DIRECT FIRE CAPABILITY

As of: 17 March 05

1. DEFINITION: A combination of the installation's dudded impact area size, available maneuver space and the largest direct-fire weapons system capability of an installation's range complex.

2. PURPOSE: Measures the ability of an installation's ranges and impact areas to support direct-fire weapons training. This measure places added military value to the ranges and impact areas that can be used to train larger direct-fire weapon systems.

3. SOURCE: Installation Capacity Data Call

4. METHODOLOGY:

a. The installation calculates the acreage of its dudded impact area as noted in the current training area regulations.

b. Using currently approved surface danger-zone diagrams; the installation reports the direct-fire weapon systems that can fire on specified ranges.

c. The installation calculates total acreage of maneuver space available. TABS uses this data to determine if there is sufficient maneuver land to accommodate the largest direct fire weapons system reported. If total maneuver space is greater than 20,000 acres and the installation possesses a direct fire weapons capability greater than 120mm, then TABS will assume that this installation has direct fire training capabilities.

d. TABS combines the data that is defined in 4a-c and calculates military value. From question 154 determine the largest direct fire weapon system reported by the installation: indicate whether the weapon system reported is: 1) <u>less than a .50 caliber</u>; 2) <u>equal to or greater than .50 caliber, but less that 120mm;</u> or 3) <u>is equal to or greater than 120mm</u>. From question 156, sum the total acres reported in column 3 by the installation for all dudded impact areas. From question 877, determine the total acreage of maneuver space available at the installation and indicate if the installation has sufficient maneuver land to support direct fire training capabilities; installation must possess greater than 20,000 acres in order to support direct fire training.

e. Leases receive 0 value for this attribute.

5. QUESTIONS THAT DEFINE DATA:

a. Dudded Impact Area – What is the size of the installations dudded impact area(s)? (DoD #156: Dudded Impact Area Acres)

b. Additional Live Fire Capacity – What direct fire weapons systems does the installation have the land capacity to accommodate live firing? (DoD #154)

c. Maneuver capability – How many total acres of maneuver land is available at the installation? (DoD #877)

6. REFERENCES: Installation Range Regulations, Army Range Inventory.

7. UNIT OF MEASURE: Thousands of acres, Type of weapon system.

8. EQUATION: N/A

9. MODEL REQUIREMENTS:

a. Model Inputs:

i. The size of the installation's dudded impact area, total maneuver space available and maximum weapon system capability is the model's three primary inputs.

ii. The largest value of 10 will be given to the installations with the largest contiguous impact area (>=30,000 acres) and the largest weapon system capability (>=120mm).

iii. The minimum value of "0" will be given to an installation if it does not have an adequate dudded impact area, sufficient maneuver space and firing capability. An installation with less than 20,000 acres of maneuver space will receive the minimum value.

iv. The below two-dimensional matrix has a Label for any combination that can exist for the value measure and an X if the combination cannot exist on an installation. Denote "Label 0" for installations with less than 20,000 acres of available maneuver space.

Labels			
Category (0)	**1**	**2**	**3**
Label (0)	**WEAPON SYSTEM CAPABILITY-Q#154**		
Dudded Impact Area (1000s ACRES)-Q#156	<= 50 Cal	> 50 Cal <120mm	>= 120mm
>0 and < = 10	Label 1	Label 2	Label 3
>10 and <= 30	Label 4	Label 5	Label 6
> = 30	Label 7	Label 8	Label 9

b. Value Function

i. The value function measures the returns to scale of the installation's largest contiguous impact area and weapon system capability and converts the raw data that TABS plots into the above matrix to determine military value for the installation.

ii. The assessment of the function is determined by TABS and coordinated with G3-TR.

iii. Assessment Results.

1. The table below illustrates the assessment's values, which consists of a series of pair-wise comparisons between the Labels, bases on a range from 1 to 9. A comparison of "1" indicates that preferences between the Labels are the same. A "9" indicates that the preference of one Label to another is extreme.

C.R. = 0.016	Label 0	Label 1	Label 2	Label 3	Label 4	Label 5	Label 6	Label 7	Label 8	Label 9
Label 0	0	0.50	0.33	0.25	0.33	0.25	0.17	0.20	0.14	0.11
Label 1	2	0.30	0.50	0.25	0.50	0.33	0.20	0.33	0.17	0.11
Label 2	3	2	1.03	0.50	1	0.50	0.25	0.50	0.25	0.17
Label 3	4	4	2	3.30	2	1	0.50	2	1	0.33
Label 4	3	2	1	0.50	1.17	0.50	0.33	0.50	0.33	0.20
Label 5	4	3	2	1	2	2.83	0.50	2	0.50	0.25
Label 6	6	5	4	2	3	2	5.95	2	2	0.50
Label 7	5	3	2	0.50	2	0.50	0.50	2.31	0.50	0.33
Label 8	7	6	4	1	3	2	0.50	2	4.85	0.50
Label 9	9	9	6	3	5	4	2	3	2	10

2. For example (refer to column 2 of the above matrix), the SME indicates that Label 9 (scores a 9) is *extremely* preferred over Label 1, and Label 6 (scores a 5) is *moderately* preferred over Label 1.

3. This has a consistency ratio (CR) of 0.016 that indicates that the pair-wise comparisons are *consistent* across all Labels. A CR 0.1 is considered adequate. For example, a consistent ranking between Labels would mean that if A > B and B > C then A > C. However, if A < C, then the ranking would be considered inconsistent.

4. The values associated with each Label are obtained from the previous assessment matrix by recording the values along the diagonal of the matrix. For ease of exposition, we show values for each Label in the following matrix:

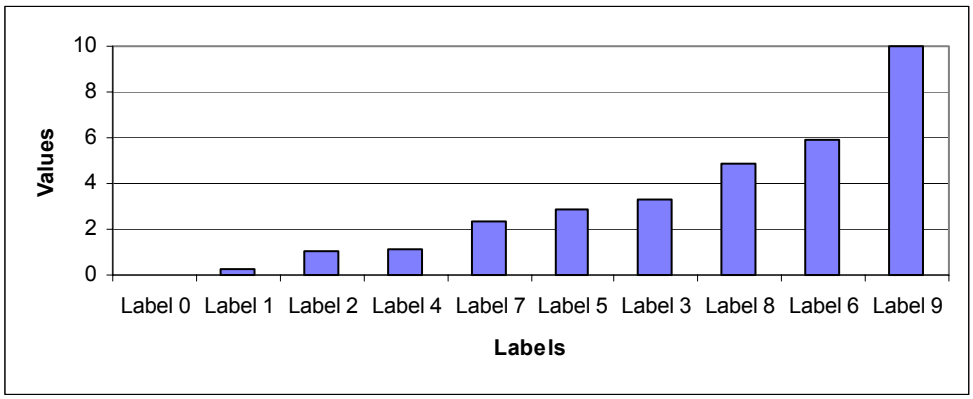
Labels			
Category (0)	**1**	**2**	**3**
Label (0)	**WEAPON SYSTEM CAPABILITY-Q#154**		
Dudded Impact Area (1000s ACRES)-Q#156	<= 50 Cal	> 50 Cal <120mm	>= 120mm
>0 and < = 10	0.30	1.03	3.30
>10 and <= 30	1.17	2.83	5.95
> = 30	2.31	4.85	10.00

c. Model Output

i. The above matrix represents the model's results (the diagonal of the assessment matrix). Most installations will have contiguous impact area and weapon system capability characteristics that fit into this matrix. If the installation's values do not fall on the matrix, it receives "0" value for this attribute.

ii. Raw scores are normalized on a scale of zero to ten based on the assessment results shown in the previous matrix.

iii. The histogram for the Value Function provides a graphical representation of the previous matrix. The military values shown in the following graph are ordered according to increasing value based on the assessment. The values show that there are several combinations for this attribute that have nearly the same military value.



DATA CALL QUESTIONS

DOD #154: Live Fire Ranges Used

Function(s): Additional Live Fire Capacity -
Question: Does the activity/installation (e.g. base) have the land capacity to accommodate firing of the listed weapon systems?
Column Headings for this question

Column names	Data Type	Source/Reference	Amplification
60mm Mortar (Yes/No)	Yes/No		
81mm Mortar (Yes/No)	Yes/No		
105mm Howitzer (Yes/No)	Yes/No		
155mm Howitzer (Yes/No)	Yes/No		
107mm Mortar (Yes/No)	Yes/No		
Multiple Launched Rocket System (MLRS) (Yes/No)	Yes/No		
SMAW (Yes/No)	Yes/No		
AT-4 (Yes/No)	Yes/No		
Javelin AT Missile (Yes/No)	Yes/No		
TOW AT Missile (Yes/No)	Yes/No		
2.75" Rocket (Yes/No)	Yes/No		
Hellfire Missile (Yes/No)	Yes/No		
20mm Helicopter Mounted Cannon (Yes/No)	Yes/No		
30mm Helicopter Cannon (Yes/No)	Yes/No		
105mm Tank Main Gun (Yes/No)	Yes/No		
120mm Tank Main Gun (Yes/No)	Yes/No		
25mm Ground Mounted Cannon (Yes/No)	Yes/No		
30mm Ground Mounted Cannon (Yes/No)	Yes/No		
MK19 40mm Grenade Launcher (Yes/No)	Yes/No		
50 Cal MG or Rifle (Yes/No)	Yes/No		
7.62mm MG or Rifle (Yes/No)	Yes/No		
5.56mm MG or Rifle (Yes/No)	Yes/No		
Patriot ADA Missile (Yes/No)	Yes/No		
Stinger ADA Missile (Yes/No)	Yes/No		

DOD #156: Live Fire Ground Ranges Used

Question: If your activity/installation (e.g., base) manages/schedules/controls any dudded impact areas complete the following table.
Amplification: Dudded Impact Area
Column Headings for this question

Column names	Data Type	Source/Reference	Amplification
Range or OPAREA (Text)	string50		
List Dudded Impact Areas (Text)	string120		
Total Acres (Acres)	numeric		
Specifiy Impact Area (Text)	string120		

DoD #877: Ranges

Question. At ___(Installation Name)__, there are _____ total acres usable for ground maneuver training.
Of this total:

_____ acres are useable for mounted (heavy) forces and
_____ acres are <u>not</u> useable for mounted (heavy) forces, but are useable for dismounted (light) forces <u>only</u>.

Note: Mounted (Heavy) Acres + Dismounted (Light) Only Acres = Total Acres

INDIRECT FIRE CAPABILITY

As of: 15 March 05

1. DEFINITION: A combination of stand off distance and the largest weapon system capability supported for indirect fire/non-line-of-sight weapons training.

2. PURPOSE: Measures the ability of the installation's ranges and impact areas to support indirect fire/non-line-of-sight weapons training.

3. SOURCE: Installation Capacity Data Call, MVA Data Call

4. METHODOLOGY:

a. The installation, using currently approved range diagrams and regulations, reports its indirect fire weapons/non-line-of-sight systems that can fire on specified ranges.

b. The installation reports the maximum distance (standoff) that each indirect fire weapon system can fire into the installation's impact area as defined in the current training area regulations.

c. TABS combines the data that is defined in 4a-b and calculates military value. Determine the largest indirect fire weapon systems as reported by the installation in question (#DoD801). The reported weapon system will be: 1) less than 120mm; 2) equal to 120mm but less than MLRS; 3) equal to MLRS; or 4) equal to Patriot. Determine the stand-off distance as reported in the same question in kilometers.

d. Leases receive 0 value for this attribute.

5. QUESTIONS THAT DEFINE DATA:

a. Additional Live Fire Capacity – What indirect fire weapons does the installation have the land capacity to accommodate live firing of the listed weapon systems? (DOD Question #154)

b. What is the maximum standoff distance for each indirect-fire weapon system that can fire in the installation's impact area? (DOD Question #801)

6. REFERENCES: Installation Range Regulations, Army Range Inventory.

7. UNIT OF MEASURE: Maximum distance a given weapon system can fire into the impact area (standoff) in kilometers, Caliber or type of weapon system.

8. EQUATION: N/A

9. MODEL REQUIREMENTS:

a. Model Inputs:

i. The installation's indirect fire capability, as measured by stand off and weapon's capability, is the model's primary input. Responses are organized into 4 categories for ease of reference. Each category denotes a combination of weapons system capabilities (Q#154) and maximum standoff distances (Q#801).

ii. The maximum value of 10 will be given to the installations with the largest standoff (>30 KM) and ability to fire the Patriot Missile.

Category	1	2	3	4
Label 0	WEAPON SYSTEM CAPABILITY (Q#154)			
STANDOFF (KM)-(Q#801)	<= 120 mm	> 120 mm	MLRS	Patriot
< = 10	Label 1	Label 2	Label 3	X
> 10 and <= 30	Label 4	Label 5	Label 6	Label 7
> 30	Label 8	Label 9	Label 10	Label 11

iii. The installation receives no value if indirect fire capability does not exist.

iv. The below two-dimensional matrix has a label for any combination of standoff and weapon system capability that exists on an installation.

b. Value Function

i. The value function is a representation of the military value of an installation's standoff and weapon system capability and converts the raw data that TABS plots into the above matrix to determine a military value for the installation.

ii. The assessment of the function is determined by TABS and coordinated with G3-TR.

iii. Assessment Results.

1. The table below illustrates the assessment's values, which consists of a series of pair-wise comparisons between the Labels, bases on a range from 0 to 11. A comparison of "1" indicates that preferences between the Labels are the same. A "11" indicates that the preference of one Label to another is extreme.

C.R. = 0.032	Label 0	Label 1	Label 2	Label 3	Label 4	Label 5	Label 6	Label 7	Label 8	Label 9	Label 10	Label 11
Label 0	0	0.50	0.33	0.25	0.50	0.33	0.25	0.20	0.33	0.25	0.20	0.17
Label 1	2	0.08	0.50	0.25	0.50	0.33	0.25	0.17	0.33	0.25	0.17	0.14
Label 2	3	2	1	0.50	2	0.50	1	0.25	0.50	0.33	0.25	0.20
Label 3	4	4	2	2.22	2	1	0.50	0.33	3	1	0.333	0.25
Label 4	2	2	0.5	0.50	0.50	0.5	0.33	0.25	0.5	0.33	0.25	0.17
Label 5	3	3	2	1	2	1.70	0.50	0.33	2	0.5	0.333	0.20
Label 6	4	4	1	2	3	2	3.03	0.50	3	1	0.5	0.33
Label 7	5	6	4	3	4	3	2	5.42	3	2	1	0.33
Label 8	3	3	2	0.33	2	0.50	0.33	0.33	1.25	0.50	0.33	0.25
Label 9	4	4	3	1	3	2	1	0.5	2	2.92	0.5	0.33
Label 10	5	6	4	3	4	3	2	1	3	2	5.42	0.33
Label 11	6	7	5	4	6	5	3	3	4	3	3	10

2. For example (refer to the above matrix), the SME indicates that Label 11 (scores a 7) is near *extremely* preferred over Label 1, and Label 6 is *moderately* preferred over Label 1 (scores a 4).

3. This has a consistency ratio (CR) of 0.032 that indicates that the pair-wise comparisons are *consistent* across all Labels. A CR 0.1 is considered adequate. For example, a consistent ranking between Labels would mean that if A > B and B > C then A > C.

However, if A < C, then the ranking would be considered inconsistent.

4. The values associated with each Label are obtained from the assessment matrix by recording the values along the diagonal of the matrix. For ease of exposition, we show values for each Label in the following matrix:

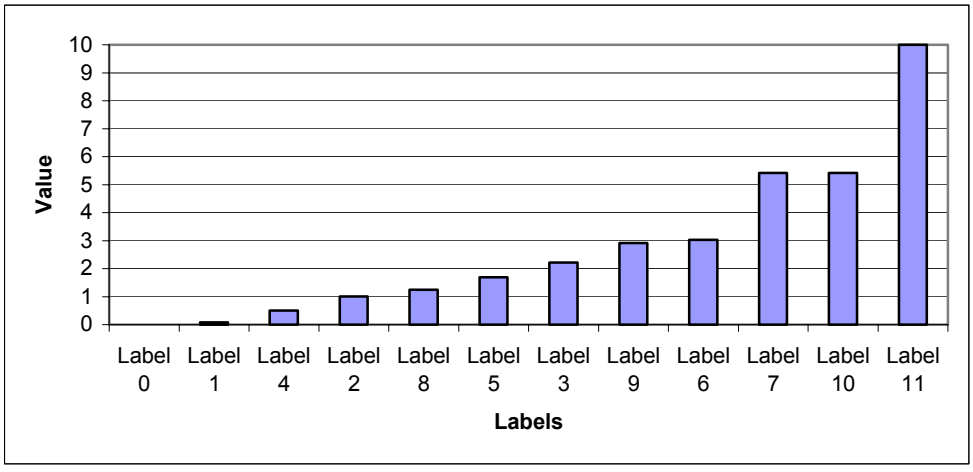
Category	1	2	3	4
Label 0	WEAPON SYSTEM CAPABILITY (Q#154)			
STANDOFF (KM)-(Q#801)	**<= 120 mm**	**> 120 mm**	**MLRS**	**Patriot**
< = 10	0.08	1.00	2.22	N/A
> 10 and <= 30	0.50	1.70	3.03	5.42
> 30	1.25	2.92	5.42	10.00

c. Model Output

i. The above matrix represents the model's results (the diagonal of the assessment matrix). Most installations will have standoff and weapon systems capability characteristics that will fit into this matrix. If the installation's values do not fall on the matrix, it receives "0" value for this attribute.

ii. Raw scores are normalized on a scale of zero to ten based on assessment results shown in the previous matrix.

iii. The histogram for the Value Function provides a graphical representation of the previous matrix. The military values shown in the following graph are ordered according to increasing value based on the assessment. The values show that there are several combinations for this attribute that have nearly the same military value.



DATA CALL QUESTIONS

DOD #154: Live Fire Ranges Used
Function(s): Additional Live Fire Capacity -
Question: Does the activity/installation (e.g. base) have the land capacity to accommodate firing of the listed weapon systems?
Column Headings for this question

Column names	Data Type	Source/Reference	Amplification
60mm Mortar (Yes/No)	Yes/No		
81mm Mortar (Yes/No)	Yes/No		
105mm Howitzer (Yes/No)	Yes/No		
155mm Howitzer (Yes/No)	Yes/No		
107mm Mortar (Yes/No)	Yes/No		
Multiple Launched Rocket System (MLRS) (Yes/No)	Yes/No		
SMAW (Yes/No)	Yes/No		
AT-4 (Yes/No)	Yes/No		
Javelin AT Missile (Yes/No)	Yes/No		
TOW AT Missile (Yes/No)	Yes/No		
2.75" Rocket (Yes/No)	Yes/No		
Hellfire Missile (Yes/No)	Yes/No		
20mm Helicopter Mounted Cannon (Yes/No)	Yes/No		
30mm Helicopter Cannon (Yes/No)	Yes/No		
105mm Tank Main Gun (Yes/No)	Yes/No		
120mm Tank Main Gun (Yes/No)	Yes/No		
25mm Ground Mounted Cannon (Yes/No)	Yes/No		
30mm Ground Mounted Cannon (Yes/No)	Yes/No		
MK19 40mm Grenade Launcher (Yes/No)	Yes/No		
50 Cal MG or Rifle (Yes/No)	Yes/No		
7.62mm MG or Rifle (Yes/No)	Yes/No		
5.56mm MG or Rifle (Yes/No)	Yes/No		
Patriot ADA Missile (Yes/No)	Yes/No		
Stinger ADA Missile (Yes/No)	Yes/No		

DOD #801: Standoff distance indirect-fire weapon systems
Function(s): Indirect Fire Capability
Question: What is the maximum standoff distance for each indirect-fire weapon system that can fire in the installation's impact area ?
Amplification: The installation, using currently approved range diagrams and regulations, reports its indirect fire weapons/non-line-of-sight systems that can fire on specified ranges. If the installation impact area cannot support a weapon system, enter zero.
Check here if this question is Not Applicable (N/A): ☐
Please fill in the following table(s)

Standoff Distance	81mm Mortar (KM) numeric	120mm Mortar (KM) numeric	105mm Howitzer (KM) numeric	155mm Howitzer (KM) numeric	MLRS (KM) numeric	Patriot ADA Missile (KM) numeric
Indirect-fire weapon systems						

MILITARY OPERATIONS IN URBAN TERRAIN (MOUT)

As of: 16 March 05

1. DEFINITION: A combination of the size in acres of the facility and the quality of the buildings associated with the training site(s).

2. PURPOSE: Determines the installation's ability to support MOUT training.

3. SOURCE: Installation Capacity Data Call

4. METHODOLOGY:

a. The installation calculates its MOUT facilities in acres. A MOUT facility can be counted when the area is easily accessible to the installation and commonly used for training. MOUT facilities acreage will include only land used for MOUT training areas. Impact areas, cantonment areas, ranges, off-limits areas, and environmentally sensitive areas that are considered unusable will not be included.

b. Determine the total MOUT acreage by summing the acres reported by the installation for each MOUT site in question #144, column 7. Determine the number of buildings by summing the number reported by the installation for each MOUT site in question #144, column 6. Provide labels to denote the combinations of building categories (*see 4.c*) and MOUT facility size in acres. Label definitions are provided in sections *a.iv* and *b.ii*.

c. Determine the quality of the buildings associated with the MOUT facilities by measuring the number of associated buildings, the percentage of instrumentation among the facilities and the type of construction. An installation will fit into the highest category where it satisfies all characteristics. The following defines each category:

- **Category A:** Less than 8 buildings, no instrumentation, temporary construction.
- **Category B:** At least 8 but less than 16 buildings, less than 50% instrumented, some temporary construction.
- **Category C:** At least 16 buildings, greater than or equal to 50% instrumented, at least 50% permanent construction.

d. TABS combine the data that is defined in 4 a-c and calculated the military value

e. Leases receive 0 value for this attribute.

5. QUESTIONS THAT DEFINE DATA:

If the activity/installation manages/controls any MOUT training/testing/operational ranges or other full-scale mockup facilities, complete the following table: .1: Identification; .2: MILCON or Permanent Facility; 3: Troop Project or Temporary Facility; 4: Instrumented; 6: Number of buildings; .7: Number of acres. (DoD #144)

6. REFERENCES: Installation Range Regulations, Army Range Inventory.

7. UNIT OF MEASURE: Acres, Building Category.

8. EQUATION: N/A

9. MODEL REQUIREMENTS:

a. Model Inputs:

i. The installation's MOUT facility size and its building category are the models two primary inputs.

ii. The maximum value of 10 will be given to the installations with building category C and >20 acres of land associated with their MOUT site.

iii. The installation receives no value if they do not have MOUT facilities.

iv. The below two-dimensional matrix has a label for any combination of building category and MOUT facility size in acres that exists on an installation.

Label 0	**Bldg. Category**		
Size of MOUT Facilities	**Category A <8**	**Category B >=8 and<16**	**Category C ≥ 16**
<20 Acres	Label 1	Label 2	Label 3
>=20 and < =50 Acres	Label 4	Label 5	Label 6
>50 Acres	Label 7	Label 8	Label 9

b. Value Function

i. The value function measures the returns to scale of the attribute's score and returns the value of an installation's facilities. The assessment of the function is determined by TABS and coordinated with G3-TR.

ii. Assessment Results.

1. The table below illustrates the assessment's values, which consists of a series of pair-wise comparisons between the Labels, based on a range from 1 to 9. A comparison of "1" indicates that preferences between the Labels are the same. A "9" indicates that the preference of one Label to another is extreme.

C.R. = 0.032	Label 0	Label 1	Label 2	Label 3	Label 4	Label 5	Label 6	Label 7	Label 8	Label 9
Label 0	0	0.33	0.25	0.20	0.50	0.33	0.20	0.33	0.25	0.17
Label 1	3	0.23	0.50	0.33	0.33	0.25	0.17	0.33	0.20	0.14
Label 2	4	2	0.95	0.50	1.00	0.33	0.25	0.50	0.25	0.17
Label 3	5	3	2	2.12	2.00	1.00	0.33	0.50	0.33	0.20
Label 4	2	3	1	0.50	1.08	0.50	0.33	0.50	0.33	0.20
Label 5	3	4	3	1	2	2.77	0.50	1.00	0.50	0.33
Label 6	5	6	4	3	3	2	5.80	2.00	1.00	0.50
Label 7	3	3	2	2	2	1	0.50	2.76	0.50	0.33
Label 8	4	5	4	3	3	2	1	2	5.57	0.50
Label 9	6	7	6	5	5	3	2	3	2	10

2. For example (refer to column 3 of the matrix), the SME indicates that Label 9 is *highly preferred* (scores a 7) over Label 1, and Label 8 is *moderately* (scores a 5) over Label 1.

3. This has a consistency ratio (CR) of 0.032 that indicates that the pair-wise comparisons are *consistent* across all Labels. A CR 0.1 is

considered adequate. For example, a consistent ranking between Labels would mean that if A > B and B > C then A > C. However, if A < C, then the ranking would be considered inconsistent.

4. The values associated with each Label are obtained from the assessment matrix by recording the values along the diagonal of the matrix. For ease of exposition, we show values for each Label in the following matrix:

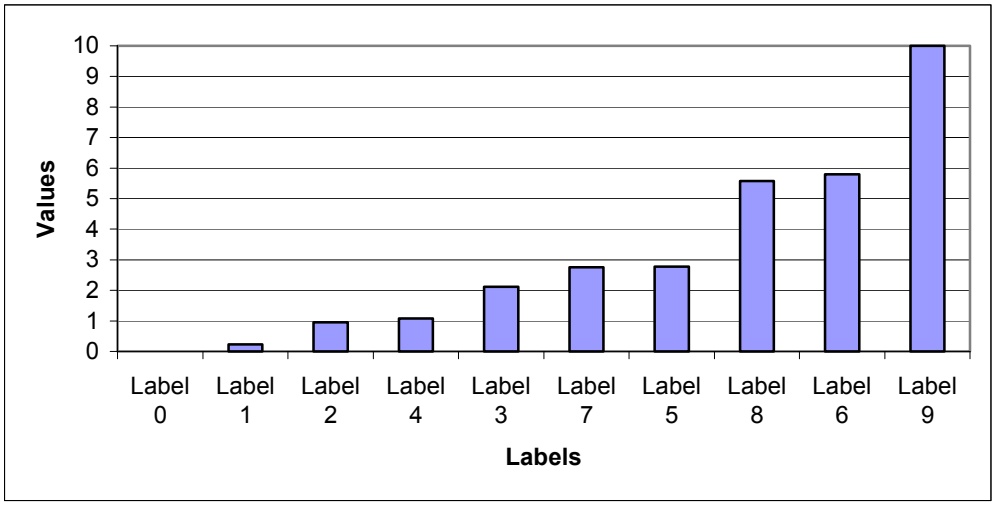
Label 0	Bldg. Category		
Size of MOUT Facilities	**Category A <8**	**Category B >=8 and<16**	**Category C ≥ 16**
<20 Acres	0.23	0.95	2.12
>=20 and < =50 Acres	1.08	2.77	5.8
>50 Acres	2.76	5.57	10

c. Model Outputs

i. Raw scores are normalized on a scale of zero to ten based on the assessment results shown in the previous matrix. Some installations will have MOUT facilities that fit into the matrix. If an installation does not, it receives a "0" value for this attribute.

ii. The histogram for the Value Function gives a graphical representation of the previous matrix. The Labels shown in the following graph are ordered according to increasing value based on the assessment.

iii. The histogram for the Value Function provides a graphical representation of the previous matrix. The military values shown in the following graph are ordered according to increasing value based on the assessment. The values show that there are several combinations for this attribute that have nearly the same military value.



DATA CALL QUESTION

DOD #144: Military Operations in Urban Terrain (MOUT) Ranges or Facilities Used

Question: If the activity /installation manages/controls any Military Operations in Urban Terrain (MOUT) training/testing/operational ranges or other full-scale mockup facilities, complete the following table.
Amplification: IVT EQUIVALENCY: Active/inactive range complex boundaries are being provided by the Services and depicted in the Installation Visualization Tool (IVT). The outermost extent of ranges or range complexes is being depicted; internal land uses and designations within range/range complexes are not being shown in IVT. Consider the range boundaries depicted in IVT when responding.

Check here if this question is not applicable (N/A): ☐

Please fill in the following table(s), adding rows as necessary

Identify MOUT Sites (Text)	MILCON or Permanent Facility (Yes/No)	Troop Project or Temporary Facility (Yes/No)	Instrumented (Cameras, AAR, Facility, etc.) (Yes/No)	Live Fire Capable - Service or Training Ammo (Yes/No)	Number of Buildings (Text)	Number of Acres (Acres)	Unit Size Supportable (Text)	# Pers using MOUT or Facility for training FY 01-03 Man-days (Day)

HEAVY MANEUVER AREA

As of: 16 March 05

1. DEFINITION: A combination of the installation's total acreage and the largest contiguous acreage for training of mechanized formations.

2. PURPOSE: Determines the installation's ability to support training and maneuver of mechanized forces. This attribute adds military value for larger contiguous areas within the overall training area.

3. SOURCE: Installation MVA Data Call

4. METHODOLOGY:

a. The installation calculates the size of their installation's heavy maneuver area as defined in the current training area regulations. A maneuver-rights area can be counted when the area is principally scheduled and commonly used by units assigned to the installation for training large, mechanized formations.

b. Maneuver acreage will include only land routinely used as maneuver and training areas. Impact areas, cantonment areas, ranges, off limits areas, and environmentally sensitive areas that are considered encumbered will not be included.

c. The installation will report the largest contiguous heavy maneuver area, which is the largest area capable of supporting heavy maneuver that is not intersected by major obstacles such as roads, highways, designated environmental areas, bodies of water, wetlands or swamps.

d. TABS combines the data that is defined in 4 a-c and calculates the military value. Determine the total heavy maneuver acres available from question #877 as reported by the installation. Determine the largest contiguous maneuver area as reported by the installation in question (DoD #802).

e. Leases receive 0 value for this attribute.

5. QUESTIONS THAT DEFINE DATA:

a. If the installation manages or controls ground maneuver areas for training, provide the net acreage available for ground maneuver training. (DoD #877)

b. What is the acreage of the installation's largest contiguous heavy maneuver area? (DoD #802)

6. REFERENCES: Installation Range Regulations, Army Range Inventory

7. UNIT OF MEASURE: Thousands of acres

8. EQUATION: N/A

9. MODEL REQUIREMENTS:

a. Model Inputs:

i. The installation's heavy maneuver area and the largest contiguous heavy maneuver area are the model's two primary inputs.
ii. The maximum value of 10 will be given to the installations with the largest contiguous area (>100,000 square acres) and the largest number of heavy maneuver acres (>100,000 acres).
iii. The minimum value of 0 will be given to an installation if it does not have any heavy maneuver land.
iv. The below two-dimensional matrix has a Label for any combination that can exist for the value measure and an X if the combination cannot exist on an installation.

Label 0	TOTAL HVY MVR AREA (1000s ACRES)			
Largest Contiguous Area (1000s)	<=10	>10 and <=50	>50 and <= 100	>100
< = 10	Label 1	Label 2	Label 3	Label 4
>10 and < = 50	X	Label 5	Label 6	Label 7
>50 and < = 100	X	X	Label 8	Label 9
>100	X	X	X	Label 10

b. Value Function

i. The value function is a representation of the military value of an installation's heavy maneuver acres and converts the raw data that TABS plots into the above matrix to determine a military value for the installation.

ii. The assessment of the function is determined by TABS and coordinated with G3-TR.

iii. Assessment Results.

1. The table below illustrates the assessment's values, which consist of a series of pair-wise comparisons between the different Labels defined in the above matrix (range from 1 to 9). Comparison of "1" indicates that the preferences are equal between the Labels and a "9" indicates that the preference of one Label to another is extreme.

C.R. = 0.016	Label 0	Label 1	Label 2	Label 3	Label 4	Label 5	Label 6	Label 7	Label 8	Label 9	Label 10
Label 0	0	0.5	0.5	0.333	0.333	0.333	0.25	0.2	0.167	0.143	0.111
Label 1	2	0.075	0.5	0.5	0.333	0.25	0.2	0.167	0.143	0.125	0.111
Label 2	2	2	0.229	0.5	0.333	0.25	0.2	0.167	0.143	0.125	0.111
Label 3	3	2	2	1.347	1	0.5	0.5	0.333	0.333	0.25	0.2
Label 4	3	3	3	1	1.951	1	0.5	0.5	0.333	0.333	0.25
Label 5	3	4	4	2	1	3.199	1	1	0.5	0.5	0.333
Label 6	4	5	5	2	2	1	4.248	1	1	0.5	0.5
Label 7	5	6	6	3	2	1	1	5.146	1	1	0.5
Label 8	6	7	7	3	3	2	1	1	6.091	1	0.5
Label 9	7	8	8	4	3	2	2	1	1	7.567	1
Label 10	9	9	9	5	4	3	2	2	2	1	10

2. The assessment converts the pair-wise comparisons into the value that an installation will receive for meeting a level of contiguous area and maneuver area.
3. For example (refer to the grey cells in column 2 of the below matrix), the SME indicates that Label 10 (scores a 9) is *extremely* preferred over Label 1, and Label 6 is *moderately* preferred (scores a 5) over Label 1.
4. The above matrix has a consistency ratio (CR) of 0.016 that indicates that the pair-wise comparisons are *consistent* across all Labels. A CR < 0.1 is considered adequate. For example, a consistent ranking between Labels would mean that if A > B and B > C then A > C. However, if A < C, then the ranking would be considered inconsistent.

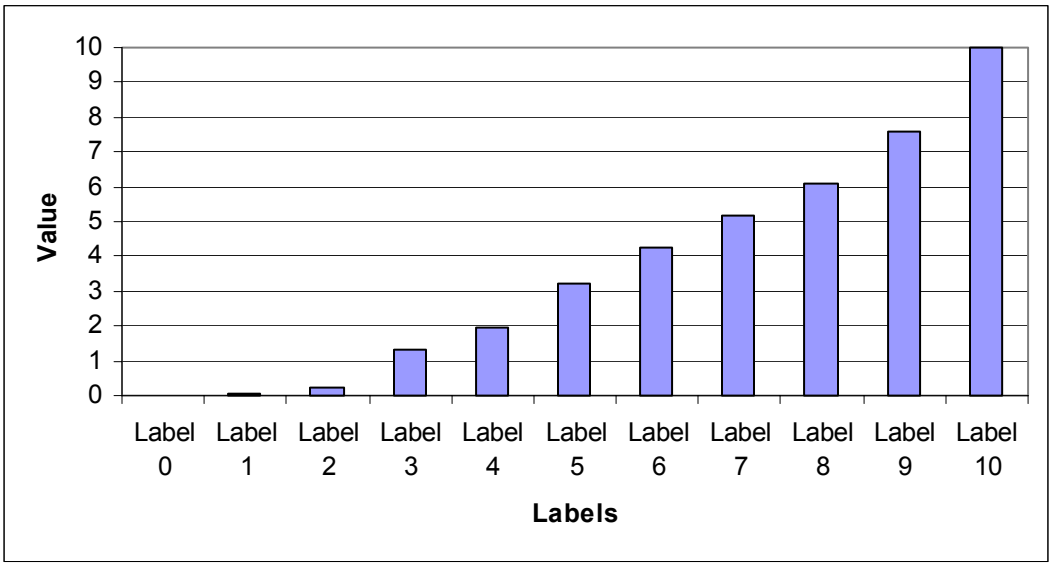
Label 0	**TOTAL HVY MVR AREA (1000s ACRES)-Q#877**			
Largest Contiguous Area (1000s Acres)-Q#802	<=10	>10 and <=50	>50 and <= 100	>100
< = 10	0.08	0.23	1.35	1.95
>10 and < = 50	X	3.20	4.25	5.15
>50 and < = 100	X	X	6.09	7.57
>100	X	X	X	10

c. Model Outputs

i. The above matrix represents the model's results (the diagonal of the assessment matrix). Most installations will have maneuver lands and contiguous space characteristics that fit into this matrix. If the installation's values do not fall on the matrix, it receives "0" value for this attribute.

ii. The raw scores were normalized on a scale of zero to ten based on the pair-wise assessment results.

iii. The histogram for the Value Function provides a graphical representation of the previous matrix. The military values shown in the following graph are ordered according to increasing value based on the assessment. The values show that there are several combinations for this attribute that have nearly the same military value and that there is an increasingly higher military value given for attaining a higher level within the matrix.



DATA CALL QUESTIONS

DOD #802: Contiguous Maneuver Area

Function(s): Heavy Maneuver Area

Question: What is the acreage of the installation's largest contiguous heavy maneuver area ?

Amplification:

A. The installation calculates the size of their installation's heavy maneuver area as defined in the current training area regulations. A maneuver-rights area can be counted when the area is principally scheduled and commonly used by units assigned to the installation for training large, mechanized formations.

B. Maneuver acreage will include only land routinely used as maneuver and training areas. Impact areas, cantonment areas, ranges, off limits areas, and environmentally sensitive areas that are considered unencumbered will not be included.

C. Report the largest contiguous heavy maneuver area, capable of supporting heavy maneuver and is not intersected by major obstacles such as roads, highways, designated environmental areas, bodies of water, wetlands or swamps.

Check here if this question is Not Applicable (N/A): ☐

This question requires a single answer with units of Acres.

Army Question 877: Ground Maneuver Training

Question. At ___(Installation Name)__, there are _____ total acres usable for ground maneuver training.

Of this total:

_____ acres are useable for mounted (heavy) forces and

_____ acres are not useable for mounted (heavy) forces, but are useable for dismounted (light) forces only.

Note: Mounted (Heavy) Acres + Dismounted (Light) Only Acres = Total Acres

LIGHT MANEUVER AREA

As of: 18 March 05

1. DEFINITION: The acreage of the installation available for the maneuver and training of light formations.

2. PURPOSE: Measures the installation's ability to support training of light forces.

3. SOURCE: Installation Capacity Data Call

4. METHODOLOGY:

a. The installation calculates the acreage of their light maneuver area as noted on the current training area regulations. A maneuver rights area can be counted when the area is controlled or primarily scheduled and commonly used for training purposes by units assigned to the installation.

b. Maneuver acreage will include only land used as maneuver and training areas. Impact areas, cantonment areas, ranges, off limits areas, and environmentally sensitive areas that are considered encumbered will not be included.

c. TABS will calculate the MV of this attribute using the responses defined in 4a-b.

d. Leases receive 0 value for this attribute.

5. QUESTIONS THAT DEFINE DATA:

What is the installation's total light maneuver acreage? (MVA Question #877)

6. REFERENCES: Installation Range Regulations, Army Range Inventory

7. UNIT OF MEASURE: Thousands of acres

8. EQUATION: N/A

9. MODEL REQUIREMENTS:

a. Model Input:

The model's primary input is the installation's unencumbered Light Maneuver Land in thousands of acres.

b. Value Function Assessment

i. The value function converts the installation's Light Maneuver acres into military value.

ii. The value function uses a single equation that measures the returns to scale of the attribute's score and returns the value of the installation's acreage. The curvature of the function is determined by TABS and coordinated with G3/TRADOC SMEs.

iii. The maximum value of 10 is given to the installation with greater than 100,000 Light Maneuver acres.

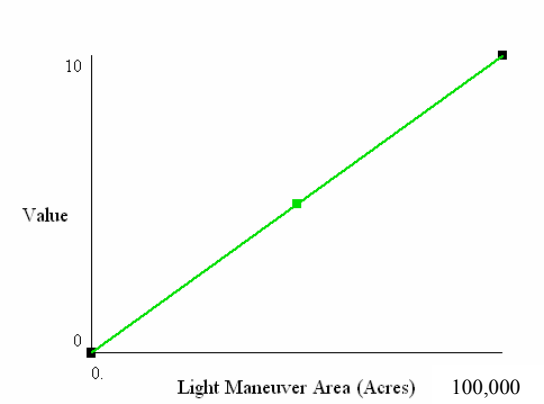
iv. The minimum value of 0 is given for a score of 0, indicating that an installation does not have any light maneuver acres.

c. Value Function Output

i. The value function provides the military value of the installation with regards to its ability to support the training of light forces as measured by light maneuver acreage.

ii. Scores are normalized on a scale of zero to ten based on the curvature of the value function.

iii. This value function shows a linear relationship, which equates to constant returns to scale. The function implies that the next acre of light maneuver land is worth the same as the prior acre.



DATA CALL QUESTION

Army Question 877: Ground Maneuver Training

Question. At ___(Installation Name)__, there are _____ total acres usable for ground maneuver training.

Of this total:

_____ acres are useable for mounted (heavy) forces and

_____ acres are not useable for mounted (heavy) forces, but are useable for dismounted (light) forces only.

Note: Mounted (Heavy) Acres + Dismounted (Light) Only Acres = Total Acres

AIRSPACE

As of: 16 March 04

1. DEFINITION: A combination of the altitude of the airspace available for training that is a part of or controlled by the installation and the size of the associated ground footprint.

2. PURPOSE: Measures the ability of the joint airspace controlled by the installation, including areas associated with a maneuver rights agreement, to support training.

3. SOURCE: Installation Capacity Data Call

4. METHODOLOGY:

a. The installation reports the feet above ground level (AGL) of the airspace and the associated ground footprint in square nautical miles as noted in the current training area regulations. A maneuver rights area can be counted when the area is easily accessible to the installation and commonly used for aviation-type training.

b. The installation determines the ground footprint in square miles of useable airspace associated with the given altitudes.

c. Ground footprint will include only land used as Military Operational Areas (MOA). Areas that cannot be over flown including, restricted impact areas, cantonment areas, ranges, off-limits areas, and environmentally sensitive areas will not be included.

d. TABS combines the data that is defined in 4a-c and calculates military value. Determine the total ground shadow of the installation's airspace by summing the total of each separate parcel of airspace in square miles as reported in question #160, column 5. Determine the max or higher published altitude as reported by the installation in question #160, column 7.

e. Leases receive 0 value for this attribute.

5. QUESTIONS THAT DEFINE DATA:

If the installation is responsible for any airspace, list and identify each piece of airspace. Use only official names as published. The standard nomenclature for the airspace is its "published name" as it exists in FLIP or FAA Letter of Agreement. For instance "Owyhee MOA," "R-4816S," "W-177A." #160.1: Identification. #160.2: Area in square miles. #160.3-4: Lower and higher published altitudes. (Note: OSD #160 is the base question and each extension, e.g. #160.1 is a sub element of the main question.)

6. REFERENCES: Installation Range Regulations, Army Airspace Master Plan.

7. UNIT OF MEASURE: Square nautical miles and altitude (FT AGL).

8. EQUATION: N/A

9. MODEL REQUIREMENTS:

a. Model Inputs:

i. The installation's airspace altitude in feet Above Ground Level (FT AGL) and ground footprint in square miles are the model's two primary inputs.

ii. The maximum value of 10 will be given to the installations with the greatest AGL (>=20,000 FT AGL) and largest contiguous ground footprint (greater than 100 square miles)

iii. The minimum value of "0" will be given if the installation does not control airspace available for military flight training.

Category	1	2	3
Label 0	Airspace (FT AGL)-Higher Published Altitude		
Ground Footprint (SQ MI)	< 5000	< 20000	>=20000
> 0 and < = 25	Label 1	Label 2	Label 3
25< and< = 100	Label 4	Label 5	Label 6
> 100	Label 7	Label 8	Label 9

iv. The below two-dimensional matrix has a Label for any combination that can exist for the value measure and an X if the combination cannot exist on an installation.

b. Value Function.

i. The value function is a representation of the military value of an installation's airspace and converts the raw data that TABS plots into the above matrix to determine the military value for the installation.

ii. The assessment of the function is determined by TABS and coordinated with G3-TR.

iii. Assessment Results.

1. The table below illustrates the assessment values, which consists of a series of pair-wise comparisons between the Labels, bases on a range from 1 to 9. A comparison of "1" indicates that preferences between the Labels are the same. A "9" indicates that the preference of one Label to another is extreme.

C.R. = 0.014	Label 0	Label 1	Label 2	Label 3	Label 4	Label 5	Label 6	Label 7	Label 8	Label 9
Label 0	0	0.50	0.33	0.25	0.50	0.25	0.20	0.33	0.20	0.14
Label 1	2	0.26	0.50	0.33	0.50	0.33	0.20	0.33	0.20	0.14
Label 2	3	2	1.01	0.50	1.00	0.50	0.33	0.50	0.25	0.17
Label 3	4	3	2	2.24	2.00	1.00	0.50	0.50	0.33	0.25
Label 4	2	2	1	0.50	1.00	0.50	0.33	0.50	0.33	0.20
Label 5	4	3	2	1	2	2.63	0.50	1.00	0.50	0.33
Label 6	5	5	3	2	3	2	5.30	2.00	1.00	0.50
Label 7	3	3	2	2	2	1	0.50	2.85	0.50	0.33
Label 8	5	5	4	3	3	2	1	2	5.82	0.50
Label 9	7	7	6	4	5	3	2	3	2	10

2. For example (refer to column 2 of the matrix), the SME indicates that Label 9 (scores a 7) is *extremely* preferred over Label 1, and Label 6 (scores a 5) is *moderately* preferred over Label 1.
3. This has a consistency ratio (CR) of 0.014 that indicates that the pair-wise comparisons are *consistent* across all Labels. A CR 0.1 is considered adequate. For example, a consistent ranking between Labels would mean that if A > B and B > C then A > C. However, if A < C, then the ranking would be considered inconsistent.
4. The values associated with each Label are obtained from the previous assessment matrix by recording the values along the diagonal of the matrix. For ease of exposition, we show values for each Label in the following matrix:

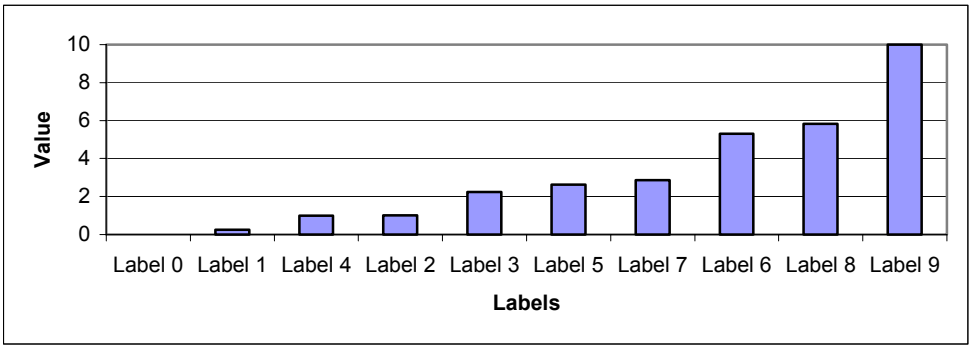
Category	1	2	3
Label 0	Airspace (FT AGL)-Higher Published Altitude		
Ground Footprint (SQ MI)	< 5000	< 20000	>=20000
> 0 and < = 25	0.26	1.01	2.24
25< and< = 100	1.00	2.63	5.30
> 100	2.85	5.82	10.00

c. Model Outputs

i. The above matrix represents the model's results (the diagonal of the assessment matrix). Most installations will have airspace characteristics that fit into this matrix. If the installation's values do not fall on the matrix, it receives "0" value for this attribute.

ii. The raw scores were normalized on a scale of zero to ten based on the pair-wise assessment results.

iii. The histogram for the Value Function provides a graphical representation of the previous matrix. The military values shown in the following graph are ordered according to increasing value based on the assessment. The values show that there are several combinations for this attribute that have nearly the same military value.



DATA CALL QUESTION

DOD #160: Airspace Attributes

Question: If the activity is responsible for any airspace, list and identify each piece of airspace in the table provided below. Use only official names as published. The standard nomenclature for the airspace is its "published name" as it exists in FLIP or FAA Letter of Agreement. For instance "Owyhee MOA," "R-4816S," "W-177A."
Source / Reference: Local supplement to AFI 13-212 (or Service equivalent of the "Range Guide"), Special Order 7400.8 and AP/1A, EIS, agreements with FAA
Amplification: When answering these questions, include all of the following: Special Use Airspace (Restricted/Alert/Warning/Military Operating Area/Prohibited Area) and Airspace for Special Use (ATCAA/LATN/MTR/AR) AND SIMILAR AREAS. List and identify each unit of airspace in accordance with DOD flight information publications and/or local/regional publications and FAA letters of agreements.
-Prevailing terrain elevation is the average minimum safe altitude from standard NIMA charts. Take all sections that are approximately 50% or greater in the area, add them all together, divide by the total number of entries and subtract 1000'. This is your "prevailing terrain elevation." For instance, a range complex has minimum safe altitudes of (36, 37, 54, 41, 61, 54, 41, 54, 81, 47, 44, 64, 73) which add up to 687, divided by 13 data points equals 53, minus 1000' (1) equals 52 or 5,200' MSL.
-Gross Airspace Volume. Gross Airspace Volume is cubic and computed in the following way. Square NM of land under each sub-piece of distinct airspace x (vertical elevation in feet ¸ 6000 feet) = NM3. [NOTE: 6000' = 1 NM for the purposes of these computations.] Compute this volume for each distinct shadow of airspace. For example, four MOAs in a complex form a vertical column up to 14,500' MSL. Above 14,500' MSL to 17,999' MSL is another larger shadow encompassing the two additional MOAs and the previously described airspace. An ATCAA uses the same shadow as the second computation but goes from FL 180 to FL 500 in the PCA. The volumes are then added to come up with the gross airspace volume.
-Unusable Airspace Volume. Unusable Airspace Volume is airspace the activity cannot use because of formal agreement/direction: No fly noise sensitive areas, wildlife management area restrictions, prohibited areas, "Thunderdomes," etc. The operative word is "formal" areas the activity/higher authority formally agreed not to over fly. Use the same basic volume computations described above, area in square NM x (vertical component in feet ÷ 6000').
-Net Airspace Volume. Net Airspace Volume is Gross Airspace Volume minus unusable airspace volume.
-Airspace Attributes Volume computations. Airspace has attributes we wish to define in terms of volume. This will allow us to calculate the volume of airspace used for specific purposes and for comparison purposes, the percentage used for that purpose as a fraction of the overall volume. These attributes are: supersonic volume, "drop" volume (volume of range space where projectiles/bodies/equipment is/are fired/released through vertical airspace impacting targets/landing/drop zones in an approved ground area); chaff volume, flare volume, night volume, lights out volume; 100/300/500' AGL to 5000' AGL (low altitude) volume. To compute this volume of airspace, take the NM2 shadow x (vertical elevation in feet ¸ 6000') = NM3. If necessary, subtract prevailing terrain elevation as described above, (NM2 shadow x ((vertical elevation in feet - prevailing terrain elevation) ¸ 6000') = NM3. [NOTE: low altitude volume is computed from the lowest airspace altitude at or below 500' AGL to 8000' AGL.]
-Use .00134 x #Acres to convert acres to NM2 (Example--12000 acres x .00134 = 16.08 NM2).
Column Headings for this question

Column names	Data Type	Source/Reference	Amplification
Airspace/Range Designation (Text)	string50		
Area of Airspace (shadow on the ground) (NM^2)	numeric		
Lower Published Altitude (Ft MSL)	numeric		
Higher Published Altitude (Ft MSL)	numeric		
Gross Volume (NM^3)	numeric		
Unusable Volume (NM^3)	numeric		
Net Usable Volume (NM^3)	numeric		
Supersonic Volume Below 30K MSL (NM^3)	numeric		

GENERAL INSTRUCTIONAL FACILITIES

As of: 16 March 05

1. DEFINITION: The weighted sum (by quality condition) of the square footage of general instructional facilities on an installation.

2. PURPOSE: Measures the existing capability of the installation to conduct training by considering general-purpose facilities used for general instruction.

3. SOURCE: June 2003, HQRPLANS Version 12.50 and Installation Status Report (ISR). No installation data call is required.

3. METHODOLOGY:

a. The Facility Category Group (FCG) for General Instructional Building is 17120 (Facilities Analysis Category 1711).

b. Quality factors for Amber (.71), Green (1) and Red (.36) are taken from COBRA JPAT deliberations (attached).

c. MVA calculates the General Instructional Facilities score (GIF) by multiplying the installation's total square feet of General Instructional Facilities in each of the three condition codes by the corresponding quality factor; These vales are then summed together. This equation is illustrated in paragraph 8.

d. Convertible space was considered for General Instructional facilities; however, all convertible FCGs did not meet cost requirements.

e. Leases receive 0 value for this attribute.

5. QUESTIONS THAT DEFINE DATA:

What is the total square footage of General Instructional Facilities on the installation by quality condition (in square feet based on HQRPLANS Version 12.50 – calculated by subtracting temporary assets from total assets)?

6. REFERENCES: June 2003, HQRPLANS Version 12.50 and Installation Status Report (ISR), Determining a Rehabilitation Construction Standard Factor For Cobra.

7. UNIT OF MEASURE: Square Feet.

8. EQUATION:

GIF Score = G*(1.0) +A*(0.71) +R*(0.36), where G, A, & R = SQ feet of Green, Amber, and Red space

9. MODEL REQUIREMENTS:

a. Model Input

i. The primary model input is the GIF Score.

ii. Input data: G, A, and R.

b. Value Function

i. The value function converts the installation's score, which is the GIF Score, to a military value between 0 and 10.

ii. The value function uses a single equation that measures the returns to scale of the attribute's score and returns the value of an installation's facilities. The curvature of the function is determined by TABS and coordinated with G3/TRADOC SMEs.

iii. The maximum value of 10 is given to the installation with the greatest number of square feet (e.g., the highest score).

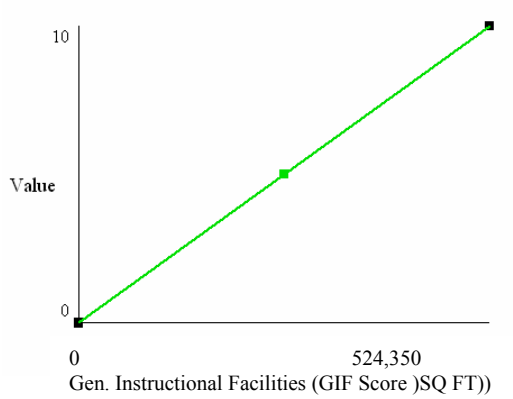
iv. The minimum value of 0 is given to the installation with the lowest number of square feet.

c. Model Output

i. The value function provides the military value of the installation with regards to general instructional facilities capabilities.

ii. Scores are normalized on a scale of zero to ten based on the curvature of the value function.

iii. This value function shows a linear relationship, which equates to constant returns to scale. The function implies that every additional SF of General Instructional Space has the same value as the prior SF.



Score

APPLIED INSTRUCTIONAL FACILITIES

As of: 16 March 05

1. DEFINITION: The weighted sum (by quality condition) of the square footage of applied instructional facilities on an installation including square footage of facilities that may be converted to applied instructional facilities. We define conversion as those facilities that are not currently instructional, but can be transformed to applied instructional facilities at a reasonable cost.

2. PURPOSE: Measures the existing capability of the installation to conduct training by considering special purpose facilities used for, or convertible facilities that could be used for, applied instruction.

3. SOURCE: June 2003, HQRPLANS Version 12.50 and Installation Status Report (ISR). No installation data call is required.

4. METHODOLOGY:

a. The Facility Category Groups (FCGs) for Applied Instructional Facilities are F17131(Compact Item Repair Instructional Facilities), F17132(Gen Item Rep Instructional Facilities), F17133(Vehicle Maintenance Instructional Facilities), F17134(Aircraft Maintenance Instructional Facilities), F17135(Lab Instructional Facilities), F17136(Automation-Aided Instructional Facilities) and F17137(Materiel Handling Maintenance Instructional Facilities). Convertible FCGs for Applied Instructional Facilities are F17115 (Band Training Facilities), and F17119 (Organizational Classroom).

b. Quality factors for Amber (.71), Green (.1), Red (.36) and Convertible (.36) are taken from COBRA JPAT deliberations (attached).

c. MVA calculates the Applied Instructional Facilities score (AIF) using a weighted sum of the existing Applied Instructional and Convertible facility square feet. The weighted sum is calculated by multiplying the installations corresponding amount of each type of square feet by the corresponding quality factor; these values are then summed. This equation is illustrated in paragraph 8.

d. Leases receive 0 value for this attribute.

5. QUESTIONS THAT DEFINE DATA:

a. What is the total square footage of Applied Instructional Facilities on the installation by quality condition (in square feet based on HQRPLANS Version 12.50 – calculate by subtracting temporary asset from total assets)?

b. What is the installation's total square footage of facilities that can be converted to Applied Instructional Facilities (in square feet based on HQRPLANS Version 12.50 – calculate by subtracting temporary asset from total assets).

6. REFERENCES:

June 2003, HQRPLANS Version 12.50 and Installation Status Report (ISR), Determining a Rehabilitation Construction Standard Factor For Cobra.

7. UNIT OF MEASURE: Square feet.

8. EQUATION:

AIF Score = G*(1.0) +A*(0.71) +R*(0.36)+C*(0.36), where G, A, and R = SQ feet of Green, Amber, and Red space respectively. C = convertible SQ feet.

9. MODEL REQUIREMENTS:

a. Model Input

i. The primary model input is the AIF Score.

ii. Input data: G, A, R, and C.

b. Value Function

i. The value function converts the installation's score, which is the AIF Score, into a military value between 0 and 10.

ii. The value function uses a single equation that measures the returns to scale of the attribute's score and returns the value of an installation's facilities. The curvature of the function is determined by TABS and coordinated with G3/TRADOC SMEs.

iii. The maximum value of 10 is given to the installation with the greatest number of square feet (e.g., the highest score).

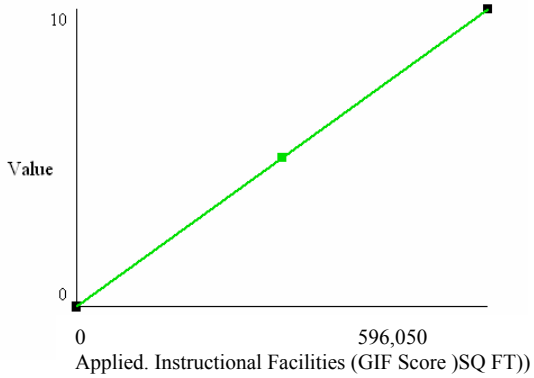
iv. The minimum value of 0 is given to the installation with the lowest number of square feet.

c. Model Output

i. The value function provides the military value of the installation with regards to applied instructional facilities capabilities.

ii. Scores are normalized on a scale of zero to ten based on the curvature of the value function.

iii. This value function shows a linear relationship, which equates to constant returns to scale. The function implies that every additional SF of Applied Instructional Facilities has the same value as the prior SF.



Score

Facilities Analysis Category (FAC) - Facility Category Groups (FGC) Conversions for Applied Instructional Facilities and those facilities that are convertible to AIF.

FAC	FCG
1712	17131, 17132, 17133, 17134, 17135, 17136, 17137
1713	17115
1717	17119

AIR QUALITY

As of: 16 March 05

1. **DEFINITION:** The air quality attainment status observed at an installation based on the presence of criteria pollutants.
2. **PURPOSE:** Measures the degree of air attainment quality for the *criteria pollutants*. Air attainment quality status reflects the "quality" of air above an installation. This quality is a quality-of-life issue for the soldiers and their families living there. Additionally, the attainment status places training or mission restrictions on any activities that may further degrade the quality of air.
3. **SOURCE:** Installation Capacity Data Call, DoD Question #213
4. **METHODOLOGY:**
    a. *Background*
        i. Criteria pollutants considered: CO, NO_2, SO_2, Pb, O_3 (1 hour), O_3 (8 Hour), PM_{10}, $PM_{2.5}$
        ii. Air pollution comes from many different sources: stationary sources such as factories, power plants, and smelters and smaller sources such as dry cleaners and degreasing operations; mobile sources such as cars, buses, planes, trucks, and trains; and naturally occurring sources such as windblown dust, and volcanic eruptions, all contribute to air pollution. Air Quality can be affected in many ways by the pollution emitted from these sources. These sources can also emit a wide variety of pollutants. These pollutants are monitored by the Environmental Protection Agency (EPA), as well as national, state and local organizations.
        iii. The Clean Air Act provides the principal framework for national, state, and local efforts to protect air quality. Under the Clean Air Act, EPA is responsible for setting standards, also known as national ambient air quality standards (NAAQS), for pollutants which are considered harmful to people and the environment. EPA is also responsible for ensuring that these air quality standards are met, or attained (in cooperation with state, tribal, and local governments) through national standards and strategies to control pollutant emissions from automobiles, factories, and other sources.
    b. *Method*
        i. The installations report their air attainment status based on National Ambient Air Quality Standards (NAAQS) for the criteria pollutants.
        ii. TABS uses four criteria pollutants to calculate the military value score. Eight criteria pollutants were reported by the installations in data call #1, however, since all installations are in attainment for NO2, Pb, and SO2 these measures don't distinguish between installations. On 15 June 04, the EPA revoked the standard for O_3 (1 hour) as an indicator of air quality replacing it with O3 (8 Hour) instead. Hence, only CO, O3 (8 Hour), PM 2.5, and PM 10 are considered valid indicators of an installation's air

quality status, as they have the ability to constrain training or mission activity or the acceptance of new missions. These pollutants use varying degrees of non-attainment classifications, but all can be grouped into one of 3 bins (attainment, "moderate non-attainment", and "serious non-attainment"). For any attribute in "maintenance" status, this is considered equivalent to "moderate non-attainment" for scoring purposes.

iii. TABS combines the data reported in 4.b.ii. and calculates the Air Quality Score using the equation in paragraph 8. The Air Quality Score can range from 0 to 40, with 0 indicating attainment for all distinguishing pollutants. A lower score indicates higher military value.

iv. Leases receive 0 value for this attribute.

5. QUESTIONS THAT DEFINE DATA:

i. What are the attainment designation classifications of the installation's National Ambient Air Quality Standard (NAAQS) for each applicable criteria pollutant. For the 8-hour Ozone and PM 2.5 Standards, use the most recent EPA reference that either projects, or actually promulgates, the final designation. (DoD #213).

ii. The data for this attribute comes from Columns named "NAAQS Designation" and "NAAQS Classification", and the Rows labeled "PM10", "CO", "O3 (8hr)*", and. "PM2.5".

6. REFERENCES: Code of Federal Regulations, Title 40--Protection of Environment, Chapter I--Environmental Protection Agency, Subchapter C--Air Programs, Part 81--Designation Of Areas For Air Quality Planning provides guidance on approval of: the area's "maintenance plan" and "redesignation" of the area to "attainment status".

7. UNIT OF MEASURE: Score based on Attainment Status or Non-attainment Status**.**

8. EQUATION: The Air Quality Score equals the sum of the criteria pollutant scores illustrated in the table below.

$$\text{Air Quality Score} = CO + O_{3*}8Hr + PM_{2.5} + PM_{10}$$

Criteria Pollutant Score	Non-Attainment Status	
	"Moderate" or "Maintenance"	"Serious"
CO	moderate = 5	serious = 10
O_3 (8-Hour)	basic - moderate = 5	serious - extreme = 10
$PM_{2.5}$	moderate = 5	serious = 10
PM_{10}	moderate = 5	serious = 10

9. MODEL REQUIREMENTS:

a. Model Input:

i. The primary model input is the Air Quality Score.

b. Value Function:

i. The value function converts the installation's score, which is from the Air Quality Score equation, into a military value between 0 and 10.

ii. TABS uses a value function with a single equation that measures the returns to scale of the attribute's score and returns the value of an installation's Air Quality. The curvature of the function is determined by TABS and coordinated with AEC SME.

iii. The Maximum value of 10 will be given to an installation that does not have non-attainment moderate or serious status.with the lowest Air Quality Score.

iv. The Minimum value of 0 will be given to the installation with the highest Air Quality Score.

c. Model Output

i. The value function provides the military value of the installation with regards to air quality score as measured by attainment status and non-attainment status.

ii. Scores are normalized on a scale of zero to ten based on the value function.

iii. This value function shows a linear relationship, which equates to constant returns to scale. The function implies that every additional air quality increment has the same value as the prior increment.

iv. The score range was adjusted from a potential high of 40 (serious nonattainment for all four areas) to a potential high of 30, based on the fact that the maximum Air Quality score was 30.

DATACALL QUESTION

DOD #213: Air Quality Attainment

Question: In the following Table, fill in the following information which describes the attainment designation classifications of the installation's National Ambient Air Quality Standard (NAAQS) for each applicable criteria pollutant.
Source / Reference: Current Edition of 40 CFR 81 or the Federal Register or the Federal Register Citation to EPA's "final rule" approving the area's "maintenance plan" and "redesignation" of the area to "attainment status"
Amplification: * For the 8-hour Ozone and PM 2.5 Standards, use the most recent EPA reference that either projects, or actually promulgates, the final designation
Example of how your grid will look

Criteria Pollutant	NAAQS Designation (Text) (List Values: Attainment, Nonattainment, Nonattainment (Deferred), Maintenance, Unclassifiable)	NAAQS Classification (Text) (List Values: N/A, Marginal, Moderate, Serious, Severe, Extreme)	Attainment Date (MM/DD/YYYY)	Conformity Threshold (Tons/Year)
O3 (1hr)				
PM10				
NO2				
SO2				
CO				
Pb				
O3 (8hr)*				
PM2.5*				

NOISE CONTOURS

As of: 16 March 05

1. **DEFINITION:** The number of acres off the installation that are incompatible with current land use practices due to Noise Contour Levels II and III.
2. **PURPOSE:** Measures the degree of external encroachment placed on a given installation as a result of noise contours extending off-installation. Primarily identifies areas where noise levels from military sound sources are high enough to be incompatible with "noise sensitive" areas such as housing, schools, churches, and hospitals. Attribute demonstrates the potential for military training to be adversely impacted because of incompatible land use practices.
3. **SOURCE:** Installation Capacity Data Call-1, DoD Questions #198, and #239.
4. **METHODOLOGY:**
    a. *Background*
        i. The Noise Control Act of 1972 (Public Law 92-574 1972) states "…that it is the policy of the United States to promote an environment for all Americans free from noise that jeopardizes their health or welfare and that Federal agencies (1) having jurisdiction over any property or facility, or (2) engaged in any activity resulting, or which may result, in the emission of noise, shall comply with Federal, State, interstate and local requirements…."
        ii. Army Regulation 200-1, Environmental Protection and Enhancement (U.S. Army, 1997), regulates noise management in the Army. The primary intent of the regulation is to avoid restrictions on training through cooperative land use agreements with the communities controlling zoning in the vicinity of the installations.
        iii. The installation will report Noise Contour II as defined by the noise exposure that would be expected to result in 15%-39% of the population describing themselves as “highly annoyed.” Also, it is defined physically as 65-75 ADNL (A-weighted Day Night Level), or 62-70 CDNL (C-weighted Day-Night Level). "A-weighting" approximates the sensitivity of the human ear, while "C-weighting" captures the additional annoyance of low frequencies.
        iv. The installation will report Noise Contour III (Incompatible Use) as defined by the noise exposure that would be expected to result in greater than 39% of the population describing themselves as “highly annoyed.” Also, it is defined physically as > 75 ADNL, or > 70 CDNL.
    b. *Method*
        i. TABS will determine the installation’s Gross Acres of noise contours extending off-installation by adding results from paragraphs 4.a.iii and 4.a.iv.

ii. TABS will determine the installation's total reported acreage by adding acreage of all reported land parcels.

iii. These two values are input into the model to determine the value for each installation.

iv. Leases receive 0 value for this attribute.

5. QUESTIONS THAT DEFINE DATA:

a. Using local zoning and/or community land use plans, what are the noise zones for the property outside of your main installation, auxiliary airfield, training range and/or RDT&E range? When totaling, do not double count overlapping incompatible acres. Also, consider all structures or activities incompatible unless there is specific knowledge (such as visual surveys) that the structure is considered compatible. (DoD #239).

b. What is the total acreages for all land owned/controlled by the installation? "Controlled" includes land/property used by the service under lease, license, permit, etc. DO NOT include easements as either owned or controlled. Include the main installation, ranges, auxiliary airfields, withdrawn land and all outlying sites. Designate ranges, auxiliary airfields, and outlying sites separately by name and real property (four letter) nomenclature. (DoD #198).

c. The data from question DoD #239 is taken from the column titled "Outside of Installation / Total Acres" and from the sum of quantities in rows titled "Noise Zone II" and "Noise Zone III". The data from question DoD #198 is taken from the column titled "Total Acreage."

6. REFERENCES: Installation Environmental Noise Management Plan (IENMP) and/or Technical Manual 5-803-7, 1 May 1997

7. UNIT OF MEASURE: Acres

8. EQUATION: N/A

9. MODEL REQUIREMENTS:

a. Model Inputs: The model's primary inputs are the number of acres of noise contours extending off-installation, and the installation's size.

b. Model Value Function

i. The value function is a representation of the military value of the extent of noise contours extending off-installation. TABS plots the sum of Noise Zones II and III (gross acres) against installation size into the below matrix resulting in a military value for the installation.

ii. The Maximum value of 10 will be given to the largest installations with the fewest number acres of Noise Zones II and III off the installation.

iii. The Minimum value of 0 will be given to the smallest installations with the greatest number acres of Noise Zones II and III off the installation

iv. The assessment of the function is determined by TABS and coordinated with the US Army Center for Health Promotion and Preventive Medicine (USACHPPM.)

	Noise Zones II & III (Gross Acres)-(Q#239)			
Installation Size (ACRES) (Q#198)	> 10K	> 100 and <=10K	>0 and <=100	0
<= 75K	Label 1	Label 2	Label 3	Label 10
>75K and <=200K	Label 4	Label 5	Label 6	Label 10
>200K	Label 7	Label 8	Label 9	Label 10

v. Assessment Results.

1) The table below illustrates the assessment's values, which consist of a series of pair-wise comparisons between the different Labels (range from 1 to 7, comparison of "1" indicates that the preferences are equal between the Labels and a "9" indicates that the preference of one Label to another is extreme).

C.R. = 0.028	Label 1	Label 2	Label 3	Label 4	Label 5	Label 6	Label 7	Label 8	Label 9	Label 10
Label 1	0	0.25	0.143	0.5	0.2	0.125	0.25	0.167	0.111	0.111
Label 2	4	1.496	0.5	2	0.5	0.5	1	0.5	0.333	0.25
Label 3	7	2	3.389	3	2	0.5	2	2	0.333	0.333
Label 4	2	0.5	0.333	0.644	0.333	0.25	0.5	0.333	0.25	0.2
Label 5	5	2	0.5	3	2.227	0.5	2	0.5	0.333	0.25
Label 6	8	2	2	4	2	4.534	3	2	0.5	0.333
Label 7	4	1	0.5	2	0.5	0.333	1.413	0.5	0.333	0.25
Label 8	6	2	0.5	3	2	0.5	2	2.675	0.333	0.2
Label 9	9	3	3	4	3	2	3	3	6.82	0.5
Label 10	9	4	3	5	4	3	4	5	2	10

2) The assessment converts the pair-wise comparisons into the value that an installation will receive for meeting the requirements at a given label.

3) For example (refer to the gray cells in column 1 of the above matrix), the SME indicates that Label 9 is *extremely* (scores a 9) preferred over Label 1, and Label 5 is *moderately* (scores a 5) over Label 1.

4) The above matrix has a consistency ratio (CR) of 0.028 that indicates that the pair-wise comparisons are *consistent* across all Labels. A CR < 0.1 is considered adequate. For example, a consistent ranking between Labels would mean that if A > B and B > C then A > C. However, if A < C, then the ranking would be considered inconsistent.

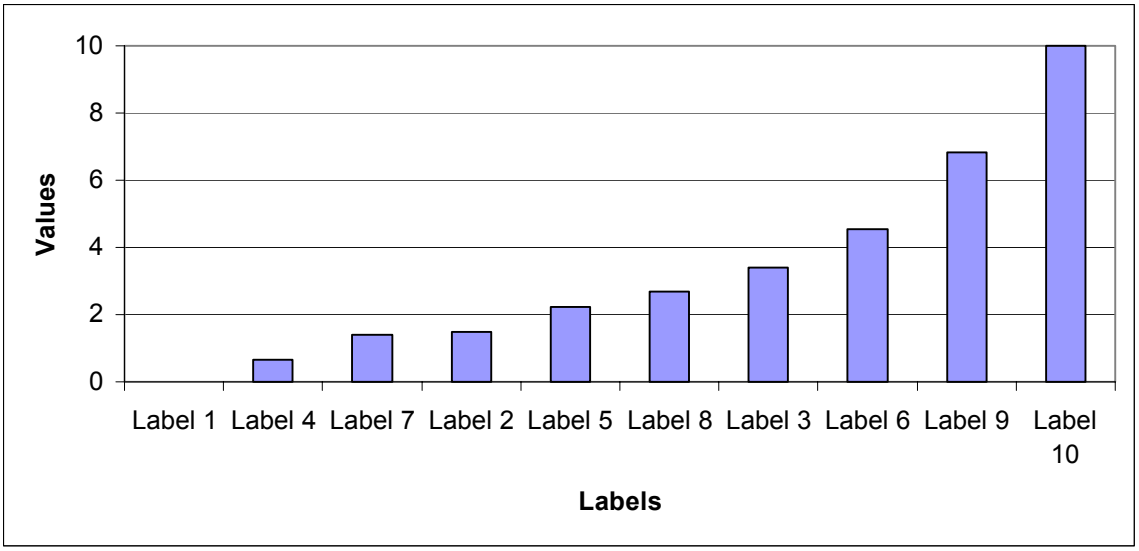
c. Model Outputs

	Noise Zones II & III (Gross Acres)-(Q#239)			
Installation Size (ACRES) (Q#198)	> 10K	> 100 and <=10K	>0 and <=100	0
<= 75K	0	1.5	3.39	10
>75K and <=200K	0.64	2.23	4.53	10
>200K	1.41	2.68	6.82	10

i. The above matrix represents the model's results (the diagonal of the assessment matrix). Each installation will have 0 or greater gross acres zoned as Noise Zones II and III off the installation, and installation size (acres) that fit into this matrix.

ii. The raw scores were normalized on a scale of zero to ten based on the pair-wise assessment results.

iii. The histogram for the Value Function provides a graphical representation of the previous matrix. The military values shown in the following graph are ordered according to increasing value based on the assessment. The values show that there are several combinations for this attribute that have the same military value.



DATA CALL QUESTIONS

DOD #198: Land Owned/Controlled By Installation

Question: Complete the table for all land owned/controlled by the installation. "Controlled" includes land/property used by the service under lease, license, permit, etc. DO NOT include easements as either owned or controlled. Include the main installation, ranges, auxiliary airfields, withdrawn land and all outlying sites. Designate ranges, auxiliary airfields, and outlying sites separately by name and real property (four letter) nomenclature (as appropriate).
Source / Reference: Military Installation real property records, Military installation General Plan.
Amplification: "Developed" acreage is defined as those areas that are built-up i.e., consist of facilities and pavements.
"Constrained" acreage is defined as those areas encompassing wetland, floodplains, contaminated areas (which include military munitions response areas or sites, groundwater contaminated sites, soil contaminated sites (including pesticide contamination), RCRA/CERCLA contaminated sites, etc) areas determined by U.S. Fish and Wildlife Service via Biological Opinions requiring special management areas designed by U.S. Fish and Wildlife Service as critical habitat, archeological sites determined eligible for listing or listed on the List of National Historic Places, ESQD arcs, radiation safety zones, antenna field of view (or line of sight), clear zones, and APZs.
Column Headings for this question

Column names	Data Type	Source/Reference	Amplification
Name of Installation/Site (4-digit real property identifier) (Text)	string50		
Total Acreage (Acres)	numeric		
Developed Acreage (Acres)	numeric		
Constrained Acreage (Acres)	numeric		
Total unconstrained acreage available for development (Acres)	numeric		

DOD #239: Off-Installation Zones with Incompatible Land Use Matrix (Installation)

Question: Fill in the following table for the property outside of your main installation, auxiliary airfield, training range and/or RDT&E range using local zoning and/or community land use plans.
Note: Report EITHER Noise Zones (Army) or AICUZ 5 dB contours (AF, Navy). When totaling, do not double count overlapping incompatible acres. Also, consider all structures or activities incompatible unless there is specific knowledge (such as visual surveys) that the structure is considered compatible.
Source / Reference: See Amplification for Source.
Amplification: Source:
For Air Force Installations, consult FICUN Handbook (Federal Interagency Committee on Urban Noise (FICUN). 1980. Guidelinesfor Considering Noise in Land Use Planning and Control) AFH 32-7084 to determine AICUZ incompatibility.
For Army: Consult Installation Environmental Noise Management Plan (IENMP) and/or Technical Manual 5-803-7, 1 May 1997.
Provide noise data in either AICUZ or Noise Zones, whichever is available and most current.
NOTES:
(1) If known from JLUS or AICUZ
(2) e.g. NAVAID
(3) e.g. Signal Clear Zone
(4) Include all munitions storage areas and buffer zones (quantity distance limits), and hot cargo pads
Example of how your grid will look

Surface Land Areas	Outside of Range (1) / Total Acres (1) (Acres)	Outside of Range / Acres that are Incompatible (1) (Acres)	Outside of Installation / Total Acres (Acres)	Outside of Installation / Acres that are Incompatible (Acres)	Outside of Auxiliary Airfields / Total Acres (Acres)	Outside of Auxiliary Airfield / Acres that are Incompatible (Acres)
65-69 dB ADNL						
70-74 dB ADNL						
75-80 dB ADNL						

80+ dB ADNL						
Noise Zone II						
Noise Zone III						
Off Base Clear Zone						
Off Base APZ I						
Off Base APZ II						
Off Base All explosive siting facilities (4)						
Off Base Communication towers (2) and buffer zones (3)						
Off Base Other (Specify)						
TOTAL Acres (do not double count areas that overlap						

SOIL RESILIENCY

As of: 18 March 05

1. **DEFINITION:** A measure of the installation's soils ability to sustain Army training.

2. **PURPOSE:** Measures the resiliency of an installation's training land, by using Highly Erodible Land (HEL) classification as a proxy. HEL class is a nationally recognized indicator that can be easily understood by both military trainers and natural resources managers.

3. **SOURCE:** The NRCS National Soil Information System (NASIS) provides the HEL Class for most soil map units in the country. On those soil map units without a HEL Class in the database, the value may exist in hardcopy in the NRCS Field Office Tech Guide, or, the methodology described in Part 511 of the National Food Security Act Manual will be used to determine HEL Class. No installation data call is required.

4. **METHODOLOGY:**

    a. *Background*

        i. The Highly Erodible Land (HEL) Class is a combination of two elements in the Revised Universal Soil Loss Equation (RUSLE) and Wind Erosion Equation (WEQ) models. The K factor (a measure of erosivity) and LS (slope and slope length) are used to calculate the HEL class for any combination of soil and slope. There are three HEL classes; Not Highly Erodible, Potentially Highly Erodible, and Highly Erodible. Highly erodible land is defined by the Sodbuster, Conservation Reserve, and Conservation Compliance parts of the Food Security Act of 1985 and the Food, Agriculture, Conservation, and Trade Act of 1990. Determinations for highly erodible land are based on an erodibility index as defined in the National Food Security Act Manual. Lists of highly erodible and potential highly erodible map units are maintained in the field office technical guide (FOTG). Natural Resources Conservation Service (NRCS) field offices cover the entire country. Policy and procedures for developing and maintaining the lists are given in part 511 of the National Food Security Act Manual.

        ii. Soil erosion, specifically erosion status (ES), is the primary measurement of land condition used in the ATTACC methodology. ES is the ratio of predicted erosion rates to tolerable erosion rates, with larger values indicating poorer land condition and smaller values indicating better land condition. ATTACC presently contains methods to determine soil loss based on water erosion (sheet and rill), wind erosion, and dust to predict soil loss

rates. Any of methods, or a combination, may be used. Water erosion is the most widely used due to available data at the majority of installations using ATTACC, and is usually the worst case for measuring soil loss. Data for determining wind and dust erosion is also widely available. Erosion rates are estimated using modified versions of the Revised Universal Soil Loss Equation (RUSLE), Wind Erosion Equation (WEQ), and the EPA Dust Erosion model; used in combination or alone.

iii. Erosion status is directly related to the productivity of a site, and military activities directly and indirectly affect erosion rates. Installations often have land management plans with goals to reduce or maintain erosion rates at levels that ensure the training lands will continue to support the training mission.

iv. There are additional means to predict soil loss, such as gully erosion and tidal effects. Loss of soil productivity is also attributed to soil compaction. Activities such as grazing impact training land since this activity can strip the land of needed cover and /or vegetation and contributes to compaction.

b. *Method*

i. TABS will use the land acreage characterized as "Not Highly Erodible" (Not HEL) in the MVA-Model to determine the installation's military value. A soil map unit with an erodibility index of 8 or greater is considered to be highly erodible land (HEL) as set forth in the regulation 7 CFR 610, Subpart B.

ii. Any installation that does not have the capacity to conduct maneuver training will receive no value under this attribute.

iii. Leases receive 0 value for this attribute.

5. QUESTIONS THAT DEFINE DATA:

Question. *Soil Erodibility.*

For each installation, provide the acreage characterized as Not Highly Erodible (Not HEL).

6. REFERENCES: Food Security Act of 1985, Food, Agriculture, Conservation; Trade Act of 1990, National Soil Information System – NRCS, National Food Security Act Manual; AEC Technical Report, dated August 2004

7. UNIT OF MEASURE: Acres

8. EQUATION: None

9. MODEL REQUIREMENTS:

a. Model Input:

The model input is the number of acres characterized as Not HEL.

b. Value Function

i. The value function uses a single equation that measures the attribute's score and returns the value of an installation's facilities. The curvature of the function is determined by TABS and coordinated with the Army Environmental Center.

ii. The Maximum value of 10 will be given to the installations with the most acres Not HEL.

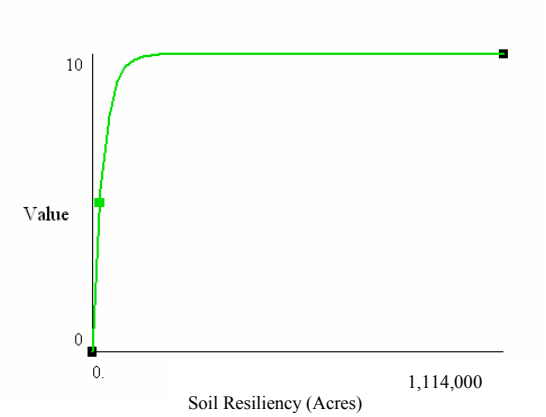
iii. The Minimum value of 0 will be given to the installation with zero acres Not HEL or does not have the ability to support maneuver training.

c. Model Output

i. The value function provides the military value of the installation with regards to the soil erodibility factor.

ii. Scores are normalized on a scale of zero to ten based on a value function.

iii. This value function shows a non-linear (concave) relationship, which equates to increasing returns to scale with diminishing marginal values. The function implies that as erodibility acre's increase, value also increases quickly, but after a certain number of acres, more acres provide little value.



WATER QUANTITY

As of: 18 March 05

1. **DEFINITION:** The availability of additional water resources measured in terms of thousand acre-feet.
2. **PURPOSE:** Measures the availability of water resources within the geographic region of the installation. The availability of water, including surface water, groundwater, and purchased water, is critical to understanding the degree of sustainability of natural resources. Sufficient water may not be available to allow for expansion of missions at the installation regardless of the physical throughput of the water treatment plant.
3. **SOURCE:** Installation Military Value Data Call, DoD Questions #825 and #826.
4. **METHODOLOGY:**
    a. *Background*
        i. Water sources may vary among installations; therefore, report the total available from all sources. Available sources may include: (1) surface water runoff from contiguous watersheds (2) surface water runoff from non-contiguous watershed (3) principal or local aquifers. Often these measures are given as safe yields from existing watersheds and aquifers. Typical units of measure are thousands of acre-feet. Rate of surface water diversion or groundwater extraction from a basin for consumptive use over an indefinite period of time that can be maintained without producing negative effects.
        ii. Additionally, there is a growing awareness that increased water use by humans does not only reduce the amount of water available for industrial and agricultural development but has a profound effect on aquatic ecosystems and their dependent species. Human activities have severely affected the condition of freshwater ecosystems, to a point where many freshwater species are facing rapid population declines or extinction.
    b. *Method*
        i. The installation will report the total water resources available to them by type of water and source. Report separately, raw surface water, ground water, water from other sources, and the average daily water use for the last three years.
        ii. TABS will calculate the quantity of *total water available* (i.e., entitled (Q#825) minus Usage (Q#826)) for expansion of the installation given the reported quantities, IAW the equation in paragraph 8.
        iii. Leases receive 0 value for this attribute.

5. QUESTIONS THAT DEFINE DATA:

a. ***Water Allocation.*** (Data Call #2, DOD#825)

What are the water supply sources for your installation? Include both direct and indirect sources, and both potable and nonpotable sources. Provide the amount of water that the installation is entitled from each source. Also, indicate the legal basis for your use of the water. Report amounts in Acre-Feet per year. An example of an "indirect source" would be purchase of water credits that are applied to your installation's withdrawal entitlements. Examples of "legal basis" would be a permit, memorandum of agreement, purchase contract, or similar document. If the same source provides both potable and nonpotable water, report as potable.

b. ***Total Water Use.*** (Data Call #2, DOD#826)

What was the average daily water use in Millions of Gallons per day (MGD) for FY01, FY02, and FY03? Combine usage of Potable and Non-Potable and report as Total Average Daily Use.

6. REFERENCES: Director of Public Works (DPW), Environmental Section, Permits

7. UNIT OF MEASURE: Acre-Feet per Year

8. EQUATION:

$$\Gamma = \sum_{i=1}^{n} w_i - \left(Q_{avg} \times \frac{1{,}000{,}000 \cdot Gal}{1 \cdot MG} \times \frac{1 \cdot ft^3}{7.481 \cdot Gal} \times \frac{1 \cdot Acre \cdot foot}{43{,}560 \cdot ft^3} \times \frac{365 \cdot days}{1 \cdot year} \right)$$

a. Γ, Total water availability is the amount of additional water that the installation is entitled, compared to current average consumption, over a given year. It is calculated from the difference between all available resources and the average water use.

b. w_i , Water Allocation. Sum of the quantity of water available from each water source (n = number of sources) that the installation is entitled, for a given year. TABS calculates the total available water.

c. Q_{avg} is the highest reported average daily use value (MGD) over the last three years.

9. MODEL REQUIREMENTS:

a. Model Input

The primary model input is the total water available (Acre-Feet perYear) at the installation.

b. Value Function

   i. The value function uses a single equation that measures the returns to scale of the attribute's score and returns the value of an installation's facilities. The curvature of the function is determined by TABS and coordinated with AEC SMEs.

   ii. The maximum value of 10 is given to any installation with 25,000 acre-feet available or greater.

   iii. The minimum value of 0 is given to any installation with zero or a negative amount of acre-feet available.

c. Assessment

   i. A value function assessment was conducted. SMEs determined that the highest usage rate for an installation was < 25,000 acre-feet; therefore, the value function was truncated at 25,000.

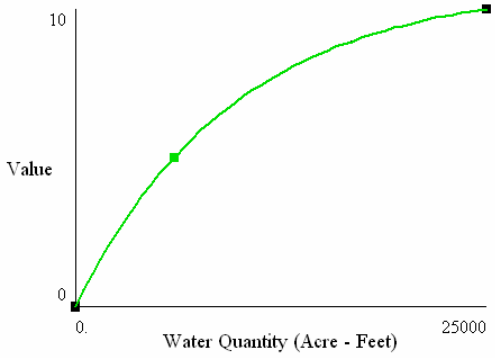
   ii. The assessment also determined that the point where an installation should receive half of the maximum value was 6000 acre feet, which means the value moving from 0 to 6000 feet is the same as 6000 to 25,000 acre-feet.

d. Model Output

   i. The model converts the water resource score to a value for the installation.

   ii. Scores are normalized on a scale of zero to ten based on value function.

   iii. This value function shows a non-linear (concave) relationship, which equates to increasing returns to scale with diminishing marginal values. The function implies that when water exceeds 6000, the military value tapers off at an increasing rate.



DATA CALL QUESTIONS

DOD #825: Water Allocation

Function(s): Water Quantity
Question: List each potable water supply source for your installation. Include both direct and indirect sources. Provide the amount of water that the installation is entitled from each source. Also, indicate the legal basis for your use of the water. Report amounts in Acre-Feet.
Source / Reference: DPW
Amplification: An example of an "indirect source" would be purchase of water credits that are applied to your installation's withdrawal entitlements. Examples of "legal basis" would be a permit, memorandum of agreement, purchase contract, or similar document.

Check here if this question is Not Applicable (N/A): ☐

Please fill in the following table(s), adding rows as necessary

Name of Water Source (Text) string75	Amount Entitled (Acre-Feet) numeric	Legal Basis (Text) string250

DOD #826: Total Water Usage

Function(s): Water Quantity
Question: What was the average daily water use in Millions of Gallons per day (MGD) for FY01, FY02, and FY03. Combine usage of Potable and Non-Potable and report as Total Average Daily Use.

Please fill in the following table(s)

Fiscal Year	Total Average Daily Use (MGD) numeric
FY01	
FY02	
FY03	

MOBILIZATION

As of: 23 March 05

1. **DEFINITION:** The fifteen-year sum of the number of soldiers mobilized at an installation.
2. **PURPOSE:** Measures the installation's potential future contribution to Reserve Component mobilization and deployment capability.
3. **SOURCE:** G-3 and FORSCOM. No installation data call is required.
4. **METHODOLOGY:**
    a. FORSCOM will submit a historical mobilization summary through G-3 to TABS.
    b. TABS will calculate the sum of Reserve Component soldiers mobilized on the installation over the past fifteen years. Mobilization numbers will include only Reserve Component soldiers assigned to units and those mobilized as individuals.
    c. Leases receive 0 value for this attribute.
5. **QUESTIONS THAT DEFINE DATA:**

    What was the total number of Reserve Component soldiers mobilized each year for the past 15 years on the 88 installations being considered under The Army Basing Study?
6. **REFERENCES:** FORSCOM Mobilization and Deployment Planning and Execution System (FORMDEPS) and the Installation Mobilization Reports
7. **UNIT OF MEASURE:** Thousands of Soldiers
8. **EQUATIONS:** Actual Load = Σ of RC soldiers mobilized per year over 15 years (1989 through 2003) at each installation.
9. **MILITARY VALUE FUNCTION:**
    a. Model Input:

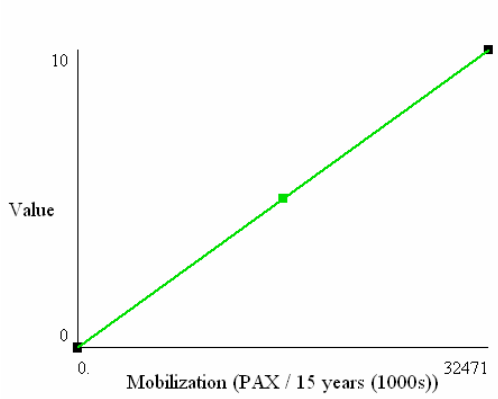
        The primary model input is the installation's 15-year sum of their annual executed mobilization load.
    b. Value Function
        i. An installation's 15-year sum of annual executed mobilization loads.
        ii. The value function uses a single equation that measures the returns to scale of the attribute's score and returns the value of an installation's 15-year sum of its annual mobilization mission contribution. The curvature of the function is determined by TABS and coordinated with G-3 and FORSCOM SMEs.
        iii. The maximum value of 10 is given to the installation with the highest mobilization mission contribution.
        iv. The minimum value of 0 is given to the installation with no mobilization mission contribution.

c. Model Output

i. The value function provides the military value of the installation with regards to its level of contribution to executing the Army's mobilization load.

ii. Scores are normalized on a scale of zero to ten based on the curvature of the value function.

iii. This value function shows a linear relationship, which equates to constant returns to scale. The function implies that every additional mobilization load increment has the same value as the prior increment.



FORCE DEPLOYMENT

As of: 23 March 2005

1. **DEFINITION:** The time, in days, it takes a Unit of Action (UA) (including all assigned equipment and personnel) to deploy eastward and westward from the installation to overseas theater locations using various modes of transport.
2. **PURPOSE:** Measures the capability of an installation to support UA deployments.
3. **SOURCE:** Military Surface Deployment and Distribution Command Transportation Engineering Agency (MSDDCTEA) databases, and Installation Military Value Data Call.
4. **METHODOLOGY:** MSDDCTEA will use the following guidelines to derive the Installation's deployment score (***depscore)***.

    a. *Surface Deployment Time*
        i. *instoutload*: Time required to out-load a UA from the installation by either rail or motor, given its current infrastructure and material handling equipment;
        ii. $mvttoSPOE_i$: Time required to move from the installation via rail or motor to the closest seaport of embarkation ($SPOE_i$) on theWest Coast and either the East or Gulf Coasts, (where the subscript *i* represents West and East/Gulf Coast ports).

    b. Aerial Deployment Time
        i. $thruputAPOE_i$: Time required for the entire unit to transload on aircraft and depart from the selected $APOE_i$
        ii. $mvttoAPOE_i$: Time required to move from the installation to the nearest aerial port of embarkation (APOE);

    c. Leases receive 0 value for this attribute.

5. **QUESTIONS THAT DEFINE DATA:**

    a. Installation MV Datacall

        i. What is your installation's rail outloading capability in railcars per day and ISO containers per day? How many times per day can a string of railcars be switched at your facility (train cycles per day)? (DoD Q#829)

        ii. What is the capability, in railcars loaded per day, of the closest off-post rail facility providing end ramp loading operations? What is the distance (in miles) to this facility from your installation? (DoD Q#830)

        iii. What is your installation's motor outloading capability as measured in tractor/trailer combinations per day and convoys per day? What is your installation's capability to outload ISO containers by truck as measured in containers per day? (DoD Q#833)

        iv. What is the distance in miles from the installation to the closest C-17 capable airport that can serve as an aerial port of embarkation (APOE)? What is the estimated maximum number of C-17 sorties per day that could fly from this airfield? (DoD Q#835)

b. TEA Databases.

i. What is the road time to port?

ii. What is the rail time to port?

6. REFERENCES: FM 55-80, MSDDCTEA Technical Report

7. UNIT OF MEASURE: Days

8. EQUATION:

$$depscore = instoutload + \sum_{i=1}^{2} \left(mvtoSPOE_i + mvtoAPOE_i \right) + thruputAPOE_i$$

9. MODEL REQUIREMENTS:

a. Model Input:

The only model inputs are the components of the installation's ***depscore***.

b. Value Function

i. The value function converts the installation's ***depscore*** into a military value between 0 and 10.

ii. The value function uses a single equation that measures the returns to scale of the attribute's score and returns the value of an installation's ***depscore***. The curvature of the function is determined by TABS and coordinated with MSDDCTEA SMEs.

iii. The maximum value of 10 is given to the installation with the lowest ***depscore***.

iv. The minimum value of 0 is given to any installation with a ***depscore*** greater than 180 days.

c. Assessment

i. A value function assessment was conducted. SMEs determined that there was significantly more value for installations with deployment capability and that value lowered quickly as the time it takes to deploy increases.

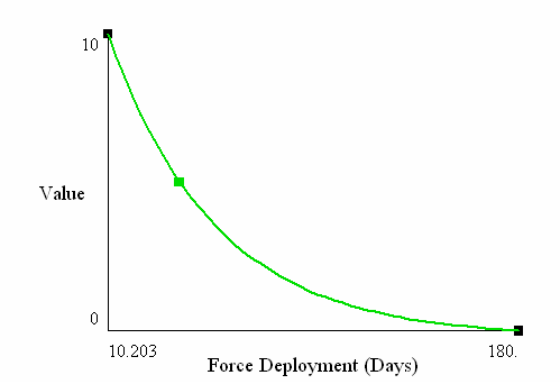
ii. The assessment also determined that the point where an installation should receive half of the maximum value was 40 days.

d. Model Output

i. The value function provides the military value of the installation with regards to force deployment capabilities as measured by the ***depscore***.

ii. Scores are normalized on a scale of zero to ten based on the curvature of the value function.

iii. This value function shows a convex relationship, which accounts for the much higher value given to faster deployment times, which then decreases at an increasing rate.


10
Value
0
10.203
180.
Force Deployment (Days)

DATA CALL QUESTIONS

DoD #829: Rail Outload Capability; On-post Railhead-Capacity

Question: What is your installation's rail outloading capability in railcars per day and ISO containers per day? How many times per day can a string of railcars be switched at your facility (train cycles per day)?

Source / Reference: AR 55-4, CONUS Installation Materiel Outloading and Receiving Capability Report.

Amplification: Assume peacetime operations, an 8-hour standard workday, and current available manpower, facilities and equipment. Also assume rail operations are conducted separately from motor operations.

Check here if this question is Not Applicable (N/A): ☐

Please fill in the following table(s)

Tracks	Number (#) numeric
Rail outload in railcars per day	
ISO containers by rail per day	
Train cycles per day	

DoD #830: Rail Outload Capability; Off-post Railhead

Question: What is the capability, in railcars loaded perday, of the closest off-post rail facility providing end ramp loading operations? What is the distance (in miles) to this facility from your installation?

Source / Reference: AR 55-4, CONUS Installation Materiel Outloading and Receiving Capability Report.

Amplification: Assume peacetime operations, an 8-hour standard workday, and current available manpower, facilities and equipment. Also assume rail operations are conducted separately from motor operations.

Check here if this question is Not Applicable (N/A): ☐

Please fill in the following table(s)

Off-post Rail Facility	Number (#) numeric
Railcars per day	
Distance from installation	

DoD #833: Motor Outload Capability

Question: What is your installation's motor outloading capability as measured in tractor/trailer combinations per day and convoys per day? What is your installation's capability to outload ISO containers by truck as measured in containers per day?

Source / Reference: AR 55-4, CONUS Installation Materiel Outloading and Receiving Capability Report.

Amplification: Assume peacetime operations, an 8-hour standard workday, and current available manpower, facilities and equipment. Also assume rail operations are conducted separately from motor operations. A convoy consists of 20 or more vehicles.

Check here if this question is Not Applicable (N/A): ☐

Please fill in the following table(s)

Motor Outload Means	Number (#) numeric
Tractor trailer combinations per day	
Convoys per day	
ISO containers per day	

DoD #835: Air Outload Capability

Question: What is the distance in miles from the installation to the closest C-17 capable airport that can serve as an aerial port of embarkation (APOE)? What is the estimated maximum number of C-17 sorties per day that could fly from this airfield?

Source / Reference: AR 55-4, CONUS Installation Materiel Outloading and Receiving Capability Report.

Amplification: Assume a 24 hour workday.

Check here if this question is Not Applicable (N/A): ☐

Please fill in the following table(s)

Question	Number (#) numeric
Distance (miles) to the closest C-17 capable airport	
Estimated maximum number of C-17 sorties per day	

MATERIEL DEPLOYMENT

As of: 22 March 05

1. **DEFINITION:** The time, in days, it takes to deploy a notional amount of materiel from the installation eastward and westward to overseas theater locations using various modes of transport.
2. **PURPOSE:** Measures the capability of an installation to support material deployment.
3. **SOURCE:** Military Surface Deployment and Distribution Command Transportation Engineering Agency (MSDDCTEA) databases, Installation Military Value Data Call.
4. **METHODOLOGY:** MSDDCTEA will use the following guidelines to derive the installation's deployment score (***depscore***).

    a. *Surface Deployment Time*
        i. *instoutload*: Time required to out-load the materiel (1000 ISO containers) from the installation by either rail or motor, given its current infrastructure and material handling equipment.
        ii. $mvttoSPOE_i$: Time required to move from the installation via rail or motor to the closest seaport of embarkation ($SPOE_i$) on theWest Coast and either the East or Gulf Coast, where the subscript *i* represents West and East/Gulf Coast ports.

    b. *Aerial Deployment Time*
        i. $thruputAPOE_i$: Time required for the entire unit to transload on aircraft and depart from the selected APOE,
        ii. $mvttoAPOE_i$: Time required to move from the installation to the nearest aerial port of embarkation (APOE);

    c. Leases receive 0 value for this attribute.

5. **QUESTIONS THAT DEFINE DATA:**

    a. Installation MV Datacall:

        i. What is your installation's rail outloading capability in railcars per day and ISO containers per day? How many times per day can a string of railcars be switched at your facility (train cycles per day)? (DoD Q#829)

        ii. What is the capability, in railcars loaded per day, of the closest off-post rail facility providing end ramp loading operations? What is the distance (in miles) to this facility from your installation? (DoD Q#830)

        iii. What is your installation's motor outloading capability as measured in tractor/trailer combinations per day and convoys per day? What is your installation's capability to outload ISO containers by truck as measured in containers per day? (DoD Q#833)

        iv. What is the distance in miles from the installation to the closest C-17 capable airport that can serve as an aerial port of embarkation (APOE)? What is the estimated maximum number of C-17 sorties per day that could fly from this airfield? (DoD Q#835)

b. TEA Databases.

i. What is the road time to port?

ii. What is the rail time to port?

6. REFERENCES: FM 55-80, MSDDCTEA Technical Report

7. UNIT OF MEASURE: Days

8. EQUATION:

$$depscore = instoutload + \sum_{i=1}^{2} \left(mvtoSPOE_i + mvtoAPOE_i \right) + thruputAPOE_i$$

9. MODEL REQUIREMENTS:

a. Model Input:

The only model inputs are the components of an installation's ***depscore***.

b. Value Function

i. The value function converts the installation's ***depscore*** into a military value between 0 and 10.

ii. The value function uses a single equation that measures the returns to scale of the attribute's score and returns the value of an installation's ***depscore***. The curvature of the function is determined by TABS and coordinated with MSDDCTEA SMEs.

iii. The maximum value of 10 is given to the installation with the lowest ***depscore***.

iv. The minimum value of 0 is given to any installation with a ***depscore*** greater than 365 days.

c. Assessment

i. A value function assessment was conducted. SMEs determined that there was significantly more value for installations with deployment capability and that value lowered quickly as the time it takes to deploy increases.

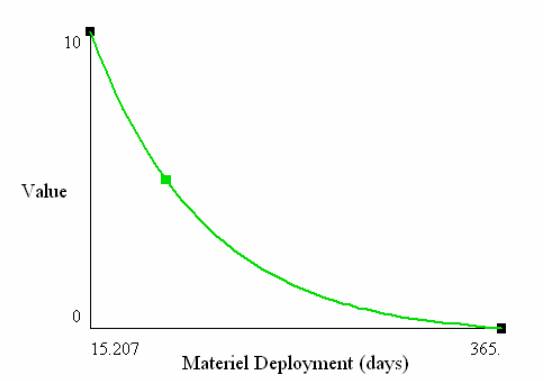
ii. The assessment also determined that the point where an installation should receive half of the maximum value was 80 days.

d. Model Output

i. The value function provides the military value of the installation with regards to material deployment capabilities as measured by the ***depscore***.

ii. Scores are normalized on a scale of zero to ten based on the curvature of the value function.

iii. This value function shows a convex relationship, which accounts for the much higher value given to faster deployment times, which then decreases at an increasing rate.


10
Value
0
15.207
365.
Materiel Deployment (days)

DATA CALL QUESTIONS

DoD #829: Rail Outload Capability; On-post Railhead-Capacity

Question: What is your installation's rail outloading capability in railcars per day and ISO containers per day? How many times per day can a string of railcars be switched at your facility (train cycles per day)?

Source / Reference: AR 55-4, CONUS Installation Materiel Outloading and Receiving Capability Report.

Amplification: Assume peacetime operations, an 8-hour standard workday, and current available manpower, facilities and equipment. Also assume rail operations are conducted separately from motor operations.

Check here if this question is Not Applicable (N/A): ☐

Please fill in the following table(s)

Tracks	Number (#) numeric
Rail outload in railcars per day	
ISO containers by rail per day	
Train cycles per day	

DoD #830: Rail Outload Capability; Off-post Railhead

Question: What is the capability, in railcars loaded perday, of the closest off-post rail facility providing end ramp loading operations? What is the distance (in miles) to this facility from your installation?

Source / Reference: AR 55-4, CONUS Installation Materiel Outloading and Receiving Capability Report.

Amplification: Assume peacetime operations, an 8-hour standard workday, and current available manpower, facilities and equipment. Also assume rail operations are conducted separately from motor operations.

Check here if this question is Not Applicable (N/A): ☐

Please fill in the following table(s)

Off-post Rail Facility	Number (#) numeric
Railcars per day	
Distance from installation	

DoD #833: Motor Outload Capability

Question: What is your installation's motor outloading capability as measured in tractor/trailer combinations per day and convoys per day? What is your installation's capability to outload ISO containers by truck as measured in containers per day?

Source / Reference: AR 55-4, CONUS Installation Materiel Outloading and Receiving Capability Report.

Amplification: Assume peacetime operations, an 8-hour standard workday, and current available manpower, facilities and equipment. Also assume rail operations are conducted separately from motor operations. A convoy consists of 20 or more vehicles.

Check here if this question is Not Applicable (N/A): ☐

Please fill in the following table(s)

Motor Outload Means	Number (#) numeric
Tractor trailer combinations per day	
Convoys per day	
ISO containers per day	

DoD #835: Air Outload Capability

Question: What is the distance in miles from the installation to the closest C-17 capable airport that can serve as an aerial port of embarkation (APOE)? What is the estimated maximum number of C-17 sorties per day that could fly from this airfield?

Source / Reference: AR 55-4, CONUS Installation Materiel Outloading and Receiving Capability Report.

Amplification: Assume a 24 hour workday.

Check here if this question is Not Applicable (N/A): ☐

Please fill in the following table(s)

Question	Number (#) numeric
Distance (miles) to the closest C-17 capable airport	
Estimated maximum number of C-17 sorties per day	

OPERATIONS/ADMINISTRATIVE FACILITIES

As of: 23 March 05

1. **DEFINITION:** The weighted sum (by quality condition) of the square footage of operations and administrative facilities on an installation.
2. **PURPOSE:** Measures the installation's current capability to accomplish operations and/or administrative missions as well as its ability to expand to accommodate additional Ops/Admin missions.
3. **SOURCE:** Data for this attribute is from HQRPLANS and the ISR. No installation data call is required.
4. **METHODOLOGY:**
    a. The FCGs used for this measure: F60000 (General Administrative), F14110 (Airfield Ops), F14112 (Aviation Unit Ops), F14161 (EOC/SCIF), F14182 (Brigade HQ), F14183 (Battalion HQ), and F14185 (Company HQ).
    b. Quality factors for Amber to Green (.71) and Red to Green (.36) are taken from COBRA JPAT deliberations (attached).
    c. MVA calculates the Ops/Admin Facilities (OAF) score using a weighted sum of the existing Operations and Administrative square feet. The weighted sum is calculated by multiplying the quality factor and the installation's corresponding amount of each type of square feet, and then summing these values. This equation is illustrated in paragraph 8.
    d. Convertible space was considered for General Instructional facilities; however, all convertible FCGs did not meet cost requirements.
    e. Leases receive 0 value for this attribute.
5. **QUESTIONS THAT DEFINE DATA:**

    What is the total square footage of Ops/Admin Facilities on the installation by quality condition (in square feet based on HQRPLANS Version 12.50 – calculate by subtracting temporary asset from total assets)?
6. **REFERENCES:**

    June 2003, HQRPLANS Version 12.50, Installation Status Report (ISR), May 2004 DOD Facility Pricing Guide, Determining a Rehabilitation Construction Standard Factor For Cobra.
7. **UNIT OF MEASURE:** Square feet
8. **EQUATION:**

    Ops/Admin Facility (OAF) Score = G*(1.0) +A*(0.71) +R*(0.36), where G, A, and R = SQ feet of Green, Amber, and Red space.
9. **MODEL REQUIREMENTS:**
    a. Model Input:

The primary model input is the OAF score.

b. Value Function

i. The value function converts the installation's score into a military value between 0 and 10.

ii. The value function uses a single equation that measures the returns to scale of the attribute's score and returns the value of an installation's facilities. The curvature of the function is determined by TABS and coordinated with ACSIM's SMEs.

iii. The maximum value of 10 is given to the installation with the greatest total square footage of Ops/Admin Facilities (e.g., the highest score).

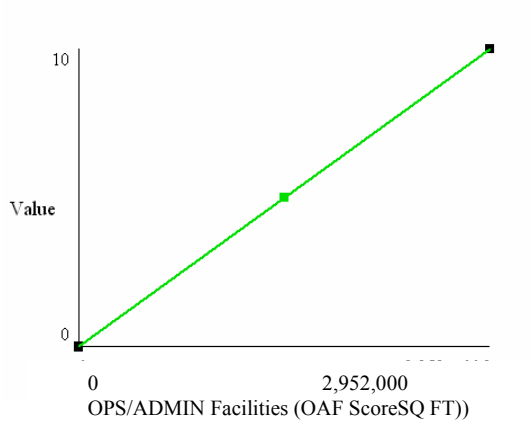
iv. The minimum value of 0 is given to the installation with the lowest total square footage of Ops/Admin Facilities.

c. Model Output

i. The value function provides the military value of the installation with regards to the total square footage of Ops/Admin Facilities capability as measured by total square footage.

ii. Scores are normalized on a scale of zero to ten based on the curvature of the value function.

iii. This value function shows a linear relationship, which equates to constant returns to scale. The function implies that every additional SF increment has the same value as the prior increment.



Score

ACCESSIBILITY

As of: 23 March 05

1. **DEFINITION:** A combination of an installation's proximity to major DoD installations, major civilian airports and the number of such installations and airports within a given radii.
2. **PURPOSE:** Measures an installation's potential to conduct/support joint and homeland defense command and control missions by assessing the ability of the installation's personnel to rapidly and efficiently travel to multiple destinations.
3. **SOURCE:** CAA, GIS; no installation data call required.
4. **METHODOLOGY:**
    a. Values are assigned using the below table based on the number of major DoD installations and major civilian airports and their relative proximity to the installation.
    b. A "major" installation is defined as having a total workforce population (military, DoD civilian, and other civilians employed on the installation) of 5,000 or more. This definition of "major" installation is the same one used by the Army Stationing and Installation Plan (ASIP) database. The population data for all installations is derived from the 2003 DoD Base Structure Report maintained by the Deputy Under Secretary of Defense for Installations and Environment (DUSD-IE).
    c. A "major" airport is defined as having a 2002 enplanement level of 1 million or more. The Federal Aviation Administration's (FAA) 2002 Air Carrier Activity Information System (ACAIS) is used for all enplanement data. By using this enplanement level as a threshold, we separate the smaller airports that offer limited flight options (e.g. destinations, flights per day, hours of operation) from those that have a more robust capability and can therefore service an installation's personnel more effectively.
    d. If an installation does not have a major DoD installation or a major civilian airfield within 180 miles, it will receive a score of zero.
    e. Using GIS databases, TABS will plot all major military installations and major airports to calculate how many fall within the given radii.
5. **QUESTIONS THAT DEFINE DATA:**

    How many major DoD installations and major civilian airports are within 60 miles, between 61 and 120 miles, and between 121 and 180 miles?
6. **REFERENCES:**
    a. GIS Software (ARCGIS 8.3 developed by ESRI-Environmental Systems Research Incorporated)
    b. 2003 Base Structure Report, maintained by the DUSD-IE
    c. 2002 Air Carrier Activity Information System, maintained by the FAA

d. Sustainable Installations Regional Resource Assessment (SIRRA) Database

e. CAA Technical Report.

7. **UNIT OF MEASURE:** Value from table

8. **EQUATION:** N/A

9. **MILITARY VALUE FUNCTION:**

a. Model Inputs:

i. The installation's accessibility, as measured by proximity and number of major DoD installations and major civilian airports, is the model's primary input.

ii. The maximum value of 10 will be given to the installations with >=2 installations and >= 1 airport or >=2 airports and >= 1 installation that are less than 60 miles from the installation.

iii. The installation receives no value if there are no installations or airports within 180 miles.

iv. The below two-dimensional matrix has a label for any combination of airports and installations and distances that exists for an installation.

	INSTALLATIONS and AIRPORTS			
DISTANCE From Airports (AP) and Installations (Inst) in miles	1 Inst	1 AP **OR** 2 Inst	1 Inst **AND** 1 AP	>= 2 Inst **AND** >= 1 AP **OR** >= 2 AP **AND** >= 1 Inst
<=180	Lable 1	Lable 2	Lable 3	Lable 4
<=120	Label 5	Label 6	Label 7	Label 8
<=60	Label 9	Label 10	Label 11	Label 12

b. Value Function

i. The value function is a representation of the military value of an installation's accessibility of that force and converts the raw data that TABS plots into the above matrix to determine a military value for the installation.

ii. The assessment of the function is determined by TABS and coordinated with CAA.

iii. Assessment Results.

1. The table below illustrates the assessment's values, which consists of a series of pair-wise comparisons between the Labels, based on a range from 1 to 12. A comparison of "1" indicates that preferences between the Labels are the same. A "12" indicates that the preference of one Label to another is extreme.

C.R. = 0.028	Label 0	Label 1	Label 2	Label 3	Label 4	Label 5	Label 6	Label 7	Label 8	Label 9	Label 10	Label 11	Label 12
Label 0	0	0.5	0.333	0.25	0.167	0.333	0.2	0.143	0.125	0.25	0.167	0.125	0.111
Label 1	2	0.14	0.5	0.333	0.25	0.5	0.2	0.143	0.125	0.25	0.167	0.125	0.111
Label 2	3	2	0.43	0.333	0.25	1	0.25	0.2	0.143	0.333	0.25	0.143	0.125
Label 3	4	3	3	1.619	0.5	3	0.5	0.333	0.25	2	0.333	0.25	0.2
Label 4	6	4	4	2	3.013	3	2	0.5	0.333	3	1	0.333	0.25
Label 5	3	2	1	0.333	0.333	0.647	0.5	0.333	0.167	0.5	0.333	0.167	0.143
Label 6	5	5	4	2	0.5	2	2.281	0.5	0.333	2	0.5	0.333	0.25
Label 7	7	7	5	3	2	3	2	4.475	0.5	3	2	0.5	0.333
Label 8	8	8	7	4	3	6	3	2	7.181	4	3	1	0.5
Label 9	4	4	3	0.5	0.333	2	0.5	0.333	0.25	1.434	0.5	0.333	0.25
Label 10	6	6	4	3	1	3	2	0.5	0.333	2	3.296	0.5	0.333
Label 11	8	8	7	4	3	6	3	2	1	3	2	6.738	0.5
Label 12	9	9	8	5	4	7	4	3	2	4	3	2	10

For example (refer to the above matrix), the SME indicates that Label 11,read vertically(scores a 7) is near *extremely* preferred over Label 2, and Label 6 is *moderately* preferred over Label 2 (scores a 4).

2. This has a consistency ratio (CR) of 0.028 that indicates that the pair-wise comparisons are *consistent* across all Labels. A CR 0.1 is considered adequate. For example, a consistent ranking between Labels would mean that if A > B and B > C then A > C. However, if A < C, then the ranking would be considered inconsistent.
3. The values associated with each Label are obtained from the previous assessment matrix by recording the values along the diagonal of the matrix. For ease of exposition, we show values for each Label in the following matrix:

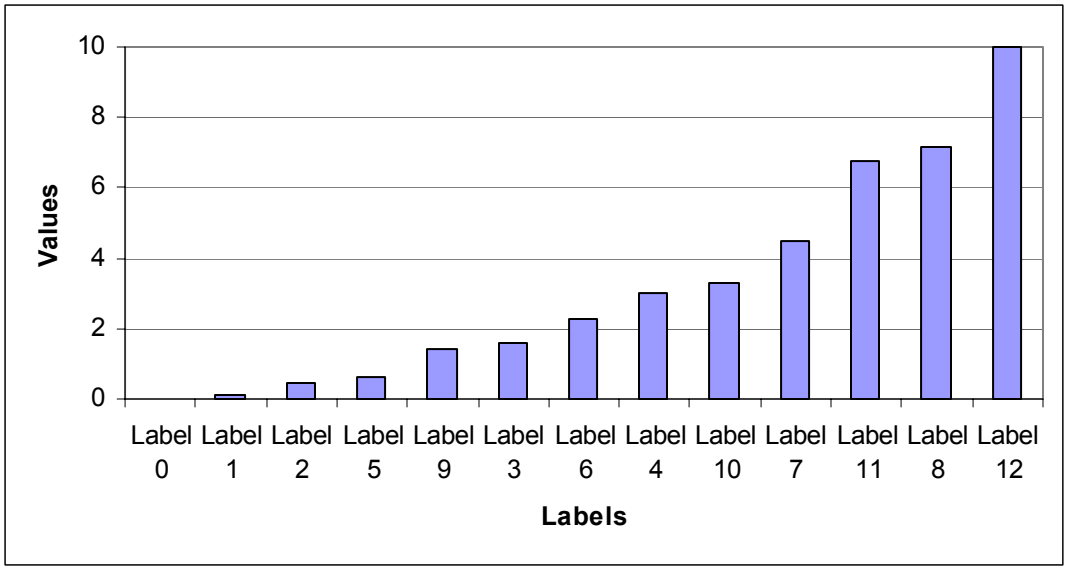
	INSTALLATIONS and AIRPORTS			
DISTANCE From Airports (AP) and Installations (Inst) in miles	1 Inst	1 AP **OR** 2 Inst	1 Inst **AND** 1 AP	>= 2 Inst **AND** >= 1 AP **OR** >= 2 AP **AND** >= 1 Inst
<=180	0.14	0.43	1.62	3.01
<=120	0.65	2.28	4.48	7.18
<=60	1.43	3.3	6.74	10.00

c. Model Output

i. The above matrix represents the model's results (the diagonal of the assessment matrix). Most installations will have accessibility that will fit into this matrix. If the installation's values do not fall on the matrix, it receives "0" value for this attribute.

ii. Raw scores are normalized on a scale of zero to ten based on assessment results shown in the previous matrix.

iii. The histogram for the Value Function provides a graphical representation of the previous matrix. The military values shown in the following graph are ordered according to increasing value based on the assessment. The values show that there are several combinations for this attribute that have nearly the same military value.



CONNECTIVITY

As of: 23 March 2005

1. **DEFINITION:** A combination of the completeness of the on-post communications infrastructure, the installation's potential connectivity to cellular communications and commercial long haul fiber optic networks, and the level of spectrum encroachment the installation is experiencing.
2. **PURPOSE:** To measure installation's ability/capability to provide its tenant units and activities access to a robust, high capacity and expandable communications network.
3. **SOURCE:** Army G-6/ISEC (no installation data call required)
4. **METHODOLOGY**: An installation's "connectivity" score is the sum of scores from four components: Installation Information Infrastructure Modernization Program (I3MP) Status; Commercial Cellular Service (CCS); Commercial Long Haul Network (CLHN); and the Risk of Spectrum Encroachment (RSE). The Army's Chief Information Officer/G6 (CIO/G6) will collect the data, score and weight the components, calculate the installations' connectivity scores using the process below and provide those scores to TABS.
    a. **I3MP Status**.
        i. **Data Source**. The I3M Program Manager in Program Executive Office Enterprise Information Systems (PEO-EIS) will provide the installations' I3MP status from their 2003 Installation Sequence List (ISL).
        ii. **Component Methodology**. The I3MP is a major upgrade to the post information infrastructure and includes campus area fiber optic cable and "Gigabit Ethernet" data switching. CIO/G6 will determine the score from the installation's current status in the Army's I3MP as provided by PEO-EIS using the matrix below:

I3MP Status	I3MP score
I3MP No	0
I3MP Yes	10

        iii. **Scoring**.
            1. Installations that are undergoing or have undergone I3MP upgrade score the maximum.
            2. Though some installations are scheduled to receive the I3MP upgrade in the near term, the priorities for executing the ISL can change and resources for future upgrades may be at risk so all installations that have not received the upgrade are considered to be equal and will be scored at zero.

b. **CCS.**

i. **Generic Data Source.** The sources of cellular telephone data will be *Wireless Advisor.com* for generic cellular service. Wireless Advisor shows both major providers and smaller companies that lease tower space and bandwidth from the major providers. In this case, major providers can be considered both "wholesalers" and "retailers", while the smaller providers are only "retailers". This difference does not negate the FCC data, but validates the minimum number of reliable providers. Wireless Advisor allows quick searches by zip code, and gives a list of providers in that specific area. The Wireless Advisor data set is an enhancement of the "Eighth Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services", from the Federal Communication Commission (FCC), dated July 14, 2003. This report provides the number of licensed providers in specific cellular market areas, by county. The cellular market areas can be cross-referenced (by county) to FCC provided cellular market area spreadsheets. An automated county to cellular market area cross-reference is also provided on the FCC Office of Engineering and Technology website.

ii. Sectera secure cellular phones provide Army and other Government users the means to exchange sensitive and classified information with end-to-end security over an extensive commercial wireless network worldwide. The Sectera phone must have access to a Global System for Mobile Communications (GSM) circuit switched data service. In addition, to ensure that senior leaders have priority mobile wireless services, Wireless Priority Service (WPS) must accompany the GSM service. WPS provides emergency access during a national security and emergency preparedness (NS/EP) event that causes congestion and blockage in the commercial cellular network. The only service providers with a nationwide GSM system that supports WPS are T-Mobile and AT&T. We will assess T-Mobile and AT&T proprietary coverage data.

iii. **Component Methodology**. The CCS Score will be derived from the number of wireless providers capable of providing service to the installation, with additional points garnered for covered by a GSM/WPS network. The table below shows the category score for the given number of commercial cellular service providers for the installation.

Commercial Cellular Service Level	Cellular Service Score
2 or less providers; no GSM/WPS	2
2 or less providers; GSM/WPS	5
3 or more providers; no GSM/WPS	7
3 or more providers; GSM/WPS	10

iv. **Scoring**.

1. With the steady increase in providers, we believe all installations will be found to have at least 2 providers. The range of services provided by only two providers is likely to be minimal.
2. An installation with three or more providers enjoys a saturated provider market, with a full range of technologies and services available.
3. GSM/WPS is a key service supporting secure users.

c. **CLHN**.

i. **Data Source**. The Defense Information Systems Agency (DISA) G6 in the form of geographical maps displaying service provider routes and access points and compare to the location of the main distribution facilities on Army posts, camps, and stations.

ii. **Component Methodology**. The CLHN score will be based on the proximity to major long haul fiber optic pathways. This assessment will address the number of independent commercial fiber optic carriers with access points within the minimum distance (80 km, or 50 miles) from the installation's main distribution facility that fiber could support a data rate of OC-48 without requiring a regeneration repeater to the carrier's access point (OC-48 range). We will also consider if there is already fiber service to the base. CLHN will be determined using this along with the number of carriers with access points and the matrix below:

Fiber optic carriers within OC-48 Range	Long-Haul Network Score
0	0
1	5
2 or more	7
Fiber to base in place	10

iii. **Scoring**.

1. Bases with fiber connectivity in place and will be scored the highest.

2. Two or more fiber optic carriers have access points within the 50 miles of the installation's main distribution facility. The installation is in a competitive market for long haul fiber optic carrier service.
3. A single fiber optic carrier has an access point within the 50-mile OC-48 range. The installation has the possibility of obtaining long haul fiber optic connectivity to the Global Information Grid.
4. If there is no fiber optic carrier access point meeting the distance requirement above, installation will be assessed at zero because of fiber optic connectivity to the outside world would available only at a prohibitive cost to DISA or the army as a significant amount of fiber optic cable would have to be constructed at Department of Defense expense.

d. **RSE.**

i. **Data Source.** The source data is extracted from three government databases: the Government Master File of all government assigned frequencies, the Joint Spectrum Center's Frequency Resource Record System covering temporarily assigned frequencies, and the Joint Spectrum Center's Federal Communications Commission Federal Assignment Retrieval System database of assigned commercial frequencies.

ii. **Component Methodology**. The RSE score will be based on an assessment of the degree of utilization of a number of key bands of both government and commercial spectrum in the vicinity of the installation. NETCOM's Spectrum Management Office will produce a technical compilation of data using the software tool "Spectrum 21" to pull and compile the data. The occupancy of a band will be the fraction of total channels in the band that are currently utilized or authorized for use. The average occupancy for the bands will be the normalized sum of the occupancy of each band. The sum is not weighted because all bands are considered equally valuable as alternate means of communications. CIO/G-6 will produce an installation's RSE score using the matrix below:

Spectrum Encroachment Level	Spectrum Encroachment Score
Severe Occupancy/Risk	0
High Occupancy/Risk	2
Med Occupancy/ Risk	6
Low Occupancy/ Risk	10

iii. **Scoring**.

1. Low overall occupancy/risk (less than 33%). The addition of new communication capability is unlikely to be limited due to spectrum availability.
2. Medium overall occupancy/risk (33 to 66%). New communications capability likely to be moderately limited affecting core mission accomplishment.
3. High overall occupancy/risk (67% to 90%). New communications capabilities likely to be limited, adversely impacting core mission accomplishment.
4. Severe Occupancy/Risk (more than 90%). No new communications capability is possible. The current mission set is impacted significantly.
5. Leases receive 0 value for this attribute.

5. QUESTIONS THAT DEFINE DATA:

a. Has the installation undergone I3MP modernization?

b. According to the Wireless Advisor provider database, how many commercial cellular service providers service the post headquarters zip code? Does that service include access to a Global System for Mobile Communications (GSM) circuit switch data service and Wireless Priority Service (WPS).

c. How many commercial fiber carriers provide access points within 50 miles of the installation's main distribution point, per DISA's data? Does the installation have fiber connectivity service already in place?

d. What is the average spectrum occupancy (channels assigned/total channels)?

6. REFERENCES:

a. The Program Manager's records of which installations have been modernized under the I3MP.

b. Wireless Advisor.com

c. DISA's fiber path records (CONUS maps)

d. The Government Master File of all government frequency assignments

e. The Joint Spectrum Center's Frequency Resource Record System covering temporarily government frequency assignments

f. The Joint Spectrum Center's Federal Communications Commission Federal Assignment Retrieval System database of commercial frequency assignments

7. UNIT OF MEASURE: Derived score.

8. EQUATION:

a. Connectivity Score = (W_{I3})*(I3 score) + (W_{CCS})*(CCS score) + (W_{CLHN})*(CLHN score) + (W_{SO})*(SO score)

b. Weighting. CIO/G6 has weighted the components as follows: $W_{I3} = 0.1$; $W_{CCS} = 0.4$; $W_{CLHN} = 0.3$; $W_{SO} = 0.2$. Rationale:

i. Of the four characteristics comprising the military value attribute "connectivity", the most immutable characteristic is the commercial cellular service ($W_{CCS} = 0.4$). The government is not capable of significantly affecting the degree to which cellular providers are willing to invest in services to a base - this is driven by population and the economy in the area; that is, the potential market.

ii. The next most immutable characteristic is the proximity of long haul commercial fiber carriers ($W_{CLHN} = 0.3$). Here DoD is experiencing firsthand the daunting task of augmenting what the market has put in place by having to trench fiber paths versus procuring dark fiber. The enormous cost of installing fiber is in some cases prohibitive even for a current $900 million bandwidth expansion program.

iii. The spectrum occupancy ($W_{SO} = 0.2$) is a characteristic that is less immutable because we own portions of the spectrum and can redirect its use. At the same time, there are military useful portions of the spectrum in commercial bands where we have no control to what degree they may already be in use; this situation may be viewed as immutable from the Army's point of view.

iv. Lastly, the I3MP ($W_{I3} = 0.1$) is the least immutable of our characteristics. If the Army, or DoD, or Congress chooses to solve any deficiency in base info infrastructure, it can do so. At the same time, solving the programatics by developing the corporate will to do so is based on priorities that can shift easily. Thus, work that has already been done in the area is of value and should be included in our attribute assessment.

9. MILITARY VALUE FUNCTION:

a. Model Input:

The primary model input is the installation's connectivity score.

b. Value Function

i. The value function converts the installation's connectivity score into a military value between 0 and 10.

ii. The value function uses a single equation that measures the returns scale of the attribute's score and returns the value of an installation's connectivity score. The curvature of the function is determined by TABS and coordinated with CIO/G6 SMEs.

iii. The maximum value of 10 is given to the installation with the highest connectivity score.

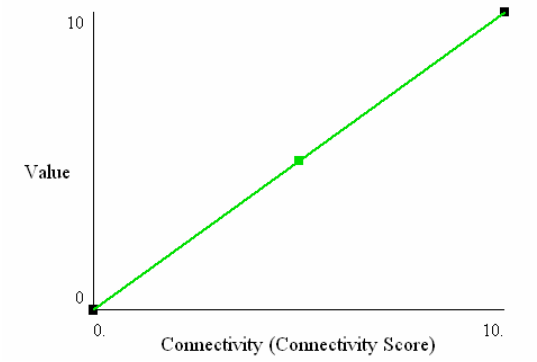
iv. The minimum value of 0 is given to the installation with the lowest connectivity score.

c. Model Output

i. The value function provides the military value of the installation with regards to communications capability as measured by the connectivity score.

ii. Scores are normalized on a scales of zero to ten based on the curvature of the value function.

iii. This value function shows a linear relationship, which equates to constant returns to scale. The function implies that every additional connectivity score increment has the same value as the prior increment.



Score

RDTE MISSION DIVERSITY

As of: 17 March 05

1. **DEFINITION:** A weighted sum of scores based on the execution of 13 technical capability areas on an installation and the installation's test resource categories that support RDTE.

2. **PURPOSE:** Measures the level of RDTE diversity that an installation can support.

3. **SOURCE:** Installation Capacity Data Call. No Installation Military Value Data Call required.

4. **METHODOLOGY:**

   a. Installation (from Installation Capacity Data Call):

      i. For each of the 13 Technical Capability Areas[1] the installation reports funds received.

      ii. The installation reports the ability to provide 5 test resource categories: Digital Modeling and Simulation, Installed System Test, Hardware in the Loop, Integration Laboratory, and Measurement.

      iii. Leases receive 0 value for this attribute.

   b. TABS

      i. All calculations will take place within TABS.

      ii. The technical capability and test resource categories are combined in a weighted equation. The maximum value for the technical capabilities is 13; Research Development and Acquisition and Testing capabilities are combined to determine the coverage across the 13 capabilities.

      iii. Specific calculations are outlined in paragraph 8.

5. **QUESTIONS THAT DEFINE DATA:**

   a. For funds received for Research Development and Acquisition use DoD Capacity Data Call; Questions #734-746; sum FY03 columns, one question is for each of 13 technical areas (Example for one Technical Capability Area is at Attachment 1)

   b. For installation's 6 test resource capabilities and 13 technical areas for Test and Evaluation use Question #748, count all technical capability areas that have a funding value for FY03, maximum of 13 (Attachment 1)

[1] The 13 Technical Capability Areas are Air Platforms, Battlespace Environments, Biomedical Technology, Chemical and Biological (CB), Defense Technology, Ground Vehicles, Sea Vehicles, Human Systems, Information Systems, Nuclear Technology, Materials/Processes, Sensors, Electronics, and Electronic Warfare, Space Platforms, and Weapons Technology (DTAP, February 2003).

6. REFERENCES: The Defense Technology Area Plan (DTAP), February 2003

7. UNIT OF MEASURE: Each

8. EQUATION:

a. TABS will take all data, place into appropriate matrix, and determine the installation scores.

i. The equation has two components, "Capability_Area" and "Test_Cat." Each component is normalized to a value of 100 (multiply "Capability_Area" by $100/13^2$ and "Test_Cat" by $100/6^3$).

ii. Capability_Area Score = $(100/13) * \sum_{k=1}^{13} A_k$,

where $A_k = \begin{Bmatrix} 0 \\ 1 \end{Bmatrix}$, is the score for each technical capability area, with 0 as the default value and is equal to 1 when any cell within a column of the following matrix is entered with a non-zero value[4]. A_k has a maximum value of 1.

	Air Platforms	Grd Vehicles	Sea Vehicles	Space Platforms	Weapons	Nuclear Technology	Materials	Biomedical	Human Sys	Chem Bio Battlespace Envirnnt		Sensors, Electronics, EW	Info Sys
Fund received (%)													
Total Score	A_1	A_2	A_3	A_4	A_5	A_6	A_7	A_8	A_9	A_{10}	A_{11}	A_{12}	A_{13}

Figure 1 Score for 13 Technical Capability Areas

iii. Test_Cat Score = $100/6 * \sum_{k=1}^{5} B_k$,

Where $B_k = \begin{Bmatrix} 0 \\ 1 \end{Bmatrix}$ is the score for each test resource categories listed in the following table, with 0 as the default value and is equal to 1 when any cell within a column of the following matrix is checked off. B_k has a maximum value of 1.

[2] 13 is the number of technical areas as stated in section 5a.
[3] 6 is the number test resource capabilities as stated in section 5b.
[4] The values for these entries will be used for other analysis. For the military value analysis, it will be only accounted as productivity in the corresponding technical capability area.

	Digital M&S	Installed System Test	H/W in the Loop	Integ Lab	Measurement	Open Air Range
Res						
D&A*						
T&E						
Total Score	B1	B2	B3	B4	B5	B6

Figure 2 Test Resource Categories
* D&A stands for Development and Acquisition.

b. TABS will take the above component results and determine the installation scores using the following equation.

MnDiv Score = 0.75* Capability_Area Score + 0.25* Test_Cat Score

9. MODEL REQUIREMENTS

a. Model Input:

The primary model input is the MnDiv Score.

b. Value Function

i. The value function converts MnDiv into a military value between 0 and 10.

ii. The value function uses a single equation that measures the returns to scale of the attribute's score and returns the value of an installation's facilities. The curvature of the function is determined by TABS and coordinated with ASAALT/TEMA/ATEC SMEs.

iii. The maximum value of 10 is given to the installation with the greatest MnDiv Score.

iv. The minimum value of 0 is given to the installation with the lowest MnDiv Score.

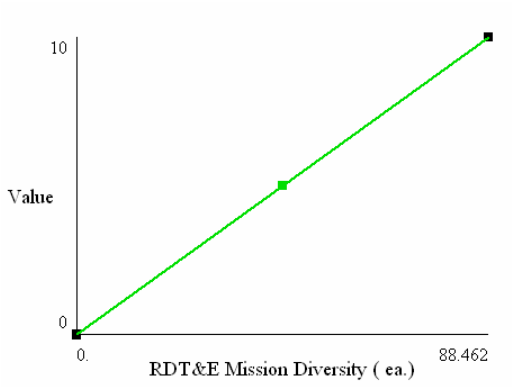
c. Model Output

i. The value function provides the military value of the installation with regards to the total value of the MnDiv Score

ii. Scores are normalized on a scale of zero to ten based on the curvature of the value function.

iii. This value function shows a linear relationship which equates to constant returns to scale. Constraint implies that every additional MnDiv score is valued as much

as the prior score.



Score

Attachment 1: Excerpts from 2004 DoD Capacity Data Call

DOD #737: Funding, Ground Vehicles (includes Land Combat)

Question: Answer the following question if research, development, test, evaluation or acquisition functions are done at your location.

For the function identified provide the funding for three years (FY01, FY02, FY03) and the peak funding year (from FY94 through FY03) for RDTE&A funding received at the location. The peak funding year could be FY01 or FY02 or FY03.

Source / Reference: Comptroller Records

Amplification: There is exactly one peak funding year at each location. It is defined to be the year (beginning with FY94) that the location had the most RDTE&A funds (summed over all the functions (R, D&A, T&E) and summed over the thirteen technical capability areas).

The total funds summed over the thirteen technical capability areas and summed over the three functions is not to exceed the total funds received by the location.

The peak year RDTE&A funding data is to correspond to the location as currently configured. RDTE&A funding data to determine the peak year should not include technical capacity that no longer exists (e.g., technical capacity which has been removed by prior BRAC transfers from the location; technical capacity which has been dismantled, demolished, abandoned, etc.).

For purposes of this question, intramural funding includes funding for all activities conducted within your facilities, including on-site contractors (e.g., SETA, A&AS, A76, all on-site FFRDC personnel, Intergovernmental Personnel Act appointees, etc. for which the location is obliged to provide space). Extramural funding includes funding transferred to another DoD activity by your activity to accomplish your mission, as well as transfers to organizations outside of the DoD. Include support functions associated with procurement, including fielding, new equipment training, provisioning, etc. The "Other" category should include funding received from industry as a result of CRDAs, international agreements, or other arrangements.

Check here if this question is not applicable (N/A): ☐

Please fill in the following table(s)

Function: Ground Vehicles (includes T&E Land Combat)	Peak Year Intramural Execution ($K)	Peak Year Extramural execution within DoD ($K)	Peak Year Extramural execution outside DoD ($K)	FY01 Intramural Execution ($K)	FY01 Extramural execution within DoD ($K)	FY01 Extramural execution outside DoD ($K)	FY02 Intramural Execution ($K)	FY02 Extramural execution within DoD ($K)
Research: from Army								
Research: from Navy								
Research: from Air Force								
Research: from Other DoD								
Research: from Other Federal								
Research: from Other non-Federal								
Development & Acquisition: from Army								
Development & Acquisition: from Navy								
Development & Acquisition: from Air Force								
Development & Acquisition: from Other DoD								
Development & Acquisition: from Other Federal								
Development & Acquisition: from Other non-Federal								
Test & Evaluation: from Army								
Test &								

Function: Ground Vehicles (includes T&E Land Combat)	Peak Year Intramural Execution ($K)	Peak Year Extramural execution within DoD ($K)	Peak Year Extramural execution outside DoD ($K)	FY01 Intramural Execution ($K)	FY01 Extramural execution within DoD ($K)	FY01 Extramural execution outside DoD ($K)	FY02 Intramural Execution ($K)	FY02 Extramural execution within DoD ($K)
Evaluation: from Navy								
Test & Evaluation: from Air Force								
Test & Evaluation: from Other DoD								
Test & Evaluation: from Other Federal								
Test & Evaluation: from Other non-Federal								

Function: Ground Vehicles (includes T&E Land Combat)	FY02 Extramural execution outside DoD ($K)	FY03 Intramural Execution ($K)	FY03 Extramural execution within DoD ($K)	FY03 Extramural execution outside DoD ($K)
Research: from Army				
Research: from Navy				
Research: from Air Force				
Research: from Other DoD				
Research: from Other Federal				
Research: from Other non-Federal				
Development & Acquisition: from Army				
Development & Acquisition: from Navy				
Development & Acquisition: from Air Force				
Development & Acquisition: from Other DoD				
Development & Acquisition: from Other Federal				
Development & Acquisition: from Other non-Federal				
Test & Evaluation: from Army				
Test & Evaluation: from Navy				
Test & Evaluation: from Air Force				
Test & Evaluation: from Other DoD				
Test & Evaluation: from Other Federal				
Test & Evaluation: from Other non-Federal				

DOD #748: Test Resource Workload

Question: Answer the following question if research, development, test, evaluation or acquisition functions are done at your location.

Complete the following table for six categories of test resources.

Source / Reference: test & evaluation records

Amplification: Test resources are digital modeling and simulation, hardware in the loop, integration laboratory, installed system test, measurement facilities, and open air ranges.

The technical capability areas are Project Reliance terms defined in the Defense Technology Area Plan (DTAP). Refer to the DTAP for full definitions. Abbreviated definitions follow.

1. Air Platforms - includes efforts devoted to manned and unmanned air vehicles to provide the warfighter: Fixed-Wing Vehicles, Rotary-Wing Vehicles, Turbine Engine Technology, aircraft power, and High-Speed Propulsion.

2. Battlespace Environments - addresses the natural environment of the battlespace for the purposes of the warfighter and the impact it has on the sensors, systems, and tactics the warfighter employs. Terrestrial Environments, Ocean Battlespace Environments, Lower Atmosphere, Space/Upper Atmosphere Environments.

3. Biomedical Technology - support of the DoD mission to provide health support and services to U.S. armed forces. Combat Casualty Care, Infectious Diseases of Military Importance, Military Operational Medicine, Medical Radiological Defense, Medical Biological Defense, Medical Chemical Defense.

4. CB Defense Technology - development of technology to counter the threat of CB weapons and to ensure the safety and mission effectiveness of U.S. forces operating within a contaminated environment with minimal impact on logistics. CB Decontamination, CB Modeling & Simulation, CB Detection, CB Protection, Medical Chemical Defense, Medical Biological Defense.

5. Ground Vehicles - addresses platform and system technology sub areas that support ground vehicles (land combat and tactical vehicles and amphibious vehicles with a ground combat role).

6. Sea Vehicles - addresses platform and system technology sub areas that support sea vehicles (surface ship combatants and submarines).

7. Human Systems - develops and provides technologies, techniques and tools to ensure that people are properly selected, placed, trained, equipped, and sustained to perform effectively and safely. System Interfaces and Cognitive Processing, Personnel, Training and Leader Development, Protection, Sustainment and Physical Performance.

8. Information Systems – Knowledge and Management, Information Security, Communications

and Networking, Modeling and Simulation Technology, Computing and Software Technology.

9. Materials/Processes – Environmental Quality, Manufacturing Technology, Civil Engineering, Materials/Processes for Survivability, Life Extension, & Affordability.

10. Nuclear Technology - develop, apply, and improve the technical capabilities needed for accomplishment of DoD's nuclear and nuclear weapons related missions and support of strategic deterrence. Systems Effects & Survivability, Test & Simulation Technology, Warfighter Support, Nuclear Environments and Effects, Nuclear Threat Reduction.

11. Sensors, Electronics, and Electronic Warfare - Radar Sensors, Electro-Optical Sensors, Acoustic Sensors, Automatic Target Recognition, Integrated Platform Electronics, RF Components, Electro-Optical Technology, Microelectronics, Electronic Materials, Electronic Integration Technology, EW Threat Warning, EW Self-Protection, and EW Control.

12. Space Platforms - efforts devoted to space and launch vehicles and space propulsion.

13. Weapons Technology - efforts devoted to armament technologies for all new and upgraded nonnuclear weapon systems

Project Reliance also has T&E terms. These appear in the row headings, intended to provide additional clarity, and are defined as follows.

1. Air Combat - Addresses test capabilities for development and use of fixed-wing and/or rotary-wing manned and unmanned aircraft and all related air operations mission and support systems throughout the system life cycle.

2. Air Vehicle Types - unmanned air vehicles (UAVs), cruise missiles (excluding munitions aspects), technology demonstrations, support programs/projects and all phases of the system life cycle.

3. Total Aircraft Weapon System - the air vehicle, aircraft stores compatibility, aerial delivery, subsystems or functions, and software changes/updates.

4. Land Combat - Addresses test capabilities for land systems for:

    a. Both mounted and dismounted warriors, as well as urban operations and robotic support systems.

    b. Platform and sub-system technologies such as battlefield digitization, propulsion and power, track and suspension, chassis and turret structures, vehicle subsystems, dynamics, integrated survivability, fuels and lubricants, and integration technologies as related to land vehicles.

5. Sea Combat - Addresses test capabilities involving the use of ships (surface and subsurface), manned and unmanned sea-mobile vehicles, shipboard systems, and land and air-based systems that support or function as extensions of shipboard systems. May include:

a. Hull, mechanical, and electrical systems for surface ships, submarines, and undersea unmanned vehicles

b. Signature and silencing systems (including acoustic and non-acoustic)

c. Propulsors

d. Combat systems (including guns and missile launchers but excluding projectiles and missiles) for anti-submarine warfare (ASW), anti-surface warfare (ASUW), anti-air warfare, discrete self-defense (not integral to other combat systems), strike, and theater air defense

e. Maritime C4I systems (shipboard and associated land-based radio frequency and satellite communications/switching networks, and tactical data processing and display)

f. Ship-based space and electronic warfare systems

g. Undersea surveillance systems (including land-based components thereof)

h. Ship-based aircraft ASW/ASUW (including unmanned aerial vehicles, but excluding airframes and flight support systems)

i. Sea-based special warfare/explosive ordnance disposal systems

6. Space Combat and Ballistic Missiles - Addresses test for development and use of capabilities to:

   a. Gain and maintain control of activities conducted in or through space. These capabilities and activities include but are not limited to space surveillance, counterspace and missile defense.

   b. Conduct of missions carried out by weapons systems operating in or through space for holding terrestrial targets at risk, to include non-nuclear and nuclear strike capabilities.

   c. Enable or support military air, land, sea, and space operations, including navigation, satellite communications, environmental monitoring, surveillance and threat warning, and battle management and control.

   d. Ensure infrastructure to enable launch operations, satellite operations, and recovery operations.

7. Armaments and Munitions - Addresses test capabilities for development and use of:

   a. Torpedoes, mines (land and sea), bombs, guided bombs, missiles, guns, rockets, grenades, and ammunition, as well as non-lethal methods.

   b. Weapon subsystems such as platform, guidance, warhead, fuse, seeker, and propulsion (chemical, electric, etc), as well as computer technologies, environmental effects (simulation, networked), micro-electronics and opto-electronics, software (network

enhancement, modeling and simulation), human-system interfaces (neural networks, data integration), and lethality (endo/exoatmospheric kill vehicles).

c. Delivery and launch subsystems that originate from space, manned and unmanned aircraft, land and water, and deep and shallow underwater.

d. Targeting of time critical, highly mobile, urban and civilian-rich surroundings, deeply buried and hardened, shallow-water, and detection-resistant structures.

e. Technologies to improve target detection, guidance and control, propulsion and velocities, energetics, countermeasures, size and weight, joint and allied compatibility and interoperability, smart skins and data fusion, and weapons separation.

f. Survivability of U.S. systems to threat armaments and munitions, as well as survivability of threat platforms to U.S. weapons.

g. Undersea warfare mine and countermine warfare systems (including airborne systems)

h. Air-launched ASW projectiles, including subsurface targets, countermeasures and torpedoes

8. Electronic Combat (EC) - Addresses test capabilities to:

a. Deny, degrade, disrupt, and destroy any adversary by electromagnetic means. Includes the recognized electronic warfare mission areas of Electronic Attack (EA), Electronic Protection (EP) and Electronic Warfare Support (ES); as well as directed energy weapons such as laser and high power microwave.

b. Enhance the warfighters effectiveness in achieving "full spectrum dominance" (ref: Joint Vision 2020) across the entire electromagnetic spectrum.

c. Command, Control, Communications, Computer, Intelligence, Surveillance, and Reconnaissance (C4ISR): Addresses test capabilities for development and use of:

i. Information technology for achieving a network-centric warfare capability that enables increased combat power by networking sensors, decision makers, and shooters to achieve shared awareness, increased speed of command, higher tempo of operations, greater lethality, increased survivability, and a degree of self-synchronization.

ii. Information superiority into combat power by effectively linking knowledgeable entities in the battlespace.

iii. The shift to an open-architecture, network-centric focus to allow the joint warfighter to achieve greater agility in responding to changes in threat and exploiting continuing advances in technology."

iv. Information security, information assurance and information warfare.

v. Frequency spectrum management and control.

9. Research - basic research (6.1), applied research (6.2) and advanced development (6.3).

10. Test and Evaluation - Developmental Test and Evaluation (DT&E) and Operational Test and Evaluation (OT&E). Test and Evaluation also includes facilities that provide measurements and analyses for science and technology (S&T) development and acquisition (D&A), developmental test and evaluation, operational test and evaluation, live fire test and evaluation, contractor test and evaluation, joint test and evaluation, in-service engineering testing, safety certifications, concept refinement, advanced technology demonstrations, shelf-life and lot verification testing, and for experimentation when predominantly used for acquisition or materiel decisions.

11. Development and Acquisition - system development and demonstration, system modifications, experimentation and concept demonstration, and product/in-service life-cycle support.

Check here if this question is not applicable (N/A): ☐

Please fill in the following table(s), adding rows as necessary

Test Resource name or description (include unique identifier) (Text)	Test Resource Category (List)[5]	Technical Capability Area (List)[6]	Year of largest # of test hours in current configuration (Max Yr) (Yr)	Test hours done in Max Yr (Hrs)	FY01 Test Hours (Hrs)	FY02 Test Hours (Hrs)	FY03 Test Hours (Hrs)	How many test events were done in the Max Yr? (Count)

Test Resource name or description (include unique identifier) (Text)	Labor Hours Expended in the Max Yr (Hrs)	FY01 Number of Test Events (Count)	FY02 Number of Test Events (Count)	FY03 Number of Test Events (Count)	FY01 Number of Labor Hours Expended (Hrs)[7]	FY02 Number of Labor Hours Expended (Hrs)[8]	FY03 Number of Labor Hours Expended (Hrs)[9]	FY01 % of total labor hours overtime (%)[10]

[5] Choose a value from this list: Installed System Test, Measurement, Open Air Ranges, Digital Modeling & Simulation, Hardware in the Loop, Integration Laboratory; Amplificaiton: Identify the single most applicable category.
[6] Choose a value from this list: Air Platforms (Air Combat), Chemical & Biological Defense, Information Systems Technology (C4ISR), Ground Vehicles (Land Combat), Sea Vehicles (Sea Combat), Materials & Processes, Biomedical, Sensors, Electronics, and Electronic Warfare, Space Platforms (Space Combat & Ballistic Mis, Human Systems, Weapons (Munitions & Armaments + Direct Energ, Nuclear Technology, Battlespace Environments; Amplificaiton: Identify the single most applicable technology capability area supported by the test resource
[7] Amplification: Include total of direct and indirect military, civilian, and contractor labor hours
[8] Amplification: Include total of direct and indirect military, civilian, and contractor labor hours
[9] Amplification: Include total of direct and indirect military, civilian, and contractor labor hours
[10] Amplification: Include total of direct and indirect military, civilian, and contractor labor hours

Test Resource name or description (include unique identifier) (Text)	FY02 % of total labor hours overtime (%)[11]	FY03 % of total labor hours overtime (%)[12]	FY01 Facility hours lost for any reason (Hrs)[13]	FY02 Facility hours lost for any reason (Hrs)[14]	FY03 Facility hours lost for any reason (Hrs)[15]	FY03 % Research workload (%)	FY03 % D&A workload (%)	FY03 % T&E workload (%)

Test Resource name or description (include unique identifier) (Text)	FY03 % other workload (%)	FY02 % Research workload (%)	FY02 % D&A workload (%)	FY02 % T&E workload (%)	FY02 % other workload (%)	FY01 % Research workload (%)	FY01 % D&A workload (%)	FY01 % T&E workload (%)

Test Resource name or description (include unique identifier) (Text)	FY01 % other workload (%)	FY01 facility hours lost to maintenance (Hrs)	FY02 facility hours lost to maintenance (Hrs)	FY03 facility hours lost to maintenance (Hrs)	FY01 facility hours lost to weather (Hrs)	FY02 facility hours lost to weather (Hrs)	FY03 facility hours lost to weather (Hrs)	FY01 facility hours lost to utilities (Hrs)

Test Resource name or description (include unique identifier) (Text)	FY02 facility hours lost to utilities (Hrs)	FY03 facility hours lost to utilities (Hrs)

[11] Amplification: Include total of direct and indirect military, civilian, and contractor labor hours
[12] Amplification: Include total of direct and indirect military, civilian, and contractor labor hours
[13] Amplification: external factors such as maintenance, weather, environmental, utility limitations and any other reason.
[14] Amplification: Include the total number of hours the facility or range was not available to support test events because of external factors such as maintenance, weather, environmental, utility limitations and any other reason
[15] Amplification: external factors such as maintenance, weather, environmental, utility limitations and any other reason.

TEST RANGE CAPACITY

As of: 16 March 05

1. **DEFINITION:** A combination of total acres and total duded impact area acres at an installation that serves as a proxy for support of test and evaluation.

2. **PURPOSE:** Measures an installation's test range capability in terms of total installation size and its total dudded impact areas in acres**.**

3. **SOURCE:** DoD Data Call #1

4. **METHODOLOGY**[1]**:**

   a. The installation reports total dudded impact areas and total installation size in acres.

   b. Construct a matrix that illustrates the combination of an installation's total acres and total dudded impact areas. Denote these combinations with labels. Label definitions are provided in Section 9.

   c. TABS combines the data defined in 4a-b and calculates military value.

   d. Leases receive 0 value for this attribute.

5. **QUESTIONS THAT DEFINE DATA:**

   a. From question #198, sum the total amount of acres owned by the installation.

   b. From question #156, sum the total dudded impact area acres on the installation.

6. **REFERENCES:** Installation Range Regulations.

7. **UNIT OF MEASURE:** Acres.

8. **EQUATION:** N/A

9. MODEL REQUIREMENTS:

a. Model Inputs:

i. The installation's total acres and dudded impacted acres are the model's two primary inputs.

ii. The maximum value of 10 will be given to the installations with the greatest acreage coverage.

iii. The minimum value of "0" will be given if the installation does not posses viable test range capabilities.

Label 0	**Total Installation Size (Acres)-Q#198**		
Impact Area (Acres)-Q#156	< =75K	> 75K and <= 200K	> 200K
>= 0 and < = 10K	Label 1	Label 2	Label 3
10K < and< = 30K	Label 4	Label 5	Label 6
> 30K	Label 7	Label 8	Label 9

b. Value Function.

i. The value function is a representation of the military value of an installation's test range capabilities and converts the raw data that TABS plots into the above matrix to determine the military value for the installation.

ii. The assessment of the function was determined by TABS and coordinated with ATEC SMEs.

iii. Assessment Results.

1. The table below illustrates the assessments values, which consists of a series of pair-wise comparisons between the Labels, bases on a range from 1 to 9. A comparison of "1" indicates that preferences between the Labels are the same. A "9" indicates that the preference of one Label to another is extreme.

2. For example (refer to column 2 of the matrix), the SME indicates that Label 9 (scores a 7) is *extremely* preferred over Label 1, and Label 6 (scores a 5) is *moderately* preferred over Label 1.

C.R. = 0.014	Label 0	Label 1	Label 2	Label 3	Label 4	Label 5	Label 6	Label 7	Label 8	Label 9
Label 0	0	0.50	0.33	0.25	0.50	0.25	0.20	0.33	0.20	0.14
Label 1	2	0.26	0.50	0.33	0.50	0.33	0.20	0.33	0.20	0.14
Label 2	3	2	1.01	0.50	1.00	0.50	0.33	0.50	0.25	0.17
Label 3	4	3	2	2.24	2.00	1.00	0.50	0.50	0.33	0.25
Label 4	2	2	1	0.50	1.00	0.50	0.33	0.50	0.33	0.20
Label 5	4	3	2	1	2	2.63	0.50	1.00	0.50	0.33
Label 6	5	5	3	2	3	2	5.30	2.00	1.00	0.50
Label 7	3	3	2	2	2	1	0.50	2.85	0.50	0.33
Label 8	5	5	4	3	3	2	1	2	5.82	0.50
Label 9	7	7	6	4	5	3	2	3	2	10

3. This has a consistency ratio (CR) of 0.014 that indicates that the pair-wise comparisons are consistent across all Labels. A CR 0.1 is considered adequate. For example, a consistent ranking between Labels would mean that if A > B and B > C then A > C. However, if A < C, then the ranking would be considered inconsistent.

4. The values associated with each Label are obtained from the previous assessment matrix by recording the values along the diagonal of the matrix. For ease of exposition, we show values for each Label in the following matrix:

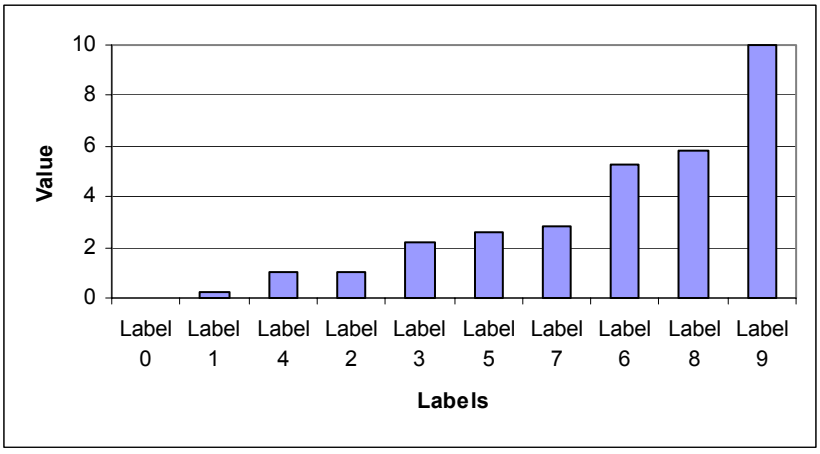
Label 0	**Total Installation Size (Acres)-Q#198**		
Impact Area (Acres)-Q#156	< =75K	> 75K and <= 200K	> 200K
>= 0 and < = 10K	0.26	1.01	2.24
10K < and< = 30K	1.00	2.63	5.30
> 30K	2.85	5.82	10.00

c. Model Outputs

i. The above matrix represents the model's results (the diagonal of the assessment matrix). Most installations will have test range characteristics that fit into this matrix. If the installation's values do not fall on the matrix, it receives "0" value for this attribute.

ii. The raw scores were normalized on a scale of zero to ten based on the pair-wise assessment results.

iii. The histogram for the Value Function provides a graphical representation of the previous matrix. The military values shown in the following graph are ordered according to increasing value based on the assessment. The values show that there are several combinations for this attribute that have nearly the same military value.



DOD #156: Live Fire Ground Ranges Used

Question: If your activity/installation (e.g., base) manages/schedules/controls any dudded impact areas complete the following table.
Amplification: Dudded Impact Area

Column Headings for this question

Column names	Data Type	Source/Reference	Amplification
Range or OPAREA (Text)	string50		
List Dudded Impact Areas (Text)	string120		
Total Acres (Acres)	numeric		
Specifiy Impact Area (Text)	string120		

DOD #198: Land Owned/Controlled By Installation (Final #538)

JCSG: Environment

Index: Base Management: Land: :

Sub Group: Environmental

Theme: Land

Question: Complete the table for all land owned/controlled by the installation. "Controlled" includes land/property used by the service under lease, license, permit, etc. DO NOT include easements as either owned or controlled. Include the main installation, ranges, auxiliary airfields, withdrawn land and all outlying sites. Designate ranges, auxiliary airfields, and outlying sites separately by name and real property (four letter) nomenclature (as appropriate).

Source / Reference: Military Installation real property records, Military installation General Plan.

Amplification: "Developed" acreage is defined as those areas that are built-up i.e., consist of facilities and pavements.

1. "Constrained" Acreage. Defined as those areas encompassing wetland, floodplains, contaminated areas (which include military munitions response areas or sites, groundwater contaminated sites, soil contaminated sites (including pesticide contamination), RCRA/CERCLA contaminated sites, etc) areas determined by U.S. Fish and Wildlife Service via Biological Opinions requiring special management areas designed by U.S. Fish and Wildlife Service as critical habitat, archeological sites determined eligible for listing or listed on the List of National Historic Places, ESQD arcs, radiation safety zones, antenna field of view (or line of sight), clear zones, and APZs.

Column Headings for this question

Column names	Data Type	Source/Reference	Amplification
Name of Installation/Site (4-digit real property identifier) (Text)	string50		
Total Acreage (Acres)	numeric		
Developed Acreage (Acres)	numeric		
Constrained Acreage (Acres)	numeric		
Total unconstrained acreage available for development (Acres)	numeric		

MUNITIONS PRODUCTION CAPABILITY

As of: 17 March 05

1. **DEFINITION:** The number of munitions production sub-processes under three overarching processes (explosive, metal parts, and load-assemble-pack) that have been performed at the installation during the last two years.

2. **PURPOSE:** The variety of munitions-related industrial-base sub-processes performed at an installation provides a measure of both current capability and the capability to respond to future requirements.

3. **SOURCE:** Installation Military Value Data Call

4. **METHODOLOGY:**

   a. Background

      The munitions production reporting installations use a mix of overarching and subordinate processes to produce munition components and end items. Attachment 1 has 3 tables identifying the possible number of munitions sub-processes that an installation may perform. This attribute compares among the installations the number of sub-processes performed in the last 2 years.

   b. Method

      i. Within the three overarching munitions production processes (LAP, Metal Parts, and Explosives) the installation will report the corresponding munitions sub-processes that it performs (DoD Question 806).

      ii. Installations that perform a higher number of sub-processes are rated higher. This rating, or *Capability Score*, is determined by summing the number of sub-processes at each installation. Paragraph 8 explains the Capability Score calculation further.

      iii. TABS calculates the number of sub-processes in each overarching process reported in 4bi and determines the installation's military value.

      iv. Leases receive 0 value for this attribute.

5. **QUESTIONS THAT DEFINE DATA:**

   What munitions explosives, metal parts, and LAP sub-processes are resident at your site and which sub-processes have you performed in the last two years? (DoD Question 806)

6. **REFERENCES:** IJCSG approved methodology

7. **UNIT OF MEASURE:** The number of sub-processes performed.

8. **EQUATION:**

   a. The number of sub-processes performed within each process is valued on a linear equation with greater value for the greater number of sub-processes performed.

   b. The values attributed to an installation within each of the three process categories are combined

for a total capability score i.e., Cap Score.

c. Cap Score = (# of explosives sub-processes)+ (# of metal parts sub-processes) + (# of LAP sub-processes).

9. MODEL REQUIREMENTS:

a. Model Input:

The primary model is the CAP Score.

b. Value Function:

i. The value function converts the installation's score, which is the CAP Score, into a military value between 0 and 10.

ii. The value function uses a single equation that measures the returns to scale of the attribute's score and returns the value of an installation's facilities. The curvature of the function is determined by TABS and coordinated with AMC SMEs.

iii. The maximum value of 10 is given to the installation with the greatest number of sub-processes (e.g., the highest score).

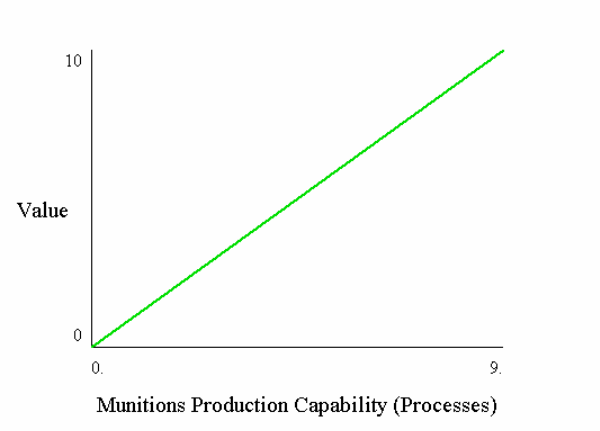
iv. The minimum value of 0 is given to the installation with the lowest number of sub-processes.

c. Model Output

i. The value function provides the military value of the installation with regards to ammunition production capability as measured by performed sub-processes – the value of multiple sub-processes.

ii. Scores are normalized on a scale of zero to ten based on the curvature of the value function.

iii. This value function shows a linear relationship, which equates to constant returns to scale. The function implies that every additional sub-process increment has the same value as the prior increment.



Score

Attachment 1: MUNITION PRODUCTION SUB-PROCESSES

Table 1: Explosive Sub-Processes

1. Explosive and/or propellant cold cast cure to include vacuum casting and / or injecting capability.
2. Melt pour to include metal parts pre-conditioning and post pour controlled cooling.
3. Precision Explosive Pressing to include explosive billet machining and sufficient tonnage and press daylight clearance for missiles.
4. Extrusion of explosives and propellants.
5. Kinetic energy munitions precision weigh and fill of propellant
6. Loaded components and initiating devices (primers, delays, relays, detonators) to include drying, blending and handling equipment for initiating equipment that precludes direct personnel exposure.
7. Infrared decoy flare pressing and / or extrusion
8. Smoke munitions mixing and pressing
9. Nitration of cotton linters or wood pulp
10. Nitration of hexamine
11. Manufacture of Nitrate esters

Table 2: Metal Parts Sub-Processes

1. Deep draw steel cartridge cases
2. Grenade cargo metal parts
3. Projectile forging, heat treatment and machining
4. High frag projectile metal parts to include large caliber forging (1000 ton presses), heat treat, ultrasonic and machining.

Table 3: Load, Assemble and Pack (LAP)

1. Navy Gun	10. Small Cal
2. Mortar	11. Bombs
3. FASCAM	12. Grenades
4. Artillery	13. Missiles
5. Tank	14. Torpedo
6. Missile Warhead	15. CAD/PAD
7. Med Cal	16. Smoke Munitions
8. MICLIC, Demo Blocks	17. Kinetic Energy Munitions
9. ICM Artillery and MLRS	18. Flares

DATA CALL QUESTIONS

Reference DOD #806: Munitions Explosives, Metal Parts, and LAP Sub-Processes

Function(s): Munitions Production Capability

Question: List the munitions explosives, metal parts, and LAP sub-processes that are resident at your site and indicate which sub-processes you have performed in the last two years?

Check here if this question is Not Applicable (N/A): ☐

Please fill in the following table(s)

Process	Sub-Process Resident at Site (Yes/No)	Sub-Process Used in Last Two Years (Yes/No)
Explosive/propellant cold cast cure including vacuum casting		
Melt pour including metal parts pre-conditioning & post pour cool		
Precision explosive pressing		
Extrusion of explosives and propellants		
Kinetic energy munitions precision weigh and fill of propellant		
Loaded components and initiating devices		
Infrared decoy flare pressing and/or extrusion		
Smoke munitions mixing and pressing		
Nitration of cotton liners or wood pulp		
Nitration of hexamine		
Manufacture of nitrate esters		
Deep draw steel cartridge cases		
Grenade cargo metal parts		
Projectile forging, heat treatment and machining		
High frag projectile metal parts		
Navy gun		
Mortar		
FASCAM		
Artillery		
Tank		
Missile warhead		
Med Cal		
MICLIC, Demo Blocks		
ICM Artillery and MLRS		
Small Cal		
Bombs		
Grenades		
Missiles		

Process	Sub-Process Resident at Site (Yes/No)	Sub-Process Used in Last Two Years (Yes/No)
Torpedo		
CAD/PAD		
Smoke Munitions		
Kinetic Energy Munitions		
Flares		

AMMUNITION STORAGE CAPACITY

As of: 18 March 05

1. **DEFINITION:** An installation's explosive and inert maximum storage capacity and unutilized capacity measured in square feet.

2. **PURPOSE:** Measures maximum storage and unutilized storage capacity at wholesale installations[1] to determine available capacity for current and future storage requirements.

3. **SOURCE:** Installation Capacity Data Call.

4. **METHODOLOGY:**

   a. Background

      Identifies and compares the maximum wholesale storage capacity and unutilized storage capacity that is available for current and future storage within the Army's Organic Industrial Base. This includes installations identified in the Army Stationing Strategy, dated 5 August 2003, as Ammunition Production Facilities, Maintenance Centers, Manufacturing Facilities, and Munitions Centers.

   b. Method

      i. The installation reports the maximum amount of explosive and inert storage capacity at *wholesale installations* (see footnote below) and the total amount of that maximum unutilized space.

      ii. Installations with greater maximum capacity and greater unutilized capacity are rated higher, with greater weighting given to maximum capacity.

      iii. A weight of 1.0 is given for maximum storage and .25 for un-utilized storage. The maximum storage is rated higher because of its capability to support the current and future force; an additional value is given for un-utilized capacity to adjust for expandability.

      iv. TABS will individually and separately sum the reported maximum net storage column and the utilized net storage capacity column. TABS will then subtract the utilized net storage total from the maximum net storage total to determine an installation's unutilized storage capacity. This unutilized storage capacity figure is used as part of calculating an installation's over-all SCORE for this attribute. Paragraph 8 details SCORE calculation. TABS will then weigh the data reported in 4bi and determine the installation's military value.

      v. Leases receive 0 value for this attribute.

[1] Wholesale installations are those that manufacture and store materials for Army use; Appendix #1, provides a list of Army installations considered to be wholesale facilities.

5. QUESTIONS THAT DEFINE DATA:

a. What is an installation's Explosive and Inert storage capacity? (DoD #517, The difference between the sum of Column 2 and the sum of - Column 3 equals unutilized).

6. REFERENCES: DoD Capacity Data Call and June 2003, HQRPLANS Version 12.50

7. UNIT OF MEASURE: Square feet.

8. EQUATION:

Ammo Storage Capacity Score (SCORE)=

1.0 * maximum wholesale storage capacity (sq. ft) + .25 * unutilized capacity (sq. ft)

9. MODEL REQUIREMENTS:

a. Model Input:

i. The primary model input is the Ammunition Storage Capacity score.

b. Value Function

i. The value function converts an installation's score, which is the Ammunition Storage Capacity score, into a military value between 0 and 10.

ii. The value function uses a single equation that measures the returns to scale of the attribute's score and returns the value of an installation's facilities. The curvature of the function is determined by TABS and coordinated with AMC SMEs.

iii. The maximum value of 10 is given to the installation with the greatest number of square footage available (e.g., the highest score).

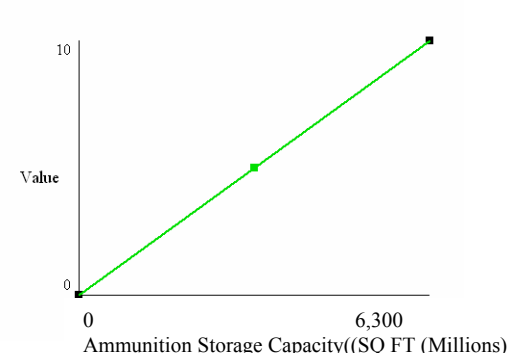
iv. The minimum value of 0 is given to the installation with the lowest number of available square footage.

c. Model Output

i. The value function provides the military value of an installation's with regards to maximum and un-utilized Explosive and Inert Storage capacity available for future storage as measured in SF.

ii. Scores are normalized on a scale of zero to ten based on the curvature of the value function.

iii. This value function shows a linear relationship, which equates to constant returns to scale. The function implies that every additional SF increment has the same value as the prior increment.


10
Value
0
0
6,300
Ammunition Storage Capacity((SO FT (Millions)
Score

DATA CALL QUESTION

DOD #517: Explosive and Inert Storage Capacity

Question: Using the table below, for each type of sited storage, identify the number of structures, the maximum net storage space (the useable space that takes into consideration structure loss created by pillars, beams, aisle space, etc.) and the utilized net storage capacity. In addition, indicate the number of waivers your facility has for explosive and inert storage.

Amplification: This question is to be answered by government-owned, government operated (GOGO) and government-owned, commercially-operated (GOCO) facilities performing the following activities: munitions and/or armaments production; depot level munitions storage; deepstow and short-term storage; depot level munitions and/or armaments maintenance; munitions and/or armaments demilitarization and repair at traditional depot- and intermediate-levels as defined below.

Definitions:

Industrial Base. Those facilities required for life cycle management (to include but not limited to development, production, storage, maintenance, rebuild, renovation, overhaul, out-loading, demil, and disposal) of items required to meet peacetime and emergency materiel requirements. The portion of the industrial base under analysis in BRAC '05 includes Government-owned, government-operated (GOGO), and Government-owned, contractor-operated (GOCO), facilities.

Munitions. A complete device charged with explosives, propellants, demolitions, pyrotechnics, and/or initiating composition used in military operations. Certain suitable modified munitions can be used for training, ceremonial, or non-operational purposes.

Armaments. All war-making weaponry, machinery, and associated special tools and equipment used to make these items function as total war-fighting systems.

Demilitarization. Demil is the act of destroying the military offensive or defensive advantages inherent in certain types of munitions and armaments. The term includes, but is not limited to, mutilation, scrapping, melting, burning, washout, steam-out, incineration, or alteration designed to prevent the further use of this equipment or equipment for its originally intended military or lethal purpose and applies equally to material in unserviceable or serviceable condition that has been screened through an inventory control point and declared excess.

For specific definitions, see the OSD BRAC library.

Example of how the grid will look:

Type of Storage	Number of Structures (Count)	Maximum Net Storage Capacity (KSF)	Utilized Net Storage Capacity (KSF)	Number of Waivers (Count)
CAT I Earth Covered Magazine				
CAT II Earth Covered Magazine				
Above Ground Magazine				
Improve Outside				
Inert				
Other Explosive Storage				

Appendix #1: Wholesale Installation List

1. ANNISTON ARMY DEPOT
2. BLUE GRASS ARMY DEPOT
3. CRANE ARMY AMMUNITION ACTIVITY
4. HAWTHORNE ARMY DEPOT
5. HOLSTON AAP
6. IOWA AAP
7. KANSAS AAP
8. LAKE CITY AAP
9. LETTERKENNY ARMY DEPOT
10. LONE STAR AAP
11. MCALESTER AAP
12. MILAN AAP
13. MISSISSIPPI AAP
14. PINE BLUFF ARSENAL
15. PUEBLO CHEM DEPOT
16. RADFORD AAP
17. RED RIVER ARMY DEPOT
18. RIVERBANK AAP
19. SCRANTON AAP
20. SIERRA ARMY DEPOT
21. TOOELE ARMY DEPOT

INTERSERVICE AND PARTNERING WITH INDUSTRY FLEXIBILITY

As of: 18 March 05

1. **DEFINITION:** The amount of capacity in Direct Labor Hours (DLHs) used to perform inter-service workload and partnered workload for maintenance and manufacturing operations (less munitions). Interservice workload is defined as work being performed in support of another Service and/or work being performed for a combatant command. Partnered workload is any work being performed in support of a commercial/ private sector customer under one or more of the specific authorities listed in the attachment (MVA Data Call Questions, Army).

2. **PURPOSE:** Demonstrates the ability of the depots and arsenals to support the other services, thus enhancing joint operational readiness and public/private partnering.

3. **SOURCE:** Installation Capacity Data Call and Installation Military Value (MVA) Data Call

4. **METHODOLOGY:**

   a. Background

      Identifies the amount of interservice and partnered workload. Compares both workload for other services and partnered workload across installations.

   b. Method

      i. The installation reports for FY03 the total number of DLHs (by Depot commodity group) performed in support of inter-service workload and workload partnered with industry.

      ii. Installations with greater interservice and partnered workload are rated higher.

      iii. TABS will sum all capacities (expressed in DLHs) across all commodity groups reported in 4bi. This sum will be called the *Flex Score*; Paragraph 8 explains the *Flex Score* calculation. TABS will use the *Flex Score* to determine the installation's military value

      iv. Leases receive 0 value for this attribute.

5. **QUESTIONS THAT DEFINE DATA:**

   a. Installation Capacity Data Call

      i. FY 03 Funded or programmed interservice workload by depot commodity group? (Defined in DoD #506, as the sum of all reported depot commodities in Column 2 (FY03 Interservice DLHs)).

      ii. FY 03 Partnerships under Title 10 USC? (Defined in DoD #511, as the sum of all reported depot commodities in Column 2 (FY03 DLHs)).

b. Installation MVA Data Call

i. For FY03, what organic workloads in DLHs by depot commodity groups do you perform in partnership with a private sector partner?(DoD #814, which is a modification to DoD Data Call 1 question 511, which adds additional partnership authorities)

ii. For FY03, what organic workloads in DLHs by Armament Commodity Family do you perform in partnership with a private sector partner? (DoD #813)

iii. Identify by Armament Commodity Family (in DLHs) the funded and programmed "Inter Service" workloads from all other services for FY 03 (DoD #812)

6. REFERENCES: DoD Handbook 4151.184H, dated Jan 97; DoD Capacity Data Call; Public-Private Partnerships for Depot Level Maintenance, July 2003, Pg. 1-3 and 1-4 (Report to the Deputy Under Secretary of Defense-Logistics and Materiel Readiness)

7. UNIT OF MEASURE: Direct Labor Hours (DLHs)

8. EQUATION: Flex Score = X1 + X2 (X1 = DLHs of joint workload and X2 = partnered workload). Value measure (constructed) = value is given for the amount of inter-service workload and partnered workload, measured in DLHs (higher is better).

9. MODEL REQUIREMENTS:

a. Model Input:

The primary model input is the number of DLHs used to perform inter-service workload and partnered workload by an installation. (Flex score defined in paragraph 8)

b. Value Function

i. The value function converts the installation's score, which is the number of DLHs, into a military value between 0 and 10.

ii. The value function uses a single equation that measures the returns to scale of the attribute's score and returns the value of an installation's facilities. The curvature of the function is determined by TABS and coordinated with AMC SMEs.

iii. The maximum value of 10 is given to the installation with the greatest number of DLHs (e.g., the highest score).

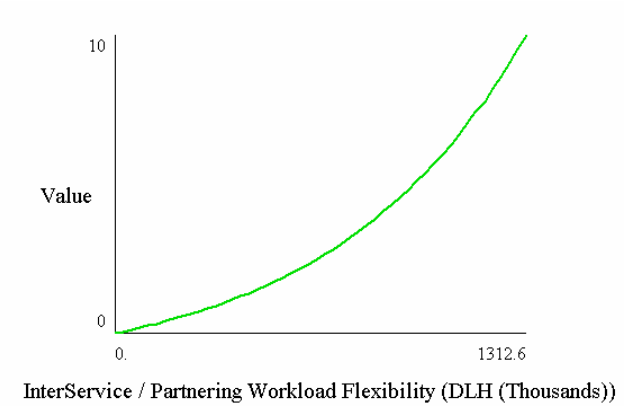
iv. The minimum value of 0 is given to the installation with the lowest number of DLHs.

c. Model Output

i. The value function provides the military value of the installation with regards to inter-service and partnered workload as measured by DLHs.

ii. Scores are normalized on a scale of zero to ten based on the curvature of the value function.

iii. This value function shows an increasing slightly convex function. The function implies that every additional DLH increment is worth slightly more than the previous increment.



Score

MVA DATA CALL QUESTIONS

DOD #506, DOD#511: Funded and/or programmed workloads by Depot commodity group and Fiscal Year

Question: Fill in the funded or programmed workloads by depot level commodity group for FY03, FY04, FY05 and FY09 (FY03 will be end of 4th Qtr actuals and FY04, FY05 and FY09 will be projections). Columns are defined as: Column "Quantify Total Organic Depot Maintenance Workload" is the total organic workload (In DLHs) being performed at your installation from all funded sources; Column "Inter-service DLHs In" is the total inter-service workload (in DLHs) being performed at your installation from all other Services; Column "Workload Needed to Sustain Core Capability Requirements" is the total workload (in DLH (K)) being performed to sustain core capability at your installation for all services; and Column "All Remaining Organic Workload" is calculated by adding "Inter-service in DLH(K) and "Workload Needed to Sustain Core Capability Requirements" and then subtracting the result from "Quantify Total Organic Depot Maintenance Workload" (This includes Foreign Military Sales (FMS), Last Source of Repair, etc.) NOTE: The calculated number that you enter in the column "All Remaining Organic Workload" will be further delineated in other non-core sustaining workload questions by source category (FMS Workload, Directed Workload, Last Source Workload, Other Non-DoD Federal Agencies Workload, or Partnerships Under Title 10 USC, Section 2474) for Fiscal Year (in DLH (K)).

Source / Reference: See this Question's Amplification for source/reference.

Amplification: SOURCE: USAF use Maintenance Planning & Execution System (MP&E); USN: Financial/Production Control Systems an budget data; USMC: Defense Industrial Financial Management System (DIFMS), Engineering Data and/or Master Work Schedule; USA: Army Workload Performance System (AWPs); DLA: Defense Supply Center Richmond, Departmental Database (DDD). If not available, provide document/database and publication date and/or methodology used to arrive at answer. "Professional judgment" will not be used. QUESTION INSTRUCTIONS: This question is to be answered by activities performing depot level maintenance. Depot Level Maintenance activities are defined as: activities that perform materiel maintenance and repair requiring overhaul, upgrading, modification, or rebuilding of parts, assemblies, or subassemblies, and testing and reclamation of equipment as necessary, regardless of the source of funds for the maintenance or repair at a government owned activity.

For specific definitions, see the OSD BRAC library.

Example of how the grid will look

Depot Level Commodity Groups	FY03 Quantify Total Organic Depot Maint Workload (DLH (K))	FY03 Inter-service DLHs In (DLH (K))	FY03 Workload Needed to Sustain Core Capability Requirements (DLH (K))	FY03 All Remaining Organic Workload (DLH (K))	FY04 Quantify Total Organic Depot Maintenance Workload (DLH (K))	FY04 Inter-service DLHs In (DLH (K))	FY04 Workload Needed to Sustain Core Capability Requirements (DLH (K))	FY04 All Remaining Organic Workload (DLH (K))	FY05 Quantify Total Organic Depot Maintenance Workload (DLH (K))	FY05 Inter-service DLHs In (DLH (K))	FY05 Workload Needed to Sustain Core Capability Requirements (DLH (K))	FY05 All Remaining Organic Workload (DLH (K))	FY09 Quantify Total Organic Depot Maintenance Workload (DLH (K))	FY09 Inter-service DLHs In (DLH (K))	FY09 Workload Needed to Sustain Core Capability Requirements (DLH (K))	FY09 All Remaining Organic Workload (DLH (K))
Aircraft Rotary																
Aircraft VSTOL																
Aircraft Cargo/Tanker																
Aircraft Fighter/Attack																
Aircraft Bomber																
Aircraft Other																
Aircraft Dynamic Components																
Aircraft Hydraulic Components																
Aircraft Pneumatic Components																
Aircraft Instruments Components																
Aircraft Landing Gear (include wheels/brakes) Components																
Aircraft Ordnance Equipment (e.g., racks and rails) Comp																
Aircraft Avionics/Electronics Components																
Aircraft Structure Components (e.g., flaps and																

Depot Level Commodity Groups	FY03 Quantify Total Organic Depot Maint Workload (DLH (K))	FY03 Inter-service DLHs In (DLH (K))	FY03 Workload Needed to Sustain Core Capability Requirements (DLH (K))	FY03 All Remaining Organic Workload (DLH (K))	FY04 Quantify Total Organic Depot Maintenance Workload (DLH (K))	FY04 Inter-service DLHs In (DLH (K))	FY04 Workload Needed to Sustain Core Capability Requirements (DLH (K))	FY04 All Remaining Organic Workload (DLH (K))	FY05 Quantify Total Organic Depot Maintenance Workload (DLH (K))	FY05 Inter-service DLHs In (DLH (K))	FY05 Workload Needed to Sustain Core Capability Requirements (DLH (K))	FY05 All Remaining Organic Workload (DLH (K))	FY09 Quantify Total Organic Depot Maintenance Workload (DLH (K))	FY09 Inter-service DLHs In (DLH (K))	FY09 Workload Needed to Sustain Core Capability Requirements (DLH (K))	FY09 All Remaining Organic Workload (DLH (K))
seats)																
Aircraft Other Components																
Aircraft Engine Turboprop/Turboshaft																
Aircraft Engine Turbofan Bypass																
Aircraft Engine Turbofan/TurboJet Augmented																
Engine Exchangeables /Components (e.g. bearings, blades and vanes)																
APUs/GTEs/ATS/SPS/GTCs																
Other Engines (e.g., Tactical Missile)																
Tactical Vehicles (e.g., trucks, trailer, bridge)																
Combat Vehicles (e.g., tanks, APC, propelled/tow artillery)																
Amphibious Vehicles																
Construction Equipment																
Material Handling																

Depot Level Commodity Groups	FY03 Quantify Total Organic Depot Maint Workload (DLH (K))	FY03 Inter-service DLHs In (DLH (K))	FY03 Workload Needed to Sustain Core Capability Requirements (DLH (K))	FY03 All Remaining Organic Workload (DLH (K))	FY04 Quantify Total Organic Depot Maintenance Workload (DLH (K))	FY04 Inter-service DLHs In (DLH (K))	FY04 Workload Needed to Sustain Core Capability Requirements (DLH (K))	FY04 All Remaining Organic Workload (DLH (K))	FY05 Quantify Total Organic Depot Maintenance Workload (DLH (K))	FY05 Inter-service DLHs In (DLH (K))	FY05 Workload Needed to Sustain Core Capability Requirements (DLH (K))	FY05 All Remaining Organic Workload (DLH (K))	FY09 Quantify Total Organic Depot Maintenance Workload (DLH (K))	FY09 Inter-service DLHs In (DLH (K))	FY09 Workload Needed to Sustain Core Capability Requirements (DLH (K))	FY09 All Remaining Organic Workload (DLH (K))
Other Vehicles																
Engines/Transmissions																
Powertrain Components																
Starters/Alternators/Generators																
Armament and Structural Components																
Fire Control Systems and Components																
Other Components (e.g., hydraulics, pneumatic, electrical)																
Radar																
Radio																
Wire																
Electronic Warfare																
Navigational Aids																
Electro-Optics/Night Vision/FLIR																
Crypto																
Computers																
Electronic Components (non-airborne)																
Ground Support Equipment																
Generators																
TMDE																
Calibration																
Other																

Depot Level Commodity Groups	FY03 Quantify Total Organic Depot Maint Workload (DLH (K))	FY03 Inter-service DLHs In (DLH (K))	FY03 Workload Needed to Sustain Core Capability Requirements (DLH (K))	FY03 All Remaining Organic Workload (DLH (K))	FY04 Quantify Total Organic Depot Maintenance Workload (DLH (K))	FY04 Inter-service DLHs In (DLH (K))	FY04 Workload Needed to Sustain Core Capability Requirements (DLH (K))	FY04 All Remaining Organic Workload (DLH (K))	FY05 Quantify Total Organic Depot Maintenance Workload (DLH (K))	FY05 Inter-service DLHs In (DLH (K))	FY05 Workload Needed to Sustain Core Capability Requirements (DLH (K))	FY05 All Remaining Organic Workload (DLH (K))	FY09 Quantify Total Organic Depot Maintenance Workload (DLH (K))	FY09 Inter-service DLHs In (DLH (K))	FY09 Workload Needed to Sustain Core Capability Requirements (DLH (K))	FY09 All Remaining Organic Workload (DLH (K))
Equipment (ROWPUs, kitchens, showers, troops support equip)																
Conventional Weapons (torpedoes, mines, etc.)																
Small Arms/Personal Weapons																
Strategic Missiles																
Tactical Missiles (e.g., TOWS, MLRS, Patriots)																
Software Weapon System																
Software Support Equipment																
Fabrication and Manufacturing																
Industrial Plant Equipment (IPE)																
Depot Fleet/Field Support (e.g., training and field teams)																
Other																

DOD Question #812: Armaments Interservice Workload

Question: Identify by Armament Commodity Family (in DLHs) the funded "Interservice" workloads from all other services for FY 03.

Source / Reference: DoD Depot Maintenance Capacity and Utilization Measurement Handbook, DoD 4151.18H

Amplification: This question is to be answered by government-owned, government operated (GOGO) and government-owned, contractor-operated (GOCO) facilities performing the following activities: munitions and/or armaments production; depot level munitions storage; deepstow and short-term storage; depot level munitions and/or armaments maintenance; munitions and/or armaments demilitarization and repair at traditional depot- and intermediate-levels as defined below.

Check here if this question is Not Applicable (N/A): ☐

Please fill in the following table(s)

Commodity Family	FY03 (DLH) (K) numeric
Small Arms Gauges	
Other Small Arms/Components	
105mm Towed Artillery	
155mm Towed Artillery	
155mm SP Artillery	
Cannon Tubes/Components	
Recoil/Recoil Components	
Other Field Artillery/Components	
60mm Mortar	
81mm Mortar	
120mm Mortar	
Other Mortar/Components	
M60 FOV Combat Vehicle	
M1 FOV Combat Vehicle	
BFV FOV Combat Vehicle	
Stryker FOV Combat Vehicle	
AAAV Combat Vehicle	

Commodity Family	FY03 (DLH) (K) numeric
Gun Mounts	
Other Combat Vehicle/Components	
CMTH Combat Support System	
FRS Combat Support System	
Armor Combat Support Systems	
Tool Sets	
Gauges for Med/Large Caliber Ammunition	
Other Combat Support Systems	
Other Products	
GAU-2	
GAU-8	
GAU-12	
GAU-18 (.50cal)	
M2A1 (40mm)	
M61A1 (20mm)	
M61A2 (20mm)	
M102 (105mm) ACFT	
M24 (OD)	
Aircraft Armament Racks	
Aircraft Armament Adapter	
Weapons Pylons	
Weapons Launchers	
Aircraft Suspension Equipment	

Reference DOD #813: Armaments Partnership Workload

Question: For FY03, what organic workloads in DLHs by Armament Commodity Family do you perform in partnership with a private sector partner?

Source / Reference: DoD Depot Maintenance Capacity and Utilization Measurement Handbook, DoD 4151.18H

Amplification: This question is to be answered by government-owned, government operated (GOGO) and government-owned, contractor-operated (GOCO) facilities performing the following activities: munitions and/or armaments production; depot level munitions storage; deepstow and short-term storage; depot level munitions and/or armaments maintenance; munitions and/or armaments demilitarization and repair at traditional depot- and intermediate-levels as defined below. Partnership is defined as workload completed under one or more of the following authorities: 10 USC 2208(j), 10 USC 2474, 10 USC 2539b, 10 USC 2536 (formally 10 USC 2553), 10 USC 2667, 10 USC 4543, 10 USC 7300, 22 USC 2754, 22 USC 2770, FAR Subpart 45.3, and FAR Subpart 45.4.

Check here if this question is Not Applicable (N/A): ☐

Please fill in the following table(s)

Commodity Family	FY03 (DLH) (K) numeric
Small Arms Gauges	
Other Small Arms/Components	
105mm Towed Artillery	
155mm Towed Artillery	
155mm SP Artillery	
Cannon Tubes/Components	
Recoil/Recoil Components	
Other Field Artillery/Components	
60mm Mortar	
81mm Mortar	
120mm Mortar	
Other Mortar/Components	
M60 FOV Combat Vehicle	
M1 FOV Combat Vehicle	

Commodity Family	FY03 (DLH) (K) numeric
BFV FOV Combat Vehicle	
Stryker FOV Combat Vehicle	
AAAV Combat Vehicle	
Gun Mounts	
Other Combat Vehicle/Components	
CMTH Combat Support System	
FRS Combat Support System	
Armor Combat Support Systems	
Tool Sets	
Gauges for Med/Large Caliber Ammunition	
Other Combat Support Systems	
Other Products	
GAU-2	
GAU-8	
GAU-12	
GAU-18 (.50cal)	
M2A1 (40mm)	
M61A1 (20mm)	
M61A2 (20mm)	
M102 (105mm) ACFT	
M24 (OD)	
Aircraft Armament Racks	
Aircraft Armament Adapter	
Weapons Pylons	
Weapons Launchers	
Aircraft Suspension Equipment	

DOD Question #814: Depot Partnership Workload

Question: For FY03, what organic workloads in DLHs by depot commodity groups do you perform in partnership with a private sector partner?

Source / Reference: See this Question's Amplification for source/reference

Amplification: SOURCE: Army Workload Performance System (AWPs). If not available, provide document/database and publication date and/or methodology used to arrive at answer. "Professional judgment" will not be used. Partnership is defined as workload completed under one or more of the following authorities: 10 USC 2208(j), 10 USC 2474, 10 USC 2539b, 10 USC 2536 (formally 10 USC 2553), 10 USC 2667, 10 USC 4543, 10 USC 7300, 22 USC 2754, 22 USC 2770, FAR Subpart 45.3, and FAR Subpart 45.4. QUESTION INSTRUCTIONS: This question is to be answered by activities performing depot level maintenance. Depot Level Maintenance activities are defined as: activities that perform materiel maintenance and repair requiring overhaul, upgrading, modification, or rebuilding of parts, assemblies, or subassemblies, and testing and reclamation of equipment as necessary, regardless of the source of funds for the maintenance or repair at a government owned activity.

Check here if this question is Not Applicable (N/A): ☐

Please fill in the following table(s)

Depot Level Commodity Groups	FY03 Direct Labor Hours (DLH) (K) numeric
Aircraft Rotary	
Aircraft VSTOL	
Aircraft Cargo/Tanker	
Aircraft Fighter/Attack	
Aircraft Bomber	
Aircraft Other	
Aircraft Dynamic Components	
Aircraft Hydraulic Components	
Aircraft Pneumatic Components	
Aircraft Instruments Components	
Aircraft Landing Gear (include wheels/brakes) Components	
Aircraft Ordnance Equipment (e.g., racks and rails) Comp	

Depot Level Commodity Groups	FY03 Direct Labor Hours (DLH) (K) numeric
Aircraft Avionics/Electronics Components	
Aircraft Structure Components (e.g., flaps and seats)	
Aircraft Other Components	
Aircraft Engine Turboprop/Turboshaft	
Aircraft Engine Turbofan Bypass	
Aircraft Engine Turbofan/TurboJet Augmented	
Engine Exchangeables/Components (e.g. bearings, blades and vanes)	
APUs/GTEs/ATS/SPS/GTCs	
Other Engines (e.g., Tactical Missile)	
Tactical Vehicles (e.g., trucks, trailer, bridge)	
Combat Vehicles (e.g., tanks, APC, propelled/tow artillery)	
Amphibious Vehicles	
Construction Equipment	
Material Handling	
Other Vehicles	
Engines/Transmissions	
Powertrain Components	
Starters/Alternators/Generators	
Armament and Structural Components	
Fire Control Systems and Components	
Other Components (e.g., hydraulics, pneumatic, electrical)	
Radar	
Radio	
Wire	
Electronic Warfare	
Navigational Aids	
Electro-Optics/Night Vision/FLIR	
Crypto	
Computers	
Electronic Components (non-airborne)	

Depot Level Commodity Groups	FY03 Direct Labor Hours (DLH) (K) numeric
Ground Support Equipment	
Generators	
TMDE	
Calibration	
Other Equipment (ROWPUs, kitchens, showers, troops support equip)	
Conventional Weapons (torpedoes, mines, etc.)	
Small Arms/Personal Weapons	
Strategic Missiles	
Tactical Missiles (e.g., TOWS, MLRS, Patriots)	
Software Weapon System	
Software Support Equipment	
Fabrication and Manufacturing	
Industrial Plant Equipment (IPE)	
Depot Fleet/Field Support (e.g., training and field teams)	
Other	

MAINTENANCE/MANUFACTURING PRODUCTION CAPACITY

As of: 17 March 05

1. **DEFINITION:** An installation's total capacity and capacity available for additional maintenance and manufacturing workload (less munitions) measured in Direct Labor Hours (DLHs).

2. **PURPOSE:** Measures total capacity and capacity available for additional maintenance and manufacturing workload.

3. **SOURCE:** Installations Capacity Data Call.

4. **METHODOLOGY:**

a. Background.

Identifies the total capacity and capacity available (unused capacity) for additional maintenance and manufacturing workload. Compares both total capacity and capacity available for additional maintenance and manufacturing workload in DLHs between installations.

b. Method.

i. The installation reports for FY03 total capacity and capacity available for additional maintenance and manufacturing workload.

ii. Installations with greater total capacity and capacity available for additional workload for maintenance and manufacturing are rated higher, with greater value given to installations with the highest total capacity, and the highest additional capacity for maintenance and manufacturing workload. This result is expressed as the Maintenance Capacity or *MCAP score*. Paragraph 8 explains the MCAP score calculation.

iii. A weight of 1 is given for total capacity and .25 for capacity available for additional workload. The total capacity is rated higher because of its potential to support the current and future force; an additional value is given for available capacity to adjust for expandability.

iv. TABS will sum all capacities across all commodity groups reported in 4bi and determine the installation's military value.

v. Leases receive 0 value for this attribute.

5. **QUESTIONS THAT DEFINE DATA:** (See attached)

a. FY 03 Total capacity index for depot commodity groups? (DoD # 501, sum of reported depot commodity group DLHs in Column 1 (FY03 DLH (K)).

b. FY 03 Funded or programmed workload by depot commodity group? (DoD #506, sum of reported depot commodity group DLHs in Column 1 (FY 03 Quantify Total Organic Depot Maintenance Workload, DLH (K)).

c. FY 03 Armaments production total capacity by armament commodity group? (DoD #512, sum of reported commodity family group DLHs from Columns 1 (FY 03, DLH (K)).

d. Armaments production workload by armament commodity group? (DoD #515, sum of reported commodity family DLHs from Columns 1 (FY 03 (DLH (K)) .

6. REFERENCES: DoD Handbook 4151.18H dated Jan 97

7. UNIT OF MEASURE: Direct Labor Hours (DLHs) as measured by MCAP Score.

8. EQUATION: MCAP Score = 1 *(Total Capacity (DLH)) + .25 (Available capacity (DLH))

9. MODEL REQUIREMENTS:

a. Model Input:

The primary model input is the MCAP score.

b. Value Function

i. The value function converts the installation's score, which is the MCAP score, into a military value between 0 and 10.

ii. The value function uses a single equation that measures the returns to scale of the attribute's score and returns the value of an installation's facilities. The curvature of the function is determined by TABS and coordinated with AMC SMEs.

iii. The maximum value of 10 is given to the installation with the greatest number of DLHs (e.g., the highest score).

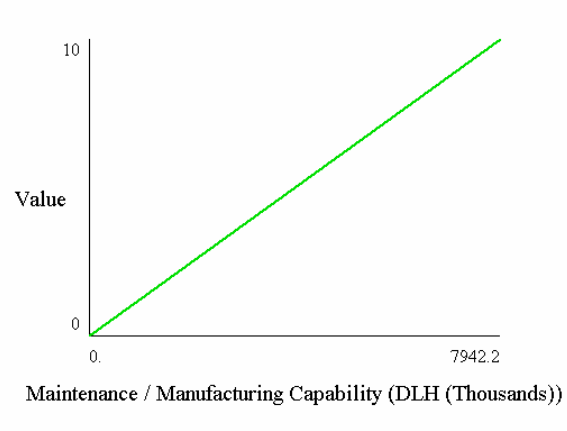
iv. The minimum value of 0 is given to the installation with the lowest number of DLHs.

c. Model Output

i. The value function provides the military value of the installation with regards to total capacity and possible capacity available for work for maintenance and manufacturing operations as measured by DLHs.

ii. Scores are normalized on a scale of zero to ten based on the curvature of the value function.

iii. This value function shows a linear relationship, which equates to constant returns to scale. The function implies that every additional DLH increment has the same value as the prior increment.



DATA CALL QUESTIONS

DOD #501: Total Capacity Index for Depot Commodity Groups

Question: Calculate the total capacity index for the depot commodity groups applicable to depot maintenance work at each maintenance installation using the formula in Chapter 3 of DoD Depot Maintenance Capacity and Utilization Measurement Handbook, DoDD 4151.18H (work positions X availability factor of .95 X annual productive hours of 1615. Provide your answers expressed in direct labor hours (DLH) by commodity groups for each fiscal year requested.

Note: See DoD Depot Maintenance Capacity and Utilization Measurement Handbook, DoDD 4151.18H, dtd Jan 24, 1997 and Handbook Supplemental guidance, dtd Oct 4, 2001. (See OSD BRAC library or http://www.acq.osd.mil/log/logistics_materiel_readiness/organizations/mppr/html/general.html.)

Source / Reference: Total Capacity Index formula in Chapter 3 of DoDD 4151.18H. If not available, provide document/database and publication date and/or methodology used to arrive at answer. "Professional judgment" will not be used.

Amplification: This question is to be answered by activities performing depot level maintenance. Depot Level Maintenance activities are defined as: activities that perform materiel maintenance and repair requiring overhaul, upgrading, modification, or rebuilding of parts, assemblies, or subassemblies, and testing and reclamation of equipment as necessary, regardless of the source of funds for the maintenance or repair at a government owned activity.

For specific definitions, see the OSD BRAC library.

Example of how the grid will look

Depot Level Commodity Groups	FY03 (DLH (K))	FY04 (DLH (K))	FY05 (DLH (K))	FY09 (DLH (K))
Aircraft Rotary				
Aircraft VSTOL				
Aircraft Cargo/Tanker				
Aircraft Fighter/Attack				
Aircraft Bomber				
Aircraft Other				
Aircraft Dynamic Components				
Aircraft Hydraulic Components				
Aircraft Pneumatic Components				
Aircraft Instruments Components				
Aircraft Landing Gear (include wheels/brakes) Components				
Aircraft Ordnance Equipment (e.g., racks and rails) Comp				
Aircraft Avionics/Electronics Components				

Depot Level Commodity Groups	FY03 (DLH (K))	FY04 (DLH (K))	FY05 (DLH (K))	FY09 (DLH (K))
Aircraft Structure Components (e.g., flaps and seats)				
Aircraft Other Components				
Aircraft Engine Turboprop/Turboshaft				
Aircraft Engine Turbofan Bypass				
Aircraft Engine Turbofan/TurboJet Augmented				
Engine Exchangeables/Components (e.g. bearings, blades and vanes)				
APUs/GTEs/ATS/SPS/GTCs				
Other Engines (e.g., Tactical Missile)				
Tactical Vehicles (e.g., trucks, trailer, bridge)				
Combat Vehicles (e.g., tanks, APC, propelled/tow artillery)				
Amphibious Vehicles				
Construction Equipment				
Material Handling				
Other Vehicles				
Engines/Transmissions				
Powertrain Components				
Starters/Alternators/Generators				
Armament and Structural Components				
Fire Control Systems and Components				
Other Components (e.g., hydraulics, pneumatic, electrical)				
Radar				
Radio				
Wire				
Electronic Warfare				
Navigational Aids				
Electro-Optics/Night Vision/FLIR				
Crypto				
Computers				
Electronic Components (non-airborne)				
Ground Support Equipment				
Generators				
TMDE				
Calibration				
Other Equipment (ROWPUs, kitchens, showers, troops support equip)				
Conventional Weapons (torpedoes, mines, etc.)				

Depot Level Commodity Groups	FY03 (DLH (K))	FY04 (DLH (K))	FY05 (DLH (K))	FY09 (DLH (K))
Small Arms/Personal Weapons				
Strategic Missiles				
Tactical Missiles (e.g., TOWS, MLRS, Patriots)				
Software Weapon System				
Software Support Equipment				
Fabrication and Manufacturing				
Industrial Plant Equipment (IPE)				
Depot Fleet/Field Support (e.g., training and field teams)				
Other				

DOD #506: Funded and/or programmed workloads by Depot commodity group and Fiscal Year

Question: Fill in the funded or programmed workloads by depot level commodity group for FY03, FY04, FY05 and FY09 (FY03 will be end of 4th Qtr actuals and FY04, FY05 and FY09 will be projections). Columns are defined as: Column "Quantify Total Organic Depot Maintenance Workload" is the total organic workload (In DLHs) being performed at your installation from all funded sources; Column "Inter-service DLHs In" is the total inter-service workload (in DLHs) being performed at your installation from all other Services; Column "Workload Needed to Sustain Core Capability Requirements" is the total workload (in DLH (K)) being performed to sustain core capability at your installation for all services; and Column "All Remaining Organic Workload" is calculated by adding "Inter-service in DLH(K) and "Workload Needed to Sustain Core Capability Requirements" and then subtracting the result from "Quantify Total Organic Depot Maintenance Workload" (This includes Foreign Military Sales (FMS), Last Source of Repair, etc.) NOTE: The calculated number that you enter in the column "All Remaining Organic Workload" will be further delineated in other non-core sustaining workload questions by source category (FMS Workload, Directed Workload, Last Source Workload, Other Non-DoD Federal Agencies Workload, or Partnerships Under Title 10 USC, Section 2474) for Fiscal Year (in DLH (K)).

Source / Reference: See this Question's Amplification for source/reference.

Amplification: SOURCE: USAF use Maintenance Planning & Execution System (MP&E); USN: Financial/Production Control Systems an budget data; USMC: Defense Industrial Financial Management System (DIFMS), Engineering Data and/or Master Work Schedule; USA: Army Workload Performance System (AWPs); DLA: Defense Supply Center Richmond, Departmental Database (DDD). If not available, provide document/database and publication date and/or methodology used to arrive at answer. "Professional judgment" will not be used. QUESTION INSTRUCTIONS: This question is to be answered by activities performing depot level maintenance. Depot Level Maintenance activities are defined as: activities that perform materiel maintenance and repair requiring overhaul, upgrading, modification, or rebuilding of parts, assemblies, or subassemblies, and testing and reclamation of equipment as necessary, regardless of the source of funds for the maintenance or repair at a government owned activity.

For specific definitions, see the OSD BRAC library.

Example of how the grid will look

Depot Level Commodity Groups	FY03 Quantify Total Organic Depot Maint Workload (DLH (K))	FY03 Inter-service DLHs In (DLH (K))	FY03 Workload Needed to Sustain Core Capability Requirements (DLH (K))	FY03 All Remaining Organic Workload (DLH (K))	FY04 Quantify Total Organic Depot Maintenance Workload (DLH (K))	FY04 Inter-service DLHs In (DLH (K))	FY04 Workload Needed to Sustain Core Capability Requirements (DLH (K))	FY04 All Remaining Organic Workload (DLH (K))	FY05 Quantify Total Organic Depot Maintenance Workload (DLH (K))	FY05 Inter-service DLHs In (DLH (K))	FY05 Workload Needed to Sustain Core Capability Requirements (DLH (K))	FY05 All Remaining Organic Workload (DLH (K))	FY09 Quantify Total Organic Depot Maintenance Workload (DLH (K))	FY09 Inter-service DLHs In (DLH (K))	FY09 Workload Needed to Sustain Core Capability Requirements (DLH (K))	FY09 All Remaining Organic Workload (DLH (K))
Aircraft Rotary																
Aircraft VSTOL																
Aircraft Cargo/Tanker																
Aircraft Fighter/Attack																
Aircraft Bomber																
Aircraft Other																
Aircraft Dynamic Components																
Aircraft Hydraulic Components																
Aircraft Pneumatic Components																
Aircraft Instruments Components																
Aircraft Landing Gear (include wheels/brakes) Components																
Aircraft Ordnance Equipment (e.g., racks and rails) Comp																
Aircraft Avionics/Electronics Components																
Aircraft Structure Components (e.g., flaps and seats)																
Aircraft Other Components																
Aircraft Engine Turboprop/Turboshaft																
Aircraft Engine Turbofan Bypass																
Aircraft Engine Turbofan/TurboJet Augmented																
Engine Exchangeables/Components (e.g. bearings, blades and vanes)																
APUs/GTEs/ATS/SPS/GTCs																
Other Engines (e.g., Tactical Missile)																
Tactical Vehicles (e.g., trucks, trailer, bridge)																
Combat Vehicles (e.g., tanks, APC, propelled/tow artillery)																
Amphibious Vehicles																
Construction Equipment																
Material Handling																
Other Vehicles																
Engines/Transmissions																
Powertrain Components																
Starters/Alternators/Generators																
Armament and Structural Components																
Fire Control Systems and Components																
Other Components (e.g., hydraulics, pneumatic, electrical)																
Radar																
Radio																
Wire																
Electronic Warfare																
Navigational Aids																
Electro-Optics/Night Vision/FLIR																
Crypto																
Computers																
Electronic Components (non-airborne)																
Ground Support Equipment																
Generators																
TMDE																
Calibration																
Other Equipment (ROWPUs, kitchens, showers, troops support equip)																
Conventional Weapons (torpedoes, mines, etc.)																

Depot Level Commodity Groups	FY03 Quantify Total Organic Depot Maint Workload (DLH (K))	FY03 Inter-service DLHs In (DLH (K))	FY03 Workload Needed to Sustain Core Capability Requirements (DLH (K))	FY03 All Remaining Organic Workload (DLH (K))	FY04 Quantify Total Organic Depot Maintenance Workload (DLH (K))	FY04 Inter-service DLHs In (DLH (K))	FY04 Workload Needed to Sustain Core Capability Requirements (DLH (K))	FY04 All Remaining Organic Workload (DLH (K))	FY05 Quantify Total Organic Depot Maintenance Workload (DLH (K))	FY05 Inter-service DLHs In (DLH (K))	FY05 Workload Needed to Sustain Core Capability Requirements (DLH (K))	FY05 All Remaining Organic Workload (DLH (K))	FY09 Quantify Total Organic Depot Maintenance Workload (DLH (K))	FY09 Inter-service DLHs In (DLH (K))	FY09 Workload Needed to Sustain Core Capability Requirements (DLH (K))	FY09 All Remaining Organic Workload (DLH (K))
Small Arms/Personal Weapons																
Strategic Missiles																
Tactical Missiles (e.g., TOWS, MLRS, Patriots)																
Software Weapon System																
Software Support Equipment																
Fabrication and Manufacturing																
Industrial Plant Equipment (IPE)																
Depot Fleet/Field Support (e.g., training and field teams)																
Other																

DOD #512: Armaments Production Total Capacity Index by Armament Commodity Group

Question: Calculate the Total Capacity Index for the production processes applicable to the work done at your installation. Provide your answers expressed in direct labor hours (DLHs) in the table below by production items for the Fiscal Years requested (Use actuals for FY03 and projections for outer years). Limit changes to those approved in the Fiscal Year 2004 and prior National Defense Appropriations Acts. The Capacity Index will be calculated in accordance with the DoD Depot Maintenance Capacity and Utilization Measurement Handbook, DoD 4151.18H. Provide explanation if Total Capacity index changes from one fiscal year to another (such as, change in equipment, facilities, process, hours worked, etc.).

Source / Reference: DoD Depot Maintenance Capacity and Utilization Measurement Handbook, DoD 4151.18H

Amplification: This question is to be answered by government-owned, government operated (GOGO) and government-owned, contractor-operated (GOCO) facilities performing the following activities: munitions and/or armaments production; depot level munitions storage; deepstow and short-term storage; depot level munitions and/or armaments maintenance; munitions and/or armaments demilitarization and repair at traditional depot- and intermediate-levels as defined below.

Definitions:

Industrial Base. Those facilities required for life cycle management (to include but not limited to development, production, storage, maintenance, rebuild, renovation, overhaul, out-loading, demil, and disposal) of items required to meet peacetime and emergency materiel requirements. The portion of the industrial base under analysis in BRAC '05 includes Government-owned, government-operated (GOGO), and Government-owned, contractor-operated (GOCO), facilities.

Munitions. A complete device charged with explosives, propellants, demolitions, pyrotechnics, and/or initiating composition used in military operations. Certain suitable modified munitions can be used for training, ceremonial, or non-operational purposes.

Armaments. All war-making weaponry, machinery, and associated special tools and equipment used to make these items function as total war-fighting systems.

Demilitarization. Demil is the act of destroying the military offensive or defensive advantages inherent in certain types of munitions and armaments. The term includes, but is not limited to, mutilation, scrapping, melting, burning, washout, steam-out, incineration, or alteration designed to prevent the further use of this equipment or equipment for its originally intended military or lethal purpose and applies equally to material in unserviceable or serviceable condition that has been screened through an inventory control point and declared excess.

For specific definitions, see the OSD BRAC library.

Example of how the grid will look

Commodity Family	FY03 (DLH (K))	FY04 (DLH (K))	FY05 (DLH (K))	FY09 (DLH (K))	FY Total Capacity Index Variance Explanation (Text)
Small Arms Gauges					
Other Small Arms/Components					
105mm Towed Artillery					
155mm Towed Artillery					
155mm SP Artillery					
Cannon Tubes/Components					
Recoil/Recoil Components					
Other Field Artillery/Components					
60mm Mortar					
81mm Mortar					
120mm Mortar					
Other Mortar/Components					
M60 FOV Combat Vehicle					
M1 FOV Combat Vehicle					
BFV FOV Combat Vehicle					
Stryker FOV Combat Vehicle					
AAAV Combat Vehicle					
Gun Mounts					
Other Combat Vehicle/Components					
CMTH Combat Support System					
FRS Combat Support System					
Armour Combat Support Systems					
Tool Sets					
Gauges for Large Caliber Ammunition					
Other Combat Support Systems					
Other Products					

Commodity Family	FY03 (DLH (K))	FY04 (DLH (K))	FY05 (DLH (K))	FY09 (DLH (K))	FY Total Capacity Index Variance Explanation (Text)
GAU-2					
GAU-8					
GAU-12					
GAU-18 (.50cal)					
M2A1 (40mm)					
M61A1 (20mm)					
M61A2 (20mm)					
M102 (105mm) ACFT					
M24 (OD)					
Aircraft Armament Racks					
Aircraft Armament Adapter					
Weapons Pylons					
Weapons Launchers					
Aircraft Suspension Equipment					

DOD #515: Armaments Production Workload by Armament Commodity Group

Question: Calculate the Workload for the production processes applicable to the manufacturing work done at your installation. Answers should be expressed in direct labor hours (DLHs) by production items for FYs requested (Use actuals for FY03 and projections for outer years). Limit changes to those approved in the Fiscal Year 2004 and prior National Defense Appropriations Acts. Workload is defined as all funded workload. The Workload will be calculated in accordance with the DoD Depot Maintenance Capacity and Utilization Measurement Handbook, DoD 4151.18H.

Source / Reference: DoD Depot Maintenance Capacity and Utilization Measurement Handbook, DoD 4151.18H

Amplification: This question is to be answered by government-owned, government operated (GOGO) and government-owned, contractor-operated (GOCO) facilities performing the following activities: munitions and/or armaments production; depot level munitions storage; deepstow and short-term storage; depot level munitions and/or armaments maintenance; munitions and/or armaments demilitarization and repair at traditional depot- and intermediate-levels as defined below.

For specific definitions, see the OSD BRAC library.

Example of how the grid will look

Commodity Family	FY03 (DLH (K))	FY04 (DLH (K))	FY05 (DLH (K))	FY09 (DLH (K))
Small Arms Gauges				
Other Small Arms/Components				
105mm Towed Artillery				
155mm Towed Artillery				
155mm SP Artillery				
Cannon Tubes/Components				
Recoil/Recoil Components				
Other Field Artillery/Components				
60mm Mortar				
81mm Mortar				
120mm Mortar				
Other Mortar/Components				
M60 FOV Combat Vehicle				
M1 FOV Combat Vehicle				
BFV FOV Combat Vehicle				
Stryker FOV Combat Vehicle				
AAAV Combat Vehicle				
Gun Mounts				
Other Combat Vehicle/Components				
CMTH Combat Support System				
FRS Combat Support System				
Armour Combat Support Systems				
Tool Sets				
Gauges for Large Caliber Ammunition				
Other Combat Support Systems				
Other Products				
GAU-2				
GAU-8				
GAU-12				
GAU-18 (.50cal)				
M2A1 (40mm)				
M61A1 (20mm)				
M61A2 (20mm)				
M102 (105mm) ACFT				
M24 (OD)				
Aircraft Armament Racks				
Aircraft Armament Adapter				

Commodity Family	FY03 (DLH (K))	FY04 (DLH (K))	FY05 (DLH (K))	FY09 (DLH (K))
Weapons Pylons				
Weapons Launchers				
Aircraft Suspension Equipment				

SUPPLY AND STORAGE CAPACITY

As of: 17 March 05

1. **DEFINITION:** The weighted sum by quality condition of the square footage of storage capacity on an installation (less ammunition and wet tank storage).

2. **PURPOSE:** Measures total storage capacity available.

3. **SOURCE:** June 2003, HQRPLANS Version 12.50 and Installation Status Report (ISR). No Installation Data Call is required.

4. **METHODOLOGY:**

   a. Background: Compares both total storage capacity and capacity available for future storage among installations.

   b. Method: Installations with greater total capacity and capacity for future available storage are rated higher, with greater weighting given to total capacity.The Facility Category Groups (FCGs) for Supply and Storage are F42110 (Depot Ammo Storage), F42200 (Installation Ammo Storage), F44100 (Storage Building, Vehicle, Depot Level), F44130 (Hum Cnt Storage Depot), F44210 (Installation Storage Facility, Underground), F44222 (Installation Covered Storage Shed), F44224 (Unit Storage Bldgs), and F44228 (Installation Storage, Hazardous Material).

   c. Quality factors for Green (1), Amber (.71) and Red (.36) are taken from COBRA deliberations (attached).

   d. Convertible space was considered for General Instructional facilities; however, all convertible FCGs did not meet cost requirements.

   e. The Supply and Storage score (SS) uses a weighted sum of the existing Supply and Storage facility in square feet. The weighted sum is calculated by multiplying the quality factor (4c) and the corresponding amount of each type of facility measured in square feet; these values in turned are summed to acquire the SS score. This equation is illustrated in paragraph 8.

   f. Leases receive 0 value for this attribute.

5. **QUESTIONS THAT DEFINE DATA:** (Table C-1 of DA Pam 415-28, Feb 2000)

   What is the total square footage of storage facilities on the installation by quality condition (in square feet) based on HQRPLANS Version 12.50 (10 FCGs)

6. **REFERENCES:** June 2003, HQRPLANS Version 12.50 and ISR

7. **UNIT OF MEASURE:** Square feet.

8. EQUATION: SS Score = G*X1+A*X2 + R*X3

a. G = 1.00, A= 0.71, R = 0.36

b. X1, X2 X3 = Total square feet of Green, Amber, and Red storage space

9. MODEL REQUIREMENTS:

a. Model Input:

The primary model input is the S&S score.

b. Value Function

i. The value function converts the installation's score, which is the S&S score, into a military value between 0 and 10.

ii. The value function uses a single equation that measures the returns to scale of the attribute's score and returns the value of an installation's facilities. The curvature of the function is determined by TABS and coordinated with AMC SMEs.

iii. The maximum value of 10 is given to the installation with the greatest number of square feet (e.g., the highest score).

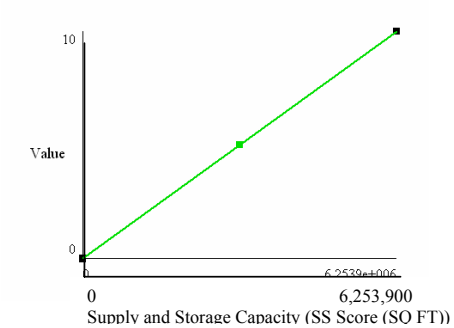
iv. The minimum value of 0 is given to the installation with the lowest number of square feet.

c. Value Function Output

i. The value function provides the military value of the installation with regards to total storage capacity and capacity available for future storage number at an installation measured in square feet.

ii. Scores are normalized on a scale of zero to ten based on the curvature of the value function.

iii. The following graphic shows a linear relationship, which equates to constant returns to scale. The function implies that every additional SF increment has the same value as the prior increment.



Score

Facilities Analysis Category (FAC) - Facility Category Groups (FGC) Conversions for Supply and Storage Facilities

FAC	FCG
4211	F42100
4221	F42200
4411	F44100
4414	F44130
4421	F44210, F44224
4422	F44222
4423	F44228

CRIME INDEX

As of: 19 August 04

1. **DEFINITION:** The level of violent and property crimes near the installation as reported by the Uniform Crime Reporting (UCR) Program.
2. **PURPOSE:** Measures the level of crime where the highest concentrations of military families live off-post. The UCR index represents the relative safety of these locations.
3. **SOURCE:** UCR, Section II: http://www.fbi.gov/ucr/cius_02/pdf/2sectiontwo.pdf. An installation data call is not required.
4. **METHODOLOGY:**
    a. *Background*

        The Uniform Crime Reporting (UCR) Program Crime Index is composed of selected offenses used to gauge fluctuations in the volume and rate of crime reported to law enforcement. The offenses selected to make up the index are violent crimes (murder, rape, robbery and assault) and property crimes (burglary, larceny-theft and motor vehicle theft).

    b. Method

        i. TABS will determine the UCR index from the 2002 UCR.
        ii. Use the MSA if applicable and if the installation is not within a MSA, then use the Military Housing Area (MHA).
        iii. TABS will identify the UCR rate by using the MSA/MHA. (The installation will identify the MSA/MHA during Datacall 2 for the attribute *Employment Opportunity*).
        iv. TABS will compute the average crime index if the MSA / MHA consists of two or more counties.
        v. TABS will use the state average for installations that do not have a UCR.
5. **QUESTIONS THAT DEFINE DATA:**

    What is the UCR index for the installation?
6. **REFERENCES:** *Crime in the United States during 2002, Uniform Crime Reports*, FBI; MHA from Datacall 2, Attribute: Employment Opportunity
7. **UNIT OF MEASURE:** rate per 100,000
8. **EQUATION:** Index = sum of Crime Index for all counties (or the MSA) divided by the number of counties or 1 if a MHA.
9. **MODEL REQUIREMENTS:**

    a. Value Model Input: The primary model input is the UCR index defined the above.

    b. Value Function

i. The value function converts the installation's UCR into a military value between 0 and 10.

ii. The value function uses a single equation that measures the returns to scale of the attribute's score and returns the value of an installation's UCR. The curvature of the function is determined by TABS and coordinated with G1 SMEs.

iii. The Maximum value of 10 will be given to the installation with the lowest UCR index level.

iv. The Minimum value of 0 will be given to the installation with the highest UCR index level.

c. Model Output

i. The value function provides the military value of the installation with regards to relative construction costs as measured by the UCR index.

ii. Scores are normalized on a scale of zero to ten based on the curvature of the value function.

iii. This value function shows a linear relationship, which equates to constant returns to scale. The function implies that every additional UCR index increment has the same value as the prior increment.

Score

EMPLOYMENT OPPORTUNITY

As of: 18 March 05

1. **DEFINITION:** A combination of median income and unemployment rate experienced near the installation.
2. **PURPOSE:** Evaluates family employment opportunities by comparing unemployment rates with median income near the installation.
3. **SOURCE:** US Census Bureau: http://quickfacts.census.gov/qfd/ or MSA: http://factfinder.census.gov/servlet/GCTGeoSearchByListServlet?ds_name=DEC_2000_SF3_U&_lang=en&_ts=97152741547; Bureau of Labor Statistics, http://www.bls.gov/data/home.htm ; Installation Military Value Data Call.
4. **METHODOLOGY:**

a. *Background*

i. Median value includes only specified owner-occupied one-family housing units on less than 10 acres without a business or medical office on the property. This data excludes mobile homes, houses with a business or medical office, houses on 10 or more acres, and housing units in multi-unit structures. The median divides the value distribution into two equal parts: one-half of the cases falling below the median value of the property (house and lot) and one-half above the median. Median value calculations are rounded to the nearest hundred dollars. The median income scale is divided into three classes determined by plotting the range of incomes from all Army installations. Median income derived from the U.S. Census Bureau database for 2000.

ii. The unemployment rate represents the number of unemployed as a percent of the labor force. Specifically, unemployed is defined as persons 16 years and over who had no employment, were available for work, except for temporary illness, and had made specific efforts to find employment. The unemployment rate scale is divided into three classes determined by plotting the range of unemployment rates across all Army installations. The unemployment rate scale was defined by averaging the unemployment rates for each year from 1996 to 2002. The averages were plotted and divided into three categories.

b. *Method*

i. The installation will determine the Metropolitan Statistical Area (MSA) in which it is located. If the installation is not located within a MSA, then the installation will determine the county(s) that is located within the Military Housing Area (MHA) for the installation.

ii. TABS will determine the median income for the installation by using the MSA data and sources in paragraph 3. If the installation is not within a MSA, then TABS will use the MHA.

iii. TABS will determine the unemployment rate by using the MSA and sources in paragraph 3. If the installation is not within a MSA, then TABS will use the Military Housing Area (MHA).

iv. TABS will determine the unemployment rate by computing the annual average of each year from 1996 to 2002 (annual average for 1996= sum of Jan-Dec 1996 monthly rate/12). The overall average will be computed from the annual average (overall average= sum of annual avg./7)

v. An installation's value is found by entering the installation's median income and unemployment rate into the constructed scale below. TABS grouped the matrix through an analysis of the attribute's data. First, TABS attempted to group the data by natural breakpoints in a histogram. If there were no natural breakpoints, then the data was broken into groups (e.g., number of columns/rows) based on the appropriate percentile of a normal distribution.

5. QUESTIONS THAT DEFINE DATA:

a. TABS

i. What is the MSA (or MHA) average unemployment rate from 1996 to 2002?

ii. What is the median income?

b. Installation- What is the MSA for the installation? If not within an MSA, report the county(s) that is (are) located in the installation's MHA?

6. REFERENCES: Bureau of Labor Statistics, US Census Bureau

7. UNIT OF MEASURE: Unemployment Rate as a percentage and State Median Income in dollars

8. EQUATION: Matrix index

9. MODEL REQUIREMENTS:

a. Model Inputs:

i. The MSA/MHA data for unemployment rate and median income are the model's two primary inputs.

ii. The maximum value of 10 will be given to the installation with the lowest unemployment rates and higher median income.

iii. The minimum value of 0 will be given to an installation with the highest unemployment rate and lower median income.

iv. The below two-dimensional matrix has a Label for any combination that can exist for the value measure and an X if the combination cannot exist on an installation.

	Unemployment Rate (%)		
Median Income ($)	> =6.0	≥ 4.0 but< 6.0	<4.0
< 45K	Label 1	Label 2	Label 3
45K - 60K	Label 4	Label 5	Label 6
> 60K	Label 7	Label 8	Label 9

b. Value Function

i. The value function measures the returns to scale of the attribute's score and returns the value of an installation's facilities. The assessment of the function is determined by TABS and coordinated with G1 SMEs.

ii. Assessment Results.

1. The assessment (following matrix) consists of a series of pair-wise comparisons between the Labels, based on a range from 1 to 9. A comparison of "1" indicates that preferences between the Labels are the same. A "9" indicates that the preference of one Label to another is extreme.

C.R. = 0.029	Label 1	Label 2	Label 3	Label 4	Label 5	Label 6	Label 7	Label 8	Label 9
Label 1	0	0.25	0.17	0.50	0.17	0.13	0.25	0.14	0.11
Label 2	4	1.14	0.50	2	0.50	0.25	1	0.33	0.17
Label 3	6	2	2.58	4	1	0.50	2	0.50	0.25
Label 4	2	0.50	0.25	0.35	0.25	0.17	0.50	0.20	0.13
Label 5	6	2	1	4	2.22	0.50	0.50	0.50	0.25
Label 6	8	4	2	6	2	5.81	4	2	0.5
Label 7	4	1	0.50	2	2	0.25	1.59	0.33	0.17
Label 8	7	3	2	5	2	0.50	3	4.17	0.33
Label 9	9	6	4	8	4	2	6	3	10

2. For example (refer to column 2 of the matrix), the SME indicates that Label 9 is *highly preferred* (scores a 9) over Label 1, and Label 5 is *moderately* (scores a 6) over Label 1.

3. This has a consistency ratio (CR) of 0.029 that indicates that the pair-wise comparisons are *consistent* across all Labels. A CR 0.1 is considered adequate. For example, a

consistent ranking between Labels would mean that if A > B and B > C then A > C. However, if A < C, then the ranking would be considered inconsistent.

4. The values associated with each Label are obtained from the assessment matrix by recording the values along the diagonal of the matrix. For ease of exposition, we show values for each Label in the following matrix:

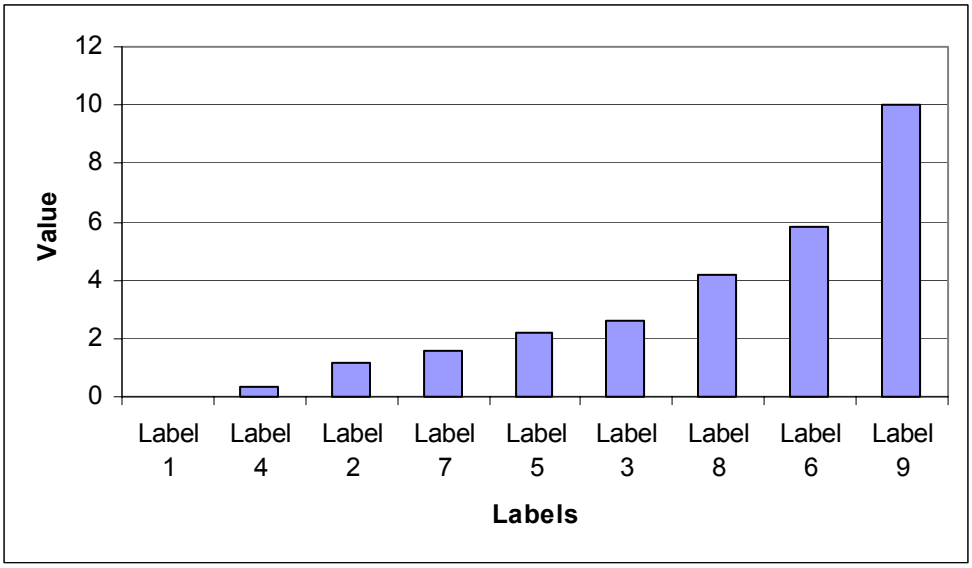
	Unemployment Rate (%)		
Median Income ($)	> =6.0	≥ 4.0 but < 6.0	<4.0
< 45K	0	1.14	2.58
45K - 60K	0.35	2.22	5.81
> 60K	1.59	4.17	10.00

c. Model Outputs

i. Raw scores are normalized on a scale of zero to ten based on AHP assessment results shown in the previous matrix.

ii. The histogram for the Value Function gives a graphical representation of the previous matrix. The Labels shown in the following graph are ordered according to increasing value based on the assessment.

iii. The histogram for the Value Function provides a graphical representation of the previous matrix. The military values shown in the following graph are ordered according to increasing value based on the assessment. The values show that all steadily increase with the greatest increase between Label 6 and Label 9, denoting the greatest military value.


12
10
8
6
4
2
0
Value
Label 1
Label 4
Label 2
Label 7
Label 5
Label 3
Label 8
Label 6
Label 9
Labels

HOUSING

As of: 19 August 04

1. **DEFINITION:** A combination of the number of available rental vacant units and Basic Allowance for Housing (BAH) rates.
2. **PURPOSE:** Compares the availability of rental vacancies to the amount of BAH computed for the installation, which provides a general measure of affordable housing availability.
3. **SOURCE:** US Bureau of the Census, Summary File 3 (Rental vacancies), http://factfinder.census.gov/servlet/DTGeoSearchByListServlet?ds_name=DEC_2000_SF3_U&_lang=en&_ts=97750263632; Defense Finance and Accounting Service (BAH rates, 2004), http://www.dtic.mil/perdiem/bahform.html. An installation datacall is not required.
4. **METHODOLOGY:**
   a. *Background*
      i. *Rental* vacancy units are units offered "for rent," and *vacant units* are offered either "for rent" or "for sale." The data on vacancy status was obtained from Enumerator Questionnaire Item C. Vacancy status and other characteristics of vacant units are determined by census enumerators obtained from landlords, owners, neighbors, rental agents, and others. The Rental availability scale is divided into three classes that determined by plotting the range of rental vacant units from all Army installations. Vacant units are determined from the U.S. Bureau of the Census 2000, Summary File 3 and varied between 1,000-23,000 available units.
      ii. BAH provides fair housing allowances to service members. Since the goal is to help members cover the costs of housing in the private sector, rental-housing costs in the private sector are the basis for the allowance. The BAH rate scale is divided into three classes that are determined by plotting the range of BAH rates for military grade O-3 with dependents from all Army installations. The ranges varied from $750- $2250.
   b. *Method*
      i. TABS will determine Rental vacancy units by using the MSA (Metropolitan Statistical Area). If the installation is not located within a MSA, then the installation will use the MHA (Military Housing Area). (The installation will identify the MSA/MHA during datacall 2 for the attribute, *Employment Opportunity*).
      ii. TABS will determine rental vacancy from the U.S. Bureau of the Census, 2000, Summary File 3.
      iii. TABS will determine the BAH rate for 2004 from Defense Finance and Accounting Service. The rate is based upon the installations zip code.

iv. Installations value is found by entering the installation's rental vacancy and BAH rate into the constructed scale below. TABS grouped the matrix through an analysis of the attribute's data. First TABS attempted to group the data by natural breakpoints in a histogram. If there were no natural breakpoints, then the data was broken into groups (e.g., number of columns/rows) based on the appropriate percentile of a normal distribution.

5. QUESTIONS THAT DEFINE DATA:

a. TABS

i. What is the installation's MSA (or MHA) number of vacant units for 2003?

ii. What is the installation's BAH rate for an O-3 with dependents?

6. REFERENCES: US Bureau of the Census; Defense Finance and Accounting Service

7. UNIT OF MEASURE: Matrix index

8. EQUATION: Not applicable

9. MODEL REQUIREMENTS:

a. Model Inputs:

i. The MSA/MHA data for rental vacant unit rates and BAH are the model's two primary inputs.

ii. The maximum value of 10 will be given to the installation that provides lowest BAH rates and higher vacant unit rate.

iii. The minimum value of 0 will be given to an installation that has a high BAH rate and low rental vacant unit rate.

iv. The below two-dimensional matrix has a Label for any combination that can exist for the value measure and an X if the combination cannot exist on an installation.

	Rental Vacant Units		
BAH ($)	≤3000	3000< and ≤8000	>8000
>1600	Label 1	Label 2	Label 3
>1200 and ≤1600	Label 4	Label 5	Label 6
≤1200	Label 7	Label 8	Label 9

b. Value Function

i. The value function measures the returns to scale of the attribute's score and returns the value of an installation's facilities. The assessment of the function is determined by TABS and coordinated with G1 SMEs.

ii. Assessment Results.

1. The assessment (following matrix) consists of a series of pair-wise comparisons between the Labels, based on a range from 1 to 9. A comparison of "1" indicates that preferences between the Labels are the same. A "9" indicates that the preference of one Label to another is extreme.

C.R. = 0.028	Label 1	Label 2	Label 3	Label 4	Label 5	Label 6	Label 7	Label 8	Label 9
Label 1	0	0.33	0.17	0.5	0.2	0.13	0.2	0.17	0.11
Label 2	3	1.07	0.25	3	0.33	0.17	1	0.33	0.2
Label 3	6	4	4.72	6	2	0.5	3	1	0.5
Label 4	2	0.33	0.17	0.32	0.33	0.17	0.5	0.2	0.13
Label 5	5	3	0.5	3	2.52	0.33	2	0.5	0.25
Label 6	8	6	2	6	3	7.66	5	2	0.5
Label 7	5	1	0.33	2	0.5	0.2	1.11	0.2	0.14
Label 8	6	3	1	5	2	0.5	5	4.81	0.5
Label 9	9	5	2	8	4	2	7	2	10

2. For example (refer to column 2 of the matrix), the SME indicates that Label 9 is *highly preferred* (scores a 9) over Label 1, and Label 5 is *moderately* (scores a 5) over Label 1.
3. This has a consistency ratio (CR) of 0.028 that indicates that the pair-wise comparisons are *consistent* across all Labels. A CR 0.1 is considered adequate. For example, a consistent ranking between Labels would mean that if A > B and B > C then A > C. However, if A < C, then the ranking would be considered inconsistent.
4. The values associated with each Label are obtained from the assessment matrix by recording the values along the diagonal of the matrix. For ease of exposition, we show values for each Label in the following matrix:

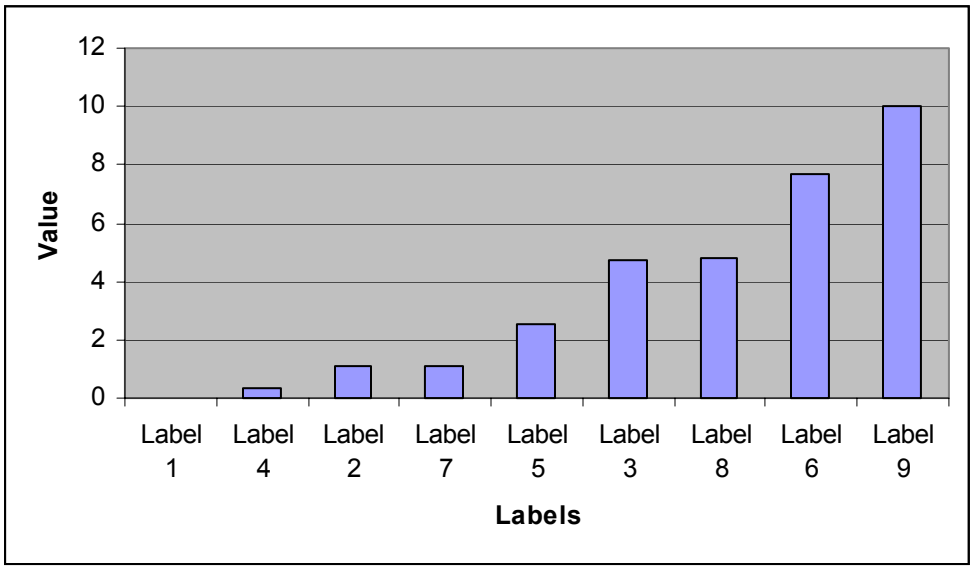
	Rental Vacant Units		
BAH ($)	≤ 3000	3000<and≤8000	>8000
> 1600	0.00	1.07	4.72
> 1200 and ≤ 1600	0.32	2.52	7.66
≤ 1200	1.11	4.81	10.00

c. Model Outputs

i. Raw scores are normalized on a scale of zero to ten based on AHP assessment results shown in the previous matrix.

ii. The histogram for the Value Function gives a graphical representation of the previous matrix. The Labels shown in the following graph are ordered according to increasing value based on the assessment.

iii. The histogram for the Value Function provides a graphical representation of the previous matrix. The military values shown in the following graph are ordered according to increasing value based on the assessment. The values show that all steadily increase between Label 1 and Label 9, denoting the greatest military value.


12
10
8
6
4
2
0
Value
Label 1
Label 4
Label 2
Label 7
Label 5
Label 3
Label 8
Label 6
Label 9
Labels

MEDICAL CARE AVAILABILITY

As of: 21 March 05

1. **DEFINITION:** The number of Primary/Specialty Care providers available per population near an installation.
2. **PURPOSE:** Indicates the ability of civilian primary and specialty care providers to accommodate the population on and adjacent to the military installation.
3. **SOURCE:** American Hospital Association Database, Office of the Surgeon General. US Census 2000, http://quickfacts.census.gov/qfd/. No installation data call required.
4. **METHODOLOGY:**
    a. TABS will determine total Primary/Specialty Care providers.
    b. Use the MSA if applicable and if the installation is not within a MSA, then use the Military Housing Area (MHA).
    c. TABS will identify population by using the MSA/MHA. (The installation will identify the MSA/MHA during Datacall 2 for the attribute *Employment Opportunity*).
    d. TABS will determine the ratio of providers to population using the data from 4i-iii, ratio = providers/population. This ratio is referred to as the *Medical Score.*
5. **QUESTIONS THAT DEFINE DATA:**
    a. How many Primary/Specialty Care providers are located within the installation's MSA or MHA?
    b. What is the population for the installation's MSA/MHA?
6. **REFERENCES:** American Hospital Association and U.S. Bureau of the Census 2000
7. **UNIT OF MEASURE:** Ratio (providers per population)
8. **EQUATION:** Sum the number of providers (Primary and Specialty) per population**.**
9. **MODEL REQUIREMENTS:**
    a. Model Input:

        The primary model input is the ratio of total providers per the total population.

    b. Value Function:
        i. The value function converts the installation's score, which is a ratio of providers per population, into a military value between 0 and 10.
        ii. TABS uses a value function with a single equation that measures the returns to scale of the attribute's score and returns the value of

an installation's facilities. The curvature of the function is determined by TABS and coordinated with G1 SMEs.

iii. The Maximum value of 10 will be given to the installation with the highest ratio level.

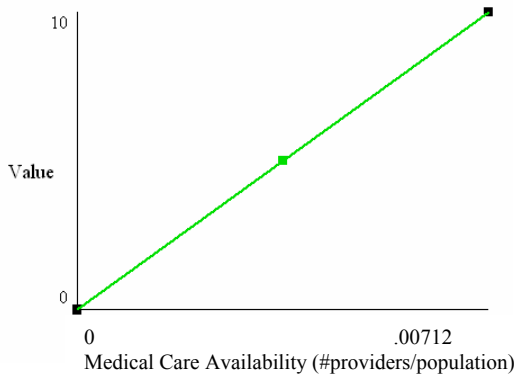
iv. The Minimum value of 0 will be given to the installation with the lowest ratio level.

c. Model Output

i. The value function provides the military value of the installation with regards to medical quality by comparing the number of providers to population.

ii. Scores are normalized on a scale of zero to ten based on the value function.

iii. This value function shows a linear relationship, which equates to constant returns to scale.



Score

IN-STATE TUITION POLICY

As of: 21 March 05

1. **DEFINITION:** A measure of the eligibility of Soldiers and family members to receive in-state educational benefits.
2. **PURPOSE:** Determines the status of state tuition education benefits for Soldiers and family members, which, in turn, provides a measure of future education affordability for Soldiers and their families at their respective installation.
3. **SOURCE:** DoD In-State website: https://www.armyeducation.army.mil/InState/StateSummary.HTM. Installation data call will not be required.
4. **METHODOLOGY:**
    a. *Background/Definition*
        i. "Stationed," conveys the in-state tuition rate for Soldiers, spouses, and family members regardless of their legal residency status.
        ii. "Continuity" conveys in-state rates to spouses and family members if a Soldier is reassigned to another state. The spouse/family members will maintain eligibility for in-state tuition as long as they are continuously enrolled in a degree program at a state institution.
    b. *Method*
        i. TABS will determine the state policy residency requirement for the state in which an installation is located from the DoD In-State website.
        ii. Each state can recognize as many as three categories; Stationed Soldier, Stationed Family Member & Continuity Family Member
        iii. Using the matrix at paragraph 9, TABS will choose the largest value from the matrix that applies to that state policy.
        iv. If the state does not have a statute or policy governing tuition rates for military and family members, a value of "0" will be given.
5. **QUESTIONS THAT DEFINE DATA:**
    a. What is the in-state tuition policy where the Soldier is stationed?
    b. What is the in-state tuition policy for family members where the Soldier is stationed?
6. **REFERENCES:** Each State policy
7. **UNIT OF MEASURE:** Matrix index
8. **EQUATION:** Not Applicable

9. MODEL REQUIREMENTS:

a. Model Inputs:

i. The stationing status of the Soldier and the participant categories are the two primary inputs.

ii. The maximum value of 10 will be given to the installation that provides continuity in-state tuition for family members.

iii. The minimum value of 0 will be given to an installation if the state where it is located does not have a policy.

iv. The two-dimensional matrix has a Label for any combination that can exist for the value measure and an N/A if the combination cannot exist on an installation (Label 0 represents an installation with no tuition policy)..

	Personnel	
TUITION POLICY	Soldier	Family Member
Stationed	Label 1	Label 2
Continuity	N/A	Label 3

b. Value Function

i. The value function measures the returns to scale of the attribute's score and returns the value of an installation's facilities. The assessment of the function is determined by TABS and coordinated with the G-1 SMEs.

ii. Assessment Results.

1. The assessment (following matrix) consists of a series of pair-wise comparisons between the Labels, based on a range from 1 to 9. A comparison of "1" indicates that preferences between the Labels are the same. A "9" indicates that the preference of one Label to another is extreme.

C.R. = 0.064	Label 0	Label 1	Label 2	Label 3
Label 0	0	0.20	0.14	0.11
Label 1	5	1.65	0.33	0.20
Label 2	7	3	4.33	0.33
Label 3	9	5	3	10

2. For example (refer to column 2 of the matrix), the SME indicates that Label 3 is *highly preferred* (scores a 9) over Label 0, and Label 2 is *preferred* (scores a 7) over Label 0.

3. This has a consistency ratio (CR) of 0.064 that indicates that the pair-wise comparisons are *consistent* across all Labels. A CR 0.1 is considered adequate. For example, a consistent ranking between

Labels would mean that if A > B and B > C then A > C. However, if A < C, then the ranking would be considered inconsistent.

4. The values associated with each Label are obtained from the assessment matrix by recording the values along the diagonal of the matrix. For ease of exposition, we show values for each Label in the following matrix:

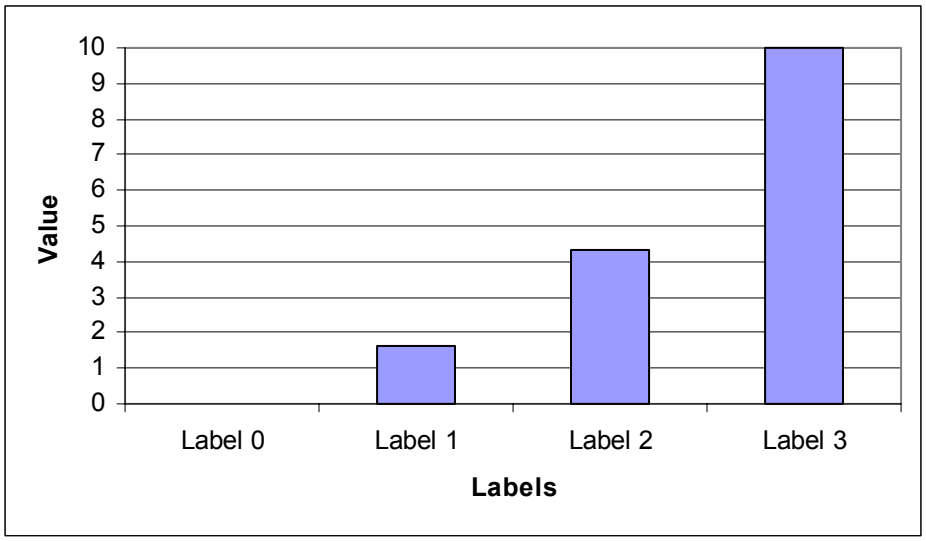
	Personnel	
TUTION POLICY	Soldier	Family Member
Stationed	1.65	4.33
Continuity	N/A	10

c. Model Outputs

i. Raw scores are normalized on a scale of zero to ten based on assessment results shown in the previous matrix. If an installation does not, it receives a "0" value for this attribute.

ii. The histogram for the Value Function gives a graphical representation of the previous matrix. The Labels shown in the following graph are ordered according to increasing value based on the AHP assessment.

iii. The histogram for the Value Function provides a graphical representation of the previous matrix. The military values shown in the following graph are ordered according to increasing value based on the assessment. The values show that there are large differences between the potential values for this attribute.



WORKFORCE AVAILABILITY

As of: 23 March 05

1. **DEFINITION:** The available labor supply. Labor supply includes individuals between ages 25 and older within a 50 mile radius of each installation.
2. **PURPOSE:** This is a measure of the availability of a workforce.
3. **SOURCES:** GeoLytics Data, www.geolytics.com
4. **METHODOLOGY:** Using the longitude and latitude for each study group installation provided by TABS, the United States Military Academy's (USMA) Office of Economic & Manpower Analysis (OEMA) determined the available labor supply, using "GeoLytics" (which stratifies the U.S. Census 2000 Long Form data into finely graded geographical regions). OEMA determined the number of people ages 25 and older who live within a 50 mile radius of each installation[1].
5. **QUESTIONS THAT DEFINE DATA:**
   a. What is the population of adults age 25 and older who reside within 50 miles of the installation?
6. **REFERENCES:** ASIP, U.S. Census Bureau, Geolytics Data, MERIC Data; OEMA Technical Report, dated 3 June 2004, TABS Technical Review
7. **UNIT OF MEASURE:** Labor supply
8. **EQUATION:** See Paragraph 4
9. **MODEL REQUIREMENTS:**
   a. Model Inputs

      The installation's labor supply is the model's primary input.

   b. Value Function
      i. The value function converts the installation's labor supply into a military value between 0 and 10.
      ii. The value function uses a single equation that measures the returns scale of the attribute's score and returns the value of an installation's labor supply. The curvature of the function is determined by TABS and coordinated with OEMA SMEs.
      iii. The maximum value of 10 is given to any installation with a labor supply greater than 2 million.
      iv. The minimum value of 0 is given to the installation with the lowest labor supply.
   c. Model Output
      i. The value function provides the military value of the installation with regards to workforce availability as measured by the labor supply.
      ii. Scores are normalized on a scales of zero to ten based on the curvature of the value function.

[1] Initially OEMA weighted populations with median incomes and normalized these weighted values across installations. TABS determined that the weighted values were correlated with the pure population numbers (.99). TABS choose to use the pure population, which is simpler, easy to understand, and serves as a direct measure.

iii. This value function shows a linear relationship, which equates to constant returns to scale. The function implies that every additional labor supply score increment has the same value as the prior increment.

JOINT FACILITIES

As of: 23 March 05

1. **DEFINITION:** A combination of the size of an installation's Total Obligation Authority (TOA) (direct and reimbursable) and the percentage of that funding an installation receives from non-Army sources to support the non-army organization's units or activities.
2. **PURPOSE:** Provides a measure of the level of Joint activity on an installation.
3. **SOURCE:** Installation Military Value Data Call.
4. **METHODOLOGY:** All calculations will be completed within TABS.
   a. The installation provides its TOA for FY03 and the total amount of funding included therein from non-Army sources to support their organization's units or activities.
   b. TABS will calculate the percentage of funding an installation receives from non-Army sources to support another organization's units or activities by dividing the total funding amount received from non-Army sources into the installation's TOA.
   c. The installation's value is found by entering its Total Obligation Authority budget size (4.a.) and the percentage of funding received from non-Army sources (4.b.) into the constructed scale below. TABS grouped the matrix through an analysis of the attribute's data. First TABS attempted to group the data by natural breakpoints in a histogram. If there were no natural breakpoints, then the data was broken into groups (e.g., number of columns/rows) based on the appropriate percentile of a normal distribution.
   d. Leases receive 0 value for this attribute.
5. **QUESTIONS THAT DEFINE DATA:**
   a. What is your installation's TOA (direct and reimbursable) for FY03? (DOD Question #807).
   b. What was the total funding amount received from non-Army sources to support the non-Army organizations' units or activities on your installation? (DOD Question #808).
6. **REFERENCES**: Installation Military Value Data Call.
7. **UNIT OF MEASURE**: Matrix index
8. **EQUATION:** N/A
9. **MODEL REQUIREMENTS:**
   a. Model Inputs:
      i. The installation's Total Obligation Authority (TOA) level and % non-Army funding are the model's two primary inputs.
      ii. The maximum value of 10 will be given to the installations with a large TOA and a high % non-Army funding.
      iii. The minimum value of 0 will be given to an installation if it has no non-Army funding.

iv. The below two-dimensional matrix has a Label for any combination that can exist for the value measure

	TOA		
% of funding not Army	≤100	>100 and ≤750	>750
≤5%	Label 1	Label 2	Label 3
>5% and ≤40%	Label 4	Label 5	Label 6
>40% to 100%	Label 7	Label 8	Label 9

b. Value Function

i. The value function is a representation of the military value of an installation's TOA and the % of it that is non-Army and converts the raw data that TABS plots into the above matrix into a military value for the installation.

ii. The assessment of the function is determined by TABS and coordinated with Army Budget Office.

iii. Assessment Results.

1. The table below illustrates the assessment's values, which consists of a series of pair-wise comparisons between the different Labels (range from 1 to 9, comparison of "1" indicates that the preferences are equal between the Labels and "9" indicates that the preference of one Label to another is extreme).

C.R. = 0.018	Label 0	Label 1	Label 2	Label 3	Label 4	Label 5	Label 6	Label 7	Label 8	Label 9
Label 0	0	1	0.5	0.333	0.25	0.2	0.167	0.143	0.125	0.111
Label 1	1	0.016	1	0.25	0.2	0.167	0.143	0.143	0.125	0.111
Label 2	2	1	0.791	0.5	0.5	0.333	0.333	0.333	0.25	0.2
Label 3	3	4	2	2.03	1	0.5	0.5	0.333	0.333	0.333
Label 4	4	5	2	1	2.226	0.5	0.333	0.5	0.333	0.333
Label 5	5	6	3	2	2	3.65	0.5	0.5	0.5	0.333
Label 6	6	7	3	2	3	2	5.424	1	0.5	0.5
Label 7	7	7	3	3	2	2	1	5.896	1	0.5
Label 8	8	8	4	3	3	2	2	1	7.19	0.5
Label 9	9	9	5	3	3	3	2	2	2	10

2. The assessment converts the pair-wise comparisons into the value that an installation will receive for meeting the requirements at a given label.

3. For example (refer to the grey cells in column 2 of the below matrix), the SME indicates that Label 2 is slightly (scores a 1) preferred over Label 1, and Label 5 is moderately (scores a 6) over Label 1.

4. The above matrix has a consistency ratio (CR) of 0.018 that indicates that the pair-wise comparisons are consistent across all Labels. A CR < 0.1 is considered adequate. For example, a consistent ranking between Labels would mean that if A > B and B > C then A > C. However, if A < C, then the ranking would be considered inconsistent.

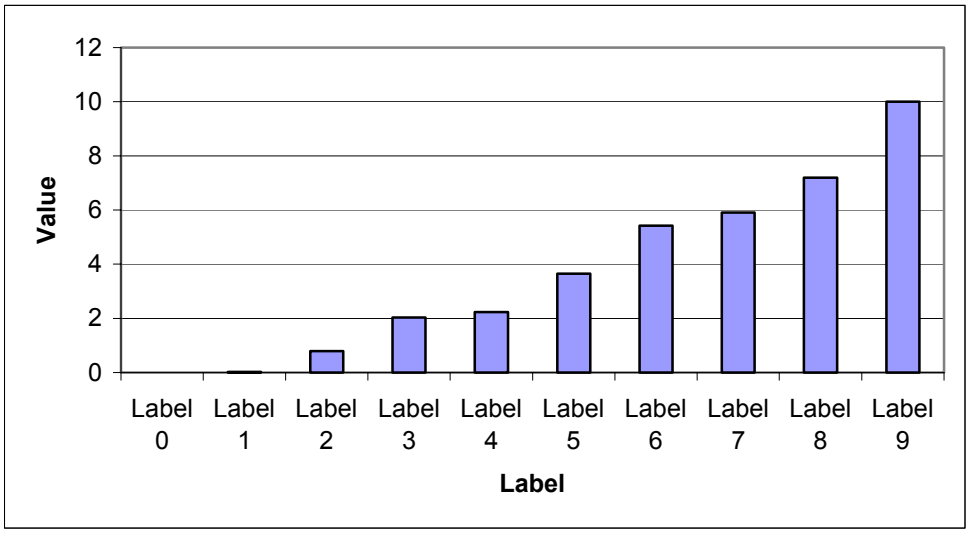
	TOA		
% of funding not Army	≤100	>100 and ≤750	>750
≤5%	0.02	0.79	2.03
>5% and ≤40%	2.23	3.65	5.42
>40% to 100%	5.9	7.19	10.00

c. Model Outputs

i. The above matrix represents the model's results (the diagonal of the assessment matrix). Each installation will have a % of its TOA from non-Army sources and budget characteristics that fit into this matrix. If the installation does not fall on the matrix, it receives "0" value for this attribute.

ii. The raw scores were normalized on a scale of zero to ten based on the pair-wise assessment results.

iii. The histogram for the value function provides a graphical representation of the previous matrix. The military values shown in the following graph are ordered according to increasing value based on the assessment. The values show that there are several combinations for this attribute that have the same military value.



DATA CALL QUESTIONS

DOD Question #807: Total Obligation Authority

Question: What was your installations Total Obligation Authority (TOA) at year end FY03 (direct and reimbursable), in millions of dollars?

Source / Reference: Funding documents for FY03, MIPRs, or 218 Report

Amplification: Please ensure your TOA number includes ALL appropriations for which your installation received Funding Obligation Authority (direct and reimbursable) in FY03.

DOD Question #808: Funding from Non-Army Sources

Question: What was the total funding amount received, in FY03, from non-Army sources to support the non-Army organizations units or activities on your installation (millions of dollars)?

Source / Reference: FY03 Funding documents, MIPRs, or M110/112 Report

Amplification: Please include your total amount of funding received from outside Army sources, e.g. Navy, Air Force, DoD, agencies, other federal agencies, state Agencies, other services reserve components. Funding received from Army National Guard or U.S. Army Reserve is to be considered Army funding.

AREA COST FACTOR (ACF)

As of: 23 March 2005

1. **DEFINITION:** A measure of an installation's military construction costs relative to the national average.
2. **PURPOSE:** Provides a comparative index for the cost to construct, modernize or expand a notional facility at an installation.
3. **SOURCE:** DOD Facilities Pricing Guide, March 2004 (Office of the Deputy Under Secretary of Defense for Installations and Environment (ODUSD-IE)). No installation data call will be required.
4. **METHODOLOGY:**
    a. Background
        i. The Area Cost Factor (ACF) of an individual location reflects a relative cost comparison to the national average of 96 baseline cities (two cities per state in CONUS).
        ii. Costs include labor, material and equipment weather, climate, seismic, mobilization, overhead and profit, labor availability and labor productivity. The March 2004 DOD Facilities Pricing Guide is applicable to all MILCON and family housing budget cost estimates for FY 2006-2007.
    b. TABS will pull the ACF Index from the Facilities Pricing Guide and determine the installation's military value. If the installation is not specifically listed in the pricing guide or not included in a regional ACF, the ACF for the host state will be used.
    c. Leases receive 0 value for this attribute.
5. **QUESTIONS THAT DEFINE DATA:**

    What is the Installation Area Cost Factor (ACF) Index value for the installation?
6. **REFERENCES:** DOD Facilities Pricing Guide, March 2004
7. **UNIT OF MEASURE:** Index Value
8. **EQUATION:** N/A
9. **MODEL REQUIREMENTS:**
    a. Model Input

        The primary model input is the installation's ACF.

b. Value Function

   i. The value function converts the installation's ACF into a military value between 0 and 10.

   ii. The value function uses a single equation that measures the returns to scale of the attribute's score and returns the value of an installation's ACF. The curvature of the function is determined by TABS and coordinated with ACSIM SMEs.

   iii. The maximum value of 10 is given to the installation with an ACF of 0.74.

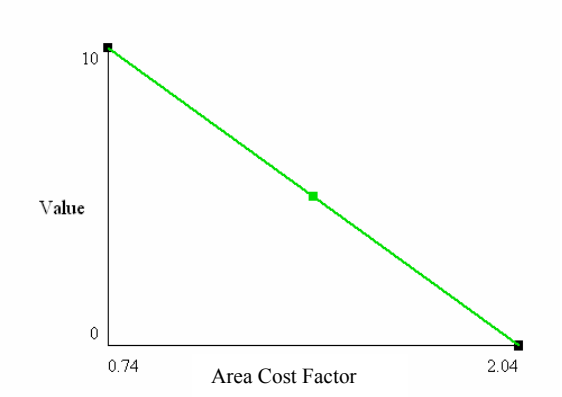
   iv. The minimum value of 0 is given to the installation with an ACF of 2.04.

c. Model Output

   i. The value function provides the military value of the installation with regards to relative construction costs as measured by the ACF.

   ii. Scores are normalized on a scale of zero to ten based on the curvature of the value function.

   iii. This value function shows a linear relationship, which equates to constant returns to scale. The function implies that every additional ACF increment has the same value as the prior increment.



Score

C2 TARGET FOR FOCUS FACILITIES

As of: 23 March 05

1. **DEFINITION:** A combination of the Assistant Chief of Staff of Installation Management (ACSIM) designated installations' total square footage and the funding required to achieve an Installation Status Report (ISR) quality rating of C2 as compared to the total square footage and funding requirements for other installations.
2. **PURPOSE:** Measures an installation's overall facility quality, using the installation's contributions to the total cost to improve its focus facilities to a C2 grade level, as compared to other installations.
3. **SOURCE:** ACSIM and HQRPLANS. No installation data call is required.
4. **METHODOLOGY:**
   a. Background

      The Army has a defined set of focus facilities that impact stationing and help estimate the quality of the installation's current infrastructure. TABS used these facilities and the cost to bring them to the C2 level as a proxy for the overall value of an installation's current facilities and future facility costs.

   b. Method

      i. TABS used a two-dimensional constructed measure to evaluate an installation's focus facilities. The two-dimensional constructed measure combines metrics that cannot be defined using a single direct measure.

      ii. RPLANS provides the square footage for the following Focus Facility Groups (FCG)for TABS installations: General Instruction Buildings (FCG F17120), Tactical Vehicle Maintenance Shops (FCG F21410), Trainee Barracks (FCGs F72181 and F72121), Physical Fitness Centers(FCG F74028), Chapels(FCG F73017), Army Guard Readiness Centers (FCGs F17180, F21407, and F17142), and Army Reserve Training Centers (FCGs F17140, F21409, and F17142).[1]

      iii. RPLANS provides the cost to bring the focus facilities defined in 4.b.ii, to a C2 level of quality at each installation.

      iv. TABS divided each installation's total cost by the sum of the costs for all 88 BRAC 05 installations to determine the percentage each installation contributes to the overall C2 requirement.

      v. TABS combined the data that is defined in 4.b.ii and 4.b.iv to calculate military value. The installation's value is found by entering the total square footage of its focus facilities and its percent contribution to reach C2. TABS grouped the matrix through an analysis of the attribute's data. First TABS attempted to group the data by natural breakpoints in a histogram. If there were no natural breakpoints, then the data was broken into groups (e.g., number of columns/rows) based on the appropriate percentile of a normal distribution.

      vi. Leases receive 0 value for this attribute.

[1] FCG 85210 (organizational parking) is not included in this attribute even though it is a focus facility. This FCG has such large numbers; it dominates all other facilities combined. TABS determined that parking lots would not be used within the installation comparison.

5. **QUESTIONS THAT DEFINE DATA:**
   a. What is the cost to bring the installation's focus facilities to C2 level?
   b. What is the total size in SQ FT of the installation's focus facilities?
6. **REFERENCES:** HQRPLANS, ISR
7. **UNIT OF MEASURE:** Matrix index
8. **EQUATION:** N/A
9. **MODEL REQUIREMENTS:**
   a. Model Inputs
      i. The installation's costs to bring focus facilities to C2 and the quantity in square feet of those facilities are the model's two primary inputs.

	Quantity (SQ FT 1000s)		
C2 as % of Total Cost	<=10000	<=50000	>50000
>1.0%	Label 1	Label 2	Label 3
<=1.0%	Label 4	Label 5	Label 6
<=0.5%	Label 7	Label 8	Label 9

      ii. The maximum value of 10 will be given to the installations with a large amount of facilities and a low % cost.
      iii. The minimum value of 0 will be given to an installation if it has no focus facilities.
      iv. The below two-dimensional matrix has a label for any combination that can exist for the value measure and an X if the combination cannot exist on an installation.
   b. Value Function
      i. The value function is a representation of the military value of an installation's focus facilities and converts the raw data that TABS plots into the above matrix into a military value for the installation.
      ii. The assessment of the function is determined by TABS and coordinated with ACSIM.
      iii. Assessment Results
         1. The table below illustrates the assessment's values, which consists of a series of pair-wise comparisons between the different Labels (range from 1 to 9, comparison of "1" indicates that the preferences are equal between the Labels and "9" indicates that the preference of one Label to another is extreme).

C.R. = 0.005	Label 0	Label 1	Label 2	Label 3	Label 4	Label 5	Label 6	Label 7	Label 8	Label 9
Label 0	0	1	0.5	0.33	0.5	0.33	0.13	0.33	0.17	0.11
Label 1	1	0.07	0.5	0.33	0.5	0.33	0.17	0.33	0.2	0.13
Label 2	2	2	0.95	0.5	1	0.5	0.25	0.5	0.33	0.2
Label 3	3	3	2	2.66	2	1	0.5	1	0.5	0.33
Label 4	2	2	1	0.5	0.95	0.5	0.25	0.5	0.33	0.2
Label 5	3	3	2	1	2	2.73	0.5	1	0.5	0.4
Label 6	8	6	4	2	4	2	7.34	2	2	0.67
Label 7	3	3	2	1	2	1	0.5	2.84	0.67	0.4
Label 8	6	5	3	2	3	2	0.5	1.5	5.03	0.4
Label 9	9	8	5	3	5	2.5	1.5	2.5	2.5	10

2. The assessment converts the pair-wise comparisons into the value that an installation will receive for meeting the requirements at a given label.
3. For example (refer to the cells in column 2 of the above matrix), the SME indicates that Label 9 is extremely (scores an 8) preferred over Label 1, and Label 5 is moderately (scores a 3) over Label 1.
4. The above matrix has a consistency ratio (CR) of 0.005 that indicates that the pair-wise comparisons are consistent across all Labels. A CR < 0.1 is considered adequate. For example, a consistent ranking between Labels would mean that if A > B and B > C then A > C. However, if A < C, then the ranking would be considered inconsistent.

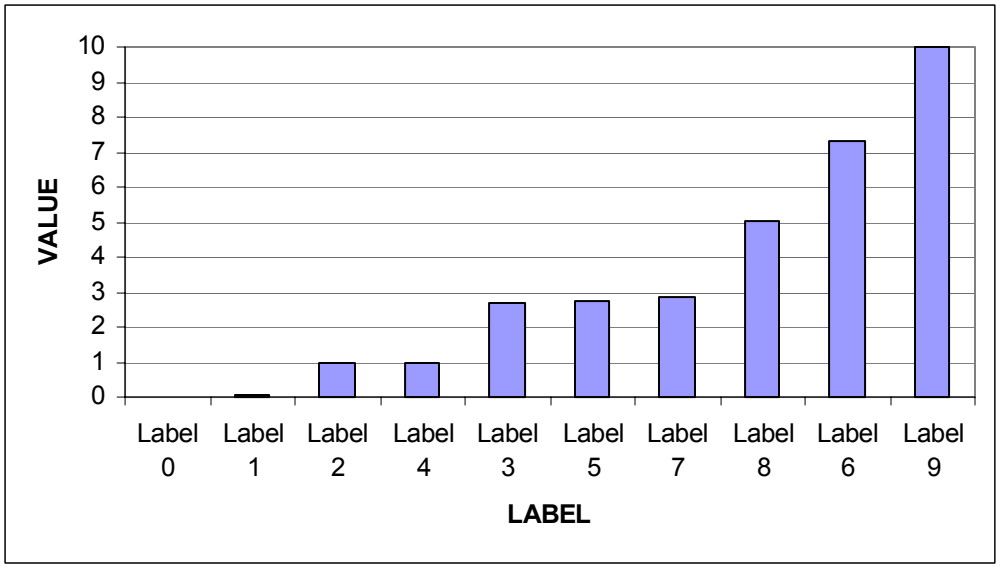
	Quantity (SQ FT 1000s)		
C2 as % of Total Cost	<=10000	<=50000	>50000
>1.0%	0.07	0.95	2.66
<=1.0%	0.95	2.73	7.34
<=0.5%	2.84	5.03	10.00

c. Model Outputs

i. The above matrix represents the model's results (the diagonal of the assessment matrix). Each installation will have costs and quantity characteristics that fit into this matrix. If the installation does not fall on the matrix, it receives "0" value for this attribute.

ii. The raw scores were normalized on a scale of zero to ten based on the pair-wise assessment results.

iii. The histogram for the value function provides a graphical representation of the previous matrix. The military values shown in the following graph are ordered according to increasing value based on the assessment. The values show that there are several combinations for this attribute that have the same military value.



Facilities Analysis Category (FAC) - Facility Category Groups (FGC) Conversions for C2 Focus Facilities

FAC	FCG
1711	F17120
1714	F17140, F17142, F17180
2143	F21407
2144	F21409
2141	F21410
7213	F72121
7218	F72181
7361	F73017
7421	F74028

INSTALLATION UNIT COST FACTOR

As of: 23 March 05

1. **DEFINITION:** The measure of Base Operations Support (BOS) costs required to support the installation's authorized population (military, civilian, and contractors). Cost factors do not include civilian payroll, sustainment, restoration, modernization, and family housing costs.
2. **PURPOSE:** Measures the relative unit cost of operating an installation.
3. **SOURCE:** BOS expenditures from the ASA (FM&C), Military/Civilian authorizations and on-board contractors from the ASIP, and the installations facility sustainment requirement from the Facility Sustainment Model. No installation data call required.
4. **METHODOLOGY:**
   a. Determine the BOS three-year (FY01-03) factor using installation's execution data for non payroll BOS (-), including environmental, communications and family programs.
   b. Determine the installation's facility sustainment requirement from the Facility Sustainment Model (FSM).
   c. Determine end strength by summing the total FY03 military/civilian authorized end strength plus on board contractors.
   d. Calculate the *Installation Cost Score* by summing the installation's FY01-03 execution data for BOS (as defined above) plus the installation facility sustainment requirement, divided by end strength.
   e. Leases receive 0 value for this attribute.
5. **QUESTIONS THAT DEFINE DATA:**
   a. TABS
      i. What are your BOS (-) non-payroll expenditures for your installation for FY01, FY02 and FY03? (ASA (FM&C))
      ii. What is the installation's authorized end strength (military/civilian) and onboard contractors? (ASIP)
      iii. What is the installation's facility sustainment requirement (from FSM)?
6. **REFERENCES:**
   a. Authorized military/civilian end strengths and On Board contractors – FY 03 ASIP reports
   b. Installation BOS (as defined above) from ASA (FM&C)
   c. Facility Sustainment Model 06 - March 2004 Facilities Pricing Guide
7. **UNIT OF MEASURE:** Dollars per person.
8. **EQUATION:**
   a. 3-Year BOS = $[BOS_{FY01} + BOS_{FY02} + BOS_{FY03}] / 3$
   b. Installation Unit Cost Factor (IUCF) = (3-Year BOS+FSM Rqmt)/Total End strength

9. MODEL REQUIREMENTS:

a. Model Input

The primary model inputs are the Installation Unit Cost Factor components.

b. Value Function

i. The value function converts the installation's Installation Unit Cost Factor into a military value between 0 and 10.

ii. The value function uses a single equation to measure the returns to scale of the attribute's score and returns the value of an installation's Installation Unit Cost Factor. The curvature of the function is determined by TABS and coordinated with ASA (FM) SMEs.

iii. The maximum value of 10 is given to the installation with the lowest Installation Unit Cost Factor.

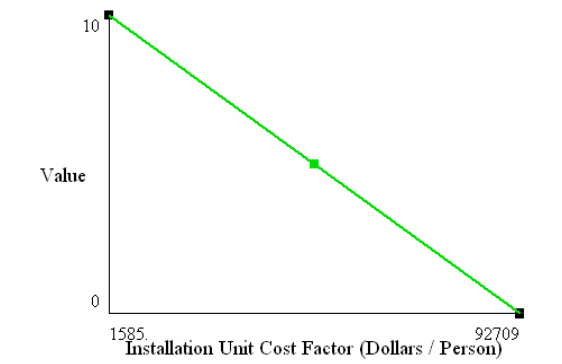
iv. The minimum value of 0 is given to any installation with a Installation Unit Cost Factor greater than 92709.

c. Model Output

i. The value function provides the military value of the installation with regards to the relative variable cost of operation as measured by the Installation Unit Cost Factor.

ii. Scores are normalized on a scale of zero to ten based on the curvature of the value function.

iii. This value function shows a linear relationship, which equates to constant returns to scale. The function implies that every additional Installation Unit Cost Factor increment has the same value as the prior increment.



Score

BUILDABLE ACRES

As of: 18 March 05

1. **DEFINITION:** The gross number of buildable acres on an installation based on eleven different land use categories.
2. **PURPOSE:** Measures the degree of internal expansion available on an installation. This attribute demonstrates the degree to which an installation may expand given current physical, building, and land use constraints.
3. **SOURCE:** Installation Capacity Data Call, DoD Question #30
4. **METHODOLOGY:**
    a. *Background*
        i. Buildable acres are land acres that are not already being used and are available to support new construction. A buildable acre must be free of environmental constraints (e.g., historical use restrictions, contamination, wetlands, incompatible encroachment, and man-made constraints such as ESQD arcs, airfield safety zones, AT/FP setbacks, etc.). Any facility to be constructed within buildable acreage must be "land use" compatible with location being considered (e.g., a playground is compatible with a family housing area and a vehicle maintenance facility is compatible with an industrial area).
        ii. Installations are generally required to have a current master plan/RSIP on hand to guide the orderly growth of the installation. Based on the master plan/RSIP, installations are to provide separate acre totals available for expansion for each of the eleven uses listed below. Each installation will report the total buildable acres by land use, and the number of land parcels. (A parcel has a distinct/contiguous perimeter.)
    b. *Method*
        i. Each installation reports their buildable acres available for the following categories of land use.

            A. Administrative - includes acreage that is appropriate for headquarters and general office buildings, training classrooms, and laboratories.

            B. Airfield Operations - includes acreage that is appropriate for airfield pavements and lighting, air operations facilities, and supporting facilities such as aircraft maintenance hangars and shops.

            C. Barracks - includes acreage that is appropriate for unaccompanied personnel housing, dining, and associated supporting facilities.

D. Community - includes acreage appropriate for base-supporting organizations such as exchanges, commissaries, security police, education facilities, etc.

E. Family Housing - includes acreage that is appropriate for family dwellings, dependent schools, and associated supporting facilities.

F. Industrial - includes acreage that is appropriate for central utility plants, equipment/vehicle maintenance and production, supply and storage, and industrial type RDT&E facilities.

G. Medical - includes acreage appropriate for medical, hospital, and dental clinic uses.

H. Outdoor Recreation - includes acreage appropriate for outdoor recreation such as ball fields, running tracks, and golf courses.

I. Waterfront Operations - includes acreage that is appropriate for pier/wharf operations, ship maintenance or production, and associated supporting facilities.

J. Undetermined Use - includes ONLY acreage for which there is no other primary use and for which any use may be appropriate.

ii. TABS combined the installation's data defined above in 4.b.i. Training Area/Ranges - includes acreage that is appropriate for individual and unit training and range facilities, maneuver land, and weapon-impact areas. Also includes acreage for RDT&E range operations. TABS then calculated the military value of buildable acres using the equation in paragraph #8. [1]

5. QUESTIONS THAT DEFINE DATA:

a. Installation Capacity Data Call, DoD Question #30 states: "Complete the following table for all land owned or controlled by the base according to the land uses listed. “Controlled” includes land/property used by DoD under lease, license, permit, etc in excess of 10 years. DO NOT include easements as either owned or controlled. Include the main installation, ranges, auxiliary fields, and all outlying sites. Designate ranges, auxiliary fields, and outlying sites separately by name and real property nomenclature (as appropriate). List each acre with its primary land use only and do not include any acre in more than one land use. Do not include developed land defined as those areas that are built-up (i.e., it consists of facilities and pavements). Do not include constrained land defined as those areas

[1] Training area and range acres are not used in calculating military value here, as training areas are typically separate and distinct from other areas, and their military value is captured in other attributes.

encompassing wetlands, flood plains, contaminated sites, RCRA/CERCLA contaminate sites, endangered species habitats, ESQD arcs, radiation safety zones, antenna field of view (or line of sight) clear zones, AT/FP setbacks and APZs."

b. The table referenced in DoD Question #30 contains columns defined by elements A thru K from paragraph #4 above and rows for each named site/real property. The data for this attribute is taken from columns A thru H and J thru K. (Column I is Training area, which is not used).

6. REFERENCES: AR 210-20, Master Planning for Army Installations, dated 30 July 1993.

7. UNIT OF MEASURE: Acres

8. EQUATION:

Gross Buildable Acres (GBA) Score = A + B + C + D + E + F + G + H + I + J

9. MODEL REQUIREMENTS:

a. Model Input

i. MVA calculates the GBA Score, the input data are: A, B, C, D, E, F, G, H, I, and J.

ii. Buildable acres are equally weighted.

b. Value Function

i. The value function uses a single equation that measures the returns to scale of the attribute's score and returns the value of an installation's facilities. The curvature of the function is determined by TABS and coordinated by U.S. Army Corps of Engineers.

ii. The Maximum value of 10 will be given to any installation with a number of GBA greater than 50,000.

iii. The Minimum value of 0 will be given to the installation with the lowest number of GBA.

iv. Leases do not receive value for this attribute.

c. Assessment

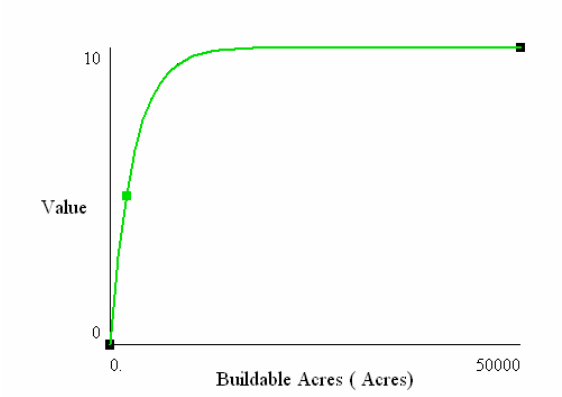
This value function was assessed using the Midpoint Method, resulting in the curve below.

d. Model Output

i. The value function provides the military value of the installation with regards to the Gross Buildable Acres score as measured by the number of buildable acres across the land use types described above.

ii. Scores are normalized on a scale of zero to ten based on the value function.

iii. This value function shows a concave curve, which equates to increasing returns to scale with diminishing marginal values. When acreage exceeds 2000 buildable acres, the military value tapers off at an increasing rate, as this approximates the ability to station numerous heavy brigades; beyond this point, significant additional constraints will limit the installation's ability to absorb forces.



Score

DATA CALL QUESTIONS

DOD Question #30: Buildable Acres

Question: Complete the following table for all land owned/controlled by the base according to the land uses listed. Controlled includes land/property used by DoD under lease, license, permit, etc in excess of 10 years. DO NOT include easements as either owned or controlled. Include the main installation, ranges, auxiliary fields, and all outlying sites. Designate ranges, auxiliary fields, and outlying sites separately by name and real property nomenclature (as appropriate). List each acre with its primary land use only and do not include any acre in more than one land use. Do not include developed land defined as those areas which are built-up; i.e. consist of facilities and pavements. Do not include constrained land defined as those areas encompassing wetlands, flood plains, contaminated sites, RCRA/CERCLA contaminate sites, endangered species habitats, ESQD arcs, radiation safety zones, antenna field of view (or line of sight) clear zones, AT/FP setbacks and APZs.
Source / Reference: See Source for Amplification.
Amplification: SOURCE:
ARMY - AR 210-20, Master Planning for Army Installations, dated: 30 July 1993. AIR FORCE - AFI 32-7062, Air Force Comprehensive Planning, dated 1 Oct. 1997, Real Property Records, Base General Plan. NAVFACINST 11010.45, Regional Planning Instruction; Sources: iNFADS, Regional Shore Installation Plans (RSIPs) and Master Plans.

DEFINITION:
Buildable acres are land acres(s) that are not already being used and are available to support new construction. A buildable acre must be free of environmental constraints to its use, e.g., historical use restrictions, contamination, wetlands, incompatible encroachment, and man-made constraints such as ESQD arcs, airfield safety zones, AT/FP setbacks (DEFINITION?), etc. Any facility to be constructed within buildable acreage must be "land use" compatible with location being considered, e.g., a playground is compatible with a family housing area and a vehicle maintenance facility is compatible with an industrial area.

METHODOLOGY:
Installations are generally required to have a current master plan/RSIP on hand to guide the orderly growth of the installation. Based on the master plan/RSIP, installations are to provide separate acre totals available for expansion for each of the eleven uses listed below. For each land use the installation will report the total buildable acres and number of land parcels. (A parcel has a distinct/contiguous perimeter)

LAND USES:
A. Administrative - includes acreage that is appropriate for headquarters and general office buildings, classroom training, and laboratories.
B. Airfield Operations - includes acreage that is appropriate for airfield pavements and lighting, air operations facilities, and supporting facilities such as aircraft maintenance hangars and shops.
C. Barracks - includes acreage that is appropriate for unaccompanied personnel housing, dining, and associated supporting facilities.
D. Community - includes acreage appropriate for base supporting organizations such as exchanges, commissaries, security police, education facilities, etc.
E. Family Housing - includes acreage that is appropriate for family dwellings, dependent schools, and associated supporting facilities.
F. Industrial - includes acreage that is appropriate for central utility plants, equipment/vehicle maintenance and production, supply and storage, and industrial type RDT&E facilities.
G. Medical - includes acreage appropriate for medical, hospital and dental clinic uses.
H. Outdoor Recreation - includes acreage appropriate for outdoor recreation such as ball fields, running tracks, and golf courses.
I. Training Area/Ranges - includes acreage that is appropriate for individual and unit training and range facilities, maneuver land, and weapon impact areas. Also includes acreage for RDT&E range operations.

J. Waterfront Operations - includes acreage that is appropriate for pier/wharf operations, ship maintenance or production, and associated supporting facilities.
K. Undetermined Use - includes ONLY acreage for which there is no other primary use and for which any use may be appropriate

Column Headings for this question

Column names	Data Type	Source/Reference	Amplification
Site Name/Real Property Nomenclature (Text)	string100		
Total Number of Parcels (Count)	numeric		
Administrative Total Buildable Acres (Acres)	numeric		
Airfield Operations Total Buildable Acres (Acres)	numeric		
Barracks Total Buildable Acres (Acres)	numeric		
Community Total Buildable Acres (Acres)	numeric		
Family Housing Total Buildable Acres (Acres)	numeric		
Industrial Total Buildable Acres (Acres)	numeric		
Medical Total Buildable Acres (Acres)	numeric		
Outdoor Recreation Total Buildable Acres (Acres)	numeric		
Training Areas/Ranges Total Buildable Acres (Acres)	numeric		
Waterfront Operations Total Buildable Acres (Acres)	numeric		
Undetermined Use Total Buildable Acres (Acres)	numeric		

BRIGADE CAPACITY

As of: 3 February 05

1. **DEFINITION:** The ability of an installation to support maneuver Brigades (light, heavy, or Stryker Brigade Combat Team (SBCT)).
2. **PURPOSE:** Determine if an installation is currently or has the ability to support a maneuver Brigade (light, heavy, SBCT; current and expandability).
3. **SOURCE:** ARRMS provides maneuver land requirements; the Army G3 provides the current location of Army maneuver Brigades (attached); and the Installation Capacity Data Call provides range capability.
4. **METHODOLOGY:**
    a. TABS determines the installations where maneuver Brigades currently reside (G3).
    b. TABS screens all installations that do not currently have maneuver Brigades stationed on the installation:
        i. Determine if an installation has enough maneuver land to support at least one Brigade (ARRM provides Brigade maneuver land requirements).
        ii. Determine if the installation reported impact area in the capacity data call that could support the firing of weapons IAW Direct Fire attribute Label 1. From question 156, sum the total acres reported in column 3 by the installation for all dudded impact areas.
        iii. If the installation can satisfy the above two screening criteria, it is considered a potential Brigade location.
    c. If the installation currently has maneuver Brigades (step 4a), the installation receives a score commensurate with the number of Brigades, if the installation passes the screening criteria in 4b, it receives a score of 1.
    d. Installations that do not currently have a maneuver Brigade or do not pass the screening criteria in 4b, receive a score of 0.
    e. Leases receive 0 value for this attribute.
5. **QUESTIONS THAT DEFINE DATA:**
    a. Where are the Army's current maneuver Brigades stationed?
    b. Maneuver land – If the installation manages or controls ground maneuver areas for training, provide the net acreage available for light and heavy maneuver training. (DoD #877)
    c. Dudded Impact Area – What is the size of the installations dudded impact area(s)? (DoD #156: Dudded Impact Area Acres)
6. **REFERENCES:** ARRM, G3
7. **UNIT OF MEASURE:** Number of maneuver Brigades

8. EQUATION: N/A

9. MODEL REQUIREMENTS:

a. Model Inputs:

The installation's current number of maneuver Brigades and if the installation passes the maneuver land/impact area screen, are the model's primary inputs.

b. Value Function Assessment

i. The value function converts the installation's maneuver Brigades into military value.

ii. The value function uses a single equation that measures the returns to scale of the attribute's score and returns the value of the installation's Brigades. The curvature of the function is determined by TABS and coordinated with G3 SMEs.

iii. The maximum value of 10 will be given to the installations with the largest number of brigades.

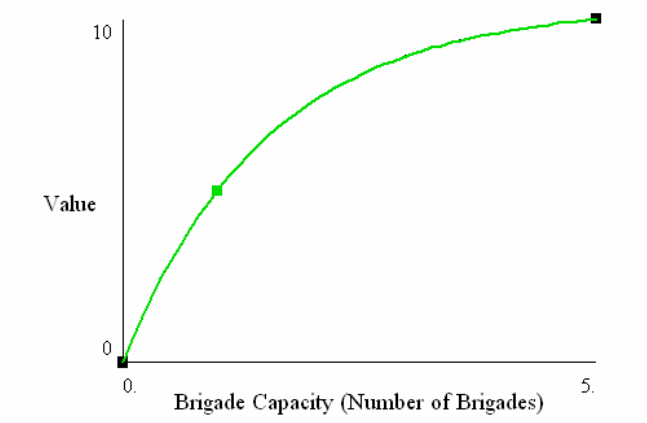
iv. The minimum value of 0 will be given to an installation if it does not have a maneuver Brigade and does not pass the maneuver land/impact area screen.

c. Value Function Output

i. The value function provides the military value of the installation with regards to its ability to support maneuver Brigades.

ii. Scores are normalized on a scale of zero to ten based on the curvature of the value function.

iii. This value function shows a concave relationship, which takes into account the decentralized concepts of the transforming Army. The function implies that an installation gains considerable value (5) if the installation has a score of at least one. From one, each additional brigade has value, but this value increases at a decreasing rate.



Draft deliberate document – For discussion purposes only – Do not release under FOIA

ENVIRONMENTAL ELASTICITY

As of: 19 August 04

1. **DEFINITION:** Environmental Elasticity is the ability of an installation to absorb additional personnel based on the utility resource physical capacity constraints and resource costs at capacity thresholds. The "threshold" is the point where the current infrastructure or resource delivery is limited and cannot be exceeded without significant cost or modification of infrastructure.

2. **PURPOSE:** To compare installations based on their relative ability to absorb additional personnel, using two installation characteristics: total costs for specified resources at capacity threshold and the number of people that can be supported by the resources at capacity threshold.

3. **SOURCE:** Installation Capacity Data Call, Installation Military Value Data Call, Army Stationing and Installation Plan (ASIP).

4. **METHODOLOGY:**

   a. *Background.*

      i. The ability to assess an installation's infrastructure capacity is essential to the decision to station additional units and increase installation population. The methodology outlined below assesses in a consistent way the relationships between capacity to support personnel and the costs for selected resources.

      ii. The four resources examined are: 1) Energy (electricity and natural gas), 2) Water (potable and non-potable) and Wastewater (municipal and industrial) treatment, 3) Solid Waste Management and 4) Maintenance of Training Land. Data used for this analysis is obtained from TABS data calls and other authoritative sources.

      iii. The per person usage and costs for each of these resources at existing installations is computed based on existing stationing and cost data. The usage data is then used to calculate how many persons may be stationed at an installation until the physical "capacity threshold" for that resource is reached; the cost data is used to determine how much the resources needed for this population would cost at that installation. To determine costs, a linear extrapolation of costs for additional personnel is done based on current per person usage and cost parameters until the capacity threshold is reached. [1].

      iv. The analysis identified the "capacity threshold" for energy, water and wastewater. For energy, it is assumed that off-installation supply is unlimited but there are capacity threshold restrictions due to limits on distribution for electric substations and transmission lines and natural gas pipelines. For water

[1] Individual contracts will not be examined to determine where cost rate increases may be imposed by contract due to increased usage.

supply and wastewater treatment, capacity threshold restrictions may be due to treatment plant size, distribution limits, or permit restrictions. For training land, other projects underway determine the capacity threshold. For solid waste, it is assumed that off-post disposal is unlimited and there is no capacity threshold limit.

b. *Method. Army* Environmental Policy Institute (AEPI) and contracted support completed the following calculations to determine the Environmental Elasticity of each installation.

i. Number of Personnel: TABS provided data on the number of personnel (PO) including Soldiers, civilians, dependents and contractors that are currently stationed at an installation.
Result: (PO) number of personnel.

ii. Peak day or highest monthly usage: Identify the electricity demand for the peak day or the highest monthly usage (from recent FY) for natural gas, potable and non-potable water, and industrial and municipal wastewater treatment resources using responses from Data Call 2 questions 815 (electricity), 818 (natural gas), 822 (municipal and industrial wastewater), 823 (potable water), and 824 (non-potable water).
Result: Usage metric (UO)

iii. Peak day or highest monthly usage per person: Calculate the peak demand for electricity and highest monthly usage for natural gas, potable and non-potable water, and industrial and municipal wastewater treatment resources per person. Divide peak/highest usage by current population: UO/PO.
Result: usage metric/ person

iv. Capacity threshold: Determine the capacity threshold in physical terms for the electricity, natural gas, potable and non-potable water, and industrial and municipal wastewater treatment resources using Data Call 1 questions 282 (industrial wastewater), 287 (non-potable water), 291 (potable water), 297 (municipal wastewater) and Data Call 2 questions 816 and 817 (electricity), and 819 (natural gas)[2].
Result: usage metric

v. Maximum number of personnel by resource at the resource's capacity threshold: Calculate maximum number of personnel, which can be supported at the capacity threshold for electricity (PP_E), natural gas (PP_{NG}), potable (PP_{PW}) and non- potable water (PP_{NPW}), and industrial (PP_{IW}) and municipal wastewater (PP_{MW}) treatment. For each resource, divide the capacity threshold by peak usage per person: Step iv/Step iii.
Result: number of personnel.

[2] Appendix 1 explains how the capacity threshold is determined for each resource.

vi. Maximum number of personnel at installation at capacity threshold: Identify the maximum number of personnel the installation can support (PP_{IT}) by selecting the lowest population from Step v.
Result: number of personnel.

vii. Total annual costs for each resource from one of the recent FY: Identify for electricity, natural gas, potable and non-potable water, and industrial and municipal wastewater treatment resources, the year with the highest monthly usage or peak. For that year select the total annual costs for these resources from Data Call 2 questions 815 (electricity: AO_E), 818 (natural gas: AO_{NG}), 822 (industrial and municipal wastewater treatment: AO_{IW}, AO_{MW}), 823 (potable water: AO_{PW}), and 824 (non-potable water: AO_{NPW}). For training land maintenance identify the annual cost from Data Call 2 question 821 (AO_{TL}). For solid waste management select the year with the highest annual cost and identify that cost from Data Call 2 question 820 (AO_{SW}).
Result: dollars.

viii. Cost per person for each resource up to its capacity threshold: Calculate the cost per person for electricity (CP_E), natural gas (CP_{NG}), potable water (CP_{PW}), non-potable water (CP_{NPW}), industrial wastewater (CP_{IW}), municipal wastewater (CP_{MW}) , solid waste (CP_S), and training land maintenance (CP_{TL}) at current stationing levels up to the capacity threshold for that resource. Divide total annual recent costs for each resource by current population: Step vii/PO.
Result: $/person.

ix. Total cost per person up to installation's capacity threshold: Calculate the total resource cost per person (CP_{IT}) at the capacity threshold the installation can support. $CP_{IT} = CP_E + CP_{NG} + CP_{PW} + CP_{NPW} + CP_{IW} + CP_{MW} + CP_{SW} + CP_{TL.}$
Result: $/person

x. Total annual cost at an installation's capacity threshold: Calculate the total annual cost for all resources at capacity threshold (AP_{IT}). Multiply the total cost per person by the maximum number of persons that can be supported at threshold. $AP_{IT} = (CP_{IT}) \times (PP_{IT})$.
Result: dollars

xi. Leases receive 0 value for this attribute.

5. QUESTIONS THAT DEFINE DATA: See Appendix 2.

6. REFERENCES: Installation records, and local utility reports.

7. UNITS OF MEASURE: Cost in thousand dollars ($K), and number of personnel.

8. EQUATION: N/A

9. MODEL REQUIREMENTS:

a. Model Inputs

i. The calculated inputs for each installation are the Maximum Number of Personnel at Capacity Threshold (PP_{IT}), and the Total Annual Cost at Capacity Threshold (AP_{IT}).

ii. When graphed with total annual costs on the Y axis, and maximum number of personnel on the X axis, the installations with the most military value would be those in the lower right quadrant – the most people at lowest total annual cost; the installations with the least military value would be those in the upper left quadrant - fewest people and highest annual cost.

b. Value Function

i. The value function plots PP_{IT} and AP_{IT} into the below matrix resulting in a military value for the installation.

ii. The Maximum value of 10 will be given to the installations with the largest populations at the lowest total annual costs.

iii. The Minimum value of 0 will be given to the installations with the smallest populations at the highest total annual costs.

iv. The assessment of the function is determined by TABS and coordinated with AEPI.

	Capacity Threshold (Persons)		
Cost ($K)	<=1000	<=20000	>20000
>10000	Label 1	Label 2	Label 3
<=10000	Label 4	Label 5	Label 6
<=2500	Label 7	Label 8	Label 9

v. Assessment Results

1) The table below illustrates the assessment's values, which consist of a series of pair-wise comparisons between the different Labels (range from 1 to 9, comparison of "1" indicates that the preferences are equal between the Labels, and a "9" indicates that the preference of one Label to another is extreme).

C.R. = 0.058	Label 1	Label 2	Label 3	Label 4	Label 5	Label 6	Label 7	Label 8	Label 9
Label 1	0.00	0.33	0.14	0.33	0.20	0.13	0.25	0.14	0.11
Label 2	3.00	0.35	0.20	1.00	0.25	0.14	0.50	0.20	0.13
Label 3	7.00	5.00	3.63	5.00	4.00	0.50	4.00	1.00	0.25
Label 4	3.00	1.00	0.20	0.39	0.33	0.17	0.50	0.20	0.13
Label 5	5.00	4.00	0.25	3.00	1.49	0.17	3.00	0.25	0.14
Label 6	8.00	7.00	2.00	6.00	6.00	6.39	5.00	3.00	0.50
Label 7	4.00	2.00	0.25	2.00	0.33	0.20	0.80	0.25	0.17
Label 8	7.00	5.00	1.00	5.00	4.00	0.33	4.00	3.45	0.20
Label 9	9.00	8.00	4.00	8.00	7.00	2.00	6.00	5.00	10.00

2) The assessment converts the pair-wise comparisons into the value that an installation will receive for meeting the requirements at a given label

3) For example (refer to the gray cells in column 1 of the above matrix), the SME indicates that Label 9 is *extremely* (scores a 9) preferred over Label 1, and Label 4 is *slightly* (scores a 3) over Label 1

4) The above matrix has a consistency ratio (CR) of 0.058 that indicates that the pair-wise comparisons are *consistent* across all Labels. A CR < 0.1 is considered adequate. For example, a consistent ranking between Labels would mean that if A > B and B > C then A > C. However, if A < C, then the ranking would be considered inconsistent.

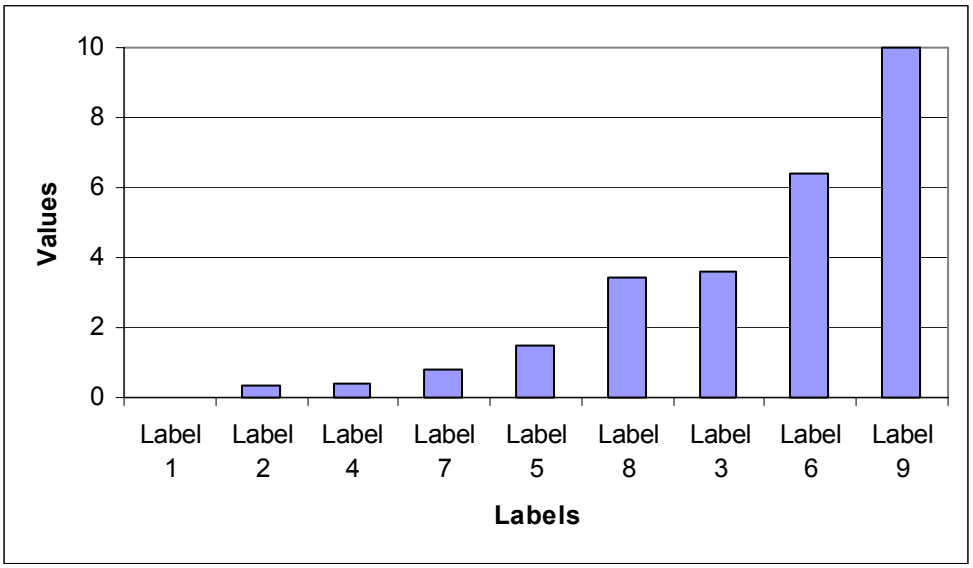
c. Model Outputs

	Capacity Threshold (Persons)		
Cost ($K)	<=1000	<=20000	>20000
>10000	0	0.35	3.63
<=10000	0.39	1.49	6.39
<=2500	0.8	3.45	10.00

i. The above matrix represents the assessment results (the diagonal of the assessment matrix).

ii. The raw scores were normalized on a scale of zero to ten based on the pair-wise assessment results.

iii. The histogram for the Value Function provides a graphical representation of the previous matrix. The military values shown in the following graph are ordered according to increasing value based on the assessment.



Appendix 1
Calculations for Physical Capacity Thresholds

Energy

Electricity

1) Dedicated Substations

From Q 816: add the KW for all dedicated substations serving the whole installation.

From Q 816: add the KW for all transmission lines listed for each dedicated substation.

The lower of these numbers is the capacity limit of the dedicated substations serving the installation.

2) Non Dedicated Substations

From Q 817: for the year with the highest peak day, subtract the KW peak demand from the KW capacity rating for each substation listed. Add the differences for each non-dedicated substation listed.

3) Add results from 1) and 2) to determine the physical capacity threshold for electricity.

Natural Gas:

From Q819 sum the capacity of all the natural gas pipelines servicing the whole installation to determine the capacity threshold.

Water

Potable:

From Q 291 for each water source select the lowest of either design or permitted maximum daily production capacity. Add the selected maximum daily production capacity from each water source to establish the installation capacity threshold for potable water.

Non-potable:

From Q 287 sum the maximum daily production capacity from each water source to establish the installation capacity threshold for non-potable water.

Wastewater

Municipal (sanitary sewage):

From Q297 for each plant or system select the lowest of either design or permitted maximum daily treatment processing capacity. Add the selected maximum daily treatment processing capacity from each plant or system to establish the installation capacity threshold for municipal wastewater.

Industrial:

From Q282 for each plant or system select the lowest of either design or permitted maximum daily treatment processing capacity. Add the selected maximum daily treatment processing capacity from each plant or system to establish the installation capacity threshold for industrial wastewater.

Appendix 2
Questions that Define Data

Data Call # 1:

DOD #282: Industrial Wastewater Treatment System (Final #601)

DOD #283: Largest Peak Monthly Outflow for Industrial Wastewater (Final #576)

DOD #287: Non-Potable Water Use (Final #557)

DOD #288: Peak Monthly Consumption of Non-Potable Water (Final #558)

DOD #291: Potable Water Production (Final #562)

DOD #292: Potable Water Consumption Peak Month (Final #573)

DOD #297: Sanitary Sewage Treatment System / Plant (Final #564) (referred to as Municipal Wastewater Treatment)

DOD #298: Largest Peak Flow for Sanitary Sewage (Final #574) (referred to as Municipal Wastewater Treatment)

Data Call #2:

Reference #815: Electricity Peak Demand and Total Annual Cost

Reference #816: Distribution Capacity Rating for Dedicated Substation(s) and Transmission Line(s)

Reference #817: Distribution Capacity Rating and Peak Demand for Non-dedicated Substation(s)

Reference #818: Natural Gas: Highest Monthly Usage and Total Annual Cost

Reference #819: Natural Gas Pipeline Capacity

Reference #820: Total Annual Cost of Solid Waste Collection and Disposal

Reference #821: Total Annual Cost of Training Range Maintenance and Repair

Reference #822: Wastewater Treatment: Highest Monthly Usage and Total Annual Operational Cost

Reference #823: Potable Water: Highest Monthly Usage and Total Annual Cost

Reference #824: Non-Potable Water: Highest Monthly Usage and Total Annual Cost

URBAN SPRAWL

As of: 19 August 04

1. **DEFINITION:** A linear forecast to 2020 of urbanization, based on changes in land use from 10 years of historical data.

2. **PURPOSE:** Evaluates land use changes and encroachment along the edges of military installations including a one-mile buffer around the installation.

3. **SOURCE:** U.S. Army Corps of Engineers Research Labs (CERL). No installation data call is required.

4. **METHODOLOGY:**

   a. *Background*

      Land use changes in the immediate vicinity of military installations can result in constraints being imposed on mission and resource management operations at these installations. Labeled "encroachment" by DoD, encroachment can compromise sustained and future training and testing missions at an installation. DoD has implemented an effort, through the National Imagery and Mapping Agency (NIMA) to acquire high-resolution, true-color commercial satellite imagery (IKONOS) of its major installations. This imagery will include a buffer around the installation perimeter.

   b. *Method*

      i. CERL will determine the % change in land use to more urban-like features (Encroachment).

      ii. Baseline values for percent land use are determined using 1992 NLCD, specifically for urban land features.

      iii. The percent change (%) in land use will be determined by comparing the 1992 National Land Cover Data (NLCD) to the land use categories derived from the 2000 or later IKONOS imagery. IKONOS imagery is consistent, current, and has sufficient resolution for good visual inspection; the data, by itself does not provide a good indication of "trends" in land use change. However, CERL combines U.S. Geological Survey-generated National Land Cover Data (NLCD) sets and IKONOS imagery, which results in land use land cover that can be used to compare the "difference" in land use patterns on the perimeter of installations over the course of the last decade.

      iv. To ensure that installations are compared fairly, the percent change is divided by the number of cells in the buffer, to normalize for the size of the installation. This prevents a slight increase in a sparsely urbanized buffer around a small installation from getting a high percentage change.

v. For 6 OCONUS sites, the 1992 NLCD is unavailable for a baseline. For these sites only, a modified methodology based on CENSUS data is used to estimate % change:
    1. We generate 1 and 5 mile buffers around the installations
    2. We determine towns and acres within 1 and 5 mile buffers
    3. We use census data now known to exist for Alaska, Hawaii, and Puerto Rico for 1990 and 2000 to generate town and rural densities from which we then correct for the area within the 1 and 5 mile buffers to generate populations. This would be making the tabular data equivalent to the imagery spatial analysis data.
    4. Generate trend data via the same method as now in place.

vi. Leases receive 0 value for this attribute.

5. QUESTIONS THAT DEFINE DATA:

For each installation, provide the percent change in land use from non-urban to urban; forecast to 2020. Use the 1992 land use as the baseline, and develop forecast based on 10 years of historical data. Report changes above baseline conditions.

6. REFERENCES: ERDC-CNN, IVT Analysis and Change Detection Algorithm developed by CERL. National Land Cover Data (NLCD), 1992 and IKONOS Imagery, 2000 or later.

7. UNIT OF MEASURE: % Change per standard unit area

8. EQUATION: None

9. MODEL REQUIREMENTS:

a. Model Input
    i. Data input includes percent change in land use per standard unit area.
    ii. These scores ranged from 9.8e-13 to 3.8e-7. To ensure computational integrity, the % change/developable cell scores were multiplied by a constant (1.0e+12).

b. Value Function
    i. The value function measures the returns to scale of the attribute's score and returns the value of an installation's facilities. The curvature of the function is determined by TABS and coordinated with the U.S. Army Corps of Engineers.
    ii. The Maximum value of 10 was given to the installation with the lowest percent change per unit area.

iii. The Minimum value of 0 was given to the installation with the highest percent change per unit area.

c. Assessment

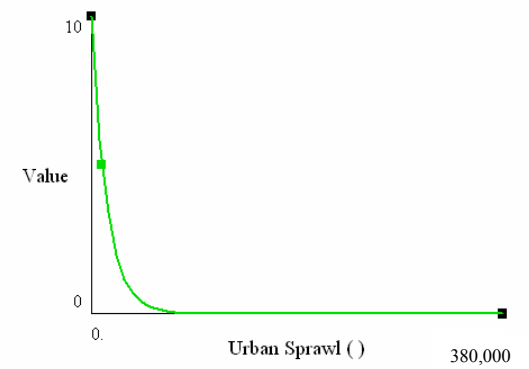
This value function's assessment considered the negative impact that encroachment has on training resulting in the curve below.

d. Model Output

i. The value function provides the military value of the installation based on the forecasted level of urbanization to 2020.

ii. Scores are normalized on a scale of zero to ten based on the value function.

iii. This value function is a convex curve. Urban encroachment severely limits the expandability of an installation, therefore the value decreases exponentially as the projected urbanization increases.



Score

CRITICAL INFRASTRUCTURE PROXIMITY

As of: 19 August 04

1. **DEFINITION:** The number of Critical Infrastructure (CI) nodes located within 150 miles of the installation.
2. **PURPOSE:** Measures the installation's potential capability to support consequence management and homeland defense missions, including military assistance for civil disturbance, natural disasters, CBRN&E accidents, terrorist incidents, and military assistance to civil law enforcement agencies.
3. **SOURCES:**
    a. Power Generating Reactors: U.S. Nuclear Regulatory Commission 2003 Information Digest, Appendix A. http://www.nrc.gov/reactors/operating/list-power-reactor-units.html.
    b. Major Dams: National Inventory of Dams, US Army Corps of Engineers (DoD) http://crunch.tec.army.mil/nid/webpages/nid.cfm.
    c. Federal Reserve Banks: The Federal Reserve Board of Governors Website http://www.federalreserve.gov/otherfrb.htm.
    d. Ports: National Geospatial Intelligence Agency, (DoD) United States Port Protection Graphic, Version 1.
    e. Top 25 Most Dangerous Chemical Plants: National Geospatial Intelligence Agency (DoD) NRDC - Top 25 Most Dangerous Chemical Facilities, Version 2
    f. Refineries: National Geospatial Intelligence Agency (DoD), United States Crude Oil Pipelines and Refineries, Version 2
    g. Census data and GIS; no installation data call required
4. **METHODOLOGY:**
    a. The installation's role will primarily be one of consequence management (the term associated with ways and means of alleviating the short- and long-term physical, socio-economic, and psychological effects of a terrorist attack) and that the installation will be used as a staging area for homeland security missions.
    b. TABS selected a radius of 150 miles with the assumption that this would be a 3-hour ride from the installation to the CI node, one-way.
    c. Using GIS software, analysts and cartographers from the Center for Army Analysis will determine the number of CI nodes that are within 150 miles of each candidate installation. The 150 miles will be measured from the installation's grid coordinates (lat/long) of its headquarters building.
    d. The more nodes located within 150 miles of the installation, the higher the installation's score.
    e. CI nodes include major dams, ports, chemical plants, crude oil refineries, Federal Reserve Banks, and nuclear power generators. All of the data for the nodes will come from open source, unclassified, certified databases. The set of CI nodes

chosen for use in this attribute are derived from open source government documents on Homeland Security and Critical Infrastructure Protection.

f. Leases receive 0 value for this attribute.

5. QUESTIONS THAT DEFINE DATA:

How many Critical Infrastructure nodes are located within 150 miles of the installation?

6. REFERENCES:

a. The National Strategy for the Physical Protection of Critical Infrastructures and Key Assets, Feb. 2003, The White House

b. Installation Latitude and Longitude

c. GIS Software (ARCGIS 8.3 developed by ESRI-Environmental Systems Research Incorporated)

d. CAA Technical Report

7. UNIT OF MEASURE: Number of Critical Infrastructure nodes

8. EQUATION: N/A

9. MODEL REQUIREMENTS:

a. Model Input:

The primary model input is the number of critical infrastructure facilities.

b. Value Function

i. The value function converts the installation's score into a military value between 0 and 10.

ii. The value function uses a single equation that measures the returns to scale of the attribute's score and returns the value of an installation's proximity to CI nodes. The curvature of the function is determined by TABS and coordinated with CAA.

iii. The maximum value of 10 is given to the installation with the greatest number of CI nodes within 150 miles of the installation (e.g., the highest score).

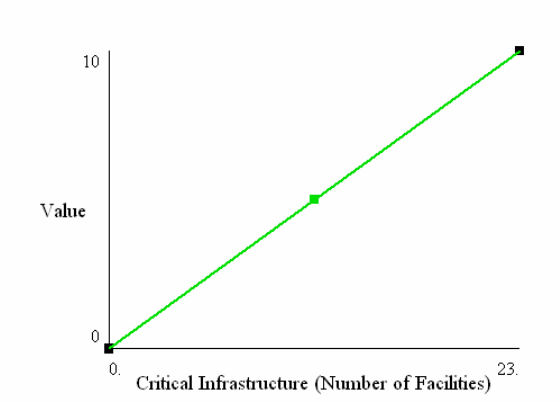
iv. The minimum value of 0 is given to an installation with the least number of CI nodes within 150 miles of the installation.

c. Model Output

i. The value function provides the military value of the installation with regards to the greatest number of CI nodes within 150 miles of the installation.

ii. Scores are normalized on a scale of zero to ten based on the curvature of the value function.

iii. This value function shows a linear relationship, which equates to constant returns to scale. The function implies that every additional CI node increment has the same value as the prior increment.


10
Value
0
0.
23.
Critical Infrastructure (Number of Facilities)

Score