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Report to the Commission

DEPARTMENT OF THE AIR FORCE

BRAC 95
JOINT CROSS SERVICE GROUP
DEPOT DATA SUPPLEMENTAL

February 1995

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OO-ALC DEPOT MAINTENANCE
DATA CALL SUPPLEMENTAL

HILL AFB, UTAH

February 1995

DATA CALL SUPPLEMENT
FOR
JOINT CROSS SERVICE GROUP -- OO-ALC DEPOT MAINTENANCE

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DATA CALL SUPPLEMENT
FOR
JOINT CROSS SERVICE GROUP - DEPOT MAINTENANCE

CAPACITY

1. Capacity Utilization

1.1 Calculate the capacity index for the commodity groups applicable to depot maintenance work at your activity. Provide your answers expressed in direct labor hours (DLHs) in Table 1.1.a by commodity groups for the Fiscal Years requested.

Table 1.1a: Capacity Index

COMMODITY GROUP	CAPACITY INDEX (DLHs)				
	FY 1995	FY 1996	FY 1997	FY1998	FY 1999
1C1 Transport	469,481	469,481	469,481	469,481	469,481
1C3 Lt Combat	1,380,825	1,380,825	1,380,825	1,380,825	1,380,825
2B A/C Structures	311,453	311,453	311,453	311,453	311,453
2C Hydr/Pneudr	41,425	41,425	41,425	41,425	41,425
2D Instruments	191,781	191,781	191,781	191,781	191,781
2E Ldg Gear	1,027,946	1,027,946	1,027,946	1,027,946	1,027,946
2F Av Ordnance	418,850	418,850	418,850	418,850	418,850
2G Av Electric	510,905	510,905	510,905	510,905	510,905
2H APUs	88,987	88,987	88,987	88,987	88,987
2I Other	492,494	492,494	492,494	492,494	492,494
2J Manufacturing	73,664	73,664	73,664	73,664	73,664
3A Engine	101,261	101,261	101,261	101,261	101,261
4A Missile, Strat	745,646	745,646	745,646	745,646	745,646
4B Missile, Tac	569,207	569,207	569,207	569,207	569,207
10E Other	102,795	102,795	102,795	102,795	102,795
12A Software	754,851	754,851	754,851	754,851	754,851
12B Spt Equip	312,987	312,987	312,987	312,987	312,987
13A Bearings	19,945	19,945	19,945	19,945	19,945
TOTAL	7,614,483	7,614,483	7,614,483	7,614,483	7,614,483

1. Capacity Utilization, continued

1.2 Calculate the utilization index for the commodity groups applicable to depot maintenance work at your activity. Provide your answers expressed as a percentage (%) in Table 1.2.a by commodity groups for the Fiscal Years requested.

Table 1.2a: Utilization Index

COMMODITY GROUP	INDEX (%)				
	FY 1995	FY 1996	FY 1997	FY1998	FY 1999
1C1 Transport	128	134	125	156	116
1C3 Lt Combat	72	62	65	63	50
2B A/C Structures	77	75	78	81	77
2C Hydr/Pneudr	32	32	32	32	32
2D Instruments	50	55	63	66	65
2E Ldg Gear	52	50	49	50	47
2F Av Ordnance	34	33	28	25	25
2G Av Electric	74	76	81	84	84
2H APUs	32	30	33	35	32
2I Other	32	33	33	36	37
2J Manufacturing	103	103	103	103	103
3A Engine	73	121	142	148	144
4A Missile, Strat	93	96	80	89	90
4B Missile, Tac	33	30	30	32	32
10E Other	104	107	111	116	116
12A Software	92	88	86	82	86
12B Spt Equip	75	71	65	73	77
13A Bearings	24	24	24	24	24
TOTAL	69%	68%	66%	69%	65%

1. Capacity Utilization, continued

1.3 Assuming (a) the current projected total workload remains as assigned; (b) that sufficient production demand is available to justify maximum hiring, with no significant investment in capital equipment; and (c) no major Military Construction additional to that already approved and funded: what is the maximum extent to which operations, by commodity group, could be expanded for depot maintenance work at your activity, based on the current and future planned workload mixes? Please provide your response in the absolute maximum number of direct labor hours (DLHs).

Table 1.3a: Maximum Potential Capacity

COMMODITY GROUP	INDEX (DLHs)				
	FY 1995	FY 1996	FY 1997	FY1998	FY 1999
1C1 Transport	469,481	469,481	469,481	469,481	469,481
1C3 Lt Combat	1,870,251	1,870,251	1,870,251	1,870,251	1,870,251
2B A/C Structures	311,453	311,453	311,453	311,453	311,453
2C Hydr/Pneudr	41,425	41,425	41,425	41,425	41,425
2D Instruments	191,781	191,781	191,781	191,781	191,781
2E Ldg Gear	1,027,946	1,027,946	1,027,946	1,027,946	1,027,946
2F Av Ordnance	418,850	418,850	418,850	418,850	418,850
2G Av Electric	811,619	811,619	811,619	811,619	811,619
2H APUs	88,987	88,987	88,987	88,987	88,987
2I Other	1,103,126	1,103,126	1,103,126	1,103,126	1,103,126
2J Manufacturing	62,904	62,904	62,904	62,904	62,904
3A Engine	101,261	101,261	101,261	101,261	101,261
4A Missile, Strat	745,646	745,646	745,646	745,646	745,646
4B Missile, Tac	569,207	569,207	569,207	569,207	569,207
10E Other	102,795	102,795	102,795	102,795	102,795
12A Software	754,851	754,851	754,851	754,851	754,851
12B Spt Equip	312,987	312,987	312,987	312,987	312,987
13A Bearings	19,945	19,945	19,945	19,945	19,945
TOTAL	9,004,515	9,004,515	9,004,515	9,004,515	9,004,515

MEASURES OF MERIT

Facilities and Equipage

6. Unique or Peculiar Facilities

6.1 List unique or peculiar testing facilities, excluding equipment (e.g. runways, railheads, ports, tracks, ponds, etc.).

Ogden ALC Silo-Based Intercontinental Ballistic Missiles (SBICBM) maintenance and test facilities are the only DoD facilities for Minuteman and Peacekeeper Missiles; *therefore, OO-ALC is the single source of repair for SBICBM workloads. This applies to all SBICBM workloads and capabilities described in the following paragraphs. (15.1 4A Strategic Applies to all paragraphs down to and including OASIS at Utah Test and Training Range).*

Test Facility: Strategic Missile Integration Center (SMIC)
Describe Uniqueness/Peculiarity: This facility is the **only one of its kind** within DoD capable of testing Intercontinental Ballistic Missiles, providing simulated system launch from a variety of launch scenarios. The facility has three 90 foot vertical below ground silos, 30 feet in diameter, constructed to meet nuclear hardness requirements of operational ICBM missile silos. Surrounding ground is compacted, and access roads are built, to meet 32,000 lb axle transportation load requirements. Buried antennae systems and underground communication meet operational requirements and connect to other test sites. Power and air supplies are capable of supporting ICBM equipment. Construction meets TEMPEST classified data processing and physical security requirements. Sensitive ICBM guidance system instruments and equipment are isolated by a large concrete seismic mass. Facilities include the following:

- Minuteman 'AM' Launch Facility (LF) and Launch Control Facility (LCF)
- Minuteman 'B' LF and LCF
- Peacekeeper LF and LCF
- Minuteman and Peacekeeper Guidance and Control Integration facilities
- Instrumentation facility
- Squadron Data Simulator facility.

Test Facility: Survivability & Vulnerability Integration Complex (SVIC)
Describe Uniqueness/Peculiarity: This complex is the **only one of its kind** within DoD. The SVIC is a group of state-of-the-art facilities dedicated to the simulation testing of nuclear hardness, survivability, reliability, and electromagnetic compatibility of defense systems. The simulated environments accommodate testing to weapon system specifications such as those required for Minuteman and Peacekeeper ICBMs. The SVIC consists of a variety of facilities, centrally located, that provide the following:

- Nuclear radiation and gamma ray bombardment are provided by two flash X-Ray machines & a linear accelerator with radiation containment provided by concrete walls, 7 feet thick on the sides and 12 feet thick in front. The PI-958 Flash X-Ray is the **only one of its size and energy level in DoD**. The PI-216AH Flash X-Ray is **unique in the world** in its high pulse rate; as many as 400 'shots' within an 8 hour day sustained without downtime, unlike other flash x-ray machines which have a typical pulse rate of 50 to 70 shots per day. The Linear Accelerator is unique in that the energy of the pulse may be varied from 5 to 20 Mev and the pulse width is variable from 20 nano-seconds to 10 micro-seconds. The pulse may also be pulsed up to 60 times per second.

- Nuclear airblast over-pressure simulation is provided by a Blast Load Generator (BLG), capable of generating pressures in excess of 1000 psi on buried structures. The BLG is unique because special fixtures used during testing expose test articles to simultaneous shock and over-pressure pulses.

- Shock and vibration simulation is provided by large hydraulic and electrodynamic shakers. The SVIC shock and vibration facility contains an eight shaker, three axis system capable of 80,000 force pounds in vertical, 40,000 force pounds horizontal for a 5000 pound test article. This triaxial shaker is the **only one of its kind in the world**. The shock and vibration facility is used to simulate the vibration on a missile guidance system during flight and is capable of replicating the in-flight shock for a wide variety of test articles. It is also used to provide classical shock, shock response spectra, random vibration, sinusoidal vibration and nuclear weapons ground simulation vibration. This isolated facility is built on a one million pound reaction mass (concrete with air bags).

- Direct Drive electromagnetic pulse simulation is provided by a laser triggered pulser, capable of a wide variety of pulse shapes and amplitudes. The facility provides the longest pulse decay and fastest pulse rise time in the Air Force direct drive inventory.

- Free field electromagnetic pulse simulation is provided by a Nuclear Electromagnetic Pulse (NEMP) simulator capable of variable pulse shapes and amplitudes with 3 nano-second rise time and 200 nano-second fall time. Pulse energy may be adjusted from 15,000 volts/meter to 300,000 volts/meter and may be applied to test article sizes of up to 2 meters square.

- The electromagnetic interference (EMI) & compatibility testing, provided by EMI generators and fiber optic instrumentation equipment, is designed around MIL-STDs 461 and 462 requirements across a frequency band ranging from 10KHz to 40GHz at a strength of up to 200 volts/meter. The EMI facility has a large anechoic chamber to simulate free space environment.

Test Facility: Propellant Analyses
Describe Uniqueness/Peculiarity: The propellant analysis facility is the only depot maintenance site within the AF for complete physical and chemical tests to support aging surveillance and failure analysis of both the large Minuteman and Peacekeeper missiles and small

tactical missile motors and their component parts. The dissection facilities, located at the Survivability & Vulnerability Integration Complex and OASIS on Utah Test & Training Range are the only solid propellant dissection facilities where safe dissection of small tactical motors and large ICBM rocket motors can be performed. These facilities are of frangible (easily broken) construction for explosive contents, and specially designed to meet explosive safety clear zone quantity distance for inhabited buildings requirements. Built into these facilities are remote propellant machining equipment, sophisticated scientific test stations, and backup computers for statistical performance analysis. Complete solid propellant analysis testing includes hardness, tensile strength, maximum/rupture stress, maximum/rupture strain, Modulus (tangent, secant, Young's), shear testing, Rheometric testing for viscosity and elasticity, and tests for moisture, density, chemical composition and degradation, ignitability, burn rate, thermal properties, ignition temperature, glass transition temperature, and Sol Gel testing for crosslink density, swell ratio and extractable percentage. Results of these tests establish shelf life criteria and guide depot maintenance and refurbishment schedules.

Test Facility: Computed Tomography
Describe Uniqueness/Peculiarity: The Ogden Air Logistics Center has the **only explosive sited DoD computed tomography facilities** to provide nondestructive inspection of large and small items, varying from small missile components to Peacekeeper rocket motors. In addition to the assigned mission, our CT facility is capable of performing computed tomography testing for all components smaller than Peacekeeper rocket motors, including engines and related components. The power source of our largest system, the largest in DoD, is capable of variable energy levels from 11 to 15 million electron volts (MEVs). This energy output is from 14 to 36 times greater than other known DoD CT capabilities. The facility is isolated to provide radiation containment, using 3000 cubic yards of concrete, with shooting direction concrete walls 10 feet thick. Output on both systems includes on-screen display, 8x10 photo, overhead viewgraphs, 35mm and VCR. Both systems are multi-axis to allow analysis from three different planes. The smaller facility contains a 58 inch diameter turntable, 100 inches in height, with 10,000 lb load capacity and a detector package which contains 130 crystal detectors. The energy source is a Varian 3000 Linatron with variable 6/9/11 MEV (million electron volts). This facility is sited for 4,000 pounds of class 1.1 explosives and 10,000 pounds of class 1.3 explosives. The larger facility is designed to handle inspection of components too large for the smaller facility. It contains the largest inspection envelope in existence, capable of inspecting Peacekeeper 1st stage solid rocket motors. The inspection envelope is 96 inches in diameter, 350 inches high, with a 120,000 lb load capacity. It is the only system capable of lifting the Minuteman and Peacekeeper stages into the vertical position for inspection.

Test Facility: High Energy X-Ray
Describe Uniqueness/Peculiarity: This high energy radiographic facility is the **only one in DoD large enough and with high enough energy levels** to provide nondestructive surveillance inspection for very large as well as small components. Specifically designed to accommodate the Minuteman and Peacekeeper solid rocket motor requirements, the facility has been sited, IAW AFR 127-100, for 1,000,000 pounds of 1.3 class explosives and 100,000 pounds of 1.1 class explosives (the **only** x-ray facility sited for explosives). The facility is sectioned into two

production wings. The north wing is configured to inspect all Minuteman solid rocket stages. The south wing accommodates Peacekeeper solid rocket boosters. Both wings have receiving and handling bays to prepare the boosters for inspection.

Test Facility: OASIS at Utah Test & Training Range (UTTR)
Describe Uniqueness/Peculiarity: OASIS at UTTR is a remote area that contains many of the facilities required to determine shelf life and depot maintenance and refurbishment schedules for the Minuteman and Peacekeeper solid rocket motors. These facilities are environmentally licensed, explosive sited and include:

- Environmentally controlled vertical and horizontal static firing facility, with fully instrumented bays and a recording capability at approximately 200 channels of information.
- **The only facility in DoD capable of dissecting large ICBM rocket motors** and small tactical motors. This system is remotely operated for safety.

Test Facility: Missile Support Equipment Repair Facility (15.1 10E Other)
Describe Uniqueness/Peculiarity: This is a single source of repair and one-of-a-kind facility for the Air Force. It is the service and repair center for Minuteman and Peacekeeper large truck and tractor equipment. The facility is equipped with utilities, including electrical, water, hydraulics, and specialized automotive testing equipment to fully complete final funtional tests of tractors and trailers.

Test Facility: Compass Transmitter and Magnetic Azimuth Detector Test Facility (15.1 2D Instruments)
Describe Uniqueness/Peculiarity: This facility is unique in the Department of Defense. We are the single source of repair. The building, tools, end items, and component parts are non-magnetic/non-ferrous and the facility is aligned directly along the earth's true magnetic north-south meridian. Before construction of this facility, an in-depth geographic study was accomplished to determine the most suitable and magnetically stable location at Ogden Air Logistics Center. The facility is built entirely from non-ferrous metals and materials such as aluminum joists in place of wood, studs rather than steel nails, nylon fabric instead of steel reinforcing bar in the concrete foundation and floor, and special lighting and electrical fixtures to minimize magnetic interference.

Test Facility : 20MM Automatic Gun Test Firing Facility (15.1 2F Aviation Ordinance)
Describe Uniqueness/Peculiarity: This is a single source of repair and one-of-a-kind facility for the Air Force. It is an underground test firing range used for the acceptance test firing after overhaul or modification of 20MM automatic guns. The test firing facility consists of a control room housing test evaluation equipment, a firing bay where guns are mounted for testing, a projectile impact area located at one end of the 100 foot long tunnel, a utility room containing all facility electric and hydraulic equipment, an explosive approved ammunition handling and storage area, and a preparation room to perform maintenance on the guns and handling systems prior to the actual test firing. Specific design features of this building include security requirements for ammunition, an overhead lifting system, a video monitoring system in an

adjacent room to the firing bay for personnel safety, a door interlock system that shuts down the test firing if any door is opened during the firing sequence, and a ventilation system capable of clearing out the gun gasses from the firing bay and tunnel within 40 seconds.

Test Facility: 30MM automatic gun test firing facility (15.2 2F Aviation Ordnance)
Describe Uniqueness/Peculiarity: This is the single source of repair and one-of-a-kind facility for the Air Force. Utah Test and Training Range has one of a kind testing equipment to perform the acceptance test firing after the overhaul of the A-10 aircraft GAU-8 gun on the 30MM test firing pad, modular building shelters the test equipment.

Test Facility: F-16 Emergency Power Unit Test Facility (15.1 2H APUs)
Describe Uniqueness/Peculiarity: This facility is the only Department of Defense single source of repair and overhaul and test capability for the F-16 Emergency Power Unit (EPU). This facility is designed to duplicate aircraft in-flight emergencies for major systems failures of the Emergency Power Unit. Integrated into the construction of this facility is deionized water equipment, hazardous waste disposal facility, and a compressor and incinerator to insure total burning of hydrazine. Deionized water is used to clean and flush hydrazine contaminated components. All hazardous waste is contained and neutralized on-site. A chemical clean line with 2 different alcohol baths that will filter to two microns, hot steam bath, and nitric acid bath make up this unique cleaning line. Also, this facility has an in-line propane compressor and combustor; a compressor and incinerator to insure total burning of hydrazine, and a 4500 psi nitrogen system.

Test Facility: F-16/F-18 Final Functional Test Facility (15.1 1C3 Light Combat)
Describe Uniqueness/Peculiarity: This facilityis the single source of repair and test capability for the F-16 and F-18 aircraft. This class 1 division I facility is equipped with the AFFF underwing cannons and an inferred flash detection system which allows work to be done indoors onfueled aircraft. Each dock is fully equipped for aircraft utilities, which include electrical, central hydraulic (3000 psi) and shop air. Additionally each dock has central avionic air cooling hook-ups, allowing for final funtional tests to be run on all systems. The facility is located inclose proximity to the runway minimizing towing distances, and has an aircraft engine run-up area.

Test Facility: Ram Air Turbine (RAT) Wind Tunnel Test Facility
Describe Uniqueness/Peculiarity: This is the only Ram Air Turbine test facility in the Air Force. This facility has a 25 foot squirrel cage type fan with variable pitch blades turned by a 900 horse power electric motor. The air flow control vanes are variable pitch blades that must be perfectly balanced to prevent vibration at the high RPMs reached during testing. These vanes are opened and closed as required for the various testing speeds. The squirrel cage fan achieves wind speeds from 75 to 375 knots variable. This specialized wind tunnel is located within a jet engine test cell because of the high noise it produces when the RAT is operating. This hush house has a 12' x 8' inlet tube that is hooked to a 25-foot blower. From the blower, the outlet tube is reduced to a 12 inch diameter tube. This 20-foot long tube is specially designed to reduce

wind turbulence at the outlet where the RAT is tested. The wind flow is picked up by a 6-foot diameter pickup tube and vented outside the building.

Test Facility: The Photographic Image Quality Test Facility (PIQTF) (15.1 2I Other)
Describe Uniqueness/Peculiarity: This is a single source of repair and a one-of-a-kind facility both for Department of Defense and private industry. This four-story facility is specifically designed for critical testing of aerial/space sensors, determining the operational imagery quality to Department of Defense standards. Three stories of this facility are underground. The features and benefits offered by an underground facility include vibration isolation to a low frequency and stability of temperature.

Test Facility: Cartographic Camera Test Facility (15.1 2I Other)
Describe Uniqueness/Peculiarity: This is a single source of repair and a one-of-a-kind test facility in the Department of Defense specifically designed for mapping camera calibration. Like the PIQTF, this facility is constructed with two stories underground and offers the features and benefits to ensure vibration isolation to a low frequency, and stability of temperature.

Test Facility: Tactical Missile All-Up-Round Maintenance Facility (15.1 12 B Support Equipment)
Describe Uniqueness/Peculiarity: The facility is the single source of repair and an Air Force one-of-a-kind, explosive certified structure. It provides testing capabilities on fully loaded and fueled tactical missiles. The facility is rated for 15,000 lbs. of 1.1 explosives. The facility was designed to allow maintenance and system testing of numerous fully operational Maverick missiles simultaneously. The facility is designed with a six feet thick wall separating the test equipment and operator from the armed missile. There are currently 4 stations setup in this configuration with the facility. The walls are made of 3 feet of sand sandwiched between 1 1/2 feet of concrete so that if a mishap occurred in one bay, the missiles in other bays will not propagate. Any explosion would be directed to specially designed walls. The facility is located in a secured area on the base with 24 hour guard. The location of the facility was designed to provide appropriate quantity and distance requirements in case of an explosion.

Test Facility: Tactical Missile Maverick Guidance and Control Section (GCS) Facility (15.1 4B Tactical)
Describe Uniqueness/Peculiarity: This is the single source of repair and the only facility in the Department of Defense that tests the guidance control sections (GCS), interface electrical assemblies (IEA), or the laser seeker assembly (LSA) of the Maverick missile. The facility supports special programs such as the Maverick 'E' model for the Navy, which contains door interlocks that shut the laser equipment down if opened during operation/testing periods. The facility is a cettified Class IV laser testing operation and includes all equipment necessary for final functional testing of the Maverick GCS assets.

Test Facility: Tactical Missile Sidewinder Guidance and Control Section (GCS) Facility (15.1 4B Tactical)
Describe Uniqueness/Peculiarity: This facility is the single source of repair, and specifically designed to meet the stringent maintenance and testing support requirements of the GCS of the

Sidewinder Missile. A special requirement in the missile in the repair of the Seeker and gyro repair requires absolute cleanliness as part of the overhaul/testing process. Specially designed electrostatic floor help to maintain the elctor dtatic discharge (ESD) concerns associated with operations/testing. The facility is a certified testing operation and includes all equipment necessary for final functional testing of Sidewinder GCS assets.

Test Facility: Advanced Cruise Missile Imaging Radar System (AIRS) Facility (15.1 4B Tactical)
Describe Uniqueness/Peculiarity: This is the single source of repair, and one-of-a-kind Department of Defense depot level AIRS facility. The design and constructio of this facility is classified; however, the purpose of this new facility is to provide the ability to diagnose degradation of the radar cross section (RCS) of stealth type weapon systems. The AIRS is an indoor (RCS) test facility that is an integral part of the maintenance concept of the Advanced Cruise Missile (ACM). When a missile comes into the depot, AIRS will be used to diagnose degradations in the missiles RCS. Once AIRS isolates the defect, the depot can repair the defect. Upon exiting the depot, ARIS is used to ensure the missile signature meets established survivability criteria before it re-enters the fleet. The equipment used by AIRS is not a test community asset; it is a part of the ACM depot maintenance facility. The radar signature of a missile body varies as a function of transmitted radar frequency, transmitted and received radar polarization, and the aspect angle at which the test body is illuminated and viewed. The radar signature must be determined from the collected backscatter, which includes both test object contributions and that associated with the surrounding environment. Top secret level 4 access is required. Currently the Advance Cruise Missile (ACM) is being serviced in this facility.

Test Facility: Cartridge Activated Device Testing Facility (15.1 2F Aviation Ordinance)
Describe Uniqueness/Peculiarity: This Testing Facility is unique in that neither another DoD installation nor contractor have all these specialists assembled at one location. The facility is designed to meet all Quantity/Distance requirements for explosive items in the CAD/PAD category. It has the ability to rapidly assemble a collocated (on base) IWSM test team composed of item managers, system engineers, test engineers, test crews, and repair specialists. Quick testing turnaround in support of aircraft accident investigation is possible because many CAD/PAD explosive items are stored at 00-ALC and a ready test team composed of the above personnel is available 24 hours a day, 365 days a year. The impact of going to another DoD facility or contractor would require longer testing lead time, thus impact on longer aircraft/fleet grounding pending resolution of test results and analysis.

Test Facility: Munitions Surveillance Testing Facilities
Describe Uniqueness/Peculiarity: These facilities are specifically designed to allow the operation/detonation of a variety of munitions components including rocket motors. Assets can be conditioned through vibration, drop testing, accelerators, temperature, and altitude chamber. Stand-alone testing of fuses, rocket motors, batteries, starter cartridges, and impulse cartridges is conducted. Propagation testing and generic buffer testing, with a net explosive weight capability of more than 500,000 pounds, has been accomplished.

Test Facility: Avionics Integration Support Facility (AISF) (15.1 12A Tactical)
Describe Uniqueness/Peculiarity: Building 1515 is a unique/peculiar testing facility both in design and location. It comprises 144,000 square feet and this facility is essentially a secure vault, radio frequency bonded and totally fenced, requiring security code access. Areas within the facility also have restricted access requiring security code for entry. This facility houses a Sensitive Compartmented Information Facility (SCIF), radar anechoic chambers, software testing laboratories, storage libraries, and work space which has been especially developed to allow a full range of testing without electronic emanations to or from the outside world. The structure, physical facilities and current security posture of building 1515 are such that it would require relatively simple modifications to upgrade the facility, all 144,000 sq ft, to SCIF status in accordance with current DCID 1/21 requirements. The size and magnitude of the Ogden ALC ASIF is unique within AFMC and DoD.

This facility was specifically designed to provide large scale classified testing, from confidential to top secret, and operational flight program (OFP) support, including computer, simulator, and test fixture support. Within the facility are engineering laboratories and office space for the development, test, and integration of software and hardware for the F-4, F-16, Minuteman, and Peacekeeper weapon systems and the Air Force Mission Support System.

This facility is positioned to allow unobstructed radar view of all incoming and outgoing aircraft from OO-ALC. This capability of tracking actual airborne targets provides a myriad of opportunities to test the development efforts in the OFP radar environment. Latest OFP innovations in the radar software are simply loaded on existing hot mock-ups and tested within the confines of building 1515 rather than actual flight testing. Advantages to this approach include decreased actual weapon system downtime, economical testing, and rapid turn-around time for test results.

Test Facility: Hot Site Computer Recovery Facility
Describe Uniqueness/Peculiarity: The Hot Site Computer Recovery Facility at OO-ALC is the only one of it's kind in the DoD. It is an IBM compatible computer facility specifically designed redundant communication nodes to ensure the facility is readily available when needed. It is constructed with a raised floor, chilled water and airconditioning systems for the main frame computers, and is humidity and temperature controlled. It is used for recovery of damaged or destroyed computer facilities and computer contingency operations/testing. Configuration includes:

AMDAHL 5870	AMDAHL 5860	SHARED RESOURCES
21 MIPS	12.4 MIPS	20 GIGS 3380 DASD
32 MB Main Memory	32 MB Main Memory	110 GIGS Sing 3380 DASD
32 Channels	16 Channels	16 Reel Tape Drive
		16 Cartridge Tape Units
		6 3880 Controllers

Test Facility: Compact Range Facility (CRF) (15.1 2G Avionics/Electronics)
Describe Uniqueness/Peculiarity: The CRF is one of a kind in DoD and is the single source of repair. It is the only CRF available for testing the F_16 AN/APG-66 and AN/APG-68 Fire

Control Radar Antennas and the F-16 Nose Radome. Used for F-16 models A, B, C, and D and two Nose Radome Electrical Test systems, it tests electrical mapping (including image sidelobe levels), power transmission deficiencies, and beam deflections. The system is divided into two separate rooms, one being an anechoic chamber (compact range group and portions of the antenna analyzed), the other containing most of the antenna analyzer group. The facility is designed and constructed to create an electromagnetic environment to allow pattern testing gain documentation and boresighting. It radiates, collimates, and detects the RF signals. It is also used to position or polarize the RF source, position the radar under test, facilitate fault isolation, and measure antenna position. The small indoor chambers eliminate the need for large outdoor facilities and real estate. Its design provides significant cost and time savings improved security, and eliminates surveillance requirements and adverse environmental factors. The system is environmentally controlled and mounted on a spring supported concrete floating foundation to preclude movement. Because of the construction, and the equipment sensitivity, it would not be economically feasible to relocate the system.

6.2 Indicate the reasons that these facilities are required by the depot maintenance function.

Ogden ALC Silo-Based Intercontinental Ballistic Missiles (SBICBM) maintenance and test facilities are the only DoD facilities for Minuteman and Peacekeeper Missiles; therefore, OO-ALC is the single source of repair for SBICBM workloads. This applies to all SBICBM workloads and capabilities described in the following paragraphs. (15.1 4A Strategic Applies to all paragraphs down to and including OASIS at Utah Test and Training Range)

Test Facility: Strategic Missile Integration Center (SMIC)
Reasons Required for Maintenance: The SMIC replicates an operational launch facility, launch control facility and operational missile minus the warhead. A variety of simulated launch scenarios can be enacted, and maintenance modifications tested prior to installation at an operational site to ensure compatibility.

Test Facility: Survivability/Vulnerability Integration Complex (SVIC)
Reasons Required for Maintenance: Nuclear hardness, gamma ray bombardment, shock and vibration, electromagnetic pulse (EMP) and electromagnetic interference (EMI) testing of ICBM components is critical in design of Minuteman and Peacekeeper systems and sub-systems.

Test Facility: Propellant Test
Reasons Required for Maintenance: Physical and chemical propellant tests to support aging surveillance assessment and failure analysis of motors. Results guide in establishing shelf life criteria which is used to determine depot maintenance and refurbishment schedules.

Test Facility: Computed Tomography (2 facilities)
Reasons Required for Maintenance: These facilities provide a three dimensional image of internal Minuteman and Peacekeeper components to allow technicians to perform nondestructive point by point statistical analysis to ultimately determine serviceability of a part or system. The

largest of the two facilities is specifically configured to accomodate Minuteman and Peacekeeper weapon system components. The shelf life criteria established guides depot maintenance and refurbishment schedules.

Test Facility: High-Energy X-Ray
Reasons Required for Maintenance: This facility is used to detect voids, changes in density, delamination of insulators and lining, and propellant separation from the case liners and insulation. This information is used to develop shelf life criteria and establish guidelines for depot maintenance and refurbishment scheduling.

Test Facility: OASIS at Utah Test & Training Range
Reasons Required for Maintenance: The aging surveillance program steers the development of shelf life criteria used to guide depot maintenance and refurbishment scheduling. Static motor firing is essential to the assessment of expected motor performance, and is an integral element of the aging surveillance program. The **solid propellant dissection facility** is the **only facility within DoD** capable of cutting solid propellant into test size samples for testing by the propellant analysis unit. The transporter board course qualifies missile motor transporters for over-the-road use after maintenance to ensure safe operation during transport. Explosive storage procedures are determined by propagation studies. Fragmentation test results guide establishing safe storage and quantity distances of explosive components.

Test Facility: Missile Support Equipment Repair Facility (15.1 10E Other)
Reasons Required for Maintenance: We are the single source of repair. There are no other DoD depot maintenance facilities with this capability. The repair and testing of missile support equipment requires a facility with state-of-the-art technology to ensure the highest reliability and maintainability are achieved in providing DoD support.

Test Facility: Compass Transmitter and Magnetic Azimuth Detector Test Facility (15.1 2D Instruments)
Reasons Required for Maintenance: We are the single source of repair. The repair and testing of the Compass Transmitter and Magnetic Azimuth Detector (MAD) requires a facility with state-of-the-art technology to ensure the highest reliability and maintainability are achieved in providing Department of Defense support. These extremely sensitive items require an environment as free from magnetic interference as possible to achieve the level of accuracy needed to obtain calibration requirements.

Test Facility: 20MM automatic gun test firing facility (15.1 2F Aviation Ordinance)
Reasons Required for Maintenance: We are the single source of repair. As part of the overhaul process, this facility is required for the acceptance test firing after overhaul or modification of 20MM automatic guns.

Test Facility: 30MM automatic gun test firing facility (15.2 2F Aviation Ordnance)

Reasons Required for Maintenance: This is the single source of repair. As part of the overhaul process, the Utah Test and Training Range (UTTR) is reqired for the acceptance test firing after overhaul or modification of 30MM automatic guns.

Test Facility: F-16 Emergency Power Unit Test Facility (15.1 2 H APUs)
Reasons Required for Maintenance: We are the single source of repair. Safety of flight items have a time change overhaul requirement. The Emergency Power Unit is an integral part of the Emergency Electrical/Hydraulic Flight Control System. Hydrazine fuel is toxic, corrosive, highly flammable, explosive, and a suspected carcinogenic requiring strict handling procedures to comply with Environmental Protection Agency, Occupational Safety and Health Administration, and Air Force Occupational Safety and Health standards. Hydrazine handling and disposal require chemical laboratory support and unique equipment.

Test Facility: F-16/F-18 Final Functional Test Facility (15.1 1C3 Klight Combat)
Reasons Required for Maintenance: We are the single source of repair. This test facility is needed for the final functional test of F-16/F-18 aircraft.

Test Facility: Ram Air Turbine (RAT) Wind Tunnel Test Facility
Reasons Required for Maintenance: This test facility is needed for functional testing of the A-7D and F-4 Ram Air Turbine.

Test Facility: The Photographic Image Quality Test Facility (PIQTF) (15.1 2I Other)
Reasons Required for Maintenance: We are the single source of repair. Part of depot maintenance, this four-story facility is specifically designed for critical testing of aerial/space sensors, necessary for determining the operational imagery quality to Department of Defense standards. It is composed of 14 off-axis parabolic mirror collimators pointing from different angles to the sensor test position. This facility is adaptable to a variety of different sensor requirements.

Test Facility: Cartographic Camera Test Facility (15.1 2I Other)
Reasons Required for Maintenance: We are the single source of repair. This one-of-a-kind facility uses 121 precisely positioned collimators covering +/- 60 degrees along 12 radial arms which is required to calibrate cartographic cameras.

Test Facility: Tactical Missile All-Up-Round Maintenance Facility (15.1 12B Support Equipment)
Reasons Required for Maintenance: We are the single source of repair. To assure the tactical missile is fully operational when it is delivered to the Air Force and Navy customers, this type of explosive certified test facility is required. This facility provides testing capabilities on fully loaded and fueled tactical missiles. The facility is rated for 15,000 lbs of 1.1 explosives. The facility was designed to allow maintenance and system testing of numerous fully operational missiles simultaneously. This facility design is in accordance with technical order requirements.

Test Facility: Tactical Missile Maverick Guidance and Contro Section (GCS) Facility (15.1 4B Tactical)
Reasons Required for Maintenance: We are the single source of repair. Current Tecnical Orders require this type of test environment be used to support the servicing of the missiles. The dangers of laser operations also require isolation fro populations. This facility tests the guidance control sections (GCS), interface electrical assemblies (IEA), and the laser seeker assembly (LSA) of the Maverick 'E' missile. This level of clean room is required to ensure non-contamination of theoptical system within the optical system within the missile.

Test Facility: Tactical Missile Sidewinder Guidance and Control Section (GCS) Facility (15.1 4B Tactical)
Reasons Required for Maintenance: We are the single source of repair. Some components cannot be contaminatec as part of the depot repair process. This test facility is required in order to service missile components. It is designed to provide maintenance and testinf support for the seeker assembly of the Sidewinder Missile. This level of clean room is required to ensure non-contamination of the optical system of the missile.

Test Facility: Advance Cruise Missile Imaging Radar System (AIRS) Facility (15.1 4B Tactical)
Reasons Required for Maintenance: We are the single source of repair. The AIRS is an indoor (RCS) test facility that is an integral part of the maintenance concept of the Advanced Cruise Missile (ACM). When a missile comes into the depot, AIRS will be used to diagnose degradations in the missiles RCS. Once AIRS isolates the defect, the depot can repair the defect. Upon exiting the depot, AIRS is used to ensure the missile signature meets established survivability criteria before it re-enters the fleet. This controlled facility design is driven by the security classification of the weapon system.

Test Facility: Cartridge Activated Device Testing Facility (15.1 2F Aviation Ordinance)
Reasons Required for Maintenance: We are the single source of repair. The facility is utilized to test and check the serviceability of Cartridge Activated Devices (CAD) components in a variety of environments.

Test Facility: Munitions Surveillance Testing Facilities
Reasons Required for Maintenance: This facility is utilized to test and check the serviceability on a variety of munitions components.

Test Facility: Hot Site Computer Recovery Facility
Reasons Required for Maintenance: The Hot Site is an IBM compatible computer facility used for recovery of damaged or destroyed computer facilities and computer contingency operations/testing.

Test Facility: Compact Range Facility (CRF) (15.1 2G Avionics/electronics)
Reasons Required for maintenance: The CRF duplicates capabilites of an outdoor range which has large facilities and real estate. Testing could be performed at outdoor ranges.

Test Facility: Avionics Integration Support Facility (AISF) (15.1 12A Tactical)
Reasons Required for maintenance: We are the single source of repair. Ogden ALC's software development maintenance function provides engineering design and development of Operation Flight Programs (OFPs) for F-4 Wild Weasel, RF-4s, F-16 production blocks 10 through 40, and the Mission Planning systems software for the F-4 and F-16 weapon systems. Software is developed for all key avionics subsystems on each of these weapon systems. These include the Fire Control Computers, Radar Systems, Stores Management Systems, the Heads Up Displays, the Up Front Control Systems, and the Multifunction Display Processors. Organic OFP capability is essential to provide responsive support to changing mission requirements. Emergency changes to weapon system software can be developed and fielded within a short period of time. After reconfiguration, integration, and testing, maintenance installs the software and/or hardware modifications.

The sensitive nature of our Ogden ALC OFP software charter makes it absolutely necessary to have such a facility as that located within Bldg 1515. This is further evidenced by the F-16 software object code being upgraded from unclassified to confidential on all F-16 block 50 aircraft development efforts. This upgrade to confidential is expected to migrate to the classification of secret.

6.3 How could the depot maintenance functions be performed without these specialized facilities?

Ogden ALC Silo-Based Intercontinental Ballistic Missiles (SBICBM) maintenance and test facilities are the only DoD facilities for Minuteman and Peacekeeper Missiles; therefore, OO-ALC is the single source of repair for SBICBM workloads. This applies to all SBICBM workloads and capabilities described in the following paragraphs. (15.1 4A Strategic Applies to all paragraphs down to and including OASIS at Utah Test and Training Range)

Test Facility: Strategic Missile Integration Center (SMIC)
Describe Testing Alternatives: The SMIC is the only facility within DoD with the specialized equipment required to perform simulated launch scenarios.

Test Facility: Survivability/Vulnerability Integration Complex (SVIC)

Describe Testing Alternatives: Operating the SVIC for combined qualification and reliability testing is the most cost effective and efficient method for the government to satisfy the required ICBM specifications. There is no other comparable facility within DoD.

Test Facility: Propellant Analysis
Describe Testing Alternatives: There are no other DoD depot maintenance facilities with this capability. With no way to verify aging, motors would be 'washed out' at the designated life, rather than extended based on our own aging and surveillance testing. This would increase replacement costs significantly.

Test Facility: Computed Tomography
Describe Testing Alternatives: There are no DoD facilities available explosives sited or large enough to provide comparable nondestructive tests on Minuteman and Peacekeeper components.

Test Facility: High Energy X-Ray
Describe Testing Alternatives: There are no DoD facilities available explosives sited or large enough and with high enough energy levels to provide comparable nondestructive tests on Minuteman and Peacekeeper components.

Test Facility: OASIS Utah Test & Training Range
Describe Testing Alternatives: There is no other facility within DoD environmentally licensed and explosive sited to dissect and static fire solid rocket propellant. Limited information can be obtained from computer math modeling. There is no other facility within DoD with the capability to dissect solid rocket propellant for small tactical and large ICBM motors. Flight testing is the only other alternative to obtaining motor performance data.

Test Facility: Missile Support Equipment Repair Facility (15.1 10E Other)
Describe Testing Alternatives: We are the single source of repair. There are no other DoD depot maintenance facilities with this capability.

Test Facility: Compass Transmitter and Magnetic Azimuth Detector Test Facility (15.1 2D Instruments)
Describe Testing Alternatives: We are the single source of repair. Ogden Air Logistics Center is one of only two continental United States (CONUS) facilities for the repair and testing of compass transmitters and magnetic azimuth detectors. The other facility is at Honeywell Corporation, Durham, North Carolina. Mike Trainer, Item Manager for the compass transmitter and magnetic azimuth detector from Oklahoma City Air Logistics Center, stated that Honeywell is only providing new manufactured units and that repair for the past ten years has been provided by Ogden Air Logistics Center only. Therefore, there are no repair and testing alternatives available.

Test Facility: 20MM Automatic Gun Test Firing Facility (15.1 2F Aviation Ordinance)
Describe Testing Alternatives: We are the single source of repair. Current testing methods are driven by technical order requirements. Any alternative test firing methods without the use of the unique test facility would require sufficient range capability to accommodate the 20MM gun and provide a climate controlled mobile facility for the hot fire control center with link capability to send and receive data to the gun. Also, an environmental constraint of noise could be a limiting factor in alternative test methods.

Test Facility: 30MM automatic gun test firing range (15.1 2F Aviation Ordinance)
Describe Testing Alternatives: We are the single source of repair. Current testing methods are driven by technical order requirements. Ogden is not aware of any DoD facility that could fire the 30MM gun indoors, the acceptance test firing is accomplished at Utah Test and Training Range. This workload could be accomplished at any DoD range that is large enough to accommodate the 30MM gun. However, some environmental constraints for noise and impact area could be limiting factors.

Test Facility: F-16 Emergency Power Unit Test Facility (15.1 2H APUs)
Describe Testing Alternatives: We are the single source of repair. This is the only Department of Defense overhaul and test facility for the F-16 Emergency Power Unit (EPU). The EPU test firing stand is a one-of-a-kind piece of equipment which was built by the manufacturer for the Air Force. Hydrazine fuel is toxic, corrosive, highly flammable, explosive and a suspected carcinogenic. It requires strict handling procedures to comply with Environmental Protection Agency, Occupational Safety and Health Administration, and Air Force Occupational Safety and Health standards. Hydrazine handling and disposal require chemical laboratory support and unique equipment which the Air Force is the sole owner of. The original manufacturer does not have this test stand and must replace components rather than repair them at a greater cost to the Government. Also, the contractor's test capability is manual and the reliability is not equal to the Air Force's computerized capability.

Test Facility: F-16/F-18 Final Functional Test Facility (15.1 1C3 Light Combat)
Describe Testing Alternatives: The F-16 and F-18 aircraft would have to be tested at another facility no located within the immediate area. This creates down-time, job routes, and an increase in the cost of operation.

Test Facility: Ram Air Turbine (RAT) Wind Tunnel Test Facility
Describe Testing Alternatives: The Ram Air Turbine would have to be tested at another facility not located within the immediate area. This creates down time, job routes, and an increase to the cost of operation. Any testing alternative facilities would require modification to accommodate the speed, horse power, and environmental concerns associated with the Ram Air Turbine testing.

Test Facility: The Photographic Image Quality Test Facility (PIQTF) (15.1 2I Other)
Describe Testing Alternatives: We are the single source of repair. The facility at Ogden ALC is the only facility of its kind providing the full range of maintenance capabilities. We provide complete overhaul and test operations including the physical, photonics, electronics, circuit boards, wiring harnesses, and testing operations not found at any other facility. Currently, there are no other facilities like the PIQTF at a contractor plant. It is possible to build a four story structure above ground; however, there would be a nonrecurring engineering cost to redesign the facility for increased requirements to maintain temperature and stability controls. There are greater temperature fluctuations and above ground facilities have a harder time maintaining stability. The facility construction costs, as well as maintenance and operating costs, would be greater due to the increased requirements in temperature control. The features and benefits offered by an underground facility are temperature control and facility stability. The benefit is less money spent on construction and maintaining this type of facility; therefore, lower repair and test costs to the customer.

Test Facility: Cartographic Camera Test Facility (15.1 2I Other)
Describe Testing Alternatives: We are the single source of repair. There is only one other cartographic camera calibration facility in government control in the United States. It is in Reston, Virginia, at the U.S. Geological Service. They only test and perform limited repair of mapping cameras. The customer has to perform their own repairs then send the camera to the U.S. Geological Service for testing. They do not offer the full range of depot overhaul and testing provided by Ogden ALC.

Test Facility: Tactical Missile All-Up-Round Maintenance Facility (15.1 12B Support Equipment)
Describe Testing Alternatives: We are the single source of repair. The process cannot be performed outside in the open because of the sensitivity of the test equipment, and it can't be relocated to different locations without duplicating similar facilities and transferring the equipment.

Test Facility: Tactical Missile Maverick Guidance and Control Section (GCS) Facility (15.1 4B Tactical)
Describe Testing Alternatives: We are the single source of repair. The only alternative would be to have contractor support which would cost significantly higher than the Government or buy new guidance systems.

Table 7.1a: Facility Conditions

CCN	Facility Type	Condition	Area	(KSF)	Comments
		Adequate	Substandard	Inadequate	Totals
211271	SHOP INSTM OVHL DEP	63.493			63.493
212212	SHOP MSL ASMB	103.478			103.478
212216	SHOP MSL SVC	144.616	4.549		149.165
212213	SHOP MISSILE G/W		.70		.70
214425	SHOP VEJHICLE MAINT	46.727			46.727
214426	VEH OPS HEAT PKG	4.62			4.62
215553	SHOP, A/WPN/O/DEP	4.788		10.376	15.164
215555	SHOP, CTRGE/0/DEP	14.166			14.166
217712	SHOP AVIONICS	23.084	63.875		86.959
217735	SHOP ELECT O&T/D	29.516	30.011		59.527
217736	SHOP RADOM O&T/D		2.538		2.538
217762	SHOP NAVAID	10.208	35.018		45.226
218712	SHOP A/SE STOR FAC	61.749	58.392		120.141
218852	SHOP SURV EQUIP	28.713			28.713
218868	LAB PME	7.30			7.30
219944	MAINT SHOP	.40			.40
222222	PROD GM	455.491	62.692		518.183
422256	STOR RKT CHK ASMB	225.872			225.872
422257	STOR SEG MAGAZINE	7.636			7.636
422258	STOR MAG AG AB&C	.80			.80
422264	STOR IGLOO	104.836	1.148		105.984
441257	HAZARD STOR DEP	11.00	.974		11.974
441758	WHSE SUP EQUIP DEP	.379	30.555		30.934
442257	HAZARD STOR BSE	1.500			1.500
442628	SHED SUP EQUIP DEP	.900			.900
610675	LOG FCLTY DEP OPS	579.471	96.395	2.353	678.219
721315	DORM, VAQ (UTTR)		5.488		5.488
	Activity Total	3114.079	1698.133	168.314	4980.526

Test Facility: Tactical Missile Sidewinder Guidance and Control Section (GCS) Facility (15.1 4B Tactical)
Describe Testing Alternatives: We are the single source of repair. The only alternative would be to have contractor support which would cost significantly higher than the Government or buy new guidance systems.

Test Facility: Advance Cruise Missile Imaging Radar System (AIRS) Facility (15.1 4B Tactical)
Describe Testing Alternatives: We are the single source of repair. This is a one-of-a-kind depot level AIRS facility. Because of the secrecy of this test operation, this facility would have to be completely replicated. If the ACM depot had to rely on an outside RCS facility, a costly transportation cycle would be incurred. For example, the RCS facility would test, find a failure, send back to the depot for repair, depot would send back to the range for repair verification, the range could potentially send back to the depot for further repair.

Test Facility: Cartridge Activated Device Testing Facility (15.1 2F Aviation Ordinance)
Describe Testing Alternatives: We are the single source of repair. Send components to a contractor facility to have testing accomplished.

Test Facility: Munitions Surveillance Testing Facilities
Describe Testing Alternatives: Send components to a contractor facility to have testing accomplished.

Test Facility: Hot Site Computer Recovery Facility
Describe Testing Alternatives: Without this backup computer recovery facility, depot maintenance functions would be at risk of losing critical weapon system inventory data.

Test Facility: Avionics Integration Support Facility (AISF) (15.1 12A Tactical)
Describe Testing Alternatives: We are the single source of repair. Ogden ALC's depot maintenance software charter simply could not be performed without a facility like building 1515. In the absence of this type facility, the only alternatives available to Air Force would be as follows: First, to collocate this workload within smaller facilities such as those located at the other Air Logistics Centers; however, at this time, the other center's facilities appear to be fully utilized and unable to absorb additional workload. The second alternative would be to build an equivalent to building 1515; however, the cost to duplicate Ogden ALC's building 1515 is estimated to be $33 million. Third, would be to contract out this workload which would require providing contractors with our unique test and development equipment, as well as time delays in writing and awarding contracts.

Facilities and Equipage, continued

7. Buildings and Their Condition

7.1 List the buildings used to perform the depot maintenance functions by category code numbers (five or six digit CCNs), identifying their current condition (adequate, substandard, and inadequate) in Table 7.1 in thousands of square feet (KSF).

Conclusion: See table. The data incorporates all of the funding, personnel, and workload of depot related facilities. This data does not include 366.84 thousand square feet for facilities required to support weapon system teams, an integral part of our depot maintenance process, but are not normally included at other DoD depots.

Table 7.1a: Facility Conditions

CCN	Facility Type	Condition	Area	(KSF)	Comments
		Adequate	Substandard	Inadequate	Totals
116661	PAD, ARM & DISARM	.10			.10
116665	PAD, POWER CHK W/SPR	2.32			2.32
116672	PAD, ACFT WASH RACK	13.28			13.28
132133	PAD, EQUIPMENT	1.48			1.48
141764	INTEGR SUPT FCL	190.342	89.875		280.217
141765	LAB, Q/C DEP	56.467	78.075		134.542
141821	MAT PROCES DEP	76.337	57.18	2.230	135.747
141912	REENTRY VEH BLD	2.70			2.70
149968	TOWER, SPECIAL	.16			.16
171214	PHYSL TNG		14.217		14.217
171621	TECH TNG, CLASSROOM	23.815			23.815
171623	TECH TNG, LAB/SHOP		18.907		18.907
211116	HANGER, MAINT DEP		667.238		667.238
211152	SHOP ACFT GEN PURP	523.349	152.864	50.567	726.78
211153	SHOP NON-DESTR INSP	12.55	9.899	.576	23.025
211154	SHOP A/M ORGL	26.034	1.417	23.533	51.004
211157	SHOP, JET ENG I/MNT			37.05	37.05
211159	ACFT COR CON	103.241	22.730		125.971
211161	COR CON UTIL STOR	1.40			1.40
211179	MAINT DOCK, FL SYS	15.948	30.018		45.966
211183	TST CELL			36.314	36.314
211252	SHOP RAM AIR DEP			4.783	4.783
211254	SHOP ACFT & ENG DEP	133.813	163.378	.512	297.703

Facilities and Equipage, continued

7.2 In Table 7.2.a, identify space available for expansion by building type for those facility category code numbers (five or six digit CCNs) that are most important to your mission. An activity's expansion capability is a function of its ability to reconfigure/rehabilitate existing underutilized facilities to accept new or increased requirements.

Conclusion:

Table 7.2a Space Available for Expansion

		Installation Space (KSF)			
Building ID/Type	CCN	Adequate CC1	Substandard CC2 & 3	Inadequate CC4 & 5	Total
5C	211152		3.0		3.0
5D	211152		16.3		16.3
5K	211152		21.0		21.0
5L	211152		10.57		10.57
5P	217712		20.0		20.0
5G	217735		20.0		20.0
5M	141764		1.0		1.0
11	141764		18.8		18.8
100C	141764		10.0		10.0
100D	141765	4.9			4.9
100E	141765	5.0			5.0
100F	141765		12.0		12.0
100J	141764		5.6		5.6
100K	141764		21.97		21.97
100L	217712	1.4	4.0		5.4
100M	217712		12.1		12.1
100N	141764		10.0		10.0
100O	141764		10.0		10.0
100P	141764		5.0		5.0
100F	610675		12.0		12.0
214	278868 141765		6.0 20.6		26.6
216	211153	2.0			2.0
220	211159	6.0			6.0
225	211116	50.0			50.0
236	211179	9.0			9.0

Table 7.2a Space Available for Expansion (Cont)

Installation Space (KSF)					
Building ID/Type	CCN	Adequate CC1	Substandard CC2 & 3	Inadequate CC4 & 5	Total
238	211152	56.0			56.0
250	610675	1.1			1.1
265	211152	23.6	65.0		88.6
267	211152	10.25			10.25
268	211152			7.7	7.7
270	211152		4.0		4.0
272	211157			40.0	40.0
273	441758			4.35	4.35
274	211154			36.0	36.0
276	211152			2.4	2.4
505	211152	21.11			21.11
507	211254 141765	66.51 1.40			67.91
509	211152	20.0			20.0
510	211254	21.92			21.92
511	211254	7.38			7.38
524	219944		1.6		1.6
745	211254			2.88	2.88
751	211271		2.0		2.0
752	215553	2.4			2.4
800	441758		39.86		39.86
805	441758		16.9		16.9
810	441758		20.53		20.53
830	442758			4.0	4.0
840	441758			21.74	21.74
843	441758	31.65			31.65
845	441758	55.18			55.18
847	222222	60.0			60.0
849	141821	7.0			7.0
849	610625	13.1			13.1
850	441758	48.7			48.70
915	441257	3.77			3.77
936	212212	3.1			3.1
940	212212	6.9			6.9
945	212212	6.9			6.9
965	212212	6.9			6.9
970	212212	6.9			6.9

Table 7.2a Space Available for Expansion (Cont)

Installation Space (KSF)					
Building ID/Type	CCN	Adequate CC1	Substandard CC2 & 3	Inadequate CC4 & 5	Total
985	22222	5.2			5.2
1146	141764	7.2			7.2
1200 Zone	610675	73.8			73.8
1208	127712	13.7			13.7
1289	610675	10.2			10.2
1294	740735	10.0			10.0
1367	212212	2.3			2.3
1379	441628		1.6		1.6
1424	212212	21.16			21.16
1554	610711		5.0		5.0
1564	422265		4.5		4.5
1568	422265		4.5		4.5
1825	212216	1.8			1.8
1835	212216	1.8			1.8
1913	212216	3.3			3.3
1915	212216	3.1			3.1
1917	212216	1.9			1.9
1943	222222	.8			.8
1946	222222	.8			.8
2005	212216	.4			.4
2014	215555	7.4			7.4
2015	215555	.7			.7
2024	441257	2.8			2.8
2026	212216	13.0			13.0
2113	22222	9.2			9.2
2143	441257	.2			.2
2145	422265	.2			.2
2147	422265	.2			.2
2202	212216	4.3			4.3
2204	217712	2.4			2.4
2211	222222	7.3			7.3
2212	222222	5.5			5.5
2213	222222	12.2			12.2
2214	222222	5.6			5.6
2233	422258			1	.1
2247	441257		.2		.2
2407	222222	1.8			1.8
	TOTAL	793.06	405.63	119.17	1317.86

Facilities and Equipage, continued

8. Unique and/or Peculiar Capabilities and Capacities

8.1 What unique and/or peculiar capabilities and capacities does the depot maintenance activity possess?

MISSILE MAINTENANCE AND TESTING FACILITIES

Ogden ALC Silo-Based Intercontinental Ballistic Missiles (SBICBM) maintenance and test facilities are the only DoD capability for Minuteman and Peacekeeper Missiles; therefore, OO-ALC is the single source of repair for SBICBM workloads. This applies to all SBICBM workloads and capabilities described in the following paragraphs. Recent analysis has identified it will cost in excess of $1 Billion to transfer the workload and replicate the facilities. The data provided in the subsequent paragraphs provide details on the unique capabilites, therefore each description is noted to be unique. (15.1 4A Strategic Applies to all paragraphs down to and including Physiological Trainer Maintenance)

Depot Maintenance Capability/Capacity: Strategic Missile Integration Center (SMIC)
Describe Why Unique/Peculiar: These are the **only DoD facilities** capable of conducting simulated launch scenarios for Minuteman and Peacekeeper weapon systems. It includes three 90 foot vertical below ground silos, 30 feet in diameter, constructed to the meet nuclear hardness requirements of operational ICBM missile silos. The surrounding ground is compacted, and access roads are built, to meet 32,000 lb axle missile transportation load requirements. Buried antennae systems and underground communication meet operational requirements and connect to other test sites. Power and air supplies are capable of supporting ICBM equipment. Construction meets TEMPEST classified data processing and physical security requirements. Sensitive ICBM guidance system instruments and equipment are isolated by a large concrete seismic mass. The center includes the following facilities:

- Minuteman 'AM' Launch Facility (LF) and Launch Control Facility (LCF)
- Minuteman 'B' LF and LCF
- Peacekeeper LF and LCF
- Minuteman and Peacekeeper Guidance and Control Integration facilities
- Instrumentation facility
- Squadron Data Simulator facility.

Depot Maintenance Capability/Capacity: Survivability & Vulnerability Integration Complex (SVIC)
Describe Why Unique/Peculiar: This complex is the only one of its kind within DoD. It is a state-of-the-art facility dedicated to the simulation testing of nuclear hardness, survivability, reliability, and electromagnetic compatibility of Peacekeeper and Minuteman defense systems. The 5000 lb load capacity **triaxial shaker** is the **only one of its kind in the world**. The PI-958 Flash X-Ray is the **only one of its size in DoD**, and the PI-216AH Flash X-Ray is **unique in the**

world. Its high pulse rate allowing many 'shots' per day (up to 400 per 8 hour shift sustained with no downtime. Typical machines are capable of only 50 - 70 shots per day). This facility is capable of simulating basically six environments:

- Nuclear radiation provided by flash X-Ray machines & a linear accelerator with a 5 to 20 MeV energy source. This electron beam is used directly to simulate radiation from a nuclear event and converted to produce gamma rays.

- Airblast, provided by a Blast Load Generator, to produce overpressures in a soil medium. It is used to test buried cable and splice cases, models of buried structures, buried cable entrances, soil attenuation studies and structure tranmissability and simultaneous acceleration and overpressure.

- Shock and vibration provided by various shakers, accelerators, and impulse testers to simulate underground shock waves from a nuclear event.

- In-flight shock and vibration profiles provided by the vibration facility, which consists of two complete control units, a computer-controlled optical monitoring system and a digital acquisition system.

- Direct drive electromagnetic pulse simulation provided by a wide variety of pulse generators, a computerized controller and a large on-site data acquisition and analysis capability.

- Electromagnetic interference (EMI) & compatibility testing provided by EMI generators and instrumentation equipment. This facility is designed to perform MIL-STDs 461 and 462 requirements across a frequency band ranging from 10KHz to 40GHz at a strength of up to 200 volts/meter. They perform radio frequency emissions interference and susceptability testing of weapon system equipment to include environments produced within a 48x24 foot anechoic chamber.

Depot Maintenace Capability/Capacity: Missile Maintenance & Repair
Describe Why Unique/Peculiar: These facilities are one of a kind in DoD and are specially constructed, configured, and explosives sited for Minuteman (MM) and Peacekeeper (PK) ICBMs. A PK Type II rail movement system interfaces with a MM "V" rail system that converts the rocket motor from a system transportation rail to a storage facility rail system. Provides tilt or break over stand operations and accomplishes maintenance and end ring changes.

Depot Maintenance Capability/Capacity: Minuteman (MM) Stage I, II, III missile assembly & repair facilities
Describe Why Unique/Peculiar: The only facilities in DoD and are specially constructed to accommodate Minuteman Missiles with a horizontal rail system, explosive safety clear zone quantity distance (ESQD for inhabited buildings), frangible (easily broken) quantity distance (QD for fragment throw), frangible construction for explosive contents.

Depot Maintenance Capability/Capacity: Peacekeeper (PK) Stage I, II, III missile motor assembly & repair (2 facilities)
Describe Why Unique/Peculiar: The only DoD horizontal rail system, sited for clear explosion safety zone quantity distance (QD), frangible construction for explosive contents. (Bldgs: 2401-2403)

Depot Maintenace Capability/Capacity: Motor Dissection
Describe Why Unique/Peculiar: The only solid propellant dissection facility capable of dissecting large ICBM rocket motors and small tactical motors. This system is explosive sited and remotely operated for safety.

Depot Maintenace Capability/Capacity: Propellant Analysis
Describe Why Unique/Peculiar: This is the only depot maintenance facility for solid propellant analysis. Complete solid propellant analysis tests are performed for nuclear hardness, tensile strength, maximum/rupture stress, maximum/rupture strain, Modulus (tangent, secant, Young's), shear testing, Rheometric testing for viscosity and elasticity, and tests for moisture, density, chemical composition and degradation, ignitability, burn rate, thermal properties, ignition temperature, glass transition temperature, and Sol Gel testing for crosslink density, swell ratio and extractable percentage. These 11 physical and chemical test facilities provide remote propellant machining processes, and sophisticated scientific test stations and computer backup for statistical performance analysis.

Depot Maintenace Capability/Capacity: Minuteman/Peacekeeper Transfer
Describe Why Unique/Peculiar: A throughput facility equipped with lifting devices for MM and PK rocket motor systems. The rail system is compatible with all MM and PK transportation and handling equipment.

Depot Maintenace Capability/Capacity: Missile Support Equipment Repair Facility (15.1 10E Other)
Describe Why Unique/Peculiar: This is a single source of repair and one-of-a-kind facility for the Air Force. It is the service and repair center for Minuteman and Peacekeeper large truck and tractor equipment. The facility is equipped with 80' by 20' paint and sandblast facilities.

Depot Maintenace Capability/Capacity: Static Firing
Describe Why Unique/Peculiar: The only enviromentally licensed vertical and horizontal static firing capability within DoD for Minuteman and Peacekeeper rocket motors. The facilities are environmentally controlled and equipped with 500,000 pound thrust blocks and a motor propelled building that moves to allow motor installation. The bays are fully instrumented and have recording capability at approximately 200 channels of information.

Depot Maintenace Capability/Capacity: Shrink backshells
Describe Why Unique/Peculiar: Forms connector backshells on Peacekeeper missile cables. No other capability exists.

Depot Maintenace Capability/Capacity: Computed Tomography (2 facilities)
Describe Why Unique/Peculiar: Facilities are the **only** ones within DoD sited for explosives inspection. The larger facility is the only system capable of scaning the ICBM missile motors and lifting them into the vertical inspection position. Our facilities are capable of inspecting all articles smaller than Peacekeeper rocket motors, including engines and related components. Unique capabilities include:

- Building 2113 - Variable 6, 9, 11 million electron volts (Mev) energy level
  Table load is 48 inch diameter, 100 inch height and 10,000 pounds load
- Building 984 - Variable 9, 15 Mev
  Table load is 96 inch diameter, 348 inch height and 120,000 pound load
- On screen display
- Overhead viewgraphs, 8 x 10 photos, 35 mm and VCR of test results
- Multi-axis capability

Depot Maintenace Capability/Capacity: High Energy X-Ray
Describe Why Unique/Peculiar: Physically large enough to handle Peacekeeper motors as well as smaller items. The energy source is the **only** one capable of producing the amount of volts required to penetrate large missile components.

Depot Maintenace Capability/Capacity: Test cubicle
Describe Why Unique/Peculiar: Test capability for Minuteman explosive ordnance devices. Contains explosive detonation test cells and is capable of monitoring devices for integrity and performance.

Depot Maintenace Capability/Capacity: Lithium Battery Storage/disposal
Describe Why Unique/Peculiar: The only AF capability to store, electrically discharge and destroy lithium batteries. This is an enviromentally restricted function.

Depot Maintenace Capability/Capacity: Liquid propellant decontamination
Describe Why Unique/Peculiar: The only AF capability to decontaminate liquid propellant.

Depot Maintenace Capability/Capacity: PSRE Storage and Repair
Describe Why Unique/Peculiar: To meet operational requirements of Minuteman and Peacekeeper, the Propulsion System Rocket Engine (PSRE) repair is designed to handle hydrazine and nitrogen tetroxide on board the flight vehicles. It is environmentally controlled and includes extensive underground communication systems. Construction meets TEMPEST classified data processing and physical security requirements.

Depot Maintenace Capability/Capacity: Cold/Heat Soak for Minuteman motors
Describe Why Unique/Peculiar: The **only** existing capability to control temperature conditioning capability , -45 degrees F to +175 degrees F, of Minuteman motors.

Depot Maintenace Capability/Capacity: Nozzle cutting

Describe Why Unique/Peculiar: The **only** capability to cut 1st and 2nd stage Minuteman motors while on on transporation rails and 3rd stage, due to the size of the stage, in pits. This is a very hazardous operation, as nozzles are an integral part of the solid propellant booster.

MISSILE STORAGE FACILITIES

Depot Maintenace Capability/Capacity: Storage facilities
Describe Why Unique/Peculiar: The rail system, used to safely and efficiently move missile motors into and out of the storage facilities, is compatible with Minuteman and Peacekeeper transportation equipment. Recent site surveys determined no other operation is equipped with this type of system. Explosive Safety Quantity Distance (ESQD) sited for a storage capacity of: greater than:

- 15 million lbs NEW, class 1.1
- 30 million lbs NEW, class 1.2
- 45 million lbs NEW, class 1.3
- or physical capacity of class 1.4

The 109 facilities provide 394,305 Square feet of explosives storage space, all environmentally controlled, plus utility connections outside of eight storage igloos that allow the storage of an extra full-up Minuteman booster in its transportation container.

MISSILE AND MUNITIONS DISPOSAL FACILITIES

Depot Maintenace Capability/Capacity: Thermal Treatment Unit
Describe Why Unique/Peculiar: The **only** environmentally licensed propellant disposal site, capable of disposing of Minuteman and Peacekeeper solid rocket motor propellant and as well as obsolete motors from other services. Environmental approval has been requested for the distruction of the Navy Poseidon 3 rocket motors, demonstrating the benefits of our Thermal Treatment Unit.

PHYSIOLOGICAL TRAINERS

Depot Maintenance Capability/Capacity: Physiological Trainer Maintenance Repair Capability.
Describe Why Unique/Peculiar: Physiological Trainer Maintenance Repair Capability is a unique Air Force capability. This team is the only government repair team of its kind in existence and is considered to be the single source of repair for this capability. They not only support all Air Force requirements but also maintain Navy and Army trainer systems through Inter service Support Agreements as well as trainer systems for the Federal Aviation Administration and Foreign Military Sales countries. The physiological trainer maintenance team at Ogden Air Logistics Center has accomplished specialized repairs, prototypes, installations, removals, modifications, and overhaul services on all types of physiological and environmental trainer systems for the entire United States Air Force, with world wide support provided for over 30 years. Unlike other repair operations, all of the team members are extremely skilled in all phases of environmental and physiological chamber and trainer

component repair and maintenance. They utilize skills in electronics, electrical, mechanical, sheet metal, welding, plumbing, air conditioning, and painting to perform all necessary maintenance and modification work. This team also manufactures mechanical parts when the parts are not otherwise available.

MAVERICK REPAIR FACILITIES

Depot Maintenance Capability/Capacity: Repair and overhaul of Air Force and Navy Maverick Missile (AGM-65) electro optic, laser, and infrared guidance control sections (GCS), Field Level Analog / Digital Missile Test Sets, and the All-Up-Round Maverick Missiles. (15.1 12B Support Equipment)
Describe Why Unique/Peculiar: Ogden ALC has the only Department of Defense facility and is the single source that repairs, overhauls, aligns, and tests all components of the guidance control sections (GCS) and Missile Test Sets of the Maverick Missile. The facility includes millions of dollars of specialize Analog and Digital Automatic Test Equipment and a peculiar designed 10,000 class laser clean room with appropriate test stations to functional service the Navy's Laser Maverick. The component repair and testing is located separately from the All-Up-Round facility. The Tactical Missile All-Up-Round Maintenance Facility provides testing capabilities for fully armed and fueled tactical missiles. The facility is rated for 15,000 lbs of 1.1 explosives and contains automated test equipment required to service all versions of the Maverick Missile. The facility is located in a secured area on base with appropriate quantity/distance requirements and designed to minimize munitions propagation in case of a mishap. All the maintenance facilities have lighting storm warning systems to protect electronic automatic test stations.

Depot Maintenance Capability/Capacity: Reapir and overhaul capability for Sidewinder Missile (Aim-9) guidance control sectioins (GCS). (15.1 12B Support Equipment)
Describe Why Unique/Peculiar: Ogden ALC is the single source of repair and has the only capability inthe Air Force to service the Sidewinder Missile guidance control sections. The process utilizes unique automatic test stations to functioinal check the weapons systems serviceability. A 1,000 class clean room with appropriate test stations is used to service te complex missile seeker and gyro assemblies.

ADVANCED CRUISE MISSILE RADAR CROSS SECTION FACILITY

Depot Maintenance Capability/Capacity: Advanced Cruise Missile (ACM) Imaging Radar System Facility (15.1 4B Tactical)
Describe Why Unique/Peculiar: The OO-ALC Advanced Cruise Missile Imaging Radar System (AIRS) Facility is one-of-a-kind in DoD and is the single source of repair in DoD. It is used to diagnose degradations in the missile radar cross section and is required to test the Advanced Cruise Missile. The AIRS is an essential maintenance tool that allows the depot to maintain the air vehicle signature. AIRS equipment is not a test community asset, it is a part of the ACM depot maintenance facility. Environmental licensing requirements for propellant disposal and ground test firing would take from four to six years for approval.

LANDING GEAR REPAIR FACILITY

Depot Maintenance Capability/Capacity: Landing Gear Repair Facility (15.1 2E Landing Gear)
Describe Why Unique/Peculiar: This is the only fully automated single source of repair Department of Defense facility capable of accommodating all aircraft in the Department of Defense inventory. We provide overhaul, repair, modification and testing services to 70% of the Department of Defense aircraft landing gear inventory. We have the capability to perform the repair/overhaul of all landing gear in the Department of Defense from the small T-38 Talon nose gear to the massive C-5 main landing gear. Force structure reductions have decreased landing gear output requirements to 585,000 DPAH which is a 35.2 percent decrease from our highest output year. This leaves room for approximately 318,000 DPAH of additional workload. We still have additional capacity for surge.

Our unique process includes tasks designed for the purpose of overhauling landing gear components with minimal human intervention.. The main landing gear overhaul and repair facility is the only facility in the Department of Defense that was specifically designed for the overhaul and repair of aircraft wheels, brakes, landing gear, and related components. A 1981 data study of the new automated landing gear facility revealed a savings of $2,500,287 (26.6% in that year) over a conventional operation.

OTHER CAPABILITIES/CAPACITIES

(Although Computed Tomography is mentioned under Missile Maintenance And Testing it is unique and should be presented as a separate unique capability and is considered to be the single source of repair, because of the capability to accommodate large weapons and components).

Depot Maintenance Capability/Capacity: Computed Tomography (15.1 4A Strategic)
Describe Why Unique/Peculiar: The CT facility is the only system capable of lifting Peacekeeper and Minuteman solid rocked motors into the vertical inspection position. It has the capability to inspect weapon systems and parts for voids and cracks to ensure that they perform when needed. Our technicians are certified to provide finite inspections of all weapons, missile motors and parts, landing gear, wheels, propellant, castings, reverse-engineering projects and space age materials, including the space shuttle boosters.

Depot Maintenance Capability/Capacity: F-16/F-18 Overhaul/Test (15.1 1C3 Light Combat)
Describe Why Unique/Peculiar: Our facility provides the single source of repair and overhaul for the Air Force F-16 and the MCAPP for the Navy F-18. The facility is equipped with aircraft docks which allow complete overhaul capabilities. Each dock is fully equipped for aircraft utilities, that include electrical, central hydraulic, and shop air.

Depot Maintenance Capability/Capacity: Laser Automated Decoating System (LADS) (15.1 IC3 Light Combat)
Describe Why Unique/Peculiar: Capability to strip or remove paint and other coating from aircraft in the DoD inventory. Our facilities and equipment are the only ones in DoD, deployed or

under development, which possess such precise coating removal capabilities and is considered as single source of repair for fighter aircraft weapon systems. LADS prepares aircraft and their components for repainting and resurfacing. LADS accurate depth decoating capability is critical to aircraft radomes since depth of coatings affect radar accuracy. No process, other than tedious hand sanding, comes close to our capability to control the level of resolution in removing layers of previous finishes and coatings. This allows us to efficiently and effectively remove coating from all DoD aircraft with no damage to underlying materials for all component parts. Our process can be successfully applied to all composites - thermoplastic, metallic substrates, etc.

Depot Maintenance Capability/Capacity: Aircraft Robotics Bead Blast (15.1 IC3 Light Combat)
Describe Why Unique/Peculiar: This facility is the DoD's only single source robotics bead blast aircraft paint stripping cell in operation. The cell consist of two custom designed nine axis robots. The robots strip fighter aircraft using plastic media blast (PMB) process for paint removal. The system is programmed for stripping F-16 aircraft. Blast parameters such as pressure, media flow rate, stand-off distance, and angle of attack are all preprogrammed and will be the same for all F-16 aircraft. The Robots themselves monitor the strip rate and adjust the end effector velocity based on paint removal rate for that individual aircraft. The system will benefit, save and improve workers environment, reduce the man-hours and flow time for stripping fighter aircraft and optimize the PMB process.

Depot Maintenance Capability/Capacity: Robotic Canopy Polisher (15.1 IC3 Light Combat)
Describe Why Unique/Peculiar: The Robotic Canopy Polisher is the single source and only one of it's kind in the world. It's precision contour work is highly efficient and much more consistent when compared to traditional hand polishing methods. The system detects flaws using vision inspection and performs the repair procedure.
System attributes:

- Unique vision inspection
- Performs repair
- Completes final inspection
- Saves up to 50% of transparencies normally replaced
- Programmable for any canopy in DoD inventory
- Supports F-16 and F-4 worldwide

Depot Maintenance Capability/Capacity: Hot Site Computer Recovery Facility
Describe Why Unique/Peculiar: The Hot Site Computer Recovery Facility at OO-ALC is the only one of it's kind in the DoD. It is an IBM compatible computer facility used for recovery of damaged or destroyed computer facilities and computer contingency operations/testing.
Configuration includes:

AMDAHL 5870	AMDAHL 5860	SHARED RESOURCES
21 MIPS	12.4 MIPS	20 GIGS 3380 DASD
32 MB Main Memory	32 MB Main Memory	110 GIGS Sing 3380 DASD

32 Channels	16 Channels	16 Reel Tape Drive 16 Cartridge Tape Units 6 3880 Controllers

Depot Maintenance Capability/Capacity: Building 511, Investment Casting Capability
Describe Why Unique/Peculiar: This is the only fully operational investment casting production capability in the Department of Defense. Aerospace quality castings are produced on a quick turnaround basis when contractor parts are not available. The facility is designed for large or small production runs. The investment casting process has been utilized to manufacture parts for Air Force F-16 Mission Capable (MICAP) requirements, C-130, F-15, and F-111 aircraft as well as Navy submarine and torpedo parts. This capability involves casting parts from alloys of aluminum, iron, copper, cobalt and nickel into numerous configurations of parts, while maintaining tight tolerances and exceptional strength.

Depot Maintenance Capability/Capacity: Airborne Reconnaissance Overhaul Capability (15.1 2I Other)
Describe Why Unique/Peculiar: The capability at Hill Air Force Base is the only one of its kind in the Department of Defense providing the full range of maintenance capabilities. As the Air Force Technical Repair Center for depot repair of airborne reconnaissance equipment, both photographic and electro-optical sensors, our maintenance and engineering personnel are uniquely qualified. We overhaul and support airborne reconnaissance systems for Air Force, Navy, Marine Corps and the Coast Guard. We also support many agencies outside the Department of Defense spectrum including Drug and Alcohol, and On-Site Inspection Agency. We provide complete overhaul and test operations including the physical, photonics, electronics, circuit boards, wiring harnesses, and testing operations not found at any other facility. We have many years of experience repairing the highest quality and most critical sensors in the Department of Defense inventory. We utilize special alignment and focusing test equipment to optimize the infrared image characteristics within a selected spectral range. During the instrument repair phase, our opticians and technicians resurface, polish and recoat those optics that can be reclaimed.

Depot Maintenance Capability/Capacity: Imaging System Overhaul Capability (15.1 2I Other)
Describe Why Unique/Peculiar: The capability at Hill Air Force Base is the only one of its kind in the Department of Defense providing the full range of maintenance capabilities, and single source of repair. As the Air Force Technical Repair Center for depot repair of imaging systems, we support a variety of film-based cameras, printers, processors, light tables, stereoscopes, electro-optic sensors, infrared sensors, mapping and hand-held cameras, optical lenses and elements. On-site support teams travel around the world servicing all Navy aircraft carriers, as well as Army, Navy, and Air Force operations locations. We provide complete overhaul and test operations including the physical, photonics, electronics, circuit boards, wiring harnesses, and testing operations not found at any other facility. Our overhaul process includes complete capabilities for tear down, bead blast, paint, reassemble and testing of imaging systems. Our overhaul technicians employ optical measuring equipment to validate system specifications.

Depot Maintenance Capability/Capacity: Optical Refurbishment Overhaul Capability. (15.1 2I Other)
Describe Why Unique/Peculiar: The capability at Hill Air Force Base is the only one of its kind in the Department of Defense having the ability to work lenses up to 30 inches and providing a full range of maintenance capabilities. We provide complete overhaul and test operations including the physical, photonics, electronics, circuit boards, wiring harnesses, and testing operations not found at any other facility. Ogden Air Logistics Center photonics opticians and technicians skillfully refurbish concave, convex, and flat optical elements consisting of metal, glass and plastic materials. The Optical Film coating area has the capability of designing and manufacturing mutilayer optical coatings on optical substrates for the purpose of altering either their physical or optical properties. Our engineers direct the work of these opticians and technicians developing skills in repair and manufacture of optical elements. Infrared spin mirrors, Head Up Display optical elements, cinesextant telescopes, Solar Observing Optical Network (SOON) optical elements, satellite tracking cameras and Tactical Airborne Reconnaissance Pod Systems (TARPS) pod windows are examples of elements we refurbish.

Depot Maintenance Capability/Capacity: Compass Transmitter and Magnetic Azimuth Detector Repair Capability (15.1 2D Instruments)
Describe Why Unique/Peculiar: The Compass Transmitter and Magnetic Azimuth Detector Repair Capability at Ogden Air Logistics Center is one of a kind in the Department of Defense. We are the single source of repair. Mike Trainer, Item Manager for the compass transmitter and magnetic azimuth detector from Oklahoma City Air Logistics Center, stated that Honeywell Corporation, Durham, North Carolina has the capability but is only providing new manufactured units and that repair for the past ten years has been provided by Ogden Air Logistics Center only.

Depot Maintenance Capability/Capacity: 20MM automatic gun test firing facility
Describe Why Unique/Peculiar: Self contained environmentally controlled facility which allows for complete recovery of all expended projectile and depleted ammunition residue.

Depot Maintenance Capability/Capacity: 30MM automatic gun test firing range
Describe Why Unique/Peculiar: Utah Test and Training Range is remote and firing of 30MM automatic gun allows for safety concerns to be minimized. Less than serviceable ammunition can be used in testing due to locally assigned management and engineering responsibilities. The situation equates to a significant cost savings by using ammunition that would be normally disposed of.

Depot Maintenance Capability/Capacity: F-16 Emergency Power Unit Repair Capability (15.1 2H APUs)
Describe Why Unique/Peculiar: This is the only Department of Defense single source of repair and overhaul and test capability for the F-16 Emergency Power Unit (EPU). This EPU is the only system using hydrazine as a fuel and the overhaul must accommodate the hazards of the hydrazine propellant in a safe and monitored environment.

Depot Maintenance Capability/Capacity: Repair and overhaul of Laser Guided Munitions (15.1 12 B Support Equipment)
Describe Why Unique/Peculiar: Ogden ALC has the only Department of Defense depot level repair capability and is the single source of repair for the following assorted air munitions. The Paveway I, II and GBU-15 laser guided munitions are serviced utilizing state-of-the-art analog and digital automatic test stations. Unique optic alignment equipment provides the necessary hardware and software needed to assure proper accuracy. Technical skills in electronics, electro-mechanical, and integrated optics provides the manpower resources needed. Access to the Utah Test and Training Range (UTTR) with its 207 by 92 nautical miles airspace and its overland supersonic corridors, allows the program office to provide age and surveillance testing of the air munitions.

Depot Maintenance Capability/Capacity: Repair and overhaul capability for Short Range Attack Missiles (SRAM).
Describe Why Unique/Peculiar: OO-ALC has the only depot level capability to service Short Range Attack Missiles (SRAM). Specialized equipment, some mounted in the overhaul facility, is used to determine serviceability of the missile. The computed tomography facility, which uses a 3 dimension x-ray process, is used to check propellant characteristics for serviceability. The Utah Test and Training Range, a short distance from the base, has capability to cut the propellant from the frame and provide live fire testing of the missile motors.

Depot Maintenance Capability/Capacity: Repair and overhaul capability for the Air Force's Air Launch Cruise Missile (ALCM) program (15.1 4B Tactical)
Describe Why Unique/Peculiar: OO-ALC is the single source of repair and has the only capability in DOD to fully service the Air Launch Cruise Missiles (ALCM). The cruise missile facilities have embedded all the necessary automatic test stations to electronically check serviceability. The complex has a fuel farm with appropriate capabilities to defuel and fuel cruise missiles and storage facilities, explosive rated with intrusion alarms, available to store numerous fuel missiles. These explosive rated facilities are isolated from general base operations and designed specifically to handle fueled missile functions. The Utah Test and Training Range (UTTR) located a short distance from the base, with its overland supersonic corridors and highly variable terrain, has been identified as a prime cruise missile range within DCD. The range has 207 by 92 nautical miles of airspace situated over 2675 square miles of DoD land.

Depot Maintenance Capability/Capacity: Repair and overhaul capability for the Advance Cruise Missile (ACM) (15.1 4B Tactical)
Describe Why Unique/Peculiar: OO-ALC is the single sorce of repair and has the only capability in DoD to overhaul and repair the Advance Cruise Missile (ACM). Within the Cruise Missile Facilities is all the latest state-of-the-art automatic test stations necessary to functional check the Advance Cruise Missile electronics and target navigating characteristics. Included within the complex is an Imaging Radar System (AIRS) that is fully operational to diagnose degradation of the radar cross section (RCS) of this stealth type weapon. The radar signature must be determined from the collected back scatter, which includes both test object contributions and that associated with the surrounding environment. Operator of the AIRS facility must have

top secret clearances to be in the facility. The Utah Test and Training Range (UTTR) located a short distance from the base, with its overland supersonic corridors and highly variable terrain, has been identified as a prime cruise missile range within DOD. The range has 207 by 92 nautical miles of airspace situated over 2675 square miles of DoD land.

Depot Maintenance Capability/Capacity: Neural Engineering and self-organizing systems.
Describe Why Unique/Peculiar: Per direction of Program Action Directive (PAD) number 90-MME-200(1), Ogden ALC has been tasked to develop and implement neural networks (NN) and/or self-organizing systems (SOS) as an advanced diagnostic tool. We are the designated Air Force organic capability to apply these techniques successfully.

The first system we applied this to was the Air Combat Maneuvering System (ACMI). Documented repair savings of over $250K the first year and improved reliability of the system from 40 hours to over 1,000 hours was experienced. Current work on the Infra-red camera to detect faults in electronic circuits has the potential to save many millions of dollars in maintenance costs.

Depot Maintenance Capability/Capacity: Software Technology Support Center (STSC).
Describe Why Unique/Peculiar: Ogden ALC is the home of the Software Technology Support Center (STSC). Per direction of SAF/AQKS under Program Management Directive (PMD) number 3118(8), 1 April 94, our STSC has been designated as the focal point for the Air Force and Department of Defense for the technical expertise, management, and evaluation of software tools, methods and environments to identify, evaluate and adopt technologies to improve the quality of their software products, their efficiency in producing them and their ability to help organizations improve their effectiveness. The prime benefits received include software/hardware standardization throughout the Air Force as well as other government agencies.

Depot Maintenance Capability/Capacity: Software Engineering Institute (SEI) Level certification for our Software Engineering Division.
Describe Why Unique/Peculiar: In May 1992 Ogden ALC Software Engineering Division was assessed as a Level 2 on the SEI Capability Maturity Model. This division was informed they were among the top 15 percent of the software organizations that had been assessed.

Depot Maintenance Capability/Capacity: Compact Range Facility(CRF)
Describe why Unique/Peculiar: The CRF is one of a kind in DoD and is the single source of repair. It is the only CRF available for testing the F-16 AN/APG-66 and AN/APG-68 Fire Control Radar Antennas and the F-16 Nose Radome. Used for F-16 models A, B, C, and D and two Nose Radome Electrical Test systems, it tests electrical mapping (including image sidelobe levels), power transmission deficiencies, and beam deflections. The system is divided into two separate rooms, one being an anechoic chamber (compact range group and portions of the antenna analyzed), the other containing most of the antenna analyzer group. The system creates an electromagnetic environment to allow pattern testing gain documentation and boresighting. It radiates, collimates, and detects the RF signals. It is also used to position or to polarize the RF source, position the radar under test, facilitate fault isolation, and measure antenna position. The small indoor chambers eliminate the need for large outdoor facilities and real estate. It provides significant cost and time savings, improved security, and eliminates surveillance requirements and adverse environmental factors. The system is environmentally controlled and mounted on a spring supported concrete floating foundation to preclude movement. Because of the construction, and the equipment sensitivity, it would not be economically feasible to relocate the system.

8.2 Separately list the depot maintenance facilities and equipment which are one of a kind within the Service and/or DoD.

Facilities

MISSILE MAINTENANCE AND TESTING FACILITIES

Ogden ALC Silo-Based Intercontinental Ballistic Missiles (SBICBM) maintenance and test facilities are the only DoD capability for Minuteman and Peacekeeper Missiles; therefore, OO-ALC is the single source of repair for SBICBM workloads. This applies to all SBICBM workloads and capabilities described in the following paragraphs. Recent analysis has identified it will cost in excess of $1 Billion to transfer the workload and replicate the facilities. The data provided in the subsequent paragraphs provide details on the unique capabilities, therefore, each description is noted to be unique. (15.1 4A Atrategic Applies to all paragraphs down to and including Missile and Munitioons Disposal Facilities)

Facility /Equipment: 3 Silos, 5 Bldgs-Strategic Missile Integration Complex (SMIC)
Describe Why it is One of A Kind: The only DoD facility capable of simulating launch scenarios with three 90' vertical below-ground silos constructed to meet Minuteman and Peacekeeper ICBM silo hardness and operational requirements. The test site is a replica of an operational silo and includes capsule and control equipment and interfaces. Facilities accommodate, replicate, and support ICBM launch control centers and launch control equipment facilities. Bldgs: 1203, 1204, 1530, 1538, 1540.

Facility /Equipment: 4 Survivability andVulnerability Integration Center (SVIC)
Describe Why it is One of A Kind: The Survivability and Vulnerability Integration Center is a state-of-the-art AFMC test facility dedicated to simulation testing of nuclear hardness, survivability, reliability, and electromagnetic compatibility of defense systems. The SVIC consists of facilities (bldgs 402, 501, 1701, and 4301) for simulating basically six environments:

- Nuclear radiation, provided by flash X-Ray machines and a linear accelerator.
- Airblast, provided by a Blast Load generator
- Shock and vibration, provided by various dynamic shakers, accelerators and impulse testers.
- In-flight shock and vibration profiles, provided by the vibration facility.
- Electromagnetic pulse (EMP) provided by electrical pulsars of various waveforms and energy capabilities.
- Electromagnetic interference and compatibility (EMI/EMC) testing, provided by EMI generators and instrumentation equipment.

Facility /Equipment: 12 Minuteman (MM) Stage I, II, III missile assembly & repair facilities
Describe Why it is One of A Kind: Horizontal rail movement system, explosive safety clear zone quantity distance (ESQD for inhabited buildings), frangible (easily broken) quantity distance (QD for fragment throw), frangible construction for explosive contents. Bldgs: 940-980 & 2406-2409

Facility /Equipment: 4 Motor dissection and Propellant analysis for Minuteman and Peacekeeper

Describe Why it is One of A Kind: Remote cutting and handling operation Franglible roof section. 50 ton overhead bridge crane. Bldgs: 40060, 40086, 60060, 60075 .

Facility /Equipment: 2 Peacekeeper (PK) Stage I, II, III missile storage facilities
Describe Why it is One of A Kind: Horizontal rail system. Clear zone quantity distance (QD), frangible construction for explosive contents. Bldgs: 2401-2403

Facility /Equipment: 11 Physical and chemical test facilities
Describe Why it is One of A Kind: Explosive sited remote propellant machining processes. Sophisticated scientific test stations and computer backup for statistical performance analysis.

Facility /Equipment: 1 Missile transfer and support (Minuteman and Peacekeeper) Bldg:
Describe Why it is One of A Kind: Horizontal rail system used for carriage and end ring change. Lifting capability for rocket motors and booster assembly. Fifty ton overhead bridge crane.

Facility /Equipment: Missile Support Equipoment Repair Facility (15.1 10E Other)
Describe Why it is One of A Kind: This is a single source of repair and on-of-a-kind facility in the Air Force. There are no other DoD depot maintenance facilities with this capability. The repair and testing of missile support equipment requires a facility with complete facilties to ensure the highest reliability and maintainability of Minuteman and Peacekeeper truck and tractor equipment.

Facility /Equipment: Computed Tomography
Describe Why it is One of A Kind: The Computed Tomography (CT) facility is the most up-to-date facility in the world and the **only** DoD facility that is capable of assessment on large rocket motors for MM and PK. The CT facilities at Ogden Air Logistics Center are the only ones sited for exlosives inspection. It enables detection of small voids, changes in density, and more accurate assessment of the bond line between propellant insulators and the case.

Facility /Equipment: High Energy X-Ray
Describe Why it is One of A Kind: Physically large enough to handle Peacekeeper motors as well as smaller items. The energy source is the **only** one capable of producing the amount of volts required to penetrate large missile components.

Facility /Equipment: 3 Rocket motor static firing facilities
Describe Why it is One of A Kind: Environmentally licensed and explosive sited MM rocket motor test pads with 500,000 pound thrust blocks. Test recording capability at approximately 200 channels of information. Test pads are covered with a motor propelled building that is moved to allow for motor installation and static firing. The test pads are environmentally controlled and are equipped with a 50 ton bridge crane mounted in the building. Bldgs 60000, 60015, 30025, Hazard pad #3.

Facility /Equipment: 1 Test cubicle

Describe Why it is One of A Kind: This facility contains explosive detonation test cells capable of testing Minuteman and Peacekeeper ordinance devises and monitoring equipment to test cartridge activated devices for integrity and performance. Bldg: 2014.

Facility /Equipment: 1 Lithium battery storage & discharge
Describe Why it is One of A Kind: The only AF facility is environmentally controlled and equipped with battery discharge equipment. Bldg: 30220

Facility /Equipment: 1 Transportation and Handling hoist proof-load test.
Describe Why it is One of A Kind: This hole is equipped with weight slugs simulating the weight of the Minuteman missile. It is approximately 90 feet deep to allow inspection and testing of hoist and wire ropes for Minuteman Transporter Erectors (TEs). Bldg: 10296

Facility /Equipment: 1 Cold soak/heat soak
Describe Why it is One of A Kind: The only DoD facility with temperature conditioning capability to control temperature of Minuteman motors at -45 degrees F to +175 degrees F. Designed for Minuteman motors.

Facility /Equipment: 1 Propulsion System Rocket Engine (PSRE) Facility
Describe Why it is One of A Kind: 10,000 class clean room, bridge crane with 25 foot hook height, infra-red fire protection system, **hydrazine intercept and recovery systems**, and electron beam welder all in support of 4th Stage MM & PK. Bldg: 2016

Facility /Equipment: 1 Liquid propellant decontamination
Describe Why it is One of A Kind: The only AF facility designed to decontaminate missile recovery equipment used to mitigate or provide abatement to hazardous spills of rocket engine liquid fuels. Bldg: 30260.

Facility /Equipment: 1 Missile support equipment repair facility
Describe Why it is One of A Kind: Service and repair center for large truck, tractor equipment associated with Minuteman and Peacekeeper missiles. Facility is equipped with 80' by 20' paint and sandblast facility. Bldg: 847

Facility /Equipment: Missile Assembly, Maintenance and Storage (MAMS) I and II, Utah Test and Training Range motor storage area access roads
Describe Why it is One of A Kind: Previous site surveys to determine alternate sites for ICBMs indicate service roads at other centers/bases would require significant upgrades just to meet the 22,000 pound Minuteman axle load and 32,000 pound Peacekeeper axle load basic requirements. Since Ogden Air Logistics Center is the prime site for MM and PK storage and repair, there is no reason to believe any site considering a workload of this magnitude would not require such upgrades. Service roads at the Utah Test and Training Range motor storage area and the MAMS I and II have been compacted to meet MM and PK weight during transportation, therefore, they are deemed to be peculiar.

Facility/Equipment: LGM-30 Shock Isolator Facility.

Describe Why it is One of A Kind: This is a one-of-a-kind facility in the Department of Defense. Ogden Air Logistics Center is the designated Technology Repair Center for the LGM-30. Shock Isolator depot maintenance and modification is accomplished with in the three-story maintenance building. The facility capability consists of a shock isolator test stand, linear actuator test stand, and a hydraulic pressure system. Built within the facility are special reinforced and shock isolated concrete pads strong enough to withstand enormous loads placed on them while testing the shock isolator.

MISSILE STORAGE FACILITIES

Facility /Equipment: 109 Rocket motor storage for MM and PK
Describe Why it is One of A Kind: Horizontal rail system, Clear zone quantity distance, frangible construction, environmentally controlled and monitored. Bldgs: 981-983, 1320-1321, 1331-1373, 1403, 1440-1463, 1811-1815, 1822-1832, 11802-11804,11825-11830, 30020-30219,30221-30250, 30270-30290.

MISSILE AND MUNITIONS DISPOSAL FACILITIES

Facility /Equipment: Thermal Treatment Unit
Describe Why it is one of a kind: The only environmentally licensed propellant disposal site, capable of disposing of Minuteman and Peacekeeper solid rocket motor propellant and as well as obsolete motors from other services. It sits on a 21,000 acre site at the Utah Test & Training Range (UTTR).

TACTICAL MISSILE REPAIR FACILITIES

Facility/Equipment: Repair and overhaul capability for Maverick Missiles (Air Force and Navy) Guidance Control Systems (GCS); Electro optic, Laser, and Infrared. (15.1 12B Support Equipment)
Describe Why it is One of A Kind: This is the only Department of Defense depot overhaul capability.

Facility/Equipment: Repair and overhaul capability for Sidewinder Missile guidance and control sections (15.1 12B Support Equipment)
Describe Why it is One of A Kind: The Sidewinder equipment embedded in this facility make it an Air Force one-of-a-kind. This facility is specifically designed to meet the stringent maintenance and testing support requirements of the seeker assembly portion of the Sidewinder Missile. Seeker and gyro repair requires absolute cleanliness as part of the overhaul process. Specially designed electro static floors help to maintain the elctro static discharge concerns associated with operation. Contamination particle count must be maintained bo 0.5 microns not to exceed 100 particles per cubic foot of air. Temperature stability is maintained at 72 degrees +or- 2 degrees. Humidity is maintained at 30-45%.

ADVANCED CRUISE MISSILE RADAR CROSS SECTION FACILITY/EQUIPMENT

Facility/Equipment: Advance Cruise Missile Imaging Radar System Facility (AIRS) Facility (15.1 4B Tactical)

Describe Why it is One of A Kind: This is a one-of-a-kind Department of Defense depot level AIRS facility and is the single source of repair in DoD. The purpose of this new facility is to provide the ability to diagnose degradation of the radar cross section (RCS) of stealth type weapon systems. The AIRS is an indoor (RCS) test facility that is an integral part of the maintenance concept of the Advanced Cruise Missile (ACM). When a missile comes into the depot, AIRS will be used to diagnose degradations in the missiles RCS. Once AIRS isolates the defect, the depot can repair the defect. Upon exiting the depot, ARIS is used to ensure the missile signature meets established survivability criteria before it re-enters the fleet. The radar signature of a missile body varies as a function of transmitted radar frequency, transmitted and received radar polarization, and the aspect angle at which the test body is illuminated and viewed. The radar signature must be determined from the collected backscatter, which includes both test object contributions and that associated with the surrounding environment. Top secret level 4 access is required. Currently the Advance Cruise Missile (ACM) is being serviced in this facility. The equipment used by AIRS is not a test community asset; it is a part of the ACM depot maintenance facility.

LANDING GEAR REPAIR FACILITY

Facility/Equipment: Automated Landing Gear Repair Facility (15.1 2E Landing Gear)
Describe Why it is One of A Kind: This is the only fully automated, single source of repair DoD facility capable of accommodating all aircraft in the DoD inventory from the small T-38 Talon nose gear to the massive C-5 main landing gear. Force structure reductions have decreased landing gear output requirements to 585,000 DPAH which is a 35.2 percent decrease from our highest output year. This leaves room for approximately 318,000 DPAH of additional workload. We still have additional capacity for surge. Our unique process includes tasks designed for the purpose of overhauling landing gear components with minimal human intervention.. The main landing gear overhaul and repair facility is the only facility in the Department of Defense that was specifically designed for the overhaul and repair of aircraft wheels, brakes, landing gear, and related components. A 1981 data study of the new automated landing gear facility revealed a savings of $2,500,287 (26.6% in that year) over a conventional operation.

The facility is specifically designed for streamlined overhaul/repair of all landing gear wheels, brakes, struts, and related components. It will accommodate all of the essential processes and equipment required to perform metal processing operations. The jib cranes, utilized in the disassembly and assembly areas, are designed with a 12' high minimum clearance and a minimum 12' hook height clearance over all dip tanks and plating tanks. These tanks have the width and depth sufficient to accommodate the largest Department of Defense aircraft components. The overhead hoists are designed with a capacity to load landing gear components of the largest military aircraft and/or fixtures onto machines such as grinders, lathes, hones, etc. The two walk-in continuous flow throughput ovens allow parts to flow from one process to another ensuring a continuous flow of the repair process without problems of bottlenecking. The newly designed Environmental Protection Agency compliant air filtration system consisting of scrubbers, blowers, and a hazardous waste removal and processing system that require special procedures. This system is designed to meet current and future foreseeable emissions regulations. All equipment was specifically identified and purchased according to the workload requirements accounting for such factors as size, capacity, and efficiency to support all landing gear processes.

OTHER ONE OF A KIND FACILITIES

Facility/Equipment: Ram Air Turbine (RAT) Wind Tunnel Test Facility.
Describe Why it is One of A Kind: This is the only Ram Air Turbine test facility in the Air Force. This facility has a 25 foot squirrel cage type fan with variable pitch blades turned by a 900 horse power electric motor. The air flow control vanes are variable pitch blades that must be perfectly balanced to prevent vibration at the high revolutions per minute (RPMs) reached during testing. These vanes are opened and closed as required for the various testing speeds. The squirrel cage fan achieves wind speeds from 75 to 375 knots variable. This specialized wind tunnel is located within a jet engine test cell because of the high noise it produces when the RAT is operating. This hush house has a 12' x 8' inlet tube that is hooked to a 25-foot blower. From the blower, the outlet tube is reduced to a 12 inch diameter tube. This 20-foot long tube is specially designed to reduce wind turbulence at the outlet where the RAT is tested. The wind flow is picked up by a 6-foot diameter pickup tube and vented outside the building.

Facility/Equipment: Building 511, Investment Casting Facility
Describe Why it is One of A Kind: This is the only fully operational investment casting production facility in the Department of Defense. Aerospace quality castings are produced on a quick turnaround basis when contractor parts are not available. The facility is designed for large or small production runs. The investment casting process has been utilized to manufacture parts for Air Force F-16 Mission Capable (MICAP) requirements, C-130, F-15, and F-111 aircraft as well as Navy submarine and torpedo parts.

Facility/Equipment: Photographic Image Quality Test Facility (PIQTF) and the Cartographic Camera Calibration Facility (CCCF) (15.1 2I Other)
Describe Why it is One of A Kind: This facility is the only one in the Department of Defense and is the single source of repair. The Photographic Image Quality Test Facility is a four-story facility an is specifically designed for critical testing of aerial/space sensors, determining the operational imagery quality to Department of Defense standards. Three stories of this facility are underground. The features and benefits offered by an underground facility include vibration isolation to a low frequency and stability of temperature. The Cartographic Camera Calibration Facility is a one-of-a-kind test facility specifically designed for mapping camera calibration. This facility has two stories underground. The features and benefits offered by an underground facility include vibration isolation to a low frequency and stability of temperature. Mission sensitivity and security required that the Air Force develop and maintain this capability. Also, high replication cost and the level of requirements dictate the need for only one facility in Department of Defense.

Facility/Equipment: F-16/F-18 Overhaul/Test (15.1 1C3 Light Combat)
Describe Why it is One of A Kind: Our facility is the only one in the DoD and is the singel source of repair and overhaul for the Air Force F-16 and the MCAPP for the Navy F-18.

Facility/Equipment: Aircraft Robotics Bead Blast (15.1 IC3 Light Combat)
Describe Why it is One of a Kind: Ogden ALC provides the world's first and only robotics plastic media bead blast for DoD fighter aircraft. This integrated facility and equipment provide a virtual closed system for the application and recycling of the plastic media material. It is recycled and sorted by size and when it becomes too small to reuse it is packaged and recycled through a contractor virtually eliminating any hazardous waste from our automated stripping operation. The robotic operation is monitored by personnel in a control room, removing them from the process application area. This reduces manpower requirements, improves stripping accuracy, and increasing employee safety

Facility/Equipment: 20MM automatic gun test firing facility (15.1 2F Aviation Ordinance)
Describe Why it is One of A Kind: This is a one-of-a-kind facility in the Air Force. It is an underground test firing range used for the acceptance test firing after overhaul or modification of 20MM automatic guns. The test firing facility consists of a control room housing test evaluation equipment, a firing bay where guns are mounted for testing, a projectile impact area located at one end of the 100 foot long tunnel, a utility room containing all facility electric and hydraulic

equipment, an explosive approved ammunition handling and storage area, and a preparation room to perform maintenance on the guns and handling systems prior to the actual test firing. Specific design features of this building include security requirements for ammunition, an overhead lifting system, a video monitoring system in an adjacent room to the firing bay for personnel safety, a door interlock system that shuts down the test firing if any door is opened during the firing sequence, and a ventilation system capable of clearing out the gun gasses from the firing bay and tunnel within 40 seconds.

Facility/Equipment: 30MM automatic gun test firing facility (15.1 2F Aviation Ordinance)
Describe Why it is One of A Kind: Utah Test and Training Range is a single source of repair and has one of a kind testing equipment to perform the acceptance test firing after overhaul of the A-10 aircraft GAU-8 gun on the 30MM test firing pad.

Facility/Equipment: Compass Transmitter and Magnetic Azimuth Detector Repair Facility (15.1 2D Instruments)
Describe Why it is One of A Kind: Ogden Air Logistics Center is one of only two continental United States (CONUS) facilities for the repair and testing of compass transmitters and magnetic azimuth detectors. The other facility is at Honeywell Corporation, Durham, North Carolina. Mike Trainer, Item Manager for the compass transmitter and magnetic azimuth detector from Oklahoma City Air Logistics Center stated that Honeywell is only providing new manufactured units and that repair for the past ten years has been provided by Ogden Air Logistics Center only. Therefore, there are no repair and testing alternatives available. This facility is unique because the building, tools, end items, and component parts are non-magnetic/non-ferrous and the facility is aligned directly along the earth's true magnetic north-south meridian. Before construction of this facility, an in-depth geographic study was accomplished to determine the most suitable and magnetically stable location at Ogden Air Logistics Center. The facility is built entirely from non-ferrous metals and materials such as aluminum joists in place of wood, studs rather than steel nails, nylon fabric instead of steel reinforcing bar in the concrete foundation and floor, and special lighting and electrical fixtures to minimize magnetic interference.

Facility/Equipment: Building 509 Gun Overhaul Shop.
Describe Why it is One of A Kind: The Guns and ammunition handling systems overhaul at this center are one-of-a-kind in the Air Force. Systems worked include 20MM and 30 MM gun systems, ejection racks, pylons, bomb racks, guns and gun control systems (both aircraft mounted and ground), missile launchers and bomb dispensers. This area of Building 509 was specifically designed for the overhaul and storage of guns and gun handling systems. Security consists of video surveillance equipment, motion detectors, door sensors and a double door entry area. Security requirements are met for aircraft guns as well as hand-held weapons to be worked and stored.

Facility/Equipment: Maverick Tactical All-Up-Round Facility (15.1 4B Tactical)
Describe Why it is One of A Kind: The facility is an Air Force one-of-kind, explosive certified structure that allows for maintenance and testing of fully loaded and fueled Maverick tactical missiles. The facility is rated for 15,000 lbs. of 1.1 explosives. The facility was designed to

allow maintenance and system testing of numerous fully operational Maverick missiles simultaneously. The facility is designed with a six feet thick wall seperating the test equipment and operator from the armed missile. There are currently 4 stations setup in this configuration with the facility. The walls are made of 3 feet of sand sandwiched between 1 1/2 feet of concrete so that if a mishap occurred in one bay, the missiles in other bays will not propagate. Any explosion would be directed to specially designed walls. The facility is located in a secured area on the base with 24 hours guard. The location of the facility was designed to provide appropriate quantity and distance requirements in case of an explosion.

Facility/Equipment: Hot Site Computer Recovery Facility
Describe Why it is One of A Kind: The Hot Site Computer Recovery Facility at OO-ALC is the only one of it's kind in the DoD. It is an IBM compatible computer facility used for recovery of damaged or destroyed computer facilities and computer contingency operations/testing.

Equipment:

Facility /**Equipment:** 507 pieces of Minuteman equipment
Describe Why it is One of A Kind: This unique equipment is configured and designed specifically to support the Depot Maintenance functions for Minuteman LGM-30 Missiles. The equipment is critical for repair, modification, testing/diagnostics and life cycle extension of the weapon system. Ogden Air Logistics Center, according to the Master Equipment Management Index Table of Allowances (TA001), is the only authorized user of this equipment.

Facility /**Equipment:** 78 pieces of Peacekeeper equipment
Describe Why it is One of A Kind: This unique equipment is configured and designed specifically to support the Depot Maintenance functions for Peacekeeper LG-118 Missiles. The equipment is critical for repair, modification, testing and life cycle extension of the weapon system. Ogden Air Logistics Center, according to the Master Equipment Management Index Table of Allowances (TA001), is the only authorized user of this equipment.

Facility /**Equipment:** Survivability/Vulnerability Integration Center (SVIC)
Describe Why it is One of A Kind: The following list of unique equipment is configured and designed specifically to support the Depot Maintenance functions for Minuteman LGM-30 and Peacekeeper LG-118 Missiles. The equipment is critical for repair, modification, testing and life cycle extension of the weapon system.

Triaxial Shaker	**One of a kind in the world** of this size and capacity
PI-958 Flash X-Ray	**Only one** of its size in the DOD
PI-216AH Flash X-RAY	**Unique in the world** in high pulse rate allowing as many as 400 "shots" per day (typical is 50-70).
Electromagnetic Pulse Assembly	**Only one** in the AF. It forms backshells to meet configuration requirements for Peacekeeper cabling.

Facility /**Equipment:** Strategic Missile Integration Complex (SMIC)

Describe Why it is One of A Kind: The following list of unique equipment is configured and designed specifically to support the Depot Maintenance functions for Minute nan LGM-30 and Peacekeeper LG-118 Missiles. The equipment is critical for repair, modifica ion, testing and life cycle extension of the weapon system.

Minuteman 'AM' Launch System	This equipment is the **only one of its kind** for testing Intercontinental Ballistic Missiles, providing simulated system launch from a varity of launch scenarios.
Minuteman 'AM' Launch Control System	
Peacekeeper Launch System	
Peacekeeper Launch Control System	
Peacekeeper/Minuteman Guidance and Control System	
Squadron Data Simulator	

Facility /**Equipment:** OASIS at Utah Test and Training Range
Describe Why it is One of A Kind: The following list of unique equipment is configured and designed specifically to support the Depot Maintenance functions for Minuteman LGM-30 and Peacekeeper LG-118 Missiles. The equipment is critical for repair, modification, testing and life cycle extension of the weapon system.

Static Motor Firing and Data Reduction System	**Unique to DOD** for collecting and reducing raw data into digital format during vertical and Horizontal Static firing of ICBM or Small Missile motors.
Propellant Dissection Unit	**Only capability** in DOD to dissect ICBM Motors

Facility/**Equipment**: Mechanized Material Handling System (MMHS)
Describe Why it is One of A Kind: This is the only fully automated overhead material handling system in Department of Defense designed for repairing landing gear components. The MMHS is assisted by an on line computer. The MMHS carriers are programmed by the computer to stop at specified stations. The carriers smoothly and safely process the parts through the cleaning tanks keeping employees out of the chemical environment. The process and dwell times for cleaning, etching, stripping, florescent particle inspection and rinsing are tightly controlled and repeatable. The carriers efficiently move the parts from station to station in the main landing gear facility and also to the electroplating shop located in an adjacent building, avoiding exposure to adverse weather conditions.

Facility/**Equipment**: Automated Remanufacture of Cylindrical Objects (ARCO)
Describe Why it is One of A Kind: ARCO is the only voice operated computer evaluation and inspection system in the Department of Defense designed for repair of landing gear components. The ARCO system is an efficient evaluation and inspection system for landing gear components. When the part arrives at the inspection station, the inspector enters an internal part number that is peculiar to the component and its serial number. A picture of the component appears on the monitor for part conformation. The areas that require inspection are highlighted on the monitor and the inspector orally enters his/her findings for each area. The system compares the input

information with acceptable limits and then generates the appropriate work control document with the required repair operations.

Facility/**Equipment:** Laser Automated Decoating System (LADS)
Describe Why it is One of a Kind: The only process in DoD capable of automatically removing layers of previous finishes on aircraft and their component parts. This is successfully applied to any aircraft, or part, and does not damage underlying materials. Depth of removal is accurately controlled for removing finishes and coatings on all thermoplastics, metallic substrates, etc. LADS accurate depthdecoating capability is critical to aircraft radomes since depth of coatings affect radar accuracy.

Facility/**Equipment:** Robotic Canopy Polisher
Describe Why it is One of a Kind: One of a kind in DoD. Presently used to polish F-4 and F-16 transparencies, but can be programmed for all DOD aircraft. Reduced labor standards from 52 to 16 hours on F-4 canopy. Can also polish any plastics or glass lens items.

Facility Equipment: F-16 Emergency Power Unit Test Stand. F-16 Nitrogen Control Valve Test Stand. F-16 Gases Generator Test Stand.
Describe Why it is One of A Kind: High cost and the level of requirements dictate the need for only one facility in Department of Defense. Unique/peculiar workloads required the Air Force to develop a facility for repair. Also, this facility is required to support a core workload. Table of Allowances and System Program Office authorization determined F-16 Emergency Power Unit and related components is to be overhauled at Ogden Air Logistics Center.

Facility/**Equipment:** Maverick All-Up-Round Electro-Optics and Infrared Test Set
Describe Why it is One of A Kind: The only Department of Defense test set available which is unique and critical to the maintenance facility.

Facility/**Equipment:** Maverick Component Repair Electro Optic and Infrared Test Set
Describe Why it is One of A Kind: The only Department of Defense test set available. The tester is the only tester capable of performing the necessary test functions.

Facility/**Equipment:** Maverick Guidance Components Test Set
Describe Why it is One of A Kind: The only Department of Defense Test Set available.

Facility/**Equipment:** Advance Cruise Missile All-Up-Round Test Set
Describe Why it is One of A Kind: The only Department of Defense Test Set available.

Facility/**Equipment:** Paveway Test Set
Describe Why it is One of A Kind: The only Department of Defense Test Set available.

Facility/Equipment: Magnetic Particle Inspection System

Describe Why It Is One of a Kind: This one of a kind system was designed and built especially for Ogden ALC to support inspection of large landing gear components as part of our world class Landing Gear Facility.

These are one of a kind test sets designed and built here at Ogden ALC specifically for testing various F-16 and F-4 weapon system entities and components. Due to the expense of these test stations, neither contractor, other AF or DoD installations possess similar equipment which can perform this specific function.

APG-66 Radar Test
APG-68 Radar Test
F-16 A/B Heads Up Display (HUD) Test Station
F-16 C/D Heads Up Display (HUD) Test Station
F-16 A/B Human Engineering Development Test Station (HEDS)
F-16 A/B Stores Management Operational Program Dynamic Test Station (2 each)
F-16 A/B Advanced Multi-Purpose Support Environment (AMPSE)
F-16 C/D Operational Program Dynamic Test Station
Honeywell 3500 F-16 Software Depot Level Maintenance Test Stands (2 ea)
F-16 A/B Dynamic System Simulation (DSS)
F-4G ARN-101 Dynamic Test Station
F-4/RF-4 Navigation Weapon Delivery System (NEWDS)
Common Modular Environmental (COMET) (8 each)
(Not all of these eight stands are completed, but are anticipated to be completed prior to the FY96 timeframe)
F-16 A/B AvionicsFacility/Equipment Bay (AEB)
F-16 C/D AvionicsFacility/Equipment Bay (AEB)
These are F-16 weapon system unique test stands. There are no others within the Air Force or DoD

Report to the Commission

DEPARTMENT OF THE AIR FORCE

BRAC 95
JOINT CROSS SERVICE GROUP
OO-ALC DEPOT MAINTENANCE
DATA CALL SUPPLEMENTAL

KELLY AFB, TEXAS

February 1995

DATA CALL SUPPLEMENT FOR JOINT CROSS SERVICE GROUP - SA-ALC DEPOT MAINTENANCE

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DATA CALL SUPPLEMENT
FOR
JOINT CROSS SERVICE GROUP - DEPOT MAINTENANCE

CAPACITY

1. Capacity Utilization

1.1 Calculate the capacity index for the commodity groups applicable to depot maintenance work at your activity. Provide your answers expressed in direct labor hours (DLHs) in Table 1.1.a by commodity groups for the Fiscal Years requested.

Table 1.1.a: **Capacity Index**

COMMODITY GROUP	INDEX (DLHs)				
	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999
(1C1) Acft, Fixed - Transport (C-5)	1495932	1,542,093	1,544,089	1,657,957	1,573,488
(1C4) Acft, Fixed - Trainer (T-38)	524781	387,923	294,203	122,209	105
(2B) Acft Comp - Acft Structure	114,909	93,049	81,058	89,521	90,441
(2C) Acft Comp - Hydraulic/Pneudraulic	2,557	2,900	2,860	3,197	3,525
(2D) Acft Comp - Instruments	12,095	13,811	9,727	13,297	12,496
(2E) Acft Comp - Landing Gear	6,493	6,333	7,805	8,063	8,297
(2G) Acft Comp - Avionics/Electronics	122,728	119,028	124,756	96,722	97,274
(2H) - Acft Comp - APUs	299,783	292,218	307,243	287,709	288,076
(2I) Acft Comp/Other	219460	234785	247002	265062	287674
(2J) Manuf/Fabrication	295301	297755	423064	411738	417010
(3A) Engines (GTEs) - Acft	4,773,595	4,947,819	5,049,301	4,985,091	5,000,818
(4A) Missiles-Strategic - Nuclear	104,118	107,017	107,000	108,711	108,734
(10C) Ground Gen/Purp - Munitions/Ordnance	2,435	2,416	3,150	3,029	3,003

(12A) S/W - Tactical Systems	21066	19013	20231	20016	20240
(12B) S/W - Spt Eqt	151,693	179,518	186,361	202,113	207,414
(13C) Spec Interest Item - TMDE Eqt	635,095	651,441	650,372	680,998	684,940
TOTAL	8,782,041	8,897,119	9,058,222	8,955,433	8,803,535

1. Capacity Utilization, continued

1.2 Calculate the utilization index for the commodity groups applicable to depot maintenance work at your activity. Provide your answers expressed as a percentage (%) in Table 1.2.a by commodity groups for the Fiscal Years requested.

Table 1.2.a: **Utilization Index**

COMMODITY GROUP	INDEX (%)				
	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999
(1C1) Acft, Fixed - Transport (C-5)	84	65	47	51	52
(1C4) Acft, Fixed - Trainer (T-38)	66	88	78	43	88
(2B) Acft Comp - Acft Structure	71	61	58	60	63
(2C) Acft Comp - Hydraulic/Pneudraulic	96	88	87	95	96
(2D) Acft Comp - Instruments	64	57	56	54	54
(2E) Acft Comp - Landing Gear	70	66	53	57	55
(2G) Acft Comp - Avionics/Electronics	90	81	88	81	81
(2H) Acft Comp - APUs	60	55	55	51	51
(2I) Acft Comp - Other	80	76	71	67	65
(2J) Manuf/Fabrication	43	41	40	37	36
(3A) Engines (GTEs) - Acft	79	74	69	68	68
(4A) Missiles- Strategic - Nuclear	98	92	97	94	92
(10C) Ground Gen/Purp - Munitions/Ordnance	99	93	98	95	93
(12A) S/W - Tac Sys	122	98	83	81	79
(12B) S/W - Spt Eqt	96	92	84	88	86
(13C) Spec Interest Item - TMDE Eqt	74	69	70	70	70
TOTAL	78	72	65	64	64

1. Capacity Utilization, continued

1.3 Assuming (a) the current projected total workload remains as assigned; (b) that sufficient production demand is available to justify maximum hiring, with no significant investment in capital equipment; and (c) no major Military Construction additional to that already approved and funded: what is the maximum extent to which operations, by commodity group, could be expanded for depot maintenance work at your activity, based on the current and future planned workload mixes? Please provide your response in the absolute maximum number of direct labor hours (DLHs).

Table 1.3.a: **Maximum Potential Capacity**

COMMODITY GROUP	INDEX (DLHs)				
	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999
(1C1) Acft, Fixed - Transport (C-5)	3250896	3250896	3250896	3250896	3250896
(1C4) Acft, Fixed - Trainer (T-38)	795123	795123	795123	795123	795123
(2B) Acft Comp - Acft Structure	161844	161844	161844	161844	161844
(2C) Acft Comp - Hydraulic/Pneudraulic	3672	3672	3672	3672	3672
(2D) Acft Comp - Instruments	24230	24230	24230	24230	24230
(2E) Acft Comp - Landing Gear	15085	15085	15085	15085	15085
(2G) Acft Comp - Avionics/Electronics	141768	141768	141768	141768	141768
(2H) Acft Comp -APUs	558624	558624	558624	558624	558624
(2I) Acft Comp - Other	442575	442575	442575	442575	442575
(2J) Manuf/Fabrication	1057660	1057660	1057660	1057660	1057660
(3A) Engines (GTEs) Acft	7317828	7317828	7317828	7317828	7317828
(4A) Missiles- Strategic - Nuclear	199618	199618	199618	199618	199618
(10C) Ground Gen/Purp - Munitions/Ordnance	5544	5544	5544	5544	5544
(12A) S/W - Tac Sys	25620	25620	25620	25620	25620
(12B) S/W - Spt Eqt	241179	241179	241179	241179	241179
(13C) Spec Interest Item - TMDE Eqt	978486	978486	978486	978486	978486

TOTAL	15219752	15219752	15219752	15219752	15219752

MEASURES OF MERIT

Facilities and Equipage

6. Unique or Peculiar Facilities

6.1 List unique or peculiar testing facilities, excluding equipment (e.g. runways, railheads, ports, tracks, ponds, etc.).

Test Facility Describe Uniqueness/Peculiarity

6.2 Indicate the reasons that these facilities are required by the depot maintenance function.

Test Facility Reasons Required for Maintenance

6.3 How could the depot maintenance functions be performed without these specialized facilities?

Test Facility Describe Testing Alternatives

a. SA-ALC is sole Source of Repair (SOR) for the following workloads:

- SA-ALC is the sole source for the F100 family of engines and T56 and TF39 engines. All the test facilities necessary to support the overhaul, repair, modification and test of these engines are unique to SA-ALC. This workload is associated with commodity groups 3A, 2G, 2J, and 2C.

- SA-ALC is the soul source for C-5A, C-5B, C5 Speedline, and C-5 related workload. All the test facilities necessary to support the overhaul, repair, modification and test of the C-5 workload are unique to SA-ALC. These workloads are associated with commodity groups 1C1, 2B, 2C, 2D, 2E, 2G, 2H, 2I, 2J, and 12A These same capabilities will be utilized for the future C-17 workload at SA-ALC.

- SA-ALC is the sole source for the repair and modification of T-38. All the test facilities necessary to support the processes, equipment and facilities associated with this workload are unique to SA-ALC. This workload is associated with commodity groups 1C4, 2B, 2C, 2D, 2E, 2G,2I, and 2J.

- SA-ALC is the sole source for the repair and overhaul of the following Gas Turbine Engines (GTE) and Secondary Power Systems (SPS). All the test facilities necessary to support the overhaul, repair, modification and test of GTE and SPS are unique to SA-ALC. This workload is associated with commodity groups 2B, 2C, 2H, 2I, and 3A.

- - GTCP-180-7
- - GTCP-85-70A
- - GTCP-397
- - GTC85-56
- - GTC85-72A
- - GTC85-180L
- - GTCP85-180(C)
- - GTCP165-1
- - GTCP85-180L
- - GTC85-106A
- - GTCP36-50
- - PATRIOT
- - GTC85-71A
- - GTCP-180-5
- - F-15 Secondary Power System (SPS)
- - F-16 Secondary Power System (SPS)
- - F-16 Engine Start System (ESS)
- - Conventional Starters

- SA-ALC is the sole source for the overhaul, repair, modification and testing of nuclear and nuclear related components of reentry vehicles. All the test facilities necessary to support this workload are unique to SA-ALC. This workload is associated with commodity groups 4A and 10C.

- SA-ALC is the sole source for some Life Support System Components. All the test facilities necessary to support the overhaul, repair, modification and test of these components are unique to SA-ALC. This workload is associated with commodity groups 2I, 2J, and 3A.

- SA-ALC is the sole source of repair for pneudraulics/hydraulics components and fuel accessories repair of the F100, TF39, T56 engines and GTE repaired at SA-ALC. As such, the overhaul, repair, modification and test facilities necessary to support these workloads are unique to SA-ALC. These workloads are associated with commodity groups 2C, 2H, and 3A.

- SA-ALC is the sole source for Automatic Test Equipment (ATE) and related software for support equipment for various weapon systems including B-1B, F-111, F-15, F-16, C-5, and general purpose equipment C-17 in the future. All the test facilities necessary to support this workload is unique to SA-ALC. This workload is associated with commodity groups 2G, 12A, and 12B.

*b. **Test Facility:*** Jet Engine Test Cell Facility

(6.1) Describe Uniqueness/Peculiarity:

- The SA-ALC Engine Test Facility provides for the testing of the F100-PW-100/200/220E/ 220/229 (F-15 & F-16 A/C) engines, the TF39-GE-1C (C-5 A/C) engine, and the TF39 EBU (Engine Build-Up Unit). In addition, SA-ALC is the only DoD installation that currently has the capability to test the Allison T56 engine in both propeller and dynamometer turboshaft cells. Engine testing is one of the most critical, mission essential elements in the depot overhaul process as it provides the most accurate, quantifiable measure of system effectiveness. The Jet Engine Test facility at SA-ALC is a state-of-the-art complex with eight independent cells as well as the engine adapters, software, test equipment and skilled jet engine mechanics and test cell operators required to perform all mandatory testing procedures as well as other specialized procedures for the engines mentioned above. Although other similar test cell facilities exist within the DoD and the Air Force, none can match SA-ALC's current capabilities without extensive MILCON costs along with the purchase of engine adapters and other specialized support equipment unique to SA-ALC.

- The modernization and construction of the current test cell complex at SA-ALC began in FY86, and was completed in 1991. The Military Construction Project provided for the modernization and upgrade of 40 year old test cells and added 55,000 square feet of new environmental controlled production (build-up) areas with twenty one engine work stations. Additional follow-on AF projects provided for test cell and preparation equipment and an overhead mechanized crane/monorail material handling system. Because of the flexibility and versatility stressed in the overall design of test cell modernization and upgrade efforts, with the proper engine adapters, the facility is capable of testing any turbofan, turbojet or turboshaft engine in the DoD inventory.

- The current test cell configuration includes four universal, turbofan and turbojet, multi-engine capable test cells, two T56 turboshaft propeller test cells, and two T56 dynamometer test cells. All test cells utilize the SA-ALC Pacer Comet III Automated/Computerized Engine Test and Data Acquisition engine test system. The four universal cells are capable of testing any 100,000 pound thrust class High By-Pass Turbofan engine or any 60,000 pound thrust class After-Burning engine with the proper adapter equipment. The Test Cell Facility employs Quick Engine Connect (QEC) Test Adapters, a Mechanized Material Handling System, Inlet Air Turning Vanes, and a Noise Abatement Treatment System. The mechanized material handling systems allows for the speedy exchange of engines being readied in the prep area with engines in the test cells so that the cells can be used almost continuously if required. Test cells in the field would have to be "loaded" and "unloaded" manually.

- The Pacer Comet (PC III) engine test system currently used at Kelly AFB, Edwards AFB, and Tinker AFB was completely organically developed and installed, both hardware and software, by SA-ALC personnel. It incorporates standard "off the shelf" equipment and modular software design to make it easily maintainable. PC III also features fully automated closed loop testing control while still allowing the operator the option to perform the testing manually. It is a user friendly system with color parameters on large display monitors. It has been in use at Kelly since September 1983 to test over 17,000 engines. Development is currently underway to install PC III system at Charleston AFB to test the F117 engine from the C-17. Saudi Arabia has also requested a bid from SA-ALC personnel for PC III installation costs in their country.

Additionally, modifications are also underway to allow for testing of the Allison 0404 GTE from the Patriot Missile Launcher for the Army.

- The SA-ALC Test Cell Facility has an Automatic Vibration Diagnostic (AVID) system which combines electronic hardware and software with installed vibration pick ups and test cell instrumentation allowing SA-ALC to collect and analyze vibration data from F100 models 100,200,220, TF39-1C, and T56 models A7, A9, and A15 engines. Excessive engine vibration causes the AVID System to generate diagnostic information. This information is presented to the test cell operator who can adjust the engine in the test cell. Such adjustments include trim balancing or other minor repairs. The vibration malfunction may not be correctable in the test cell, in which case, diagnostic indications of low or high rotor anomalies are available to rework personnel to identify and repair the malfunction. The diagnostics consist of frequency spectrum plots, other charts, and tables indicating sources of vibration such as low/high rotor imbalance, shift, increased flexibility, bowing, seal rub and accessories vibrations.

- The SA-ALC Facility is also capable of performing Accelerated Mission Testing (AMT) or Accelerated Accelerated Mission Testing (A2MT) for the F100-PW-100/200 engines in test cells 57-60. These tests duplicate in-service conditions of a seven year period in the field in a compressed time frame. Usually, these tests are approximately 3000-4000 cycles long and can be performed in a couple of months. Current test profiles include F-15 and F-16 air-to-ground and air-to-air missions or sorties. These tests provide valuable information concerning Component Improvement Program (CIP) repairs, serve to validate depot- and contractor-developed repairs, can be used to certify new vendors, and allow for the collection of disc crack growth and Lead the Fleet data.

- One final capability of the SA-ALC Test Cell Facility is its Gas Path Analysis (GPA) system. GPA is the process of determining engine overall performance individual module performance, and sensor performance from any specified set of engine related measurements through the thermo-mathematical relationships that exist among them. The method involves relating independent and dependent parameters through the fundamental physical equations that describe gas turbine engine operation. The dependent parameters are generally the measurable physical quantities such as pressure and temperature at various stations, engine RPM, fuel flow and thrust. The independent parameters consist of performance quantities such as compressor and turbine efficiency, pumping capacity, turbine inlet temperature, compressor bleed air and turbine nozzle area, items which are normally not measurable directly but best describe performance of individual engine components. Discernible changes taking place in observable parameters are used by the GPA model to detect physical faults. Typically these faults encompass some combination of problems such as erosion, corrosion, fouling, built up dirt, foreign object damage (FOD), worn seals, and burned or bowed blades. Currently the GPA models, developed by Hamilton Standard, available for use at SA-ALC include F100 models 100,200,220 bare engine, TF39-1C bare engine, and TF39-1C EBU.

(6.2) Reasons Required for Maintenance: Engine testing is required to ensure overhauled engines meet or exceed the specifications set in Air Force Technical Orders.

(6.3) Describe Testing Alternatives: Depot (100,000 lb. rated) test cells are required to perform engine testing for depot maintenance for the F100, TF39 and T56 engines. However,

abridged testing may be performed in field level test cells and hush houses. At Kelly AFB, abridged testing for the F100 engine may be performed at the Texas Air National Guard (149th) hush house with its M-37 Test system. As noted earlier, with the proper software and adapters, the testing for the TF39 engine can be accomplished in the single test cell recently completed at Charleston AFB. Also, test cells at Dover AFB, Travis AFB and Altus AFB are capable of testing the TF39 Engine. However, even together , these cells (accounting for increased routing time) would be hard pressed to accommodate the volume and schedule requirements driven by the combined needs of the depot and JEIM at SA-ALC.

b. Test Facility: Advanced Fuel Accessories Repair and Test

(6.1) Describe Uniqueness/Peculiarity: Bldg 345, the Advanced Fuel Accessories Test Facility (AFATF) houses the Advanced Fuel Accessories Test System (AFATS). The facility was constructed with special design features to accommodate the configuration and goals of AFATS. The design features include reduced air conditioned space, test areas to house and support test stations and operators, pump rooms built to keep pump noise from the test areas, and utility distribution designed to provide for optimum utilization of space. AFATF and AFATS represent a totally new concept of equipment and facility overtly designed in concert to produce specifically identified improvements.

(6.2) Reasons Required for Maintenance: The Advanced Fuel Accessories Test System (AFATS) is a unique system of equipment designed to include AFATS for reduced energy cost, improved testing reliability, improved production flexibility, increased throughput and capability to support future workloads. Test Stations are fully automated and test a large suite of different engine and airframe fuel accessories (pumps, valves, fuel controls, atomizers, etc.).

(6.3) Describe Testing Alternatives: Alternatives to AFATS/AFATF would be to use various separate manually-operated antiquated equipment designed with test capability for a few items. Test capability for new workload could not be integrated into existing equipment and would require purchase of additional equipment. Productivity would decrease and additional manpower and equipment maintenance would be required.

c. Test Facility: Cryogenic Spin Test Facility

(6.1) Describe Uniqueness/Peculiarity:

- The Cryogenic Spin Test Facility at SA-ALC is an unique form of possibly destructive testing. The Cryogenic Spin Test is used to screen for flaws which, due to their size or location within the part, are not reliably detectable through other non-destructive means. This process, used exclusively to test 1st, 2nd , and 3rd Stage disks of the F100-PW-100/-200/-220 engines, was designed to test the titanium 6-2-4-6 alloy which is subject to low cycle fatigue failure.

- The first step of the process is a pre-balance of the disk test assembly, the test assembly being comprised of the disk, tooling weights, and a dishpan mounted on a 1/2 inch titanium shaft. The dishpan assembly is designed to simulate the operational effects of other engine stages during the test.

- The balanced assembly is loaded into the spin pit, mounted by the shaft, through a high speed motor. The insulated pit is then flooded with liquid nitrogen and the assembly is cooled to approximately -320°F. The pit is actually a containment vessel design to safely absorb the impact of a failure at 15,000 rpm. The insulation liner is backed by a wall of lead brick and an outer wall of laminated steel six inches thick.

- After cooling, the pit is drained and a vacuum is pulled to eliminate turbulence in the pit during the spin. The test assembly is spun to 15,000 rpm and held at speed for one minute. The high speed motor is then disengaged and the assembly free spins to a stop some twenty minutes later. At this super cooled temperature any flaws in the disk will rapidly propagate to failure and the disk will shatter.

- A successful test is a reliable indication that no critical flaws exist in the component. Due to realignment of the intermetallic bonds during the spin process the strength of the alloy is actually improved. The overhaul interval for the part is extended from 1800 to 3000 cycles and follow on tests can extend the component life from 6000 to 9000 cycles.

- The facility consists of 5 cryogenic spin systems, a computerized control system in a raised control room, two liquid nitrogen plumbing systems, two vacuum plumbing systems, balancing machines, and work benches for fixturing and general set up procedures. Each spin system includes an insulated spin pit, liquid nitrogen and vacuum plumbing connections, high speed motor and a control panel. The five spin pits are plumbed on two vacuum systems allowing two simultaneous tests and continued system operations following a test failure.

- The facility at SA-ALC is unique and is not matched at any other DoD installation. This is also the only facility of its type in the U.S.

(6.2) Reasons Required for Maintenance:

- There is a TCTO for the F100 inlet fan that requires this specific type of test. Since there is no other source for this type of testing, it must be performed at the depot.

(6.3) Describe Testing Alternatives:

- As noted, there is no other suitable, cost effective alternative in the DoD to perform these tests. Cryogenic spin testing is unique to SA-ALC and would have to be relocated or duplicated if Kelly were closed. The original equipment manufacturer estimates that it would cost $10 million to relocate the equipment alone and $37.5 million to duplicate the entire facility.

d. Test Facility: Gas Turbine Engine (GTE) Repair and Test

6.1 Describe Uniqueness/Peculiarity: Construction of a unique 132,949 sq ft, $16.5M GTE Repair Facility (Bldg 331) was completed in September 1993. It will take approximately 18

months from construction completion to relocate 23 test systems, seven assembly shops, five routed items shops and nine administrative support areas. The GTE facility maximizes efficiencies by collocating the various assembly and test processes in a specialized facility. The new facility provides controlled environments for component assembly areas and is also designed for maximum flexibility so that new workloads can be easily accommodated. The test cells have current technology utility; systems which provide improved test parameter control. Bldg 331 also provides improved safety for the workers. Product flow through high traffic areas has been eliminated and the carbon dioxide (CARDOX) fire protection system has been replaced by a water based foam system which eliminates the suffocation hazard associated with CARDOX. An additional feature of Bldg 331 is an approximate 42,212 sq ft of controlled areas (Class 300,000) used for assembling GTEs and Secondary Power System components. The 300,000 Classification means "no more than 300,000 particles 0.5 micron and larger per cubic foot of air" which we refer to as "near" clean room conditions. By achieving this is Bldg 331, SA-ALC has become compliant with Air Force Tech Orders and no longer operates under waivers. In addition, the 28 Voltage Direct Current (VCD) electrical system serves the facility test cells and the water brake system provides recirculating water for the water dynamometer which simulates load on GTEs and SPS components during testing.

*6.2 **Reasons Required for Maintenance:*** Bldg 331 is a mission essential unique facility which supports various Weapon Systems in the Air Force. SA-ALC repairs approximately 1,000 GTEs annually.

*6.3 **Describe Testing Alternatives:*** Depot Maintenance could not be performed without these unique specialized facilities. Efficient and quality production of serviceable engines and components is dependent upon this or a like facility constructed with the same state-of-the-art capability and capacity.

*e. **Test Facility:*** Unified Fuel Control Test Facility

(6.1) Describe Uniqueness/Peculiarity:

- The Unified Fuel Control Test Facility at SA-ALC is an unique facility dedicated to perform all of the inspections, repairs, and testing procedures required to produce serviceable Unified Fuel Controls (UFCs) for the F100-100/200 engines. Although it is primarily dedicated to On Condition Maintenance (OCM) for the F100 UFC, it also possesses the capability to overhaul and test fuel nozzles for the F100, T56, and TF39 engines, the fuel controls for the TF39 and T56 engines, and finally fuel atomizers for smaller Gas Turbine Engines. These latter capabilities are not unique or peculiar to SA-ALC but are still an important part of the facilities capabilities.

- Since its inception in March 1977, the UFC Repair Section has processed over 13,500 F100 Engine UFC's. The facility has the capability to perform major and minor repair, safety enhancement modifications, and reliability upgrades on the components listed above. All inspection, maintenance and testing tasks are developed and accomplished in compliance with Air Force T.O.'s. The extent of the repair under the OCM concept is determined by the in-place

OCM team, which reviews historical data, analyses malfunction data, and determines the most expeditious method for the specific repairs.

- The most unique feature of the entire facility is its testing capability. The **UFC test stands** are computer controlled electro- and hydromechanical systems designed to simulate the conditions and inputs the UFCs and fuel nozzles will face in operation to see if they respond and operate correctly. They display information through both analog gauges and computer screens. Software allows operators to troubleshoot and identify faults and then suggests the proper repairs. The control system that manipulates all of the various inputs and measures the results is the key to the technology. The **fuel nozzle test stands** operate in much the same fashion. They are also electro-and hydromechanical computer controlled stands. They measure flow rate and allow for the manual measurement of flow pattern. These stands are unique in that they are designed to specifically test F100 engine fuel controls and that it is impossible to simply place these types of controls onto other stands and test them.

- Overall, there are 89 test stands dedicated to testing the UFC, whether as a total assembly or one of its major sub-assemblies. More specifically, there are: 33 stands to test the (whole up) UFC main fuel control; 10 stands to test the gas generator section; 6 stands to test the augmentor section; 17 stands to test the augmentor computer; 7 stands to test miscellaneous UFC sub-assemblies; and finally 16 stands that act as Electronic Engine Control (EEC) simulators. The fuel nozzle test stand capability includes: 5 F100 fuel nozzle test stands; 2 TF39 fuel nozzle test stands; 2 T56 fuel nozzle test stands; and 2 GTE Jet Fuel Starter fuel atomizer test stands. Finally, the facility has the capability to test TF39 and T56 engine fuel controls with 6 TF39 Fuel Control test stands and 8 T56 Fuel Control test stands.

- The UFC testing area is classified as a Class I, Division II, group D hazardous testing area. This means that there are flammable gases and vapors in a location where there is high probability that an explosive concentration is present during normal plant operation. This mandates special facility and safety requirements. B348 meets all special ventilation, fire detection and suppression, and blast-proofing requirements. Along with the in-house repair and overhaul capabilities mentioned, this adds to the overall uniqueness of the UFC Test facility as a whole.

- Replacement cost for the 89 stands dedicated to the F100 UFC is estimated at $243 Million in FY90 dollars. It is important that this facility not be confused the Advanced Fuel Accessories Test Facility (AFATF) in B345 which houses the Advanced Fuel Accessories Test System (AFATS). While the facility is specially designed to test a number of fuel accessories for the various F100 engine models, it does not possess the capability to test the Unified Fuel Control, and there are no current plans to relocate any of the F100 UFC test stands to B345. The best generic explanation is that the UFC facility in B348 concentrates exclusively on testing F100 Unified Fuel Controls, while the AFATF in B345 concentrates on testing all other Non-UFC fuel accessories. While many of the processes are similar, and to some degree the test stands are similar, the capabilities do not in any way overlap. The equipment in each facility has been designed and modified to perform specific and separate tasks. However, the combination of the two facilities provides SA-ALC with one of the most advanced jet engine fuel accessory repair and test capabilities in the Air Force, and the DoD.

(6.2) Reasons Required for Maintenance:

- UFC testing is required to ensure overhauled UFCs meet or exceed the specifications set in Air Force Technical Orders. Stands must be tested both as "whole up" units as well as major sub-assemblies in order to assure the highest quality product is provided to the customer. The testing procedures also serve to simulate both the engine itself and the electronic engine controls in order to aid in trouble shooting and facilitate the evaluation of "real life" performance.

(6.3) Describe Testing Alternatives:

- As noted, the test stands described above are unique and the process cannot be readily completed on other equipment without extensive programming and physical changes.

f. Test Facility: Aircraft Non-Destructive Inspection (NDI)/X-Ray Facility

(6.1) Describe Uniqueness/Peculiarity: Completion of FY94 Add/Alter Military Construction Program (MCP) for NDI/X-ray Facility (Bldg 361) will provide state-of-the-art inspection capability and substrate evaluation for C-17, C-5 and smaller aircraft. This MCP will begin in June 1994 and is scheduled for completion in September 1995. The MCP will renovate 56,000 square feet of existing hangar space with 44 foot clear height. New NDI film processing, evaluation, and office space will be constructed in the hangar for complete NDI capabilities within one facility. An additional 17,000 square feet of high bay hangar space will be constructed with 80 feet clear height and supporting two new overhead telescoping platforms which will be used to perform the inspection on the aircraft. One is for personnel access and the other for positioning of the X-ray tube.

(6.2) Reasons Required for Maintenance: This NDI/X-ray facility is mission essential and will allow for complete NDI of large cargo aircraft, such as the C-5 and C-17. Complete NDI requires the use of equipment requiring a controlled, closed environment.

(6.3) Describe Testing Alternatives: The NDI equipment for a complete inspection cannot be accomodated for outdoor use. The limited NDI that can be accomplished outdoors is subject to the weather and other uncontrollable environmental influences. A MILCON would be required to provide full inspection capabilties at another site. This is based on a dedicated single use facility for hands-on access to the entire cargo sized aircraft and for inspection of composite materials.

g. Test Facility: Service Star Lab

(6.1) Describe Uniqueness/Peculiarity: The SA-ALC Nuclear Weapon Components Repair and Test (Environmental Stress Screening) Facility provides for the repair and testing of the ICBM reentry vehicle components; nuclear related related aircraft components and nuclear

munitions handling equipment. SA-ALC is the only DoD installation that has the capability to test these components due to the uniue test equipment and associated facilities.

The Multi-Use Centrifuge which is located underground thereby providing an added degree of protection to operation personnel, is capable of obtaining a maximum acceleration rate of 200 Gs. It has a capacity of 50,000 G-lbs and has an on-set rate of 50 Gs per second. Maximum payload capacity is 1000 lbs. It is used to test components by simulating G forces and timing intervals required to arm the fuses or reentry vehicles and certain missiles.

The High Impulse Transducer Test System is the only known tester capable of testing the High Impulse (impact) Transducers found on ICBM reentry vehicles. The MK21 High Impulse Transducer is a high performance piezoelectric accelerometer for operation up to 100 kgs of acceleration. The test system conducts performance tests by producing a controlled haversine mechanical shock event which produces up to 100 kgs to excite the High Impulse Transducer. The electrical response is recorded and analyzed for proper response.

The Altitude Temperature Test Chamber provides a thermal cycle/altitude test environment. Temperature ranges from -10 to +350 degrees Fahrenheit; holding time is indefinite throughout the range; and temperature is redundant after stabilization at the control sensor. The chamber can simulate altitudes to 200,000 ft. Internal dimensions are 3 ft deep by 3 ft high by 3 ft wide. The chamber is used to simulate the conditions in which nuclear components will experience in flight or to stress the components to certain maximum limits.

The Shielded Cable Tester uses a pass/fail criteria that is based on the component's original specifications, weapon system level Electromagnetic Pulse (EMP) test data, and the cable's baseline test data. The resulting pass/fail criteria allows for a reasonable amount of degradation in most cables, thereby reducing cable repair requirements while insuring the survivability of the host system (reentry, vehicle, attack missile, etc).

The three above ground Accelerator, Rotary Centrifuges have a capability of accelerating a 150 lb payload to 150 Gs at a radius of 63 inches. The unit has a capacity of 22,500 G-lbs and the payload radius can be set from 36 to 63 inches. The payload areas is made up of a 24-in by 24-in platform. Those centrifuges provide an autobalance capability which will balance loads up to a 10 lb difference thereby decreasing unnecessary vibration and wear. The maximum acceleration/decelleration rates range from 0 Gs to 150 Gs to 0 Gs in 15 seconds. These centrifuges are used to test individual weapon system component by simulating the G forces and timing intervals needed to trigger certain responses in reentry vehicle and missile components.

A Shock Machine Test System is also available to subject components to various levels and types of shock stress. A Lansmont 65/81 free-fall shock test machine is controlled from a rack mounted pane. The table size is 25 x 32 inches, with a maximum specimin weight of 500 lbs. There is an acceleration monitoring instrument with max acceleration of 600 Gs or 30,000 Gs (with dual mass shock amplifier) and a min/max pulse duration of 2 msec min/80msec max

velocity change of 32 ft per second. This test machine produces half sign and terminal peak sawtooth pulse waveforms using the shock pulse program for control.

A special storage room is used for the storage of ICBM test components. This room, known as the Isothermal Storage Room, is a controlled access storage area. The room is dust-free and temp/humidity controlled. The room is monitored for operation limits of 70+/- degrees Fahrenheit and 40%+/-20% humidity.

The Thermotron Temperature Chamber is used to stress components. The temperature chamber is programmable with a temperature variance capability of -100 degrees Fahrenheit tp +300 degree Fahrenheit. It has a capability to control the rate of temperature change from 0 to 9 degrees Fahrenheit per minute.

(6.2) Reasons Required for Maintenance: The SA-ALC Service Star Lab nuclear weapon system component testing is required to ensure repaired systems and components meet or exceed the specification set in Air Force Technical Orders.

(6.3) Describe Testing Alternatives: Testing would have to be contracted out after locating companies having the necessary security clearances, proper test equipment and facilities.

h. Test Facility: Shielded Microwave Anechoic Antenna Test Facility

(6.1) Describe Uniqueness/Peculiarity: The only facility currently capable of supporting tests on the Minuteman III Intercontinental Ballistic Missile (ICBM) MK-12 Reentry Vehicle (RV) radar antenna is the anechoic chamber at SA-ALC. The RV delivers the warhead to target. Tests are critical to assess reliability. No other anechoic chamber in the Air Force is capable of absorbing the frequency range of MK-12 radar only (frequency is classified). The Radio Frequency (RF) shielded rectangular enclosure has an overall dimension of 36 feet deep by 15 feet wide by 12 feet high.

(6.2) Reasons Required for Maintenance: An anechoic chamber designed to specific classified radar frequencies is mission essential to assessment of ICBM reliability.

(6.3) Describe Testing Alternatives: Another Air Force anechoic chamber would have to be retrofitted with unique absorbent material for a specific frequency range and could not be utilized for non-nuclear operations without another retrofit.

i. Test Facility: Textile Laboratory

(6.1) Describe Uniqueness/Peculiarity:

- SA-ALC owns the only Air Force industrial laboratory with the peculiar capability of providing textile testing. It is equipped with a variety of test equipment such as computerized tensile testers, weatherometers, laundrometers, a thermoanalyzer, and an infrared spectrophotometer.

(6.2) Reasons Required for Maintenance:

- This facility allows SA-ALC to perform and develop test procedures on textile materials and any components used in end item life-support equipment. It performs all first article life-support inspections. The laboratory also supports the Navy, Army and Forestry Service with their testing requirements for life-support materials and equipment.

(6.3) Describe Testing Alternatives:

- Requires a search and qualification of a suitable contractor.

j. Test Facility: Nuclear Weapon Components Repair and Test Facility (Environmental Stress Screening)

(6.1) Describe Uniqueness/Peculiarity: The SA-ALC Nuclear Weapon Components Repair and Test (Environmental Stress Screening) Facility provides for the repair and testing of ICBM reentry vehicle components; nuclear related aircraft components, and nuclear munitions handling equipment. SA-ALC is the only DoD installation that jas the capability to test these components due to the unique test equipment and associated facilities.

The Multi-Use Centrifuge which is located underground thereby providing an added degree of protection to operation personnel, is capable of obtaining a maximum acceleration rate of 200 Gs. It has a capacity of 50,000 G-lbs and has an on-set rate of 50 Gs per second. Maximum payload capacity is 1000 lbs. It is used to test components by simulating G forces and timing intervals required to arm the fuses or reentry vehicles and certain attack missiles. (TO 11N-TRV5126-2, 23 May 85)

The High Impulse Transducer Test System is the only known tester capable of testing the High Impulse (impact) Transducers found on ICBM reentry vehicles. The MK21 High Impulse Transducer is a high performance piezoelectric accelerometer for operation up to 100 kgs of acceleration. The test system conducts performance tests by producing a controlled haversine mechanical shock event which produces up to 100 kgs to excite the High Impulse Transducer. The electrical response is recorded and analyzed for proper response. (TO-11N-TRV5487-1, 1 Aug 94)

The Altitude Temperature Test Chamber provides a thermal cycle/altitude test environment. Temperature ranges from -10 to +350 degrees Fahrenheit; holding time is indefinite throughout the range; and temperature is redundant after stabilization at the control sensor. The chamber can simulate altitudes to 200,000 ft. Internal dimensions are 3 ft deep by 3 ft high by 3 ft

wide. The chamber is used to simulate the conditions in which nuclear components will experience in flight or to stress the components to certain maximum limits. (Instruction Manual 27ST-35350, undated)

The Shielded Cable Tester uses a pass/fail criteria that is based on the component's original specifications, weapon system level Electromagnetic Pulse (EMP) test data, and the cable's baseline test data. The resulting pass/fail criteria allows for a reasonable amount of degradation in most cables, thereby reducing cable repair requirements while insuring the survivability of the host system (reentry, vehicle, attack missile, etc). (TO 11N-CRV5036-1, 1 Jul 93)

The three above ground Accelerator, Rotary Centrifuges have a capability of accelerating a 150 lb payload to 150 Gs at a radius of 63 inches. The unit has a capacity of 22,500 G-lbs and the payload radius can be set from 36 to 63 inches. The payload areas is made up of a 24-in by 24-in platform. Those centrifuges provide an autobalance capability which will balance loads up to a 10 lb difference thereby decreasing unnecessary vibration and wear. The maximum acceleration/decelleration rates range from 0 Gs to 150 Gs to 0 Gs in 15 seconds. These centrifuges are used to test individual weapon system component by simulating the G forces and timing intervals needed to trigger certain responses in reentry vehicle and missile components. (TO 11N-TRV5445-2, 11 Aug 92)

A Shock Machine Test System is also available to subject components to various levels and types of shock stress. A Lansmont 65/81 free-fall shock test machine is controlled from a rack mounted pane. The table size is 25 x 32 inches, with a maximum specimin weight of 500 lbs. There is an acceleration monitoring instrument with max acceleration of 600 Gs or 30,000 Gs (with dual mass shock amplifier) and a min/max pulse duration of 2 msec min/30msec max velocity change of 32 ft per second. This test machine produces half sign and terminal peak sawtooth pulse waveforms using the shock pulse program for control. ((Users Manual MM-482, 21 Jun 88)

A special storage room is used for the storage of ICBM test components. This room, known as the Isothermal Storage Room, is a controlled access storage area. The room is dust-free and temp/humidity controlled. The room is monitored for operation limits of 70+/- degrees Fahrenheit and 40%+/-20% humidity.

The Thermotron Temperature Chamber is used to stress components. The temperature chamber is programmable with a temperature variance capability of -100 degrees Fahrenheit tp +300 degree Fahrenheit. It has a capability to control the rate of temperature change from 0 to 9 degrees Fahrenheit per minute.

(6.2) Reasons Required for Maintenance: Nuclear Weapon System Component teting is required to ensure repaired systems and components meet or exceed the specifications set in Air Force Technical Orders.

(6.3) Describe Testing Alternatives: Testing would have to be contracted ou after locating copanies having the necessary security clearance, proper test equipment and facilities.

k. Test Facility: Integrated Support Facility (Bdlg 178)

(6.1) Decribe Uniqueness/Peculairity: The Integrated Support Facility (ISF) is unique in that it is the only building designed from the outset, as a software engineering facility to support Mission Critical Computer Resources (MCCR) workloads. The unique workloads supported within this building include: C-5 and C-17 Operation Flight Programs, Turbine Engine Monitoring System, (TEMS) for the A-10 and F-111, MADARS, F16 AIS, and many testers that have been specifically set up to test itemswhich only Kelly AFB repairs. The facility currently provides 80,000 sg ft of space with closely controlled air conditioning, conditioned power, and reaised flooring all designed to enhance the eddiciency ans effectiveness of software engineering efforts. The entire building is designed with software development and testing in mind. Half the building is set up to house testers and test equipoment that provides unique testing and softweare support efforts. The other half of the building was designed to allowcommnuications with the tester side while providing a programming atmosphere. Currently a $4.1 million addition is underway which well ass an additional 40,000 sg ft (20,000 sg ft of which was justified for C-17 OFP support). Unique equipment includes: MADARS (which supports data recording on the C-5 aircraft), IATS (which provides testing and capability for monitoring equipment on-board the A-10, KC-135R and the F-111 aircraft), and many other small testers that have been modified to supportspecific workloads. In addition to its unique equipment and workload, the ISF houses a diverse group of professionals built from thelocal communnity and surrounding area. These include engineers and technicians who have vast experience and capabilities in the areas of Automatic Test Equipment (ATE), Operational Flight Programs (OFP), and many other software and hardware areas.

(6.2) Reasons Required for Maintenance: SA-ALC's ISF was specifically designed and equipped to provide software engineering support to unique assigned MCCR workloads.

(6.3) Describe Testing Alternatives: Testing alternatives would require establishment of another software facility(ies) with the testers spefiically modified to support the unique wokloads. To provide maximum efficiency, the alternative facilities should be collocated with the source of repair for the MCCR's correllary weapon system or end-item application.

Facilities and Equipage, continued

7. Buildings and Their Condition

7.1 List the buildings used to perform the depot maintenance functions by category code numbers (five or six digit CCNs), identifying their current condition (adequate, substandard, and inadequate) in Table 7.1 in thousands of square feet (KSF).

Table 7.1: **Facility Conditions**

CCN	Facility Type	Condition / Area (# KSF)			Comments
		Adequate	Substandard	Inadequate	
121124	Hydr Fl, Bldg	1			
125977	Pmp Stn, LF	1			
111311	Comm Fclty	1			
141764	Integr Spt Fclty	79			
141765	Lab, Q/C Dep	39	16		
141821	Mat Proc Dep	42			
141763	Tech Lab	11			
171621	Tech Tng Clsrm	3			
211116	HG, Maint Dep	571			
211152	Shp Acft Gen/Pur	409	167	1	
211153	Shp NDI	10			
211154	Shp A/M Orgl	96	7		
211157	Shp Jet Eng I/Mnt	713			
211159	Acft Cor Con	244	13		
211174	Consol Acft Maint	3			
211175	Maint Dock, M/A	17			
211183	Test Cell	114	19		
211193	Test Std				
211251	Shp Turbine Dep	137	206	43	
211254	Shp Acft Eng Dep	239	88		
211256	Shp Eng Tst & Stor/D	28			
211271	Shop Instm Ovhl Dep		3		
215553	Shp, A/WPN/O Dep	6			
217712	Shp, Avionic	185	26		
217736	Shp, Radom O&T/D	37			
217762	Shp, Navaid		7		
218852	Shp Surv Equip	29			
218868	Lab, PME	48	33		
218712	Shp A/SE Stor Fclt	4			
221229	Prod Acft Comp Mfg	15			

228228	Prod Misc Proc	40			
319441	Equip Rsch Lab	6			
441257	Hazard Stor, Dep	8	6	10	
441628	Shed Sup & Equip Dep	71			
441758	Whse Sup & Equip Dep		94	76	
442628	Shed Sup & Equip Bse	1			
610675	Log Fclty Dep Ops	318	375		
610711	DPI	10			
723392	San Latrine	21			
730839	Traffic Chk Hse	6			
821117	Htg Fclty Bldg		2		
821156	Steam Fclty	1			
821168	Wst Trmt Bldg	1			
890123	Air Cond Plnt Bldg	16	4		
890136	Cmprs Air Plt Bldg	20			
890187	Util Vault	2			
890197	Weight Scale	1			
	TOTAL	3604	1016	130	

Facilities and Equipage, continued

7.2 In Table 7.2.a, identify space available for expansion by building type for those facility category code numbers (five or six digit CCNs) that are most important to your mission. An activity's expansion capability is a function of its ability to reconfigure/rehabilitate existing underutilized facilities to accept new or increased requirements.

Table 7.2.a: **Space Available for Expansion**

Building ID / Type	CCN	Installation Space (KSF)			Total
		Adequate	Substandard	Inadequate	
B178	141764	33.0			33.0
B300	218868	10.0			10.0
B301	211152	1.3			1.3
B305	217712	16.0			16.0
B306	217712	16.0			16.0
B308	217712	58.1			58.1
B323	211254	24.8			24.8
B324	211152	105.9			105.9
B326	217712	9.4			9.4
B329	211251	53.4			53.4
B333	211254	.4			.4
B347	211254		70.3		70.3
B348	211254	5.0			5.0
B351	211254	2.0			2.0
B360	211157	61.8			61.8
B375	211254	12.7			12.7
B655	211183	1.5			1.5
B1420	610675	7.1			7.1
	TOTAL:	418.4	70.3		488.7

* ADDITIONAL 999.8 KSF AVAILABLE IF REMOVED FROM THE DEMOLITION LIST

Building ID / Type	CCN	Installation Space (KSF)			Total
		Adequate	Substandard	Inadequate	
B178	141764	33000			33000
B300	218868	10000			10000
B301	211152	1287			1287
B305	217712	16000			16000
B306	217712	16000			16000
B308	217712	58108			58108
B323	211254	24815			24815
B324	211152	105887			105887
B326	217712	9400			9400
B329	211251	53390			53390
B333	211254	357			357
B347	211254		70267		70367
B348	211254	4968			4968
B351	211254	2000			2000
B360	211157	61825			61825
B375	211254	12669			12669
B655	211183	1505			1505
B1420	610675	7100			7100
SUBTOTAL		418311	70267		488578
ON DEMO LIST					
B340		42685			42685
B170			60801		60801
B172				91222	91222
B184			5695		5695
B343				1533	1533
B366				113107	113107
B1566			162810		162810
B1562			60000		60000
B1560			167307		167307
B1564				128612	128612
B1556				166096	166096
SUBTOTAL		42685	456613	500470	999768
	TOTAL:	460996	526880	500470	1488346

*ADDITIONAL 999.8 KSF AVAILABLE IF REMOVED FROM THE DEMOLITION LIST

Facilities and Equipage, continued

8. Unique and/or Peculiar Capabilities and Capacities

8.1 What unique and/or peculiar capabilities and capacities does the depot maintenance activity possess?

Depot Maintenance Capability/Capacity | Describe Why Unique/Peculiar

8.2 Separately list the depot maintenance facilities and equipment which are one of a kind within the Service and/or DoD.

Facility/Equipment | Describe Why It is One of a Kind

a. SA-ALC is sole Source of Repair (SOR) for the following workloads:

- SA-ALC is the sole source for the F100 family of engines and T56 and TF39 engines. All the test facilities necessary to support the overhaul, repair, modification and test of these engines are unique to SA-ALC. This workload is associated with commodity groups 3A, 2G, 2J, and 2C.

- SA-ALC is the soul source for C-5A, C-5B, C5 Speedline, and C-5 related workload. All the test facilities necessary to support the overhaul, repair, modification and test of the C-5 workload are unique to SA-ALC. These workloads are associated with commodity groups 1C1, 2B, 2C, 2D, 2E, 2G, 2H, 2I, 2J, and 12A These same capabilities will be utilized for the future C-17 workload at SA-ALC.

- SA-ALC is the sole source for the repair and modification of T-38. All the test facilities necessary to support the processes, equipment and facilities associated with this workload are unique to SA-ALC. This workload is associated with commodity groups 1C4 2B, 2C, 2D, 2E, 2G,2I, and 2J.

- SA-ALC is the sole source for the repair and overhaul of the following Gas Turbine Engines (GTE) and Secondary Power Systems (SPS). All the test facilities necessary to support the overhaul, repair, modification and test of GTE and SPS are unique to SA-ALC. This workload is associated with commodity groups 2B, 2C, 2H, 2I, and 3A.

- - GTCP-180-7
- - GTCP-85-70A
- - GTCP-397
- - GTC85-56
- - GTC85-72A
- - GTC85-180L

- - GTCP85-180(C)
- - GTCP165-1
- - GTCP85-180L
- - GTC85-106A
- - GTCP36-50
- - PATRIOT
- - GTC85-71A
- - GTCP-180-5
- - F-15 Secondary Power System (SPS)
- - F-16 Secondary Power System (SPS)
- - F-16 Engine Start System (ESS)
- - Conventional Starters

- SA-ALC is the sole source for the overhaul, repair, modification and testing of nuclear and nuclear related components of reentry vehicles. All the test facilities necessary to support this workload are unique to SA-ALC. This workload is associated with commodity groups 4A and 10C.

- SA-ALC is the sole source for some Life Support System Components. All the test facilities necessary to support the overhaul, repair, modification and test of these components are unique to SA-ALC. This workload is associated with commodity groups 2I, 2J, and 3A.

- SA-ALC is the sole source of repair for pneudraulics/hydraulics components and fuel accessories repair of the F100, TF39, T56 engines and GTE repaired at SA-ALC. As such, the overhaul, repair, modification and test facilities necessary to support these workloads are unique to SA-ALC. These workloads are associated with commodity groups 2C, 2H and 3A.

- SA-ALC is the sole source for Automatic Test Equipment (ATE) and related software for support equipment for various weapon systems including B-1B, F-111, F-15, F-16, C-5, and general purpose equipment C-17 in the future. All the test facilities necessary to support this workload is unique to SA-ALC. This workload is associated with commodity groups 2G,,12A, and 12B.

b. Depot Maintenance Capability/Capacity: Aircraft Maintenance Hangar (Bldg 375)

(8.1) Describe Why Unique/Peculiar: Bldg 375 is one of the largest hangars of its type (permanent bridge construction) in the world and is still recognized as a major engineering structural feat. Initially built at a cost of $11 million, Bldg 375 has a present replacement cost of over $88 million.

(8.2) Facility/Equipment: The entire building contains over one million square feet of floor space. The hangar floor covers a 600,000 square foot area; 300 feet wide by 2,000 feet long. The backshop area covers over 412,000 square feet of floor space and provides

manufacture/repair support for aircraft exchangeable workloads. The administrative area is located on the second floor and has 63,000 square feet of office space.

Describe Why It is One of a Kind: This unique building contains a number of facility characteristics which enhance the C-5 production capability. The 59-foot high hangar doors and three track-mounted bridge cranes in the hangar have enabled the facility to accommodate up to six C-5 aircraft simultaneously for Depot Level Maintenance. An additional 10,000 pound capacity remote controlled hoist has been installed inside the southwest corner of the hangar for removal of the C-5 horizontal stabilizer. This allows floor level PDM inspection and repair of the horizontal stabilizer and allows access to the vertical stabilizer per T.O. 1C-5A-3. The hangar has been modified to accept four C-5s in the jacked configuration by providing pockets in the overhead structure to allow clearance for the vertical stabilizer. This allows the four aircraft to remain on jacks without exposure to weather conditions and additional aircraft can be nosed in through the two west side doors for on-aircraft maintenance. These two aircraft can be totally enclosed when placed in the kneeled position, allowing a total of six C-5s to be secured inside the hangar.

b. Depot Maintenance Capability/Capacity: Aircraft Corrosion Control/Depaint (Bldg 379)

(8.1) Describe Why Unique/Peculiar: This facility is the only one of its size in DoD which utilizes a relatively new process, the Plastic Media Blasting (PMB), to remove coatings from airframes. SA-ALC has the only capability to strip C-5 cargo size or smaller aircraft. This revolutionary process eliminates the carcinogenic chemical paint strippers utilized for decades. In addition to the health benefits, substantial economic benefits are realized by replacing chemicals with the PMB process. Reduced manpower requirements, improved flow times, and reduction in material acquisition and disposal costs all contribute to the annual savings.

(8.2) Facility/Equipment: This new 76,500 square foot facility is the primary aircraft depainting facility at SA-ALC. State-of-the-art accessibility is afforded to any aircraft type or size via overhead "stacker" cranes. These platforms provide three-dimensional capability, traversing laterally and longitudinally along rails mounted in the truss work of the hangar structure. The work platform is mounted on, and can rotate around the bottom of a telescoping mast, providing the workers with excellent articulation and hands-on access to the entire aircraft.

Describe Why It is One of a Kind: SA-ALC has the only capability in DOD to accommodate large-bodied aircraft in conjunction with depot maintenenance that utilizes Plastic Media Blasting, an environmentally "clean" process, to remove airframe coatings from C-5A/B and smaller aircraft. It eliminates carcinogenic chemical paint strippers and reduces hazardous chemical waste by 72,000 gallons per year.

c. Depot Maintenance Capability/Capacity: Advanced Fuel Accessories Repair and Test

(8.1) Describe Why Unique/Peculiar: The Advanced Fuel Accessories Test Facility (AFATF) houses the Advanced Fuel Accessories Test System (AFATS). The facility was constructed with special design features to accommodate the configuration and goals of AFATS. The design features include reduced air conditioned space, test areas to house and support Test Stations and operators, pump rooms built to keep pump noise from the test areas, utility distribution is designed to provide for optimum utilization of space. AFATF and AFATS represent a totally new concept of equipment and facility overtly designed in concert to produce specifically identified improvements.

(8.2) Facility/Equipment: SA-ALC, faced with limited performance of antiquated equipment, embarked on a program to replace that special equipment with a system that encompassed a wide range of technical capabilities and provided improvements over existing technologies and design philosophies. The Advanced Fuel Accessories Test System (AFATS) is a unique system of equipment, designed for reduced energy cost, improved testing reliability, improved production flexibility, increased throughput and capability to support future workloads. Test Stations are fully automated and test a large suite of different engine and airframe fuel accessories (pumps, valves, fuel controls, atomizers, etc.), using MIL-C-7024 Calibration Fluid (CalFluid). Noise producing supply pumps are remotely located in separate pump rooms. Pump modules provide CalFluid to a group of Test Stations and produce only that amount of flow required at any time by all of the Test Stations served. This reduces energy consumption. Testing reliability is improved through "smart automation", which will not allow an item to be certified unless it passes all applicable tests. Built in Adjustment Diagnostics assists the operator in identifying which adjustment to make, how much to adjust and which tool to use. Fault Isolation tells the operator that the item cannot be calibrated and what repairs are needed or parts need replacement. Flexibility is improved by having a large number of Test Stations with the capability to test a large group of Fuel Accessories for the F-15, F-16, KC-135, C-130, C-5, A-10 and B-52 aircraft as well as ground power units. Interfaced Test Adapters eliminate the need for manually connecting the fuel accessory to the test stand. Productivity improvement,, which translates to customer cost savings, ranges from 25% to 45% test time reduction. This means reduced numbers of test stands and personnel needed for existing workloads or increased capacity to accept new and different workloads.

Describe Why It is One of a Kind: The combination of the facility and equipment is not found anywhere else in the DOD.

d. Depot Maintenance Capability/Capacity: T56 Dynamometer Test Cells

- **Description of Technology:** This capability allows the depot to test a variety of turboprop engines under a wide range of simulated operating conditions without actually using a propeller. They are, in effect, more adaptable than actual prop test cells and so are capable of testing any turboshaft engine in the DoD inventory.

(8.1) Describe Why Unique/Peculiar: - These dynamometer test cells and the skills and equipment required to operate them are unique to SA-ALC. No other DoD facility currently employs this means to test the Air Force -7 and -15 versions of the Allison T56 engine. It would require extensive MILCON and equipment costs to even move the dynamometers to another test cell facility. The cost of duplication depends on the scenario at the receiving center. It would cost roughly $12 million to construct two new cells and install the dynamometers and control systems and provide other necessary support equipment. It would cost roughly $7 million to modify existing cells and to install the dynamometers. Testing is mission essential as it is the only way to confirm all engine performance and specification requirements have been met.

(8.2) Facility/Equipment: Two of the test cells in SA-ALC's Test Cell facility are equipped with Zollner 7500 Shaft Horsepower Universal Heavy Turboshaft Dynamometers. Specialized engine adapter equipment, test procedure software, the Pacer Comet III Automated/ Computerized Engine Test and Data Acquisition engine test system, the cells themselves along with the requisite facility hookups for fuel, water, and electricity, cooling water towers, emergency water system, and finally the jet engine mechanics and test cell operators make the capability complete.

Describe Why It is One of a Kind: - The Universal Heavy Turboshaft Dynamometers are unique pieces of equipment in their own right. They can be programmed to simulate the conditions an engine would experience if it were attached to an actual propeller. Both torque and speed requirements can be entered manually or through automated programming. Testing is mission essential as it is the only way to confirm all engine performance and specification requirements have been met.

e. Depot Maintenance Capability/Capacity: Gas Turbine Engine (GTE) and Secondary Power System (SPS) Repair and Overhaul

(8.1) Describe Why Unique/Peculiar: The combination of the equipment listed in 8.2 (below) creates a one-of-a-kind capability in the Air Force.

(8.2) Facility/Equipment: The following equipment. housed in Bldg 331, are essential to produce GTEs and SPSs. Without the GTE Pacer Comet III Tester and B-1 ADG Tester which are exclusively Air Force or one-of-a-kind, the GTE center of excellence performance could not be maintained.

- F-15 Jet Fuel Starter/CGB Test (2 each)
- GTE Test (8 each) - Pacer Comet III (Air Force proprietary)
- F-16 ADG Test (1 each) - only 4 each worldwide
- F-16 JFS Test (2 each)
- Conventional Starters (4 each)
- B-1B ADG Test (1 each) - one-of-a-kind
- B-1B Torque/Clutch (1 each)

- Valve Test (1 each)
- Oil Pump Test Stands, SPS (3 each)
- Oil Pump Test Stands, GTE (1 each)
- Electrical Starter Test Stands (3 each)

Describe Why It is One of a Kind: The combination of the equipment listed in 8.2 creates a one-of-a-kind capability in the Air Force.

f. Depot Maintenance Capability/Capacity and Facility/Equipment: Unified Fuel Control (UFC) Facility

- Description of Technology: - The Unified Fuel Control Test Facility at SA-ALC is an unique facility dedicated to perform all of the inspections, repairs, and testing procedures required to produce serviceable Unified Fuel Controls (UFCs) for the F100-100/200 engines. Although it is primarily dedicated to On Condition Maintenance (OCM) for the F100 UFC, it also possesses the capability to overhaul and test fuel nozzles for the F100, T56, and TF39 engines, the fuel controls for the TF39 and T56 engines, and finally fuel atomizers for smaller Gas Turbine Engines. These latter capabilities are not unique or peculiar to SA-ALC but are still an important part of the facility's capabilities.

- Since its inception in March 1977, the UFC Repair Section has processed over 13,500 F100 Engine UFC's. The facility has the capability to perform major and minor repair, safety enhancement modifications, and reliability upgrades on the components listed above. All inspection, maintenance and testing tasks are developed and accomplished in compliance with Air Force T.O.'s. The extent of the repair under the OCM concept is determined by the in-place OCM team, which reviews historical data, analyses malfunction data, and determines the most expeditious method for the specific repairs.

(8.1) Describe Why Unique/Peculiar: - The repair process for these components can be quite complicated due to the large number of parts involved (4500+) and the tight tolerances required by the nature of its operation and its importance to optimum engine performance. As a repair facility, the capability in question lies mainly in the expertise of the craftsmen who perform the majority of the rework by hand. Specialized tooling, fixturing and equipment facilitates the delicate and sometimes tedious tasks. These essential skills are the core of the repair capability and cannot be easily duplicated elsewhere. The test stand operators are also highly trained and have to undergo an extensive apprenticeship program.

(8.2) Facility/Equipment: The UFC Repair Facility area is classified as a Class I, Division II, group D hazardous testing area. This means that there are flammable gases and vapors in a location where there is high probability that an explosive concentration is present during normal plant operation. This mandates special facility and safety requirements. Bldg 348 meets all special ventilation, fire detection and suppression, and blast-proofing requirements. Along with the in-house repair and overhaul capabilities mentioned, this adds to the overall uniqueness of the

UFC Test Facility as a whole. These capabilities are mission essential as there is no contract vehicle currently available or any other DoD capability present to effect these repairs.

Describe Why It is One of a Kind:

- The primary driver behind the uniqueness of the UFC Test Facility is its automated test stands. Overall, there are 89 test stands dedicated to testing the UFC, whether as a total assembly or one of its major sub-assemblies. More specifically, there are: 33 stands to test the (whole up) UFC main fuel control; 10 stands to test the gas generator section; 6 stands to test the augmentor section; 17 stands to test the augmentor computer; 7 stands to test miscellaneous UFC sub-assemblies; and finally 16 stands that act as Electronic Engine Control (EEC) simulators. The fuel nozzle test stand capability includes: 5 F100 fuel nozzle test stands; 2 TF39 fuel nozzle test stands; 2 T56 fuel nozzle test stands; and 2 GTE Jet Fuel Starter fuel atomizer test stands. Finally, the facility has the capability to test TF39 and T56 engine fuel controls with 6 TF39 Fuel Control test stands and 8 T56 Fuel Control test stands. A Halon fire suppression system is in place to meet regulations. The test stands are operated with a pressurized solvent (volatile calibration fluid) compound selected for its flow characteristics which are similar to JP-4 jet fuel. This is used for both UFC and fuel nozzle testing. A calibration fluid-fueled, vapor incinerator is currently on contract to replace the current filter/condensation system.

- The Unified Fuel Control Facility is unique to SA-ALC and would have to be relocated or duplicated if Kelly were closed. There is no other or DoD system that can duplicate the UFC facility. Replacement cost for the 89 test stands is estimated at $240 Million. This would be a major undertaking due to the size and complexity of the facility and equipment respectively. Test stands are 12 years old but only had an original 7 year life span. They have been refitted and repaired as required to keep them operational. There is, in effect, no "replacement" technology. These capabilities are mission essential as there is no contract vehicle currently available or any other DoD capability present to effect these repairs.

g. ***Depot Maintenance Capability/Capacity:*** Rubber Products Manufacturing

(8.1) Describe Why Unique/Peculiar:

- The SA-ALC Rubber Products Manufacturing function is completely peculiar to the Air Force in its ability to manufacture rubber parts. Although other ALCs have some capability to repair rubber on jet engines (which is also done here), this shop is uniquely able to fully support the manufacture of new rubber parts from beginning to end of the production cycle. All that is needed from the customer is a part design and a statement of the physical requirements.

- The Rubber Products Manufacturing Shop, in conjunction with the Chemical Laboratory, uses that information to develop a custom rubber formulation (or recipe)

when necessary. We are able to develop formulations to meet the stringent requirements of all applicable technical orders, military specifications, or customer specifications.

- Next, a custom mold for shaping the rubber is designed by the Rubber Products Manufacturing support staff, which is then constructed at SA-ALC. Often this process involves designing a mold to hold a metal part so that rubber can be directly applied to it, such as aircraft arresting cable connectors, or fuel access door seals. Because of local control over the design and manufacture process of the molds, we are able to anything from the smallest o-ring (the size of a pencil eraser) to large engine parts (over 3 feet in diameter).

- Continuing the production cycle requires that the rubber formulation be mixed or compounded, a very significant capability at SA-ALC. Again, meeting the strict requirements of our customers is vastly aided by our ability to make our own rubber.

- The final step is to actually mold the rubber into the desired shape, which is done before using a variety of techniques unique to the Air Force. Examples of these techniques are extrusion and compression molding.

- All of these steps taken together give this ALC a unique capability.

(8.2) Facility/Equipment: One unique category of equipment in the Rubber Products Manufacturing Shop is used for compounding or mixing of rubber. This includes a Banbury mixer, a hand mixer, and two compounding mills for large or small amounts of rubber. With these, the shop can make all types for short runs or high volume runs. The primary forming methods used in the Rubber Products Manufacturing Shop include standard molding, compression molding, extrusion, and gasket cutting. Peculiar to the Air Force in supporting these methods are 8 large capacity ovens, 10 compression presses, 2 extruders, and a variety of support equipment. All of this supports the wide variety of rubber parts, in both size and shape, that can be manufactured at SA-ALC.

Describe Why It is One of a Kind: The SA-ALC Rubber Products Manufacturing Shop is the only Air Force facility with the capability to compound rubber to virtually any specified formulation, using so many rubber forming methods. The wide range of product capabilities, in both size and material, along with the proven experience that can put it all together, make this shop peculiar to the Air Force.

h. Depot Maintenance Capability/Capacity: Production of X-Ray Quality Aluminum Castings

(8.1) Describe Why Unique/Peculiar: A unique DoD facility capable of producing high grade (x-ray quality) aluminum sand castings, and also the first DoD production facility utilizing

Stereolithography (SLA) for the manufacture of casting patterns. The foundry capabilities have proven to be a critical DoD industrial capability.

(8.2) Facility/Equipment: The SA-ALC foundry features state-of-the-art induction melting furnaces, an automated chemically bonded sand mold system and a mechanized green sand (clay bonded) sand system.

Describe Why It is One of a Kind: It is the only DoD installation which manufactures all plastic drop hammer dies in lieu of conventional kirksite (zinc) dies, allowing faster production of drop hammer dies. SA-ALC's foundry is the only one in DoD capable of producing high grade (x-ray quality) aluminum sand castings.

i. ***Depot Maintenance Capability/Capacity:*** Stereolithography (SLA) capable of Pattern/Part Development

(8.1) Describe Why Unique/Peculiar: StereoLithography technology supports both manufacturing and engineering. While Stereolithography is now a segment of manufacturing, our application of it is not currently organic to other DoD facilities. One other Air Force facility and several other Navy and Army organizations have this or other rapid prototyping capabilities, but their uses and applications are largely restricted to supporting engineering organizations through generation of design prototypes for fit-form-function testing. Organic foundry casting and rubber shop capabilities at SA-ALC afforded the opportunity to broaden the application of this technology beyond prototyping for fit-form-function to rapid tooling support for these and other net-shape or near-net-shape (NS/NNS) manufacturing processes. This is only possible because these discrete capabilities reside within the same organization. Proof of concept for applying StereoLithography to these capabilities led to development of computer-aided, automated casting pattern design, a capability that, until now, has not been available from any other source. Nor was there much advantage to such capability prior to the recent existence (1989) of StereoLithography and other forms of rapid prototyping. Computer-aided pattern design, coupled with StereoLithography for rapid physical pattern or mold generation has not existed **anywhere** within DoD prior to the installation and development of this capability at SA-ALC. The uniqueness of the foundry and the rubber shops stand on their own; as does the StereoLithography capability. However, the support of one for the other multiplies the effect of that uniqueness far beyond the sum of the two or three capabilites added together. In that the StereoLithography installation at SA-ALC can also support other Air Force and DoD facilities with the same or similar, NS/NNS pattern, mold, or tooling requirements, it retains its uniqueness because these other manufacturing facilities do not have organic rapid prototyping capability, nor the requisite computer-aided pattern design expertise in residence to support such an undertaking.

The similar case can be argued for the integration of the Computer Industrial Tomographic Analyzer (CITA) system and the StereoLithography installation through RE*CAD software. Reverse engineering capability is enhanced in that items requiring reverse engineering due to lack of supporting tech data packages can be addressed by the unique capability of regenerating a

computer-aided design (CAD) solid model file from CITA generated x-ray scans output of the item by the RE*CAD software.

(8.2) Facility/Equipment: Software used will automatically convert a Computer Aided Design (CAD) part file to a foundry pattern configuration, including the shrink factors, draft angles, gating system, risers, cores coreboxes and matchplates. Additional capabilities of this technology, when linked with the industrial CT-Scan in the laboratory, provides a powerful tool for reverse engineering tasks, including novel applications impossible to perform otherwise.

Describe Why It is One of a Kind: Only facility in DoD to provide rapid prototyping and pattern/part development. The supporting software was developed through a PRAM funded project for this operation and exists nowhere else in the world. This evolving process is revolutionizing the foundry pattern making process.

j. ***Depot Maintenance Capability/Capacity:*** C-5 Engine Pylon Repair

(8.1) ***Describe Why Unique/Peculiar:*** The C-5 Engine Pylon Repair is a unique capability that has been successfully performed to quality standards at SA-ALC and no other source has proven their ability to perform the workload. A variety of skills coupled with production experience allows SA-ALC to support the overhaul, repair and modfication required to produce a serviceable asset. Work specifications include removal/installation, inspection, corrosion control, repair and modification, static checks and miscellaneous support for C-5 pylons.

(8.2) ***Facility/Equipment:*** The support equipment includes two fixtures designed exclusively to hold four pylons each are utilized during the performance of the inspection, repair and modification.

Describe Why it is one of a Kind: Since 1991, SA-ALC has provided the C-5 Programmed Depot Maintenance (PDM) pipeline with top quality engine pylons. Work specification includes removal/installation, inspection, corrosion control, repair, modify, static check and miscellaneous support.

k. ***Depot Maintenance Capability/Capacity:*** Halon Recovery, Recycling, and Recharging Facility (HRRR)

(8.1) ***Describe Why Unique/Peculiar:*** SA-ALC has the only reclamaation system that can restore Halon 1301 to MILSPEC in the Air Force. The HRRR system reclaims for use more than 99 percent of the 250,000 lbs of Halon 1301 on the 35,000 aircraft fire suppression system halon storage bottles managed by SA-ALC. This has eliminated any need for the USAF to purchase Halon 1301 in the future. The system cost was $260,000. The payback period will be less than two years due to the rise in cost of Halon 1301 to $20 per pound. The HRRR became operational in January 1994.

(8.2) Facility/Equipment: Installation of this state-of-the-art HRRR system has a significant impact on the use of high Ozone Depletion Potential (ODP) halon by the USAF in its aircraft. Other depots have a recovery system that collects and stores Halon 1301 to prevent release into the atmosphere. However, SA-ALC is the only depot that recovers, filters, and recycles Halon 1301 to military specifications for immediate reuse in the Air Force.

Describe Why It is One of a Kind: This HRRR system is the only such system in the Air Force that can recover, recycle, and recharge Halon 1301 and is the first installation of its type in DoD.

l. Depot Maintenance Capability/Capacity: Bicarbonate of Soda Blast Stripping of Components

Description of Technology: Provides paint removers for corrosion treatment and cleaning for aircraft and jet engine parts and components with exemplary results. Process uses abrasive blasting techniques in a component walk in booth (14' by 34' by 14'). SA-ALC currently uses the process for depainting components with sensitive substrates.

(8.1) Describe Why Unique/Peculiar: Bicarbonate of Soda Blast is a unique Air Force capability resident at both SA-ALC and WR-ALC, though the application of the technology is different at the two depots. SA-ALC is the only Air Force depot that utilizes Bicarbonate of Soda Blast to depaint and clean thin skinned aircraft components in a dedicated booth. This process produces a zero hazardous waste stream, including air emissions, liquid effluent, and solid waste. SA-ALC's process uses the abrasive nature of the bicarbonate of soda as the primary removal agent and the water is injected for dust control. WR-ALC uses bicarbonate of soda to strip aircraft; however, their process relies predominately on the water for paint removal and the bicarbonate of soda is an additive to enhance stripping rates.

(8.2) Facility/Equipment: Bicarbonate of Soda Blast provides an environmentally safe alternative to chemical degreasers, carbon removal agents, and paint removers for corrosion treatment and cleaning for aircraft and jet engine parts and components with exemplary results. The process utilizes abrasive blasting techniques in a component walk-in booth (14 ft X 34 ft X 14 ft).

Describe Why It is One of a Kind: SA-ALC has the only Air Force depot that utilizes Bicarbonate of Soda Blast to depaint and clean thin skinned aircraft components in a dedicated booth.

m. Facility/Equipment: T56 Gearbox Test Stand

- **Description of Technology:** The purpose of this testing is to ensure that the gearboxes are operating within their design specifications; which is vital toward engine performance. As an extra step in quality assurance, every twenty-fifth gearbox is tested assembled to a production engine in the primary engine test cell. This engine/gearbox assembly testing feature can be used as temporary back-up or alternate means for testing gearboxes in cases of maintenance downtimes.

(8.1) Describe Why Unique/Peculiar: The SA-ALC Engine Test Facility has a peculiar complementary testing feature in that it is the only The prime function of these gearbox units is to provide the means for reducing the engine power section speed to the range of efficient propeller operation. T56 Gearbox testing is required to ensure overhauled gearboxes meet or exceed the specifications set in Air Force Technical Orders.

(8.2) Facility/Equipment: This testing requirement is accomplished on a specialized gear reduction test stand that has been designed to simulate the T56 engine in operation.

Describe Why It is One of a Kind: SA-ALC is the only Air Force installation with the capability to test T56 engine series propeller speed reduction gearbox units.

n. Depot Maintenance Capability/Capacity: Engine Sprayed Abradable Compressor Tip Shrouds (ESACTS) Thermal Spray Procedure

- **Description of Technology:** The ESACTS thermal spray procedure project gives SA-ALC the parameters, fixturing and equipment necessary to remove, spray, finish machine, and inspect the PWA279 abradable material used on F100 engine high compressor stators.

(8.1) Describe Why Unique/Peculiar: SA-ALC has a "turn-key" capability to perform this procedure without requiring any special waiver or oversight from the Original Engine Manufacturer (OEM). SA-ALC is the only source in DoD certified to perform this process.

(8.2) Facility/Equipment: ESACTS thermal spray procedure uses an existing robotic plasma spray and water jet stripping systems with modifications, a new laser holography inspection system, hardness tester and thickness gauge to remove existing abradable and replace it with PWA 279 on the F100-PW-220/220E 4th through 12th stage compressor stators. Included is all necessary fixturing and tooling required to perform the procedure.

Describe Why It is One of a Kind: This process is unique to SA-ALC as it is the only source in DoD certified to perform this process.

o. Facility/Equipment: - T56 Blade Depinning System

- **Description of Technology:** This procedure incorporates removing the T56 engine's compressor wheel's blades and pins automatically and simultaneously at two diametrically opposed stations.

(8.1) Describe Why Unique/Peculiar: The Blade Disk Disassembly Machine (BDDM) at SA-ALC is a one-of-a-kind machine that disassembles compressor wheels (stages 6-14) for the T56 turboprop engine.

(8.2) Facility/Equipment: The deblading station consists of an electric impact hammer (Electropunch) which drives a special tool through the blade slot, shearing the holding pin, allowing the blade to fall free. The turntable automatically rotates a precise amount to the next blade. The disk stops at the pin removal station where a video camera takes a close-up view of the pin. With the image being displayed on a monitor, the craftsman is able to vertically align the station position to ensure precise pin removal.

Describe Why It is One of a Kind: This system is unique in the DoD and was designed specifically for this application at SA-ALC. In the past, the process was completed by hand. This process was time consuming and tedious and often resulted in damaged wheels. REPTECH funding was used to contract out the design for the BDDM. This equipment is mission essential due to the fact that the parts damage caused by the old method made the process economically unfeasible.

p. Facility/Equipment: Robotic Shot Peening System

- **Description of Technology:** The Robotic Shot Peening System at SA-ALC treats the surfaces of parts as required by T.O. by bombarding the part surface with round steel shot or glass beads (media) under computer controlled conditions to induce a layer of uniform compression.

(8.1) Describe Why Unique/Peculiar: The system was developed specifically to meet SA-ALC requirements and was funded through REPTECH.

(8.2) Facility/Equipment: The system uses advanced robotics (two independently controlled robots) and computerized control equipment to eliminate or minimize the need for the operator's presence within the machining environment; in effect, manual control of the processes has been computerized. Improved airborne particle removal techniques are used to minimize airborne particle hazards. The operator is removed from the cell environment and is isolated from it by sound-insulating walls . This sound insulation is beneficial to the operator as well as any other personnel in the general area. Multiaxis, programmable, manipulating devices are used to manipulate the guns, reducing operator fatigue and intervention. A supervisory control system located away from the blasting cell, permits an operator to monitor all activities of the entire system. An industrial process controller programmed for the selected engine components automatically controls the appropriate functions involved. Part loading and transfer are

accomplished using automated part handling roller conveyors, reducing the need for operators to enter the hazardous blast cell, except for periodic maintenance of the system components.

Describe Why It is One of a Kind: - The Robotic Shot Peening system is peculiar to the AF in that it can be programmed to automatically shot peen a wide range of engine components. The Navy has purchased an identical system and it will be on line by the end of the summer. While other systems in the AF and DoD are automated, they do not have programmable robotic, multi-axis capability of this particular system. Currently parts worked by the system include: 1st, 2nd, 3rd Stage F100 fan disks and the 8th Stage F100 compressor disk.

q. ***Facility/Equipment:*** Non-Contact Dimensional Inspection (NCDI) System

- **Description of Technology:** The NCDI system provides SA-ALC with the ability to undertake precise geometrical inspections of a wide variety of engine components without actually having to touch the part physically. The system can measure any part that will fit in its 2'x2'x2' gauging envelope. This system permits gauging resolutions of over 100 times better than other techniques. The resolution allows the detection of flaws down to two ten thousandths of an inch in size. The system can be used to measure roundness, eccentricity, and a number of other geometrical measurements common to jet engine component inspection procedures.

(8.1) ***Describe Why Unique/Peculiar:*** This particular system is peculiar to the Air Force, but not unique in the DoD as there are similar non-contact systems used by the Navy to inspect blades. However, the particular application of the NCDI system at SA-ALC is unique. The NCDI system is currently used to inspect the 10th and 12th stage compressor disks of the F100-100/200 engines for radial discontinuities.

(8.2) ***Facility/Equipment:*** The system takes measurements by projecting a set of parallel, equally spaced lines using filtered white light onto the part surface. The pattern is distorted by the curved part surface. Using a combination of the traditional moiré pattern analysis technique and the optical interferometry technique, the distorted patterns are converted into 3-Dimensional coordinate points. The system's computers then use these points to calculate the precise measurements required.

Describe Why It is One of a Kind: While there are other types of measurement equipment, such as Coordinate Measurement Machines (CMMs), that could perform this type of inspection, the NCDI system can perform the inspection in much less time. Currently it is processing disks in 10-12 minutes that would take up to 1.5 hours to measure using other methods. This particular application is mission essential as it is called out in a specific TCTO in order to identify disks with the manufacturing defect mentioned above.

r. ***Depot Maintenance Capability/Capacity:*** Heated Compressed Air Systems & Centrifugal Air Compressor

(8.1) Describe Why Unique/Peculiar: The Heated Compressed Air System is a unique capability possessed by the depot. Building 333 houses two specialized Heated Compressed Air Systems. The first system is capable of supplying 5000 Standard Cubic Feet per Minute air at pressures up to 800 psig at both ambient temperatures and up to 1000 degrees Fahrenheit. The primary use for this air is to test F100 Engine Convergent Exhaust Nozzle Controls (CENC) and the F100-229 Augmentor Fuel Pump. The second system is a natural gas fired Gas Turbine Engine driven Centrifugal Air compressor. This system is capable of supplying up to 1000 degrees Fahrenheit. A boost compressor is in line with one test cell to raise the pressure to 700 psig and still maintain the 1000 degree Fahrenheit temperature. The primary use for this system is to supply test air for Fuel Accessory Pneumatic Valves and Regulators as well as Air Frame mounted Pneumatic Accessories. Aircraft supported include the F-16, F-15, B-52, C-130, KC-135, F-111 and B-1.

(8.2) Facility/Equipment: The Heated Compressed Air System and Centrifugal Air Compressor are located in Bldg 333. Special equipment and configuration are required to provide the necessary air temperature.

Describe Why It is One of a Kind: These facilities are configured specifically to provide 1000 degrees Fahrenheit air for workloads for which SA-ALC inthe Technology Repair Center (TRC) and are not available elsewhere in the Air Force.

s. Depot Maintenance Capability/Capacity: Auto Prompting Inspection System (APIS)

(8.1) Describe Why Unique/Peculiar: The APIS is a unique capability that the depot possesses in B329. The APIS software is a step-by-step instructional guide on how an aircraft part is to be inspected. It combines graphics and verbage to assist the craftsman through the work control document (WCD) and tech order requirements. These dimensional inspection requirements include diameter reading concentricity, run out, out-of-roundness, parallelism between centerlines or planes, perpendicularity, flatness and true positioning. Items being inspected in the APIS are from 13 models of GTEs, 17 models of aircraft starters, F-15 Secondary Power System (SPS) and the F-16 Engine Start System. Plans are in the works to interface hand-held tools such as micrometer calipers, vernier calipers, height gages, and bore gages.

(8.2) Facility/Equipment: The APIS includes 20 coordinate measurement machines for dimensional inspection of aircraft parts.

Describe Why It is One of a Kind: The SA-ALC APIS is unique to DoD. SA-ALC procured the hardware and then developed the software to fit our peculiar needs.

Report to the Commission

DEPARTMENT OF THE AIR FORCE

BRAC 95
JOINT CROSS SERVICE GROUP
OO-ALC DEPOT MAINTENANCE
DATA CALL SUPPLEMENTAL

TINKER AFB, OKLAHOMA

February 1995

DATA CALL SUPPLEMENT
FOR
JOINT CROSS SERVICE GROUP -- OC-ALC DEPOT MAINTENANCE

CAPACITY

1. Capacity Utilization

1.1 Calculate the capacity index for the commodity groups applicable to depot maintenance work at your activity. Provide your answers expressed in direct labor hours (DLHs) in Table 1.1.a by commodity groups for the Fiscal Years requested.

Table 1.1.a: **Capacity Index**

COMMODITY GROUP	INDEX (DLHs)				
	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999
AIRCRAFT AIRFRAMES					
CARGO, TANKER, BOMBER	2,208,054	2,201,755	2,243,945	2,279,080	2,279,080
COMMAND AND CONTROL	258,501	265,911	299,112	288,779	288,779
TOTAL	2,466,555	2,467,666	2,543,057	2,567,859	2,567,859
AIRCRAFT COMPONENTS					
AIRCRAFT STRUCTURES	381,129	430,487	434,208	403,608	403,608
HYDRAULIC/PNEUMATIC	269,464	278,721	278,739	277,731	277,731
INSTRUMENTS	234,758	237,516	230,217	227,444	227,444
AVIATION ORDNANCE	1,124	1,184	1,221	1,171	1,171
AVIONICS/ELECTRONICS	156,857	172,322	189,470	218,295	218,295
OTHER	568,572	583,800	578,151	594,423	594,423
MANUFACTURING AND FABRICATION	253,626	157,839	162,945	162,313	162,313
TOTAL	1,865,530	1,861,869	1,874,951	1,884,985	1,884,985

Table 1.1.a: **Capacity Index** (Cont'd)

COMMODITY GROUP	INDEX (DLHs)				
	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999
ENGINES (GAS TURB)					
AIRCRAFT TOTAL	2,650,688	2,558,714	2,511,462	2,496,512	2,496,512
BLADES AND VANES	154,958	154,959	154,962	154,957	154,957
TOTAL	2,805,646	2,713,673	2,666,424	2,651,469	2,651,469
SOFTWARE					
TACTICAL SYSTEMS	266,684	247,633	263,172	238,070	238,070
SUPPORT EQUIPMENT	426,914	445,937	430,386	455,476	455,476
TOTAL	693,598	693,570	693,558	693,546	693,546
SPECIAL INTEREST					
BEARINGS REFURBISH	14,323	12,260	9,513	9,530	9,530
TEST MEASUREMENT & DIAGNOSTIC	3,519	3,502	3,438	3,474	3,474
TOTAL	17,842	15,762	12,951	13,004	13,004
TOTAL	7,849,171	7,752,540	7,790,941	7,810,863	7,810,863

1.2 Calculate the utilization index for the commodity groups applicable to depot maintenance work at your activity. Provide your answers expressed as a percentage (%) in Table 1.2.a by commodity groups for the Fiscal Years requested.

Table 1.2.a: **Utilization Index**

COMMODITY GROUP	INDEX (%)				
	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999
AIRCRAFT AIRFRAMES					
CARGO, TANKER, BOMBER	110	100	93	95	95
COMMAND AND CONTROL	132	134	195	198	198
TOTAL	112	104	105	107	107
AIRCRAFT COMPONENTS					
AIRCRAFT STRUCTURES	104	97	84	83	83
HYDRAULIC/PNEUMATIC	70	67	65	65	65
INSTRUMENTS	122	122	117	116	116
AVIATION ORDNANCE	31	30	29	30	30
AVIONICS ELECTRONICS	30	36	46	64	64
OTHER	38	36	35	37	37
MANUFACTURING AND FABRICATION	89	60	59	60	60
TOTAL	73	68	64	65	65

Table 1.2.a: **Utilization Index** (Cont'd)

COMMODITY GROUP	INDEX (%)				
	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999
ENGINES (GAS TURB)					
AIRCRAFT TOTAL	88	94	93	94	94
BLADES AND VANES	42	35	39	49	49
TOTAL	86	91	90	91	91
SOFTWARE					
TACTICAL SYSTEMS	128	136	135	153	153
SUPPORT EQUIPMENT	91	92	90	74	74
TOTAL	105	108	107	101	101
SPECIAL INTEREST					
BEARINGS REFURBISH	84	92	127	160	160
TEST MEASUREMENT & DIAGNOSTIC	60	60	61	61	61
TOTAL	79	85	109	133	133
TOTAL	93	91	90	91	91

1.3 Assuming (a) the current projected total workload remains as assigned; (b) that sufficient production demand is available to justify maximum hiring, with no significant investment in capital equipment; and (c) no major Military Construction additional to that already approved and funded: what is the maximum extent to which operations, by commodity group, could be expanded for depot maintenance work at your activity, based on the current and future planned workload mixes? Please provide your response in the absolute maximum number of direct labor hours (DLHs).

Table 1.3.a: **Maximum Potential Capacity**

COMMODITY GROUP	INDEX (DLHs)				
	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999
AIRCRAFT AIRFRAMES					
CARGO, TANKER, BOMBER	2,890,416	2,838,867	2,571,928	2,609,186	2,609,186
COMMAND AND CONTROL	407,138	458,687	725,626	688,368	688,368
TOTAL	3,297,554	3,297,554	3,297,554	3,297,554	3,297,554
AIRCRAFT COMPONENTS					
AIRCRAFT STRUCTURES	434,208	434,208	434,208	434,208	434,208
HYDRAULIC/PNEUMATIC	884,751	884,751	884,751	884,751	884,751
INSTRUMENTS	712,396	712,396	712,396	712,396	712,396
AVIATION ORDNANCE	1,467	1,467	1,467	1,467	1,467
AVIONICS/ELECTRONICS	218,295	218,295	218,295	218,295	218,295
OTHER	816,914	816,914	816,914	816,914	816,914
MAUFACTURING AND FABRICATION	294,499	294,499	294.499	294,499	294,499
TOTAL	3,362,530	3,362,530	3,362,530	3,362.530	3,362,530

Table 1.3.a: **Capacity Index** (Cont'd)

COMMODITY GROUP	INDEX (DLHs)				
	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999
ENGINES (GAS TURB)					
AIRCRAFT TOTAL	4,912,111	4,912,111	4,912,111	4,912,111	4,912,111
BLADES AND VANES	529,321	529,321	529,321	529,321	529,321
TOTAL	5,441,432	5,441,432	5,441,432	5,441,432	5,441,432
SOFTWARE					
TACTICAL SYSTEMS	268,792	249,769	265,320	240,230	240,230
SUPPORT EQUIPMENT	426,914	445,937	430,386	455,476	455,476
TOTAL	695,706	695,706	695,706	695,706	695,706
SPECIAL INTEREST					
BEARINGS REFURBISH	62,412	62,412	62,412	62,412	62,412
TEST MEASUREMENT & DIAGNOSTIC	3,519	3,519	3,519	3,519	3,519
TOTAL	65,931	65,931	65,931	65,931	65,931
TOTAL	12,863,153	12,863,153	12,863,153	12,863,153	12,863,153

6. Unique or Peculiar Facilities

6.1 List unique or peculiar testing facilities, excluding equipment (e.g. runways, railheads, ports, tracks, ponds, etc.).

Test Facility Describe Uniqueness/Peculiarity

6.2 Indicate the reasons that these facilities are required by the depot maintenance function.

Test Facility Describe Reasons Required for Maintenance

6.3 How could the depot maintenance functions be performed without these specialized facilities?

Test Facility Describe Testing Alternatives

a. Peculiar Test Facility: **BLDG 210 - AIR ACCESSORIES OVERHAUL/TEST (15.1 Aircraft Components-Hydraulic/Pneumatic)**

(6.1) Describe Peculiarity:
This is the only facility of its kind in the Air Force. Capabilities include single source repair, overhaul, calibration, and testing of any air driven item in the Air Force inventory. It contains 22 test cells designed to contain high speed rotating components, such as air turbine motors, in the event of part failure. It also safely isolates the operator and remainder of the facility from the item under test. Contrary to the OO-ALC Ram Air Test wind tunnel test facility, which utilizes very high volumes of low pressure ambient air through a large diameter duct, this facility tests air driven components, such as valves and cooling turbines, up to nine inches in diameter under compressed air conditions. The building houses equipment required to generate, control, and condition compressed air from ambient temperature to 300 PSIG and 800 degrees F at flow rates up to 8 lb/sec thus simulating in-flight operational conditions. In addition, the facility accommodates a single "Super Cell" that boosts test capability to 800 PSIG, 400 degrees F and 3 lb/sec or 9 lb/sec at ambient temperature is available for the higher technology aircraft and is critical for support of F-16 items. The facility produces over 16,000 items per year in support of U.S., NATO (C-130), and other FMS aircraft. During Desert Storm this facility surged 7,977 items in support of the war effort. A feasibility study accomplished by Sverdup Technology Inc of Tennessee indicates that this facility will be able to support future weapon systems such as the F-22, B-2, and C-17.

(6.2) Reasons Required for Maintenance:

Air Accessories Overhaul/Test Facility provides specialized testing. This testing, including serviceability testing, is necessary for technical data compliance and for verification of field discrepancies. Weapon system readiness is dependant upon overhaul and production testing. This unique testing facility provides correct environment necessary for testing of even the most sensitive components and parts which provide for crew comfort and safety. Military readiness and crew safety is dependent upon proper testing of components, engines, and weapon systems.

(6.3) Describe Testing Alternatives:
Workload will have to be accomplished in a comparable facility. If comparable facilities within existing capabilities are unavailable, other options such as MILCON or field resources (on-aircraft checkout) would have to be considered. If capability is not available workload would be subject to availability of contractor and/or field resources at higher cost with potential mission impact.

b. Unique Test Facility: **BLDG 214 - CRUISE MISSILE ENGINE FACILITY (15.2 Engines-Aircraft Total)**

(6.1) Describe Uniqueness
Only DOD self-contained single source maintenance repair/test center specializing in cradle-to-grave overhaul and production testing of air launched cruise missile engines (F107 and F112). Currently, the Tinker AFB Cruise Missile Engine Facility receives missile engines in containers from both field units and OO-ALC for engine refurbishment and test. During test, automated software monitors engine conditions such as thrust, fuel flow, revolutions per minute, and exhaust temperature to detect and establish possible sources of error for out-of-limit engine parameters. This greatly increases the reliability of the engine when the missile is fired. The clean room in this building controls dust particles, humidity, and temperature to increase engine reliability. An electrostatic discharge certified floor prevents static electrical discharge to the engines during uncrating. Without this flooring the explosive device used as a starter for the engine might accidentally be discharged. This facility could be expanded to support other small missile engines and is adaptable to any small jet or reciprocating engine.

(6.2) Reasons Required for Maintenance
The Cruise Missile Engine Facility provides specialized testing, including serviceability testing, that is necessary for technical data compliance and for verification of field discrepancies. Pre-test screening is necessary to identify required engine rework. Trending of engine data to monitor changes in repair processes and engine configuration, and fault isolation and troubleshooting is included. Software debug and integration testing is often required. Weapon system readiness is dependent upon overhaul and production testing. Most systems are needed for support of CORE capability in response to war requirements. This facility provides correct environment necessary for testing of even the most sensitive components and parts. Military

readiness and crew safety is dependent upon proper testing of components, engines, and weapon systems.

(6.3) Describe Testing Alternatives:
Workload will have to be accomplished in a comparable facility. If comparable facilities within existing capabilities are unavailable, other options such as MILCON or field resources (on-aircraft checkout) would have to be considered. If capability is not available, workload would be subject to availability of contractor and/or field resources at higher cost with potential mission impact.

c. Peculiar Test Facility: **BLDG 1055 - OXYGEN AND ASSOCIATED EQUIPMENT OVERHAUL FACILITY (15.1 Aircraft Components-Other (Oxygen))**

(6.1) Describe Peculiarity
This facility, which is the only single source oxygen overhaul facility in the Air Force, is used for the overhaul, test, and calibration of critical life support systems (Oxygen Breathing Systems) for all types of aircraft in the Air Force inventory. Facility is kept isolated from other facilities due to the requirement for clean, dry, and oil free systems. The facility consists of specialized chemical cleaning systems, overhaul equipment, calibration equipment, and oxygen purging/filling systems. Over 22 different types of life support equipment are overhauled in this facility; Over 8,000 items are repaired each year.

(6.2) Reasons Required for Maintenance
Oxygen and Associated Equipment Overhaul Facility provides specialized testing, including serviceability testing, which is necessary for technical data compliance and for verification of field discrepancies. Weapon system readiness is dependent upon overhaul and production testing. Most systems are needed for support of CORE capability in response to war requirements. Military readiness and crew safety is dependent upon proper testing of components.

(6.3) Describe Testing Alternatives:
Workload will have to be accomplished in a comparable facility. If comparable facilities within existing capabilities are unavailable, other options such as MILCON or field resources (on-aircraft checkout) would have to be considered. If capability is not available, workload would be subject to availability of contractor and/or field resources at higher cost with potential mission impact.

d. Unique Test Facility: **BLDG 3220 - AVIONICS INTEGRATED SUPPORT FACILITY (AISF) (15.1 & 15.2 Software-Tactical Systems)**

(6.1) Describe Uniqueness

OC-ALC is the only B-1B/E-3/B-52/ALCM and Rotary Launcher complete avionics test facility in DOD. It provides single source software maintenance and integration of computer programs for the systems listed in question 8.2. AISF performs ground integration and test of avionics systems software through the combined use of weapon system specific avionics components and one-of-a-kind hardware/software thereby reducing full integration design development costs. Only existing world-wide facility in DoD capable of testing and integrating E-3, B-1B, B-52, AGM-86, and AGM-129 software changes. Workload cannot be readily moved without impact to software support because of lack of duplicate capability. The AISF was designed and constructed to accommodate resources required to perform Operational Flight Program (OFP) support for OC-ALC assigned weapon systems. Constructed of specially designed brick and mortar, and reinforced concrete floors, wall, and ceilings, it contains prime mission equipment driven by simulation computers in a laboratory environment which provides the means to accomplish OFP modifications which correct design deficiencies, enhance weapon systems operation, and incorporate new capabilities in the B-1B, E-3, and B-52/Air Launched Cruise Missiles (ALCM) integration. A specially designed high bay area was constructed to accommodate the rotary and pylon cruise missile launchers within required collocation distance of the B-52 software integration lab. This construction included facility integration to accommodate the cable tray runs, 400 Hz power, and hydraulics for testing the missile load frames/rotary launcher for the AGM-86 and AGM-129 Air Launched Cruise Missiles.

(6.2) Reasons Required for Maintenance
The Avionics Integrated Support Facility (AISF) provides specialized testing, including serviceability testing, which is necessary for technical data compliance and for verification of field discrepancies. Also supports the AISF Software debug and integration testing requirements.

Weapon system readiness is dependant upon overhaul and production testing. Most systems are needed for support of CORE capability in response to war requirements. Military readiness and crew safety is dependent upon proper testing of components, engines, and weapon systems.

(6.3) Describe Testing Alternatives:
Workload will have to be accomplished in a comparable facility. If comparable facilities within existing capabilities are unavailable, other options such as MILCON or field resources (on-aircraft checkout) would have to be considered. If capability is not available, workload would be subject to availability of contractor and/or field resources at higher cost with potential mission impact.

e. Unique Test Facility: **BLDGS 3234/3703 - JET ENGINE TEST FACILITIES (12 CELLS) (15.1 Engines-Aircraft Total)**

(6.1) Describe Uniqueness

These are the only engine test facilities configured and certified in DOD which house single source test cells (4) rated at 100,000 lbs thrust class cells capable of handling up to 4,000 lbs of air per second, up to 150,0000 lbs per hour of fuel, and 5500 gallons per minute of afterburner cooling water. An eleven foot center line for the engine allows testing of engines up to a 11 foot diameter inlet. This provides current capability for testing the J57, TF30, TF33, F101, F108, F110, and F118 engines used as power plants in the B-1B, B-2, B-52, F-14 (Navy), F-16, F-111, C/KC-135, C-141, and E-3 aircraft. All engine to adapter buildup is accomplished on the prep floor in front of the test cells thus minimizing test cell time. A monorail system is used to transport the engine from the buildup floor into the test cells providing a 5-minute engine installation time once in the test cell.

The medium cells are 50,000 lbs thrust class cells capable of testing turbo jet engines with afterburners and small turbofan engines (TF33).

All cells are multi-engine capable allowing easy switching between engine types without major test cell re-tooling and allow for future growth with minimal modifications.

OC-ALC has the only depot test cell in DOD equipped to test the F118 engine used to power the B-2 aircraft. The instrumentation and computer systems are unique to this engine and are in addition to the normal test cell system.

Each test cell utilizes the Pacer Comet III Automated/Computerized Engine Test and Data Acquisition engine test system that was developed at SA-ALC and customized and installed at OC-ALC by in-house engineering support staff.

Capability exists to test engines in the Quick Engine Connect (QEC) configuration. This capability was developed for the TF30, TF33, and F108 engines in-house by modifying existing depot adapters and/or modifying existing field level T-9 adapters.

An Automated Vibration Diagnostic (AVID) System is used to provide engine vibration signature analysis and trim balance data. The system uses both transient and steady state vibration data to assemble a vibration signature. These signatures contain plots of vibration amplitude versus engine speed for acceleration and deceleration runs. Separate plots are obtained for each vibration pickup and for vibration synchronous with each rotor. The resulting signature package is a valuable tool in the analysis of engine vibration problems. The system is also used in trim balancing engines using a 1:1 mechanical tachometer to indicate a specific rotor position. The trim balance routine supplies the engine operator with a trim balance weight size and mounting location.

The OC-ALC facilities are capable of performing endurance testing and accelerated mission testing. These tests provide valuable data for Component Improvement Program (CIP) repairs,

serve to validate depot and contractor developed repairs, and can provide "Lead the Fleet" data. OC-ALC is currently involved with interservicing workload by testing the Navy TF30-414 and F110-400 engines.

(6.2) Reasons Required for Maintenance:
Engine testing is required to ensure overhauled and 2-level repaired engines meet or exceed technical data compliance and for verification of field discrepancies. Pre-test screening is necessary to identify required engine rework. Trending of engine data to monitor changes in repair processes and engine configuration, and fault isolation and troubleshooting is included. Software debug and integration is often required. Weapon system readiness is dependent upon overhaul and production testing. Most systems are needed for support of CORE capability in response to war requirements. These facilities provide correct environment necessary for control of dust particles, humidity, and temperature. Jet Engine Test Facilities are constructed to facilitate potential explosive devices used as starters on engines or components. Military readiness and crew safety is dependent upon proper testing of components, engines, and weapon systems.

(6.3) Describe Testing Alternatives:
Workload will have to be accomplished in a comparable facility. If comparable facilities within existing capabilities are unavailable, other options such as MILCON or field resources (on-aircraft checkout) would have to be considered. If capability is not available, workload would be subject to availability of contractor and/or field resources at higher cost with potential mission impact.

f. Peculiar Test Facility: **BLDG 3761 - B-1B COMPACT RANGE FACILITY (15.1 Aircraft Components-Avionics/Electronics)**

(6.1) Describe Peculiarity
This facility is the Air Force single source repair and testing capability for the B-1B APQ-164 multi-functional radar antenna. The antenna is tested in two configurations: (1) Phased Array and (2) Low Observable Antenna (LOA). Five intricate and complex test sets used to perform tests on the antenna include Memory Module, Gimbal, Antenna Array, Network Analyzer, and Range Array. The Range Array Test Set is a unique procedure enclosed in an Anechoic Chamber which sits atop an adjustable isolated pad. This unique 19' x 37' isolated pad de-couples the equipment from seismic shock and or vibration induced from heavy trucks, trains, aircraft engine testing or other sources in the area which could affect antenna measurement accuracy. The pad has to be stiff so that the compact range reflector, the test positioner, the source positioner, the LOA tower, and the mirror stand all maintain their relative position during testing of B-1B antennas.

(6.2) Reasons Required for Maintenance:

B-1B Compact Range Facility provides specialized testing, including serviceability testing, which is necessary for technical data compliance and for verification of field discrepancies. Weapon system readiness is dependent upon overhaul and production testing Most systems are needed for support of CORE capability in response to war requirements. Military readiness and crew safety is dependent upon proper testing of components, engines, and weapon systems.

(6.3) Describe Testing Alternatives:
Workload will have to be accomplished in a comparable facility. If comparable facilities within existing capabilities are unavailable, other options such as MILCON or field resources (on-aircraft checkout) would have to be considered. If capability is not available, workload would be subject to availability of contractor and/or field resources at higher cost with potential mission impact.

g. Peculiar Test Facility: **BLDG 3902 - FUEL CONTROL AND ACCESSORIES CONSOLIDATED TEST FACILITY (CTF) (15.1 Engines-Aircraft Total)**

(6.1) Describe Peculiarity
Currently under construction is the Consolidated Test Facility (CTF). This $13.6 Million Class 1 and Division 1 National Fire Protection Association (NFPA) rated state-of-the-art fuel control and accessories test facility is expected to be completed Oct 94. The CTF's 63,500 square feet are designed to be environmentally friendly and to house the Automated Fuel Accessory Test System (AFATS) and current semi-automated General Electric engine controls and accessories test stands. The CTF will have a charcoal filter system which will reduce calibration fluid emissions by 95% and a distillation unit which will recycle up to 67% of the calibration fluid. The calibration fluid storage and pumping system will be double-lined and monitored for leak detection. Also, the CTF will not use any class 1 Ozone Depleting Chemicals (ODCs). The CTF will have the ability to house AFATS which is currently under contract for manufacture with an expected delivery date for the Initial Outfitting Equipment of Sep 95. At that time the AF will have two state-of-the-art fuel test facilities unique in DOD in that other services' depots will not enjoy the capabilities at the AF engine facilities. Other future purchases of AFATS are planned to replace older workload specific test stands. AFATS will not only test older fuel wetted controls and accessories, but will also have flexibility to test new or different workloads. The CTF will also have the ability to support semi-automated General Electric controls and accessories test stands which are currently supporting DoD weapon systems. The CTF will be state-of-the-art at its planned completion date of Oct 94 and well into the future. The CTF was designed to meet or exceed current environmental requirements and also house the AFATS.

(6.2) Reasons Required for Maintenance:
Fuel and Accessories Consolidated Test Facility (CTF) provides specialized testing, including serviceability testing, which is necessary for technical data compliance and for verification of

field discrepancies. The CTF combined with the AFATS and General Electric engine controls and accessories test stands is now and will be in the future, a mission essential facility for supporting the fuel wetted testing needs of DOD. The CTF with its Class 1 Division 1 NFPA rated test areas and environmentally friendly systems will be unequaled in the DOD. The CTF will house the equipment to provide unique support of the Air Force F101-100, F101-102, F108-100, F110-100, F110-129, F118-100, TF33-P3, TF33-P5, TF33-P7, TF33-P9, TF33-P100, TF33-P102, TF33-P103, TF30-P103, TF30-P107, TF30-P109, TF30-P111, and Navy TF30-P414 engines. Pre-test screening is necessary to identify required engine rework. Trending of engine data to monitor changes in repair processes and engine configuration, and fault isolation and troubleshooting is included. Weapon system readiness is dependent upon overhaul and production testing. Most systems are needed for support of CORE capability in response to war requirements. This facility provides correct environment necessary for testing of even the most sensitive components and parts; Facility was constructed to facilitate potential explosive devices used as starters on components. Military readiness and crew safety is dependent upon proper testing of components, engines, and weapon systems.

(6.3) Describe Testing Alternatives

Workload will have to be accomplished in a comparable facility. If comparable facilities within existing capabilities are unavailable, other options such as MILCON or field resources (on-aircraft checkout) would have to be considered. If capability is not available, workload would be subject to availability of contractor and/or field resources at higher cost with potential mission impact.

h. Peculiar Test Facility: **MATERIALS TEST FACILITY - BLDG 3220**

(6.1) Materials Test Lab facilitates crack growth rate and fatigue life testing as well as material properties determination. Projects include wing skin panel crack growth rate testing, actuator rod fatigue life testing, and adhesive strength determination. Five servo hydraulic material test systems with programmable digital controllers replicate in-flight cyclic loading of aircraft components. Special requirements include space below floor level for frame base and hydraulic pumps.

(6.2) Reasons Required for Maintenance:
Materials Test Facility provides specialized testing, including serviceability testing, which is necessary for technical data compliance and for verification of field discrepancies. Weapon system readiness is dependent upon overhaul and production testing. Military readiness and crew safety is dependent upon proper testing of components, engines, and weapon systems.

(6.3) Describe Testing Alternatives:

Workload will have to be accomplished in a comparable facility. If comparable facilities within existing capabilities are unavailable, other options such as MILCON or field resources (on-aircraft checkout) would have to be considered. If capability is not available, workload would be subject to availability of contractor and/or field resources at higher cost with potential mission impact.

211-152	General Purpose Aircraft Maintenance	255.47			B/210, 229, 230, 2102, 2106, 2121, 2134, 2211, 3117, 3221, 3234, 3707, 3761,3771, 3772, 3773, 2101, 2122, 2124, 2128, 2129, 2210, 2280, 3215, 3703, 2105, 3001, 3108, 214
211-153	Shop, Non-Destructive Inspection	66.38			B/2122, 2211, 3001
211-157	Shop Jet Engine Inspection/Maint	1,098.47			B/3001, 3105, 3221
211-159	Aircraft Corrosion Control	184.53	109.26		B/2121, 2137, 2211, 3001, 3707, 2122, 2280
211-183	Test Cell	79.33			B/3234, 3703, 214
211-251	Shop Turbine Accessory, Overhaul and Test, Depot	116.78			B/212, 213, 210
211-253	Shop, Alternator Drive Overhaul and Test, Depot	67.69			B/2210
211-254	Shop, Aircraft and Engine Access Overhaul, Depot	496.08	179.53		B/229, 1054, 1055, 1062, 2211, 3001, 3123, 3771, 95, 3108
211-256	Shop, Engine Test and Storage	162.45			B/3234, 214, 3703

211-271	Shop, Instrument Overhaul and Test, Depot	70.18			B/230
217-712	Avionics Shop	183.85			B/2121, 2122, 2136, 3707, 3708, 3761
217-735	Shop, Electronics Overhaul and Test, Depot	32.76			B/2121, 2122, 3001
217-736	Shop, Radome Overhaul, Depot	43.46			B/230, 2211, 3507
218-712	Aircraft Support Equipment Shop/Storage Facility	35.46			B/2101, 2124, 2129
218-852	Shop, Survival Equipment	14.51			B/229
218-868	Precision Measurement Equip Lab	28.98	1.65		B/210, 214, 230, 1055, 3001, 3113, 3234, 3108, 3703
442-258	Storage, Liquid Oxygen	2.04			B/1051
610-675	Logistics Facility Depot Operations	668.83			B/210, 230, 240, 2121, 2122, 2136, 2211, 3001, 3108, 3, 18, 3102, 3105
610-711	Data Processing Installation	3.08			B/3220
	Total	5,156.19	290.44	0	

7.2 In Table 7.2.a, identify space available for expansion by building type for those facility category code numbers (five or six digit CCNs) that are most important to your mission. An activity's expansion capability is a function of its ability to reconfigure/rehabilitate existing underutilized facilities to accept new or increased requirements.

Table 7.2.a: **Space Available for Expansion**

Building ID / Type	CCN	Installation Space (KSF)			Total
		Adequate	Substandard	Inadequate	
B3108/Hazard Fuel Test	211-314	49.0			49.0
B3001/General Purpose	211-314	21.2			21.2
B3001/300,000 Class	211-314	4.7			4.7
B3708/Avionics	211-422	29.0			29.0
B3708/Office	610-675	3.0			3.0
B3707/Avionics	211-422	23.5			23.5
B3707/Warehouse	211-422	14.5			
B214/Small Engine Test	211-314	21.9			21.9
B2211/Adv Composites	211-335	11.5			11.5
B230/Elec Cable Repair	211-365	12.0			12.0
B2122/Avionics	211-422	17.0			17.0
B210/Air Accessories	211-314	7.2			7.2
B1055/Gas Generating	211-394	3.0			3.0
B2210/CSD	211-364	15.0			15.0
B2101/Engine Inspection	211-237-I	10.0			10.0
B2101/Engine Reclamation	211-314-B	2.0			2.0
B3001/Engine Cleaning	211-241-A	61.0			61.0

B3001/Engine Disassembly	211-257-A	28.0			28.0
B3001/Plasma Spray	211-241-B	32.0			32.0
B3001/Engine Machine Shop	211-241-C	205.0			205.0
B3001/Nondestructive Test	211-233-A	72.0			72.0
B3001/Engine Overhaul	211-257-A	148.0			148.0
B3001/Rotor Overhaul	211-347-B	26.0			26.0
B3001/Engine Mod/Repair	211-247-D	43.0			43.0
B3001/Gearbox Overhaul	211-348-A	30.0			30.0
B3001/Engine Welding Shop	211-241-E	24.0			24.0
B3001/Material Handlers	211-934-A	23.0			23.0
B3105/Engine Mod/Repair	211-247-D	5.0			5.0
B3105/GSE Maint Shop	211-632-O	4.0			4.0
B3221/Engine Welding Shop	211-241-E	48.0			48.0
B3221/Nondestructive Test	211-233-B	51.0			51.0
B3234/Jet Engine Test Cell	211-833-C	53.0			53.0
B3703/Jet Engine Test Cell	211-833-C	24.0			24.0
B3703/Engine Inspection	211-237-I	6.0			6.0
B3703/Engine Preparation	211-226-O	41.0			41.0
B3705/Warehouse	441-758		390.0		390.0
B2101/Vehicle Maintenance	214-425		139.0		139.0

B260 APOE (Banked)	141-782		146.0		146.0
TOTAL		1168.5	675.0		1843.5

8. Unique and/or Peculiar Capabilities and Capacities

8.1 What unique and/or peculiar capabilities and capacities does the depot maintenance activity possess?

Depot Maintenance Capability/Capacity Describe Why Unique/Peculiar

Aircraft capabilities include:

a. Large Aircraft Robotic Paint Stripping (LARPS): (15.1 & 15.2 Aircraft)

OC-ALC is the only known activity within DoD prototyping a robotic/high pressure water system for as single source of repair paint removal on large thin-skinned aircraft (E-3, C-135, B-52, and B-1B). This one-of-a-kind system will remove aircraft paint without any chemicals or abrasives. LARPS process generates virtually no hazardous materials (Paint chips only). Paint stripping man-hours for this process will be reduced by more than 50 percent over existing methods. In addition, high-pressure water technology requires minimal facility modifications, as OC-ALC is already facilitized to support wet paint removal operations.

b. Paint Proportioning and Mix Systems: (15.1 & 15.2 Aircraft)

OC-ALC is the only single source Air Force facility employing the Paint Proportioning and Mix System. This technology is suited for large aircraft coating applications where large amounts of coatings are mixed. Traditional coating application equipment (i.e. paint pots) requires that unused coatings be discarded as hazardous waste. Paint proportioning equipment automatically measures and mixes on demand only the amount of coating necessary, thus reducing wasted paint. In addition, this equipment reduces process time and personnel exposure to hazardous fumes during paint mixing operations.

c. E-4B Super High Frequency (SHF) System: (15.1 Aircraft Components-Avionics/Electronics)

DOD unique single source for E-4B Super High Frequency (SHF) Computerized Antenna Pointing System (CAPS) component repair. The E-4B SHF CAPS system contains sophisticated items totally unique to the relatively small (4 A/C) E-4B fleet. E-4B SHF unique test equipment and unique programming devices are required to repair these items.

d. Dual Energy Real-Time Microfocus X-Ray System: (15.1 Aircraft -Cargo, Tanker, Bomber)

This equipment is the only Air Force capability sized for single source repair of large B-1B/B-2 composite components. It replaces film radiography which in turn reduces film consumption and man-hours.

e. Automated Ultrasonic Scanning System (AUSS): (15.1 Aircraft-Cargo, Tanker, Bomber)

The AUSS at OC-ALC is the only 13-axis computer controlled robotic ultrasonic scanning machine in the Air Force used for single source for repair on B-1B. It consists of a standard 9-axis scanning system, as found at OO-ALC, for compound contoured parts, plus a 3-axis parts positioner for more highly contoured parts and a one-axis turntable for cylindrical parts. It is sized for large aircraft and engine components. This machine detects delaminations and disbonds in metallic and composite parts. It records total inspection data on optical discs for future reference.

f. Centralized Aircraft Support System: (15.1 Aircraft-Cargo, Tanker, Bomber)

The CASS is a unique DOD capability. It provides hydraulic power, liquid cooling and system air conditioning during performance of single source DoD maintenance and power-on checks to four B-1B aircraft docks in B2122. Four conditioned air/coolanol systems for avionics cooling, 16 Hydraulic Ground Pumping Units to supply 4,000 psi hydraulic fluid, three chillers for chilled water and one 2,000 KVA transformer for electric power are integrated to the facility to minimize the need for ground support equipment. This clears the work area of wires, hoses and equipment by providing much of this support through overhead sources which improves safety in the work
environment.

ENGINE CAPABILITIES INCLUDE:

g. Blade and Vanes Repair Center: (15.1 Engines-Blades & Vanes)

OC-ALC is the only designated single source AF Technology Repair Center (TRC) and Service Center of Excellence for blade and vanes repair. OC-ALC is the only DoD center certified to repair F110 and F101 High Pressure Turbine (HPT) blades. Since repairs are safety-of-flight critical, it is important that repairs have stringent process and quality controls and inspection in order to insure the repair will not fail in flight. The quality and uniformity of these repairs directly affect the performance, efficiency, and fuel consumption of the engine. Repair of jet engine blades and vanes is, in the majority of cases, far more economical and less expensive (50% or less) than the cost of the original or new replacement blade or vane.

OC-ALC embarked on a program to incorporate all the processes required for jet engine blade and vane repair, inspection, repair, recoating, in one blade facility. The consolidated processes and equipment provided a synergy of function to insure uniformity, process control, and quality control. The processes and equipment incorporated are:

Processes:

Automated Cleaning
Manual and Automated NDI Inspection
Welding: Conventional Gas Tungsten Welding
Automated Microplasma Welding
Manual and Automated Superalloy Welding at Elevated Temperatures (S.W.E.T.)
Automated Laser Welding
Machining: Automated Electrical Chemical and Creep Feed Grinding
Conventional Manual Grinding
Automated Milling
Automated Laser Drilling
Advanced Electrophoretic Coating (AEP)
Vibratory Finishing
Air Flow and Water Flow testing
NDI/Inspection: Conventional X-Ray
Computed Tomography
Automated Plasma Spray and High Velocity Plasma Spray ("Gator Guard")
Shot Peening
Activated Diffusion Healing (ADH)
Vane Restrike

Three of these processes, ADH, S.W.E.T. welding, and Gator Guard high velocity plasma spray are proprietary processes and OC-ALC is the only DOD capability certified to perform these processes. Capability to support new thermal spray processes on both General Electric and Pratt Whitney engine blades already exists at OC-ALC and as result, OC-ALC is the only existing DOD facility capable of all three major coating repair procedures.

Specialized Equipment includes:

Automatic Microplasma Welding System
Superalloy Welding at Elevated Temperature Operation
Laser Cladder
Air Flow Test Stand

An Automated Parts Conveyor capable of tracking and queuing parts to specific work stations is integrated in the facility process flow. An additional conveyor system moves parts from the Blade Facility to B3001 to support engine reassembly.

h. <u>Engine Technology Repair Center</u>: (15.1 Engines-Aircraft Total)

OC-ALC is the designated single source TRC and Service Center of Excellence for J57, TF30 (AF and Navy), TF33, F101, F108, F110 (AF and Navy), and F118 and their related engine components. As one of two Air Force engine depots there are similar capabilities existing at both state-of-the-art facility that are unique to DOD in that other services' engine depots do not have the technology or facilities the AF depots enjoy.

With the exception of engine test and blade/vane repair, 90+% of basic engine repair is consolidated in B3001 which houses the varied processes and equipment required as well as the engine sustainment management function. After disassembly, engine component proceed through extensive processing.

Processes found in B3001 include:

CLEANING

To remove greasy soils, carbon, and oxidation which would interfere with the inspection or repair processes, cleaning is performed by either of two methods which are selected based on part base metal, cleanliness level required, and on the type of coatings.

Chemical Cleaning: A computerized chemical cleaning immerses jet engine parts into heating cleaning solutions consisting of caustic, acidic scale conditioning, and solvent based solutions.

Mechanical Cleaning: Mechanical cleaning is accomplished by numerous methods--abrasive blasting, vibratory finishing, C02 pellet blasting, and waterjet stripping. Both C02 blasting and high pressure waterjet stripping processes do not use hazardous chemicals and are environmentally friendly. **C02 cleaning is uniquely used at OC-ALC to clean aircraft engine components which are sensitive to grit entrapment.**

Engine Manifold Cleaning: This computer operated system is designed to remove carbon, coke, varnish, and oxides from manifolds and nozzle sets. With the implementation of this system alkaline permanganate waste disposal was reduced by 3,700 gallons each year. It provides greater cleaning efficiency at reduced operating costs.

OC-ALC aggressive action in pollution prevention initiatives have eliminated many of the previously used hazardous chemicals such as freon and ODC Benzene.

INSPECTION

After a component is clean it is then ready for inspection. OC-ALC is the certified DoD single source for performance of ENSIP on F110, F101, and F118 and has latest technology inspection capability:

Mission-essential eddy current non-destructive inspection is accomplished on rotating engine components using automated and semi-automated equipment to identify cracks and flaws so small that no other method can detect. Most of the eddy current performed by OC-ALC is **mandated by Congress under the Engine Structural Integrity Program (ENSIP)** to assist in managing the life of critical parts. Housed in a climate controlled room, equipment required is:

- an RFC Version 2 station
- seven RFC Version 3 stations
- four ECIIC stations
- one ECIIE station

Additional eddy current equipment (six RFC Version 3 in CY94 and two RFC Version 3 stations in 1995) will be installed. Intervals of inspection are determined by the type of engine and its mission. As the mission changes, so does the inspection interval and critical flaw size. The requirements for inspection are listed in ENSIP Tech Orders 2J-F101-9-1, 2J-F110-9-1, and 2J-F110-19-1. OC-ALC has performed inspections not only for AF engines but also for Israeli F110-100 and Navy F110-400. No other systems have been developed or approved to meet the critical crack limit detection requirements.

Additionally B3001 houses two complete NDI lines: Fluorescent Penetrant Inspection (FPI) and Magnetic Particle Inspection. The FPI was constructed as an overhead conveyor system on which components are suspended for better processing and handling of parts. Each line runs by computer control which keeps track of the processing throughout the shop, controls drying ovens, and provides safety controls. The lines are built for highest flexibility without specialized fixturing. Each line has an automatic pre-rinse, emulsification, and post wash tunnel for removal of the penetrant.

In conjunction with cleaning, specific repaired areas on GE engine cases and rotating parts, undergo a mission-essential process, Acid Etch, dictated by contractor identified requirements, (2J-F101-9, 2J-F110-9, 2J-F110-19, and 2J-F108-3-6, SWP00318). The station is designed for containment of the corrosive chemicals with an acid neutralization fume scrubber system. The equipment and tooling development and procurement was accomplished to ensure compatibility with chemicals, flexibility to accommodate the different sizes and

configuration of jet engine parts, and capability to perform metallurgical examination of samples for metal removal and Intergranular Attack determination.

After inspection, engine components are processed through various combinations of machining, welding, plating, plasma spray and heat treat when required.

MACHINING

Machining is accomplished by many methods:

- Electrical Discharge Machining (EDM) used on nozzle and blades is typically used when conventional machining methods cannot remove metal efficiently or when a complex-shaped cavity must be created. This process is especially useful for materials with high heat resistance and is specifically suited to the repair of turbine nozzles and blades. **The large and small EDM are to our knowledge unique to DOD.** Two large EDMs with capability of machining in all three axis on turbine nozzles up to 36 inches diameter performs all EDM operations on these nozzles with one setup thereby reducing man-hours. OC-ALC also has four smaller EDMs used to effect of unserviceable vane and vane stubs without changing fixtures or removing the nozzle. This has allowed OC-ALC to reduce processing time from as much as 40 hours per part to as little as 12 hours.

Other machining is divided into four areas: (1) drilling, (2) milling, (3) turning, and (4) boring.

Various automated and semi-automated drill presses, mills, and lathes are used. **The fixtures and adapters used are unique to the engines worked by OC-ALC.**

During the overhaul process engine components are measured to maintain the form and relationship. The roundness and Geometric Measurement Systems (RGMS) provides the capability to inspect form and position, such as roundness, flatness, squareness, parallelism, concentricity, and runout. **To our knowledge, OC-ALC's RGMS is unique in size capability (48 inch parts diameter and up to 1000 lbs).** Also, the Coordinate Measuring Machines (CMM) are used where very tight tolerances for components are required. In many cases, there is no alternative to CMM capable of meeting Air Force technical order dimensional requirements. OC-ALC CMM has the capability to automatically change probe and stylus arrangements and configurations several times during the inspection program without changing the component set-up. This is absolutely essential for the required ENSIP dimensional inspection. Two special duty CMMs are unique to DOD having been specifically designed to measure gas turbine engine drive shafts.

HEAT TREAT

The Heat Treat capability at OC-ALC is remarkable. Collocated in B3001, the facility has a variety of equipment to meet the control standards of +/- 10 degrees F for temperatures under 1000 degrees F, +/- 15 degrees up to 1600 degrees F, and +/- 25 degrees up to 2400 degrees F. Twelve modern high-temperature vacuum furnaces are available for treating nickel and cobalt based superalloys. One of these is equipped with an internal oil quench bath to prevent any contamination during the hardening of high-strength alloy steels. Twenty-seven atmosphere furnaces are available for stress relief of weld and plating operations, for aging aluminum components, and for tempering steels. One furnace is equipped to carburize a hard layer into low-alloy steels.

Shot Peening is used to induce compressive stress layers after any Heat Treat, machining, welding, or any other metal removal processes which increases fatigue strength and stress corrosion cracking resistance. Engine performance is dependant on shot peening to prevent increase in crack propagation. The size of shot peening cabinets is designed to accommodate the components (F108 fan blades, six foot engine shafts, etc.).

ELECTROPLATING

The Electroplating capability, an Air Force weapon system mission essential support facility collocated in B3001, has been under phased renovation with the last phase under contract to start Aug 94. Renovation will incorporate state-of-the-art pollution prevention and control technologies to meet or exceed current EPA regulations. These will include: metal recovery systems for cadmium, chromium, and nickel; rejuvenation systems for acids etches and alkaline cleaners; and a waste water pretreatment system. Energy cost reductions will be accomplished by capturing waste heat from the steam condensate through a reboiler system.

Electroplating is used to restore worn surfaces and apply corrosion preventing coatings IAW T.O. 2-1-111 and 42C2-1-7. Several unique capabilities are involved:

- Zinc-Nickel Plating (rack and barrel) - OC-ALC was the first plating shop to eliminate the use of cadmium plating (Nov 91). Most of the parts were switched to zinc-nickel plating which provides superior corrosion protection without the pollution compliance problems of cadmium. **OC-ALC is the only DOD source using this process.** A 900 gallon tank is required to support plating on large parts.

- High-Build Electroless Nickel - OC-ALC is the **only facility** to plate to thicknesses of 0.030 - 0.070 inches.

- Plating electroless nickel on titanium - Titanium plating presents a special problem due to difficulties in activation. OC-ALC has achieved titanium plating capability through the use of electroless nickel plating.

Other special coating capabilities include:

- AEP coating is used in the Blade Repair Facility (the only AF Level II blade/vane repair capability) to protect the blades from sulfidation/corrosion.

- Ion Vapor Deposited (IVD) aluminum coatings are applied to engine parts to provide sacrificial corrosion protection. It is applied in a vacuum chamber where aluminum is evaporated and deposited on a negatively charged part.

- Plasma Spray Shop - OC-ALC is the most versatile metal coating operation in the aerospace industry. The shop houses six major disciplines of thermal spray and produces more than fifty spray coating for more than 300 part geometrics. Automated systems linking computer-controlled process parameters and industrial robot movement are used. Special processes to apply ceramic coatings to entire afterburners and to replace as much as 1/8 inch worn material allows recovery of parts no longer in manufacture. Recent additions include the industry standard for chrome plating replacement, High Velocity Oxygen Facility, PWA 279 abradable coating, and the patented Gator-Guard high energy coating processes. **No other aerospace spray coating facility has the size equipment, technology, and throughput of the OC-ALC shop.**

TEST FACILITIES

After all parts are reworked they are routed to the assembly area for reassembly of the engine. The engine is then sent to one of the OC-ALC jet engine test facilities. Two facilities consist of twelve test cells with thrust capability from 50,000 lbs to 100,000 lbs. Some unique or special capabilities are:

7. Buildings and Their Condition

7.1 List the buildings used to perform the depot maintenance functions by category code numbers (five or six digit CCNs), identifying their current condition (adequate, substandard, and inadequate) in Table 7.1 in thousands of square feet (KSF).

Table 7.1: **Facility Conditions**

CCN	Facility Type	Condition / Area (# SF)			Comments
		Adequate	Substandard	Inadequate	
121-124	Hydrant Fueling System	.19			B/2111
123-335	Vehicle Fuel Station	.14			B/2103
125-977	Liquid Fuel Pump Station	.84			B/2112
141-391	Radar Transmitter/ Computer Bldg	15.70			B/1017
141-459	Crew Readiness	.96			B/3102
141-763	Technical Laboratory	27.30			B/3220
141-764	Integrated Support Facility	227.15			B/210, 214, 1083, 3220
141-765	Depot Quality Control Lab	33.26			B/2211, 3001, 3125, 3221
211-116	Hangar, Maintenance Depot	1,240.32			B2121, 2136, 3001, 240, 2122, 3102, 3105, 3771

- **Unique F118 engine test capability** which include unique instrumentation and computer systems in addition to the normal test cell system.

- In house adaptation of existing adapters to test TF30, TF33, and F108 engines in the Quick Engine Connect (QEC) configuration to support the 2-Level maintenance concept on these engines.

Engine testing is required to ensure repaired engines meet or exceed the performance specification set forth in Air Force Technical Orders. With a successful engine test, the engine is returned to supply to support user requirements.

In addition to the normal depot overhaul of engines, OC-ALC has assumed 2-Level repair responsibility for its designated engines. This has allowed reduction of personnel at the field locations while maintaining a high state of engine readiness. Engine test cells are being reconfigured to accommodate testing with quick engine test kits. In two years OC-ALC has become the largest Jet Engine Intermediate Maintenance center in the world.

i. Activated Diffusion Brazing Healing (ADH): (15.1 Engines-Aircraft Total, Aircraft Components-Other (Oxygen) - Manufacturing and Fabrication)

OC-ALC is the only single source DOD facility certified and licensed to perform ADH repair. Activated Diffusion Healing/Brazing is a technology that must be thought of as an entire repair concept and not just Brazing. The repair concept is used to repair cracks < or = 0.040" wide on stationary components. The diffusion brazing portion of the repair is described as a wide gap brazing process with one major difference; certain material properties are restored to nearly as high as high substrate/parent material. The ADH/ADB concept also has another distinct advantage over welding. Since it has none of the shrink related problems of welds, post weld cracking and shrinkage is significantly reduced.

ADH/ADB alloys are developed such that they are as close a chemistry as, or at a minimum compatible with the substrate material. There are generally two different sets of powdered alloys used. One is the "high melt", generally parent material powder or an alloy that enhances a particular desired property, and a second "low melt" powder that will lower the melting point of the "high melt" and generate braze flow during the furnace braze repair. The "low melt material is chosen to generate brazing capabilities at a particular temperature to ensure the substrate properties are not jeopardized.

ADH/ADB is capable of healing a crack up to 0.040" wide as long as it is free of oxides. Fluoride Ion Cleaning (FIC) is generally required to reduce the tenacious oxides of aluminum and titanium. Once cleaned the components are ready for braze alloy application, furnace

brazing and blending to contour. Process control samples are checked by the Materials Laboratory with every batch.

This procedure is required by Tech Orders 2J-F110-3-6 and 2J-F101-3-6 for the repair of Low Pressure Turbine (LPT) nozzles. Other components such as F100 flameholders, F110 flaps and TF30 Diffusers have undergone repair development using Vacuum FIC and diffusion brazing to improve or just make possible the repair of these components. F100 flameholders for example, require just about a week of preparation and welding to repair the hundreds of cracks it suffers. This conventional process would also impose warpage that would require restraightening and realignment of the flameholder. With this new developed procedure the repairs are Vacuum FIC, vacuum cleaning, and diffusion brazing; in lieu of v-grooving and welding. The result is a component that is evenly heated, therefore distortion is minimized, and 80% of the cracks are repaired with parent metal diffusion braze alloys.

j. Bearing Overhaul - Level II Bearing Refurbishment: (15.1 Special Interest-Bearings)

OC-ALC is the single source AF TRC and Service Center of Excellence for all Air Force bearing refurbishment. Since designation as TRC in FY74, OC-ALC has pioneered organic bearing refurbishment by effecting design and procurement of special honing machines to perform honing of bearing races to identified tolerances and developing techniques using appropriate bearing stocks to offset material removed from races. **The ability to perform ball and roller replacement is a unique capability.** Over 23,000 bearings are produced per year to an accuracy of one millionth of an inch. This capability is expandable to additional bearings in aircraft, engines, and ground vehicles. Existing special OC-ALC facility and equipment requirements are a Class 100,000 clean room, four specially procured honing machines, sophisticated dimensional inspection equipment, and a computerized inventory tracking system.

k. Constant Speed Drives (CSD)/Integrated Drive Generators (IDG), Air Drive Accessories and Air Valves Systems: (15.1 Aircraft Components-Hydraulic/Pneumatic)

OC-ALC is the single source Air Force Service Center of Excellence for the above listed Hydraulic/Pneudraulic/Pneumatic components.

- Twenty-two types of CSDs and IDGs are overhauled and tested at OC-ALC. The specialized test stands are housed in a controlled area for worker and operator safety during high speed testing.
- Air driven accessories and air valve systems are worked in an environmentally controlled room and tested using the 22 test cells designed to contain high speed rotating components in the event of parts failure. Test parameters requiring conditioned compressed air from ambient temperature to 300 PSIG and 800 degrees F at flow rates up to 8lbs/sec simulating in-flight operational conditions and 800 PSIG, 1400 degrees F. and 3lbs/sec or 9lbs/sec at ambient temperature are accomplished through the facility air compression system and a "Super Cell" critical for support of F-16 items.

As the primary PDM facility for the B-52 aircraft, we have in place the ideal combination of resources and experience to work the B-52 in a manner that best satisfies customer requirements. We have delivered all B-52 aircraft on-time for the past six (6) years, providing the customer the least impact to their operational mission.

Building 2122, north hangar, was converted from three B-52 aircraft maintenance docks to four B-1B aircraft maintenance docks. These docks are available for PDM, special inspections, and modification workloads. The maintenance docks are equipped with a built-in support system that provides hydraulic fluid, air, and liquid coolant to the B-1B during maintenance. The Centralized Aircraft Support System (CASS) provides modern and more convenient services for performing in-dock operations by eliminating the need to use portable Ground Support Equipment (GSE) in the docks.

Bomber Production Capability: The uniqueness of the OC-ALC B-52 PDM Program is demonstrated by the availability of our skilled personnel, knowledge of the airframe, material and equipment requirements, and facility/support shop capabilities. We have proven our capability to perform all aspects of B-52 modifications and depot-level maintenance in a quality manner over the past 35 years. Our outstanding reputation for quality products, on-time delivery, program commitment, and customer satisfaction is well known. The transition of the B-52 depot workload to OC-ALC resulted in a net savings of $12.6 million to the USAF since FY92. OC-ALC represents the best value and lowest risk option available to the government in accomplishing the work on the B-52 fleet. Our proven record of performance demonstrates that we have, we can, and we will continue to support our B-52 customer in an exemplary fashion.

q. Cargo Aircraft Programmed Depot Maintenance Center of Excellence: (15.1 & 15.2 Aircraft-Cargo, Tanker, Bomber, Aircraft Component-Aircraft Structure)

Our Cargo aircraft PDM repair facility is enormously versatile, allowing for exceptional flexibility in workload mix. This mix includes single source for special purpose aircraft PDM, engine repair, and aircraft/engine accessory overhaul and depot repair for -135 airframe structures. The Cargo aircraft maintenance facility is located in the largest covered aircraft repair facility in the Air Force. This unique asset offers the flexibility to realign for new aircraft workloads involving large aircraft as well as fighters. The low bay shop area, adjacent to the high bay line, presents unique operational cost savings potential with regard to material handling. Most of the components removed from aircraft could be repaired, stored, and kitted for return to the aircraft for installation without routing to outside buildings or remote locations. An overhead conveyor system, which is being updated with state-of-the-art computer controls, is available for use in moving aircraft parts to support shops for repair and return.

Described below are some of the unique capabilities of the Cargo aircraft facility.

OC-ALC provides in-depth repair and overhaul of automatic flight control (autopilot) systems, from older foreign and Air Force systems to the latest digital systems now being introduced.

o. Secure Electric Power Plant:

-- In 1990, the local utility company completed efforts to relocate a 64 megawatt electric generating plant to a site on base at no cost to the government.

--- Should commercial power be disrupted in the Oklahoma City area, this plant has enough capacity to power all of Tinker during the summer months when the demand for electricity is highest.

--- Should the entire off-base electric distribution system be lost due to natural disaster or sabotage, Tinker has a secure electric power plant capable of supporting the entire base.

---- The plant has a highly reliable design with four gas turbines and two electric generators.

----- The primary fuel is natural gas, which is an abundant Oklahoma resource.

----- Power for the plant can also be generated with jet fuel should the gas supply be disrupted.

-- This plant is owned and operated by the local utility company.

--- Operators can start the plant from either of the remote control centers, and isolate Tinker from the rest of the distribution grid, thus dedicating the plant to Tinker during contingencies.

-- This is a very unique capability that few, if any, DoD installations have.

p. Bomber Programmed Depot Maintenance (PDM) Center of Excellence: (15.1 & 15.2 Aircraft-Cargo, Tanker, Bomber, Aircraft Component-Aircraft Structure)

OC-ALC is the single source of repair for B-52 and B-1B and their related structural components. The uniqueness of the Bomber PDM repair complex offers exceptional experience, diversity, and flexibility of manpower and facilities. Some of the work, skills, and processes can be considered unique. Buildings 2121 and 2122 offer flexibility to work fluctuating numbers of bomber aircraft, as well as large frame aircraft such C/KC-135s. Three B-52 aircraft maintenance docks on the north side of Building 2121 were converted into five C/KC-135 docks in response to an urgent need to increase the cargo/tanker aircraft workload. This facility was changed back to B-52 aircraft maintenance docks with the increase in the bomber workload. Building 2121 has one dock modified, allowing for use of one B-52 dock as a B-1B aircraft maintenance dock when needed. These actions and capabilities demonstrate the flexibility to respond to changing workloads and an experienced skills base that can work multiple weapon system workloads.

l. Carbon Dioxide (CO2) Pellet Blasting System: (15.1 Aircraft, Engines) (15.1 and 15.1 Aircraft Components-Aircraft Structures)

Carbon Dioxide Pellet Blasting System at OC-ALC is a single source unique capability which uses compacted dry ice pellets to clean aircraft engine and component parts. The system cleans carbon, light rust, and light films of rubber from aircraft parts. In particular, the system is ideally suited to cleaning major engine cases which are sensitive to abrasive grit entrapment. CO2 Pellet Blast also acts as a secondary or backup process for parts cleaned in our automated cleaning system. Reprocessing a part due to small patch of carbon or paint has been eliminated. This action saves on costly chemicals and shortens cleaning time. Many of the hazardous chemicals which were previously used for cleaning have been eliminated.

m. Flexible Manufacturing Cell: (15.1 Manufacturing & Fabrication)
The unique Flexible Manufacturing Cell (FMC) at OC-ALC consists of two machining centers "tied" together. The FMC consists of two DeVlieg-Sundstrand 5-axis, horizontal spindle, computer numerically controlled (CNC) machining centers interconnected and serviced by a ten station pallet changing system. Manufacture jobs are fixtured to any of the ten 42 inch diameter pallets, shuttled onto one of the machining centers, machined, and automatically shuttled off. Machine cycle times are reduced up to one-third the time required for a stand alone CNC machine since the setup times are incurred off-line. The duty rated 40 horsepower spindle motor is capable of speeds from 10 to 4000 rpm and accepts 50 V-flange fool holders automatically from the 90 tool capacity magazines. Broken tool detection capabilities and tool length measurement probes assure uninterrupted and accurate machining.

Other unique/peculiar depot maintenance related capabilities and capacities

n. Engine/Automatic Flight Control Instruments: (15.1 Aircraft Components-Instruments)

OC-ALC is the Air Force single Source of Repair (SOR) and Service Center of Excellence for many types of aircraft instrumentation, including, but not limited to:

- Electronic Amplifier
- Flight Director Computer
- Torquemeter Indicator
- Fuel Flow Systems, Indicators and Transmitters
- Tachometers
- Indicators, Turbine Inlet Temperature
- E-4 and FCFS-105 Autopilot Systems
- Flap Position Transmitters
- Flight Services Transmitters

Building 3001. The major feature of this building is the length of the high bay aircraft line at 3320 linear feet or 5/8ths of a mile. The high bay hangar space capacity is approximately 0.5 million square feet or 11.5 acres under one roof. The entire building has a total or 61 acres of space under one roof. Clearance between columns in the high bay is 148' 6" with vertical clearance of 32' 6". Our facility has an extremely versatile capability for the repair and overhaul of a variety of aircraft. The high bay aircraft line is one of the few aircraft maintenance hangar facilities within the Air Force that is air conditioned. This is important when considering a confined space working environment. Our high bay aircraft line has three five-ton, full coverage, overhead bridge cranes. The cranes are capable of removing and installing engines, horizontal and vertical stabilizers, flight control surfaces, spoilers, wing skins, and outer wing panels.

Unique Cargo Aircraft Repair: **OC-ALC is the single source of PDM repair for C/KC-135 special purpose aircraftsuch as C-135B, RC-135, RC-135C, RC-135E, KC135D, KC-135A (NASA), NKC-135A (Navy), OC-135B and WC-135B.** OC-ALC is centrally located in the Continental United States and has an experienced, multi-skilled aircraft work force on site and within the state of Oklahoma. OC-ALC is the only ALC which has worked the C/KC-135 special purpose aircraft. The first special purpose aircraft was delivered in 1960 and has continued to be worked at Tinker AFB, due to fine workmanship and competitive costs. We have the capability to support field team requirements and accept fly-in work on short notice. OC-ALC's ability to compress or accelerate work requirements has been demonstrated many times in the past. OC-ALC is collocated with the System Program Director and engineering organizations, which facilitates prototyping, testing, and sampling of projects for the C/KC-135 aircraft. This also results in excellent response time for engineering evaluation of aircraft structural problems discovered during depot maintenance. Collocation with the 507th Air Refueling Group benefits both the tenant and the ALC through facility sharing, training for personnel, and reduced delivery cost to the customer.

r. Surveillance Programmed Depot and Expanded Phase Maintenance Center of Excellence: (15.1 & 15.2 Aircraft-Command & Control, Aircraft Component-Aircraft Structure)

- **OC-ALC is the single source of repair for E-3 and E-6. OC-ALC is the single DoD source of repair for all structure on EC-135 aircraft for deport level repairs.** The uniqueness of the E-6 Surveillance Aircraft complex is due to our centralization of PDM maintenance functions for E-3 aircraft in one facility and providing cross-service support for aircraft maintenance. Building 2136 was specifically designed for E-3 aircraft but can accommodate any one of four configurations supporting B-1B, B-52H, C/KC-135, or E-3 aircraft. The Navy E-6 aircraft can also be hangared in the E-3 facility. Building 2136 was designed with sufficient height and contains two 7.5-ton overhead bridge crane systems to remove the 14,000 pound hardback rotodome. The facility is designed for use with "Texas Tower" platform maintenance workstands to service and repair E-3 aircraft rotodomes. The

overhead bridge cranes must be used with the tower platforms to accomplish maintenance on the rotodome system. The bridge cranes can also support the removal and installation of flight control surfaces and horizontal/vertical stabilizers. The facility is provided with a centralized hydraulic system, providing one or two circuits of 3000psi or 4000psi hydraulic fluid flow. A centralized breathing air system is also provided for personnel use in confined space areas of the aircraft. A 400HZ centralized electrical distribution system provides four legs of power in each of three docks for full power operational checks of E-3 aircraft. This facility and Building 240, with the experience of production personnel, make it possible to support the 552nd ACW, Royal Saudi Air Force, and possible future British E-3 aircraft workloads. Specific unique capabilities are as follows:

-- Interservice Maintenance: The Navy Expanded Phase Maintenance (EPM) Program is unique in that OC-ALC is accomplishing airframe depot maintenance requirements on E-6A aircraft in Navy facilities as part of their field-level maintenance schedule. In this unique situation, we have taken the ALC's depot support capability to the customer rather than having the customer send their aircraft to the depot. This program means more available flying hours for the Navy's E-6A aircraft. This is accomplished by eliminating an estimated six months of maintenance downtime per aircraft every six years. The savings results from comparison with the traditional Navy Standard Depot Level Maintenance (SDLM) Program. This innovative program is successfully meeting its primary objectives of providing depot maintenance within the context of the field-level environment. Availability of aircraft to meet their strategic mission is greatly enhanced.

s. Electrical Discharge Machining (EDM) of Nozzles and Blades: (15.1 Engines)

To perform some repairs on gas turbine engine components, electrical discharge machining must be used to remove metal. EDM is typically used on aerospace materials when conventional machining methods cannot remove metal efficiently or when a complex-shaped cavity must be created in a component part. EDM is especially useful for machining complex-shaped cavities in high heat resistant materials. OC-ALC has used the EDM process for many years to machine complex shapes in large and small size component parts that cannot be machined with conventional methods. OC-ALC presently uses electrical discharge machines which are specifically suited to the repair of turbine nozzles and blades used in gas turbine engines. Both of these components are manufactured from materials that are very hard to machine with conventional methods, and must be repaired to exact tolerances. OC-ALC has two very large EDMs which can machine in all three axes on turbine nozzles up to 36 inches diameter, allowing all EDM operations required to be performed on turbine nozzles in one setup. OC-ALC also has four small EDMs which are especially suited to high pressure turbine blade repair by allowing high throughput of blades with minimal floor space requirements. **The very large EDMs used for the turbine nozzle repair are, to our knowledge, unique in the DoD.** Using an off-the-shelf commercial design, the EDMs include cutting capability in both horizontal axes and the

vertical axis. In the case of turbine nozzle repair, this allows us to remove the center of the unserviceable vane and the vane stubs on one machine without having to change fixtures or remove the nozzle from the fixture. With these machines, OC-ALC has been able to reduce processing times from as much as 40 hours per part to as little as 12 hours for the same required repairs. The small EDMs used for turbine blade repair are also, to our knowledge, unique in the DoD. The EDM repairs required on the turbine blades, which are approximately two inches by one inch by one inch in size, involve a very small area of the blade. The small EDMs, which are also off-the-shelf items, are especially well suited for small parts work. Their small size facilitates set-up for the operator, as well as reducing floor space requirements versus standard size EDMs, without sacrificing throughput. This results in a higher quality product and higher productivity per square foot of floor space.

t. Bldg 3220 - Avionics Reliability Center (ARC) for Inertial Navigation Systems (INS), Attitude Heading Reference Systems (AHRS) and Automatic Flight Control Systems (AFCS):

OC-ALC is the single source Air Force management center for INS, AHRS and AFCS for the testing of inertial systems and represents a significant investment of funds. The ARC's unique equipment and weapon system component availability provides the only inertial engineering facility in DOD. ARC supports depot organizations and field activities using commodities managed by OC-ALC/LII by enabling engineers and technicians to investigate/resolve service revealed deficiencies in fielded equipment. Built specifically for inertial navigation testing, the facility includes: **North Star Azimuth Reference Observatory,**
Seismically Stable Test Piers and Co-resident Environmental Stress Screening Equipment. The stable piers are essential to the testing of inertial systems and represent a significant investment of funds.

u. Bldg 210 - Air Accessories Overhaul/test: (15.1 Airrcraft Components-Hydraulic/Pneumatic)

This is the only facility of its kind in the Air Force. Capabilities include single source repair, overhaul, calibration, and testing of any air driven iten in the Air Force inventory. It contains 22 test cells designed to contain high speed otating components, such as air turbine motors, in the event of part failure. It also safely isolates the operator and remainder of the facility from the item under test. Contrary to the OO-ALC Ram Air Test wind tunnel test facility, which utilizes very high volumes of low pressure ambient air through a largediameter duct, this facility tests air driven components, such as valves and cooling turbines, up to nine inches in diameter under compressed air conditions. (Detailed write-up in question 6.1.)

v. Bldg 214 - Cruise Missile Engine Facility: (15.2 Engines-Aircraft Total)

Only DoD single source self-contained maintenance repair/test center specializing in cradle-to-grave overhaul and production testing of air launched cruise missile engines (F107 and F112).

Currently, the Tinker AFB Cruise Missile Engine Facility receives missile engines in containers from both field units and OO-ALC for engine refurbishment and test. During test, automated software monitors engine conditions such as thrust, fuel flow, revolutions per minute, and exhaust temperature to detect ans establish possible sources of error for out-of-limit engine parameters This greatly increases the reliability of the engine when the missile is fired. The clean room in this building controls dust particles, humidity, and temperature to increase engine reliability. An electrostatic discharge floor prevents static electrical discharge to the engines during uncrating. Without this flooring the explosive device used as a starter for the engine might accidentally be discharged. This facility could be expanded to support other small missile engines and is adaptable to any small jet or reciprocating engine.

w. Bldg 1055 - Oxygen and Associate Equipment Overhaul Facility: (15.1 Aircraft Components-Other (Oxygen))

This facility, which is theonly single source oxygen overhaul facility in the Air Force, is used for the overhaul, test, and acalibration of critical life support systems (Oxygen Breathing Systems) for all types of aircraft in the Air Force inventory. Facility is kept isolated from other facilities due to the requirement for clean, dry, and oil-free systems. The facility consists of specialized chemical cleaning systems, overhaul equipment, calibration equipment, and oxygen purging/filling systems. Over 22 different typoes of life support equipment are overhauled in this facility; over 8,000 items are repaired each year.

x. Bldg 3220 - Avionics Integrated Support Facility (AISF): (15.1 & 15.2 Software-Tactical Systems)

OC-ALC is the only B-1B/E-3/B-52/ALCM and Rotary Launcher complete avionics test facility in the DoD. It provides single source software maintenance and integration of computer programs for the systems listed in question 8.2. AISF performs ground integration and test of avionics systems software thorugh the combined use of weapons system specific avionics components and one-of-a-kind hardware/software thereby reducing full integration design development costs. Only existing world-wide facility capable of resting and integrating E-3, B-1B, B-52, AGM-86, and AGM-129 software changes. Workload cannot be readily moved without impact to software support because of lack of duplicate capability. ASIF was designed and constructed to accommodate resources required to perform Operational FlightProgram (OFP) support for OC-ALC assigned weapon systems. Constructed of specially designed brick and mortar, the reinforced concrete floors, walls, and ceilings, it contains prime mission equipment driven by simulation computers in a laboratory environment which provides the means to accomplish OFP modifications ehich correct design deficiencies, enhance weapon systems operation, and incorporate new capabilities in the B-1B, E-3, and B-52/Air Launched Cruise Missiles (ALCM) integration. A specially designed high bay area was constructed to accommodate the rotary and pylon cruise missile launchers within required collocation distance of the B-52 software integration lab. This construction included facility integration to accommodate the cable tray runs, 400 Hz power, and hydraulics for testing the missile load frames/rotary launcher for the AGM-86 and AGM-129 ALCMs.

y. Bldgs 3234/3703 - Jet Engine Test Facilities (12 Cells): (15.1 Engines-Aircraft Total)

These are the only engine test facilities configured and certified in DoD which house single sourve test cells (4) rated at 100,000 lbs thrust class cells capable of handling up to 4,000 lbs of air per second, up to 150,000 lbs per hour of fuel, and 5500 gallons per minute of afterburner cooling water An eleven foot center line for the engine allows testing of engines up to a 11 foot diameter inlet. **This provides current capability for testing the J57, TF30, TF33, F101, F108, F110, and F118 engines used as powerplants in the B-1B, B-2, B-52, F-14 (Navy), F-16, F-111, C/KC-135, C-141, and E-3 aircraft.** All engine to adapter buildup is acomplished on the prep floor in front of the test cells thus minimizing test cell time. A monorail system is used to transport the engine from the buildup floor into the test cells providing a 5-minute engine installation time once in the test cell. (Detailed write-up inquetion 6.1.)

z. Bldg 3761 - B-1B Compact Range Facility: (15.1 Airraft Components-Avionics/Electronics)

This facility is the Air Force sole source repair and testing capability for th eB-1B APQ-164 multi-functional radar antenna. The Antenna is tested in two configurations: (1) Phased Array and (2) Low Observable Antenna (LOA). Five intricate and complex test sets used to perform tests on the antenna include Memory Module, Gimbal, Antenna Array, Network Analyzer and Range Array. The Range Array Test set is a unique procedure enclosed in an Anechoic Chamber which sits atop an adjustable isolated pad. This unique 19' x 37' isolated pad de-couples the equipment from seismic shock and or vibration induced from heavy trucks, trains, aircraft engine testing or other sources in the area which could affect antenna measurement accuracy. The pad has to be stiff so that the compact range reflector, the test positioner, the source positioner, the LOA tower, and the mirror stand all maintain their relative position during testing of B-1B antennas.

aa. Bldg 3902 - Fuel Control and Accessories Consolidated Test Facility (CTF): (15.1 Engines-Aircraft Total)

Currently under construction is the CTF. This $13.6 Million Class 1 and Division 1 National Fire Protection Association (NPFA) rated state-of-the-art fuel control and accessories test facility is expected to be completed Oct 94. The CTF's 63,500 sq ft are designed to be environmentally friendly and to house the Automated Fuel Accessory Test Systems (AFATS) and current semi-automated General Electric engine controls and accessories test stand. (Detailed write-up in question 6.1.)

bb. Bldg 3001 - Multiple Workload Industrial Complex: (15.1 Aircraft-Cargo, Tanker, Bomber, Engines-Aircraft, Special Interest-Bearings)

It is a unique multi-faceted facility which houses single source DoD and Air Force capability for special purpose -135 aircraft, J57, TF30 (AF and Navy), TF33, F101, F108 F110 (AF and Navy) and F118 and their related engine components and bearings, (Detailed write-up in question 8.2.)

cc. Test Stands for Calibration and Testing of Fuel Wetted Engine Controls and Accessories: (15.1 Engines- Aircraft Total)

The equioment provides single source testing for peculiar controls and accessories which supports the Air Force. The calibration and testing of engine controls and accessories requires the use of unique equipment. The equipment is unique from the standpoint that it controls the physical characteristics of a hazardous calibration fluid, MIL-C-7024 TYPE 2, to simulate conditions the components will be exposed to in its working environment. Design methods for test equipment were to build workload specific test stands which means only the components the test stands were designed for would be able to be calibrated and tested by that equipment. For example, a TF30 main fuel control can only be tested on a TF30 main fuel control test stand. Currently, our equipment is limited to testing peculiar controls and accessories which support the Air Force F101-100, F101-102, F108-100, F110-100, F110-129, F118-100, TF33-P3, TF33-P5, TF33-P7, TF33-P9, TF33-P100, TF330-P102, TF33-P103, TF30-P103, TF30-P107, TF30-P109, TF30-P111, and the Navy TF30-414 engines.

dd. Texas Towe: (15.1 & 15.2 Aircraft-Command and Control)

The Texas Tower is unique single source (only one in US) support duplicate equipment used to perform depot maintenance tasks on the E-3 rotodome. It is jointly utilized between 552 ACW and depot maintenance for ongoing depot maintenance requirements. In the event of relocation, equipment would have to be duplicated to support the organizational requirement, at a cost of approximately $1.6M plus construction costs for suitable building with tracks to house the tower.

ee. Centralized Aircraft Support System (CASS): (15.1 Aircraft-Cargo, Tanker, Bomber)

The CASS is a unique single source and peculiar capability. It was tranported to Tinker AFB in 1991 and is the only one in DoD. It is utilized during performance of maintenance and power-on checks to four B-1B aircraft docks in Bldg 2122. Four conditioned air/collanol systems are used to provide avionics cooling. The hydraulic systems use sixteen Hydraulic Ground Pumping Units to supply 4000 psi hydraulic fluid. Three chillers provide chilled water during operations, and one 200 KVA transformer provides electric power to the entire CASS.

ff. Bldg 2280 - Paint Hangars: (15.1 & 15.2 Aircraft)

The paint hangar is single source paint facility for the E-3, B-52 and B-1B aircraft. This two-bay facility is currently sized to support somplete corrosion control of any weapon system in the Air Force, including the C-5 and 747-size aircraft. Borth docks are designed to allow complete stripping, washing, chemical tretment and painting. (Detailed write-up in question 8.2.)

gg. High Force Axial-torsion Test System:

This testequipment in unique to the DoD. It is the largest combined Axial-Torsional test system (serial number 1) ever produced by the MTS Systems Corporation for the free world. While there are larger pure axial or pure torsional test systems, this is the largest combined test system capable of producing 500,000 pounds axial force and 720,000 in-lbs of torque. It is a coputer controlled, closed loop, servohydraulic material test system which can be programmatically phased to simultaneously control axial force and torque. The aterial test system can be programmed to replicate in-flight loading spectra.

hh. Coordinate Measuring Machines (CMMs): (15.1 Engines-Aircraft Total)

Dimensional inspectionis critical to the overhaul and repair process due to the very tight tolerances required of gas turbine engine components. To ensure that repaired component parts meet the tight dimensioal requirements of Air Force technical orders, OC-ALC uses ten production-oriented CMMs to perform the bulk of dimensional inspection procedures. In many cases, CMMs are the only method of measurement which can accurately characterize the dimensional condition of a component part. Manual methods of dimensional inspection are labor intensive and cannot reproduce the feature analysis functions of the CMM, which are required to ensure accurate dimensional inspection. Dedicated gages can provide the necessary feature analysis, but are also labor intensive, as well as very expensive in comparison to the purchase price and operational expenses of the CMM. In many cases, there is no alternative the CMM inspection capable of meeting Air Force technical order dimensional inspection requirements. This is especially true of ENSIP dimensional inspection requirements identified in T.O. 2J-F110-3-5 and 2J-F110-13-5. OC-ALC has several CMMs that have the capability to automatically change probe and stylus arrangements and configurations several ties during the execution of an inspection program without changing the setuup of the component part being inspected. Thisis absolutely essential for the required simensional inspection of the ENSIP parts. **OC-ALC also has two special duty CMMs designed specifically to measure gas turbine engine drive shafts which are unique in the DoD.**

8.2 Separately list the depot maintenance facilities and equipment which are one of a kind within the Service and/or DoD.

Facility: **BLDG 3001 MULTIPLE WORKLOAD INDUSTRIAL COMPLEX (15.1 & 15.2 Aircraft-Cargo, Tanker, Bomber, Aircraft Component-Aircraft Structures)**

Describe Why It Is One Of A Kind:
Bldg 3001 is the longest covered (61 acres) repair facility in DOD. **It is a unique multi-faceted facility which includes single source for special purpose aircraft PDM, engine repair, and aircraft/engine accessory overhaul and depot repair for -135 airframe structures.** In addition, the facility includes:

- 502,988 SF highbay which has alternately and concurrently handled aircraft which range from -135s to A-7s.

- 1,084,213 SF lowbay which has been reconfigured in many combinations to support wokload peaks and contingency surges in engines, aircraft structures, and aircraft and engine components.
- 39,788 SF Chemical Cleaning facility which provides support for engines and aircraft components.

- 36,683 SF Plating facility and 12,389 SF plating prep area providing support for engines and aircraft components.

- 41,693 SF Heat treat facility supporting all heat treat requirements.

- 21,144 SF Automated stacker providing vertical storage and tracking of production components and parts.

- 12,389 SF Chemical and Metallurgical Labs

Additionally, there is 647,832 SF of administrative space available to collocate weapon system, engine, and commodity management as well as most of the ALC support functions (i.e., Financial Management, Procurement, Personnel, Medical, Plant Services and Command.)

Overhead cranes are available to support the entire high bay area. Automated overhead conveyor systems (26,500 feet or slightly over 5 miles) support movement and routing of components and parts throughout the industrial area. Recently constructed conveyors now link B3001 with Blade Repair Facility and B3705 warehouse which contains a preponderance of the parts required for engine support.

Facility: **B-2 WEAPON SYSTEM SUPPORT CENTER (BLDG 1083)**

Describe Why It Is One Of A Kind:

The "B-2 Datalink" hub is located in the crypto vault of this facility. This Datalink is peculiar to the B-2. It links the various B-2 sites: Northrop, Tinker AFB, Wright-Patterson AFB, Whiteman AFB, Langley AFB, Edwards AFB and the PEO's office in the Pentagon. The link between these sites provides classified electronic logistics management data to and from Northrop via computer terminals, a telephone system between all the sites that allows for classified discussion, and a classified video-teleconferencing capability. There is also a limited capability for personnel at remote sites to "dial into" the Datalink system via use of STU III equipment. B-2 peculiar equipment/facility capabilities include: Work areas are raised floor computer room space with access control. One area has Uninterruptible Power. Entire 124,000 SF facility is built to Class B vault standards, and within the facility are Class B and A vaults. Additionally, due to Special Access Required (SAR) designation of the B-2 program, JSIIDS alarm systems were installed. A high bay space with additional cooling and lighting will house one set of ATE and an actual AARL (Advanced Application Rotary Launcher).

Equipment: **TEST STANDS FOR CALIBRATION AND TESTING OF FUEL WETTED ENGINE CONTROLS AND ACCESSORIES (15.1 Engines-Aircraft Total)**

Describe Why It Is One Of A Kind:

The calibration and testing of engine controls and accessories requires the use of unique equipment. The equipment is unique from the standpoint that it controls the physical characteristics of a hazardous calibration fluid, MIL-C-7024 TYPE 2, to simulate conditions the components will be exposed to in its working environment. Design methods for test equipment were to build workload specific test stands which means only the components the test stands were designed for would be able to be calibrated and tested by that equipment. For example, a TF30 main fuel control can only be tested on a TF30 main fuel control test stand. Currently, our equipment is limited to testing peculiar controls and accessories which support the Air Force F101-100, F101-102, F108-100, F110-100, F110-129, F118-100, TF33-P3, TF33-P5, TF33-P7, TF33-P9, TF33-P100, TF33-P102, TF33-P103, TF30-P103, TF30-P107, TF30-P109, TF30-P111, and the Navy TF30-414 engines.

Equipment: **TEXAS TOWER (15.1 & 15.2 Aircraft-Command and Control)**

Describe Why It Is One Of A Kind:

The Texas Tower is unique single source (only one in U.S.) support equipment used to perform depot maintenance tasks on the E-3 rotodome. It is jointly utilized between 552 ACW and depot maintenance for ongoing depot maintenance requirements. In the event of relocation, duplicate equipment would have to be duplicated to support the organizational

requiremen, at a cost of approximately $1.6M plus construction costs for suitable building with tracks to house the tower.

Equipment: **CENTRALIZED AIRCRAFT SUPPORT SYSTEM (15.1 Aircraft-Cargo, Tanker, Bomber)**

Describe Why It Is One Of A Kind:
The Centralized Aircraft Support System (CASS) is a unique and peculiar capability. It provides hydraulic powe, liquid cooling and system air conditioning during performance of single source DoD aintenance and power-on checks to four B-1B aircraft docks in Bldg 2122. It was transported to Tinker AFB in 1991. Four conditioned air/coolant systems are used to provide avionics cooling. The hydraulic systems use sixteen Hydraulic Ground Pumping Units to supply 4000 psi hydraulic fluid. Three chillers provide chilled water during operations, and one 2000 KVA transformer provides electric power to the entire CASS.

Facility: **BLDG 2280 - PAINT HANGAR (15.1 & 15.2 Aircraft)**

Describe Why It Is One Of A Kind:

Building 2280 is the premier aircraft paint facility in DoD. This paint hangar is single source paint facility for E-3, B-52, and B-1B aircraft. This two-bay facility is currently sized to support complete corrosion control of any weapon system in the Air Force, including the C-5 and 747-size aircraft. Both docks are designed to allow complete stripping, washing, chemical treating, and painting. Each dock has its own environmentally controlled (temperature and humidity) ventilation system, making the operations in each dock independent of each other. The Clean Air Act Amendments of 1990 (CAAA90) have mandated increasingly stringent emissions for aircraft primers and topcoats. These compliant coatings require strict temperature and humidity conditions to ensure necessary adhesion and durability and to prevent extended production flow time. Accessibility to upper portions of aircraft are by multi-directional operating manlifts. Personnel are protected during hazardous chemical and painting operations by a centralized breathing air system. A centralized chemical distribution system allows for highly efficient dispensing of chemicals used in aircraft surface preparation, significantly accelerating the process. State-of-the-art electrostatic paint spraying equipment results in less wasted paint, less hazardous materials generated, and reduced emissions.

Equipment: **LARGE AIRCRAFT ROBOTIC PAINT STRIP SYSTEM (LARPS) (15.1 & 15.2 Aircraft)**

Describe Why It Is One Of A Kind:

OC-ALC is the only known activity within DoD prototyping a robotic/high pressure water system as single source of repair for paint removal on large thin-skinned aircraft (E-3, C-135, B-52, and B-1B). Use of the LARPS system will reduce man-hours by more than 50 percent when compared to conventional paint removal methods.

Equipment: **HIGH FORCE AXIAL-TORSIONAL TEST SYSTEM**

Describe Why It Is One Of A Kind:

This test equipment is unique to DoD. It is the largest combined Axial-Torsional test system (serial number 1) ever produced by the MTS Systems Corporation for the free world. While there are larger pure axial or pure torsional test systems, this is the largest combined test system, capable of producing 500,000 pounds axial force and 720,000 inch pounds of torque. It is a computer controlled, closed loop, servohydraulic material test system which can be programmatically phased to simultaneously control axial force and torque. The material test system can be programmed to replicate in-flight loading spectra.

Equipment: **AVIONICS INTEGRATED SOFTWARE EQUIPMENT (AISF) (ACM/ALCM/B-52/B-1/E-3) (15.1 & 15. 2 Software-Tactical Systems)**

Describe Why It Is One of A Kind: **OC-ALC is the only B-1B/E-3/B-52/ALCM and Rotary Launcher complete avionics test facility in DoD It provides suingle source software maintenance and integration of computer programs in existence are unique for the listed systems.**

ACM SOFTWARE EQUIPMENT

Mobile Hot Bench
MHU-174 Guided Missile Lift Truck
6 MHU-202/E Rolling Missile Maintenance Stand
SUU-67/A Pylon
Pylon Adapter Kit
Load Frame
Electronic System Test Set
2 MXU-690 Electronic Equipment Cooling Unit
6 AGM-129 Missile Maintenance Trainers
Missile Radar Altimeter Test Assembly
Sensor Test Set
Remote Switching Control Assembly
VAX 3600 Mini-Computer System
Advanced Missile Simulator
Computer Support System

HP 64000UX Logic Development Station
Electronic System Test Set
HP A900 Computer System
Test Edit Software Station (TESS 1/TESS 2)
Test Maintenance Stand Rail Set
Guided Missile Test Maintenance Stand Adapter Kit
ON-211 Interconnecting Group (Level I/II)
ON-211 Adapter Kit (ACM unique cables)

ALCM SOFTWARE EQUIPMENT

8 AGM 86B Missile Maintenance Trainers
Missile Electronics System Simulator
ALCM Subsystem Simulator
Advanced Missile Simulator
Computer Support System
3 Portable Computer Test Units
Computer Test Unit
Load Frame
Common Strategic Rotary Launcher
SUU-67/A Pylon
MHU-174 Guided Missile Lift Truck
8 MHU-159 Guided Missile Handling Unit
3 Racal 14 Channel Tape Recorders
Gould ES1000 Strip Chart Recorder
Test Software Development Station
Electronic System Test Set
2 Missile Radar Altimeter Test Assembly
MHU-123/M Bomb Trailer
MHU-141/M Munitions Handling Trailer
ON-189/GSM263 Pylon Box Group (ALCM Unique)
OF-99/GSM263 Test Adapter Group
ON-271 (ON-189) Breakaway Box Group
ON-289/GSM Box Interconnecting Group (Loaded and Empty Pylon)
ON-189/GSM Box Group
ON-211/GSM Interconnecting Group (Level I/II)

B-52 SOFTWARE EQUIPMENT

Weapon Systems Avionics Automated Test Equipment
Special Test Equipment
B-52 Offensive Avionics System (OAS)
Avionics Integrated Support Facility (AIS)

Weapons System Simulator
Vehicle Systems Simulator
Left Hand Equipment and Power Rack
Right Hand Equipment and Power Rack
Bomb Simulation and Power Rack

Global Positioning System (GPS) Hardware
Antenna Electronics Unit
Receiver/Processor Unit
Personal Computer Data Base Monitor
GPS Interface Unit Hardware

PC Data Recording System
Flight Test Support System (FTSS)
Weapons Pylon Tester (WPT) and Cables
Bomb Navigation Systems Procedure Trainer (BNSPT)
Bomb Navigation System Maintenance Trainer (BNSMT)
Peripheral Interface Unit (PIU) (Three Units)
Guided Missile Systems Trainer/Armament System Trainer (GMST/AST)

IBM 3090 authorized for B-52 w/joint utilization for ALCM/ACM.
NOTE: Also jointly utilized in support of E-3 and B-1. But if these software workloads are not collocated, duplicate equipment will have to be purchased.

Software Control Center includes:
Filenet System
SUN System
Media Production System
Other Hardware Specialized Items

E-3 SOFTWARE EQUIPMENT

Software Control Center supports E-3 Software and includes:
Filenet System
SUN System
Media Production System
Other Hardware Specialized Items

DAPG
DDG
RTSS
IFF

ES175-3
ES177A
PAU
Receivers(5)
EDS-110
ESE-123
AP-101C
ECT-130
ECR Module

If E-3 software workload is not collocated with B-52 software workload, it will drive additional procurement costs estimated at $2.5M to include IBM 3090.

B-1 SOFTWARE EQUIPMENT

B-1 Avionics and Software Development Items
Software Development Laboratory (5 each)
Avionics Development Lab (IBM 3090 System)
B-1B Radar Computer Resources
  Radar Test Bench
  Radar Tower Bench

Inertial Navigation Software Equipment
ACC/MSU Test Station
ALQ-161 Software Equipment
Total Cost of CCP 400-119G
EMUX Level 1 (2 Each)
EMUX Level 2 (2 Each)
CITS Level 1 (2 Each)
CITS Level 2 (2 Each)
Module Test Station (MTS)
Ground Maintenance Circuit
Protection Status Unit (GMCPS)
Memory Loader Verifier (MLV)
CADC Portable Programmer (SIS/1)
CADC Portable Programmer (SIS/SEF)
Program Development Verification Test Station (PDVTS)
CITS Ground Processor

Software Control Center supports B-1 Software and includes:
  Filenet System
  SUN System

Media Production System
Other Hardware Specialized Items

If B-1 software workload is not collocated with B-52 software workload, it will drive additional procurement costs estimated at $2.5M to include IBM 3090.

Equipment: **COORDINATE MEASURING MACHINES (CMMs) (15.1 Engines-Aircraft Total)**

Describe Why It Is One of A Kind

Dimensional inspection is critical to the overhaul and repair process due to the very tight tolerances required of gas turbine engine components. To ensure that repaired component parts meet the tight dimensional requirements of Air Force technical orders, OC-ALC uses ten production-oriented CMMs to perform the bulk of dimensional inspection procedures. In many cases, CMMs are the only method of measurement which can accurately characterize the dimensional condition of a component part. Manual methods of dimensional inspection are labor intensive and cannot reproduce the feature analysis functions of the CMM, which are required to ensure accurate dimensional inspection. Dedicated gages can provide the necessary feature analysis, but are also labor intensive, as well as very expensive in comparison to the purchase price and operational expenses of the CMM. In many cases, there is no alternative to CMM inspection capable of meeting Air Force technical order dimensional inspection requirements. This is especially true of ENSIP dimensional inspection requirements identified in T.O. 2J-F110-3-5 and 2J-F110-13-5. OC-ALC has several CMMs that have the capability to automatically change probe and stylus arrangements and configurations several times during the execution of an inspection program without changing the setup of the component part being inspected. This is absolutely essential for the required dimensional inspection of ENSIP parts. **OC-ALC also has two special duty CMMs designed specifically to measure gas turbine engine drive shafts which are unique in the DoD.**

Report to the Commission

DEPARTMENT OF THE AIR FORCE

BRAC 95
JOINT CROSS SERVICE GROUP
OO-ALC DEPOT MAINTENANCE
DATA CALL SUPPLEMENTAL

WARNER ROBIN AFB, GEORGIA

February 1995

DATA CALL SUPPLEMENT
FOR
JOINT CROSS SERVICE GROUP - DEPOT MAINTENANCE

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DATA CALL SUPPLEMENT
FOR
JOINT CROSS SERVICE GROUP - DEPOT MAINTENANCE

CAPACITY

1. Capacity Utilization

1.1 Calculate the capacity index for the commodity groups applicable to depot maintenance work at your activity. Provide your answers expressed in direct labor hours (DLHs) in Table 1.1.a by commodity groups for the Fiscal Years requested.

Table 1.1.a: Capacity Index

COMMODITY GROUP	INDEX (DLHs)				
	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999
ACFT/AIRFRAME					
Transport	2,103,974	2,103,974	2,103,974	2,103,974	2,103,974
Light Combat	1,083,865	1,083,865	1,083,865	1,083,865	1,083,865
ACFT COMPONENTS					
Aircraft Structures	656,477	656,477	656,477	656,477	656,477
Hydraulic/Pneumatic	173	173	173	173	173
Instruments	412,266	412,266	412,266	412,266	412,266
Landing Gear	1,247	1,247	1,247	1,247	1,247
Aviation Ordnance	837	837	837	837	837
Avionics/Electronics	1,763,055	1,763,055	1,763,055	1,763,055	1,763,055
Manufacturing & Fabrication	431,525	431,525	431,525	431,525	431,525
Other	387,839	387,839	387,839	387,839	387,839
MISSILE COMPONENTS					
Tactical/MLRS	18,105	18,105	18,105	18,105	18,105
GRND COMM & ELECTR EQUIP					
Radar	1,550	1,550	1,550	1,550	1,550
Radio Communications	43	43	43	43	43
Wire Communications	63	63	63	63	63
Navigation Aids	145	145	145	145	145
Electro-Optics/Night Vision	87	87	87	87	87
SOFTWARE					
Tactical Systems	795,304	795,304	795,304	795,304	795,304
Support Equipment	530,203	530,203	530,203	530,203	530,203
TOTAL	8,186,758	8,186,758	8,186,758	8,186,758	8,186,758

1.2 Calculate the utilization index for the commodity groups applicable to depot maintenance work at your activity. Provide your answers expressed as a percentage (%) in Table 1.2.a by commodity groups for the Fiscal Years requested.

Table 1.2.a: Utilization Index

COMMODITY GROUP	INDEX (%)				
	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999
ACFT/AIRFRAME					
Transport	131	121	92	81	64
Light Combat	101	85	88	121	117
ACFT COMPONENTS					
Aircraft Structures	72	72	78	74	73
Hydraulic/Pneumatic	76	76	83	78	77
Instruments	72	72	78	74	73
Landing Gear	72	72	78	74	72
Aviation Ordnance	72	72	78	74	73
Avionics/Electronics	72	72	78	74	73
Manufacturing & Fabrication	73	72	79	74	73
Other	72	71	78	74	72
MISSILE COMPONENTS					
Tactical/MLRS	72	72	78	74	73
GRND COMM & ELECTR EQUIP					
Radar	72	72	78	74	73
Radio Communications	72	72	79	74	72
Wire Communications	71	71	78	75	73
Navigation Aids	72	72	79	74	72
Electro-Optics/Night Vision	72	72	78	74	72
SOFTWARE					
Tactical Systems	87	96	113	111	112
Support Equipment	87	96	113	111	112
TOTAL	93	90	89	88	83

1.3 Assuming (a) the current projected total workload remains as assigned; (b) that sufficient production demand is available to justify maximum hiring, with no significant investment in capital equipment; and (c) no major Military Construction additional to that already approved and funded: what is the maximum extent to which operations, by commodity group, could be expanded for depot maintenance work at your activity, based on the current and future planned workload mixes? Please provide your response in the absolute maximum number of direct labor hours (DLHs).

Table 1.3.a: Maximum Potential Capacity

COMMODITY GROUP	INDEX (DLHs)				
	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999
ACFT/AIRFRAME					
Transport	2,103,974	2,103,974	2,103,974	2,103,974	2,103,974
Light Combat	1,083,865	1,083,865	1,083,865	1,083,865	1,083,865
ACFT COMPONENTS					
Aircraft Structures	801,152	801,152	801,152	801,152	801,152
Hydraulic/Pneumatic	223	223	223	223	223
Instruments	503,352	503,352	503,352	503,352	503,352
Landing Gear	1,517	1,517	1,517	1,517	1,517
Aviation Ordnance	1,026	1,026	1,026	1,026	1,026
Avionics/Electronics	2,152,671	2,152,671	2,152,671	2,152,671	2,152,671
Maufacturing & Fabrication	514,172	514,172	514,172	514,172	514,172
Other	462,934	462,934	462,934	462,934	462,934
MISSILE COMPONENTS					
Tactical/MLRS	21,907	21,907	21,907	21,907	21,907
GRND COMM & ELECT EQUIP					
Radar	1,550	1,550	1,550	1,550	1,550
Radio Comm	43	43	43	43	43
Wire Comm	63	63	63	63	63
Navigation Aids	145	145	145	145	145
Electro-Optics/Night Vision	87	87	87	87	87
SOFTWARE					
Tactical Systems	1,358,465	1,358,465	1,358,465	1,358,465	1,358,465
Support Equipment	905,643	905,643	905,643	905,643	905,643
TOTAL	9,912,789	9,912,789	9,912,789	9,912,789	9,912,789

2. Plant Replacement Value

2.1 What is the estimated Plant Replacement Value (PRV) as of the end of each Fiscal Year of your depot maintenance activity expressed in thousands of dollars ($K) as a function of the facilities and equipment? Provide your answer in Table 2.1.

Table 2.1: Expenditures and Equipment Values

PRV	$ K				
	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999
Facilities	878,264	929,204	1,012,832	1,116,398	1,313,676
Equipment	994,000	1,046,190	1,067,608	1,101,696	1,128,442
TOTAL	1,872,264	1,975,394	2,080,440	2,218,094	2,442,118

3. Programmed Workload

3.1 Given the current configuration and operation of your activity, provide the programmed depot level workload by commodity group in Tables 3.1.a and 3.1.b. Express your answer in both dollars ($K) and direct labor hours (DLH) for the Fiscal Years requested.

(See Tables on following pages)

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Table 3.1.a: Programmed Workload

COMMODITY GROUP	$ K				
	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999
ACFT/AIRFRAME					
Transport	232,691	220,384	149,010	13[illegible],943	108,221
Light Combat	91,908	78,958	84,460	11[illegible],644	116,336
ACFT COMPONENTS					
Aircraft Structures	43,591	44,954	49,787	4[illegible],952	47,191
Hydraulic/Pneumatic	12	13	14	13	13
Instruments	27,375	28,231	31,266	29,486	29,636
Landing Gear	83	85	94	89	90
Aviation Ordnance	56	57	63	59	60
Avionics/Electronics	117,069	120,730	133,710	126,094	126,738
Maufacturing & Fabrication	28,800	29,701	32,894	31,020	31,178
Other	25,607	26,408	29,247	27,581	27,723
MISSILE COMPONENTS					
Tactical/MLRS	1,202	1,240	1,373	1,295	1,302
GRND COMM & ELECT EQUIP					
Radar	103	106	118	111	111
Radio Communications	3	3	3	3	3
Wire Communications	4	4	5	5	5
Navigation Aids	10	10	11	10	10
Electro-Optics/Night Vision	6	6	7	6	6
SOFTWARE					
Tactical Systems	41,082	46,482	55,649	54,942	56,704
Support Equipment	27,388	30,988	37,100	36,628	37,803
TOTAL	636,989	628,362	604,813	603,883	583,131

Table 3.1.b: Programmed Workload

COMMODITY GROUP	DLHs				
	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999
ACFT/AIRFRAME					
Transport	2,757,366	2,544,281	1,925,239	1,69[illegible],038	1,348,994
Light Combat	1,094,889	918,498	954,162	1,31[illegible],273	1,267,169
ACFT COMPONENTS					
Aircraft Structures	473,770	471,864	514,555	48[illegible],388	476,571
Hydraulic/Pneumatic	132	131	143	135	133
Instruments	297,528	296,330	323,140	30[illegible],824	299,286
Landing Gear	899	895	976	921	904
Aviation Ordnance	604	601	656	619	607
Avionics/Electronics	1,272,368	1,267,247	1,381,900	1,30[illegible],569	1,279,889
Maufacturing & Fabrication	313,010	311,751	339,956	32[illegible],686	314,861
Other	278,317	277,197	302,276	28[illegible],142	279,962
MISSILE COMPONENTS					
Tactical/MLRS	13,067	13,014	14,192	1[illegible],387	13,144
GRND COMM & ELECT EQUIP					
Radar	1,119	1,114	1,215	1,146	1,125
Radio Communications	31	31	34	32	31
Wire Communications	45	45	49	47	46
Navigation Aids	105	104	114	107	105
Electro-Optics/Night Vision	63	63	68	64	63
SOFTWARE					
Tactical Systems	689,334	763,634	894,983	881,795	888,197
Support Equipment	459,556	509,089	596,655	587,863	592,131
TOTAL	7,652,203	7,375,889	7,250,313	7,195,036	6,763,218

5. Encroachment

5.1 Have operations at this activity been at all constrained to accommodate requests of the local communities?

NO.

5.2 Indicate any encroachment constraints on current or future operations that would restrict future expansion.

NONE.

Facilities and Equipage

6. Unique or Peculiar Facilities

6.1 List unique or peculiar testing facilities, excluding equipment (e.g. runways, railheads, ports, tracks, ponds, etc.). Describe Uniqueness/Peculiarity of each.

<u>Test Facility:</u> Buildings 640/645 Avionics Complex (15.1, 2.g. and 12b)

The uniqueness of the avionics complex deals with the complexity, diversity, and flexibility of the facilities. These features are listed individually below, however the synergy derived from the integration of the features of these facilities is what make them truly one of a kind within the Department of Defense. Our facilities offer the flexibility to realign for new workloads while providing for specific technologies including hybrid microelectronics manufacture, computer integrated repair, environmental screening, RF/microwave antenna measurement, and a comprehensive software engineering capability. The total facility size is 533,573 square feet (12.25 acres under roof). Described below are some of our more unique facility capabilities:

Antenna Ranges: The avionics complex houses eight (8) indoor antenna ranges totaling 9,185 square feet providing for a full range of services necessary for antenna evaluation, repair, and recertification. Our facilities have the capability for antenna testing between 2 - 94 GHz. The anechoic chambers are shielded to prevent radio frequency (RF) noise from infiltrating into the surrounding production facility and have microwave absorbent material on the floor, walls, and ceiling to absorb RF noise created within the chamber. Removable exterior walls facilitate arrival and/or removal of antenna test equipment. The F-111 range has a seismic isolation pad.

Printed Wiring Board Manufacturing: The avionics complex has an area of 17,000 square feet for the design and manufacture of double sided and multi-layered Printed Wiring Boards. This area has an extensive industrial waste system, recessed flooring for wet processing areas, exhaust systems, deionized water, explosion proof facility for chemical mixing/distribution, raised floor for computer aided design and sealed walls (floor to roof) to prevent chemical processes infiltrating into the surrounding facilities/operations.

Hybrid Microelectronics: The Hybrid Microelectronics manufacturing facility consists of 2600 square feet of class 10,000 clean room. Temperature/humidity factors, and airborne contamination are controlled within this electrostatic static discharge (ESD) sensitive environment utilizing high efficiency particulate air filters with accelerated air velocities. The ESD concerns are met by utilizing a static dissipative raised floor system. Other special utilities incorporated in the facility are liquid/gaseous nitrogen, fume hoods for chemical exhaust, and 400 Hertz power.

LANTIRN: The LANTIRN (Low Altitude Navigation and Targeting Infra-Red for Night) technology repair center (TRC) features automated storage/retrieval systems (high bay required), a 2000 square foot class 10,000 clean room, and a 400 square foot LASER light tight room. The entire LANTIRN area has a static dissipative raised floor over a monolithic signal reference grid which provides a equipotential earth ground at any point. General utilities are distributed under the raised floor as well as telecommunications, industrial waste, and gaseous nitrogen.

Clean Rooms: The avionics complex houses 12,085 square feet of clean rooms having cleanliness levels ranging from class 10,000 up to class 300,000. These clean rooms have rigid temperature/humidity/air filtration requirements as well as ESD, positive pressure, vacuum, air locks, and material handling requirements.

LASER Rooms: There are 16 LASER safe firing rooms within building 640. These rooms are totally sealed, including doors, to prohibit a LASER beam from exiting the room. These rooms are also electrically interlocked so that if the door seal is broken the power supplied to the LASER firing mechanism is de-energized.

Optics Repair: The avionics complex has two (2) optic repair stations with isolated seismic foundations - in the PAVE Tack and in the LANTIRN Automated Depot. These seismic pads, located below the raised floor, isolate the optics repair equipment from vibrations normally transmitted within repair facilities.

Security: The facility consists of an Air Force controlled area of 522,313 sq ft certified for open storage of classified equipment (up to secret). The facility is completely fenced to maintain security including two (2) security guard posts to regulate personnel and vehicular entry. The Avionics Complex also houses a unique cryptographic facility.

Heating Ventilation and Air Conditioning: The facility is environmentally controlled by 11 chillers (capacity totaling 3600 Ton of A/C), providing temperature control of 72 degrees F +/- 5 degrees F and a humidity control of 40% +/- 10%. All chillers are in compliance with the Ozone Depleting Substance regulations. Also, two (2) industrial painting facilities totaling 2,577 square feet are located in the complex; these rooms have specialized air handling/ventilation systems, fire detection and suppression systems.

Power/Utility Distribution: Electrical capabilities include a high reliability exterior electrical distribution system, underground cable, loop fed, dedicated circuit which uses tie switches to isolate loads, and 16,250 KVA of uninterruppted power. The electrical system also contains an equipotential, internal earth ground reference grid with low impedance. The electrical system feeds 11,659 linear feet of freestanding uniformly distributed utility systems (also known as "Raceways") throughout the complex. All raceways contain outlets and electrical receptacles which are repeated every five (5) feet on center. These electrical outlets include the following capacities:

120 Volts AC, 60 Hz, single (1) phase (standard capacity 20 Amps)
208 Volts AC, 60 Hz, single (1) phase (standard capacity 20 Amps)
208Y/120 Volts AC, 60 Hz, three (3) phase 4 wire (standard capacity 30 Amps)
200 Volts AC, 400 Hz, single (1) phase (standard capacity 20 Amps)
200Y/115 Volts AC, 400 Hz, three (3) phase 4 wire (standard capacity 30 Amps)
115 Volts AC, 400 Hz, single (1) phase (standard capacity 20 Amps)
28 Volts DC +/- .5 volts DC (standard capacity 20 Amps).

Also provided in each raceway is compressed air ranging from 30 psi to 100 psi and a vacuum system ranging from 14 in Hg to 22 in Hg. The Avionics Complex also accommodates several non standard utilities such as automatic computer supervised fire detection systems linked to the base fire department, deionized water/nitrogen (liquid and gaseous), natural gas, and industrial waste. The complex also has three (3) civil engineering support buildings, two (2) chemical storage buildings totaling 700 square feet and a machine shop support facility of 4,700 square feet.

Software Production Facilities: The Avionics Software Production facility has the unique capability to design, produce, and maintain Test Program

Sets (TPS) for LRU and SRU end items. Organic repair activities include requirements analysis, project planning/management/ control, software design, interface test assembly design, quality assurance, computer and dedicated test resources, and product delivery. This facility supports major systems including Joint STARS, E-3, F-111, F-15, AC-130, MC-130, MH-53, MH-60, B-52, C-130, GPS, MRT, and LANTIRN.

Test Facility: Building 226/227 Complex (15.1, 12a and 12b)

Avionics Integrated Support Facilities (AISFs) are unique, modular, multi-system engineering facilities developed to support specific avionics sub-systems. AISFs provide a comprehensive support environment for supported subsystems. AISF capabilities include: real time system integration testing, Operational Flight Program (OFP) software development, testing/reconfiguration, compilation, configuration control, off line sub system analysis, data reduction. comprehensive self diagnostics, and maintenance of software documents. AISF facilities provide data communication and software data transmission to the operational user units. AISFs resident to and supported by WR-ALC include LANTIRN, Joint Tactical Information Distribution System Centralized Software Support Activity (JTIDS CSSA), Special Operations Forces Extendible Integrated Support Environment (SOF EISE), C-130 Self Contained Navigational System (SCNS), Miniature Receiver Transmit Software Maintenance Facility (MRT SMF), PAVE TACK, and Extendible Communication Integration Support Environment (ECOMISE). The Electronic Warfare Avionics Integrated Support Facility (EWAISF) has a 10,000 square foot intelligence and communications facility accredited for Sensitive Compartment Information. The EWAISF has four electromagnetic screen rooms and two microwave anechoic chambers. The electromagnetic isolation of these rooms ensures external signals do not falsely stimulate equipment under test and security sensitive transmitter techniques are not radiated outside the controlled area. The Electronic Warfare Avionics Integrated Support Facility (EWAISF) has emergency power generation to allow full operation in the absence of commercial power. This complex supports most major weapon systems including Joint STARS, E-3, F-111, F-15, AC-130, MC-130, MH-53, MH-60, B-52, C-130, C-141, F-16, GPS, MRT, A-7, EF-111, A-10A, F-4, HH-3, UH-1, UH-60, B-1B, OA-10A, C-5B, and C-17. Electronic Combat (EC) systems by nomenclature and aircraft weapon system are listed in the Avionics Planning Baseline, September 1993.

Test Facility: Building 231 Security Assistance Electronic Warfare Support Facility (15.1, 12a)

The facility was bought with FMS funds to be used only for FMS purposes. The facility includes labs, within security vaults approved for processing up to SECRET NO FOREIGN level of information, with special climate conditioning and additional backup sources for air and power, raised floor, and a radio-frequency screen room. Software development and test are accomplished on Integrated Support Stations (ISS) which provide system interfaces and wiring closely representing the system as installed on the aircraft; test facility instrumentation and control systems to monitor, manage, and record system operations; plus simulators capable of generating accurate representations of the threats. Highly reliable and repeatable lab tests save valuable range and aircraft flight time. Certified classified computer network supports multiple Foreign Military Sales cases and their peculiar software support requirements.

Test Facility: Building 323 Engineering Assessment Facility Tear down Inspection High Bay Area (15.1, 2.b)

The engineering assessment facility in support of C-141 Empennage and oversize access doors for which WR-ALC is the single source of repair for the DoD.

Test Facility: Building 675/676 Radome Ranges (15.1, 2.b and 2.g)

WR-ALC is the single source of repair for the DoD for the F-15 nose radome.

Test Facility: Building 91 Special Operations Forces Aircraft Maintenance Hangars (15.1, 1.c.(1))

WR-ALC is the single source of repair in the Air Force for Special Operations Forces assigned aircraft such as Combat Talon, C-130 Gunships, and Helicopters.

Test Facility: C-141 Aircraft Maintenance Complex (15.1, 1.c.(1) and 15.2, 1.c.(1))

WR-ALC is the single source of repair in the DoD for the C-141 aircraft.

Test Facility: **C-141 Aircraft Component Complex (15.1, 2.b and 2.j)**

WR-ALC is the single source of repair in the DoD for the C-141 aircraft components.

Test Facility: **Bulding 140 F-111 Crew Escape Module Parachute (15.1, 2.I)**

WR-ALC is th single source of repair in the DoD for the F-111 Crew Escape Module Parachute.

Test Facility: **F-15 Aircraft Component Complex (15.1, 2.b, 2.j)**

WR-ALC is the single source of repair in the DoD for the total refurbishment of the F-15 wings and other associated field generated components.

Test Facility: **C-130 Aircraft Component Complex (15.1, 2.b, 2.i, 2.j)**

WR-ALC is the single source of repair for the Air Force for the C-130 aircraft field generated structural components and propellers.

Test Facility: **Building 158 Gyro Repair Facility (15.1, 2.d)**

Bldg 158, totaling 69,075 sq ft, was specifically designed to support organic overhaul and testing of gyroscopes, accelerometers and indicators. It contains 47,285 sq ft of Class 300,000 certified controlled space, and 12,258 sq ft of Class 100,000 certified controlled space. The entire facility is climate controlled to 72 degrees plus or minus 5 degrees with 30 to 50 percent humidity. Seismological stable piers are in pace for automated and manual test stations required to support this workload. All work stations are electro-static discharge sensitive. Miniature precision bearing inspection, repair and testing area exist, in addition to machining and welding support functions. Contained in this facility are 12 general purpose automatic test stations, 31 manual test stations, 9 mass spectrometer leak detector systems, 14 dynamic ballancers, 2 random drift automated test stations and a host of other specialized equipment.

6.2 Indicate the reasons that these facilities are required by the depot maintenance function.

The engineering assessment facility in support of C-141 Empennage and oversize access doors for which WR-ALC is the single source of repair for the DoD.

Test Facility: Building 675/676 Radome Ranges (15.1, 2.b and 2.g)

WR-ALC is the single source of repair for the DoD for the F-15 nose radome.

Test Facility: Building 91 Special Operations Forces Aircraft Maintenance Hangars (15.1, 1.c.(1))

WR-ALC is the single source of repair in the Air Force for Special Operations Forces assigned aircraft such as Combat Talon, C-130 Gunships, and Helicopters.

Test Facility: C-141 Aircraft Maintenance Complex (15.1, 1.c.(1) and 15.2, 1.c.(1))

WR-ALC is the single source of repair in the DoD for the C-141 aircraft.

Test Facility: C-141 Aircraft Component Complex (15.1, 2.b and 2.j)

WR-ALC is the single source of repair in the DoD for the C-141 aircraft components.

Test Facility: Bulding 140 F-111 Crew Escape Module Parachute (15.1, 2.I)

WR-ALC is th single source of repair in the DoD for the F-111 Crew Escape Module Parachute.

Test Facility: F-15 Aircraft Component Complex (15.1, 2.b, 2.j)

WR-ALC is the single source of repair in the DoD for the total refurbishment of the F-15 wings and other associated field generated components.

Test Facility: C-130 Aircraft Component Complex (15.1, 2.b, 2.i, 2.j)

WR-ALC is the single source of repair for the Air Force for the C-139 aircraft field generated structural components.

Test Facility: Buildings 640/645 Complex (15.1, 2.g, 12.b)

Avionics Repair: The unique facilities described in question 6.1 are required to support the security, safety, environmental controls, diverse electrical, and electromechanical test equipment requirements for 300 + mission critical common/peculiar avionics and electronic warfare test/repair systems. The volume and diversity of equipment cannot be supported utilizing general industrial or administrative space.

Test Facility: Building 226/227 Complex (15.1, 12.a)

The Avionics Integrated Support Facilities (AISFs)are required to provide a capability for testing and reconfiguration of Operational Flight Program (OFP) software. An organic OFP capability is necessary to provide responsive support to changing mission requirements. The EWAISF is required by HQ USAF direction to give 24 hour, seven day per week support for EW operational requirements, engineering, and software reprogramming. Electronic Warfare systems engineering requires communications with the customers, rapid worldwide software distribution, and immediate access to all levels of intelligence information. Testing of highly classified electronic countermeasures techniques require the security of the EWAISF. After testing, maintenance installs the changes or modifications outside of the EWAISF. To accomplish the security level of the Warner Robins ALC EWAISF would require many facilities world wide.

Test Facility: Building 231 Security Assistance Electronic Warfare Support Facility

The facilities are required to give 24 hour, seven day a week support for FMS requirements. Electronic Warfare systems engineering require communications with customers, rapid worldwide distribution and immediate access to all levels of intelligence information. The facilities and equipment can simulate aircraft and threat. The security level of these buildings elsewhere would require multiple buildings.

Test Facility: Building 323 Engineering Assessment Facility Teardown Inspection High Bay Area (15.1, 2.b)

6.3 How could the depot maintenance functions be performed without these specialized facilities? Describe testing alternatives.

Test Facility: Buildings 640/645 (Avionics, Antenna Ranges, Printed Wiring Board Manufacturing, Microelectronics, LANTIRN, Clean Rooms, LASER Rooms, Optics Repair, Security, HVAC, Power/Utility Distribution, Avionics Software Production Facilities) (15.1, 2.g, 12.b)

The workload in this facility would have to be accomplished in a comparable facility. The availability of comparable facilities is dependent on where the work is assigned.

Test Facility: Buildings 226/227 (Avionics Integrated Support Facilities (AISFs) (15.1, 12.a)

The workload in this facility would have to be accomplished in a comparable facility. The availability of comparable facilities is dependent on where the work is assigned.

Test Facility: **Building 231 Security Assistance Electronic Warfare Support Facility (15.1, 12.a)**

The workload in this facility would have to be accomplished in a comparable facility. The availability of comparable facilities is dependent on where the work is assigned.

Test Facility: **Building 323 Engineering Assessment Facility Teardown Inspection High Bay Area (15.1, 2.b)**

The workload in this facility would have to be accomplished in a comparable facility. The availability of comparable facilities is dependent on where the work is assigned.

Test Facility: **Building 675/676 Radome Ranges (15.1, 2.b and 2.g)**

The workload in this facility would have to be accomplished in a comparable facility. The availability of comparable facilities is dependent on where the work is assigned.

Test Facility: **Building 91 Special Operations Forces Aircraft Maintenance Hangars (15.1, 1.c.(1))**

The workload in this facility would have to be accomplished in a comparable facility. The availability of comparable facilities is dependent on where the work is assigned.

Test Facility: **C-141 Aircraft Maintenance Complex (15.1, 1.c.(1) and 15.2, 1.c.(1))**

The workload in this facility would have to be accomplished in a comparable facility. The availability of comparable facilities is dependent on where the work is assigned.

Test Facility: **C-141 Aircraft Component Complex (15.1, 2.b and 2.j)**

The workload in this facility would have to be accomplished in a comparable facility. The availability of comparable facilities is dependent on where the work is assigned.

Test Facility: Bulding 140 F-111 Crew Escape Module Parachute (15.1, 2.I)

The workload in this facility would have to be accomplished in a comparable facility. The availability of comparable facilities is dependent on where the work is assigned.

Test Facility: F-15 Aircraft Component Complex (15.1, 2.b, 2.j)

The workload in this facility would have to be accomplished in a comparable facility. The availability of comparable facilities is dependent on where the work is assigned.

Test Facility: C-130 Aircraft Component Complex (15.1, 2.b, 2.i, 2.j)

The workload in this facility would have to be accomplished in a comparable facility. The availability of comparable facilities is dependent on where the work is assigned.

Test Facility: Building 158 Gyro Repair Facility (15.1, 2.d)

The workload in this facility would have to be accomplished in a comparable facility. The availability of comparable facilities is dependent on where the work is assigned. Closure of the Aerospace Guidance and Metrology Center was decided in the BRAC 93.

7. Buildings and Their Condition

7.1 List the buildings used to perform the depot maintenance functions by category code numbers (five or six digit CCNs), identifying their current condition (adequate, substandard, and inadequate) in Table 7.1 in thousands of square feet (KSF).

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(See Table on following page)

Table 7.1: Facility Conditions

CCN	Facility Type	Condition/Area (#KSF)			Comments
		Adequate	Substandard	Inadequate	
121-124	Hydr Fl	0.3	0	0	
123-335	Veh Fl Stn	1	0	0	
141-763	Tech Lab	140	0	0	
141-764	Integr Spt Fclty	58	109	0	
141-765	Lab, Q/C Depot	39	0	0	
171-471	RG Con Hse	2	0	0	
171-625	High Bay Tech Tng	5	0	0	
211-116	Hg Maint Dep	1,150	31	0	
211-152	Shp Acft Gen Purp	469	139	0	
211-153	Shp Non Destr Insp	5	5	0	
211-154	Shp A/M Orgl	7	84	0	
211-157	Shp Jet Eng I/Mnt	26	0	0	
211-159	Acft Cor Con	115	53	0	
211-173	Maint Doc, L/A	104	30	0	
211-177	Maint Dock, S/A	0	9	0	
211-179	Maint Dock, Fl Sys	15	0	0	
211-183	Tst Cell	0	8	0	
211-254	Shp Acft & Eng Dep	5	0	0	
211-271	Shp Instm Ovhl Dep	67	0	0	
[illegible]7-712	Shp, Avionics	303	201	0	
[illegible]-736	Shp, Radom O & T/D	5	0	0	
[illegible]8-712	Shp, A/SE Stor Felt	0	5	0	
218-852	Shp, Surv Equip	20	42	0	
218-868	Lab, PME	44	0	0	
221-228	Prod Acft Fin Asmb	27	0	0	
422-258	Stor, Mag	0	0.5	0	
442-257	Hazard Stor	1	0.5	0	
442-258	Stor Liq Oxy	0.5	0	0	
442-628	Shed Sup & Equip Bse	15	0	0	
442-758	Whse Sup & Equip Bse	8	12	0	
610-675	Log Fclty Dep Ops	292	243	0	
723-392	San Latrine	2	0	0	
730-839	Traffic Chk Hse	2	0	0	
811-149	Elec Pwr Stn Bldg	0.2	7	0	
890-123	Air Cond Plt Bldg	15	13	0	
890-136	Compr Air Plt Bldg	3	0	0	
TOTAL		2,946	992	0	

7.2 In Table 7.2.a, identify space available for expansion by building type for those facility category code numbers (five or six digit CCNs) that are most important to your mission. An activity's expansion capability is a function of its ability to reconfigure/rehabilitate existing underutilized facilities to accept new or increased requirements.

Table 7.2.a: Space Available for Expansion

Building ID / Type	CCN	Installation Space (KSF)			Total
		Adequate	Substandard	Inadequate	
323/Tech Lab	141-763	9.7	0	0	9.7
231/Prod & Support	141-764	4.6	0	0	4.6
226B/Prod & Support	141-764	3.9	4.6	0	8.5
227/Prod & Support	141-764	23.0	0	0	23.0
110/Acft Hangar	211-116	120.8	0	0	120.8
125/Acft Hangar	211-116	117.8	0	0	117.8
125/Shp Acft Gen Purpose	211-152	9.5	0	0	9.5
158/Shp Acft Gen Purpose	211-152	4.2	0	0	4.2
Wing Repair Fac	211-152	5.1	0	0	5.1
Composites Fac	211-152	72.2	0	0	72.2
Depot Plant Svc	211-154	87.6	0	0	87.6
44/Maint Doc, L/A	211-173	0	30.0	0	30.0
47/Maint Doc, L/A	211-173	40.5	0	0	40.5
48/Maint Doc, L/A	211-173	40.5	0	0	40.5
640/Avionics Shop	217-712	116.9	0	0	116.9
645/Avionics Shop	217-712	0	20.2	0	20.2
Acft GSE Paint Fac	218-712	3.6	0	0	3.6
GSE Maint Shop	218-712	47.0	0	0	47.0
125/Admin	610-675	5.0	0	0	5.0
301/Admin	610-675	4.4	0	0	4.4
640/Admin	610-675	2.4	0	0	2.4
645/Admin	610-675	0	1.4	0	1.4
TOTAL:		718.7	56.2	0	774.9

8. Unique and/or Peculiar Capabilities and Capacities

8.1 What unique and/or peculiar capabilities and capacities does the depot maintenance activity possess? Describe why unique and/or peculiar.

Capability: Avionics Complex (15.1, 2.g, 12.b)

The avionics complex is the single largest electronics repair activity in DoD housing over a half million square feet of environmentally controlled avionics design, test, repair, and manufacturing capacity. The specialized electronics capabilities provide for the full spectrum of workloads from the latest surface mount technologies found in the LANTIRN and Joint STARS programs to the 1930s vacuum tube technologies found in the ARN-6 radio compass.

The uniqueness of the avionics complex deals with the complexity, diversity, and flexibility of the WR-ALC infrastructure. Providing a capability for fully integrated centralized mission based avionics support, WR-ALC possesses the comprehensive infrastructure to support all aspects of electronics repair including laser technologies, microwave measurement, hardware fabrication, electronics failure analysis, software engineering, computer integrated repair, and microelectronics manufacturing. These features are listed individually below; however the synergy derived from the integration of the features is what makes them truly one of kind within the Department of Defense.

Antenna Microwave Radiation Pattern and Boresight: The Avionics Production Division has one of the largest and most comprehensive antenna repair and certification operations within the Armed Services. Weapon System antennas and radomes require comprehensive testing to ensure technical parameters are within the critical tolerances needed to meet mission requirements. The avionics complex houses eight (8) indoor antenna ranges totaling 9,185 square feet providing for a full range of services necessary for antenna evaluation, repair, and recertification. Our facilities have the capability for antenna testing between 2 - 94 GHz, and the Doppler antenna range is the only boresight capability for the APN-218, APN-230, and APN-236 antennas within DoD.

Hardware Fabrication: Due to the rapid changes in electronics technology and limited avionics quantity requirements, an organic fabrication capability is essential to depot capability. WR-ALC has an extensive fabrication and manufacturing capability to support the avionics repair activities. Through

reverse engineering, form, fit and function requirements are identified at the component, circuit card, or major sub-assembly level. The requirements are then satisfied via WR-ALC organic fabrication facilities.

Hybrid Microelectronics Manufacture and Requalification: The Avionics Production Division maintains a comprehensive manufacturing support capability for hybrid microelectronics. It is the only Air Force activity that has the combined capabilities of hybrid circuit design, manufacture, repair and requalification.

Electronics Failure Analysis: WR-ALC has a unique capability in the Air Force by collocation of an electronic failure analysis capability with the depot maintenance production activities. The amount and variety of electrical test equipment and the photon emission microscope are unique within the Air Force.

Computer Integrated Repair: The LANTIRN (Low Altitude Navigation and Targeting Infra-Red for Night) technology repair center (TRC) is the only Air Force activity that has incorporated a paperless computer integrated repair concept. WR-ALC has planned for future avionics workloads with digital electronic display of technical orders and computer assist of the production activities. Computer integrated repair concepts are presently being incorporated into the new Joint STARS facility collocated with LANTIRN.

Laser/Optics Repair: The avionics complex has extensive laser repair capabilities including advanced optics. These capabilities support workloads associated with precision targeting and weapons delivery systems, imaging systems and combat recording systems.

Software Engineering: The Avionics Software Production facility has the a significant capability to maintain Test Program Sets and design and produce TPS for LRU and SRU end items. Organic repair activities include requirements analysis, project planning/management/ control, software design, interface test assembly design, quality assurance, computer and dedicated test resources, and product delivery.

Capability/Capacity: Avionics Integrated Support Facilities (AISF's) (15.1, 12.a)

WR-ALC's AISFs provide a comprehensive support environment for multiple subsystems. AISF capabilities include: real time system integration

testing, Operational Flight Program (OFP) software development, testing/reconfiguration, compilation, configuration control, off line sub system analysis, data reduction, comprehensive self diagnostics, and maintenance of software documents. AISF facilities provide data communication and software data transmission to the operational user units. AISFs resident to and supported by WR-ALC include LANTIRN, Joint Tactical Information Distribution System Centralized Software Support Activity (JTIDS CSSA), Special Operations Forces Extendible Integration Support Environment (SOF EISE), C-130 Self Contained Navigational System (SCNS), Miniature Receiver Transmit Software Maintenance Facility (MRT SMF), PAVE TACK, Extendible Communication Integration Support Environment (ECOMISE) and various Electronic Warfare systems

<u>Capability/Capacity:</u> Aerospace Fastener Testing (15.1, 2.j)

The WR-ALC fastener testing laboratory is the only accredited DoD facility for aerospace fastener test. The Fastener laboratory is accredited to ISO Guide 25 Standard under the ISO 9000 series of standards.

<u>Capability/Capacity:</u> Miniature Precision Bearing Testing (15.1, 2.d)

Bearings are tested in class 100 certified laminar flow booths, which are located in a class 300,000 certified controlled area.

<u>Capability/Capacity</u>: Security Assistance Electronic Warfare Support Capability (15.1, 12.a)

Capacity includes labs, within security vaults, approved for processing up to SECRET NO FOREIGN level of information, with special climate conditioning and additional backup sources for air, power, raised floor, and a radio-frequency screen room. Software development and test are accomplished on Integrated Support Stations (ISS) which provide system interfaces and wiring closely representing the system as installed on the aircraft; instrumentation and control systems to monitor, manage, and record system operations; plus simulators capable of generating accurate representations of the threats.

Capability/Capacity: Electronic Failure Analysis (15.1, 2.g)

This capability is unique in the Air Force. The amount and variety of electrical test equipment for an Electronic Failure Analysis capability, and a Photon Emission Microscope are also unique in the Air Force.

Capability/Capacity: Automated Depots (15.1, 2.g)

The Paperless LANTIRN Automated Depot (PLAD) (10,000 square feet) and the Joint STARS Paperless Automated Depot (14,000 square feet) support total integration of depot test and repair systems including automated material handling, technical information collection analysis and application, and computer based technical orders. The unique properties provided by these facilities are directly related to the manner in which they were designated to satisfy the requirements of a modern avionics depot.

Capability/Capacity: Corrosion Prevention and Control (15.1, 1.c.(1))

Dedicated expertise on all Air Force weapon systems, munitions, munitions handling equipment, common support equipment, communication-electronics equipment and vehicles. Provides for a single programmatic face to the DoD customer.

Capability/Capacity: Bicarbonate of Soda Paint Stripping (BOSS) (15.1, 1.c.(1))

Bicarbonate of Soda Paint Stripping is applicable to paint removal from any aircraft structure. Currently it is available only on C-130 aircraft at WR-ALC. This procedure reduces the use of methylene chloride paint stripper for aircraft paint removal by 96%. The Environmental Protection Agency is considering banning the use of methylene chloride completely. Bicarbonate of Soda is environmentally safe for the earth and for the individuals who work with it.

Capability/Capacity: Computer Integrated Manufacturing (CIM) (15.1, 2.j)

The WR-ALC CIM shop has the ability to accept digital data transfer from any source worldwide across the Internet network integrating the total

manufacturing enterprise, including data transfer, programming, shop floor scheduling and tracking of individual job orders. Computer Integrated Manufacturing provides electronic links from system engineering, technical data systems and CAD-CAM programming station to the CIM machines. The CIM capabilities consists of three, four and five axis vertical and horizontal machining capabilities; and three and six axis turning capabilities. These capabilities allow almost unlimited fabrication, modification and repair of a variety of extremely detailed and complex aerospace components made from steel, aluminum, beryllium, copper or titanium and ranging in size up to 120"X30"X24" while maintaining tolerances of .001".

Capability/Capacity: Metal Finishing Facility (15.1, 2.j)

Newly renovated state of the art metal finishing facility which meets all local, state and federal environmental regulations. Only DoD facility capable of Titanium chemical milling and IVD of steel aircraft fasteners.

Capability/Capacity: F-111 Parachutes (15.1, 2.i)

Only Depot level repair and packing facility in the DoD capable of handling F-111 Crew Escape Module parachutes. These parachutes deploy when a F-111 Crew Capsule is jettisoned during a life threatening emergency. The aircraft crew remains within the cockpit which is catapulted from the airframe. The packing of these chutes requires a tower for shake-out, special equipment, an autoclave and special skills and certification. WR-ALC is the only facility with DoD possessing all the requirements for repairing and packing these parachutes.

Capability/Capacity: F-15 Robotic Paint (15.1, 1.c(3))

The F-15 paint facility is unique because it is the only robotic aircraft paint facility in the Department of Defense. Together, the robotic paint and depaint facilities provide a unique automated capability for the entire corrosion control process. These facilities significantly reduce environmental impact and human exposure to toxic chemicals. Employee exposure to hazardous paint is reduced through the use of the robot for painting F-15 aircraft. The robotic depaint area reduces the amount of hazardous waste removed during the depaint operation since depaint is accomplished through the use of carbon dioxide instead of stripping compounds or plastic media.

Capability/Capacity: Gyro Overhaul (15.1, 2.d)

Designated as the Technology Repair Center (TRC) for the Air Force. Possesses 12,258 sq ft of class 100,000 and 47,285 sq ft of class 300,000 cleanroom space. Unique and specialized equipment is certified and traceable to the National Institute of Standards and Technology (NIST)

Capability/Capacity: Aerospace Fastener Manufacturing (15.1, 2.j)

The fastener manufacturing facility at WR-ALC is the only one of its kind in DoD. The capability exists to manufacture a wide variety of aerospace quality fasteners from carbon steel alloys, stainless steel and titanium. Fasteners sizes range from #6 thread size to 3/8" thread size. This capability in conjunction with the only accredited DoD fastener testing laboratory located at WR-ALC provides the unique capability to provide emergency support for critical aerospace fasteners.

Capability/Capacity: Fluid Cell Press (15.1, 2.j)

The WR-ALC sheet metal shop possesses unique flex-forming capabilities with a new 20,000 psi fluid cell press. The press was purchased at &8.6 million ABB Metallurgy of Sweden, and is the only press of its kind in the DoD. Due to the large tray capability and high forming pressures, it is the largest fluid cell press in the United States. The press provides for high pressure flexible die forming to achieve quality parts not available from other forming techniques. The high pressure allows forming of alloys that are very difficult to form with other presses, including forming of severe shrink flanges without wrinkling. The flex-forming process eliminates a high percentage of secondary forming operations that are required with other types of presses. Hand forming processes are practically eliminated by high side pressures produced by a flexible diaphragm hydrostatically backed by pressurized fluid.

Test Facility: Building 323 Engineering Assessment Facility Teardown Inspection High Bay Area (15.1, 2.b)

The engineering assessment facility in support of C-141 Empennage and oversize access doors for which WR-ALC is the single source of repair for the DoD.

Test Facility: Building 675/676 Radome Ranges (15.1, 2.b and 2.g)

WR-ALC is the single source of repair for the DoD for the F-15 nose radome.

Test Facility: Building 91 Special Operations Forces Aircraft Maintenance Hangars (15.1, 1.c.(1))

WR-ALC is the single source of repair in the Air Force for Special Operations Forces assigned aircraft such as Combat Talon, C-130 Gunships and Helicopters.

Test Facility: C-141 Aircraft Maintenance Complex (15.1, 1.c.(1) and 15.2, 1.c.(1))

WR-ALC is the single source of repair in the DoD for the C-141 aircraft.

Test Facility: C-141 Aircraft Component Complex (15.1, 2.b and 2.j)

WR-ALC is the single source of repair in the DoD for the C-141 aircraft components.

Test Facility: F-15 Aircraft Component Complex (15.1, 2.b, 2.j)

WR-ALC is the single source of repair in the DoD for the total refurbishment of the F-15 wings and other associated field generated components.

Test Facility: C-130 Aircraft Component Complex (15.1, 2.b, 2.i, 2.j)

WR-ALC is the single source of repair for the Air Force for the C-130 aircraft field generated structural components. As the single source of repair for C-130 propellers, WR-ALC has complete capability to balance and functional test propellers. Only C-130 Propeller overhaul/repair facility within DoD.

8.2 Separately list the depot maintenance facilities and equipment which are one of a kind within the Service and/or DoD.

<u>One of a Kind Facility/Equipment:</u> Hybrid Microcircuit Requalification (15.1, 2.g):

WR-ALC is the only Air Force facility that has the combined capability of hybrid microcircuit design, manufacture, repair and requalification. Collocation with failure analysis engineering functions provides access to high technology analytical tools useful in identifying material compatibility during the development of new microcircuit manufacturing and repair processes. Unique equipment includes:

Auto Assembly: The only hybrid auto assembly machine in the Air Force that utilizes a pattern recognition system to automatically dispense epoxy and position semiconductor devices.

Auto Wire Bonder: The only fully programmable high speed auto wire bonder in the Air Force that uses a pattern recognition system to locate die pads and thermosonically bond 0.001" diameter wire. Equipment provides increased reliability over manual machines and is capable of bond speeds of 250 milliseconds per wire with 0.0005" placement accuracy.

Automatic Optical Inspection System: The only production facility in the Air Force that uses automatic optical inspection.

<u>One of a Kind Facility/Equipment:</u> Low Altitude Navigation and Targeting Infra-Red for Night (LANTIRN) (15.1, 12.a, 12.b)

Integration of the Navigation Pod Station and Targeting Pod Station with a General Purpose Computing System provides a capability to modify Operational Flight Program (OFP) software code and simulate system operation for the LANTIRN Navigation and Target Pods. These Pods support mission requirements for the F-15E and F-16 weapon systems. Unique LANTIRN AISF equipment includes:

LANTIRN Navigation Pod Station

LANTIRN Targeting Pod Station

LANTIRN General Purpose Computing System

The LANTIRN support equipment, valued in excess of $150 million, is one of a kind in DOD. Unique LANTIRN equipment includes:

Environmental Control Unit Test Station (ECUTS): The ECUTS is a unique test station used to test the ECU assembly and sub-assemblies on both LANTIRN Pods. The LANTIRN depot has 2 ECUTSs.

Mass Reprogramming Station (MRPS): The MRPS is a unique station to load Operational Flight Program (OFP) software at the board level. The LANTIRN depot has 3 MRPSs.

Laser Receiver Test Station (LRTS): The LRTS is a unique test station used to functionally test the Laser transmitter and Receiver. The LANTIRN depot has 1 LRTS.

Laser Functional Test Station (LFTS): The LFTS is a unique test station used to test and align the Laser transmitter and the Laser Electronics. The LANTIRN depot has 2 LFTSs.

Snap Look Test Set (SLTS): The SLTS functionally tests the snap look assembly on the NAV Pod. The LANTIRN depot has 1 SLTS.

AEG Cooler Repair Station: The AEG Cooler Repair Station is a unique test/repair station designed and built by AEG, in Germany, to repair the AEG cooler on both LANTIRN pods. The LANTIRN depot has 1 AEG Cooler Repair Station.

Detector Cooler Test Station (DCTS): The DCTS is a unique test station used to functionally test the detector coolers on both of the LANTIRN Pods. The LANTIRN depot has 2 DCTSs.

Static Balance Bench: The Static Balance Bench is a unique test station used to statically balances and aligns the pitch gimbal assembly. The LANTIRN depot has 1 Static Balance Bench.

RF Test Station (RFTS): The RFTS is a unique test station used to test LANTIRN RF assets. The LANTIRN depot has 2 RFTS.

Scanner Assembly Test Station (SATS): The SATS is a unique test station designed and built by WR-ALC personnel to functionally align and fault isolate the LANTIRN scanner

assembly on the NAV and Target Pods. The LANTIRN depot has 1 Scanner Assembly Test Station.

Electro-Optical Work Center (EOWC): The EOWC is a unique station used to test all optical and Laser assemblies on LANTIRN (6 Test Programs). The LANTIRN depot has 1 EOWC.

<u>One of a Kind Facility/Equipment:</u> Joint Tactical Information Distribution System Centralized Software Support Activity (JTIDS CSSA) AISF (15.1, 12.a)

Integration of the JTIDS Terminal Acceptance Test Set, the JTIDS Formal Qualifications Test Equipment, JTIDS Communications and Navigation Dynamic Simulator, and the JTIDS Integrated Test Set provide a unique capability to modify OFP software code and simulate system operation for the JTIDS system. Unique JTIDS CSSA AISF equipment includes:

JTIDS Terminal Acceptance Test Set

JTIDS Formal Qualifications Test Equipment

JTIDS Communications, Navigation Dynamic Simulator

JTIDS Integrated Test Set

<u>One of a Kind Facility/Equipment:</u> Special Operations Forces Extendible Integration Support Environment (SOF EISE) AISF (15.1, 12.a)

The SOF EISE is a unique, modular, multi-system engineering facility developed for the support of USAF Special Operations aircraft avionics. The EISE provides for a comprehensive support environment for the SOF fleet.

Unique SOF EISE AISF equipment includes:

MC130H Combat Talon II/MH-53J PAVE LOW III/MH-60G PAVE HAWK Simulation Platform

AC-130H Gunship

MC-130E Combat Talon I Simulation Platform

SOF EISE Avionics Software Primary Support System (SUN)

SOF EISE Avionics Software Primary Support System (VAX)

PAVE LOW III Enhanced Navigation System Test Station

PAVE LOW III Gunship (CDU) Software Verification Test Station

PAVE LOW III (BIU/SGU) Software Verification Test Station

Combat Talon II (CDC) Software Verification Test Station

<u>One of Kind Facility/Equipment:</u> C-130 Self Contained Navigational System (SCNS) AISF (15.1, 12.a)

The C-130 SCNS is the only facility in DoD, which contains all of the hardware and software tools needed to modify OFP software code and simulate system operation. Unique C-130 SCNS AISF equipment include:

C-130 SCNS Integrated Software Support Station

<u>One of a Kind Facility/Equipment:</u> Miniature Receiver Transmit Software Maintenance Facility (MRT SMF) AISF (15.1, 12.a)

The MRT SMF, unique within DoD contains all of the hardware and software tools needed to make the embedded software in the MRT system and to test those changes. Unique MRT SMF AISF equipment includes:

Manual Performance Station consisting of TE Antenna Simulator

TM L/R Antenna

TM F/A Antenna Simulator

TMLU to Base Station Interface Cable Miniature Receive Terminal Software Maintenance Facility

<u>One of a Kind Facility/Equipment:</u> PAVE TACK AISF (15.1, 12.a)

The PAVE TACK AISF is the only facility in existence that can support the PAVE TACK system. Unique PAVE TACK AISF equipment include:

Simulated Aircrew Station

<u>One of a Kind Facility/Equipment:</u> Extendible Communication Integration Support Environment (ECOMISE) AISF (15.1, 12.a)

The ECOMISE AISF is a unique software/system integration facility that is capable of supporting the upgrade and testing of multiple military communications systems (ARC-164, ARC-190, TRC-181). The AISF contains the only ECOMISE test station in the AF inventory. ECOMISE test software was developed using the ATLAS/ADA Based Environment for TEST (ABET) and consists of reusable software modules. ECOMISE is designed to be expandable to support testing of other military communications systems and is currently being used to support inter-operability testing of the TRC-181.

<u>One of a Kind Facility/Equipment:</u> AN/GSM-285 (15.1, 12.b)

This RCA-built ATE is used to develop AWACS TPSs (E-3) and to test AWACS avionics items using them. WR-ALC/LY has the only three in the Air Force. NATO uses two of these ATEs to perform depot repair using USAF developed TPSs. The NAVY at North Island uses the only other AN/GSM-285 to perform depot repair for selected items on the F-18.

<u>One of a Kind Facility/Equipment:</u> Advanced Radar Test Bench Set (ARTBS) (15.1, 12.b)

The ARTBS is a unique engineering test center designed to significantly reduce the high number of "bad actors" on the F-15. Although there is one other ARTBS at Langley AFB, Robins AFB has the only ARTBS outfitted with environmental testing chamber and an 039 Unit Burn-In Test Stand.

<u>One of a Kind Facility/Equipment:</u> F-15 Radar(15.1, 12.a)

A unique overhaul capability exists for the F-15 APG-63 and APG 70 radars. WR-ALC has the only complete set of test program sets for the Automated Depot Test Stations (ADTS) and possesses the only intermediate Frequency Video Microwave (IFVM) stations in existence.

<u>One of a Kind Facility/Equipment:</u> F-15 Robotic Paint/Depaint Equipment (15.1, 1.c.(3))

The robotic paint and depaint equipment is the only one of its kind in DoD. The paint booth consists of two robotic systems; one for wash/rinse and the other to paint the aircraft. The depaint system consists of three robots which

use carbon dioxide to depaint the aircraft in lieu of stripping chemicals or plastic media.

<u>One of a Kind Facility/Equipment:</u> Electron Beam Welder(15.1, 2.b, 2.j)

Possess the largest (112" X 96" X 96") vacuum chamber capacity in the Air Force. Required for welding F-15 titanium wing spars on lower skin panels.

<u>One of a Kind Facility/Equipment:</u> Fluid Cell Press (15.1, 2.j)

The Fluid Cell Press (FCP) is the only one of its kind in DoD and the largest in the USA. The FCP is a bladder type hydraulic forming press used for forming various types of sheet metal aircraft structural components. This equipment is capable of forming parts made of aluminum, titanium, stainless steel, roll steel, tool steel and magnesium ranging from .008" to .375" in thickness. It generates 20,000 pounds per square inch of forming pressure and has dual trays to allow loading from both sides of the machine. This feature enables simultaneous loading and unloading of components while parts are being formed inside the chamber. The total weight of the FCP is 353 tons and is approximately 78 feet long by 22 feet wide by 15 feet high. Utilization of the FCP increases forming capacity, increases part definition and repeatability, reduces overall process time for formed parts by 40% with up to a 75% reduction on forming time. The FCP virtually eliminates hand forming and in combination with the robotic abrasive water jet cutter moves us closer to lean logistics.

<u>One of a Kind Facility/Equipment:</u> Automated Aircraft Rework System (AARS) (15.1, 2.b, 2.j)

The robotic work cell was designed to perform fastener removal, hole location, inspection, and transfer (within +/- 0.005") to new skin panels and/or structures of the F-15 wing workload. The system uses an extended reach industrial overhead gantry robot provided a large work envelope (30' X 18' X 5' high) and high precision accuracy for large scale process operations. The robot is capable of a global accuracy rating of +/- 0.015" and a global repeatability rating of +/- 0.005". The robot is runway mounted an provides five degrees of freedom (axes) consisting of: three translational movements (X,Y,Z) and two rotational movements, main rotation (yaw) and pivot (pitch). The robot is all electric servo motor driven and microprocessor controlled. A holding fixture is incorporated in the work cell to hold the

wings and maintain structural alignment of the part during rework. The work cell has the capability to drill and countersink 250 holes per hour. Mapping existing hole patterns takes approximately four seconds per hole so mapping drilling, and countersinking the holes can be performed at about 198 holes per hour. The rate for manually performing these operations ranges from three to ten holes per hour.

One of a Kind Facility/Equipment: Metallograph Image Analysis System (15.1, 12.b)

The computer enhanced image analysis system allows up to nine composite micro images to be computer enhanced in order to compare metallurgical conditions of samples before and after corrosion testing.

One of a Kind Facility/Equipment: Rheometrics Spectrometric Materials (15.1, 12.b)

Unique to the Air Force Material Command. The state-of-the-art equipment to investigate the effect of environmental conditions on the rheological properties (flow and deformation) of composite materials.

One of a Kind Facility/Equipment: Electronic Warfare AISF (15.1, 12.a)

The Electronic Warfare Management Directorate owns the EWAISF which occupies approximately 200,000 square feet of secure electronic and computer work area for complete support of 25 electronic warfare systems. Each work area includes flight hardware, controls and displays, engineering instrumentation, support computers, analysis equipment, and complex threat simulators. One of a kind electronic warfare equipment includes

> Complement of equipment, reprogramming tools and support facilities for Electronic Warfare that do not exist elsewhere in DOD.
>
> ALR-46/69 Software Support Facility. This facility is a unique stand-alone, computer facility enclosed in a Class B security vault and paid for by International customers. It contains 6 unique ALR-46/69 Integrated Support Stations (ISS) which each are unique due to the different time frames, requirements and technology when purchased. These ISSs are a unique integration of Radio-Frequency (RF) simulator, Electronic

Warfare (EW) Equipment (ALR-46 or ALR-69), commercial test equipment, unique interface wiring, specialized analysis equipment and computer work stations with unique integration software which is used for software development, integration and test of the ALR-46 and ALR-69 Radar Warning Receivers (RWRs). This facility is the only dedicated facility designed to provide complete software support of International customers of the ALR-46/69 RWRs.

Royal Saudi Air Force (RSAF) F-15 Tactical Electronic Warfare System (TEWS) Software Support Facility. This facility is a unique stand-alone, dedicated computer facility, enclosed in a Class B security vault and paid for by Saudi Arabia. This facility consists of a RF simulator integrated with unique EW equipment, commercial test equipment, specialized analysis equipment and computer workstations, integrated together with a central computer and unique interface wiring and software to develop, integrate and test the unique RSAF TEWS software. This is the only facility capable of supporting the Saudi unique hardware and software configuration of the F-15 TEWS.

Advanced Radar Warning Receiver (ARWR) / Countermeasures Dispenser (CMD) Integrated Software Support Facility. This facility is a unique stand-alone computer facility, enclosed in a Class B security vault that has been paid for by International customers. This facility consists of a RF simulator integrated with unique EW equipment, commercial test equipment, specialized analysis equipment and computer workstations, integrated together with a central computer and unique interface wiring and software to develop, integrate and test the unique ARWR/CMD software. This facility is the only dedicated facility designed to provide complete software support for the unique ARWR/CMD hardware and software configurations of a number of International customers.

Security Assistance Electronic Warfare Support Facility. This facility provides conditioned power and air for the operation of a classified computer network. This classified computer network is utilized in the software support of our International

customer's EW systems. This network is a unique integration of various types of computers, host software, applications and interface hardware.

One of a Kind Facility/Equipment: Radar Test Bench Set (RTBS) (15.1, 12.a)

The Radar Test Bench Set is the only APG-63 integrated test bench in DoD which is configured and equipped for development and support of APG-63 OFPs.

One of a Kind Facility/Equipment: Radar Workstation (RWS) (15.1, 12.a)

The Radar Workstation is the only DoD facility designed for supporting software development of APG-63 Electronic Counter Countermeasures (ECCM).

One of a Kind Facility/Equipment: Software Development and Integration Facility (SDIF) (15.1, 12.a)

The Software Development and Integration Facility is a $5.5 million dollar facility for the integrated development and support of the F-15 CentralComputer (CC) and the F-15 Programmable Signal Data Processor (PSDP) OFPs. This F-15 OFP equipment is DoD unique.

One of a Kind Facility/Equipment: 70Radar Test Bench Set (RTBS) (15.1, 12.a)

The 70RTBS is the only APG-70 integrated test bench in DoD which is configured and equipped for development and support of APG-70 OFPs.

One of a Kind Facility/Equipment: Advanced Simulation Bench (ASB) (15.1, 12.a)

The ASB is the only APG-70 integrated test bench in DoD which is configured and equipped with digital simulation capability for development and support of APG-70 OFPs.

<u>One of a Kind Facility/Equipment:</u> Cockpit Integration Bench (CIB) (15.1, 12.a)

The CIB is the facility for the integrated development and support of the VHSIC Central Computer (CC) and Programmable Signal Data Processor (PSDP) OFPs for MSIP configuration F-15 aircraft.

<u>One of a Kind Facility/Equipment:</u> Avionics Integration Bench (AIB) (15.1, 12.a)

The AIB is the only DoD facility for the integrated development and support of the VHSIC Central Computer (CC) and Multi-Purpose Data Processor (MPDP) OFPs for F-15E model aircraft.

<u>One of a Kind Facility/Equipment:</u> Central Computer Workstation (15.1, 12.a)

The VHSIC VCC WS is the facility for the stand alone development and support of the VHSIC CC for F-15E model aircraft. This F-15 OFP equipment is DoD unique.

<u>One of a Kind Facility/Equipment:</u> Programmable Armament Control Set Workstation (PACS WS) (15.1, 12.a)

The PACS WS is the facility for stand alone support of the PACS OFPs for F-15E model aircraft. This F-15 OFP equipment is DoD unique.

<u>One of a Kind Facility/Equipment:</u> Multi-Purpose Display Processor Workstation (MPDP WS) (15.1, 12.a)

The MPDP WS is the facility for the stand alone development and support of the MPDP OFPs for the F-15E model aircraft. This F-15E OFP equipment is DoD unique.

<u>One of a Kind Facility/Equipment:</u> Automatic Flight Control System Workstation (AFCS WS) (15.1, 12.a)

The AFCS WS is the facility for the stand alone development and support of the AFCS OFPs for F-15E model aircraft. This F-15E OFP equipment is DoD unique.

<u>One of a Kind Facility/Equipment:</u> Avionics Integration Unit Workstation (AIU WS) (15.1, 12.a)

The AIU WS is the facility for the stand alone development and support of the AIU OFPs for F-15E model aircraft. This F-15E OFP equipment is DoD unique.

<u>One of a Kind Facility/Equipment:</u> Thermal Wave Enhanced Thermography System (15.1, 1.c.(1))

This system is a DoD one of a kind. WR-ALC currently uses thermography in support of the depot inspection of the composite C-141 weep hole repairs under the Coral Weep project. All patches must be inspected prior to releasing the aircraft from the depot to ensure aircraft structural integrity. NASA has provided WR-ALC with computer improvements which greatly enhance the capability of our thermography system to Non-Destructively Inspect (NDI) composite aircraft repairs.

<u>One of a Kind Facility/Equipment:</u> Scanning Acoustic Microscope (15.1, 1.c.(1))

In support of depot maintenance activities, the Scanning Acoustic Microscope is a state-of-the-art analytical system for non-destructive and non-invasive imaging of internal cracks and corrosion in advanced composite materials and multi-layered aluminum alloy structures and contributes directly to resolving aging aircraft and other material issues.

<u>Test Facility:</u> Building 323 Engineering Assessment Facility Teardown Inspection High Bay Area (15.1, 2.b)

The engineering assessment facility in support of C-141 Empennage and oversize access doors for which WR-ALC is the single source of repair for the DoD.

<u>Test Facility:</u> Building 675/676 Radome Ranges (15.1, 2.b and 2.g)

WR-ALC is the single source of repair for the DoD for the F-15 nose radome.

Test Facility: Building 91 Special Operations Forces Aircraft Maintenance Hangars (15.1, 1.c.(1))

WR-ALC is the single source of repair in the Air Force for Special Operations Forces assigned aircraft such as Combat Talon, C-130 Gunships, and Helicopters.

Test Facility: C-141 Aircraft Maintenance Complex (15.1, 1.c.(1) and 15.2, 1.c.(1))

WR-ALC is the single source of repair in the DoD for the C-141 aircraft.

Test Facility: C-141 Aircraft Component Complex (15.1, 2.b and 2.j)

WR-ALC is the single source of repair in the DoD for the C-141 aircraft components.

Test Facility: Bulding 140 F-111 Crew Escape Module Parachute (15.1, 2.I)

WR-ALC is th single source of repair in the DoD for the F-111 Crew Escape Module Parachute.

Test Facility: F-15 Aircraft Component Complex (15.1, 2.b, 2.j)

WR-ALC is the single source of repair in the DoD for the total refurbishment of the F-15 wings and other associated field generated components.

Test Facility: C-130 Aircraft Component Complex (15.1, 2.b, 2.i, 2.j)

WR-ALC is the single source of repair for the Air Force for the C-130 aircraft field generated structural components and propellers.

Report to the Commission

DEPARTMENT OF THE AIR FORCE

BRAC 95
JOINT CROSS SERVICE GROUP
OO-ALC DEPOT MAINTENANCE
DATA CALL SUPPLEMENTAL

McCLELLAN AFB, CALIFORNIA

February 1995

DATA CALL SUPPLEMENT
FOR
JOINT CROSS SERVICE GROUP - SM-ALC DEPOT MAINTENANCE

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DATA CALL SUPPLEMENT
FOR
JOINT CROSS SERVICE GROUP - DEPOT MAINTENANCE

CAPACITY

1. Capacity Utilization

1.1 Calculate the capacity index for the commodity groups applicable to depot maintenance work at your activity. Provide your answers expressed in direct labor hours (DLHs) in Table 1.1.a by commodity groups for the Fiscal Years requested.

Table 1.1.a: **Capacity Index**

	COMMODITY GROUP	INDEX (DLHs)				
		FY 1995	FY 1996	FY 1997	FY 1998	FY 1999
1C1	TRANS/TNKR/BOMB	818059	809279	795168	820939	818908
1C3	LIGHT COMBAT	1458121	1442471	1417319	1463251	1459632
	1 SUB-TOTAL	2276180	2251749	2212487	2284190	2278540
2B	ACFT STRUCTURES	228872	226469	222549	229750	229181
2C	HYD/PNEU	486515	483267	477162	493066	491846
2D	INSTRUMENTS	280965	278014	273202	282041	281343
2G	AVIONICS/ELECTRIC	451738	448854	443344	458154	457020
2J	MANUFACT/FABRICATION	530012	590095	702839	496591	512847
	2 SUB-TOTAL	1959738	2026699	2119095	1959602	1972237
7A	RADAR	740277	715127	681745	704151	702409
7B	RADIO	338449	336145	330300	341150	340306
7C	WIRE	212354	201920	207253	214063	213534
7E	NAV AIDS	277433	275643	270847	279745	279054
7F	E-O NIGHT VISION	136541	156610	174836	180581	180134
7G	SATELLITE CONT/SENSORS	171861	170701	167733	173245	172816
	7 SUB-TOTAL	1876915	1865146	1832714	1892935	1888253
10D	GROUND GEN	96777	99724	97957	101131	100881
10E	OTHER	74209	66176	60509	61537	61385
	10 SUB-TOTAL	170986	165900.3	158466	162668	162266

12A	TACTICAL SYS	401036	397202	390254	402459	401464
12B	SUPPORT EQUIP	328121	324984	319299	329284	328470
	12 SUB-TOTAL	729157	722186	709553	731743	729934
14	OTHER	36974	36635	35999	37164	37072
	GRAND TOTAL	7068314	7068315	7068315	7068302	7068302

1. Capacity Utilization, continued

1.2 Calculate the utilization index for the commodity groups applicable to depot maintenance work at your activity. Provide your answers expressed as a percentage (%) in Table 1.2.a by commodity groups for the Fiscal Years requested.

Table 1.2.a: **Utilization Index**

COMMODITY GROUP		INDEX (%				
		FY95	FY96	FY97	FY98	FY99
1C1	TRANS/TNKR/BOMB	78.76	78.60	73.04	71.94	69.57
1C3	LIGHT COMBAT	81.94	81.77	75.98	74.84	72.37
	1 SUB-TOTAL	80.80	80.63	74.92	73.80	71.36
2B	ACFT STRUCTURES	77.57	77.39	71.90	70.82	68.49
2C	HYD/PNEU	83.18	82.67	76.44	75.23	72.75
2D	INST	77.56	77.38	71.89	70.83	68.48
2G	AVIONICS/ELEC	83.61	83.07	76.78	75.56	73.07
2J	MFG & FABRICATION	78.35	78.03	73.37	71.44	69.08
	2 SUB-TOTAL	80.54	80.09	74.13	73.20	70.76
7A	RADAR	65.77	67.21	64.37	63.37	61.28
7B	RADIO	69.25	68.83	63.96	62.97	60.90
7C	WIRE	68.89	68.47	63.62	62.64	60.57
7E	NAV AIDS	69.36	68.92	64.04	63.05	60.97
7F	E-O NIGHT VISION	90.38	81.14	63.62	62.64	60.57
7G	SATELLITE	68.91	68.49	63.64	62.66	60.59
	7 SUB-TOTAL	63.05	62.92	58.20	57.30	55.41

10D	GROUND GEN	98.49	94.36	87.70	86.39	83.54
10e	OTHER	90.20	99.85	99.70	99.70	96.41
	10 SUB-TOTAL	94.89	96.55	92.29	91.42	88.41
12A	TACTICAL SYS	81.62	81.35	75.50	74.55	72.09
12B	SUPPORT EQUIP	81.62	81.35	75.50	74.55	72.09
	12 SUB-TOTAL	81.62	81.35	75.50	74.55	72.09
14	OTHER	88.08	87.76	81.54	80.32	77.67
	GRAND TOTAL	78.15	77.94	72.35	71.27	68.92

Note: All percentages in the above table rounded to the nearest hundredth's.

1. Capacity Utilization, continued

1.3 Assuming (a) the current projected total workload remains as assigned; (b) that sufficient production demand is available to justify maximum hiring, with no significant investment in capital equipment; and (c) no major Military Construction additional to that already approved and funded: what is the maximum extent to which operations, by commodity group, could be expanded for depot maintenance work at your activity, based on the current and future planned workload mixes? Please provide your response in the absolute maximum number of direct labor hours (DLHs).

Table 1.3.a: **Maximum Potential Capacity**

COMMODITY GROUP	INDEX (DLHs)				
	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999
1c1. Trans/Tank	957392	945451	947860	985342	982904
1c3. Light Combat	1475270	1456105	1464386	1523901	1520131
1d. Other	163240	161743	158928	164078	163672
Total	2595902	2563299	2571174	2673320	2666707
2b. Aircraft Structures	676284	668321	584927	526321	524929
2c. Hydraulic/Pneumatic	715917	737375	805020	817254	815232
2d. Instruments	514802	523896	526126	542858	541515
2g. Avionics/Electronics	727702	781391	844139	871761	869605
2j Manufact/Fabrication	764072	852765	1011419	695905	719639
Total	3398057	3563749	3794918	3475111	3491972
7a. Radar	1040612	1225877	1220363	1238306	1235243
7b. Radio Communications	844005	678893	711464	736206	734385
7c. Wire Communications	231903	229778	225779	233094	232517
7d. Electronic Warfare	9777	9687	9519	6552	6536
7e. Navigational Aids	567725	482186	480596	502720	501476
7f. Electro-Optics/Night Vis	136541	166510	209060	215834	215300
7g. Sat Control/Sensors	185523	183823	180623	186475	186014
Total	3016086	2976753	3037404	3119187	3111471
10d. Ground Generators	96777	111402	109463	113010	112730
10e. Other	74209	66176	60509	61537	61385
Total	170986	177578	169972	174546	174115
12a. Tactical Systems	470834	455459	420488	452956	451835
12b. Support Equipment	446854	453379	409226	358390	357504
Total	917688	908838	829715	811346	809339
14. Other	37105	36764	36125	37295	37203
Total	10,135,824	10,226,981	10,439,307	10,290,807	10,290,807

There have been no requests by the local community to constrain or restrict operations at McClellan AFB. As a good neighbor to the community, Self-imposed noise abatement procedures have been implemented.

5.2 Indicate any encroachment constraints on current or future operations that would restrict future expansion.

Type of Encroachment Constraint on Expansion Describe

There have been no encroachment constraints on current operations. This can be contributed to a Joint Land Use Study which was completed at McClellan AFB in 1986. During that same year the Sacramento Area Council of Governments (SACOG) developed a McClellan AFB Comprehensive Land Use Plan (CLUP). The plan was approved by the Airport Land Use Commission (ALUC) and adopted by both the Sacramento City Council and Sacramento County Board of Supervisors in January 1987. The most recent Air Force AICUZ Handbook land use compatibility tables have been incorporated into a December 1992 CLUP Amendment. When the AICUZ data is changed and authorization is received to release the data, it is provided to SACOG personnel to incorporate into the CLUP. Both the city and county planning departments have taken the necessary steps to incorporate the CLUP restrictions into their respective community and general plans. Enforcement of the CLUP restrictions is being accomplished by either the Zoning Commission, Planning Commission, Sacramento City Council or Sacramento County Board of Supervisors public hearings.

Because of the implementation and enforcement of the CLUP, we do not foresee encroachment as being a constraint for future operations.

MEASURES OF MERIT

Facilities and Equipage

6. Unique or Peculiar Facilities

6.1 List unique or peculiar testing facilities, excluding equipment (e.g. runways, railheads, ports, tracks, ponds, etc.).

6.2 Indicate the reasons that these facilities are required by the depot maintenance function.

6.3 How could the depot maintenance functions be performed without these specialized facilities?

Testing Facility (6.1)	Description of Uniqueness (6.1)	Reason Required (6.2)	Alternative (6.3)
F-111 cold proof	An 8,500 square foot facility used for F-111 airframe certification. The aircraft airframes are stressed on a wing fixture inside an environmental chamber. A computerized program simulates a flight profile of -2.46G and +7.36G, and -3.00G and +7.33G at the 56 degree and 26 degree wing sweeps. Echo characteristics and the structural give allow flaws as little as .007 in to be accurately located. Cooling to -42 deg F increases metal sensitivity and decreases fracture toughness.	The F-111 manufacturers states that this facility offers the only acceptable means of airframe certification. Other Nondestructive Inspection (NDI) methods do not detect all flaws responsible for loss of aircraft. Testing is designated mission essential, and is mandated by Air Force wide flight safety requirements.	No alternatives acceptable for certification and no such capabilities exist elsewhere. SM-ALC is the only asigned Air Force source of repair for this workload.

McClellan Nuclear Radiation Center (MNRC).	The MNRC houses a 1 megawatt research type reactor. The facility was originally designed to perform neutron radiography of aircraft structures. That capacity has been expanded to include nuclear and space survivability and Air Force treaty verification support. The MNRC is the only reactor facility in the Air Force and provides multiple neutron output selections. The 4464 square foot facility is unique in that it has been designed and constructed to contain high levels of radioactivity. The walls, doors and windows are heavily shielded to protect the environment as well as the employees that work there. The facility meets the critical requirements of the Atomic Energy Commission (AEC). In staff are a cadre of health physics employees that ensure our adherence to AEC requirements.	The capability to perform both in-core irradiation's and neutron radiography at the same time provides the versatility to accomplish research and development projects simultaneously with the military mission. The research applications include the ability to study and evaluate the effects of nuclear radiation on electro-optic components and Neutron Capture Therapy research and development. Neutron radiography is extremely effective in detecting very low levels of hydrogen and corrosion. This facility, in concert with the adjacent NDI facility at SM-ALC, provides for the most complete and comprehensive NDI facility in the United States	There is no alternative capability available anywhere.

Non-Destructive Inspection (NDI) Facility	SM-ALC has the most comprehensive NDI facility in the defense industry. We have all the conventional processes at the state-of-the-art, including X-Ray, Ultrasound, Mag Particle, Dye Penetrant and Eddy Current. We offer Robotic and conventional applications to inspect entire aircraft as well as components. The facility contains 8000 square feet of production space. Its construction includes heavy shielding to insure safety and health to the environment as well as the employees. We have ability to provide film, video, and real-time output products. The inclusion of the Neutron Radiography facility as a capacity or capability makes this facility entirely unique. The combination of so many NDI disciplines makes the SM-ALC operation the premier NDI facility.	We offer Robotic and conventional applications to inspect entire aircraft as well as components. We have the ability to provide film, video, and real-time output products. The inclusion of the Neutron Radiography facility as a capacity or capability makes this facility entirely unique. The combination of so many NDI disciplines makes the SM-ALC operation the premier NDI facility in DoD.	Since there is no other comprehensive NDI facility available, much of the testing could not be done at all. That which is available is not in a single location, so would necessitate sending units to multiple locations for testing.

Near Field Test Range	The only DOD facility for testing of Fire Finder, TPQ-36/37, Phased Array Radar.	Fire Finder is an Army competition workload gained by SM-ALC. The test facility is DOD unique to this radar system and was transferred from the Sacramento Army Depot to this center. It has been installed and calibrated in support of this workload. It is unique in that it has precision alignment rails for positioning the Fire-Finder in the chamber.	Since this is the only DOD test range, we would have to contract with the prime contractor, Hughes Division, to support maintenance/repair of this radar system.
1000 Meter Tower	The tower, in conjunction with the test probe, simulate a target for near field calibration of the Fire Finder.	This complements the near field test range. This test facility is vital for checkout of the Fire Finder system after depot maintenance.	Since this is the only DOD Fire Finder test range, we would have to contract with the prime contractor, Hughes Division, to support maintenance/repair of this radar system.
Near Field Probe	The largest one in DOD for calibration of Fire Finder antenna near range beam pattern housed in a close tolerance anechoic chamber.	A unique computer calibrated and operated close tolerated probe for near field antenna beam pattern testing housed in an anechoic room used for Fire Finder radar system antenna calibration and system operational checkout.	Since this is the only DOD test range this size, we would have to contract with the prime contractor, Hughes Division, to support maintenance/repair of this radar system.

Munson Road Test Track	A Mil-Spec designed bumpy road simulating rough terrain	After 20 hours of burn-in time, Fire Finder system is subjected to the Munson Test Track at moderate speeds, then retested for an additional 20 hours of operation prior to release to customer	Capability exists in another service (Army) and contractors. We would obtain this service from them.

Hydraulics/ Pneudraulics Component Repair	Three modern buildings occupying more than 180,000 sq. ft. with a 6000 psi hard plumbed manifold system. The system is expandable to 8000 psi for future use. It is unique to all other types of hydraulic repair facilities; there is no other facility like it! The manifold consists of thousands of feet of stainless steel pipe; the number of settings, valves and meters measures in the hundreds. The facility contains environments of 100,000 class controlled area. State-of-the-art test equipment, both manual and automatic are hard plumbed to the manifold. This type of system provides better temperature control and constant flow. The configuration eliminates hazardous noise in the work place and allows the test stands to be placed in the assembly work area making the work process more efficient.	The repair of hydraulic/pneudraulic components require highly specialized and constructed facilities as called out by Technical Orders. There are special requirements, i.e. unique power, fluid and air requirements to meet current and future needs.	We would be unable to repair the components that we do without the facility, the repair would have to be contracted out to multiple sources, no single source is able to do all we can. The component could also be purchased new instead of being repaired. SM-ALC is the only assigned Air Force source of repair for this workload.

Flow grind	It is unique to all other hydraulic repair organizations. It is a combination of skills, equipment, facility and workload. The flowgrind unit as a fully equipped machine shop and tool making capabilities and its workload is tied closely with the hydraulic component repair. Flow grinding strives to: (1) retrofit used spools and sleeves. (2) Replace work spools and sleeves/selector sets with new manufactured non-flow ground spools and sleeves employing our new state-of-the-art automated flow grind system. This system is capable of plus or minus 0.000010 inches linear grinding to an edge finish of 8 micro-inches. (3) Precision fitting of old and work valve bodies and restoring the bore to a straight and round condition of plus or minus 0.000020 inches. We routinely achieve a finish of 4 micro-inches on all fitted parts. (4) Perpendicularly is also kept to plus or minus 0.000050 inches. (5) Produce a hydraulic synchronization between metering ports/orifices and corresponding edges on the spool to be consistent tolerance of plus or minus 0.000050 inches. The flow grind shop is the best in the Air Force and in this particular field the most advanced in DOD and possibly the world!	The high tolerance and specialized grinding equipment is necessary to overhaul close tolerance hydraulic/pneudraulic components.	No current alternatives available.

Ground Power Generator & Engine Test Facility	Dynamometer Test capability up to 500 kw for all Air Force aircraft generators and interservice workloads. Facility requires cooling towers and plant air.	Maintain operational Ground Power Generators to provide power for all Air Force aircraft and ground support systems.	No current alternatives available. SM-ALC is the only assigned Air Force source of repair for this workload.
Radome Test	This facility was designed to test F-111 aircraft radomes. It is unique because it can test the F-111's TFR (Terrain Following Radar) and ARS (Attack Radar System) systems for beam deflection, antenna pattern distortion, and RF transmission efficiency.	The F-111 is managed at SM-ALC and the PDM overhaul is also performed here. The F-111 radome test facility was established to support the PDM line.	Can be contracted or relocated. SM-ALC is the only assigned Air Force source of repair for this workload.
Laser Range	Outdoor laser range with controlled access and minimum of 515 meters long to test laser systems.	To test sensitivity parameters of tank laser systems.	Products could not be repaired without specialized facilities. If attempts were made without the facilities the product produced would not comply with directives and specifications.
Laser Test Bed	Only test and calibration equipment of its kind. Used daily to align laser designating equipment for battlefield use.	Required by repair an overhaul technical manuals.	Equipment would be relocated.

AN/FPS-117 Log Support Facility (LOGSET)	The facility is a complete and operational radar system that can be re-configured to operate and emulate various versions of the radar. The LOGSET provides hardware and software support for systems installed in Alaska (Version 1 or V1), Berlin (V2) Saudi Arabia (V3), Canada (V4), Iceland (v5), United Kingdom (Version GE-592-UK), Israel (GE-592-QM), Korea (GE-592-K), and Taiwan (GE-592-PJ). In addition, the LOGSET supports parts that are common with the AN/TPS-59 and AN/TPS-34 radars (owned by the Marine Corps and Egypt).	This facility is required to test hardware and software items before sending out to the field. Because of the many different versions deployed around the world, a re-configurable LOGSET is absolutely necessary to test all outgoing parts to ensure the part will function in the particular radar in which it will be installed.	The only testing alternatives on the older versions of the radar would be to send parts out on a trial and error basis. This method would be unacceptable from both a cost and operational standpoint. SM-ALC is the only assigned Air Force source of repair for this workload.

Communications Nodal Control Element (CNCE) (TSQ-111) ISF	Integrated Logistics Support Facility (ISF). Overhaul/parts repair and emergency assistance worldwide including software support. This is the only shop that supports worldwide CNCE requirements and depot level overhaul. DoD unique test equipment, test software, depot training, and depot tech data were designed for this system. They also serve as management tools for the Inventory Control Point function.	This facility is required to test hardware and software items before sending out to the field.	The only testing alternatives would be to send parts out on a trial and error basis. This method would be unacceptable from both a cost and operational standpoint. SM-ALC is the only assigned Air Force source of repair for this workload.
Modular Control Equipment (MCE) (TYQ-23) ISF	Integrated Logistics Support Facility (ISF). Overhaul/parts repair and emergency assistance worldwide including software support. Designated Technical Repair Center for Air Force and Marine Corps TYQ-23 System. DoD unique test equipment, test software, depot training, and depot tech data were designed for this system. They also serve as management tools for the Inventory Control Point function.	This facility is required to test hardware and software items before sending out to the field.	The only testing alternatives would be to send parts out on a trial and error basis. This method would be unacceptable from both a cost and operational standpoint. SM-ALC is the only assigned Air Force source of repair for this workload.

Electronic Warfare (EW) ISF	Integrated Logistics Support Facility (ISF). Overhaul, repair and testing of 35 separate electronic combat subsystems that comprose the 806L system. This suite of test equipment was designed to support a number of EW systems and is continually modified to accommodate new or modified equipment in the field. They also serve as management tools for the Inventory Control Point function.	This facility is required to test hardware and software items before sending out to the field.	The only testing alternatives would be to send parts out on a trial and error basis. This method would be unacceptable from both a cost and operational standpoint. SM-ALC is the only assigned Air Force source of repair for this workload.
Ground Wave Emergency Network (GWEN) ISF	Integrated Logistics Support Facility (ISF). Overhaul/parts repair and emergency assistance worldwide including software support. Test equipment designed for GWEN and communication secret (COMSEC) requirements.	This facility is required to test hardware and software items before sending out to the field.	The only testing alternatives would be to send parts out on a trial and error basis. This method would be unacceptable from both a cost and operational standpoint. SM-ALC is the only assigned Air Force source of repair for this workload.
A-10/F-111 AISF	This is a special reinforced steel structure with filtered power, special security, and TEMPEST shielding. It is used for testing of the F-111 and A-10 avionics systems and insertion of technological upgrades to these systems.	This facility is required to test hardware and software items before sending out to the field.	There is no known alternative. SM-ALC is the only assigned Air Force source of repair for this workload.

20. **F-111 Aircraft Programmed Depot Maintenance, Modification, and Repair Capability.** McClellan posses the only capability in the DoD to provide the complete range of depot management required by all models of the F/EF-111 aircraft. In addition to the Cold Proof capability described above, this includes but is not limited to hush house support, sull wiring services, extensive modifications, compete overhaul and repair of radomes, contorl surfaces, and sub-systems, corrosion control, wing overhaul and reseal, analytical condition inspections (ACI) to track patterns of weapon systems failures, pyrotechnics refurbishment, and structural integrity programs to analyze high stress areas for cracks, corosion and wear. SM-ALC is the sole DoD source of repair for this aircraft.

21. **A-10 Aircraft Modification and Repair Capability.** McClellan possesses the only capability in the DoD to provide the complete range of depot maintenance required by the A-10 aircraft. This includes but is not limited to hush house support, full wing services, extensive modifications, complete overhaul and repair of radomes, control surfaces, and subsystems, corrosion control, wing overhaul and reseal, analytical condition inspections (ACI) to track patterns of weapon systems failures, pyrotechnics refurbishment, and structural integrity programs to analyze high stress areas for cracks, corrosion and wear. SM-ALC is the sole DoD source of repair for this aircraft.

22. **Air Force Ground Communications Electronics Overhaul and Repair Capability.** This consists of 14 fully equipped buildings (473K sq ft) used for overhaul and repair of all AF Ground Communications Electronics systems ranging from ahnd held radios to computer integrated radar systems. Some of the most complex ground-comm systems in the world are overhauled and repaired in these facilities. McClellan AFB is the only source of this capability in the Air Force. Skills, capabilities, and capacities exist at McClellan for: ground communications (LF/HF/VHF/UHF radios, single sife and multiple side band radios, troposhperic scatter systems, microwave systems, and ground-based jammers), air traffic control and navigation (instrument landing systems, tactical navigation systems, precision approach radars, terminal VHF OMNI range systems), radars (phased array or feed horn type, fixed site, tactical or mobile, height finder radar systems, search radar systems, three dimensional radar systems and over-the-horizon backscatter systems), identification friend-or-foe, telephone and teletype (teletypes, telephones, DSN, mechanical and electronic switching systems), meteorology (storm tracking radars, runway visibility equipment, satellite tracking systems, weather forecasting equipment), microwave, electronic imagery, sensors, copy exploitation, and electronic warfare training devices (including either re-designated radar, communications, navigation equipment, ot because of design, function and support require the same skills and support equipment in the repair process as other equipment in this technology, such as: multiple threat emitter simulators, surface to air missile simulators, tactical radar threat generator systems, and ground based jammers). Within these broad categories are systems and subsystems which include microwave and launch control systems, tracking and range safety, in regards to manned and unmanned orbiter launching,

communications equipment operating through the complete range of communications frequiencies, intercom and audio equipment, display groups (color and B/W TV monitors, recorders, mappers, selective identification features), computers, antennas and ancillary equipment. Some peculiar features of many of the radio, radar, and navigational family groups are: large physical size (either permanent ground stations, mounted in transportable shelters, or in mobile vans), high power outputs with long range capabilities, complex system composition (transmitters, receivers, computers, control devices, and interconnecting hardware) and mockups required for depot support. Ground Communications electronics equipment is all electronic in nature and include applications of the full spectrum if electronics technology from vacuum tube throughhybrid and Very High Speed Integrated Circuits (VHSIC). Scope of repair includes completeground-up overhaul, repair, amnufacture, system modification and integration, and mock-up designand facbrication. McClellan is the sole source for this capability in the Air Force.

23. **Ground Communications-Electronics Operational Software Development and Maintenance Capability.** McClellan possesses the only comprehensive capability inthe Air Force for development and maintenance of Ground C-E operationial software. Capabilities include operational program development, operation program maintenance, simulation modeling, mission software developmetn, integration testing, test data analysis, case tols engineering, and technolgy insction. SM-ALC is the sole Air Force source for this capability.

24. **Instrument and Electronic Component Repair Capability.** McClellan is hoome to the largest, most modern, most comporehensivenstrument and Electronic Component Test and Repair capability inthe DoD. This facility provides test and repair of a full range of pressure, temperature, humidity and time measurement, instruments, flight control and navigationsl instruments, and flight data cockpit recorders. Skills and capabilities include reverseengineering, unsupportable electronicequipment repair, large wire harness test automation, specialized test equipment manufacture, test system overhaul process development, supportability review, normal repair procedures development, and mil-standard technical manual development. McClellan is the sole source for this capabiilty in the Air Force.

25. **Aircraft Operation Flight Software Development and Maintenance.** McClellanhas the most comprehensive OFP development and maintenance capability for F/EF-111 and A-10 aircraft in DoD. Using the Extendible Integration Support Environment (EISE), equipment is shared by several weapon systems. McClellan is the sole Air Force source for this capability.

8.2 Separately list the depot maintenance facilities and equipment which are one of a kind within the Service and/or DoD.

Facility/Equipment Describe Why It is One of a Kind

1. **F-111 Cold Proof Facility.** The only Certified F-111 structural test facility in existence.

2. **Infrared Reflow Soldering System.** Processor controlled 10 zone conveyorized IR convection oven used for mass soldering of surface mount components onto multilayer printed wire boards. Peculiar to the Air Force.

3. **Automated Conformal Coating Application System.** Processor controlled conveyorized spray application and curing of polyurethane, silicone, epoxy, or acrylic conformal coatings onto printed wire assemblies. Peculiar to the Air Force.

4. **Automatic Power Supply Test System.** Processor controlled generic power supply test system. Accomplishes fully automated functional testing of "never before seen" low voltage power supplies within one day after receipt at depot. Peculiar to the Air Force.

5. **Kryterion 5000 Bare Board Test System.** Processor controlled bare board test system capable of accessing 25,000 test points simultaneously. It tests for open or shorted traces on unpopulated printed wire boards. Peculiar to the Air Force.

6. **Near Field Probe.** Processor controlled antenna calibration system. This system is used to calibrate an antenna's beam position in an anechoic chamber. The information gained from this calibration is used to project the long range beam position, thus eliminating the need for a Far Field Probe. Peculiar to Air Force

7. **Near Field Test Range.** The only DOD facility for testing of Fire Finder, TPQ-36/37, phased array radar. Unique within DOD.

8. **Munson Road.** A Mil-Spec designed bumpy road which simulates rough terrain. This road is currently used to test the Fire Finder Radar System for survivability under rough terrain conditions. Peculiar to Air Force.

9. **Mockups.** Attached is a list of mockups that are necessary for the performance of our workload requirements. These mockups are unique within DOD as depot maintenance support equipment. Unique within DOD.

10. **Hydraulic/Pneudraulic Component Repair (fluid driven).** This hydraulic repair facility is the most advanced facility of its kind in the world. It has highly specialized equipment and skilled personnel.

11. **Flow Grind Capability.** Precision match fitting/grinding and precision spool and sleeve grinding.

12. **Airborne Generator Rewind Capability for Flat & Rectangular Wire.** Rewind process for rotors, stators, coils, armatures, and exictors developed by Service Center of Excellence to reduce acquisition costs. Process has resulted in a 70% savings to the customer.

13. **A-10 and F-14 CADC Transducer.** The only capability within DOD to test and repair.

14. **F-111 Radome Repair.** The only capability within the Air Force to test and repair.

15. **Electro Optics Night Vision.** Image intensification, thermal imagery, and laser systems in a single facility. This is the only facility with three mission items in one area in DOD. Specific capabilities which are performed in no other service are as follows: Main Battle Tank Thermal Systems, Main Battle Tank Laser Systems, Ground Laser and Laser Designator Systems.

16. **Non-Destructive Inspection.** SM-ALC has the most comprehensive NDI capability in the defense industry. We have all the conventional processes at the state-of-the-art, including X-Ray, Ultrasound, Mag Particle, Dye Penetrant and Eddy Current. We offer Robotic and conventional applications to inspect entire aircraft as well as components. We have the ability to provide film, video, and real-time output products. The inclusion of the Neutron Radiography facility as a capacity or capability makes this facility entirely unique. The combination of so many NDI disciplines makes the SM-ALC operation the premier NDI facility in DoD.

17. **McClellan Nuclear Radiation Center (MNRC).** The MNRC houses a 1 megawatt research type reactor. The facility was originally designed to perform neutron radiography of aircraft structures. That capacity has been expanded to include nuclear and space survivability and Air Force treaty verification support. The MNRC is the only reactor facility in the Air Force and provides multiple neutron output selections. The capability to perform forth in-core irradiation's and neutron radiography at the same time provides the versatility to accomplish research and development projects simultaneously with the military mission. The research applications include the ability to study and evaluate the effects of nuclear radiation on electro-optic components and Neutron Capture Therapy research and development. The MNRC is the only DoD licensed source for providing Neutron Transmutation Doping for silicon use in the semiconductor industry. We are an authorized source under the Defense Production Act Title III

Program for the purpose of expanding domestic production capacity and accelerating development in the semiconductor field.

Neutron radiography is extremely effective in detecting very low levels of hydrogen and corrosion. This facility, in concert with the adjacent NDI facility at SM-ALC, provides for the most complete and comprehensive NDI facility in the United States.

18. Composite Demonstration Center (Blue Room). Residing within TI is the USAF Advanced Composites Program Office. Their mission is the development and introduction of advanced composites technologies into the Air Force. This facility is unique to the Air Force because the technologies inserted into fielded weapons systems are not available elsewhere. They also provide production applications that are quickly transitioned to our manufacture/repair activity. This facility is capable of handling classified, low-observable technology applications.

19. Injection Molding. This capability is unique in that it is the largest facility of its kind in the DOD. The facility provides a test and development arena for the resolution of DOD problems relating to composites and plastics. As a matter of fact, the injection molding capability was instrumental in the competition, award and subsequent production of the A- 10 Link Tube second source contract. This milestone was important because it represents the first time a DOD agency was able to compete for and win a workload that previously had been awarded to the private sector. It proved we could provide both capability and value.

20. Optical Measurement System (OMS). The OMS is unique and peculiar to both DOD and the private sector. The capability provides for precise laser measurement (mapping) of a part. The data is digitized and processed so that it can be used to provide Numerical Control (NC) input. That NC input may be include quality verification (Gold Part), analysis and prototyping functions.

21. Communications Nodal Control Element (CNCE) (TSO-111) Integral Support Facility (ISF). This is the only facility that provides support to worldwide CNCE requirements and depot level overhaul in the world.

22. Modular Control Equipment (MCE) (TYO-23) Integrated Support Facility (ISF). This is the only facility that provides support to worldwide MCE requirements and depot level overhaul in the world.

23. AN/FPS-117 and AN/FPS-118 Integrated Support Facility (ISF). This is the only facility that provides support to worldwide AN/FPS-117 and AN/FPS-118 requirements and depot level overhaul in the world.

24. **Electronic Warfare (EW) Integrated Support Facility (ISF).** This is the only facility that provides support to requirements and depot lecel overhaul worldwide of the 35 separate electronic combat subsystems that compromise the 806L system in the world

25. **Ground Wave Emergency Netwrok (GWEN) Integrated Support Facility (ISF).** This is the only facility that provides support to worldwide GWEN requirements and depot level overhaul in the world.

26. **F/EF-111 Aircraft Programmed Depot Maintenance, Modification and Repair Facilities.** McClellan has the only comprehensive set of facilities and equipment in the world capable of performing all the required tasks for F/EF-111 depot level maintenance.

27. **A-10 Aircraft Modification and Repair Facilities.** McClellan has the only comprehensive set of facilities and equipment in the world capable of performing all the required tasks for A-10 depot level maintenance.

28. **Air Force Ground Communications Electronics Overhaul and Repair Facilities.** McClellan has the only comprehensive set of facilities and equipment suites in the world that are capable of all depot level tasks required for ground communications and electronics.

29. **Instrument and Electronic Component Repair Capabilities.** McClellan is home to the largest, most modern, most comprehensive instrument and electronic component test and repair facilities and equipment suites in DoD.

30. **F/EF-111 and A-10 Avionics Integrated Support Facility (AISF).** McClellan has the only AISF for the F/EF-111 aircraft and the A-10 aircraft.

Ground Comm-Electronics Facility	This consists of 14 separate, fully equipped buildings (473K sq ft) used for test and repair of all AF Ground Communications-Electronics systems ranging from hand held radios to computer integrated radar systems. Some of the most complex ground-comm systems in the world are tested in these facilities. A list of unique "hot-mockups" used for the testing and repair is attached.	This set of facilities is required to perform test and repair of all AFF Ground Commuications-Electronics equipment. McClellan AFB is the only source of this capability in the Air Force.	There is no suitable alternative for this capability. SM-ALC is the only assigned Air Force source of repair for this workload.
Instrument and Electrical Components Test Facility	McClellan is home to the largest, most modern, most comprohensive Intrument and Electronic Component Repair Facility in the DoD This facility (90K sq ft) provides test and repair of a fill range of pressure, temperature, humidity and time measurement instruments; flight control and navigational instruments, and flight data cockpit recorders.	McClellan is the sole source for this capability in the Air Force. It is required to provide serviceable instruments and electrical components.	There is no alternative in existence today. SM-ALC is the only assigned Air Force source of repair for this workload.

Facilities and Equipage, continued

7. Buildings and Their Condition

7.1 List the buildings used to perform the depot maintenance functions by category code numbers (five or six digit CCNs), identifying their current condition (adequate, substandard, and inadequate) in Table 7.1 in thousands of square feet (KSF).

Table 7.1: **Facility Conditions**

CCN	Facility Type	Condition / Area (# KSF)			Comments
		Adequate	Substandard	Inadequate	
125977	PMP STN, LF	.17			
141763	TECH LAB	1.975		6.42	
141764	INTEGR SPT FCLTY	24.562			
141765	LAB, Q/C DEP	27.861			
211111	HG MAINT	50.7			
211116	HG, MAINT DEP	824.256			
211152	SHP ACFT GEN PURP	665.373	10.674		
211153	SHP NON-DESTR INSP	50.973			
211154	SHP A/M ORGL	351.866			
211159	ACFT COR CON	100.562			
211161	COR CON UTIL STOR	8.785			
211175	MAINT DOCK, M/A	154.128			
211179	MAINT DOCK, FL SYS	49.827	4.56		
211183	TST CELL		52.301		
211254	SHP ACFT & ENG DEP	235.398			
211271	SHP INSTM OVHL DEP	97.920			
214467	SHP, REFL VEH		1.672		
217735	SHP, ELCT O&T/D	540.333	5.333		
217736	SHP RADOM O&T/D	3.95			
218712	SHP A/SE STOR FCLTY	15.6	.8		

218852	SHP SURV EQUIP	4.143			
218868	LAB, PME	30.165			
310932	SC LAB AVIONICS	17.7			
442258	STOR LIQ OXYGEN	1.309			
610281	HQ CENTER	19.813			
610675	LOG FCLTY DEP OPS	62.022	6.196		
723392	SAN LATRINE	1.808			
811149	ELEC PWR STN BLDG	.336			
890123	AIR COND PLT BLDG	.437			
890136	CMPRS AIR PLT BLDG	1.698			
	Total	3343.67	81.536	6.42	**3431.626**

Facilities and Equipage, continued

7.2 In Table 7.2.a, identify space available for expansion by building type for those facility category code numbers (five or six digit CCNs) that are most important to your mission. An activity's expansion capability is a function of its ability to reconfigure/rehabilitate existing underutilized facilities to accept new or increased requirements.

Table 7.2.a: **Space Available for Expansion**

Building ID / Type	CCN	Installation Space (KSF)			Total
		Adequate	Substandard	Inadequate	
1048	211-152	32.0			32.0
1046	211-152	6.8			6.8
878	211-175	17.7			17.7
1022	211-173	12.0			12.0
1033	218-712	12.0			12.0
877	211-175	8.4			8.4
259	211-153	1.4			1.4
876	211-154	.8			.8
721	211-175	21.6			21.6
722	211-175	21.6			21.6
250L	610-675		21.6		21.6
1071	211-111		7.2		7.2
4	610-128	4.4			4.4
9	610-128	.5			.5
250K	442-758		34.2		34.2
250J	510-176		16.4		16.4
269H	610-675		21.6		21.6
922	721-315		25.7		25.7
355	610-675		15.0		15.0
1026	211-154		2.5		2.5
1042	171-212		.6		.6
1025	171-618		1.8		1.8
829	211-154		1.3		1.3
1016	141-753		3.2		3.2
1030	141-753		2.5		2.5
1017	141-753		4.4		4.4
335	610-675			9.2	9.2
339	610-675			8.7	8.7

639	217-735			1.4	1.4
628	141-763		109.0		109.0
338	171-618			1.8	1.8
607	141-764	1.4			1.4
608	141-764	1.4			1.4
609	141-764	1.4			1.4
606	141-764	1.4			1.4
458	141-764			14.6	14.6
381	141-764			1.4	1.4
6661	610-121	1.4			1.4
6662	610-121	1.4			1.4
6663	610-121	1.4			1.4
6664	610-121	1.4			1.4
1043	141-753	2.7			2.7
350	141-763			6.4	6.4
18	219-944		6.1		6.1
347	442-628			107.0	107.0
621	141-787			168.0	168.0
650	441-758			167.7	167.7
627	441-758			168.0	168.0
54	219-944			18.5	18.5
53	219-946			11.6	11.6
412	218-842			5.3	5.3
431	211-183			52.3	52.3
	Total	153.1	273.1	741.9	1168.1

Facilities and Equipage, continued

8. Unique and/or Peculiar Capabilities and Capacities

8.1 What unique and/or peculiar capabilities and capacities does the depot maintenance activity possess?

Depot Maintenance Capability/Capacity Describe Why Unique/Peculiar

1. **F-111 cold proof Facility.** An 8,500 square foot facility . An enclosed environmental chamber used for testing aircraft in a flight simulation environment. The F-111 aircraft is being tested in an environment of -42 degrees plus or minus 3 degrees with an aircraft wing gravitational equivalent force of approximately -3G to +7G. The purpose of the chamber is to detect catastrophic structural failures. The advanced/enhanced acoustic system in the chamber also detects secondary failures, such as popped rivets, broken bolts and cracked panels, within twelve inches of failure.

The acoustic system (Spartan 3000) is used to locate defects in the F-111 airframe structure during applied test loads. The system provides monitoring and a continuous record of audible sounds emitted by the airframe structure during test. These signals (which could be an indication of structural failure or significant deformation) are analyzed to determine the character and significance of the sound. Experience obtained from the testing of a number of aircraft has provided a basis for comparison of acoustic signal produced by each aircraft tested. Unusually large acoustic signals are analyzed to determine their signal origin.

The noises are picked up by sensors attached to the aircraft during structural loading. Noises common to every aircraft or from the wing fixture are zeroed out by program algorithms. Additional algorithms establish pre-determined time elapses between sensors to reduce echoes. Significant spikes are then triangulated to determine their source. Other NDI methods are used for post inspection.

The low temperature proof test facility is composed of an insulated weather protective building which houses an environmental test chamber, a pit area containing the test fixture located under the test chamber, a control room adjacent to the chamber and ancillary equipment, work space and storage area.

The environmental test chamber is 58 feet wide , 84 feet long and 24 feet high. Side bays extend out from each side of the test chamber to permit a forward sweep of the aircraft wings to 26 degrees. Two large roll-away doors admit the aircraft into the chamber. The chamber is insulated and sealed on the walls, floor, and ceiling. The floor insulation will support normal

pedestrian traffic and is removable in areas where a heavy load would cause crushing of the insulated panels. Pressure buildup within the environmental chamber during nitrogen vaporization and during chamber purging is regulated by an adjustable, automatic ceiling vent to the outside atmosphere. Six windows are located around the chamber walls to permit observation of the aircraft during testing. Also the chamber can be viewed by a closed circuit television system. Explosion proof lighting is provided for the test chamber.

The pit area is located under the environmental chamber and provides for installation, operation and maintenance of the test fixture. Also the pit provides for ground level roll in and installation of the aircraft on the test fixture. The pit is approximately in the shape of a cross with a maximum north- south internal dimension of 55.5 feet and east-west dimension of 74 feet. Average depth is nine feet. The pit can be entered by stairway.

The aircraft is attached to the fixture during wing loading. The test fixture is designed to test the F-111 aircraft at two wing sweep angles of 26 degrees and 54 degrees. A nose landing gear elevator is used to position the aircraft when pinning up the nose landing gear load assembly. The fixture design incorporates the use of energy absorbers and shear pins at critical points to prevent damage to the aircraft during loading.

The control room is attached to the outside of the environmental chamber. The control room contains the environmental control console, master test control console, computer, recording equipment and ancillary service equipment.

An ancillary weather enclosure houses the support equipment that includes the air compressor, hydraulic pumps, air dryer, and utilities.

The low temperature environment of -65 F and -40 F in the environmental chamber is provided by vaporizing liquid nitrogen in the test chamber. Liquid nitrogen (LN2) is stored in a 25,000 gallon storage tank and injected into the environmental chamber through atomizing nozzles into a duct system. The duct system includes two blowers which discharge the vaporized nitrogen gas to opposite ends of the environmental chamber. For fast warming of the environmental chamber heat is provided by two natural gas fired industrial heater units, each with a capacity of 2 million BTU/Hr. The airplane is structurally loaded by nine electro-hydraulic loading modules, one hydro-mechanical loading module.

Once loaded, the load control and data system and its associated equipment comprise a test system with computer control of the hydraulic actuators for stress testing of the F-111 air frame under both positive and negative G loading. The system performs data gathering automatically by scanning, digitizing and processing test data from load cells, potentiometer and strain gauges.

SM-ALC is the only DoD source of repair for thes F/EF-111 aircraft.

2. Comprehensive Integrated Process to Resolve Parts Obsolescence. The PWB (printed wire board) manufacturing area in LH directly supports the LRE (Logistics Retrofit Engineering) process by providing the PWBs for the iterative prototype operation. Typically LRE workload is in support of blackbox redesign or diminishing source hardware requirements. Redesign of the hardware to new configurations may require redefinition of written and graphical documentation, manufacture of PWBs and verification of performance characteristics in the Automatic Test Equipment (ATE) shop. The surface mount capability within the PWB shop is utilized in support of LRE workload.

The PWB shop is composed of circuit board manufacturing and assembly operations, including single, double and multi-layer, both through-hole and surface mount types. The shop, in addition to supporting LRE redesign, has its own workload supporting LH and multi-service activities. PWB workload is typically 50% Air Force, 32% Army, 7% Navy, 2% Air National Guard and 9% other customers. About 15% of the Air Force workload is in support of LRE. TI and LH have developed a cloning process whereby an image of an existing PWB can be reproduced onto a stable base film or mylar which can be used with fabrication data taken from the existing board to manufacture any number of PWBs with the same characteristics and dimensions as the original. The process has value when a contractor is no longer in business and original technical data are inadequate, cost prohibitive or no longer available. The shop also manufactures PWBs for the LRU/SRUs produced by the custom repair/manufacturing process, another solution to the parts obsolescence problem.

When a customer needs to replicate an existing LRU/SRU but has no technical data, the Custom Repair/Manufacturing area will reverse engineer the item, and either develop a reprocurement package or manufacture the unit. The documentation will be produced by the Technical Services area to include required engineering drawings (up to Level 3) and technical orders. These support packages are geared to field and/or depot level as necessary. PWB design, layout, circuit routing, drill path instructions, assembly drawings, parts lists and photo tools can all be provided to the PWB shop for manufacture. The newly manufactured PWB can be tested in the ATE area prior to being assembled into the LRU/SRU. Depending on requirements, the LRU/SRU may be tested in the Custom Repair/Manufacturing area or the ATE area.

The integrated approach to supporting parts obsolescence and sustaining weapon systems with electronics repair and manufacturing provides a synergistic benefit to the center. This is a unique capability within DOD; no other facility has incorporated these functions within its organization.

3. **Repair of Microwave Printed Wire Assemblies (PWAs).** Microwave PWAs associated with the PASS radar (a small, receive only space array) are being repaired utilizing the near field probe (ref. 6.1, 8.2). The microwave PWA repair capability is unique to DOD. No other installation has this capability.

4. **Hydraulic/Pneudraulic Component Repair (fluid driven).** This hydraulic repair capability is the most advanced facility of its kind in the world. It is the largest aircraft-related hydraulic and pneudraulic overhaul and repair capability in the DoD. The 185,000 sq ft new and modern facility has five separate hydraulic manifold systems with 4000 psi working pressure and 6000 proof psi and expansion capability to 8000 proof psi. There are 70 hydraulic test stands built by manufacturers such as Dayton T. Brown , Vickers, ACL Technologies, R.R. Textron, MOOG, Parker Hanifin, Greer, Weston, and Sprauge. Pump and motor test stands are 3000 psi with flow of 70 gallons per minute and regulated temperatures up to 240 degrees F. The facility has a controlled temperature and humidity, 300,000 class air particle environment as well as a 100,000 class metrology lab and 100,000 class laminar flow stations. There is also a computer operated mechanized material handling system, precision lapping equipment, and precision measuring equipment. It has highly skilled artisans with 21 different skills capable of providing complete "ground-up" rebuild and re-manufacture of components, and complete plating and machining support. Support can be provided for any pneudraulic component, whether ground equipment or aircraft. McClellan AFB is the sole source for this capability in the Air Force.

5. **Flow Grind Capability.** Precision match fitting/grinding and precision spool and sleeve grinding. Computer controlled/laser guided flow grinding machining to 0.000001 inch.

6. **Airborne Generator Rewind Capability for Flat & Rectangular Wire.** Rewind process for rotors, stators, coils, armatures, and exictors developed by Service Center of Excellence to reduce acquisition costs. Process has resulted in a 70% savings to the customer. McClellan is the sole DoD source of repair for flat wire rewind.

7. **A-10 and F-14 CADC Transducer.** The only capability within DOD to test and repair. McClellan is the sole DoD source of repair for this item.

8. **F-111 Radome Repair.** The only capability within the Air Force to test and repair F111 radomes. It is unique because it can test the Terrain Following Radar (TFR) and Attack Radar System. McClellan is the sole DoD source of repair for this item.

9. **Electro Optics Night Vision.** Image intensification, thermal imagery, and laser systems in a single facility. This is the only facility with three mission items in one area in DOD. Specific capabilities which are performed in no other service are as follows: Main Battle Tank Thermal Systems, Main Battle Tank Laser Systems, Ground Laser and Laser Designator Systems.

10. **Non-Destructive Inspection (NDI).** SM-ALC has the most comprehensive NDI capability in the defense industry. We have all the conventional processes at the state-of-the-art, including X-Ray, Ultrasound, Mag Particle, Dye Penetrant and Eddy Current. We offer Robotic and conventional applications to inspect entire aircraft as well as components. We have the ability to provide film, video, and real-time output products. The inclusion of the Neutron Radiography facility as a capacity or capability makes this facility entirely unique. The combination of so many NDI disciplines makes the SM-ALC operation the premier NDI facility in DoD.

11. **McClellan Nuclear Radiation Center (MNRC).** The MNRC is the only DoD industrial reactor and houses a 1 megawatt research type reactor. The facility was originally designed to perform neutron radiography of aircraft structures. That capacity has been expanded to include nuclear and space survivability and Air Force treaty verification support. The MNRC is the only reactor facility in the Air Force and provides multiple neutron output selections. The capability to perform both in-core irradiation's and neutron radiography at the same time provides the versatility to accomplish research and development projects simultaneously with the military mission. The research applications include the ability to study and evaluate the effects of nuclear radiation on electro-optic components and Neutron Capture Therapy research and development. The MNRC is the only DoD licensed source for providing Neutron Transmutation Doping for silicon use in the semiconductor industry. We are an authorized source under the Defense Production Act Title III Program for the purpose of expanding domestic production capacity and accelerating development in the semiconductor field.

Neutron radiography is extremely effective in detecting very low levels of hydrogen and corrosion. This facility, in concert with the adjacent NDI facility at SM-ALC, provides for the most complete and comprehensive NDI facility in the United States.

12. **Composite Demonstration Center (Blue Room).** Residing within TI is the USAF Advanced Composites Program Office. Their mission is the development and introduction of advanced composites technologies into the Air Force. This facility is unique to the Air Force because the technologies inserted into fielded weapons systems are not available elsewhere. They also provide production applications that are quickly transitioned to our manufacture/repair activity. This facility is capable of handling classified, low-observable technology applications. This facility handles classified. low-observable technology applications (e.g., F-117A).

13. **Injection Molding.** This capability is unique in that it is the largest facility of its kind in the DOD. The facility provides a test and development arena for the resolution of DOD problems relating to composites and plastics. The Sacramento Injection Molding Facility manufactures parts using up to twenty pounds of material on dies up to four feet square. The facility at OO-ALC is limited to the manufacture of parts containing no more than sixteen ounces of material on dies no more than sixteen inches square. Furthermore, the collocation of the Air Force

Composite Program Office with the Injection Molding Facility provides for a beneficial cooperative between Engineering and Production that does not exist elsewhere in DoD.

14. Optical Measurement System (OMS). The OMS is unique and peculiar to both DOD and the private sector. The capability provides for precise laser measurement (mapping) of a part. The data is digitized and processed so that it can be used to provide Numerical Control (NC) input. That NC input may include quality verification (Gold Part), analysis and prototyping function.

15. Communications Nodal Control Element (CNCE) (TSQ-111). Integrated Logistics Support Facility (ISF). Overhaul/parts repair and emergency assistance worldwide including software support. This is the only shop that supports worldwide CNCE requirements and depot level overhaul. DOD unique test equipment, test software, depot training, and depot tech data were designed for this system. They also serve as management tools for the Inventory Control Point function. SM-ALC is the sole DoD source of repair for this system.

16. Modular Control Equipment (MCE) (TYQ-23) Integrated Logistics Support Facility (ISF). Overhaul/parts repair and emergency assistance worldwide including software support. Designated Technical Repair Center for Air Force and Marine Corps TYQ-23 System. DOD unique test equipment, depot training, and depot tech data were designed for this system. They also serve as management tools for the Inventory Control point function. SM-ALC is the sole DoD source of repair for this system.

17. AN/FPS-117 and AN/FPS-118 Integrated Logistics Support Facility (ISF). Overhaul, repair modification testing of all six world-wide versions of this radar including software support. A wide variety of hardware and software test equipment and an operational radar designed specifically for the support of this system. DOD unique test equipment, test software, depot training, and depot tech data also serve as management tools for the Inventory Control Point function. SM-ALC is the sole DoD source of repair for this system.

18. Electronic Warfare (EW) Integrated Support Facility (ISF). Overhaul, repair and testing of 35 separate electronic combat subsystems that comprise the 806L System. This suite of test equipment was designed to support a number of EW systems and is continually modified to accommodate new or modified equipment in the field. They also serve as management tools for the Inventory Control Point function. SM-ALC is the sole DoD source of repair for this system.

19. Ground Wave Emergency Network (GWEN) Integrated Support Facility. Overhaul, parts repair and modification testing including software support. Test equipment was designed for GWEN and communication secret (COMSEC) requirements. SM-ALC is the sole DoD source of repair for this system.