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Operations

AIR MOBILITY PLANNING FACTORS

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This pamphlet provides broad air mobility planning factors for peacetime and wartime operations. It is designed to help service, joint, and combined planners make gross estimates about mobility requirements in the early stages of the planning process. It covers strategic airlift, deployment and employment air refueling, and aeromedical evacuation. The use of detailed computer simulation models is encouraged for extensive calculations. For greater detail, or in-depth mobility analysis, contact Headquarters Air Mobility Command (AMC)/A9 at DSN 770-7769/5165 or 18 AF/A5 at DSN 779-7842. Refer recommended changes and questions about this publication to the Office of Primary Responsibility via Air Force Form 847, *Recommendation for Change of Publication*; route Air Force Forms 847 from the field through the appropriate functional's chain of command.

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SUMMARY OF CHANGES

Air mobility planning data contained within the tables of this document, including but not limited to aeromedical evacuation data, aircraft payload, ground times, primary mission aircraft inventory, airfield throughput, fuel burn rates, and new Maximum [aircraft] On Ground (MOG) terms, has been substantially revised and should be completely reviewed for impacts on existing plans. Commercial, Contract and Civil Reserve Air Fleet aircraft data are no longer in this pamphlet. The following tables are added, Table 12, "KC-46 Tanker Aircraft Required;" Table 16, "Planning Sortie and Hour Limits for a typical KC-10 Unit;" and Table 17, "Planning Sortie and Hour Limits for a typical KC-135 Unit."

Section A - Mobility Planning

1.0. How To Use This Pamphlet

There are four basic parts to this pamphlet: formulas (airlift/air refueling/aeromedical evacuation), examples, tables, and terms and definitions. Although each of these parts can be used individually, we recommend you review the entire contents to get a full understanding of the planning process. All references contained herein are to provide high-level airlift planning estimates over large air mobility operations. Due to the number of variables involved, they are not universally applicable, especially to actual individual operational missions. For guidance on current operational planning to include aircraft Allowable Cabin Load's and ground times, please contact the 618th AOC (TACC). This pamphlet addresses only objective planning computations. It does not provide guidance concerning other factors, such as environmental and tactical considerations, that can impact the mobility operation.

Section B - Airlift Formulas

1.0. Number of Cargo Missions Required = $\frac{Requirement\ (Short\ Tons)}{Average\ Payload\ (Short\ Tons)}$

2.0. Number of Passenger Missions Required $= \frac{(Total\ Passengers) - (Passengers\ on\ Cargo\ Missions)}{Passengers\ Capability\ per\ Passenger\ Mission}$

Note: Passengers on Cargo Missions = Number of Passengers seats available on each cargo mission x Number of Cargo Missions.

3.0. Total Missions Required = Cargo Missions + Passengers Missions.

4.0. Time to Arrival = active route flying time + active route ground time

$$Active\ Route\ Flying\ Time = \left(\frac{Distance_1}{Block\ Speed_1}\right) + \left(\frac{Distance_2}{Block\ Speed_2}\right) + \left(\frac{Distance_3}{Block\ Speed_3}\right) + \cdots$$

$$Active\ Route\ Ground\ Time\ =\ Ground\ Time_1 +\ Ground\ Time_2 +\ Ground\ Time_3 + \cdots$$

Note: Distance = total distance from takeoff to landing.

5.0. Cycle Time = round trip flying time + round trip ground time

$$Round\ Trip\ Flying\ Time\ = \left(\frac{Distance_1}{Block\ Speed_1}\right) + \left(\frac{Distance_2}{Block\ Speed_2}\right) + \left(\frac{Distance_3}{Block\ Speed_3}\right) + \cdots$$

$$Round\ Trip\ Ground\ Time\ =\ Ground\ Time_1 +\ Ground\ Time_2 +\ Ground\ Time_3 + \cdots$$

6.0. Closure = $\frac{(Requirement)\ x\ (Round\ Trip\ Flying\ Time)}{(Average\ Payload)\ x\ (Number\ of\ Aircraft)\ x\ (\text{Utilization}\ Rate)}$

Note: For major wartime operations, recommend planners use the wartime objective surge utilization rate published in Table 6. For non-mobilized contingencies, recommend the contingency utilization rate published in Table 6. Utilization rate computations are extensive and not necessary for initial gross planning estimates.

7.0. Fleet Capability Short tons delivered to the theater per day

$$= \frac{(Average\ Payload)\ x\ (\#\ of\ Aircraft)\ x\ (\text{Utilization}\ Rate)}{(Round\ Trip\ Flight\ Time)}$$

Note: This formula is preferred for contingency planning, because it accurately relates the variables affecting the deployment of requirements.

8.0. Fleet Capacity Million Ton-Miles per Day

$$= \frac{(\#\ of\ Aircraft)\ x\ (Block\ Speed)\ x\ (Average\ Payload)\ x\ (\text{Utilization}\ Rate)\ x\ (Productivity\ Factor)}{1{,}000{,}000}$$

Note: Although planners do not commonly use this formula, occasionally the conversion of short ton figures into Million Ton-Miles per Day is required. AMC force structure programmers use Million Ton-Miles per Day when funding out-year aircraft purchases and many civilian agencies are accustomed to visualizing AMC fleet capability in terms of Million Ton-Miles per Day. Fleet Capacity is generally more optimistic than actual Fleet Capability for a particular contingency.

9.0. Airfield Throughput Capability (station capability)

$$= \left[\frac{(wMOG\ or\ pMOG\ or\ fMOG\ or\ apMOG\ or\ mxMOG\ or\ opMOG)\ x\ (Average\ Payload)\ x\ (Operating\ Hours)}{Ground\ Time}\right] X\ (85\%\ Queuing\ Efficiency)$$

Note: Use the lower of either working MOG (wMOG), aerial port MOG (apMOG), parking MOG (pMOG), fuel MOG (fMOG), maintenance MOG (mxMOG), or Operations MOG (opMOG).

10. Required Mission Aircraft
= mission required aircraft + [mission required aircraft * (1-Fleet Mission Capable Rate)]

Section C—Air Refueling Formulas

1.0. Air Refueling Overview

Refer to **Table 16** and **Table 17** for determining employment factors including estimated fleet size and capacity. Tankers can support air refueling as well as airlift requirements, depending on resources available and mission considerations. Tanker planning tables are constructed using average/historical data and calculations from the example formulas. Tables provide gross estimate of tanker fleet required to support operations. If actual mission specifics and data are known, such as aircraft model, configuration, air refueling altitude, airspeed, tanker basing, etc., using the formulas below will provide more accurate planning estimates. However, these formulas should be adjusted for specific mission considerations for each aircraft type from each operating location. When feasible, planning should be done by tanker planning experts, using vetted flight planning tools and procedures.

2.0. Offload Required (per receiver)

a. $Offload\ required = \left[\left(\frac{Distance}{True\ Airspeed}\right) \times (Fuel\ Flow)\right] - (Total\ Fuel) + (Required\ Reserves)$

b. $Offload\ required = [(Flight\ Time) \times (Fuel\ Flow)] - (Total\ Fuel) + (Required\ Reserves)$

Example: (Single F-18C/D)

$Offload\ required = \left[\left(\frac{2880\ NM}{480\ NM/hour}\right) \times (6.5k/hour) - (17.6k) + (7.5k)\right] = 6.0\ hour \times 6.5k/hour - 17.6k + 7.5k$ = 39k – 17.6k + 7.5k = 39k – 17.6k + 7.5k = 28.9k

$Offload\ required = \left[(7.0\ hr) \times \left(\frac{6.5k}{hour}\right)\right]$ – (17.6k) + (7.5k) = 45.5k - 7.6k + 7.5k = 35.4K

3.0. Offload Available (per tanker)

a. Play Gas = $(Total\ Fuel) - (Destination\ Reserves) - (Transit\ Time) \times (Burn\ Rate)$

$= 200klbs - 25klbs - 4.0\ hours \times 11.3$ = 200k – 25k – 45.2k = 129.8K

b. Available Offload $= (Play\ Gas) - [(Additional\ Loiter) \times (Burn\ Rate)]$
$= (135k) - [(2.0\ hours\ Additional\ Loiter) \times \left(10\frac{k}{hour} Burn\ Rate\right)]$ = 135k – 20k = 115k

4.0. Deliverable Offload = $(Available\ Offload) \times (Expected\ Plan\ Efficiency)$

$= (115k\ Available\ Offload) \times (85\%\ Expected\ Plan\ Efficiency) = 115k \times 85\% = 97.8k$

5.0. Tankers Required. These calculations are based on average planning factors for fleet operations. Specific aircraft gross weights, atmospheric conditions, and flight profiles will impact these planning calculations. These numbers serve as initial estimates for planning, and need to be vetted by unit-level planning.

5.1. Play Gas = $(Total\ Fuel) - (Destination\ Reserves) - (Transit\ Time) \times (Burn\ Rate)$
Example:
$= 200klbs\ Total\ Fuel - 25klbs\ Destination\ Reserves - 4.0\ hours \times 10\frac{klbs}{hour}$
$= 200k - 25k - 40k = 135k$

5.2. Available Offload = $(Play\ Gas) - [(Additional\ Loiter) \times (Burn\ Rate)]$
Example:
$= (135k\ Play\ Gas) - \left[(2.0\ hours\ Additional\ Loiter) \times \left(10\frac{k}{hour} Burn\ Rate\right)\right]$ = 135k – 20k = 115k

5.3. Deliverable Offload = $(Available\ Offload) \times (Expected\ Plan\ Efficiency)$
Example:
$= (115k\ Available\ Offload) \times (85\%\ Expected\ Plan\ Efficiency) = 115k \times 85\% = 97.8k$

5.4. Tanker Sorties Required $= \frac{(Offload\ Required)}{(Deliverable\ Offload)}\ (Rounded\ Up)$

Example:

$$= \frac{(2{,}500k\ Offload\ Required)}{(97.8k\ Deliverable\ Offload\ per\ Sortie)} = \frac{2{,}500k}{97.8k} = 25.6\ Sorties \sim 26\ Sorties$$

6.0. Burdened Cost of Fuel

$$= \frac{(Fuel\ Burned) + (Fuel\ Offloaded)}{(Fuel\ Offloaded)}$$

7.0. Offload Efficiency

$$= \frac{(Planned\ Offload)}{(Available\ Offload)}$$

8.0. Example 1:

KC-10, 300k takeoff fuel, 9.0 hour Sortie Duration, 25k Reserve.

8.1. Available Offload

$$= [300k\ Takeoff\ Fuel - (9\ Hours\ Flight\ Time\ \times 18k\ per\ hour) - 25k\ Reserve]$$
$$= (300 - 162 - 25)$$
$$= 113k\ Available\ Offload$$

8.2. Offload Efficiency

$$= \frac{(110k\ Planned\ Offload)}{(113k\ Available\ Offload)} = \frac{110k}{113k} = 97\%\ Efficiency$$

8.3. Burdened Cost of Fuel

$$= \frac{(162k\ Fuel\ Burned) + (110k\ Fuel\ Offloaded)}{110k\ Fuel\ Offloaded} = \frac{272k}{110k} = 2.47\ Burdened\ Cost\ of\ Fuel$$

9.0. Example 2:

KC-135, 160k takeoff fuel, 3.0 hour Sortie Duration, 20k Reserve.

9.1. Available Offload $= (160k\ Takeoff\ Fuel - (3\ Hours\ Flight\ Time\ \times 10k\ per\ hour) - 20k\ Reserve) = (160 - 30 - 20) = 110k$

9.2. Offload Efficiency

$$= \frac{(80k\ Planned\ Offload)}{(110k\ Available\ Offload)} = \frac{80k}{110k} = 73\%\ Efficiency$$

9.3. Burdened Cost of Fuel

$$= \frac{(30k\ Fuel\ Burned) + (80k\ Fuel\ Offloaded)}{80k\ Fuel\ Offloaded} = \frac{110k}{80k} = 1.38\ Burdened\ Cost\ of\ Fuel$$

Note: While the KC-10 sortie looks much more efficient than the KC-135 sortie, the KC-10 sortie has a considerably higher burdened cost of fuel delivered.

10.0 Maximum Aircraft Sortie.

10.1. Maximum Aircraft Sortie Generation Rate.

$$= \frac{Plan\ Time\ Period}{Average\ Sortie\ Duration + Minimum\ Ground\ Time}$$

Example:

$$= \frac{24\ hour\ \text{Air Tasking Order}\ Day}{6.0\ hour\ Average\ Sortie\ Duration + 6.0\ hour\ Minimum\ Ground\ Time} = \frac{24}{12} = 2.0$$

10.2. Maximum Aircraft Sorties (percentage)

$$= [(Total\ Aircraft) \times (Aircraft\ Commitment\ Rate) - (Ground\ Alert(s)\ (Ground\ Alert))] \times (Maximum\ Aircraft\ Sortie\ Generation\ Rate)$$

Example:

$$= (10\ Aircraft\ \times\ 80\%\ Commitment\ Rate - 1\ Ground\ Alert)\ \times\ 2.0\ Sortie\ Generation\ Rate = (10\ \times 80\% - 1) \times 2.0 = (8 - 1)\ \times 2.0 = 14.0\ \ \textit{Maximum Aircraft Sorties per day}$$

11.0. Maximum Aircrew Sortie.

11.1. Maximum Aircrew Sortie Generation Rate.

$$= \frac{Plan\ Time\ Period}{Average\ Sortie\ Duration + Crew\ Rest}$$

Example:

$$= \frac{24\ hour\ Air\ Tasking\ Order\ Day}{6.0\ hour\ Average\ Sortie\ Duration + 17.0\ hour\ Crew\ Rest} = \frac{24}{23} = 1.04\ \ Maximum\ Aircrew\ Sortie\ Generation\ Rate$$

11.2. Maximum Aircrew Sorties (percentage)

$$= (Total\ Aircrew) \times\ [(Aircrew\ Commitment\ Rate) - (Ground\ Alerts)] \times (Max\ Aircrew\ Sortie\ Generation\ Rate)$$

Example:

$$= (15\ Crews \times 90\%\ Commitment\ Rate - 1\ Ground\ Alert) \times 1.20\ Max\ Aircrew\ Sortie\ Rate\ = (15\ \times 90\% - 1)\ \times 1.2 =\ (13.5 - 1) \times 1.2 =\ 15\ Sorties\ per\ day$$

12.0. Aircrew Hour Limited Sorties (150 hours per month)

$$= \frac{[(Total\ Aircews) \times (Aircrew\ Commitment\ Rate) - (Ground\ Alerts) \times (Aircrew\ Monthly\ Hour\ Restriction)]}{(Average\ Sortie\ Duration) \times (30\ Days)}$$

Example:

$$= \frac{(15\ crews \times 90\% - 1\ Ground\ Alert) \times 150\ hours}{6.0\ Average\ Sortie\ Duration\ x\ 30\ Days} = \frac{(13.5-1) \times 150}{6.0 \times 30} = \frac{1875}{180} = 10.4\ Sorties\ per\ Day$$

13.0. 80/40 Sortie Contract.

Front Lines = $(Total\ Aircraft\ \times Front\ Commitment\ Rate - Ground\ Alert)$ *(Rounded down)*

Turn Lines = $(Front\ Lines\ \times Turn\ Line\ Commitment\ Rate\ )$ *(Rounded down)*

Example:

Front Lines = $[(10)Aircraft \times 80\%\ Front\ Commitment\ Rate - 1\ Ground\ Alert] = (10\ \times 80\% - 1) = (8 - 1) = 7\ Front\ Lines$

Turn Lines = $(7\ Front\ Lines\ x\ 40\%) = (7\ x\ 40\%) = (2.8\ Rounded\ Down) = 2\ Turn\ Lines$

14.0. Total Sortie Contract.

80/40 Contract*: 7 Turn 2 + 1 Ground Alert (9 planned flying lines and 1 ALFA Alert)*

15.0. Task Rate (5.0 Average Sortie Duration).

Maximum utilization rate (5.0 Average Sortie Duration) =

$$\frac{(24\ hour\ plan\ period)}{(5.0\ hour\ sortie\ duration + 6.0\ minimum\ ground\ time)} = \frac{24}{11.0} = 2.18$$

$$\text{Task Rate} = \frac{(Contract\ Front\ Lines + Contract\ Turn\ Lines)}{(Total\ Aircraft \times 100\% - Ground\ Alert) \times Max\ Aircraft\ Utilization\ Rate)}$$

Example:

$$= \frac{(7\ Front\ Lines + 2\ Turn\ Lines)}{(10\ Total\ Aircraft \times 100\% - 1\ Ground\ Alert) \times 2.18} = \frac{(7+2)}{(10 \times 100\% - 1) \times 2.18} = \frac{9}{9 \times 2.18} = \frac{9}{19.6} = 46\%\ Task\ Rate$$

16.0. Airframe Hours (30 day).

$$= \frac{[(Front\ Lines + Turn\ Lines + Ground\ Alert) \times (Average\ Sortie\ Duration) \times (30\ Days)]}{Total\ Aircraft}$$

Example:

$$= \frac{(7\ Front\ Lines + 2\ Turn\ Lines + 1\ Ground\ Alert) \times 5.0\ hours \times 30\ Days}{10\ Total\ Aircraft} = \frac{(7+2+1) \times 5.0 \times 30}{10}$$

$$= \frac{10 \times 5.0 \times 30}{10} = 150\ Hours\ per\ 30\ Days$$

17.0. Average Ground Time.

$$= \frac{\begin{bmatrix} (Total\ Aircraft \times 24\ Hours \times 30\ Days) \\ - (Front\ Lines + Turn\ Lines + Ground\ Alert) \times Average\ Sortie\ Duration \times 30\ Days \end{bmatrix}}{Total\ Aircraft \times 30\ Days}$$

Example:

$$= \frac{(10\ Aircraft \times 24\ Hours \times 30\ Days) - (7\ Front\ Lines + 2\ Turn\ Lines + 1\ Ground\ Alert) \times 5.0\ hours \times 30\ Days}{10\ Total\ Aircraft}$$

$$= \frac{(10 \times 24 \times 30) - (7+2+1) \times 5.0 \times 30}{10 \times 30\ Days} = \frac{7200 - 1500}{300} = \frac{5700}{300} = 19\ Hours$$

17.1. Aircrew Hours (30 day) =

$$\frac{[(Front\ Lines + Turn\ Lines + Ground\ Alert) \times (Average\ Sortie\ Duration) \times (30\ Days)]}{Total\ Aircraft}$$

Example:

$$= \frac{(7\ Front\ Lines + 2\ Turn\ Lines + 1\ Ground\ Alert) \times 5.0\ hours \times 30\ Days}{15\ Total\ Aircraft} = \frac{(7+2+1) \times 5.0 \times 30}{15}$$

$$= \frac{10 \times 5.0 \times 30}{15} = \frac{1500}{15} = 100\ Hours\ per\ 30\ Days$$

18.0 Required Mission Aircraft.

= mission required aircraft + [mission required aircraft * (1-Fleet Mission Capable Rate)]

Section D - Aeromedical Evacuation Formulas

1.0. Aeromedical Evacuation Overview

Refer to AFI 11-2AE Volume 3, Addenda A, *Aeromedical Evacuation Operations Configuration/Mission Planning* for detailed aircraft specific configuration and mission planning. Use the following formulas and data in Table 15 to determine the aeromedical evacuation force and capabilities. In the near term, aeromedical evacuation will be primarily accomplished using, C-17, C-130, KC-46, or KC-135 aircraft. Opportune airlift may be used, keeping the best interest of the patient and crew in mind.

1.1. Aeromedical Evacuation Missions (# required per day)

$$= \frac{\#\ of\ Evacuees\ per\ Day}{Load\ Planning\ Factor}$$

Aircraft Load Planning Factor = standard number of patients loaded per aircraft for aeromedical evacuation (see Table 15).

1.2. Aeromedical Evacuation Crew (# required for missions flown, does not include stage)

$$= \left(\text{Missions}/_{Day}\right) x\ 1.25\ (Crew\ Planning\ Factor)\ x\ \left(^{Crews}/_{Aircraft}\right) x\ (Crew\ Cycle\ Time)$$

Crews per Aircraft: Refer to Table 15
Crew Cycle Time:
Intratheater (Within Theater) = 2 days
Intertheater (Theater to Continental United States) = 4 days.

Section E—Examples

1.0. Airlift Example. As an example of how to use the formulas and planning factors in this pamphlet, assume the following scenario. The 10th Mountain Division out of Ft. Drum, NY, is to deploy to Kathmandu, Nepal, at the foot of the Himalayas, to assist in earthquake relief. The requirement is to move 800 short tons of cargo via C-17s.

Note: Civilian airframes are not standardized, and can vary widely, even within each carrier's fleet. Planners should reference AMC/A3B, Civil Reserve Air Fleet Capability link, on the Air Force Portal for the latest commercial, contract, and Civil Reserve Air Fleet aircraft capabilities. A common access card is required to access the Air Force Portal. Planners can also reference Air Mobility Command Instruction 10-402, *Civil Reserve Air Fleet* and Air Mobility Command Pamphlet 24-2, Volume 1, *Civil Reserve Air Fleet Load Planning*, for civilian aircraft capabilities. The following examples use International Civil Aviation Organization codes, which are four-character alphanumeric codes designating each airport around the world and commonly used in flight planning.

1.1. Suitable Airfield.

Referring to the Aircraft Airfield Restrictions (Table 1), we see that the C-17 requires a minimum of 3,500 feet of runway for landing.

Since the airfield at Ft. Drum, Wheeler-Sack AAF, has a runway length of 10,000 feet, it meets the C-17 requirements (this assumes adequate runway width).

Note: Refer to the Headquarters AMC Airfield Suitability and Restrictions Report or the airfield detail assessment in AMC's Global Decision Support System to determine suitability for mobility aircraft (C-5, C-17, C-20, C-21, C-32, C-37, C-40, C-130, KC-10, KC-46, and KC-135). If the airfield does not appear in the Airfield Suitability and Restrictions Report/airfield detail, contact AMC/A3AS and request the airfield be evaluated and added to the database (Airfield.Helpdesk@us.af.mil). AMC/A3AS will provide prompt feedback and include suitability information in future editions of the Airfield Suitability and Restrictions Report and GDSS airfield detail.

Looking in the Kathmandu area, we find Tribhuvan International Airport (VNKT) in Kathmandu to have 10,121 feet of runway which, along with the associated taxiways and ramp, is stressed for C-17 aircraft. Therefore, make initial plans based on using Wheeler Sack AAF (KGTB) as the onload and Tribhuvan International as the offload.

1.2. Missions Required. The example will address only the cargo requirement, however passenger movement would be handled in a similar manner. For all examples to follow, assume 15 C-17s apportioned for use and crew staging will be utilized where necessary.

$$= \frac{(Cargo\ Requirement)}{(Average\ Payload)} = \frac{800\ Short\ Tons}{45\ Short\ Tons\ per\ C{-}17} = 18\ C-17\ Equivalent\ Missions\ Required$$

1.3. Time to Arrival. The time required for cargo/ passengers to arrive at the offload location including all en route ground times. For this example, the C-17s will depart McGuire (KWRI), fly to Wheeler Sack AAF for onload, then en route stop at Rota (LERT), Dhahran (OEDR), Delhi (VIDP), and then offload at Tribhuvan. Refer to definitions and tables as needed.

Time to Arrival = active route flying time + active route ground time

$$Active\ Route\ Flying\ Time = \left(\frac{Distance_1}{Block\ Speed_1}\right) + \left(\frac{Distance_2}{Block\ Speed_2}\right) + \left(\frac{Distance_3}{Block\ Speed_3}\right) + \cdots$$

$$= \left(\frac{3119}{406}\right) + \left(\frac{2924}{406}\right) + \left(\frac{1443}{398}\right) + \left(\frac{441}{335}\right) = 19.8\ hours$$

Note: First leg from McGuire to Wheeler Sack is inactive as it's a positioning leg. Block speeds were interpolated from Table 4.

(Referring to Table 5)

$$Active\ Route\ Ground\ Time = Ground\ Time_1 + Ground\ Time_2 + Ground\ Time_3 + \cdots$$

$$= 2.25 + 2.25 + 2.25 = 6.75\ hours$$

Time to Arrival = $19.8 + 6.75 = 26.55\ hours$

1.4. Cycle Time. For this example, round trip flying time and round trip ground time were calculated using reverse routing except the last leg will be from Rota (LERT) to McGuire. Refer to definitions for Round Trip Flying Time and Round Trip Ground Time.

Cycle Time = round trip flying time + round trip ground time

$$Round\ Trip\ Flying\ Time = \left(\frac{Distance_1}{Block\ Speed_1}\right) + \left(\frac{Distance_2}{Block\ Speed_2}\right) + \left(\frac{Distance_3}{Block\ Speed_3}\right) + \cdots$$

$$= \left(\frac{248}{335}\right) + \left(\frac{3119}{406}\right) + \left(\frac{2924}{406}\right) + \left(\frac{1443}{398}\right) + \left(\frac{441}{335}\right) + \left(\frac{441}{335}\right) + \left(\frac{1443}{398}\right) + \left(\frac{2924}{406}\right) + \left(\frac{3140}{406}\right)$$

$$= 40.4\ hours$$

$$Round\ Trip\ Ground\ Time = Ground\ Time_1 + Ground\ Time_2 + Ground\ Time_3 + \cdots$$
$$= 3.25 + 2.25 + 2.25 + 2.25 + 2.25 + 2.25 + 2.25 + 3.25 = 20\ hours$$

$Cycle\ Time = 40.4 + 20 = 60.4\ hours$

1.5. Closure

$$= \frac{(\ Requirement)\ x\ (Round\ Trip\ Flying\ Time)}{(Average\ Payload)\ x\ (\#\ of\ Aircraft)\ x\ (Utilization\ Rate)} = \frac{(800\ Short\ Tons)\ x\ (40.4)}{(45\ Short\ Tons)\ x\ (15)\ x\ (12.5)} = 3.8\ days$$

1.6. Fleet Capability (short tons delivered to the theater)

$$= \frac{(Average\ Payload)\ x\ (\#of\ Aircraft)\ x\ Utilization\ Rate}{(Round\ Trip\ Flying\ Time)} = \frac{(45)\ x\ (15)\ x\ (12.5)}{(40.4)} = 208.8\ \text{Short Tons/day}$$

2.0. Airfield Throughput Capability. It is necessary to look at the throughput capability of all airfields associated with a deployment to determine whether any one airfield limits a planned operation. However, for initial planning, the en route locations may be assumed to have a higher throughput capability than the onload and offload locations. Note: Throughput is based on capability, but this doesn't constitute a guarantee. Also, airfields have competing interests based on their other customers. MOG should be expressed in two exclusive numbers, wide-body (C-17 equivalent) MOG and narrow-body (C-130 equivalent) MOG.

2.1. For this example, Tribhuvan International has a working MOG of one wide body aircraft.

Airfield Throughput Capability (e.g., Tribhuvan)

$$= \frac{[(wMOG)\ or\ \ (pMOG)\ or\ (fMOG)]\ x\ (Average\ Payload)\ x\ (Operating\ Hours)}{(Ground\ Time)} X\ (85\%\ Queuing\ Efficiency)$$

$$= \frac{(1)(45\ Short\ Tons)(24)}{3.25}\ X\ (85\%\ Queuing\ Efficiency) = 282.5\ \text{Short Tons/day (Refer to Table 8)}$$

Note: Since the arrival airfield can handle the estimated fleet capability that will be delivered, this calculation is complete. If the fleet capability had exceeded the airfield's throughput, either the flow would need to be slowed to compensate or the airfield's resources increased to handle the airflow.

3.0. Air Refueling Example. For this example, assume 6 F-15C's need to deploy from Langley (KLFI) to Spangdahlem (ETAD). How much fuel and how many tankers (KC-135R) are required? Note: For this example average/historical figures were used. Actual numbers would vary according to aircraft model, configuration, altitude, airspeed, etc.

3.1. Onload Required (per receiver)

$$= \left[\left(\frac{Distance}{True\ Air\ Speed}\right)\ x\ (Fuel\ Flow)\right] -\ (Total\ Fuel) +\ (Destination\ Reserves)$$

Note: Use true airspeed in Table 4 for mobility aircraft or applicable flight manual airspeeds for other aircraft.

3.2. Destination Reserves = required fuel reserves at destination

$$= (3500/480\ \text{x}\ 10{,}822)\ -\ 23{,}000\ +\ 7500$$

$$=\ 63{,}410\ \text{lbs (per receiver) x 6}\ =\ 380{,}462\ \text{lbs}$$

3.3. Offload Available (per tanker)

$$= (Total\ Fuel) -\ [(Distance/True\ Air\ Speed)\ \ x\ (Fuel\ Flow)] -\ (Destination\ Reserves)\ = (180{,}000) -\ [(3500/480)\ \ x\ (10{,}718)] -\ (30{,}000)$$

$= 71{,}848\ lbs\ per\ tanker$

3.4. Tankers required

$= \frac{(Offload\ Required)}{(Offload\ Available)} = (380{,}462/71{,}848\ )\ rounded\ up$

$= 6\ KC - 135\ required$

4.0. Aeromedical Evacuation Example. For this example, C-130s will be used to evacuate a mix of 500 ambulatory and litter patients.

4.1. Aeromedical evacuation Missions (# required)

$= \frac{(\#\ of\ Evacuees\ per\ Day)}{(Load\ Planning\ Factor)} = \frac{500}{50} = 10\ Aeromedical\ Evacuation\ Missons\ required$

Table 1. Aircraft Airfield Restrictions. [1, 2, 3]

Aircraft Type	Minimum			Empty Weight (1000 lbs)	Maximum T/O Weight (1000 lbs)	Tire Pressure PSI[5]
	Runway for Landing[4]	Runway Width	Taxiway Width			
C-130H	3000	60	30	85	175	60-118
C-130J	3000	60	30	85	175	60-118
C-130J-30	3000	60	30	89	175	60-118
C-17	3500	90	50	279	585	144
C-5M	6000	147	75	400	840	150
KC-10A	7000	147	75	270.8	590	190
KC-46A	7000	147	74	212	415	200
KC-135R/T	7000	147	74	120	322	170

NOTES:

1. Refer to Department of Defense Flight Information Handbook for an airfield's specific Pavement Classification Number and subgrade as well as additional aircraft Aircraft Classification Number.
Table 1 reflects values for the aircraft's empty weight and the aircraft's maximum take-off/taxi weight. Note: Pavement Subgrades in Global Decision Support System airfield detail are not classified as high, med, low, or ultra-low and come in an alpha/numeric format to be decoded. The AMC Airfield Suitability and Restrictions Report provides specific guidance and is an available source for decoding that format. Calculations using the Aircraft Classification Number/Pavement Classification Number website https://transportation.wes.army.mil/acnpcn/ are not considered official for AMC, but rather values listed in Global Decision Support System Airfield Detail (Giant Report) are to be used for mission planning.
2. AMC mission planners will refer to the weight bearing information in the Airfield Suitability and Restrictions Report or Global Decision Support System airfield detail for specific runway Pavement Classification Number values (if available). The Global Decision Support System also provides weight bearing capacity information when pavement strength is reported in terms other than Aircraft Classification Number or Pavement Classification Number, and translates raw weight bearing capacity into aircraft gross weight limits. Planners can contact the AMC Airfield Help Desk (Airfield.Helpdesk@us.af.mil) for assistance regarding weight bearing capacity information in the Airfield Suitability and Restrictions Report or Global Decision Support System/airfield detail. Mobility aircraft planners will use only the weight bearing information figures published in the Airfield Suitability and Restrictions Report and Global Decision Support System/airfield detail.
3. For the latest commercial, contract, and Civil Reserve Air Fleet aircraft data go to the Air Force Portal, select AMC/A3B, and click on the Civil Reserve Air Fleet Capability link. Common Access Card and Air Force Portal access required.
4. Headquarters AMC/A3 retains runway criteria waiver authority for AMC organic aircraft.
5. See aircraft manuals for required tire pressure under specific conditions.

Table 2. Aircraft Size.

Aircraft Type	Length (feet)	Wing Span Width (feet)[1]	Maximum Weight (lbs)	Landing Gear Type[2]		Width Required 180° Turn[3]	Required C-17 Parking Spots[4]
				AMC Code	FAA Code		
C-5M	247.8	222.7	840,000	TDT	C5	150	1.9
C-130H/J	97.75	132.6	175,000	ST	2S	74	0.4
C-130J-30	112.75	132.6	175,000	ST	2S	78	0.5
C-17	173.92	169.75	585,000	TRT	2T	143[5]	1.0[4]
KC-10A	181.6	165.3	593,000	SBTT	2D/D1	149.5	1.0
KC-46A	165.84	156.08	416,000	TT	2D	130	0.87
KC-135R/T	136.25	130.85	322,500	TT	2D	130	0.6

NOTES:
1. Wingtip clearance: 10 feet on each side with wing walker, 25 feet each side without wing walker.
2. Refer to Department of Defense Flight Information Publication (En route Supplement) for an airfield‘s maximum runway load bearing capability expressed as a maximum aircraft weight for a particular landing gear type. Additionally, the Airfield Suitability and Restrictions Report and Global Decision Support System/airfield detail provide maximum runway/taxiway/parking apron load bearing capability information for AMC aircraft by landing gear type.
3. Width required is for landing gear only and does not include the wingspan footprint required for a 180° turn.
4. C-17 parking spot equivalent calculation = (aircraft length x aircraft width)/(C-17 length x C-17 width).
5. The C-17 minimum width for a star-turn is 90 feet (can be done in 80 feet, but 90 feet is the minimum runway width for landing).

Table 3. Aircraft Payloads. [1]

Aircraft Type	Pallet Positions	Cargo (Short Tons)[2]		Passengers[3]		Standard Noncombatant Evacuation Operation Passengers
		Allowable Cabin Load	Planning	Allowable Cabin Load	Planning	
C-130H/J	6	Use Table 3.1	12	90	80	90/74[4]
C-130J-30	8	Use Table 3.1	18	124	128	128
C-17	18	Use Table 3.1	65	101	90	101[5]
C-17 ER	18	Use Table 3.1	64	101	90	101[5]
C-5M	36	Use Table 3.1	100	73	73	73
KC-10A (Airlift)	23	Use Table 3.1	32	75	68	75
KC-46A (Airlift)	18	Use Table 3.1	32	112	98	112
KC-135R/T (Airlift)	6	Use Table 3.1	13	53	36[6]	53

NOTES:

1. Cargo and passenger payloads (except for the C-5) are exclusive of one another.
2. Organic aircraft calculated as the maximum Allowable Cabin Load for the leg length (unrefueled) shown in Table 3.1.
3. Weights are based on 400 lbs per passenger, which includes passenger, baggage, and combat gear. Take total passenger weight into account as part of total cargo weight when requirements dictate movement of cargo and passengers on the same aircraft.
4. Lower Noncombatant Evacuation Operation number reflects life raft capacity.
5. Reference the Air Force Instruction 11-2C-17, Volume 3, *C-17 Operations Procedures*, for an estimated number of personnel that can be airlifted during an emergency.
6. Maximum souls allowed on board for KC-135 is 40 (crew + passengers). Waiver required for more than 40 souls.

Table 3.1. Maximum Allowable Cabin Load.

MAXIMUM ALLOWABLE CABIN LOAD [1, 2]								
	C-17	C-17ER	C-5M	C-130H/J	C-130J-30	KC-135R/T	KC-46A	KC-10A
NM	WEIGHT[3]							
1500	81	80	140	15.5	21	28	32	77
2500	81	80	130	8	15	28	32	77
3250	68	67.5	111	3	N/A	28	32	73
5000	N/A	37.5	67	N/A	N/A	28	32	47

NOTES:
1. The maximum allowable cabin load can be used for planning with concurrence of 618 AOC (TACC) Mission Planners, Flight Managers, or Combatant Commander's Air Operations Center/Air Mobility Division in conjunction with detailed mission information (critical mission leg, winds, weather, terrain clearance, runway limitations, and diplomatic clearance). For cargo load planning, verify size and dimensions and input data into Integrated Computerized Deployment System for an accurate load plan.
2. Key Assumptions: Standard day, no wind, sea level, dry runway, zero obstacles, sufficient runway length
3. Weight expressed in Short Tons.

Table 4. Aircraft Block Speeds.

Type	Mach	500nm	1000nm	1500nm	2000nm	2500nm	3000nm	3500nm	4000nm
C-130H	0.49	242	266	272	273	272	271	-	-
C-130J/-30	0.59	286	294	301	308	314	320	-	-
C-17	0.76	335	384	400	405	406	406	409	412
C-5	0.77	341	393	410	415	416	416	420	422
KC-10A	0.81	354	410	428	435	436	437	440	443
KC-46A	0.81	354	410	428	435	436	437	430	433
KC-135R/T	0.79	348	401	419	425	426	426	433	434

Type	Mach	4500nm	5000nm	5500nm	6000nm	6500nm	7000nm	7500nm	8000nm
C-130H	0.49	-	-	-	-	-	-	-	-
C-130J/-30	0.59	-	-	-	-	-	-	-	-
C-17	0.76	-	-	-	-	-	-	-	-
C-5	0.77	424	426	428	429	430	-	-	-
KC-10A	0.81	446	447	449	450	451	451	452	452
KC-46A	0.81	-	-	-	-	-	-	-	-
KC-135R/T	0.79	435	437	438	439	439	440	440	440

Assumptions:
1. Standard day, pressure, temperature, -2° temperature lapse per 1000 feet of altitude.
2. 500nm leg flown at FL180 with linear increase in altitude to FL450 for 4000nm and beyond.
3. 20 minute airborne delay for departure, approach, and landing.
4. 5 minute taxi time from landing to block-in.
5. Total time measured from rotation on takeoff leg to block-in after landing.
6. Total distance measured from point of takeoff to point of landing.
7. Changes in planned cruise airspeed will alter results.

NOTE: Organic aircraft block speeds obtained from computer flight plan data. All airspeeds are True Air Speed.

Table 5. Ground Times.

Aircraft Type	Passenger and Cargo Operations Wartime Planning Times [1] (hours + minutes)				Minimum Crew Rest Times [2]	Aeromedical Evacuation (hours + minutes)		
	Onload / Offload	En route Refuel only	Expedited[3]	Employment Tanker Turn-Time[4]		Reconfigure	Onload / Offload	Expedited[3]
C-130	2+00	1+15	1+45		16+00	1+30	1+30	0+45
C-17	2+45	1+45	2+15		16+30	1+25	2+45	1+45
C-5	3+45	2+45	3+45		17+00	-	-	-
KC-10	3+45	2+45	3+15	6+00	17+00[7]	-	-	-
KC-46	3+45	2+45	3+15	6+00	17+00[7]	1+30	1+30	0+45
KC-135[5]	3+45	2+45	3+15	6+00[6]	17+00[7]	1+30	1+30	0+45

NOTES:

1. Times are estimated based on average cargo/fuel loads. Where possible, planners should deviate from these times to account for known factors such as amount and/or complexity of cargo, amount of fuel upload, and/or airfield capability limitations.
2. Times are based on minimum post-flight duties. Planners must account for additional ground time to account for cargo operations performed upon arrival, if necessary.
3. Onload or offload operations only. Does not include refuel or reconfiguration operations.
4. Times assume an 80% commit rate for sustained operations.
5. KC-135 times apply to roller-equipped aircraft.
6. Add 2 hours for KC-135 configuration changes.
7. When cargo is required add 1+15 to minimum crew rest time.

Table 6. Aircraft Utilization.

Aircraft Type	Utilization Rate[1]		Primary Mission Aircraft Inventory					
	Sustained	Surge	2018	2019	2020	2021	2022	2023
C-130H	6.0	6.0	152	148	144	144	144	144
C-130J/30	6.0	6.0	110	110	110	110	110	110
C-17	12.5	14.5	180	188	188	188	188	188
C-5M	8.1	11.5	42	44	46	48	48	48
KC-10A[2]	8.6	9.8	54	53	45	30	24	12
KC-46A[2]	-	-	TBD	TBD	TBD	71	84	99
KC-135R/T[2]	5.1	6.8	352	334	320	320	320	320

NOTES:
1. Day-to-day operations.
2. KC-10, KC-46, and KC-135 utilization rate apply only in the airlift role.

Table 7. Productivity Factors. [1, 2]

Tactical (Intra-theater)						
Onload to Offload Distance	500nm	1000nm	1500nm	2000nm	2500nm	3000nm
Productivity Factor	.33	.40	.44	.46	.46	.46
Strategic (Inter-theater)						
Onload to Offload Distance	3000nm	4000nm	5000nm	6000nm	7000nm	8000nm
Productivity Factor	.48	.48	.49	.49	.49	.49

NOTES:
1. Productivity Factors published above reflect average values for broad planning applications. The values above assume average non-productive positioning legs (home station to onload, and offload to recovery) of 250nm for tactical missions and 500nm for strategic missions.
2. A more accurate scenario specific productivity factor can be approximated with the equation: Productivity = (onload to offload distance)/(round trip cycle distance).

Table 8. Maximum Airfield Throughput. [1]

	24 Hour Operations		16 Hour Operations[6]		10 Hour Operations[7]	
MOG [2]	Passengers[3, 4]	Cargo[4, 5] Short Tons	Passengers[3, 5]	Cargo[4, 5] Short Tons	Passengers[3, 5]	Cargo[4, 5] Short Tons
1	1469	282	979	188	612	118
2	2938	565	1958	377	1224	235
3	4406	847	2938	565	1836	353
4	5875	1130	3917	753	2448	471
5	7344	1412	4896	942	3060	588
6	8813	1695	5875	1130	3672	706
7	10282	1977	6854	1318	4284	824
8	11750	2260	7834	1506	4896	942
9	13219	2542	8813	1695	5508	1059
10	14688	2825	9792	1883	6120	1177

NOTES:
1. For airfield specifics, refer to the Base Support Plan, via the MAJCOM, for detail planning or to provide fidelity/validation of your "estimate".
2. Use the lower of wMOG, pMOG, or fMOG.
3. Passenger throughput based on B-767-400 equivalents (average payload 216 passengers, ground time 3+00).
4. Cargo throughput based on C-17 equivalents (average payload 45 Short Tons, ground time 2+45).
5. Queuing efficiency of 85% applied.
6. Daylight operations in summer months.
7. Daylight operations in winter months.

Table 9. Fuel Burn Rates.

Aircraft Type	Fuel Burn Rate (lbs/hr)	Aircraft Type	Fuel Burn Rate (lbs/hr)
C-5M	22,110	F-16	5,795
C-17	21,097	F-22A	11,118
C-130H	4,533	A/OA-10	3,996
C-130J/30	4,500	AV-8B	5,461
KC-10A	18,948	E-6A/B	10,747
KC-46A	11,000	EA-6B	7,102
KC-135R/T	11,291	F/A-18C/D	7,417
F-15C	11,189	F/A-18E/F	8,623
F-15E	13,244		

NOTE: Fuel burn rates extracted from AFPAM 23-221, *Fuels Logistics Planning*, (converted to pounds/hour using 6.7 pounds/gallon conversion rate). Fuel burn rates are for planning purposes only. Actual rate varies according to mission profile, aircraft model, configuration, altitude, airspeed etc.

Table 10. Tanker Offload Capabilities. [1, 2, 3]

Aircraft	Takeoff Gross Weight (lbs)	Takeoff Fuel Load[4, 5] (lbs)	Maximum Offload Available[2, 6, 7] (lbs)			
			Mission Radius			
			500nm	1000nm	1500nm	2500nm
KC-10A	590,000	340,000	247,500	207,500	168,800	131,000
KC-46A	415,000	208,000	163,100	140,200	117,300	71,400
KC-135R/T	322,500	200,000	142,000	117,100	98,800	77,800

NOTES:
1. Standard Atmospheric Conditions with winds 270/50.
2. Cruise altitude and temperature at cruise will impact fuel burn rates, and will reduce available offload.
3. All KC-10, KC-46, and a limited number of KC-135 aircraft are air refuelable, providing increased range, off-load, and loiter capabilities.
4. Takeoff fuel will vary by runway available and atmospheric conditions.
5. Cargo carried will reduce fuel load on a 1:1 basis.
6. Offload data based on 1-hour orbit time at 440T (315C).
7. Orbit times greater than 1 hour may be required to complete offload of all available fuel.

Table 11. KC-135 Tanker Aircraft Required. [1, 2, 3]

Receiver # / Aircraft Type	Distance (nm)					
	1000	2000	3000	4000	5000	6000
3 F/A-18	-	1	2	3	5	6
6 F-15C	-	2	3	5	6	9
6 F-15E	1	2	5	6	7	8
6 F-16	-	1	2	3	5	7
6 F-22A	1	2	5	6	7	8
6 A/OA-10	-	1	3	4	-	-
3EA6-B	-	1	2	3	4	4
1 C-17[4]	-	-	-	1	1	2
1 C-5[4]	-	-	-	-	1	2

NOTES:
1. Due to the multitude of Air Refueling variables, this table reflects an order of magnitude only.
2. Table assumes multiple tanker launch bases would be used for air refueling distances greater than 3000nm.
3. Fighter/tanker ratio can be limited by boom cycle time.
4. For the airlift aircraft, assume average payloads, maximum takeoff gross weight, optimum located air refueling tracks and divert bases, and a minimum tanker off-load capability of 90,000 lbs.

Table 12. KC-46 Tanker Aircraft Required. [1, 2, 3]

Receiver # / Aircraft Type	Distance (nm)					
	1000	2000	3000	4000	5000	6000
3 F/A-18	-	1	2	3	5	6
6 F-15C	-	2	3	5	6	9
6 F-15E	1	2	5	6	7	8
6 F-16	-	1	2	3	5	7
6 F-22A	1	2	5	6	7	8
6 A/OA-10	-	1	3	4	-	-
3EA6-B	-	1	2	3	4	4
1 C-17[4]	-	-	-	1	1	2
1 C-5[4]	-	-	-	-	1	2

NOTES:
1. Due to the multitude of Air Refueling variables, this table reflects an order of magnitude only.
2. Table assumes multiple tanker launch bases would be used for air refueling distances greater than 3000nm.
3. Fighter/tanker ratio can be limited by boom cycle time.
4. For the airlift aircraft, assume average payloads, maximum takeoff gross weight, optimum located air refueling tracks and divert bases, and a minimum tanker off-load capability of 90,000 lbs.

Table 13. KC-10 Tanker Aircraft Required. [1, 2, 3]

Receiver # / Aircraft Type	Distance (nm)					
	1000	2000	3000	4000	5000	6000
3 F/A-18	-	1	2	2	3	4
6 F-15C	-	1	2	3	4	5
6 F-15E	1	1	3	4	5	6
6 F-22A	1	1	3	4	5	6
6 F-16	-	1	1	2	3	4
6 A/OA-10	-	1	1	2	-	-
3 EA6-B	-	1	2	2	3	4
1 C-17[4]	-	-	-	1	1	2
1 C-5[4]	-	-	-	-	1	2

NOTES:
1. Due to the multitude of Air Refueling variables, this table reflects an order of magnitude only.
2. Table assumes multiple tanker launch bases would be used for air refueling distances greater than 3000nm.
3. Fighter/tanker ratio can be limited by boom cycle time.
4. For the airlift aircraft, assume average payloads, maximum takeoff gross weight, optimum located air refueling tracks and divert bases, and a minimum tanker off-load capability of 90,000 lbs.

Table 14. Aeromedical Evacuation Capabilities Matrix.

Capability			Operations Capacities	Ops Hrs	Deployment Characteristics			
	Function	Unit Type Code[1]			Pers	Pallets	Rolling Stock	Short Tons
C2 - LNO	AECT	FF7M	Task with Air Operations Center/Air Mobility Division	24	8			
	C2	FFQCC	Command Staff	12	8	2		
	C2 Equipment	FFQC1	Equipment AE Command Squadron	24		1		5.14
	C2 Communication	FFQCR	AE Communication	24	2			
	AE C2 Vehicle Support	UFMVE	1 x M-1097 HMMWV	24		2	1	3.6
	AE C2 Support Cell	FFQSC	Admin, Log, Maintenance	24	4			
	AE Ops Team	FFQNT	Support 10 AE Crews, 4 Critical Care Air Transport Team	24	10			
	AE Ops Team Equipment	FFQN1	Supports FFQNT	24		1		1.5
	AEOT C2 Communication	FFQCR	AE Communication	24	2			
	AE Ops Team Vehicle	UFMVE	1 x M-1097 HMMWV	24		2	1	3.6
	AEOT Manpower Augmentation Team	FFQCM	Adds support for 10 AEC, 4 Critical Care Air Transport Team	24	6	1		0.2
	AE Augmentation Team Equipment	FFQC2	AEOT Equipment Package	24		1		1.25
AELT	AELT	FFQLA	Liaison & (x 2 for 24/7)	12	2			
	AELT C2 Communication	FFQCR	AE Communication	24	2			
	AELT Equipment (Rolling Stock)	FFQL1	AELT Equipment Package	24		1		5.31
	AELT Vehicle Support	UFMVE	1 x M-1097 HMMWV	24		2	1	3.6
CREW	Basic Crew	FFQDA	AE Crew - 50 Patients	CD[2]	5			
	Equipment	FFQDM	AE Equipment – 1 AE Crew/50	24		1		0.8
	Resupply	FFQDH	30 Day Supply per AE Kit	24		1		0.8
	Small Aircraft In Flight Kit	FFQDE	Small AE Kit – 3 Patients	24		1		0.97
CCAT	Basic Crew	FFCCT	3 High or 6 Low Acuity	CD[2]	3			
	Equipment	FFCC4	Mission Depend/3-6 Patients	24		1		0.66
	Supply	FFCCB	Expendable Supplies	24		1		0.5
	Tactical Care	FFTC1	3 Critical Care High Acuity	24		1		0.5
	Pediatric Augmentation	FFCC2	Pediatric Augmentation Kit – 1 to 3 Patients	24		.8		0.3
	Ultrasound, Portable	FFCC5	Ultrasound Portable	24		0		0.1
ERPSS 10	ERPSS10	FFEPS	10 Bed Personnel	24	13			
	ERPSS10 Vehicle Support	UFMVE	2 x M-1097 HMMWV	24		4	2	7.2
	Equipment (Rolling Stock)	FFPS1	Equipment	24	13	2		10.06
	C2 Communication	FFQCR	AE Communication	24	2			
	ERPSS 10 Resupply	FFPS8	30 Day Supply	24		1		1.38
	ERPSS 10 Support Package	FFPS7	Environmental Control Unit, Generator, and Plenum	24		2		0.75
	Clinical Providers	FFPPS	Clinical Augmentation Flight Surgeon + Staff	24	10			

***NOTES*:**
1. Communication augmentation unit type code applies to any AE Unit Type Code requiring additional communication support.
2. Crew duty day.

Table 14. Aeromedical Evacuation Capabilities Matrix. (Continued)

Capability			Operations Capacities	Ops Hrs	Deployment Characteristics			
	Function	Unit Type Code[1]			Pers	Palletts	Rolling Stock	Short Tons
ERPSS 50	C2 Ops	FFFPS	Staff Module 1 per 50 Beds	24	10			
	Staff Support	FFHPS	Staff Module 1 per 100 Beds	24		3		8.3
	C2 Communication	FFQCR	AE Communication	24	2	1		0.7
	Equipment Package	FFPS2	Modules – 1 per 150 bed	24		3		5.03
	Expendable Package	FFPS3	Modules – 1 per 50 bed	24		2		2.71
	Facility Package	FFPS4	Modules – 1 per 50 bed	24		8		16.69
	Ambulance Bus	UFM81	2 Per 50 Bed Capability	24		4		12.00
EQUIPMENT	Stacking Litter System	FFQD1	3 Litter Capability, 5 Stacking Litter System per	24		1		1.02
	Litter Stanchion Augmentation System	N/A	C-17 Liter Stanchion - MX	24		1		1.8
	Transportation Isolation System[2]	FFTS1	Transportation Isolation System	24		2		7.6
	Transportation Isolation System Interior Module Component (IMC)	FFTS2	Transportation Isolation System IMC	24		1		3.8
	Transportation Isolation System Personal Protect Equipment	FFTS3	PPE for 12 - Person Team	24		1		0.3
	Transportation Isolation System Support Package	FFTS4	Transportation Isolation System Support Sys CONOPS Supplies	24		1		.23
	Transportation Isolation System Spare/Repair Kit	FFTS5	Transportation Isolation System Spare/Repair Kit	24		1		0.3
	Transportation Isolation System Refill Kit	FFTS6	Transportation Isolation System System Bag	24		1		0.5

***NOTES*:**
1. Communication augmentation unit type code applies to any aeromedical evacuation Unit Type Code requiring additional communication support.
2. The Transportation Isolation System is used only on C-17 and C-130 aircraft.

Table 15. Aeromedical Evacuation Capabilities.

Aircraft	Aeromedical Evacuation Crews Per Aircraft[1]	Aeromedical Airlift Capability[2, 3]			
		Total Litter/ Ambulatory Patients	All Litter Patients	All Ambulatory Patients	Floor Loaded Litter Patients
C-17	1	36/54 (AE-2)[4]	36[5] (AE-2)[4]	80	60
C-130[6]	1	50/24 (AE-4)[4]	72 (AE-2)[4]	90[7]	15
C-130J-30[6]	1	60/53 (AE-4)[4]	97 (AE-2)[4]	90[7]	21
KC-46[6]	1	24/32[8]	30	30	N/A
KC-135[6]	1	15/20 (AE-3)[4]	15 (AE-3)[4]	22	8

NOTES:

1. Standard basic aeromedical evacuation crew only (two Flight Nurses and three aeromedical evacuation Technicians).
2. Total positions. Data reflects the subtraction of litter positions and seat requirements for a basic aeromedical evacuation crew with medical equipment. Addition of one Critical Care Air Transport Team would subtract an additional three seats and two litter positions.
3. Various litter and ambulatory patient combinations are available based on requirement. Refer to 18 AF aeromedical evacuation Planning Factors for Defense Support of Civil Authorities Operations aeromedical evacuation capabilities.
4. Aeromedical evacuation configurations IAW AFI 11-2AE, Volume 3, Addenda A.
5. Capacity increases to 36 litter positions with Litter Stanchion Augmentation Set Kit installed, or by redistributing assets from other airframes.
6. No integral litter capability.
7. Limited to 80 seats including crew for overwater flights.
8. Seat pallet is required to transport ambulatory patients.

Table 16. Planning Sortie and Hour Limits, 2.0 Crew Ratio (Typical KC-10 Unit).

Minimum				
Number of Crews	20	**Number of Aircraft**	10
Crew Rest	17.0 Hours	**Aircraft Ground Time**	6.0 Hrs.

Average Sortie Duration	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
Maximum Aircraft Sortie Rate	2.40	2.29	2.18	2.09	2.00	1.92	1.85	1.78	1.71	1.66	1.60	1.55	1.50
Maximum Aircraft Sorties 100%	21.6	20.6	19.6	18.8	18.0	17.3	16.6	16.0	15.4	14.9	14.4	13.9	13.5
Maximum Aircraft Sorties 80%	16	16	15	14	14	13	12	12	12	11	11	10	10
Maximum Aircrew Sortie Rate	1.14	1.12	1.09	1.07	1.04	1.02	1.00	0.98	0.96	0.94	0.92	0.91	0.89
Maximum Aircrew Sorties 90%	19	18	18	18	17	17	17	16	16	16	15	15	15
125 Hour Limit Sorties (90%)	17	15	14	12	11	10	10	9	8	8	7	7	7
150 Hour Limit Sorties (90%)	21 (19)	18	17	15	14	13	12	11	10	10	9	8	8
Offload (300K, 2 hour orbit)	115	110	105	100	95	90	85	80	75	70	65	60	55
80% Base Capacity @ 85%	1564K	1496K	1338K	1190K	1130K	994K	867K	816K	765K	654K	607K	510K	467K
80/40 Daily Contract @ 85%	879K	841K	803K	765K	726K	688K	650K	612K	573K	535K	497K	459K	420K
70/40 Daily Contract @ 85%	782K	748K	714K	680K	646K	612K	578K	544K	510K	476K	442K	408K	374K
80/40 Sortie Contract[1]	9 Sorties: 7 Turn 2												
Task Rate	42%	44%	46%	48%	50%	52%	54%	56%	58%	60%	63%	65%	67%
Airframe Hours (30 day)	120	135	150	165	180	195	210	225	240	255	270	285	300
Average Touch Time	20	19.5	19	18.5	18	17.5	17	16.5	16	15.5	15	14.5	14
Aircrew Hours (100%)	60	67.5	75	82.5	90	97.5	105	113	120	128	135	143	150
70/40 Sortie Contract[1]	8 Sorties: 6 Turn 2												
Task Rate	38%	39%	41%	43%	45%	47%	49%	51%	53%	54%	56%	58%	60%
Airframe Hours (30 day)	108	122	135	149	162	176	189	203	216	230	243	257	270
Average Ground Time	20.4	20	19.5	19.1	18.6	18.2	17.7	17.3	16.8	16.4	15.9	15.5	15
Aircrew Hours (100%)	54	60.8	67.5	74.3	81	87.8	94.5	101	108	115	122	128	135

NOTES:

1. A ground alert aircraft is required.

Table 17. Example Sortie and Hour Limits, 1.5 Crew Ratio (Typical KC-135 Unit).

Minimum										
Number of Crews	15			**Number of Aircraft**			10			
Crew Rest	17.0 Hours			**Aircraft Ground Time**			6.0 Hours.			
Maximum Aircraft Sortie Rate	2.67	2.53	2.40	2.29	2.18	2.09	2.00	1.92	1.85	1.78
Maximum Aircraft Sorties 100%	24.0	22.7	21.6	20.6	19.6	18.8	18.0	17.3	16.6	16.0
Maximum Aircraft Sorties 80%	18	17	16	16	15	14	14	13	12	12
Maximum Aircrew Sortie Rate	1.20	1.17	1.14	1.12	1.09	1.07	1.04	1.02	1.00	0.98
Maximum Aircrew Sorties 90%	15	14	14	13	13	13	13	12	12	12
125 Hour Limit Sorties (90%)	17 (15)	14	13	11	10	9	8	8	7	6
150 Hour Limit Sorties (90%)	20 (15)	17 (14)	15 (14)	13	12	11	10	9	8	8
Offload (175K, 2 hour orbit)	125	120	115	110	105	100	95	90	85	80
80% Base Capacity @ 85%	1593K	1428K	1368K	1215K	1160K	1105K	1049K	918K	867K	816K
80/40 Daily Contract @ 85%	956K	918K	879K	841K	803K	765K	726K	688K	650K	612K
70/40 Daily Contract @ 85%	850K	816K	782K	748K	714K	680K	646K	612K	578K	544K
80/40 Sortie Contract[1]	9 Sorties (7 Turn 2)									
Task Rate	38%	40%	42%	44%	46%	48%	50%	52%	54%	56%
Airframe Hours (30 day)	90	105	120	135	150	165	180	195	210	225
Average Touch Time	21	20.5	20	19.5	19	18.5	18	17.5	17	16.5
Aircrew Hours (100%)	60	70	80	90	100	110	120	130	140	150
70/40 Sortie Contract[1]	8 Sorties (6 Turn 2)									
Task Rate	34%	36%	38%	39%	41%	43%	45%	47%	49%	51%
Airframe Hours (30 day)	81	94.5	108	121.5	135	149	162	176	189	203
Average Ground Time	21.3	20.85	20.4	19.95	19.5	19.1	18.6	18.2	17.7	17.3
Aircrew Hours	54	63	72	81	90	99	108	117	126	135

***NOTES*:**
1. A ground alert aircraft is required.

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Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

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618 AOC (TACC)/XOP, Contingency Operations & Exercise Division, DSN 779-1930, Comm (618) 229-1930

Headquarters AMC/A3AS, Airfield Suitability Branch, DSN 779-3112, Comm (618) 229-3112

Headquarters AMC/A3B, Commercial Airlift Division, DSN 779-1751, Comm (618) 229-1751

Headquarters AMC/A3OE, Aeromedical Evacuation Plans Branch, DSN 779-2076, Comm (618) 229-2076

Headquarters AMC/SGXM, AE & Medical MEFPAK Management Branch, DSN 779-6952, Comm (618) 229-6952

Adopted Forms

Air Force Form 847, *Recommendation for Change of Publication*

Abbreviations and Acronyms

AE—Aeromedical Evacuation
AMC—Air Mobility Command
MOG—Maximum [Aircraft] on Ground

Terms

Active route flying time—The flying time from onload to the offload location including all intermediate locations en route. This does not include ground time.

Active route ground time—The cumulative ground time of all intermediate stops from the onload location to the offload location. This does not include flying time.

Aeromedical Evacuation Patients—

Litter = Patient may require a litter to be enplaned or deplaned.

Ambulatory = Patient does not require assistance to be enplaned or deplaned.

Air cargo—Stores, equipment or vehicles, which do not form part of the aircraft, and are part or all of its payload. Note: There are different classifications of military cargo, categorized as follows:

Bulk air cargo, including the 463L pallet itself, which is within the usable dimensions of a 463L pallet (104” x 84” x 96”) and within the height and width requirements established by the cargo envelope of the particular model of aircraft.

Oversize cargo exceeding the usable dimensions of a 463L pallet loaded to the design height of 96” but is equal to or less than 1,090” in length, 117” in width, and 105” in height. This cargo is transportable on the C-5, C-17, C-130, and to a limited extent the KC-10.

Outsize cargo which exceeds the dimension of oversize (1,090” x 117” x 105”) and requires use of a C-5 or C-17. Rolling Stock Equipment that can be driven or rolled directly into the cargo compartment.

Special Items cargo requiring specialized preparation and handling procedures, such as space satellites or nuclear weapons.

Aircraft block speed—True airspeed in knots under zero wind conditions adjusted in relation to length of sortie to compensate for takeoff, climb out, descent, instrument approach, and landing.

Aircraft Mission Capability Rate—The average percentage of a fleet that is either Partially Mission Capable or Fully Mission Capable over the expected plan period. This represents the maintenance reliability for the entire fleet, and does not directly correlate to task rates.

Aircraft parking size—The ramp space a particular aircraft occupies, usually expressed in C-17 equivalents (See Table 2).

Aircraft Task Rate—The rate at which a specific fleet is tasked, after rounding is applied. Task Rates should normally stay below Mission Capability Rates for sustained operations. Sustained operations are typically tasked at lower rates than short-duration contingency support rates and surge operations.

Aircrew Commitment Rate—This is the average rate crews can be committed to missions for planning purposes. This commitment rate takes factors such as aircrew Duties Not Including Flying rate, circadian rhythm, and mission sequencing into account. A typical historical commitment rate for aircrew is 90%.

Aircrew Hours (100%)—This is the average number of hours each crew is expected to accrue over the course of a 30-day flying period. The examples below assume down-time and alert periods are shared equally across the crew force. Actual aircrew hours must be monitored by the individual flying units and communicated to the Operational planners when issues arise.

Aircrew Monthly Hour Restriction—This is the total number of flight hours an aircrew can fly in a given 30-day period. This restriction may be waived to a higher number by the appropriate command authority. Typical flight hour limit for deployed aircrew is 150 hours per 30 days.

Airfield detail assessment—Contained in GDSS establishes suitability and restrictions for AMC and AMC-gained C-5, KC-10, C-17, C-20, C-21, C-32, C-37, C-40, KC-46, C-130, and KC-135 aircraft operations.

Airfield Suitability and Restrictions Report—AMC/A3 periodic publication available on line that contains AMC policy and guidance regarding airfield suitability and a synopsis of suitability for airfields AMC operates at globally.

Airfield throughput capability—The amount of passengers or cargo that can be moved through the airfield per day via strategic airlift based on the limitations of the airfield (such as parking spots).

Airframe Hours (per plan period)—This is an estimated average number of hours each airframe will accrue in a given time period, normally 30 days. It is more conservative to plan for all Alert lines to launch when calculating this number.

Air refueling control point—The planned geographic point over which the receiver(s) arrive in the observation/pre-contact position with respect to the assigned tanker.

Air refueling control time—The planned time that the receiver and tanker will arrive over the air refueling control point Air Refueling Control Point.

Air refueling exit point—The designated geographic point at which the refueling track terminates. In a refueling anchor, it is a designated point where the tanker and receiver may depart the anchor area after refueling is completed.

Air refueling initiation point—A point located upstream from the Air Refueling Control Point at which the receiver aircraft initiates a rendezvous with the tanker.

Air refueling track—A track designated for air refueling reserved by the receiver unit/planner. If possible, the track from the Air Refueling Initiation Point to the Air Refueling Control Point should be along a Tactical Air Navigation/Very High Frequency Omni directional Range and Tactical Air Navigation radial and within 100 NM of the station.

Allowable cabin load—The maximum payload that can be carried on a mission. Note: The allowable cabin load may be limited by the maximum takeoff gross weight, maximum landing gross weight, or by the maximum zero fuel weight.

Anchor point—A designated geographical point on the downstream end of the inbound course of the Anchor Refueling Pattern.

Anchor refueling—Air refueling performed as the tankers maintain a prescribed pattern which is anchored to a geographical point or fix.

Anchor rendezvous—The procedures normally employed by radar (Control and Reporting Center/Ground Control Intercept/ Airborne Warning and Control System) to vector the tanker(s) and receiver(s) for a visual join-up for refueling. Note: North Atlantic Treaty Organization uses the term Rendezvous Alpha.

Available Offload—Fuel available for offload from a single tanker, including loiter time in an air refueling airspace.

Average Deliverable Offload—The average fuel expected to be offloaded from each tanker in a large fleet air refueling plan. When tankers do not have sufficient fuel remaining to account for loiter and requested offload, any remaining fuel cannot be offloaded effectively.

Average Ground Time—This is an estimate of the average time each aircraft will be on the ground between missions, averaged across the total fleet of aircraft. For aircraft that turn to a second mission on a single Air Tasking Order day, actual ground time may be as low as the minimum ground time between individual events. Over the course of a typical 30 day plan period, these numbers reflect the actual amount of time aircraft are on the ground and available for maintenance operations.

Average Sortie Duration—The average flight time, from takeoff until landing, for a single type aircraft from a single operating location. This time applies to both aircraft and aircrew.

Base air refueling altitude—A reference altitude at which lead aircraft of a tanker formation (or single aircraft for individual air refueling) will fly at initial contact.

Base Offload (by plan factor)—This is an estimate of the overall fleet deliverable capacity by a single type aircraft at a single location. Offload Plan Efficiency is accounted for in this planning factor. Ground alert aircraft are counted against the fleet for sortie generation (more conservative), and fuel from the alert aircraft is not considered in total fuel deliverable (also more conservative).

80% Base Capacity = 80% of available aircraft, excluding alert aircraft, maximum utilization rate. Note: This does not take operating restrictions or mission flow into account.

80/40 Daily Contract = examples include 85% Plan Efficiency factor, excluding Alert
70/40 Daily Contract = examples include 85% Plan Efficiency factor, excluding Alert

Burdened Cost of Fuel—This is the ratio of fuel delivered to fuel consumed to accomplish the delivery. Burdened Fuel includes fuel delivered as well as fuel consumed by the tanker. Efficient tanker plans drive towards the minimum Burdened Cost of Fuel to meet the offload required. This is a true measure of tanker fleet optimization.

Burn Rate—The average burn rate, across the flight duration, used for approximating fuel consumption.

Civil Reserve Air Fleet—A program in which the Department of Defense uses FAA Part 121-certificated, United States-flagged aircraft. These aircraft are allocated by the Department of Transportation to augment the military airlift capability of the Department of Defense. These aircraft are allocated, in accordance with Department of Defense requirements, to segments, according to their capabilities such as International and Domestic segments, as may be mutually agreed upon by the Department of Defense and the Department of Transportation. The Civil Reserve Air Fleet can be incrementally activated by the Department of Defense in three stages in response to defense-oriented situations, up to and including a declared national emergency or war, to satisfy Department of Defense airlift requirements. Note: The international segment is further divided into long-range and short-range sections; and the domestic segment is further divided into National and Alaskan sections.

Closure—In transportation, the process of a unit arriving at a specified location. It begins when the first element arrives at a designated location, e.g. port of entry/port of departure, intermediate stops, or final destination, and ends when the last element does likewise. For the purposes of studies and command post exercises, a unit is considered closed after 95 percent of its movement requirements for personnel and equipment are completed.

Contingency—Non-Mobilized Utilization Rate = Sustained rate of flying hour activity based upon full active duty participation and 25% reserve volunteerism.

Crew Rest—The minimum amount of time from landing until the next subsequent takeoff for a single crew to fly a second mission after completion of a previous mission. This time accounts for post-flight, mission planning, and pre-flight duties. The standard Crew Rest time for tanker aircrew is 17 hours.

Critical Care Air Transport Teams—Provide critical care augmentation to aeromedically evacuated injured, ill and/or burn patients requiring advanced care during transportation. They are available to assist the aeromedical evacuation crews if a patient‘s condition dictates. A Critical Care Air Transport Team is comprised of three personnel: a physician who may be an intensivist (cardiopulmonary), a critical care nurse, and a respiratory technician.

Cycle time—Total elapsed time for an aircraft to depart home station, fly a complete mission and be back to start a second time.

Destination Reserves—Required fuel at destination. Reserve requirements will vary along the route for fighter-type aircraft depending on divert requirements and actual weather conditions.

Distance—Total distance between departure location and arrival location. Linear distance between locations does not account for route of flight or wind factors. When available, actual flight plans from vetted flight planning systems should be used to determine actual distance and time of flight.

Dual Role Mission—A mission where both air refueling and airlift are provided to the user. The primary mission role is normally air refueling. Missions where cargo movement is primary require a dedicated funded special assignment airlift mission.

Duties Not Including Flying Rate—This is the percentage of crews unable to fly missions due to medical restrictions. This rate will vary by crew force and local conditions, but is typically below 10%. Scheduling flexibility and aircrew management must take actual Duties Not Including Flying rates into account when determining minimum crew force requirements for crisis response and sustained operations.

En Route Rendezvous—A rendezvous procedure whereby the tanker and receiver arrive at a common rendezvous point at the same time with 1,000 feet altitude separation. Note: North Atlantic Treaty Organization uses the term Rendezvous Golf.

Expected Plan Efficiency—The percentage of "Available Offload" that can be delivered effectively to receiver aircraft by a combined refueling fleet. This factor is used as an average fleet planning factor when determining tanker sortie requirements. Actual offload rates will vary from sortie to sortie, depending on mission timing and receiver flow. This factor is may be as high as 85-95% for operations with steady receiver flows. Historical data (Operation Iraqi Freedom) shows this rate may drop as low as 45% due to receiver mission profiles. As a general rule, higher Plan Efficiency numbers reflect less flexibility for mission execution.

Fleet Capability—The amount of cargo or passengers that can be moved into or out of a location or theater expressed in short tons or passengers per day. Limitations include the number of aircraft in the operation, their utilization rate, and the distance between onload and offload locations.

Flight Time—Time from takeoff until landing, including the planned departure and arrival procedures. This time includes planned loiter over the intended operating location.

Front Lines—The expected number of sorties that can be launched, beginning at the start of the plan time period. This number is determined by the size of the total fleet, the mission commitment rate, and the number of ground alert aircraft.

Fuel Flow—Average burn rate in pounds/hour.

Global Decision Support System—AMC's force level command and control system supporting 618 AOC (TACC) execution authority for effective airlift mission management. It provides AMC accurate, near real-time data required for making decisions concerning the deployment and employment of AMC resources. New accounts may be obtained by contacting one's Unit Program Account Manager at their home unit. An individual can find out who their Unit Program Account Manager is by calling the GDSS Help Desk at DSN 576-4949, Option 2, Option 2.

Ground Time—The planned ground time for the type of aircraft used.

Ground Alert—The number of aircraft and crews assigned to ALFA Alert status. Alert aircraft are cut from the pool of available aircraft for mission taskings. Ground Alerts are normally planned in 24-hour increments, and may launch at any time during the plan period.

Integrated Computerized Deployment System—A fully integrated information system that provides multi-modal load planning capabilities to Department of Defense agencies and services. The combined functionality of ship, air, truck, rail, and yard planning services provides commanders, planners, and operators with a single platform capable of producing and evaluating load plans and alternative actions for various sized units, employing various modes of transportation, in support of peacetime or wartime operations. The Integrated Computerized Deployment System consumes cargo and passenger information from a variety of Department of Defense manifesting systems and, in return, provides load planning, report generation, and forecasting services to USTRANSCOM and its component commands, Department of Defense customers, and other authorized users.

Maximum Aircraft Sorties (percentage)—This is the maximum number of sorties a given fleet of aircraft can fly at a given commitment rate, accounting for all aircraft not tasked with Alert lines. This does not take operating conditions into account, and is used only as a starting point. A 100% commitment rate requires perfect scheduling.

Minimum Required Ground Time—The amount of planned time required from one landing until the next subsequent takeoff per aircraft for a single type aircraft from a single operating location. This time includes post-flight, refueling, and pre-flight duties for any subsequent sorties. This time assumes the aircraft is either flying another mission during the same plan period, or at the early part of the next plan period. Mission profiles and operating unit/location restrictions may preclude short turn times. Evaluate planning factors with each operating unit to determine actual mission capacity.

Missions required—The number of strategic airlift missions (by aircraft type) required to move a requirement from the onload to the offload location.

Noncombatant Evacuation Operation—Operations conducted to relocate threatened noncombatants from locations in a foreign country. These operations normally involve US citizens whose lives are in danger, and may also include selected foreign nationals. Note: Noncombatant Evacuation Operation planning factors (refer to Table 3) should be used when planning Noncombatant Evacuation Operation operations. Emergency Noncombatant Evacuation Operation capabilities represent the most extreme of circumstances.

Number of aircraft—The specific number of aircraft apportioned to any peacetime operation, contingency, or exercise, or the number of aircraft apportioned in the Joint Strategic Capabilities Plan Enclosure 11, for tasked Operational Plans.

Offload (by plan factor)—This is the available offload for a single tanker at the planned average sortie duration. This factor considers a static ramp fuel load for each Air Tasking Order day, average burn rates, and returning to the departure airfield with required reserves.

Offload Efficiency—Percentage of planned offload compared to the amount of fuel available for offload on a single sortie. This is useful to track, but does not accurately reflect optimum asset employment. Planned Offload Efficiency and actual sortie offloads should be regularly compared to improve planning and employment models.

Pavement/Aircraft classification system—The International Civil Aviation Organization standard method of reporting pavement strengths. The Pavement Classification Number is established by an engineering assessment of the runway. The Pavement Classification Number is for use in conjunction with an Aircraft Classification Number. Aircraft Classification Number values (provided in Table 1) relate aircraft characteristics to a runway‘s load bearing capability, expressed as a Pavement Classification Number. An aircraft with an Aircraft Classification Number equal or less than the reported Pavement Classification Number can operate on the pavement subject to any limitations on the tire pressure. Refer to Department of Defense Flight Information Publication (En route Supplement) for an airfield‘s specific Pavement Classification Number.

Payload—The sum of the weight of passengers and cargo that an aircraft can carry. Note: Cargo weight is normally expressed in short tons.

Plan Period—The time span used for sortie generation capacity. This is typically a single 24 hour Air Tasking Order cycle.

Planning payload—The payload (expressed in short tons of cargo or number of passengers) expected on a fleet-wide basis, and used by planners to make initial gross planning estimates. The size, shape, and density of most payloads, as well as passenger constraints (i.e., oxygen or life preservers available), rarely permit loading to 100 percent capacity. Planning payload data, not maximum payload data, should be used for operations/transportation planning.

Play Gas—Fuel available on a single tanker that can be burned, offloaded, or dumped. This fuel is based on zero time on station, and does not account for time required to accomplish an offload or additional loiter time.

Point Parallel Rendezvous—A rendezvous accomplished with the tanker maintaining an appropriate offset, the receiver flying the Air Refueling Initiation Point to Air Refueling Control Point track, and the tanker turning in front of the receiver at a computed range. Note: North Atlantic Treaty Organization uses the term Rendezvous Delta.

Primary Mission Aircraft Inventory—Aircraft authorized to a unit for performance of its operational mission. The Primary authorization forms the basis for the allocation of operating resources to include manpower, support equipment, and flying hours funds per Chairman of the Joint Chiefs of Staff Instruction 4410.01G, *Standardized Terminology for Aircraft Inventory Management*.

Productivity Factor—Gross measure of an aircraft's expected useful ability to move cargo and passengers to a user, expressed as a percentage. Positioning, depositioning, and other non-productive legs all diminish the overall productivity. For example, on a strategic airlift mission involving an outbound and a return leg, the return leg is normally considered nonproductive. The productivity factor, in this case would be 50 percent. However, this assumes cargo has already been positioned at the aircraft's departure point. In most situations, airlift aircraft must fly one or more positioning legs to an onload location. Since productive cargo is usually not moved at this time, these positioning legs reduce the overall productivity factor to a value less than 50 percent. For planning purposes use the productivity factors found in Table 7, or calculate your own by dividing productive leg distance (onload to offload) by round trip cycle distance.

Queuing Efficiency—A factor used by planners and applied in formulas (i.e., throughput capability) to account for the physical impossibility of using limited airfield facilities with perfect efficiency. For example, when a parking spot is vacated, it is never instantly re-occupied. Historically, planners have applied a queuing efficiency of 85 percent.

Requirement—

Airlift - The force to be moved in number of passengers or short tons of cargo.

Tanker - The number and type of receivers, fuel desired, time to loiter, and air refueling track.

Round Trip Flying Time—The accumulated flying time from the aircraft's starting point, to the onload location, through the en route structure, to the offload location, back through the en route system, to starting point of origin or other final destination.

Round Trip Ground Time—The accumulated ground time from the aircraft's starting point, to the onload location, through the en route structure, to the offload location, back to the final destination.

Short Ton—2,000 pounds.

Sortie Contract—This is an expected sortie generation plan agreed upon between operations and maintenance for the total number of sorties that a specific unit can plan for in a given time period. Planners will typically task sorties within this contract, provided all plan sorties fall within the given plan period, accounting for planned ground times. Note: total sorties planned under a contract must be equal to or lower than the lowest of:

- Maximum Aircraft Sorties
- Maximum Aircrew Sorties
- Aircrew Hour Limited Sorties

Sortie Generation Rate (for tankers, this is commonly referred to as utilization rate)—The number of sorties a single aircraft or aircrew can generate in a given plan time period. Aircraft utilization rates are typically higher than aircrew utilization rates. Utilization rates typically generate maximum employment numbers, which may be reduced by various mission factors. As an example, operations may be limited by the following list of factors as well as multiple additional considerations:

- Receiver demand/mission profiles
- Airfield operating hours
- Fuel re-supply and fuel delivery capacity
- Weather conditions
- Airfield infrastructure

Tanker Sortie Generation—For theater refueling support, tanker aircraft typically recover to the same airfield they departed from. Air refueling capacity is determined by the amount of fuel available from each tanker, and how many sorties each aircraft can generate in a given time period. Sustained sortie generation rates will be lower than surge rates or contingency support rates. Sustained sortie generation rates in a combat theater will be higher than home-station sustained mission generation rates. As a rule, rounding off numbers will make calculations either more or less conservative, depending on the formula. Tanker planners typically round requirements up, and capacity down, producing a more conservative number. Either approach is acceptable, as long as planners understand all assumptions applied to planning calculations.

Tanker Sorties Required—This is the estimated total number of sorties required to meet receiver requirements. Tanker sorties required may be estimated by taking total requested offload divided by the Average Deliverable Offload per tanker. This accounts for the Expected Plan Efficiency. This model is based on meeting or exceeding receiver requirements to provide mission effective refueling. Excess airborne fuel provides additional flexibility during execution.

True Air Speed—Average true airspeed of receiver leg (Aircraft Block Speeds or applicable flight manual airspeeds for other aircraft.)

Task Rate—This is the ratio of the flying contract to the maximum number of sorties that can be generated at 100%, using average sortie duration and average ground time. Task rates higher than Mission Capability may result in mission cancellations. Task rates significantly below Mission Capability Rate indicate excess capacity and low mission effectiveness of the overall fleet.

Time to arrival—The time required for cargo/passengers to arrive at the offload location including all en route ground times.

Total Fuel—Total fuel on board an individual aircraft at takeoff. This accounts for fuel in external tanks for appropriately configured aircraft.

Transit Time—Total time either between takeoff and landing airfields, or from the departure airfield to a holding location and back. This must be based on actual route-of-flight distance, and not direct linear distance between locations. Airspace restrictions and Air Traffic Control routing will impact this number.

Turn Lines—The number of missions that planners expect to launch, recover, and fly a second sortie within the given plan period. This number should be at or below the number of Front Lines. Turn line percentages are intended to balance mission capacity with maintenance reliability. Not all operating units and operating locations can support Turn Lines. For example, locations with daylight only operations would most likely only be able to fly one mission per aircraft per day. In addition, receiver requirements may not be structured to facilitate turn sorties. Receiver demand must be considered when determining whether or not to plan for Turn Lines as part of a unit contract.

Use-Rate—The capability of a subset of Primary Mission Aircraft Inventory aircraft to generate flying hours expressed in average flying hours per aircraft per day. Use-rate is computed only for those aircraft applied to a specific mission. For example, consider an operation using 2 C-17 aircraft. If one aircraft flies 10 hours while the other is in maintenance, then one aircraft has 10 hours of use-rate and the other has 0 hours of use-rate. Collectively, these two aircraft generate 5.0 hrs/day of use-rate.

Utilization Rate—The capability of a fleet of aircraft to generate flying hours in a day, expressed in terms of per Primary Authorized Inventory. Applies only to long-term, large scale operations such as Operational Plans. For small operations involving less than the entire fleet, utilization rate is not normally a factor.

Wartime Objective "Surge" utilization rate—A command established flying hour goal for planning and programming to meet JCS directed wartime objectives in the first 45 days of the most demanding wartime operations. AMC sets this rate as a target for planning and programming aircrews, maintenance, and aerial port manpower, active and reserve force mixes, and spare parts. This early 45-day surge period assumes the deferral of scheduled maintenance, support people working overtime, and the full mobilization of both active and reserve forces with fully funded and fully stocked spares in supply.

Wartime Objective "Sustained" utilization rate—Sustained utilization rate represent another command goal for planning purposes. After a 45-day surge operation in wartime, the immediate demand for airlift decreases somewhat and a greater percentage of needed equipment arrives by sealift/surface. AMC plans to fly at a lower operational tempo known as a sustained utilization rate. This reduced rate is based upon normal duty days, 100% active and reserve participation, and the accomplishment of maintenance activities deferred in the surge period.

Working Maximum on Ground—The maximum number of aircraft at a given location that can be simultaneously quick-turned within the standards published here in AFPAM10-1403. wMOG is the most restrictive of apMOG, fMOG, mxMOG, opMOG, and pMOG.

apMOG – The most restrictive of Passenger MOG, Fleet Service MOG, and Cargo MOG.

paxMOG – The number of high-reach/wide-body aircraft that can be serviced simultaneously with Passenger Service based upon complete download and upload requirements. The figure is based on 24-hour sustained capability, high-reach/wide-body quick-turn ground times.

fsMOG – The number of aircraft that can be serviced simultaneously with Fleet Service. The figure is based on 24-hour sustained capability.

cMOG – The number of high-reach/wide-body aircraft that can be serviced simultaneously with Cargo Loading Operations based upon complete cargo download and upload requirements. The figure is based on 24-hour sustained capability, high-reach/wide-body quick-turn ground times.

fMOG – The number of aircraft that can be simultaneously refueled given use of fuel hydrants, and/or fuel trucks, manpower to operate them and capacity of the system.

mxMOG – The number of aircraft that can be simultaneously ground handled for standard maintenance items during a Quick Turn/Remain Over Night). Standard maintenance items include: launch/recovery, servicing, inspections, debrief, minor maintenance and forms management (requires 3 qualified aircraft maintenance personnel per transient aircraft).

opMOG – The maximum number of aircraft operating under or supporting US missions permitted at a location by host nation restrictions, restricted by dip clearances, Aircraft Rescue and Fire Fighting, slot times, Air Traffic Control restrictions, or other items not directly related to the airfield infrastructure or aircraft servicing capability.

pMOG – The physical parking spaces available for Department of Defense airlift aircraft and/or contract carriers. It should not exceed the number of spots identified on the most current parking plan and may be limited by factors such as Host Nation Agreement, Hazardous Parking spots available or other infrastructure limitations. It should be expressed in two exclusive numbers—wide-body (C-17 equivalent) MOG and narrow-body (C-130 equivalent) MOG. Airfield managers may identify a “contingency” pMOG (number of aircraft that could be parked on the airfield in the event of contingency operations). A contingency pMOG will always equal or exceed the standard pMOG.