

**OTIS REVISED MCI SCORING DATA**  
**19 July 2005**

The purpose of this document is to outline all revised Mission Capability Index (MCI) Military Value attributes and provide quantitative justification. Otis has determined at least 9 of the 23 attributes of MCI score were incorrectly calculated due to erroneous/missing data and programming errors. This results in a new score of **61.82**. The attributes highlighted in red are the incorrect attributes. Yellow highlights indicate there are additional scoring increases that could not be accounted for due to limited/inaccurate information released by OSD. The Tab number references the question asked by OSD, Otis' analysis, and corrected response.

<b>Mission Compatibility Index - Effective Weights (Fighter MCI)</b>				
<b>TAB</b>	<b>Name</b>	<b>Eff. %</b>	<b>DoD</b>	<b>Recalculated</b>
	<b>1</b>	<b>Current / Future Mission</b>	<b>46.00</b>	
	<b>1</b>	<b>Operating Environment</b>	<b>11.50</b>	
	1242	ATC Restrictions to Operations	5.98	5.98
<b>Tab 1</b>	1271	Prevailing Installation Weather Conditions	5.52	0
	<b>2</b>	<b>Geo-locational Factors</b>	<b>34.50</b>	
<b>Tab 2</b>	1245	Proximity to Airspace Supporting Mission (ASM)	22.08	3.83
	1246	Proximity to Low Level Routes Supporting Mission	7.25	0.54
<b>Tab 3</b>	1270	Suitable Auxiliary Airfields Within 50NM	5.18	2.59
	<b>2</b>	<b>Condition of Infrastructure</b>	<b>41.50</b>	
	<b>3</b>	<b>Key Mission Infrastructure</b>	<b>22.83</b>	
	8	Ramp Area and Serviceability	2.97	2.97
	9	Runway Dimension and Serviceability	2.28	2.28
	1207	Level of Mission Encroachment	2.28	1.75
<b>Tab 4</b>	1221	Hangar Capability - Small Aircraft	3.88	2.43
<b>Tab 5</b>	1232	Sufficient Explosives-sited Parking	3.65	1.21
<b>Tab 6</b>	1233	Sufficient Munitions Storage	4.79	0
	1235	Installation Pavements Quality	2.97	2.97
	<b>4</b>	<b>Operating Areas</b>	<b>18.68</b>	
<b>Tab 7</b>	1203	Access to Adequate Supersonic Airspace	6.72	2.69
<b>Tab 8</b>	1266	Range Complex (RC) Supports Mission	11.95	6.95
	<b>3</b>	<b>Contingency, Mobilization, Future Forces</b>	<b>10.00</b>	
	<b>5</b>	<b>Mobility/Surge</b>	<b>4.40</b>	
	1214	Fuel Dispensing Rate to Support Mobility and Surge	2.64	0.71
<b>Tab 9</b>	1241	Ability to Support Large-Scale Mobility Deployment	1.76	0.44
	<b>6</b>	<b>Growth Potential</b>	<b>5.60</b>	
	213	Attainment / Emission Budget Growth Allowance	1.68	1.01
	1205.1	Buildable Acres for Industrial Operations Growth	1.96	1.96
	1205.2	Buildable Acres for Air Operations Growth	1.96	1.47
	<b>4</b>	<b>Cost of Ops / Manpower</b>	<b>2.50</b>	
	<b>7</b>	<b>Cost Factors</b>	<b>2.50</b>	
	1250	Area Cost Factor	1.25	0.59
	1269	Utilities cost rating (U3C)	0.13	0.04
	1402	BAH Rate	0.88	0.18
	1403	GS Locality Pay Rate	0.25	0.25
		<b>TOTAL</b>	<b>100.00</b>	<b>42.83</b>
				<b>61.82</b>

Scores were recalculated using the algorithms described in *Department of the Air Force Analysis and Recommendations BRAC 2005 (Volume V, Part 2 of 2)*. Seven of nine attributes were accurately recalculated using missing data. In one case, attribute/equation 1266 (Tab 8), the algorithm described did not replicate the posted scores and therefore could not be accurately used to assess our true value using missing data. In another case, attribute 1203 (Tab 7), the listed score is incorrect when using the posted algorithm and actual OSD data. Otis' recalculated MCI score was **61.82** without any additional credit for attribute 1266. This MCI ranks Otis #24 out of 154 bases for Fighter Missions (see scores at right).

Microsoft Excel was used to recalculate six of the nine attribute scores. Formula 1245 was replicated using a combination of ArcGIS and Excel. All files are included on the CD.

Each tab will show the question and formula provided by OSD, followed by the recalculated score. The tab will also include auditable background information used for the recalculation.

Data used in scoring questions 1271, 1245, 1270, 1203, and 1266 was provided at the HAF level.

FIGHTER MCI (EXCEPT A-10S)		
RANK	BASE	OVERALL MCI SCORE
1	Seymour Johnson AFB	83.24
2	Langley AFB	82.84
3	Eglin AFB	81.40
4	Hurlburt Field	77.43
5	MacDill AFB	75.60
6	Tyndall AFB	73.63
7	Shaw AFB	72.20
8	Edwards AFB	71.92
9	Moody AFB	70.80
10	Holloman AFB	69.82
11	Eielson AFB	69.09
12	Luke AFB	69.06
13	Nellis AFB	68.73
14	Hill AFB	68.02
15	Dover AFB	66.69
16	Kirtland AFB	66.44
17	Pope AFB	65.86
18	Patrick AFB	64.96
19	Charleston AFB	64.94
20	March ARB	64.84
21	Andrews AFB	64.83
22	Davis-Monthan AFB	63.83
23	Mountain Home AFB	63.01
24	Otis AGB	61.82
25	Jacksonville IAP AGS	61.80
26	Barksdale AFB	61.49
27	Altus AFB	61.43
28	Little Rock AFB	60.78
29	McChord AFB	60.73
30	Fairchild AFB	60.32
31	Maxwell AFB	59.61
32	Homestead ARS	59.17
33	Robins AFB	59.13
34	Indian Springs AFS	59.11
35	Dyess AFB	58.96
36	Tinker AFB	58.47
37	Elmendorf AFB	58.35
38	Whiteman AFB	58.18
39	Beale AFB	58.10
40	Ellsworth AFB	58.06
41	Savannah IAP AGS	57.80
42	McGuire AFB	57.02
43	Minot AFB	56.64
44	McConnell AFB	56.47
45	Travis AFB	56.42
46	Sheppard AFB	56.26
47	Grand Forks AFB	55.88
48	Lackland AFB	55.79
49	McEntire AGS	55.74
50	Richmond IAP AGS	55.34

Tab 1

<b>Mission</b>	Fighter
<b>Criterion</b>	Current / Future Mission
<b>Attribute</b>	Operating Environment
<b>Formula #</b>	1271
<b>Label</b>	Prevailing Installation Weather Conditions
<b>Effective %</b>	5.52
<b>Question</b>	<p>Check the average number of days annually the prevailing weather is better than 3000/3 Nautical Miles (NM).</p> <p>If installation has no runway or no active runway, or no serviceable, suitable runway then score 0 pts. See section 1.9 "Shared" for details.</p> <p>If the average number of days <math>\geq 300</math>, get 100 points.  Otherwise, if the average number of days <math>\leq 250</math>, get 0 points.  Otherwise, pro-rate the average number of days between 250 and 300 on a 0 to 100 scale.</p> <p><b>Example:</b>  The average number of days annually where the prevailing weather is better than 3000/3 NM is 275. 275 is halfway between 250 and 300, for a score of 50.</p>
<b>Source</b>	AFCCC Climatological tables

Data for this question came from HAF (AFWA) according to *USAF Questionnaire Definitions*

<p><b>QUESTION TITLE</b></p> <p>1271 Air Operations - Prevailing Weather</p> <p><b>TEXT</b></p> <p>For installations with an active runway, how many days each year, averaged over 30 years, was the prevailing weather better than 3000/3NM?</p> <p><b>AMPLIFICATION</b></p> <p>(HAF: AF/XO to list bases of interest; AFWA to answer) Record each installation entry in days/year. Answer should be weather data for the installation averaged over 30 years (CY1973 - 2003).</p>
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Using data attained from AFCCC, Asheville NC, historical data over the past 30 years results in 72.5% of the days (or 264.6 days a year) meeting the criteria. This equates to an additional 1.6 more points in the MCI. The data sheets are on the next page.

GLOBAL CLIMATOLOGY BRANCH  
 PERCENTAGE FREQUENCY OF OCCURRENCE OF CEILING VERSUS VISIBILITY  
 AFCCC, ASHEVILLE NC FROM HOURLY OBSERVATIONS

STATION NUMBER: 725060 STATION NAME: Otis ANGB MA PERIOD OF RECORD: JAN 1973 - NOV 2004  
 UTC TO LST: -5 MONTH: ANN HOURS: ALL

CEILING IN FEET	VISIBILITY IN MILES															
	7	6	5	4	3	2 1/2	2	1 1/2	1 1/4	1	3/4	5/8	1/2	3/8	1/4	0

NO CEIL | 42.9 43.7 44.5 45.1 45.6 45.7 46.0 46.0 46.1 46.1 46.1 46.1 46.2 46.2 46.2

|  
 GE 20000 | 49.8 50.8 51.7 52.4 53.1 53.2 53.4 53.5 53.6 53.7 53.7 53.7 53.7 53.7 53.7 53.8  
 GE 18000 | 50.0 51.0 51.9 52.6 53.3 53.4 53.7 53.8 53.8 53.9 53.9 53.9 53.9 53.9 54.0 54.0  
 GE 16000 | 50.0 51.1 52.0 52.7 53.4 53.5 53.7 53.8 53.9 53.9 53.9 53.9 54.0 54.0 54.0 54.1  
 GE 14000 | 51.3 52.4 53.3 54.1 54.8 54.9 55.2 55.3 55.3 55.3 55.4 55.4 55.4 55.4 55.5 55.5  
 GE 12000 | 52.9 54.0 55.0 55.7 56.5 56.6 56.9 57.0 57.0 57.1 57.1 57.1 57.2 57.2 57.2 57.2

|  
 GE 10000 | 55.4 56.6 57.7 58.6 59.4 59.5 59.8 59.9 60.0 60.0 60.1 60.1 60.1 60.1 60.1 60.2  
 GE 9000 | 56.0 57.2 58.3 59.1 59.9 60.1 60.4 60.5 60.6 60.6 60.6 60.7 60.7 60.7 60.7 60.8  
 GE 8000 | 58.1 59.3 60.5 61.4 62.3 62.4 62.7 62.9 62.9 63.0 63.0 63.1 63.1 63.1 63.1 63.1  
 GE 7000 | 59.1 60.4 61.6 62.5 63.4 63.5 63.9 64.0 64.0 64.1 64.1 64.1 64.2 64.2 64.2 64.3  
 GE 6000 | 60.3 61.6 62.8 63.7 64.6 64.8 65.2 65.3 65.3 65.4 65.4 65.4 65.5 65.5 65.5 65.6

|  
 GE 5000 | 62.0 63.4 64.7 65.7 66.6 66.8 67.1 67.3 67.3 67.4 67.5 67.5 67.5 67.5 67.5 67.6  
 GE 4500 | 62.9 64.4 65.7 66.7 67.6 67.8 68.2 68.3 68.4 68.4 68.5 68.5 68.5 68.5 68.6 68.6  
 GE 4000 | 64.3 65.8 67.2 68.2 69.2 69.4 69.8 70.0 70.0 70.1 70.1 70.1 70.1 70.2 70.2 70.2  
 GE 3500 | 65.4 66.9 68.4 69.4 70.4 70.6 71.0 71.2 71.2 71.3 71.3 71.3 71.4 71.4 71.4 71.4  
 GE 3000 | 67.3 68.8 70.4 71.5 72.6 72.8 73.2 73.4 73.4 73.5 73.5 73.5 73.6 73.6 73.6 73.7

|  
 GE 2500 | 68.7 70.3 71.9 73.1 74.2 74.4 74.9 75.1 75.1 75.2 75.2 75.3 75.3 75.3 75.4  
 GE 2000 | 70.3 72.0 73.7 75.0 76.2 76.4 76.9 77.1 77.2 77.3 77.3 77.3 77.4 77.4 77.5  
 GE 1800 | 70.6 72.4 74.1 75.4 76.6 76.8 77.3 77.6 77.6 77.7 77.7 77.7 77.8 77.8 77.9  
 GE 1500 | 71.7 73.5 75.4 76.7 78.0 78.3 78.8 79.0 79.1 79.2 79.3 79.3 79.3 79.3 79.4  
 GE 1200 | 72.8 74.7 76.7 78.1 79.5 79.9 80.4 80.7 80.8 80.9 80.9 81.0 81.0 81.0 81.1

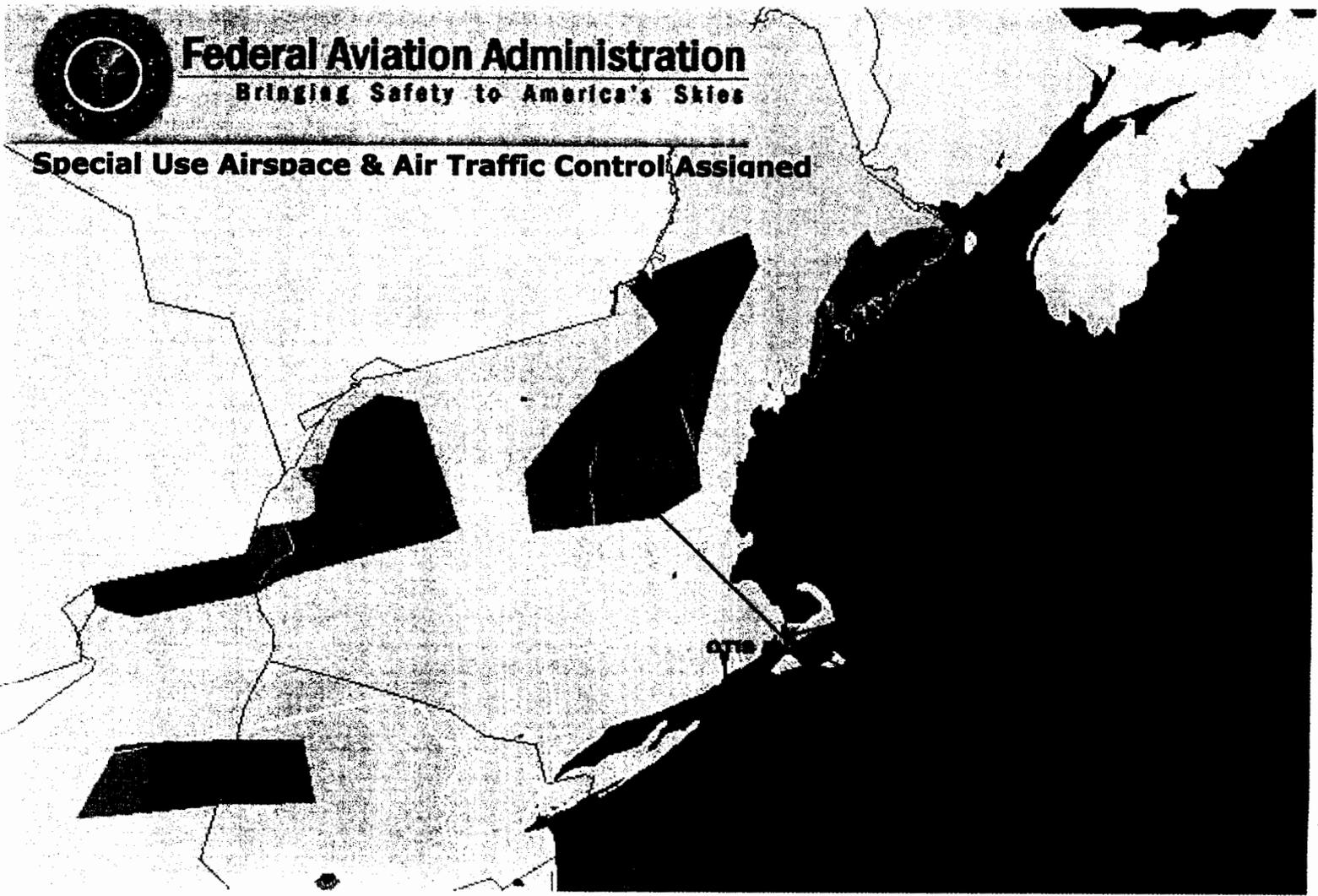
264.6 days  
 GE 3000/3

Tab 2

<b>Mission</b>	Fighter
<b>Criterion</b>	Current / Future Mission
<b>Attribute</b>	Geo-locational Factors
<b>Formula #</b>	1245
<b>Label</b>	Proximity to Airspace Supporting Mission (ASM)
<b>Effective %</b>	22.08
<b>Question</b>	<p>If installation has no runway or no active runway, or no serviceable, suitable runway then score 0 pts. See section 1.9 "Shared" for details.</p> <p>All airspace over 150 Nautical Miles (NM) away will be ignored. See OSD # 1245, column 2. (N/A means more than 250 NM.) Data is in OSD #s 1266, 1245 and 1274 must be matched via column 1 in each question.</p> <p>Calculate each of the subcategories scores listed below, and weight as listed.</p> <ul style="list-style-type: none"> <li>15% Airspace Volume (AV)</li> <li>15% Operating Hours (OH)</li> <li>10% Scoreable Range (SR)</li> <li>11.25% Air to Ground Weapons Delivery (AGWD)</li> <li>.75% Low Angle Strafe (LA)</li> <li>3% Live Ordnance (LO)</li> <li>5% IMC Weapon Release (IW)</li> <li>5% Electronic Combat (EC)</li> <li>10% Laser Use Auth. (LU)</li> <li>10% Lights Out Capable (LC)</li> <li>5% Flare Auth. (FA)</li> <li>5% Chaff Auth. (CA)</li> </ul> <p>Each of the subcategories use the following general pattern for calculating them:</p> <p>Check the corresponding subcategory in formula #1266. If it would get 0 points for that subcategory, get 0 points here also.</p> <p>Otherwise, Compute a raw total for the subcategory for the base according to this formula:</p> <p>For each airspace:</p> <p>If the distance to the airspace is &gt; 150 miles, get 0 points.</p> <p>Otherwise, if the distance to the airspace = 150 miles, get 10 points.</p> <p>Otherwise, if the distance to the airspace = 50 miles, get 100 points.</p> <p>Otherwise, pro-rate the distance to the airspace from 50 miles to 150 miles on a 100 to 10 point scale.</p> <p>Once you have a base raw subcategory total, find the highest, and the lowest, non-zero raw total for the subcategory across all bases.</p> <p>If the raw total = 0, that subcategory score = 0.</p>



When these errors/omissions are factored into the algorithm, Otis earns an additional 2.72 points for these airspaces. It is important to note that W105 was scored only as 2 separate airspaces. Following the pattern of other similar type airspaces, it should have actually been scored as SEVEN separate airspaces (W105A through G). Doing such would have GREATLY increased the score based on the methodology used in the algorithms. This is explained in detail in our MCI Methodology point paper. The following map depicts the missing airspaces. The FAA Memorandum of Agreement is included immediately after.



Tab 3

<b>Mission</b>	Fighter
<b>Criterion</b>	Current / Future Mission
<b>Attribute</b>	Geo-locational Factors
<b>Formula #</b>	1270
<b>Label</b>	Suitable Auxiliary Airfields Within 50NM
<b>Effective %</b>	5.18
<b>Question</b>	<p>Identify runways within 50 NM of the installation that are 8,000ft x 150ft or greater and are suitable for use as an auxiliary runway.</p> <p>If installation has no runway or no active runway, or no serviceable, suitable runway then score 0 pts. See section 1.9 "Shared" for details.</p> <p>For each airfield listed in OSD Question 1270, if it is &gt; 50 nautical miles (NM) away, it is not qualified to be counted. See OSD Question 1270, column 2 for this data. (N/A equals not qualified.)</p> <p>If the count &gt;= 3, get 100 points.                      Otherwise, if the count = 2, get 75 points.                      Otherwise, if the count = 1, get 50 points.                      Otherwise, get 0 points.</p> <p><b>Example:</b>                      There are three airfields listed, Alpha, Bravo and Charlie, at distances away of 20, 40, and 200 NM away respectively. Alpha and Bravo are both within the 50 NM limit, so they are qualified. Charlie is 200 NM away, which is &gt; 50 NM, so it is not qualified. The number of qualified airfields for auxiliary use = 2, which results in a score of 75 points.</p>
<b>Source</b>	FLIP and Falcon View (or any other certified flight planning software)

In the Otis score for this formula, credit was only given for one auxiliary airfield, Logan International. Quonset State Airport (Org 157, KOQU) located in Rhode Island, was NOT included as a viable auxiliary airfield. OSD data shows the runway was a viable alternate runway within 50 miles. Quonset shows Otis as an auxiliary airfield in the OSD data (i.e. within 50 NM).

Section 1 Air/Space Operations, Question 9 Runways															
1 Airfield Identifier (ICAO 4 character Identifier) (Text)	2 Runway Designat or (First End) (0)	3 Runway Designator (Second End) (0)	4 PCN (1) 0	5 PCI (2) 0	6 Date of Evaluation (3) (dd mm yyyy)	7 Length (ft)	8 Width (ft)	9 Type of Arresting Gear, if available (First End, First Set) (0)	10 Type of Arresting Gear, if available (First End, Second Set) (0)	11 Type of Arresting Gear, if available (Second End, First Set) (0)	12 Type of Arresting Gear, if available (Second End, Second Set) (0)	13 Paveme nt Type (4) (0)	14 Closed (Yes/No)	15 Service able (5) (Yes/No)	16 Own/con trolled or Access only to runway (Yes/No)
Org 157 KOQU	16	34	59	N/A	1-Feb	8000	150	N/A	N/A	N/A	N/A	Asphalt	No	Yes	A
157 KOQU	5	23	N/A	N/A	N/A	4000	75	N/A	N/A	N/A	N/A	Asphalt	No	Yes	A

Section 39 Airfield Management, Question 1270 Air Operations - Auxiliary Airfield		
1 Airfield Name (Text)	2 Distance Main Runway to Aux field (NM)	
Org 157 GENERAL EDWARD LAWRENCE LOGAN INTL	49.5	
157 OTIS ANGB	40.2	

Tab 4

<b>Mission</b>	Fighter
<b>Criterion</b>	Condition of Infrastructure
<b>Attribute</b>	Key Mission Infrastructure
<b>Formula #</b>	1221
<b>Label</b>	Hangar Capability - Small Aircraft
<b>Effective %</b>	3.88
<b>Question</b>	<p>Check to see if the installation has Aircraft Hangar Facilities that will accommodate F-15 sized aircraft: state the number of F-15-sized acft (61ft long x 45ft wingspan x 19ft high) that can fit in the installation's maintenance hangars without modification.</p> <p>If the installation has no runway or no active runway, or no serviceable, suitable runway then score 0 pts. See section 1.9 "Shared" for details.</p> <p>Otherwise, sum the number of aircraft the hangars can hold. See OSD Question 1221, column 2 for this data. (N/A equals 0.)</p> <p>If the sum is <math>\geq 24</math> aircraft, get 100 points.  If the sum = 6 aircraft, get 25 points.  If the sum is <math>&lt; 6</math> aircraft, get 0 points.  Otherwise, pro-rate the number of aircraft between 6 and 24 on a 25 to 100 point scale.</p> <p><b>Example:</b></p> <p>1) There are 7 hangars at the installation, with the following capacities: 0, 0, 1, 2, 2, 0, and 0, for a sum of 5 aircraft. That is less than 6 aircraft, so the score is 0.</p> <p>2) There are 7 hangars at the installation, with the following capacities: 1, 2, 3, 2, 2, 3, and 2, for a sum of 15 aircraft. 15 is halfway between 6 and 24, for a score of 50.</p>
<b>Source</b>	Real Property Records, Record Drawings, UFC 3-260-01

Otis was given credit for only 15 Hangar spaces. Upon further review, Otis did not take full credit for their potential hangar spaces. Total hangar capacity for small aircraft is proved to be 31. The following map with official real property record (SAF MIL7115 Report) listed quantities show these locations. The map is to scale.

Tab 5

<b>Mission</b>	Fighter
<b>Criterion</b>	Condition of Infrastructure
<b>Attribute</b>	Key Mission Infrastructure
<b>Formula #</b>	1232
<b>Label</b>	Sufficient Explosives-sited Parking
<b>Effective %</b>	3.65
<b>Question</b>	<p>List the number of explosives-sited parking spots by MDS (Mission Design Series).</p> <p>If installation has no runway or no active runway, or no serviceable, suitable runway then score 0 pts. See section 1.9 "Shared" for details.</p> <p>Total the number of explosives sited parking spots. See OSD Question 1232, column 2 for this data. (N/A equals 0.)</p> <p>If the total <math>\geq 47</math>, get 100 points.  Otherwise, if the total <math>\geq 24</math>, get 66 points.  Otherwise, if the total <math>\geq 12</math>, get 33 points.  Otherwise, get 0 points.</p> <p><b>Example:</b>  The installation has two listings for explosive sited parking spots, with 5 and 20 respectively, which totals to 25.  25 is between 24 and 47, so the score is 66 points.</p>
<b>Source</b>	AFMAN 91-201, Explosives Safety Standards; Installation Explosives Site Plan

Otis entered 18 explosive loaded sites based on current assigned aircraft and existing explosives site plan. The question did not ask what is the installations capability/capacity for explosive sited parking. Otis has 102 explosives loaded aircraft spots with no waivers or exceptions. This leads to an additional 2.44 points on the MCI score. Map from Tab 4 depicts in excess of 50 of the 102 loadable spots.

Tab 6

<b>Mission</b>	Fighter
<b>Criterion</b>	Condition of Infrastructure
<b>Attribute</b>	Key Mission Infrastructure
<b>Formula #</b>	1233
<b>Label</b>	Sufficient Munitions Storage
<b>Effective %</b>	4.79
<b>Question</b>	<p>List maximum explosive capacity for the installation's hazard classification Class 1.1 munitions storage areas, in pounds. Maximum assumes F-117 18 PAA (GBU-27) and F/A-22 24 PAA (GBU-32 &amp; AIM 120).</p> <p>If installation has no runway or no active runway, or no serviceable, suitable runway then score 0 pts. See section 1.9 "Shared" for details.</p> <p>Otherwise, total the capacity. See OSD question 1233, column 1 for this data. (N/A means 0.)</p> <p>If the total <math>\geq</math> 45312, get 100 points.  Otherwise, if the total <math>\geq</math> 38520, get 75 points.  Otherwise, if the total <math>\geq</math> 19260, get 25 points.  Otherwise, get 0 points.</p> <p><b>Example:</b>  There are two storage areas, with a capacity of 10,000 each, for a total of 20,000. 20,000 is between 19,260 and 38,250, so the score is 25 points.</p>
<b>Source</b>	AFMAN 91-201, Explosives Safety Standards; Installation Explosives Site Plan

This answer to this question is munitions specific. A different answer will apply based on MDS and weapon system. The original answer was based on the approved site plan, which was based on a normal, realistic amount of explosive storage that was not MDS specific. It was not approved based on MDS capacity at the time. The following documentation shows how different munitions will change the final answer. The munitions storage area located at Otis is capable and approved to store HC 1.1 AIM Series Missiles totaling 31,104 lbs of NEW in each of the 40' X 80' Earth Covered Igloo's for a total capacity of 62,208 lbs. This leads to an additional 4.79 points in the MCI. The second two letters break down the maximum storage capacity based on Aim Series designation.



DEPARTMENT OF THE AIR FORCE  
102D FIGHTER WING (ACC)  
MASSACHUSETTS AIR NATIONAL GUARD  
OTIS AIR NATIONAL GUARD BASE MASSACHUSETTS

17 June 2005

MEMORANDUM FOR RECORD

FROM 102<sup>ND</sup> Fighter Wing Safety Office  
158 Reilly St., Box 15  
Otis ANGB, MA. 02542-1330

SUBJECT: Sufficient Munitions Storage, Otis ANGB

1. The maximum explosive capacity hazard classification 1.1 by missile system, in pounds, without waivers.
2. AFMAN 91-201, par. 3.34, Explosive Safety Standards gives detailed guidance in the proper storage of AIM Series Missiles and adding the total hazard classification 1.1, in pounds. Testing has been completed and proven that detonation of warheads in All Up Round Containers (AURC's) will not propagate to any adjacent container either vertically or horizontally. Therefore, Maximum Credible Event (MCE) would be one AURC of four missiles when calculating Inhabited Building Distance / Quantity Distance (IBD / QD). The 40' X 80' Earth Covered Igloo's were built for the purpose to store AIM Series Missiles Hazard Class 1.1 to their physical capacity and at the same time comply with all site planning requirements.
3. The 102<sup>nd</sup> Fighter Wing is capable and is approved to store HC 1.1 AIM Series Missiles totaling 31,104 lbs in each of the 40' X 80' Earth Covered Igloo's.

//signed//  
JOHN V. NOLAND, SMS, MA ANG  
Ground/Explosive Safety Manager



DEPARTMENT OF THE AIR FORCE  
102D FIGHTER WING (ACC)  
MASSACHUSETTS AIR NATIONAL GUARD  
OTIS AIR NATIONAL GUARD BASE MASSACHUSETTS

17 June 2005

MEMORANDUM FOR RECORD

FROM 102<sup>ND</sup> Fighter Wing Safety Office  
158 Reilly St., Box 15  
Otis ANGB, MA. 02542-1330

SUBJECT: AIM Series Missile break down

1. AIM-7 with WAU-17 warhead (36 lbs)

- 144 lbs per container
- 216 AURC's in each igloo stacking them 6 high
- 31,104 lbs in each igloo
- AURC demes ions
  - 15' long X 3'.75' wide X 1'.7 high

2. AIM-7 with WAU-10 warhead (26 lbs)

- 104 lbs per container
- Same AURC used as above
- 22,464 lbs in each igloo

3. AIM-9X Missile, warhead (7.9 lbs)

- 31.6 lbs per container
- 200 AURC's in each igloo stacking them 5 high
- 6,320 lbs in each igloo
- AURC dimensions
  - 11'.5 long X 3'.5 wide X 1'.9 high

//signed//  
JOHN V. NOLAND, SMS, MA ANG  
Ground/Explosive Safety Manager



DEPARTMENT OF THE AIR FORCE  
102D FIGHTER WING (ACC)  
MASSACHUSETTS AIR NATIONAL GUARD  
OTIS AIR NATIONAL GUARD BASE MASSACHUSETTS

30 June 2005

MEMORANDUM FOR RECORD

FROM 102<sup>ND</sup> Fighter Wing Safety Office  
158 Reilly St., Box 15  
Otis ANGB, MA. 02542-1330

SUBJECT: Sufficient Munitions Storage for HC/D 1.2.1 AIM-120 Missile System

1. The maximum explosive capacity hazard classification 1.2.1 AIM-120 Missile System that can be stored at Otis Air National Guard Base, without waivers is 27,000 lbs.

2. The 102<sup>nd</sup> Fighter Wing is capable of storing the munitions specific assets in the following approved munitions storage facilities:

- A. 2 each 40' X 80' Earth Covered Igloo's for a total Net Explosive Weight (NEW) of 12,000 lbs.
- B. 5 each Above Ground Unbarricaded, ADC-Multicubicle Magazines (30 cells) Type II ADC, Drawing #AD 33-13-20R2 for a total NEW of 15,000 lbs.

(1) The procedure will be to physically pull the AIM-120 out of its ALL UP Round Container (AURC), which will turn the munitions item to HC/D 1.1.

(2) AIM-120's will be placed on storage stands inside each cell not to exceed 100 lbs.

- a) 1 Above Ground Multicubicle Magazines with 30 cells is capable of storing 3,000 lbs.
- b) 5 Magazines for a total of 15,000 lbs.

//signed//  
JOHN V. NOLAND, SMS, MA ANG  
Ground/Explosive Safety Manager

Tab 7

<b>Mission</b>	Fighter						
<b>Criterion</b>	Condition of Infrastructure						
<b>Attribute</b>	Operating Areas						
<b>Formula #</b>	1203						
<b>Label</b>	Access to Adequate Supersonic Airspace						
<b>Effective %</b>	6.72						
<b>Question</b>	<p>Identify special use airspace that is suitable for supersonic training.</p> <p>If installation has no runway or active runway, or no serviceable, suitable runway then score 0 pts. See section 1.9 "Shared" for details.</p> <p>Otherwise, score each special use airspace suitable for supersonic training according to the following formula and return the single highest score.</p> <table> <tr> <td>% of Score</td> <td>Category</td> </tr> <tr> <td>50</td> <td>Operating Hours</td> </tr> <tr> <td>50</td> <td>Size</td> </tr> </table> <p><b>For Operating Hours:</b></p> <p>A supersonic special use airspace gets 100 points if it is available for use 24 hours a day and 0 points if it is unavailable for use. (N/A means unavailable for use.) For operating hours between those two boundaries, pro-rate the score linearly. See OSD question 1276, column 2 for this data.</p> <p><b>For Size:</b></p> <p>If the supersonic special use airspace is at least 150 nautical miles (NM) by 80 NM in size, and has an altitude block <math>\geq</math> 30,000, get 100 points. See OSD question 1276, column 7 for this data. (N/A means no.)</p> <p>Otherwise, if it is at least 100 NM by 60NM and has an altitude block <math>\geq</math> 30,000', get 80 points. See OSD question 1276, column 6 for this data. (N/A means no.)</p> <p>Otherwise, if it is at least 100 NM by 50 NM and has an altitude block <math>\geq</math> 30,000', get 60 points. See OSD question 1276, column 5 for this data. (N/A means no.)</p> <p>Otherwise, if it is at least 80 NM by 40 NM and has an altitude block <math>\geq</math> 30,000', get 40 points. See OSD question 1276, column 4 for this data. (N/A means no.)</p> <p>Otherwise, if it has an airspace volume <math>\geq</math> 2,100 NM squared and an</p>	% of Score	Category	50	Operating Hours	50	Size
% of Score	Category						
50	Operating Hours						
50	Size						

	<p>altitude block <math>\geq 20,000'</math>, get 20 points. See OSD question 1276, column 3 for this data. (N/A means no.)</p> <p>Otherwise, get 0 points.</p> <p><b>Example:</b>                  A supersonic special use airspace is listed under OSD question 1276. It has an airspace of 105 NM by 61 NM in size, with an altitude block of 32,000'. That airspace is available for use 18 hours a day.</p> <p>(80 points for 100 NM by 60 NM, 30,000' altitude block airspace * 50%)                  +( (75 points for 18 hours of use / (difference between 24 hours and 0 hours)) * 50%),</p> <p>This equates to 40 size points + 37.5 operating hours points = 77.5 points for this special use airspace. The overall score is the highest score received by any one special use airspace at the installation.</p>
<b>Source</b>	DoD #1203; Digital Aeronautical Flight Information Files (DAFIF), 30 Sep 04; FAA ATCAA Database

Using the referenced algorithm and stated data files, the score listed for Otis is incorrect. The formula uses data from OSD Question 1276:

<b>Section 1 Air/Space Operations, Question 1276 Airspace Attributes - Supersonic</b>							
3							
Airspace Volume							
$\geq 2,100N$							
4 At least 5 At least 6 At least 7 At least							
M 80NM x 100NM x 100NM x 150NM x							
squared 40NM 50NM 60NM 80NM							
and and and and and							
20,000' altitude altitude altitude altitude							
Airspace Operatin altitude block block block block 8 Not							
Designat g Hours block $\geq 30,000'$ $\geq 30,000'$ $\geq 30,000'$ $\geq 30,000'$ used.							
Org or (Text) (Hr) (Yes/No) (Yes/No) (Yes/No) (Yes/No) (Yes/No) (Yes/No)							
27	W105	24	Yes	Yes	Yes	No	N/A
27	W106	24	No	No	No	No	N/A

The file lists W105 with a max block of 100NMx60NM which translates into 80 points. The operating hours translates into 100 points. The formula results in 90 points out of a hundred for this algorithm. When weighted, this results in 6.048 points, an increase of 3.358 over the posted score.

Tab 8

<b>Mission</b>	Fighter
<b>Criterion</b>	Condition of Infrastructure
<b>Attribute</b>	Operating Areas
<b>Formula #</b>	1266
<b>Label</b>	Range Complex (RC) Supports Mission
<b>Effective %</b>	11.95
<b>Question</b>	<p>If installation has no runway or no active runway, or no serviceable, suitable runway then score 0 pts. See section 1.9 "Shared" for details.</p> <p>All airspace over 150 Nautical Miles (NM) away will be ignored. See OSD # 1245, column 2. (N/A means more than 250 NM.) Data is in OSD #s 1266, 1245 and 1274 must be matched via column 1 in each question.</p> <p>Calculate each of the subcategories scores listed below, and weight as listed.</p> <ul style="list-style-type: none"> <li>15% Airspace Volume (AV)</li> <li>15% Operating Hours (OH)</li> <li>10% Scoreable Range (SR)</li> <li>11.25% Air to Ground Weapons Delivery (AGWD)</li> <li>.75% Low Angle Strafe (LA)</li> <li>3% Live Ordnance (LO)</li> <li>5% IMC Weapon Release (IW)</li> <li>10% Electronic Combat (EC)</li> <li>10% Laser Use Auth. (LU)</li> <li>10% Lights Out Capable (LC)</li> <li>5% Flare Auth. (FA)</li> <li>5% Chaff Auth. (CA)</li> </ul> <p>Each of the subcategories use the following general pattern for calculating them:</p> <p>Compute a raw total for the base by following the instructions for the respective subcategory total.</p> <p>Find the highest, and the lowest, non-zero raw total for the subcategory across all bases.</p> <p>If the raw total = 0, that subcategory score = 0.</p> <p>Else, if the raw total = the highest raw total, the subcategory score = 100.</p> <p>Else, if the raw total = the lowest, non-zero raw total, the subcategory score = 10.</p> <p>Else, pro-rate the raw total between the lowest non-zero score and the highest score on a 10 to 100 scale.</p> <p>Once each score for each subcategory is known, multiply them by their respective weighting percentage and total the results for the overall score.</p>

	<p><b>AV Raw Total:</b> Get AV for the pts. See OSD # 1277, column 1. (N/A means 0.)</p> <p><b>OH Raw Total:</b> Sum the pts for each airspace: If the OH &lt; 1 or = N/A, get 0 pts. See OSD # 1266, column 2. Else, if the OH = 1 or IMTMT or INTMT, get 10 pts. Else, if the OH = 24 or NOTAM, get 100 pts. Else, pro-rate the OH between 0 and 24 on a 10 to 100 point scale.</p> <p><b>SR Raw Total:</b> Sum the pts for each airspace: If the SR = Yes, get 100 pts. See OSD # 1266, column.3. Else, get 0 pts.</p> <p><b>AGWD Raw Total:</b> Sum the pts for each airspace: If the AGWD = Yes, get 100 pts. See OSD # 1266 column 4. Else, get 0 pts.</p> <p><b>LA Raw Total:</b> Sum the pts for each airspace: If the LA = Yes, get 100 pts. See OSD # 1266 column 5. Else, get 0 pts.</p> <p><b>LO Raw Total:</b> Sum the pts for each airspace: If LO = Yes, get 100 pts. See OSD # 1274, column 5. Else, get 0 pts.</p> <p><b>IW Raw Total:</b> Sum the pts for each airspace: If IW = Yes, get 100 pts. See OSD # 1266, column 6. Else, get 0 pts.</p> <p><b>EC Raw Total:</b> Sum the pts for each airspace: If EC = Yes, get 100 pts. See OSD # 1266, column.7. Else, get 0 pts.</p> <p><b>LU Raw Total:</b> Sum the pts for each airspace: If LU = Yes, get 100 pts. See OSD # 1266, column 8. Else, get 0 pts.</p> <p><b>LC Raw Total</b></p>
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	<p>Sum the pts for each airspace: If LC = Yes, get 100 pts. See OSD # 1266, column 9. Else, get 0 pts.</p> <p><b>FA Raw Total</b> Sum the pts for each airspace: If FA = Yes, get 100 pts. See OSD # 1274, column 3. Else, get 0 pts.</p> <p><b>CA Raw Total</b> Sum the pts for each airspace: If CA = Yes, get 100 pts. See OSD # 1274, column 4. Else, get 0 pts.</p> <p><b>Example:</b> AV = 20,000, get 20,000 pts; 10.</p> <p>There are two airspaces within 150 NM, and they both have these characteristics (which means their raw totals will be double the number of pts listed) followed by the lowest non-zero and highest raw totals across all bases and subcategory scores.</p> <p>OH = NOTAM, get 100 pts; 20,000 to 150,000 pts: 10. SR = Yes, get 100 pts; 200 to 500 pts: 10. AGWD = No, get 0 pts; 200 to 1000 pts: 10. LA = No, get 0 pts; 200 to 1000 pts: 0. LO = Yes, get 100 pts; 500 to 1000 pts: 10. IW = N/A, get 0 pts; 200 to 2000 pts: 0. EC = N/A, get 0 pts; 200 to 1000 pts: 0. LU = Yes, get 100 pts; 100 to 1000 pts: 20. LC = Yes, get 100 pts; 200 to 1000 pts: 10. FA = No, get 0 pts; 100 to 1000 pts: 0. CA = No, get 0 pts; 100 to 1000 pts: 0. Weighted, the overall score = 8.425 pts.</p>
<b>Source</b>	FLIP AP-1A: Falcon View or other certified flight planning software

We re-created this formula using ArcGIS and Excel using the stated algorithms. Although we could replicate the example with our program, we could not duplicate the scores posted for this question. Therefore, we could not calculate the exact increase to the posted score. The three additional airspaces drive our overall rank for airspace volume (AV) to number one. Adding the three additional airspaces and correcting faulty airspace attribute data could lead to an increase as high as 2 points. We did not receive full credit for this question and it is NOT reflected in our recalculated MCI.

Tab 9

<b>Mission</b>	Fighter
<b>Criterion</b>	Contingency, Mobilization, Future Forces
<b>Attribute</b>	Mobility/Surge
<b>Formula #</b>	1241
<b>Label</b>	Ability to Support Large-Scale Mobility Deployment
<b>Effective %</b>	1.76
<b>Question</b>	<p>State installation's parking MOG for C-17 equivalents using surveyed/approved transient parking ramps.</p> <p>If installation has no runway or no active runway, or no serviceable, suitable runway then score 0 pts. See section 1.9 "Shared" for details.</p> <p>Otherwise, total the number of C-17 equivalents the installation transient ramp can hold. See OSD question 1241, column 1 for this data. (N/A equals 0.)</p> <p>If the total <math>\geq 6</math>, get 100 points.  Otherwise, if the total <math>\geq 4</math>, get 75 points.  Otherwise, if the total <math>\geq 2</math>, get 25 points.  Otherwise, get 0 points.</p> <p><b>Example:</b></p> <p>The installation transient ramp can hold 5 C-17 equivalents. 5 is between 4 and 6, so the score is 75 points.</p>
<b>Source</b>	ASR (Airfield Suitability Report)

Otis listed the ability to park three C-17s in the original data call. However, this was based on transient parking in a designated small area of the F-15 main ramp. It did not take into consideration the two other serviceable ramps at Otis.

Using all available serviceable ramps, Otis can park in excess of eight C-17s. The attached map (Diagram 1, Tab 4) shows the layout meeting all airfield-parking criteria. This leads to an additional 1.32 points in our MCI score.