

The Role of Seabasing in SOF **Operations**

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The future joint force will exploit the operational flexibility of seabasing to counter political anti-access and irregular warfare challenges. The Maritime Prepositioning Force (Future) family of ships will advance the capability of seabasing to support a wide spectrum of joint force operations. Special Operations Forces will exploit Afloat Forward Staging Bases to provide more flexible and sustainable locations from which to operate globally.

2006 Quadrennial Defense Review¹

One of the biggest challenges facing the Department of Defense (DoD) as it postures itself to meet future national security objectives is the fact that forward bases are becoming increasingly more difficult to obtain and maintain. Conflicts in Kosovo, Afghanistan, and Iraq provide evidence that many nations are finding it politically undesirable to host military bases or allow U.S. forces access through their territory. To overcome these strategic challenges, the DoD is focusing on developing power projection capabilities that are not reliant on overseas access. To this end, the Defense Science Board recommended a joint program authority lead an effort to develop a joint seabasing concept as a means to project U.S. power.² Although the DoD elected to follow the Joint Capabilities Integration and Development System (JCIDS) process in lieu of establishing the recommended Joint Program Office, the Navy took the lead in developing the Seabasing Joint Integrating Concept (JIC). While this approach was intended to integrate and maximize the capabilities of each of the services to overcome future anti-access challenges, it has done nothing to address the access challenges faced by the inherently joint Special Operations Forces (SOF). Therefore, the overall concept of Joint Seabasing was reviewed to determine if it is a viable option to project Joint Special Operations Task Force (JSOTF) assets into anti-access environments. A careful examination of the benefits of seabasing, a logistics supportability analysis and a look at the historical application of seabasing in SOF operations will prove the joint seabasing concept can indeed provide joint task force commanders with a

range of flexible options needed to successfully conduct SOF operations to achieve national security objectives in spite of anti-access challenges.

SEABASING DEFINITION AND ASSUMPTIONS

Seabasing is an evolving joint concept in which combat forces are projected ashore and sustained from a sea base. “The sea base is an inherently maneuverable, scalable aggregation of distributed networked platforms that enable the global power projection of offensive and defensive forces from the sea.” (i.e., there is no set composition of a sea base).³ Its goal is to minimize anti-access challenges by capitalizing on the relative freedoms of the high seas to conduct operational maneuver in the maritime environment. This concept, formally outlined in the JIC, is defined as the “rapid deployment, assembly, command, projection, reconstitution, and re-employment of joint combat power from the sea, while providing continuous support, sustainment, and force protection to select expeditionary joint forces without reliance on land bases within the Joint Operations Area (JOA).”⁴ Additionally, it is intended for this concept to be applied by any combination of joint forces throughout a range of military options to include Major Combat Operations (MCO), preemptive MCO with limited forward access, Humanitarian Assistance operations, and Counterinsurgency Operations.⁵

Joint forces will deploy to the sea base either from the CONUS, an advance base, or an intermediate staging base by using both air and surface high-speed inter- and intra-theater connectors.⁶ The sea base will host the Joint Reception, Staging, Onward-Movement and Integration (JRSOI) portion of an operation and then project the joint forces ashore. This process is accomplished in five phases (referred to as lines of operation in the JIC), which are: close, assemble, employ, sustain and reconstitute.⁷ Appendix 1 graphically summarizes the Seabasing

Concept of Operation (CONOPS). In general, the concept was designed to overcome those situations in which U.S. forces have reduced access to overseas forward operating bases and no host nation support, with no Advanced Base (AB), Intermediate Staging Base (ISB), Aerial Port of Debarkation (APOD) or Sea Port of Debarkation (SPOD) within helicopter range of the operating area up to 2000 miles away.

BENEFITS OF SEA BASED OPERATIONS

Future sea bases will provide a dynamic, mobile, networked platform from which naval and special operations forces can operate at will in relative safety from land based observation and fires. The sea base will reduce dependence on vulnerable facilities ashore while reducing footprint.

GEN Robert Magnus, Deputy Commandant, USMC⁸

While it is clear the seabasing concept is being advertised as the all-encompassing solution to the anti-access challenge, it is important to understand why this is the case. Seabasing offers benefits to all joint forces (not just SOF) to include: the reduction of strategic lift requirements, reduction in the amount of base operating support personnel/equipment/infrastructure required, reduction of the footprint ashore, and increase in the overall security of our forces. According to Maj Gen Gordon Nash, former USMC Director of Expeditionary Warfare, “seabasing assures joint access by exploiting the maneuver space and sovereignty of the sea, providing combatant commanders with significantly enhanced operational flexibility and effectiveness. It’s sustained military power, when and where needed.”⁹ Additionally, because the sea base is inherently moveable and not tied to either an APOD or SPOD and their associated threats (including: manpad missiles, human intelligence observations of our operations and enemy infiltration), seabasing offers an increase in safety and force protection to our assets. Furthermore, there is no need to build an “iron mountain” of assets in the JOA, as

most operations are completely sustainable from the sea base. This also helps in maintaining the element of surprise. When you are building the iron mountain ashore, the enemy knows where you are going to start projecting power. With a sea base, the enemy has to consider and defend a radius hundreds of miles inland from the sea base.

In terms of SOF operations, land-based JSOTFs are “airfield centric: they require...ramp parking for fixed- and rotary-wing aircraft, hangar space for maintenance, fuel storage and distribution, crash/fire rescue, ground transportation, ground base defense force and/or security forces dedicated to anti-terrorism/force protection, air traffic control, ammunition and weapons storage and base operating support (to include dining facility, medical/dental, living areas, showers, latrines, etc).”¹⁰ In short, all of these requirements can be filled by minor increases in the existing capabilities of a sea base. Therefore, it is clear the sea base offers tremendous capabilities to a JSOTF commander, but the question remains as to whether the sea base can effectively project and sustain SOF capabilities in such a manner as to support mission accomplishment.

LOGISTICS FEASIBILITY ANALYSIS

While joint sea-based operations seem like a fairly obvious and extremely beneficial operational answer to anti-access challenges, projecting joint forces completely from the sea without relying on a major seaport or airport in the JOA poses rather significant logistical challenges that, if not overcome, would most certainly have an adverse affect on the success of those operations. Today, joint and multinational forces operating ashore are supported by a host nation’s infrastructure (airfields and sea ports) and supplies. Leadership has grown accustomed to having these port facilities which enable the U.S. to build “iron mountains” prior to commencing combat operations. Unfortunately, future anti-access environments preclude that

luxury from being an option; therefore, this section will address the logistical challenge of sustaining a sea-based operation while answering the question of whether or not certain SOF operations, in which there are no APODs or SPODs within the JOA, can be sustained completely from a sea base. Therefore, to be an effective force projection platform, the sea base must be able to provide time-critical resupply and sustainment for joint forces, with minimum supplies held ashore, until either the objective is achieved or until the situation provides a secure port ashore.

This analysis will be broken down into two parts: The first section will define the parameters of sustaining sea-based SOF forces in general by answering the “who, what, when, and how” questions of this logistical challenge, the type of forces, platforms and general sustainment requirements that most likely will comprise a SOF sea-based operation will be identified. The second section will evaluate the distribution system in terms of the speed and capacity of the force projection platforms and the ship-to-shore connectors relative to general SOF mission requirements.

The composition of the JSOTF is tailored significantly to the mission; no two deployments are alike. It could be made up of any combination of Air Force, Army, Navy and Marine SOF operators. The JSOTF can be as large as 2,500 personnel or as small as a couple hundred. The actual SOF operators can deploy in 200-man units or two-man teams and the supporting aircraft may be two to ten helicopters depending of the type of the operation. SOF forces by their very nature are required to be flexible, scalable, and independent, which requires the supporting logistics task to be equally as responsive.

Based on the SOF composition, the first challenge in sustaining a sea-based SOF operation is determining what assets are necessary to support those joint forces operating on or

from the sea base through all phases of an operation. After interviewing three SOF experts (one each from the Air Force, Navy and Army) and two logisticians, it became clear SOF operations have neither “standard” deployable packages nor standard planning factors for sustainment.¹¹ Because of these facts, defining the sustainment requirements for SOF operations is not an exact science, but is rather more of an adhoc estimation. Additionally, because joint doctrine specifies that each service is responsible for providing logistical supplies and support to their individual SOF units, it is difficult to define logistical requirements for the SOF community as a whole.¹² When CDR Frank Futcher, who is conducting a Seabasing Sustainment Study with the Marine Corps Combat Development Command, was asked about how his group accounted for the sustainment requirements of SOF forces, he said: “They don’t really have planning factors we can use. We usually use the Army sustainment data for the SOF forces on the ground and the Navy planning factors for the SOF assets remaining at the sea base. The only difference is that because of the sensitivity and criticality of their mission, the SOF requirements are usually filled first.”¹³

Sustainment Requirements for Sea-based Forces / Platforms

The ability of the sea base to sustain operations ashore is predicated on being able to sense the requirements of the forces embarked and those projected ashore. Therefore, based on CDR Futcher’s statement regarding the use of Army and Navy planning factors for SOF operations, the following section will highlight applicable sustainment planning factors. For reference, Appendix 2 provides a summary of the classes of supply. While the logisticians would clearly have to accomplish sustainment analysis on all classes of supply, this analysis is primarily limited to Class I, Class III, Class V and stores (Class I, Class VIII, and Class IX). This limitation is imposed for two reasons: 1) these four categories make up “98% of the weight

of daily replenishment requirements” for operations ashore;¹⁴ and 2) the movement and sustainment of liquids and ammunition are the hardest to accomplish.

The Army has very detailed guidance for planning sustainment requirements. The tables provided in Attachment 3 provide the planning factors for United States Army units: Table 1 shows the general planning requirements for Classes I, II, III (p), IV, VI and mail; Table 2 shows the consumption rates for Class III and Class V for certain units. The information provided in these tables serves as generic planning factors for SOF ground forces. Table 2 would have to be scaled down from the unit data provided to the actual size of the SOF forces. Likewise, the fuel and ammunition requirements for a separate infantry brigade and an attack helicopter brigade, which are most closely representative of SOF requirements, would also have to be tailored to the size of the SOF force.¹⁵

Deriving sustainment figures for Navy units is not nearly as clear-cut as it is for Army units because there is limited guidance and very few standardized planning factors used to determine requirements (although they have more than the SOF community). In fact, there are only a few general rules of thumb the Navy uses to determine the amount of supplies necessary. The first is that shipboard personnel will consume approximately 35 gallons of water per day per person. The second is that total shipboard water consumption (including water used for aircraft washing, maintenance, ship operation, etc) is 50 gallons of water per person per day. The third rule is that stores will be calculated at 10 pounds per day per person.¹⁶ In terms of fuel, the Navy has historically used 65 percent of fuel capacity as the trigger point for conducting refueling and, for the remaining classes of supply, the Navy tries to maintain a minimum of 10 days of supply to sustain the forces ashore.¹⁷

Ship-To-Shore Distribution Process

Perhaps the greatest challenge of the entire seabasing concept is the movement of goods from the sea base to the forces ashore. Once the forces and sustainment requirements have been determined, the logisticians must then figure out the how to project forces ashore and then resupply them as required. Because there are no APODs, SPODs or advance bases in the operating area, no host nation support, and potentially significant weather and sea state factors, there has been significant emphasis placed on the advancement and procurement of ship-to-shore connectors. Currently, the movement ashore is done either by air, using the MV-22 Osprey, CH-53K, CH-47 or UH-60 helicopters; over the shore (also known as Joint Logistics over the Shore); or by surface using the landing craft, air-cushioned (LCAC), landing craft-utility (LCU) and the advanced amphibious assault vehicle (AAAV). Appendix 4 shows the available connectors and their respective capacities. Unfortunately, given the nature of the SOF operations, the movement of forces and supplies ashore will normally have to be conducted using air assets, as the other modes of travel are usually too loud and overt to safely conduct the mission.

There are also several issues that may have to be overcome to make the seabasing concept work for SOF forces. The first deals with the number of helicopter operating spots on the decks of the ships (nine on the carriers). If the SOF mission requires more than nine helicopters to launch simultaneously, multiple ships will have to be used for the force projection. A second issue is that the majority of the SOF helicopters and weapons are not maritized, which means the reliability of those assets will decrease as they face the more highly corrosive environment experienced during long term use at sea. Finally, if the JOA is 110 nm from the sea base or less, then there will be no limit to the force projection capability of the sea base as this is the distance a fully loaded V-22 can travel round-trip without refueling. However, if operations

are to be conducted deeper into enemy territory, then either an air bridge will have to be set up using SOF refueling assets deployed into the ISB or a forward area refueling point (more commonly referred to as a FARP) will have to be set up enroute to the JOA.

Based on this information, one can determine if a generic JSOTF can be successfully projected and sustained from a sea base. In general, large SOF task forces will beddown on either carriers (CVN) or amphibious assault ships (LHA or LHDs). These platforms have plenty of berthing for the largest of SOF teams and can hangar most of the aircraft as well.¹⁸ The C-130 based SOF assets and any air refueling aircraft will have to deploy to the ISB and launch from that location. In terms of sustainment, the sea base supporting SOF will most likely be part of a Carrier Strike Group (CSG), Expeditionary Strike Group (ESG) or SSG, each of which deploys with 30 to 45 days of provisions, 90 days of repair parts and consumables, and 95 percent of their fuel and ordnance capacity. Therefore, the majority of the SOF sustainment requirements will either already be on-hand or filled through the normal resupply process. The movement of small, high-priority/unique SOF assets and personnel can be conducted by C-2, MV-22, CH-53K, and MH-53E. Additionally, the Joint High Speed Vessel (JHSV) offers tremendous capability in moving assets quickly [nearly twice the speed (35-40 kts) of the normal resupply ship (T-AKE)]. Similarly, the V-22 has a greater speed (250kts) than current helicopters, which will also speed the distribution process.

The “Liquids” – Fuel and Water

The greatest sustainment challenge in any operation is the movement of liquids. In fact, bulk liquids account for over 75% of the tonnage moved in wartime operations. Getting sufficient water and fuel to forces ashore when they cannot rely on host nation support (the preferred method of dealing with this issue today) is a tremendous challenge. Therefore, it is no

surprise that the biggest hurdle in a SOF sea-based operation is also the transfer and delivery of bulk liquids from the sea base to forces ashore, particularly if both fuel and water need to be delivered simultaneously. Clearly, forces ashore will maximize the use of water generation/purification equipment ashore to lessen the ship-to-shore movement requirement. But if those methods do not provide enough potable water (which most likely will be the case for SOF), it will have to be transferred from the sea base (sea base vessels have organic capabilities to produce water including some excess which can be transported ashore) in the same manner as bulk fuel. There are a multitude of surface and air assets that can be used to transport both fuel and water ashore, although this will require extremely close coordination to ensure no cross-contamination.

Most likely, a combination of surface and air assets will be used so that the liquids can get to potentially austere sites without having to build an intermediate supply site ashore. The benefit of transferring fuel and water via surface modes is that it provides a significantly greater quantity ashore, although it then has to be protected as it is being delivered to the forces that actually need the assets. One factor to consider is the fact that the nature of the mission, weather, sea state, and overall security environment may prevent surface transport. Therefore, SOF units will most likely have to rely on resupply by air, which is usually accomplished using external 500 gallon “blivots,” or “bladders,” which are carried internally on the MV-22 or the CH-53s. These bladders would then be used to establish a FARP as highlighted earlier. Clearly, the quantity delivered by air will be significantly less, but the air assets can normally deliver the fuel and water fairly close to the forces which is usually better for the SOF operation. Based on this review, it is clear that although there will be some challenges in meeting all of the requirements, projecting and sustaining SOF operations from a sea base is logistically feasible.

HISTORICAL PERSPECTIVE

Now that it has been determined sea-based operations are both extremely beneficial and logistically supportable, one must evaluate whether or not it is a viable force projection mechanism for future SOF operations. Fortunately, there are several examples where this concept has been tested. In fact, despite the hype proclaiming the concept of seabasing to be the newfound solution to future anti-access challenges, the actual concept of seabasing is not new -- the U.S. has been projecting SOF forces ashore from a “sea base” for the last 20 years. The following historical examples show how SOF forces met mission objectives after having been projected forward from the relative security of a sea base.

In 1994, the Commander of USACOM, Admiral Paul David Miller, pioneered a concept whereby specific CONUS-based units from various services were linked into a force package.¹⁹ His most notable experiment involved the USS THEODORE ROOSEVELT (CVN71), where he combined a Carrier Air Wing (CVW) and a Special Marine Air/Ground Task Force (SPMAGTF) for a six month deployment.²⁰ Overall, the experiment was judged as a success. However, Commander, U.S. SIXTH FLEET gave the operation negative reviews in that he judged that the SPMAGTF “was not an acceptable substitute for a Marine Expeditionary Unit (MEU)”. In addition, he stated that the need to rebuild the full CVW for combat operations would require that the SPMAGTF either crossdeck or offload,” a time and asset intensive operation which could delay the arrival of forces in a critical theater.²¹ The CINC of U.S. Pacific Command concurred that both a full MEU and CVW were required to meet his theater’s minimum expeditionary warfighting requirements.²² Despite COCOM dissension regarding mission requirements, the experiment proved overall that Marine and Navy aviation assets can work together on a CV flight deck.

Another application of a sea-based SOF operation is in the SSGN missile submarine concept. The SSGN program involves the conversion of four nuclear, Ohio class Trident ballistic missile submarines into a combination Tomahawk land attack cruise missiles (TLAM) shooter and SOF operations platform. Equipped with 154 TLAMs (~ 80% of the TLAM capability of a Carrier Strike Group) yet also fitted with pressure locks and the ability to carry two SEAL Delivery Vehicles (Legacy, Advanced, or one of each), the SSGN platform concept shapes an existing platform into an underwater SEAL sea base capable of housing 64 SEALs.²³ Though incapable of hosting air assets, the SSGN brings stealth, global reach, and endurance to the GWOT.²⁴ “Submarines combine stealth, ISR, sea and land attack, and special operations forces (SOF) on one platform.”²⁵ While the SSGN concept shapes an existing platform into a platform more aligned with the Navy's more 'SOF-like' 21st century mission, while retaining their multi-mission capability.

The success of reshaping existing platforms to new missions has also led to “a fundamental shift in the Navy's approach to platform capabilities...future Navy platforms will place a stronger emphasis on the 'SOF-capable' design aspects. For example, the Jimmy Carter Class SSGN is the first Navy submarine designed from the ground up with SOF as a primary mission.”²⁶ Additionally, the design and functionality of the Littoral Combat Ship (LCS) and the new CV-22 also support SOF operations.²⁷

RECOMMENDATIONS

The analysis provided clearly shows how SOF operations can and have successfully been projected from sea-based platforms. Unfortunately, the level of USSOCOM participation in the concept development and capabilities-based assessment processes has not been commensurate with level of SOF participation anticipated for this capability.²⁸ In view of this fact, there are

two recommendations which will help the SOF community formalize their requirements of and contributions to the seabasing concept. In this way, they will help sea basing become not only a truly joint operational concept, but also a more effective option for the joint task force commander by maximizing the capabilities of the entire Department of Defense.

The first recommendation is to establish a Seabasing Joint Program Office. While the Joint Staff decided to use the Joint Capabilities Integration and Development System (JCIDS) process in lieu of a Joint Program Office, the process did not work.²⁹ The JIC development team and the Capabilities Based Assessment teams did not appear to have received the degree of service or SOF participation needed to develop and then evaluate a concept of this magnitude. For example, the lead for the JIC drafting team stated that the Air Force had only one member participate in writing the JIC, the Army had only sporadic participation and the SOF community had no participation. While he emphasized that he was in no way criticizing the input or effort of those actually present, it would have been beneficial to have direct action, special reconnaissance, PSYOP and civil affairs experts available to address SOF capabilities in their respective areas.³⁰ Because of these facts, a Joint Program Office needs to be developed immediately and manned in such a way to ensure all capabilities and requirements are adequately addressed. A Joint Program Office will help unify all of the services' efforts to develop common solution sets, vice service-specific solutions.

The second recommendation is for USSOCOM to develop a SOF Sea-Based Concept of Operation (CONOPS). Not only will a CONOPS formalize the SOF requirements and employment concept, but it could then be used by the Joint Staff to compare with those of the other services when they develop the Joint Seabasing CONOPS. Although SOF is not a "service," this recommendation also meets the intent of the CJCS Instruction on the Joint

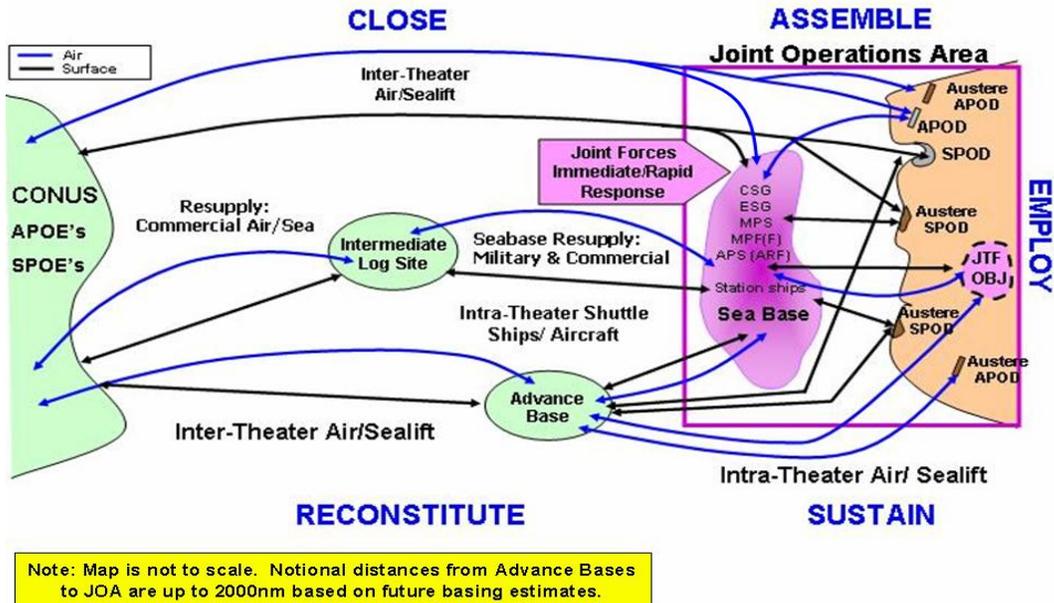
Capabilities Integration and Development System, which states that each service should develop service-specific concepts to support joint concept experimentation and testing.³¹ Likewise, the recommended CONOPs and overall SOF operations should be incorporated into Version 2.0 of the Seabasing JIC. The JIC will be updated after the release of the Functional Needs Analysis, and in this way, the SOF inputs could help drive a more joint solution set.

CONCLUSION

As the Department of Defense struggles with continuing budgetary constraints, it has become obvious that forces must find new and innovative ways to use our existing capabilities to meet future challenges. The concept of seabasing is a national capability that clearly provides one such solution. Seabasing is a critical capability that the United States military must further develop as it works to overcome anti-access challenges in rapidly projecting military power anywhere around the globe. Seabasing will exploit the strategic maneuver space of the seas to enable joint operations and provide the joint force commander with a flexible and efficient option to achieve national security objectives. Likewise, it is clear the seabasing concept is a beneficial, logistically feasible and overall viable option to project SOF forces. Therefore, the seabasing option, if properly developed in the JCIDS process and documented in the JIC, can help the SOF community meet its 2006 QDR mandate: “To achieve the future force characteristics for SOF and build on progress to date, the Department will...enhance capabilities to support SOF insertion and extraction into denied areas from strategic distances.”³²

APPENDIX 1

Seabasing Overarching View



The five phases/lines of operation of the Seabasing concept of operations are defined as follows:

1. **CLOSE** – rapid closure of joint force capabilities to an area of crisis.
2. **ASSEMBLE** – seamless integration of scalable joint force capabilities on and around secure sea-based assets.
3. **EMPLOY** – flexible employment of joint force capabilities to meet mission objectives supported from the sea base.
4. **SUSTAIN** – persistent sustainment of selected joint forces afloat and ashore, through transition to decisive combat operations ashore.
5. **RECONSTITUTE** – the capability to rapidly recover, reconstitute and redeploy joint combat capabilities within and around the maneuverable sea base for subsequent operations.³³

Appendix 2

Classes, Definition and Subclasses of Supply

| CLASS | SYMBOL | | | SUBCLASSES |
|--|---|---|---|---|
| Class I - Subsistence |  |  |  | A - Nonperishable C - Combat Rations R - Refrigerated S - Other Non-refrigerated W - Water |
| Class II - Clothing, Individual Equipment, Tools, Admin. Supplies |  |  |  | A - Air B - Ground Support Materiel E - General Supplies F - Clothing G - Electronics M - Weapons T - Industrial Supplies |
| Class III - Petroleum, Oils, Lubricants |  |  |  | A - POL for Aircraft W - POL for Surface Vehicles P - Packaged POL |
| Class IV - Construction Materials |  |  |  | A - Construction B - Barrier |
| Class V - Ammunition |  |  |  | A - Air Delivery W - Ground |
| Class VI - Personal Demand Items |  |  |  | A - Air B - Ground Support Materiel D - Admin. Vehicles G - Electronics |
| Class VII - Major End Items: Racks, Pylons, Tracked Vehicles, Etc. |  |  |  | J - Racks, Adaptors, Pylons K - Tactical Vehicles L - Missiles M - Weapons N - Special Weapons X - Aircraft Engines |
| Class VIII - Medical Materials |  |  |  | A - Medical Materiel B - Blood / Fluids |
| Class IX - Repair Parts |  |  |  | A - Air B - Ground Support Materiel D - Admin. Vehicles G - Electronics K - Tactical Vehicles L - Missiles M - Weapons N - Special Weapons X - Aircraft Engines |
| Class X - Material For Nonmilitary Programs |  |  |  | A1 X 3 |

APPENDIX 3

Army Supply Planning Factors

| Class of Supply | Planning Factors |
|-------------------------------|---|
| I: Food | 1.75 lb per meal; 3 meals per day 5.25 lbs per person/per day (PPD) |
| I: Health/Comfort Pack | I: 58 lbs for 10 people/30 days II: 20 lbs for 10 people/30 days |
| I: Water | Hot Tropical: 7.7 gal/man/day (GMD) Hot Arid: 7.9 (GMD) Temperate: 6.1 GMD Cold: 6.6 (GMD) |
| II | SWA: 1.6 PPD Northeast Asia (NEA) = 2.2 PPD Other: 1.9 PPD |
| III (p) | .51 PPD |
| IV | NEA = 9.92 PPD NEA Construction = 3.67 NEA Barrier = 6.25 SWA = 8.09 SWA Construction = 3.80 SWA Barrier = 4.29 Other = 9.01 Other Construction = 3.74 Other Barrier = 5.27 |
| VI | 2.06 PPD Temperate 3.74 PPD Tropic/Arid |
| Mail | 1.78 PPD Arctic 1.34 PPD |

Table 1: Army Consumption Rates³⁴

| Unit | Class III | | Class V | |
|----------------------------------|---------------|----------------|----------------------------|---------------------------|
| | JP-8 (gal) | MOGAS (gal) | AMMO (stons) Sustain | AMMO (stons) Attack |
| Aviation Brigade, hvy | 86,583 | 2,395 | 34.6 | 57.6 |
| Attack Helo bd (AH-64) | 19,667 | 639 | 5.9 | 13.8 |
| Engr bn, hvy div | 20,608 | 593 | 8.7 | 32.7 |
| FA bn, 155 SP, hvy div | 13,806 | 660 | 69.6 | 173.6 |
| FA btry, MLRS | 3,298 | 96 | 599.1 | 895 |
| FA bn, MLRS | 11,120 | 576 | 899 | 1345 |
| Infantry battalion (mech) | 10,614 | 540 | 22.6 | 31.3 |
| Separate Infantry BDE | 24,224 | 3,909 | 5.2 | 61.2 |
| Tank battalion | 42,985 | 582 | 34.2 | 49.7 |
| ADA bn, hvy div | 7,389 | 791 | 0.5 | 1.2 |
| ADA btry | 1,462 | 159 | 0.2 | 0.4 |
| Infantry Div, light | 119,170 | 13,758 | 20.4 | 158.3 |

Table 2: Class III Bulk and Class V Consumption Factors³⁵

APPENDIX 4

SHIP-TO-SHORE CONNECTORS³⁶

| Type | Operating Speed w/load | Range | Total Cargo (Stons) | Pax |
|-----------------|------------------------|-------|---------------------|----------------|
| LCAC | 40 | 300 | 60 | 24 / 180 w/PTM |
| JMAC | 40 | 300 | 76 | 24 / 150 |
| AAAV / EFV | 23 | 65 | 3 | 18 |
| MV-22 | 240 | 520 | 7 | 24 |
| LCM-8 | 12 | 65 | 66 | 200 |
| LCU-1600 | 11 | 170 | 187 | 400 |
| LCU-2000 | 11 | 350 | 385 | 800 |
| UH-60 Blackhawk | 130 | 300 | 4.5 | 11 |
| CH-47 | 130 | 260 | 10 | 33 |
| CH-53 | 130 | 500 | 15 | 55 |

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- ¹⁶ *Ibid.*
- ¹⁷ *Ibid.*
- ¹⁸ Carriers have over 5,000 beds and LHA/LHDs have approximately 3,000 [after accounting for the required naval support element and crew.
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- ²⁰ The SPMAGTF was composed of a Ground Combat Element equivalent to a reinforced rifle company, and an Air Combat Element composed of eight CH-53D and four UH-1N helicopters. To make room for the helicopters, 50 percent of the CVW's F-14's and all of the S-3B's remained behind in CONUS.
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- ³⁴ US Army Command and General Staff College, Combat Service Support Battle Book, ST 101-6, Ft Leavenworth Kansas, July 2005, Page 4.1. Note: although the information shown in these tables is based on current operational planning factors, the numbers are taken from the Combat Service Support Battle Book, which was intended for instructional use at the United States Army Command and General Staff College.
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