UNCLASSIFIED

OPERATION DESERT STORM SUSTAINMENT

OFFICE OF THE DEPUTY CHIEF OF STAFF, LOGISTICS
FOREWORD

DESERT SHIELD AND DESERT STORM SUSTAINMENT

The logistics support of Operations Desert Shield/Storm (ODS) is an overwhelming success story for our Nation and Army. ODS tested the Total Army's capability to deploy our forces and sustain them in a distant and hostile environment. Strategic mobility, equipment readiness, supply availability, equipment modernization, security assistance, industrial base preparedness and a logistical force of well-trained, highly motivated, and superbly led soldiers and civilians were all aspects of logistics which proved critical to our victory.

There is much to be learned in the Army's study of Combat Service Support operations conducted during ODS. The challenge for the future is to build upon the successes of ODS by identifying lessons to be learned and adjusting our doctrine, force structure, and training accordingly. The vision of Army logistics of the future will encompass those lessons emerging from analysis of logistics operations and systems performance during ODS and must be met by a trained and ready Total Army force with sufficient forward presence to ensure stability in dynamic regions, the strategic lift to deploy and sustain the contingency force in its global role, the lethality gained through modern technology that allows us to defeat all adversaries with minimal friendly force casualties, and the staying power for the intensity and duration levels our warfighting CINCs need to ensure the desired national strategic outcomes.

I commend this brochure to you as a useful source as the Army reshapess through the decade of the 1990's and prepares for the force employment and sustainment scenarios faced in the 21st Century.

JIMMY D. ROSS
Lieutenant General, GS
Deputy Chief of Staff for Logistics
In December 1990, the Office of the Deputy Chief of Staff for Logistics (ODCSLOG) published a brochure entitled "Operation Desert Shield Deployment Lessons". The deployment brochure provided units not yet deployed to Southwest Asia (SWA) with a description of the then current theater combat service support (CSS) structure at Corps and Echelons Above Corps (EAC), lessons noted in earlier unit deployment to SWA, and key reference data containing deployment guidance and logistics information on operating in the SWA environment.

It is the purpose of this sustainment brochure to focus on sustainment operations during Operations Desert Shield and Desert Storm (ODS) and to act as a follow-on document to the deployment brochure. As such, the sustainment brochure describes the theater's CSS structure at Corps and EAC, discusses sustainment as observed in key functional support areas, and provides a source of supporting reference data that can be used in further examinations of CSS operations during ODS.

Material within the brochure contains data collected from various sources. Additionally, data reflects the status of logistics operations at a specific point in time which, in some instances, was prior to completion of the operation. Although not staffed with all of those sources, the brochure represents the best judgement of the HQDA ODCSLOG Staff in compiling data which may be useful to the reader. Therefore, material contained within the brochure does not constitute an official HQDA position.
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I. Introduction.

"...logistics...the practical art of moving armies and keeping them supplied..."

Martin Van Creveld
Supplying War, 1977

a. Background. In December 1990, the Office of the Deputy Chief of Staff for Logistics (ODCSLOG) published a brochure entitled "Operation Desert Shield Deployment Lessons". The Deployment Brochure provided units not yet deployed to Southwest Asia (SWA) a description of the then current theater combat service support (CSS) structure at Corps and Echelons Above Corps (EAC), lessons noted in earlier unit deployments to SWA, and key reference data containing deployment guidance and logistics information on operating in the desert environment. Upon fielding of the Deployment Brochure it was determined that a similar brochure approach in dealing with Operations Desert Shield and Desert Storm (ODS) sustainment lessons would provide a useful document for logisticians to use in examining ODS CSS operations.

b. Purpose. To focus on sustainment operations during ODS and to act as a follow-on document to the Deployment Brochure. As such, the Sustainment Brochure describes the forces to be supported and the theater's CSS structure at Corps and EAC, discusses sustainment lessons as observed in functional areas of support, and provides a source of supporting reference data that can be used in further examinations of CSS operations during ODS.
II. The Sustainment Challenge.

"The sole measurement of successful sustainment has always been the generation of combat power at the decisive time and place. High- and mid-intensity operations will therefore be characterized by high consumption of military materiel; by a great diversity of equipment types; by the expansion of the battle area resulting from both sides employing sophisticated weapons, communications, and sensors; and by extended lines of support within and outside the theater of operations. Sustainment on this enlarged, material-intensive, electronically sensitive, and lethal battlefield presents an unprecedented challenge."

FM 100-5 (OPERATIONS)  
May 1986

a. The sustainment challenge as described above in AirLand Battle warfighting doctrine clearly articulates the type of battlefield support challenge which faced logisticians during ODS. In fact the sustainment challenge was even more difficult given the long air and sea lines of communications as well as the harsh operational environment of the SWA desert. Yet despite obstacles, U.S. Army sustainment systems performed outstandingly in meeting ODS support challenges. Desert Shield deployment operations were a considerable achievement accounting for the farthest projections and most rapid buildup of military forces to an overseas area of operation in our Nation's history. Subsequently, Desert Storm logistical support of our combat forces successfully sustained the fight providing the means by which a swift and overwhelming victory against the enemy was achieved.

b. Several factors contributed to the Army's logistical success: the six months timeframe prior to combat to build up our forces and sustainment base; the advantage of unattributed supply lines; an extensive seaport and airport infrastructure in the area of operations; robust host nation support; fruition of the Army's force modernization programs, which equipped our units with highly capable and reliable weapon systems and support equipment; and a logistical force of well-trained, highly motivated, and superbly led soldiers and civilians.

c. Despite the overall success of logistics in support of ODS, the logistical effort was not problem free. The challenge to logisticians now is to build upon the successes of ODS, analyze problem areas, identify the appropriate lessons to be learned, and adjust combat service support (CSS) doctrine, force structure, and training to posture our Army logistics forces to be prepared to support the next fight.
III. Organization for Sustainment.

a. Evolution of CSS Support Structure during ODS.

(1) Background. Absolutely critical to the successful sustainment of deployed forces is the correct determination and timely introduction of the logistics force structure into the theater. Size and type of combat units deployed dictates CSS unit requirements. In addition, the level of enemy activity, expected duration of the deployment, geographic location, and theater infrastructure, all influence decisions on the scope of the support requirement and the type and quantity of CSS units to deploy.

(2) Mission.

(a) At 1600 hours on 6 August 1990, President Bush approved deployment of US combat forces to Saudi Arabia. He gave the Joint Chiefs three missions: Deter further Iraqi aggression, Defend Saudi Arabia, and Improve the overall defense capabilities of the Peninsula. Subsequent to receiving these three missions the fourth, "Be prepared for other operations", was included. The fourth mission resulted in additional deployment of forces from Europe and CONUS which gave the Army the capability to effectively respond with offensive operations, as required. The chart below illustrates the change of missions for CENTCOM over time.
(b) Major Army deployments which occurred in support of the ODS missions appear on the following chart. Annex A contains an ODS chronology of events, to include logistically significant events.

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Operation Desert Shield | Operation Desert Storm
(3) Evolution of the Logistics Force Structure. The size of the force to be supported expanded from 4 2/3 divisions to 7 2/3 divisions with the NOV 90 decision to deploy additional forces from Europe and CONUS. This larger force provided the theater with the means to conduct an offensive campaign, if necessary. The impact on the logistics force structure can be seen on the chart below.

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<td>CO AVN MAINT (AVIM REAR)</td>
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</tbody>
</table>
The CSS units down the left of the chart represent Corps and EAC logistics organizations needed in-theater to sustain deployed US forces. The numbers appearing in the requirements column were devised by first identifying for each CSS unit listed, the doctrinal allocation for that type unit given requirements to support a force of 7 2/3 divisions, and then subtracting some number of each type unit for which HNS equivalents could be used to offset the need for a US logistical unit. For example, the number of truck companies required could be offset (reduced) based upon use of the available HNS truck capability. The "TPFD" columns show what quantities of units actually appeared in the time-phased force deployment (TPFD) lists on the dates indicated. The increase in TPFD numbers between 15 NOV and 17 DEC show the increase in logistics force structure in response to the expansion of ODS combat forces.

(4) Reliance on the Reserve Component (RC) CSS force structure. Considering that 70 percent of all Army logistics capability is in the RC, ODS could not have been successfully supported without heavy reliance on and superb mission performance by RC CSS soldiers and units. The following numbers outline the force structure importance of the RC to ODS CSS operations:

- 40% of all Army CSS units deployed to SWA
  -- 60% were RC units

- 139,400 Reservists mobilized
  -- 1033 units/124,500 personnel
  -- 14,900 individuals (IMA/IRR/Retired)

- RC deployed to SWA and also performed essential missions in Conus and Europe.
  -- CONUS: 284 units/39,300 personnel
  -- Europe: 41 units/9,500 personnel
  -- SWA: 708 units/75,700 personnel

(5) Issues/Observations. What is the logistical force structure required to sustain the force, and when does it need to be there? How well this basic question was answered on ODS is discussed, in terms of the consequences, in many of the unit ODS after action reports (AAR).

(a) Early ODS decisions deployed forces with austere CSS capability due to the uncertainty of the tactical situation, and the need to rapidly position combat forces to deter further Iraqi aggression. The lack of early arriving CSS capability, particularly command and control elements needed to establish logistical systems, compounded the logistical difficulties associated with sustaining the force already on the ground while controlling the massive influx into theater of additional troops and materiel. The "next fight" may once again start with an uncertain tactical situation resulting in delayed deployments of CSS units. The ODS experience provides logisticians with the opportunity to carefully examine the deployment of the logistics
force structure in terms of "what CSS units are needed to sustain the deployed force, and when do they need to be there?"

(b) The "... when do they need to be there?" portion of deploying CSS units must also consider the availability and mix of active component (AC) versus RC in the logistics force structure that is developed to support a contingency force. ODS demonstrated a force structure shortfall, in that, certain unit capabilities required to deploy and sustain a contingency force are resourced only in the RC or insufficiently resourced in the AC. Mobilization of the RC unit capability required a political decision. While waiting for the political authority to activate RC units, the Army sought out and was supported by RC volunteers, who in many cases were blended into ad hoc organizations to assist in deploying the force. The Army needs to determine the types and number of units required to deploy the force, and then reallocate the appropriate resource capability into the AC. The Army must move towards ensuring the AC/RC mix supports deployment of a contingency force without dependence on RC forces during the first 30 days of the deployment. This observation is being worked at HQDA through the Contingency Force Enhancement Initiative.

b. Corps and Echelons Above Corps (EAC) Support.

(1) The U.S. Army combat forces supported in SWA consisted of seven and two-thirds divisions. The chart below depicts these divisional elements and the supporting Corps and Echelons Above Corps (EAC) logistics support structure. Annex B to this brochure contains VII Corps and XVIII Airborne Corps Task Organizations at the outset of the ground combat phase of Desert Storm.
(2) Within each Corps Support Command (COSCOM) a Corps Support Group (CSG) with multi-functional CSS battalions was designated to provide support forward to each division's sector. Each COSCOM also had one CSG with functionally oriented battalions assigned to provide direct support (DS) to units in the Corps rear areas, and backup DS to the forward divisions. Depicted for each COSCOM, on the following chart, are representative CSGs containing multi-functional and functionally oriented battalions. Annex C contains the organizational diagrams for each COSCOM, their CSGs and subordinate CSS battalions.
(3) At EAC, the 22d Theater Army Area Command (TAACOM) included three Area Support Groups (ASGs), whose battalions were primarily functionally aligned at battalion level. The chart, shown below, depicts the organizational structure of the EAD CSGs. Annex C also contains the organizational diagrams for the 22d TAACOM, its ASGs and subordinate CSS battalions. (Note: The 22d TAACOM is also referred to as 22d Support Command (Provisional). For purposes of this brochure the unit titles 22d TAACOM and 22d SUPCOM (Prov) are considered interchangeable.

(1) The USASG, established by the Army Materiel Command (AMC), operated as the key means to project the wholesale system into the Southwest Asia (SWA) theater of operations, and to manage contract maintenance support. The USASG was organized using Depot Systems Command (DESCOM) assets as a theater-unique support element tailored to provide selected GS and depot level repair. It was formed to provide supply and maintenance support for deployed forces in Operation Desert Shield. In supply areas, the USASG was charged with the management and distribution of high dollar, high-tech, low-density items; shortening and reducing the amount of materiel in the supply pipeline; and, retrograde management. In maintenance areas, the USASG was structured to provide the highest level of maintenance practical in the forward areas. In some cases, the maintenance performed was close to a complete overhaul; in others, repairs consisted of parts replacement. The goal for the USASG was to accomplish a 70 percent turnaround in-theater of major assemblies, and thereby reduce the turnaround time for repair and to minimize the evacuation of critical materiel from the SWA theater. Those items which exceeded USASG's capability were evacuated for repair at depots in the United States or Germany. The performance of AMC depot personnel and the commodity command's logistics assistance representatives (LARs), backed up by contract maintenance support personnel, was a key link in maintaining the readiness of our newer high technology weapon systems.

(2) The USASG began operations at Dhahran, Saudi Arabia on 17 November 1990, however special maintenance missions had been ongoing since 9 August 1990. These special missions included the USMC Applique Armor Program 11 Sep 90 - 27 Oct 90, the M1/M1A1 Rollover Program 6 Nov 90 - 10 Mar 91, and the Battalion Counter-mine System Fielding 12 Nov 90 - 4 Feb 91. At its peak during ODS, the USASG had on board over 1000 personnel. Shown on the next page are the USASG's organizational strengths from 9 August 1990 to 12 May 1991. Annex D contains a list of the organizations contributing personnel to the USASG.

### USASG Organizational Strength

<table>
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<tr>
<th>DATES</th>
<th>CIV</th>
<th>CONT</th>
<th>ACT</th>
<th>IRR/IMA</th>
<th>TOTAL*</th>
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<tbody>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>7</td>
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<tr>
<td>10 Oct-8 Nov 90</td>
<td>45</td>
<td>0</td>
<td>4</td>
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<td>50</td>
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<td>9 Nov 91-14 Jan 91</td>
<td>793</td>
<td>85</td>
<td>74</td>
<td>52</td>
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<tr>
<td>15 Jan-6 Mar 91</td>
<td>824</td>
<td>132</td>
<td>75</td>
<td>52</td>
<td>1,083</td>
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<tr>
<td>7 Mar 91-12 May 91</td>
<td>377</td>
<td>79</td>
<td>104</td>
<td>57</td>
<td>617</td>
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</table>

* Strength shown indicates max during indicated period
(3) Supply Operations.

(a) The USASG started supply operations on or about 17 Nov 90 with a waiting workload of 20 stake and platform trailer loads of unserviceable reparables. Therefore, supply operations quickly became a cornerstone for the organization. There were three essential missions supply had to perform. The first was to establish a wholesale account for forward stockage of critical line replaceable units and other high-dollar, high-tech components for selected weapon systems. The individual commodity commands (e.g., MICON, CECOM) selected the items to be pushed forward and to be stocked by the support group. Supply also had to establish a retail account to support the maintenance mission of the USASG. Items selected for initial stockage in the retail account were determined by depot weapons system technicians and wholesale managers. The third, and probably most important supply function was the accountability control and flow of retrograde from Theater.

(b) Commodity commands selected the items to be stored forward in the Support Group's Wholesale Account. Initial requirements were identified at 746 line items, however, as OPTEMPO increased and combat became imminent, that requirement grew to nearly 1,400 lines, of which nearly 1,300 had been shipped, with over 1,000 received and posted to records. As of 1 May 91, the USASG had over 1,600 across the counter issues in a repair and exchange mode. Because of the criticality of these type items, it was necessary to establish this as an Repair Exchange Activity (RXA) to ensure that unserviceables were returned in a timely manner for repair. The USASG set up the operation so the Support Group would be the sole source of supply for these high-dollar, high-tech, low-density items.

(c) The depot and commodity commands identified over 16,000 retail lines of Class IX to support the Group's Maintenance Mission. As of 1 May 91, over 14,000 lines had been received and posted to the record. Additionally, the USASG received over 11,000 lines of retrograde materiel, again in varying quantities. As of 1 May 91, the USASG shipped over 10,000 lines to Mainz Army Depot, CONUS Depots, or contractor repair facilities. Most of the 1,200 lines of below-depot level reparables were passed to the 321st MMC for GS repair.

(d) As a result of the cessation of hostilities, during Apr 91 the USASG retrograde mission was expanded by establishment of the Saudi Arabian Redistribution Facility (SARF). The SARF was established to process all Class II, III(P), IV, and IX excess materiel and to redistribute within SWA, USAREUR, CONUS, or the Defense Reutilization Management Office (DRMO) system. Through May 91 the SARF processed over 64,000 receipts with a total value of $800 million.

(e) AMC operations in support of ODS accounted for over 737,000 ST of supplies shipped to SWA, and over 88 percent of all requisitions received being supplied to the customer. Shown
below for each class of supply, are the cumulative dollar value and number of requisitions received and filled by AMC.

**AMC CUMULATIVE CLASS OF SUPPLY**
**SUPPORT TO THE ODS PIPELINE**
**(AS OF AMC EXCAP 12, dated 5 AUG 91)**

<table>
<thead>
<tr>
<th>Class</th>
<th>Requisition by Customer ($ Value/ # of RQNs)</th>
<th>Received by Customer ($ Value/ # of RQNs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 2</td>
<td>497.7M/ 90,694</td>
<td>350.4M/ 80,517</td>
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<td>Class 3 (PACKAGED)</td>
<td>4.0M/ 3,157</td>
<td>3.6M/ 2,757</td>
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<td>Class 4</td>
<td>33.3M/ 890</td>
<td>33.0M/ 828</td>
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<tr>
<td>Class 5</td>
<td>7.6B/ 13,204</td>
<td>6.5B/ 11,812</td>
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<td>Class 7</td>
<td>3.8B/ 38,156</td>
<td>1.7B/ 28,707</td>
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<tr>
<td>Class 8</td>
<td>41.8K/ 64</td>
<td>36.6K/ 61</td>
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<td>Class 9</td>
<td>6.7B/ 1,290,516</td>
<td>4.0B/ 1,141,567</td>
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<td>Class 0</td>
<td>96.3M/ 3,329</td>
<td>57.0M/ 2,524</td>
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<tr>
<td>TOTAL</td>
<td>18.7B/ 1,440,016</td>
<td>12.4B/ 1,268,773</td>
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</table>

(4) Maintenance Operations. The primary maintenance mission for the Support Group was one of component repair to rapidly respond to ARCENT's critical requirements. The thrust was to provide a flexible rapid turnaround capability to enhance readiness, ease pressures on the supply pipeline, and cover the entire spectrum of combat and tactical vehicles, ground support and troop support equipment, weapons systems, missile electronics and communications equipment. Shown on the next page are USASG cumulative component repair production figures for the periods 9 Nov 90-15 Jan 91, 16 Jan-6 Mar 91, and 7 Mar 91-16 May 91.
USASG PRODUCTION REPORT

<table>
<thead>
<tr>
<th>COMMODITY</th>
<th>As of 15 Jan 91</th>
<th>As of 6 Mar 91</th>
<th>As of 16 May 91</th>
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<td><strong>TOTAL</strong></td>
<td>6,449</td>
<td>29,871</td>
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* Production Report numbers are cumulative.

(5) The USASG concept was essential to the success of the Army's ODS sustainment efforts. Formalized procedures in Army doctrine are needed to allow for the rapid deployment of support from the wholesale system, including contract maintenance support, on future contingency operations.

d. ARCENT Executive Agent Responsibilities.

(1) During ODS, CINCCENT requested and the Joint Chiefs of Staff (JCS) approved assigning the Army Executive Agent support responsibilities to begin between C+30 and C+60, for inland surface transportation, port operations, Class I, backup water support, selected Class II & IV, Class III (bulk fuel distribution), Class V (common munitions), Class VIII (medical), veterinary services, construction support, and graves registration (GRREG). Although some support areas were provided as early as C-Day through host nation support (HNS), other support areas were not provided until after C+60 because the CSS structure and supplies necessary to provide the support were not
yet in place in the AOR. The process was also hindered by slow identification or understanding of other Services support requirements. The following chart, prepared on 6 February 91, shows when ARCENT began providing support to other services. It also shows the Army's assessment of its ability, combined with host nation support, as of 6 February 91, to meet projected support needs. Executive Agent responsibilities carry with them a force structure and material utilization resource bill for the service that must provide the designated support to other services. The service, designated as Executive Agent, must know other service requirements and include them in provisioning of the theater support structure and materiel. This was not the case for ODS, hence the alternating ARCENT start dates, as shown in the chart below, for different support items. To illustrate the problem, each area of support addressed as amber in the chart is addressed in the following paragraphs.

### SWA SUSTAINMENT

**ARCENT SUPPORT TO OTHER SERVICES**

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<th>ITEM</th>
<th>OBJECTIVE</th>
<th>NOW</th>
<th>15 FEB 91</th>
<th>15 MAR 91</th>
<th>15 APR 91</th>
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<td>WHEN DIRECTED</td>
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<td>GREEN</td>
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<td>INLAND SURFACE TRANS</td>
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<td>AMBER</td>
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<td>VETERINARIAN SVCS</td>
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<td>BARRIER MATERIAL</td>
<td>C+90</td>
<td>AMBER</td>
<td>AMBER</td>
<td>AMBER</td>
<td>GREEN</td>
</tr>
<tr>
<td>MEDICAL SUPPLIES</td>
<td>C+60</td>
<td>GREEN</td>
<td>GREEN</td>
<td>GREEN</td>
<td>GREEN</td>
</tr>
<tr>
<td>COMMON AMUNITIONS</td>
<td>C+150</td>
<td>AMBER</td>
<td>AMBER</td>
<td>GREEN</td>
<td>GREEN</td>
</tr>
</tbody>
</table>

**BOTTOMLINE : SUPPORT CAPABILITIES IN PLACE - STATUS IMPACTED BY SHORTAGES**

(2) Inland Cargo Linehaul. The massive requirement for inland cargo linehaul in the AOR presented one of the great logistical challenges of ODS. Over 600 ships were discharged at
seaports of debarkation (SPODs) and over 9000 aircraft were received at the aerial ports of debarkation (APODs). The role of rail was very minor initially but increased in importance as ammunition and containers were moved by rail from the ports to the inland ammunition storage sites. Inland waterways were nonexistent; however, coastal waterways were used by Army watercraft to move cargo from the primary ARCENT seaport of embarkation, Ad Dammam, to other ports on the Persian Gulf coast. Dedicated Echelons Above Division (EAD) Army aircraft (CH-47 Chinook helicopters) flew a significant number of intra-theater logistical support missions. However, the bulk of the requirement for inland cargo linehaul was handled by truck transport. The magnitude of the truck mission can be seen in statistics turned in by the 22d TAACOM on the movement of material by truck during the 21-day period prior to G-Day (24 February, start of the Ground Offensive): 2,746 miles of Main Supply Routes (MSRs), 3,568 convoys, 1,400 U.S. Army trucks used, 2,100 HNS trucks used, 35 million miles driven, 1,739 HET moves, 5,828 lowboy moves, 10,149 flatbed moves. The foreign trucks used by ARCENT varied in make, model, payload, and condition. They also came without drivers, and of necessity, were operated by ARCENT soldiers detailed out of other Military Occupational Specialties (MOSs) to drive. HNS, coalition force support, and support from non-traditional allies (including WARSAY Pact nations) was substantial, and essential to intra-theater transport success. Over 4,000 trucks, including flatbeds, lowboys, HETs, water and POL tankers, reefer trucks and trailers, were donated to the coalition.

(3) Barrier Materials. Insufficient quantities of barrier materials were deployed with units or available in on hand theater stocks to meet the immediate requirements for preparation of defensive positions by early arriving units. This resulted in a critical shortage of Class IV (concertina and barbed wire, pickets and fence posts, and sand bags) in theater during the deployment phase of Desert Shield. Worldwide Army theater reserve and operational project stocks were used to partially satisfy requirements while the Defense Logistics Agency surged production and sought additional producers. However, once available from production, shipment of other higher priority cargo delayed barrier material shipments.

(4) Class V (ground munitions). ARCENT experienced difficulty with providing Class V ground munitions to the Marine Corps. ARCENT was to begin providing ground munitions to the Marine Corps at C+60. Later it was agreed that Complete Items Support (CIS) would be available at C+90, and it eventually slipped to C+150. Several significant events added to ARCENT's difficulties in providing CIS of ground munitions: (a) an increase in the force to be supported with the decision to deploy VII Corps, (b) force modernization of weapon systems in the AOR increasing requirements for specific types of ammunition, and (c) increasing the supply stockage objective for theater from 30 to 60 days of supply. Worldwide Army assets were inadequate to support both Army and USMC requirements for the total committed
force. These factors limited ARCENT's ability to attain and sustain safety levels and fully implement CIS of ground munitions. The observation drawn from ODS is that CIS is limited by peacetime provisioning and will directly affect the Army's ability to support other services.

e. Host Nation Support (HNS).

(1) U.S. forces rapidly deployed a large, heavy force with no prior Saudi Arabia (SA)/U.S. HNS planning or acquisition procedures in effect. ARCENT organic CSS capabilities in the Aug-Sep 90 timeframe were austere and inadequate to support the mission. Large, critical support shortfalls surfaced immediately. SA reacted well in supplying US requirements and considerable HNS was immediately provided for badly needed life support requirements at airports, seaports, and initial base camps. By 15 August 1990, U.S. logisticians laid out the initial HNS requirements into 20 functional areas shown below:

- ACCOMMODATIONS *
- AIRPORTS
- CONSTRUCTION
- COMMUNICATIONS
- FACILITIES
- FUEL
- HYGIENE **
- MEDICAL
- MAINTENANCE
- MATERIEL
- SEAPORTS
- SECURITY
- SERVICES
- SPECIALIZED EQUIPMENT
- STORAGE
- SUBSISTENCE
- SUPPLIES
- TRANSPORTATION
- UTILITIES
- WATER (INCLUDES ICE)

* Shelters/Billeting with associated services
** Showers, Latrines, Laundry, Refuse Collection

(2) ARCENT's first set of HNS requirements were developed to support a projected force of 135,000 personnel and called for the following items:

<table>
<thead>
<tr>
<th>ITEM</th>
<th>REQUIREMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>WATER</td>
<td>1.5M GAL/DAY</td>
</tr>
<tr>
<td>ICE</td>
<td>96 ST/DAY</td>
</tr>
<tr>
<td>A-RATIONS</td>
<td>270,000 MEALS/DAY</td>
</tr>
<tr>
<td>TENTS</td>
<td>1,200 GP MED/LG</td>
</tr>
<tr>
<td>HYGIENE (DAILY)</td>
<td>2,700 LATRINES</td>
</tr>
<tr>
<td></td>
<td>2,250 SHOWERS/BATHS</td>
</tr>
<tr>
<td></td>
<td>145,000 ST-REFUSE</td>
</tr>
<tr>
<td></td>
<td>40,000 BUNDLES - LAUNDRY</td>
</tr>
<tr>
<td></td>
<td>700 BUSES</td>
</tr>
<tr>
<td></td>
<td>6,500 TRUCKS (2 1/2T)</td>
</tr>
<tr>
<td></td>
<td>3,500 TRUCKS (5T)</td>
</tr>
<tr>
<td></td>
<td>1,200 TRUCKS (12T)</td>
</tr>
<tr>
<td></td>
<td>800 DUMPSTERS (5T)</td>
</tr>
<tr>
<td></td>
<td>180 HETS</td>
</tr>
<tr>
<td></td>
<td>380 POL TANKERS</td>
</tr>
<tr>
<td></td>
<td>300 WATER TANKERS</td>
</tr>
</tbody>
</table>
(3) As the HNS requirements grew it became readily apparent that a formal SA and U.S. HNS organization had to be established to request, acquire, and integrate HNS assets provided into organic U.S. support systems. An Assistant Chief of Staff for Host Nation Activities (ACSHNA)/G5 was established to deal with all SA and allied support for U.S. forces. The chart shown below depicts the ACSHNA/G5 organizational structure.

(4) In November 1990 Saudi Arabia signed the SA HNS Implementation Plan agreeing to provide support of U.S. forces. This plan rolled the original 20 HNS functional area requirements into 5 areas: fuel, food, water, transportation, and accommodations/facilities. Under the HNS Implementation Plan SA (a) provided U.S. forces with government controlled/owned assets, (b) contracted to obtain the assets to be provided U.S. forces, or (c) reimbursed the U.S. for contracts the U.S. let to provide for the needs of U.S. forces. As of 1 August 1991, SA
had provided U.S. forces with HNS amounting to $13.4 billion. $4.0 billion in U.S. reimbursement requests were still pending SA approval.

(5) Aggregate examples of ODS peak HNS support for the 5 basic support categories in effect under the SA HNS Implementation Plan are shown below:

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>HNS PROVIDED</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUEL</td>
<td>1.5M GAL DAILY</td>
</tr>
<tr>
<td>FOOD</td>
<td>FULLY CATERED AND PARTIALLY PREPARED FOR UNITS TO COOK.</td>
</tr>
<tr>
<td></td>
<td>U.S. MEAL SUPPLEMENTS: FRESH JUICE, MILK, BREAD, FRUITS, VEGETABLES.</td>
</tr>
<tr>
<td></td>
<td>&quot;WOLF MOBILES&quot; (AOR COVERAGE): HAMBURGERS, HOT DOGS, DRY SNACKS, DRINKS.</td>
</tr>
<tr>
<td></td>
<td>AUG 90 - APR 91: SA COSTS $2.1B</td>
</tr>
<tr>
<td>WATER</td>
<td>8.2 GAL/DAY/PERSON</td>
</tr>
<tr>
<td></td>
<td>CONSIDERS REDEPLOYMENT WASHING NEEDS.</td>
</tr>
<tr>
<td></td>
<td>BOTTLED CONTRACTS (MONTH)</td>
</tr>
<tr>
<td></td>
<td>U.S. - 7.4M CASES (87%)</td>
</tr>
<tr>
<td></td>
<td>SA - 1.1M CASES (13%)</td>
</tr>
<tr>
<td></td>
<td>BULK WATER</td>
</tr>
<tr>
<td></td>
<td>U.S. CONTRACTS: 6.2M GAL</td>
</tr>
<tr>
<td></td>
<td>SA RESERVES: 3M GAL/DAILY</td>
</tr>
<tr>
<td>TRANSPORTATION</td>
<td>U.S. CONTRACTS IN EFFECT NOW; SA NEGOTIATIONS STILL ONGOING FOR FULL REIMBURSEMENT.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ASSET</th>
<th>#</th>
<th>COST ($M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLATBEDS</td>
<td>1,286</td>
<td>$45.51</td>
</tr>
<tr>
<td>LOWBOYS</td>
<td>437</td>
<td>21.0</td>
</tr>
<tr>
<td>HETs</td>
<td>655</td>
<td>37.5</td>
</tr>
<tr>
<td>POL TANK</td>
<td>275</td>
<td>7.3</td>
</tr>
<tr>
<td>BUSES</td>
<td>630</td>
<td>23.9</td>
</tr>
<tr>
<td>REEFERS</td>
<td>724</td>
<td>19.2</td>
</tr>
<tr>
<td>TOTALS</td>
<td>4,007</td>
<td>$152.4M</td>
</tr>
</tbody>
</table>

SA RAIL (no cost) - 72,000 ST of all classes moved by an equivalent of 5,248 car loads.

ACCOMMODATIONS/FACILITIES ...... - $1.9B
(INCLUDES GRATIS USE OF SPOD, APOD, WAREHOUSES, TROOP HOUSING, ETC; PLUS SUPPORTING INFRASTRUCTURE SERVICES, SECURITY AND UTILITIES.)
(6) The importance of HNS to sustainment operations was clearly demonstrated during ODS. Army doctrine and procedures for HNS require careful review, analysis, and appropriate modification in light of the ODS experience.

f. Theater Infrastructure.

(1) General. Saudi Arabia is a large country, equal in size to an area approximating the United States east of the Mississippi (2,217,949 square kilometers). At its widest point, Saudi Arabia is roughly 1,250 miles from north to south and 1,350 miles from east to west. The vast majority of the country is desert, except for some coastal plains and salt marshes. There are no rivers or permanent bodies of water inland from the coasts. Most of the population lives in small, widely separated towns and villages in the vicinity of the Persian Gulf oil fields and at sources of water along old caravan routes.
(a) Roads. Most major towns and cities in Saudi Arabia are connected by a system of two-lane asphalt roads. Hard-surface roads connect Saudi Arabia to Kuwait, Iraq, Jordan, Qatar, the United Arab Emirates, Bahrain, and Yemen. A series of secondary roads connects the major cities and towns to minor towns and villages, with a series of dirt tracks between the smaller villages and into the outlying regions. Paralleling the Trans-Arabian Pipeline (Tapline) is the Tapline road, a major east-west roadway. The other significant roadway is the 500-kilometer-long coastal highway running from the Kuwait border south to the Qatar border. This road services the economic heart of Saudi Arabia.

(b) Rail. There is currently only one active, major rail line in the country; a standard-gauge, single-track line, with spur, running from the port of Ad Dammam to Riyadh.

(c) Ports. Saudi Arabia has 7 major ports capable of handling more than 10,000 metric tons of throughput per day, 5 secondary ports capable of handling 10,000 to 5,000 metric tons, and 7 ports capable of handling less than 5,000 metric tons per day. Four of the major ports are located along the Persian Gulf coast and the other three are located along the Red Sea coast. The debarkation of the vast majority of ARCENT supplies and equipment came into the port of Ad Dammam and, as required, Al Jubayl. These two modern port facilities operated by ARCENT provided an extraordinary in-country capability. Other in-theater port operations in support of ODS were handled by contract at ports in Bahrain, Oman, and the United Arab Emirates.

(d) Airfields. As with the port operations, modern Saudi Arabian airfields in Dhahran and Riyadh fully supported ARCENT's airfield facility needs. In addition, sufficient smaller airfields exist throughout the country which supported ARCENT's intra-theater airlift requirements.

(2) The wealth created for Saudi Arabia by its oil resources and production facilities has spurred considerable economic development of the country during the last twenty years. As a result, the economic infrastructure that exists today was able to generate considerable amounts of host nation support (HNS) for deployed U.S. and coalition forces.
g. Use of Logistics Bases (LBs).

(1) The establishment of LBs was a key feature of support planning and execution to ensure CSS assets were maintained well forward, and therefore, positioned to sustain the momentum of the attack once ground hostilities commenced.

(2) ARCENT's sustainment planning called for fifteen days of supply (DOS) Class I to be positioned forward at LBs, 10 DOS with the TAACOM, and 5 DOS with the Corps. A total of 20
million gallons of Class III (B) was to be at LBs A, B, C, and E. 15-20 DOS of Class V were positioned forward with the TAACOM responsible for throughput to LB's C and E. Class III(P), II, and I were also positioned forward at the Corps' LBs. The following chart depicts the stockage position of the primary LBs as reported on 28 FEB 91.

### SWA SUSTAINMENT LOGISTIC BASES

28 FEB 1991

<table>
<thead>
<tr>
<th>LOG BASE &quot;C&quot; (G-4)</th>
<th>XVIII ABN CORPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOAL</td>
<td>OH</td>
</tr>
<tr>
<td>CLASS I</td>
<td>20 DOS</td>
</tr>
<tr>
<td>III</td>
<td>5.8M GAL</td>
</tr>
<tr>
<td>V</td>
<td>43,000 ST</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LOG BASE &quot;E&quot; (G-4)</th>
<th>VII CORPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOAL</td>
<td>OH</td>
</tr>
<tr>
<td>CLASS I</td>
<td>5 DOS</td>
</tr>
<tr>
<td>III</td>
<td>10.2M GAL</td>
</tr>
<tr>
<td>V</td>
<td>48500 ST</td>
</tr>
</tbody>
</table>

### LOG BASE "A" (TAACOM)

| GOAL | OH | % FILL | Δ % |
| CLASS I | - | 0 DOS | N/R | N/A |
| III | 3.4M GAL | 3.40M | 100 | N/C |
| V | - | 37 | N/R | N/A |

### SUMMARY OF LOG BASE TOTALS

| GOAL | OH | % FILL | Δ % |
| CLASS I | 20 DOS | 29 DOS | 145 | N/C |
| III | 27 MIL/GAL | 28.82M | 93 | +4.1 |
| V | 163100 ST | 108239 ST | 86.3 | -4 |

(3) Desert Storm LB Planning.

(a) XVIII Airborne Corps. Initial Corps support was based at LB Charlie. As the battle unfolded and tactical objectives were seized, support was to be echeloned forward to temporary LBs established as LB Oscar and LB Romeo. Once the success of the tactical operation allowed it, LB Mars would be opened to provide support for the remainder of the battle, with LBs Romeo, Oscar, and Charlie being allowed to dry up. LB Echo would also be used to support the Corps upon opening LB Mars.
(b) VII Corps. Initial Corps support was from LB Echo. LB Nellingen was opened to support the Corps through the end of the battle.

![Logistics Diagram]

(4) Desert Storm LB Execution. The extended maneuver of US ground combat units, characterized by rapid advance and continuous day/night operations, was successfully sustained from the established LBs during the course of ground hostilities. The plan for XVIII Airborne Corps to use LB Oscar was quickly made obsolete by the rapid pace of the maneuver. The greatest challenge, for CSS operators at the LBs and supply operators with the maneuver units, was trying to effectively manage the use of transportation assets to effect resupply across the rapidly expanding battlefield. The whole area of LB organization and operations require careful review, analysis, and articulation in future CSS doctrine.

h. Use of Express Systems (Desert and Sealift Express).

(1) Desert Express. TRANSCOM established Desert Express, a small package, high priority air express service, in support of ODS. The system was designed to provide direct service to Dhahran and Riyadh for the shipment of relatively small, high priority warstoppers critical to ODS (e.g., parts for aircraft on the ground). Large bulky items such as helicopter blades, as well as Air Line of Communication (ALOC) items, flowed through normal MAC channels. Scheduled dedicated flights left daily from Charleston AFB, as well as Rhein Main AB in Germany. Daily CONUS flights began 30 Oct 90 with a second daily flight added on 13 Feb 91. Daily European flights began 8 Dec 90. Each Component Service was provided a daily tonnage allocation against which to validate shipments. Army CONUS allocation was 15-18,000 lbs and 25-35,000 lbs with initiation of the second flight. Army
European allocation varied as required. Shippers would use expedited CONUS transportation means for delivery of Desert Express items to Charleston AFB. Cargo arriving at the airhead, prior to the scheduled flight loading time, was transshipped the same day. Total overseas flight time was approximately 18-20 hours. Once Desert Express items arrived in theater, CINCCENT attempted to provide same day delivery to the requisitioner. Cumulative Desert Express tonnage was 5,101,106 lbs from CONUS and 1,358,969 lbs from Europe for a combined total of 6,450,075 lbs. Percentage usage by service of Desert Express was Army 61 percent, Air Force 35 percent, Navy 3 percent, and Marines 2 percent. CONUS Desert Express was terminated 19 May 91, and European Desert Express was terminated 10 March 91. Desert Express was an extremely effective program and provided a critical, and highly visible, air express service for key Desert Storm materiel requirements.

(2) Sealift Express. Normal over-ocean shipping time to Southwest Asia is 30-35 days for containers. Sealift Express was established to expeditiously move priority containerized surface cargo to SWA. The Military Traffic Management Command (MTMC), in coordination with the ocean shipping lines, established and managed Desert Storm Sealift Express for moving priority surface cargo to SWA. Adapting commercial shipping patterns, containers were not shipped directly to Saudi Arabia but instead were interlined (transshipped) to smaller feeder vessels in the Mediterranean and shuttled to SWA. Sealift Express had a 23 day goal for shipment from the last CONUS port of debarkation to the SWA port of entry. Actual Sealift Express shipping times averaged 25-27 days, reducing over-ocean time by approximately one week. The initial six sealift express sailings departed over a 35 day interval before the weekly schedule of sealift express sailings were established to support Desert Storm sustainment requirements. Sealift Express proved to be a valuable transportation tool for moving priority surface cargo.

i. Theater Aviation Maintenance Program - Saudi Arabia (TAMP-SA)

(1) The TAMP-SA created by the U.S. Army Aviation Systems Command (AVSCOM) provided wholesale level maintenance and supply, contract maintenance, special repair activity and backup aviation intermediate maintenance (AVIM) support to aviation units deployed to Southwest Asia. The organization was tailored to provide responsive support to units operating in the rigors of the harsh desert environment.

(2) The TAMP-SA was organized into three Aviation Support Facilities (ASF) located in King Khalid Military City (KKMC), Dhahran, and Abu Dhabi, UAE.
(a) The KKMC facility provided backup AVIM, modification work orders (MWO), limited depot level repair, combat/crash damage assessment, classification and repair, and exchange and retrograde of reparables.

(b) The Dhahran facility performed depot level armament, component and engine repair, conducted phase maintenance inspections, applied MWO and operated special repair activities (SRA) for Aircraft Survivability Equipment (ASE) and the Aviation Ground Power Unit (AGPU).
(c) The facility in Abu Dhabi, UAE performed depot level airframe and component repair and maintained a wholesale aviation repair parts and aviation intensively managed items (AIMI) account. Additionally, it operated an SRA for the Apache Target Acquisition Designation Sight/Pilot Night Vision Sensor (TADS/PVNS), the Apache Integrated Helmet and Display Sight System, the Apache airframe, the OH-58D Mast Mounted Sight and aircraft avionics. The ASF Abu Dhabi also provided C-23B aircraft support.

(3) The TAMP-SA began operation on 17 August 1990 and by 9 April 1991, had grown to 764 personnel (47 military, 62 DA civilian and 655 contractors).

(4) Supply Operations.

(a) AVSCOM identified over 700 lines of essential repair parts, including AIMI, for stockage in the TAMP battlefield spares account. Ultimately the TAMP-SA had stock on hand for 99 percent and a 30 day supply of 90 percent of these critical lines. In all the Abu Dhabi facility stocked over 122,000 parts.

(b) To support the theater and TAMP supply requirements, AVSCOM surged 675 maintenance and overhaul programs, accelerated 1,777 contracts and initiated 3,794 procurement actions. AVSCOM and the TAMP processed 82,551 requisitions and filled 80,231 (demand satisfaction of over 87 percent).

(5) Maintenance Operations. To deal with the harsh environmental conditions that were encountered in the Southwest Asia desert, AVSCOM and the TAMP-SA initiated several technical innovations. These programs included combat phase maintenance inspections, airborne engine health indicator tests, revised times between overhaul, and battle damage repair criteria. The
TAMP applied anti-erosion tape to the rotor blades of nearly all of the 1,824 rotary wing aircraft in the theater and installed improved air filtration devices to many models of the aircraft. Shown below are some selected measures of maintenance production by the TAMP.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGINES</td>
<td>390</td>
</tr>
<tr>
<td>AIRFRAMES</td>
<td>710</td>
</tr>
<tr>
<td>AVIONICS COMPONENTS</td>
<td>1,019</td>
</tr>
<tr>
<td>AIRCRAFT PREPARED</td>
<td></td>
</tr>
<tr>
<td>FOR DEPLOYMENT</td>
<td>1,832</td>
</tr>
<tr>
<td>MWO APPLIED</td>
<td>2,114</td>
</tr>
<tr>
<td>BLADES TAPED</td>
<td>5,800</td>
</tr>
</tbody>
</table>
IV. Sustainment Functions.

"Mobility is the true test of a supply system."
B.H. Liddell Hart
_Thoughts On War._
iv, 1944

This section of the brochure will review the early assessment of the Army's logistical capability to sustain the deployed force, and then focus specifically on functional areas of supply, transportation, maintenance, and field services.

a. The Early Assessment. On 31 Aug 90 (C+24) an ODCSLOG briefing to the senior Army leadership provided projections on the ability of the Army's logistical systems to sustain the force at C+55 (1 Oct 90) and C+115 (1 Dec 90). The briefing script which follows provides a good overview of the sustainment challenge facing our combat service support systems at the outset of ODS.

**LOG ASSESSMENT AT C+55**

Based on analysis conducted by the Logistics Center, the Logistics Evaluation Agency and the ODCSLOG staff, using the TPFDL, serious shortages are found at C+55 in logistics units at both division level and echelons above division. Although many LOG units are scheduled in the flow, the vast majority will not be on station. HNS will offset some shortages but LOG sustainment is still marginal. The force is being supplied and maintained but little buildup of sustainment is occurring. Support requirements for other services which also include significant inland transportation distribution requirements are currently under analysis. ARCENT has been provided the gross requirements from other services and the initial assessments indicates that requirements are realistic and can be met using HNS, contracting and Army assets. Major combat unit closure by strategic sealift will not occur until C+64. This delay impacts on the delivery of LOG support personnel and unit equipment. Sustainment cargo will begin to enter theater through strategic airlift and sealift. The production base supports current requirements primarily due to the quantities existing in war reserve, and from assets generated by CFE and QUICKSILVER reductions. Items like Desert BDU's, chemical suits, and masks are being produced in necessary quantities at this time.
LOG ISSUES C+55

LOG support structure at Echelons Above Division (EAD) is being flowed later at the direction of the CINC and the slippage in strategic movement is delaying our capabilities. We are working with ARCENT to ensure that the right LOG units are being moved forward as early as possible. Field services in forward areas will remain limited. Availability of water will be a critical concern pending further supplement to our purification and distribution systems. We may not assume the full lead service role for Class I management by C+60 due to late arrival dates. However, the Air Force and Marines indicate this is not a problem. Shower and laundry service support, although sufficient in built-up areas, will remain limited in forward areas. Intra-theater distribution systems will remain based largely on host nation support, but will begin to be augmented by truck companies by C+55. Capability to turn around the high volume of containerized cargo which will begin to arrive in theater will be crucial to the smooth supply flow.

LOG ASSESSMENT C+115

At C+115 logistics sustainment is marginal but adequate. HNS and contractor maintenance along with Army units are capable of supporting the force at this point. However, LOG unit structure for Echelons Above Division is still inadequate. We will be greatly dependent on HNS and contractor support to meet other Service requirements. Transportation assets are now fully dedicated to sustainment lift. At C+115 production surge will remain limited to the plant and equipment capabilities at existing facilities and in some cases on availability of long leadtime components or materials. This is particularly so in the case of missile production.

LOG ISSUES C+115

The LOG support structure, although nearer the required strength will be relatively immature by C+115. An area we will closely track is the potential rotation of reserve component personnel and units to ensure we avoid any shortfall. Indications are that field services and intratheater distribution will not be at required levels by C+115 nor will the other critical areas of logistics necessary for the war fight. Host nation support may well be approaching maximum levels. We will closely monitor the CINC's priorities for in-place LOG units to offset unavailable HNS functions.
(1) Class I.

(a) The Army's Class I support of ODS began on 6 Aug 90, when the first U.S. troops were ordered to the Persian Gulf. On 26 Oct 90, the Army became Executive Agent for ODS subsistence support for all land based U.S. forces in theater. The Army provided Class I support for a troop strength that peaked at approximately 435K, equating to approximately 39.2 million meals per month. From C-day, an effort was made to achieve a 60-day supply of subsistence in theater.

(b) Ration Consumption and Types.

1. Rations consumed in the theater included A, B, T, MRE, and Meal, Ordered Ready to Eat (MORE). The ration mix varied based on stocks available, facilities, and operational constraints. The following table reflects the average percentage consumed per month during the course of the operation:

<table>
<thead>
<tr>
<th>TYPE RATION</th>
<th>PERCENT CONSUMED/MONTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-Rations</td>
<td>5.8</td>
</tr>
<tr>
<td>MORES</td>
<td>9.0</td>
</tr>
<tr>
<td>Class A (incl from HNS)</td>
<td>13.5</td>
</tr>
<tr>
<td>B-Rations (Unitized)</td>
<td>39.5</td>
</tr>
<tr>
<td>MRES</td>
<td>32.3</td>
</tr>
</tbody>
</table>

2. Since there was limited peacetime production of T-Rations the Army had to acquire large quantities of rations other than T-Rations to feed the troops. Even though ODS represented less than 40% of full mobilization, the Army sent all available T-Rations from stock and production to the operation. Through mid-November 1990, approximately 2% of the meals eaten in the theater of operations were T-Rations. Through January approximately 5.8% of the operational rations utilized were T-Rations. The Army substituted type other rations (i.e., As, Bs, MREs, and MOREs) to make up for the shortfall in T-Rations.

3. MORE. MOREs combine the attributes of both MREs and T-Rations. They are individual servings of commercially available food items that can be packaged for individual or group feeding. The MOREs menu items do not require field cooking; some need heating, others can be eaten cold. The Defense Personnel Support Center (DPSC) started buying MOREs in November 1990. One month later the deliveries of MOREs doubled those of T-Rations. In January, deliveries were more than six times those of T-Rations. HQDA capped requirements for MOREs at 8 million meals per month, however, additional MOREs could have been acquired from the production base.

4. A-Rations. Large scale A-Ration feeding from both Host Nation contracts and CONUS stocks were used from the beginning of deployment. Through mid-November 1990,
approximately 40 percent of the meals were A-Rations. A-Ration use declined as B-Rations and MOREs began arriving.

5. B-Rations: The Marine Corps and Air Force used B-Rations as their primary hot operational ration, while the Army chose the T-Ration to conserve manpower. Within a month, acceleration of B-Ration production doubled that of T-Rations. Sufficient B-Ration production capability existed to meet the operation's entire non-MRE ration requirement. Beginning in September 1990, B-Rations were provided to the theater in unitized 100 meal modules.

5. MREs: Sixty percent of the operational rations that troops consumed through mid-November 1990 were MREs. This consumption level made it difficult for the Army to attain theater stockage objectives. Approximately 76% of worldwide MRE stocks were used to support ODS.

(c) Operational ration production for all type rations increased significantly during ODS. The table below reflects production quantities in millions of meals produced per month for all services:

<table>
<thead>
<tr>
<th>RATION</th>
<th>Pre ODS</th>
<th>ODS Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRE</td>
<td>3.0 M</td>
<td>28.8 M</td>
</tr>
<tr>
<td>T-Rations</td>
<td>.9 M</td>
<td>16.6 M</td>
</tr>
<tr>
<td>Unitized Bs</td>
<td>.0 M</td>
<td>21.0 M</td>
</tr>
<tr>
<td>MOREs</td>
<td>.0 M</td>
<td>8.0 M</td>
</tr>
</tbody>
</table>

Acceleration of production testing made possible the fielding of two new items - pouch bread and on a limited basis, the flameless ration heater. Pouch bread, a shelf-stable bread may be consumed with the MRE, T-Ration or B-Ration when commercial fresh bread is unavailable. The flameless ration heater uses a water-activated heating pad to heat MREs.

(d) A mobile kitchen built by a HN contractor, called the Wolfmobile, provided short order A-Ration meals using U.S. military cooks. HNS provided 129 of these mobile fast food stands to the divisions. They prepared and served hamburgers, hotdogs, and grilled/cold sandwiches.

(e) Issues/Observations.

1. The industrial base capability to support contingency requirements was insufficient to rapidly achieve theater stockage objectives. This not only affected the ability to rapidly achieve SWA stockage objectives, but also resulted in a shortage of MREs and T-Rations to support CONUS training. The quantity, variety, and location of prepositioned war reserve (PWR) stocks needs to be reviewed to ensure future contingencies can be rapidly supported.
2. Commodities common to all services such as Class I should be managed by a joint theater Class I management cell and be deployed at the onset of hostilities.

3. DLA is the wholesale Class I manager and must be established in theater quickly to interface with the theater MMC.

4. OPLANS should be reviewed to determine executive agent designees and ensure TPFDLs are adequate to execute the mission.

5. The Army provides two types of Ration Supplement Sundry Packs (RSSPs): Type I for all soldiers contains items such as soap, shaving materials, writing materials, lip balm, suntan lotion, and sunglasses. In addition to Type I items, female soldiers are provided Type II items which contain feminine hygiene articles. Supporting commands had difficulty initially monitoring receipt and consumption of RSSPs making it difficult to determine the adequacy of the support being provided.

6. The Medical Planning Module (MPM) of the Joint Operational Planning and Execution System (JOPES) does not automatically generate Medical B Ration requirements to sustain the hospitals in theater. Planning factors are not identified for the approximately 130 Medical B Ration items required. The problem could be avoided next time if requisitions were automatically generated and the requirements were computed and scheduled for movement on the TPFDL. JCS J-4 (Medical) in conjunction with the Class I proponent (DA DCSLOG (TSA)) should develop a capability within MPM of forecasting hospital Class I requirements.

(2) Water.

(a) The Army, as DOD Executive Agent for land-based water, enhanced water support throughout the theater. Based on the approved theater planning factor of 20 gallons per man per day, ARCENT operated tactical water purification equipment with a total production capacity in excess of 6 million gallons per day.

(b) Executive agent actions included providing Army purification barges in direct support of MARCENT forces.

(c) Tactical Water Support.


<table>
<thead>
<tr>
<th>UNIT</th>
<th>AC/RC/NG IN AOR</th>
<th>AC/RC/NG IN FORCE</th>
<th>TOTAL</th>
<th>TOTAL</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>WATER BN</td>
<td>0/1/2</td>
<td>0/2/3</td>
<td>3</td>
<td>5</td>
<td>*4TH BECAME S&amp;S BN</td>
</tr>
<tr>
<td>WATER CO</td>
<td>0/4/3</td>
<td>0/2/3</td>
<td>7</td>
<td>5</td>
<td>*2-NG S&amp;S CO USED</td>
</tr>
<tr>
<td>BARGE TM</td>
<td>2/0/0</td>
<td>2/0/1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>WATER TM</td>
<td>1/4/4</td>
<td>1/13/7</td>
<td>9</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>WATER DET</td>
<td>0/4/2</td>
<td>0/4/3</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>TWDS TM</td>
<td>0/3/8</td>
<td>0/3/9</td>
<td>11</td>
<td>12</td>
<td>*5-TMS AS DIV AUG</td>
</tr>
</tbody>
</table>
Additionally, 4-medium truck companies were dedicated to the line haul of potable water. A total of 42 units and approximately 2000 soldiers were dedicated to the general support tactical water support mission for the theater.

2. Equipment deployed and donated.

<table>
<thead>
<tr>
<th>DEPLOYED EQUIPMENT</th>
<th>DONATED EQUIPMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITEM</td>
<td>SOURCE</td>
</tr>
<tr>
<td>ROWPU BARGES</td>
<td>GOJ</td>
</tr>
<tr>
<td>150K ROWPUS</td>
<td>GOG</td>
</tr>
<tr>
<td>3K ROWPUS</td>
<td>GOG</td>
</tr>
<tr>
<td>600 ROWPUS</td>
<td></td>
</tr>
<tr>
<td>20K SDS</td>
<td></td>
</tr>
<tr>
<td>40K SDS</td>
<td></td>
</tr>
<tr>
<td>300K SDS</td>
<td></td>
</tr>
<tr>
<td>800K SDS</td>
<td></td>
</tr>
<tr>
<td>1M SDS</td>
<td></td>
</tr>
<tr>
<td>3K ONION TK</td>
<td></td>
</tr>
<tr>
<td>3K SMFT</td>
<td></td>
</tr>
<tr>
<td>5K SMFT</td>
<td></td>
</tr>
<tr>
<td>FAWPSS</td>
<td></td>
</tr>
<tr>
<td>TWDS</td>
<td></td>
</tr>
<tr>
<td>CHILLERS</td>
<td></td>
</tr>
</tbody>
</table>

3. Support to other forces.

- 1-ROWPU BARGE--Direct support to USMC upon hostilities
- Medium truck platoon--Direct support to USMC
- Approximately 150-200K daily distribution
- Approximately 10K daily distribution to French forces immediately prior to G-Day


- Bottled water procured at a basis of .5 case/man/day
- Bottled water objective: 5 DOS at division; 2 DOS at Corps; and, 1 DOS at EAC
- Personnel used municipal water at Dhahran, Dammam, KFIA, and KKMC
- Potable water fill points located at KFIA and Al Jubayl

5. Consumption.

- By doctrine, water is not an accountable commodity; therefore, detailed usage data was not kept
- No combat operations were delayed or curtailed due to a shortfall with tactical water supply in the theater

6. GS water units had six 150K ROWPUs and portions of 1M Supply Distribution Systems (SDSs) prepared for forward movement. Divisions had 600 ROWPUs and 40K SDSs in place at all available water sources within tactical assembly areas.
(d) Issues/Observations.

1. Each division and separate brigade possess organic water purification, storage and distribution capability. Water supply doctrine is to purify water as far forward as possible as determined by the availability of water sources and the tactical situation. A water point will be provided in each brigade support area. Water distribution is provided on a supply point distribution basis versus unit distribution. The additional personnel authorized by the Arid Augmentation packages for the divisions and the separate brigades were not available for ODS. The spaces identified as arid augmentation fillers were COMPO 4 and do not exist. In order to provide the divisions with the additional authorized personnel some of the RC Tactical Water Distribution System teams were assigned as their arid augmentation teams.

2. Water doctrine does not include the use of hardwall water tankers for retail support to or within the divisions. Supply point distribution, within the division, by the use of water trailers, Forward Area Water Point Supply System (FAWPSS), and other means is current doctrine. Large quantities of water were intended to be hauled to the various supply points in Semi-trailer Mounted Fabric Tanks (SMFT), with units using their organic assets to distribute water within the division area. During ODS, hardwall tankers, donated by the government of Japan, were used to line-haul water and to provide retail water support to the divisions.

3. Huge quantities of water support equipment must be moved to the theater and must compete for scarce strategic transportation assets. This water equipment is vital to the support of a deploying force and must be available early-on in a conflict in an arid environment. Transit time from Pueblo Army Depot, (PUDA), was excessive and the tonnage overwhelming for the transportation system. There was some equipment stored on PREPO ships, but this equipment could not totally support the deploying force until equipment stored at PUDA arrived.

4. Units were deployed in the very early stages of ODS to provide support to the deploying force, however, were unable to provide water support to the deploying force until RC units and the PREPO ships arrived in-country.

5. Bottled water was used by units during deployment and upon arrival after they arrived in-country until their organic equipment arrived and the GS water support units could support them. The bottled water, provided by the host nation, was vital to the daily support of units and was especially valuable as a reserve water source.

(3) Class II.

(a) Clothing and Individual Equipment (CIE).
1. A full range of CIE was issued to soldiers in
support of ODS. This included: Desert Battledress Uniforms (DBDUs) and various desert components (neckerchief, covers for helmet, field pack and body armor vest, floppy hat, nighttime parka with liner and trousers), body armor, full TA-50, boots (black, hot weather and desert), underwear and winter clothing (long underwear, sweater, sleep shirt, gloves with liner and woodland field jacket in absence of nighttime parka).

2. Clothing issues were drawn from Operational Projects and War Reserves. Planning factor for clothing issue from contingency stocks was 2 sets each. In Sep 90, ARCENT requested that all soldiers be issued 4 sets each of DBDUs. Based on the additional deployment of forces and the increase of Basis-of-Issue (BOI), the uniform objective was 1.2M sets of DBDUs, which would provide all soldiers in SWA with 4 sets each.

3. In Aug 90, there were only sufficient DBDUs in war reserves to outfit one Corps with two sets of DBDUs per soldier. Additionally, there was no ongoing production of DBDUs. The industrial base responded by producing fabric and manufacturing uniforms to meet additional requirements. In late Aug 90, the Defense Personnel Support Center (DPSC) used Government Furnished Material (GFM) to produce DBDUs in their clothing factory. There was enough fabric to make about 200K uniforms. Meanwhile, contractors began producing uniforms in small quantities in Oct 90 but the surge in production did not begin until Dec 90. By Feb 91, DIAA was producing over 300K sets a month, using 15 different contractors to make coats and trousers. The non-availability of desert camouflage fabric, which is not an off-the-shelf item, delayed production of uniforms in that textile mills had to produce fabric before manufacturers could produce uniforms.

4. From Aug 90 through Jun 91, the following quantities listed for each item were shipped:

   o DBDU coats 1.4M
   o DBDU trousers 1.3M
   o Desert hats 708K
   o Desert helmet covers 287K
   o Desert boots 343K
   o Cloth replica, U.S. flag patches 2.1M

5. Free issue of socks and underwear to male and female (officer and enlisted) soldiers deployed to SWA was approved in Nov 90. Items included brown undershirts and brown drawers for men, and brown undershirts, bras and panties for women. Socks were issued to both men and women. The following quantities were issued during ODS:

   Brown undershirts 2.1M
   Brown drawers 1.2M
   Bras 223K
   Panties 530K

35
(b) AAFES Support. AAFES established thirty-three Tactical Exchanges in SWA. They stocked hair, dental, skin, beauty and health care items, tobacco products, underwear, and snacks and beverages. An Army Military Clothing Sales Store (AMCSS) was set up in Dhahran which stocked such items as Hot Weather Battle Dress Uniforms, BDU caps, underwear, boots, physical fitness t-shirts and trunks, sweaters, towels, sewing kits, assorted insignia and DBDU name tape and U.S. Army tape.

(c) Chemical Defense Equipment (CDE).

1. The Iraqi chemical warfare threat during Operation Desert Shield/Storm (ODS) was considered to be extremely high. Preparation for meeting this threat by U.S. and Allied Forces required significant interaction of the Joint Services to ensure adequate equipment and supplies were available.

2. The Army established the Joint Services Coordination Committee (JSCC) for Chemical Defense Equipment (CDE). The JSCC effectively managed the fragile industrial base as well as orchestrated the cross leveling of CDE equipment among the services and Foreign Military Sales. As an example, the Navy required nearly 20,000 sets of a model of chemical protective boots that were not available through Defense Logistics Agency Stocks. The Army was able to meet the Navy's requirement by drawing on its theater reserve stocks. Conversely, the Army received in trade 1,004 Chemical Agent Alarms from the Marine Corps to support Army units in Southwest Asia (SWA).

3. Prepositioned CDE stocks were not adequate to support deploying units. Over $250M of CDE worldwide theater reserve assets were required to be drawn upon to equip and sustain SWA forces. Shortages occurred at deploying unit level, and no stocks were initially available to support the call-up of reserves who flowed through CONUS Replacement Centers. This situation was further exacerbated by a lack of visibility of worldwide CDE assets due to an absence of CDE logistical reporting procedures.

4. The limited industrial base and wholesale stocks of CDE and clothing were unable to support deploying forces. Furthermore, the industrial base was unable to sustain the force once deployed. Therefore, U.S. forces relied upon the Army's War Reserve Stocks to meet their requirements.

5. Steps were also taken to support other nations' requirements for chemical protective equipment and clothing. The Army logistics cell worked with U.S. Allies to ensure that they were provided with individual protective equipment, i.e., masks, boots, gloves, and overgarments, as well as decontamination, detection, and medical related equipment. The JSCC was also instrumental in ensuring that even non-DOD U.S. civilians residing in Southwest Asia were provided with adequate individual protective equipment.
6. The U.S. also worked with its allies to assist when required. As an example, the Canadian Government provided the U.S. with 500 Chemical Agent Monitors under an American, British, Canadian, Australian Armies Reciprocal Use of Materials Loan. The German Government donated 60 XM92 Fox vehicles which are NBC Reconnaissance Systems. A total of 50 Fox vehicles were provided to the Army and 10 systems to the U.S. Marines Corps. The Fox was logistically supported in the field by the combined efforts of the German manufacturer, Thyssen-Henschel, and General Dynamics Service Corporation.

7. The increased demand for chemical protective equipment required the U.S. to go to contractors with additional, expedited buys. Since the beginning of Operation Desert Shield, DLA added 5 contractors and modified seven contracts for chemical protective battle dress overgarments (BDOs). The following chart reflects the changes in production or development of selected chemical defense items.

<table>
<thead>
<tr>
<th>ITEMS</th>
<th>AUGUST 90</th>
<th>FEBRUARY 91</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battle Dress Overgarment (BDO)</td>
<td>3 contractors</td>
<td>8 contractors</td>
<td>new contract for 889K</td>
</tr>
<tr>
<td>CP Gloves</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M17A2 Mask rebuild</td>
<td>1,100/wk</td>
<td>3,000/wk</td>
<td>2 producers accel production</td>
</tr>
<tr>
<td>M40 Mask</td>
<td>0</td>
<td></td>
<td>659 accel production</td>
</tr>
<tr>
<td>M43 Mask</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M13A2 Filters</td>
<td>not in production</td>
<td>new contract for 641K</td>
<td></td>
</tr>
<tr>
<td>M10A1 Canisters</td>
<td>not in production</td>
<td>new contract for 125K</td>
<td></td>
</tr>
<tr>
<td>M15 Mask Carriers</td>
<td>not in production</td>
<td>new contract for 442K</td>
<td></td>
</tr>
<tr>
<td>M8A1 Chemical Alarm assembly</td>
<td>50/day</td>
<td>112/day until completion (1st QTR FY91)</td>
<td>500 accel procurement</td>
</tr>
<tr>
<td>Chemical Agent Monitor</td>
<td>0</td>
<td></td>
<td>new contract for 44K</td>
</tr>
<tr>
<td>M256A1 Detectors</td>
<td>10 prototypes</td>
<td>refurbished &amp; fielded prototypes (5 Army &amp; 5 Marines)</td>
<td></td>
</tr>
<tr>
<td>XM93 NBCRS (FOX)</td>
<td>5 Army-wide</td>
<td>55 Army-wide (50 from GOG gift)</td>
<td></td>
</tr>
<tr>
<td>Individual Chemical Agent Detector</td>
<td>0 Army-wide</td>
<td>60 Army-wide accelerated production of 1000</td>
<td></td>
</tr>
<tr>
<td>M258A1 Decontamination Kit</td>
<td>7,222 on contract</td>
<td>80,000 on contract; no surge clause in contract</td>
<td></td>
</tr>
<tr>
<td>M20 Collective Prot Equipment</td>
<td>64/mo</td>
<td>104/mo</td>
<td>accel development/production</td>
</tr>
<tr>
<td>XM28 Temper Tent Liner</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M40 Gas Particulate Filter</td>
<td>not in production</td>
<td>new contract for 7,712</td>
<td></td>
</tr>
<tr>
<td>M18 Gas Particulate Filter</td>
<td>not in production</td>
<td>new contract for 3,488</td>
<td></td>
</tr>
</tbody>
</table>
8. During ODS, new or revised procedures were developed to manage the possibility of handling chemically contaminated human remains. Forty-eight lines of off-the-shelf equipment valued at $2.2 million was required as a part of this effort.

(d) Tentage and Cots.

1. Army units initially deployed with insufficient tentage and cots. The Defense Logistics Agency (DLA), manager of these items, was unable to respond to the supply demands resulting in unit shortages. The Army used its assets of General Purpose (GP) small, medium, and large tents and maintenance tents, which were in operational project stocks, war reserves, and depot stocks, in order to fill partial shortages. A total of 17,500 tents were taken from these sources to apply against shortages. In addition, the harsh environment dictated new procurement ($26.1M) in order to provide clamshelters as enhanced work areas for aviation and ground maintenance personnel. Local procurement was authorized with a German firm to provide 59 fest tents to accommodate billeting and mess requirements of deployed forces while approximately 16,000 additional tents were provided by the host nation.

2. Life expectancy of tents was determined to be 9-12 months due to the harsh climate and deterioration of the tear strength. DLA initiatives to correct the shortfall of support included accelerating deliveries, working with industry trade organizations to identify potential new sources, reducing production lead times from 240 to 160/180 days, identifying commercial substitutes and initiating negotiations to place additional requirements on contractors under mobilization authority.

(e) Issues/Observations.

1. War reserves and operational project stocks of area specific clothing and selected individual and organizational life support equipment is essential to the readiness of the deploying forces.

2. A National Inventory Control Point (NICP) is needed to manage clothing commodities. The present method of managing clothing commodities between the Project Manager's Office, the Army Support Activity, and DA ODCSLOG did not provide the proper degree of unified effort in support to the theater.

3. Units should deploy with tents and cots. The supply system cannot provide sufficient tents and cots to a large deployed force on a demand basis from stock on-hand.

4. An increase in the quantity of CDE must be maintained in the theater reserves and operational project stocks to offset industrial base ramp-up time.
5. Joint Service coordination of CDE requirements is needed, both in units and theater reserves, to ensure that adequate stocks are maintained to support large scale deployments and sustainment.

(4) Class III.

(a) Class III petroleum (bulk, packaged) supply support for US forces participating in ODS was provided from Host Nation and Defense Logistics Agency (DLA) contract sources from within the Saudi Arabian AOR and elsewhere worldwide; and by allocation as required of available USCENTCOM war reserves. ARCENT provided overall command and control of construction, installation, operation, and expansion of the petroleum distribution system in SWA. ARCENT was also responsible for inland distribution of bulk petroleum to supported service components. The 475th Petroleum Group provided wholesale petroleum supply, storage and distribution support to ARCENT, CENTAF, MARCENT, NAVCENT, SOCCENT, and Allied Forces, as required or directed. The 475th POL Group maintained a direct operational link with the CENTCOM Joint Petroleum Office, which exercised overall staff petroleum logistics responsibility for CINCCENT.

(b) The number of POL units deployed to support ODS operations is shown below:

<table>
<thead>
<tr>
<th>UNIT</th>
<th>AC/RC/NG</th>
<th>TOTAL IN/</th>
<th>TOTAL DEPLOYED</th>
</tr>
</thead>
<tbody>
<tr>
<td>PETROLEUM GROUP</td>
<td>0/1/0</td>
<td>3/1</td>
<td></td>
</tr>
<tr>
<td>POL SUPPLY BN</td>
<td>1/0/1</td>
<td>12/2</td>
<td></td>
</tr>
<tr>
<td>POL TML OPN BN</td>
<td>1/2/0</td>
<td>5/3</td>
<td></td>
</tr>
<tr>
<td>POL SUPPLY CO</td>
<td>3/6/3</td>
<td>19/12</td>
<td></td>
</tr>
<tr>
<td>POL TML OPN CO</td>
<td>3/5/0</td>
<td>12/8</td>
<td></td>
</tr>
<tr>
<td>MED TRK CO</td>
<td>6/14/8</td>
<td>32/28</td>
<td></td>
</tr>
</tbody>
</table>

(c) Southwest Asia Petroleum Distribution Operational Project (SWAPDOP):

1. Use of pipeline is the most efficient and least manpower intensive method to distribute large quantities of fuel over great distances. Use of pipeline reduces requirement for POL Medium Truck Companies and HNS truck tanker assets. SWAPDOP consists of tactical pipeline systems (1000 FT, 1 mile and 5 mile Sets), tactical storage systems (3.8M gallons each), and associated ancillary equipment to facilitate tactical storage and rapid delivery of petroleum. The decision to call forward SWAPDOP equipment to the AOR was not made until late Oct 90. Although Army expedited shipment, the equipment did not arrive in-theater until early Dec 90. Meanwhile, to keep pace with the Air Force's requirements, an ever increasing number of Army and HNS tankers were needed while simultaneously using the same tankers to fill forward Army Logistics Base (LBs) requirements. Had SWAPDOP been prepositioned earlier, tactical pipelines would
have been more extensively used, and their operation would have eliminated many of the distribution problems in supplying the Air Force and LBs.

2. SWAPDOP materiel deployed and employed consisted of the following:

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DEPLOYED</th>
<th>EMPLOYED</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot; Pipe</td>
<td>260 Miles</td>
<td>127 Miles</td>
</tr>
<tr>
<td>TPT</td>
<td>15</td>
<td>10 (3.8M Gal each)</td>
</tr>
<tr>
<td>Pump Stations</td>
<td>45</td>
<td>37</td>
</tr>
<tr>
<td>ROM Kits (125 sent to the AOR)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(d) Fuel Consumption:

1. From Aug 90-Feb 91, 1.8 billion gallons of fuel were consumed by all land based operations. The Army consumed 105 million gallons from 17 Jan to 28 Feb 91.

2. During ODS 13.6% of all fuel consumed was used by the Army. The Army consumption percentages by product were 7% of all JA-1, 96% of all DF-2, and 89% of all MOGAS consumed in-theater. Prior to commencement of ground hostilities (18 Feb 91), 25.27 million gallons of fuel were in place at tactical log bases.

(e) Class III Packaged (CLIIIP):

1. The effects of increased operating tempo and the harsh environment of SWA on vehicles and equipment, resulted in an expanded use of oils, greases, and lubricants. Initial deploying units had some difficulty in meeting increased maintenance requirements because of insufficient availability of the correct types and quantities of CLIIIP products in the AOR. Units were deploying with insufficient basic loads or with CLIIIP products which were not suitable for the SWA desert environment. Information on "which" and "how much" CLIIIP products to take was either not available or the units did not have time to obtain required products, or both. Even some of the units deploying late in Phase I and in early Phase II were arriving in the AOR with incomplete or inappropriate basic loads of CLIIIP products. As a result of increased requirements and usage and a need to replenish incomplete basic loads, CLIIIP support in-theater became critical.

2. Prior to the development of ARCENT policy concerning MMC responsibility to consolidate Army CLIIIP requirements at theater level, deploying and deployed units were tasking the system with individual unit requirements. Theater-level visibility over total requirements, receipts, and stock availability was limited. Control over what was required, shipped, received, and available for all Army units in theater was initially non-existent. When
MMC control and consolidation became more evident, there were still problems with duplicated requirements and incomplete requisitions. The end result was five months of catch-up with both the immediate and increasing requirements of deployed units for CLIIIP products. Delays and shortages may have been avoided if requirements had been consolidated and verified. Theater-level control over CLIIIP product requirements and supply requests must be established early. This will help to alleviate duplication of requests, ensure proper requisitions enter the "system," provide for equitable distribution of available items to all forces, reduce unnecessary burden on supply sources, and reduce the amount of transportation required to deliver CLIIIP to theater.

(f) Issues/Observations:

1. A doctrinal requirement exists for an active component (AC) Petroleum Group to be readily available for deployment and immediate performance of assigned missions and functions. During ODS an operational need for a Petroleum Group Headquarters existed from the outset. A critical requirement existed for functional petroleum logistics management, not only for deploying Army elements, but also for support of other DOD components and coordination of Host Nation petroleum support requirements. For ODS, a POL Group was not readily available to perform vital coordination and mission support. A QM Petroleum Battalion, not organized or manned to perform as a POL Group, had to perform the Group functions until activation and deployment of a reserve component (RC) POL Group could be accomplished. Close to four months was required to activate, deploy, train, and turn over control of POL functions to the Group. As a result, operational delays and problems were encountered which may have been avoided if a POL Group had been readily available. Were it not for the Defense Fuel Supply Center's Mideast Fuel Region Headquarters being operational from Bahrain before and during ODS, and their assistance to the QM POL Battalion, initial operations and future planning may have been inadequate. An AC POL Group Headquarters must be established, fully trained, and readily deployable to assure future accomplishment of the petroleum logistics missions and functions.

2. ODS may have been difficult to logistically support, at current operating levels, without the availability and use of Host Nation petroleum supplies and equipment. Sufficient HNS may not always be available in all situations, but when it is, all efforts should be made to fully utilize it. Organic support capability can then be used with greater flexibility and support farther forward on the battlefield, where HNS may not go.

(5) Class IV.

(a) Sufficient barrier materials were not on-hand, or within units, to meet immediate requirements for preparation of defensive positions by early arriving units. Army theater reserve and operational stocks were used to partially satisfy
requirements while Defense Logistics Agency surged production and sought additional producers. The limited availability of transportation from CONUS to SWA compounded the problem due to the need to use available assets to ship higher priority supplies and equipment before barrier materials.

(b) Issues/Observations:

1. Class IV sources of supply should be expanded for items which have only one or a limited number of producers.

2. Barrier plans should be developed as part of contingency planning and appropriate stockage levels established.

3. Contingency stocks of barrier materials for up to a corps size force should be maintained as operational projects and prepositioned stocks.

(6) Class V.

(a) Background. FM 9-6, Sep 89, Munitions Support in a Theater of Operations provides for the following organization of conventional ammunition support:

1. The TAACOM establishes Theater Storage Areas (TSAs) operated by one or more GS ammunition companies. These supply points maintain theater reserves and ship bulk ammunition forward to the Corps and Division supply points.

2. The COSCOM establishes Corps Storage Areas (CSAs) operated by one or more GS ammunition companies. Units are supplied by these supply points from the Corps rear area and ship ammunition forward to the Ammunition Supply Points (ASPs) and Ammunition Transfer Points (ATPs). Additionally, combat configured loads (CCLs) are prepared and shipped from these supply points.

3. Each division is supported by a COSCOM DS ammunition company operating an ASP in the Division rear area. The ASPs supply units in the Division rear area and ship ammunition forward to the ATPs.

4. The division DISCOMs operate Ammunition Transfer Points (ATPs) in the brigade support areas as required. ATPs do not store ammunition but act as a mobile transfer point to resupply forward units and are activated only during actual operations.

(b) ODS ammunition operations initially deviated from this doctrinal organization in that the theater storage areas (TSA) and corps storage areas (CSA) were integrated into a logistics base (LB) organization which also contained Class I and Class III supplies. Throughput of Class V was from the port to these forward logistics bases.
(c) Issues/observations.

1. Whenever the Army adopts a weapon system, sufficient quantities of ammunition must be purchased well before its use in any potential conflict to support the projected usage of that system under varying combat conditions. Key munition supplies were barely adequate given projected ammunition requirements to support offensive operations for certain weapon systems.

2. Standard Army Ammunition System (SAAS) assets were not deployed fast enough to permit the in-country materiel management center (MMC) to accurately account for or manage ammunition flow. SAAS equipment and personnel became mission capable only after significant quantities of ammunition arrived from units, prepositioned ships, resupply ships, and ALOC. This forced forward deployed MMC personnel to manage ammunition receipts and issues manually and to catch up later. This significantly degraded management, reporting, and forecasting.

3. Automation systems at the depots, CONUS and USAREUR, functioned as designed even with the heavy workload. However, there was some difficulty in analyzing available data because no link exists between the transportation and the ammunition data bases. Another problem arose when using the World Wide Ammunition Reporting System (WARS), because this system lacks the capability of reporting "realtime" data.

4. As units deployed to SWA prepared for combat, there was little consideration given to their need for training ammunition. During the six months that elapsed from initial deployment to ground hostilities, units needed training ammunition to sustain their skills. The lack of training ammunition required HQDA to go "off-line" and provide training ammunition push packages which required movement by ALOC at the expense of other critical supplies and equipment. Training ammunition support needs to be incorporated in planning sustainment for future contingency operations.

(7) Class VII.

(a) The fill objective for deploying units to ODS was C1. However, units were considered fully deployable when their overall C-level was C3 or better for equipment on hand. Critical shortages were directed to be filled by the redistribution of excess and by cross leveling from non-deploying units. AMC filled requisitions for Class VII items in accordance with the time phased force deployment listing (TPFDL) using the latest arrival date as the sequence. To ensure all deployers were mission capable, AMC filled requisitions for class VII shortages for all deployers first to the 65 percent level, then 80 percent level, and finally 100 percent.

(b) Major force modernization efforts and equipment upgrades were accomplished in support of deployed forces. These efforts are discussed in this brochure in section VI.
(c) Major items theater reserves (TR) were established in SWA. The next chart shows the major items in SWA TR stocks as of 19 Feb 91, and gives the percentage of fill of the stockage objective as of that date and as projected for 15 Mar 91, 15 Apr 91, and 15 May 91. The continuing 61% shortage for wheeled vehicles was due to a lack of required HETs, trailers, and lowboys.

### SWA SUSTAINMENT
### MAJOR ITEMS THEATER RESERVES
### CLASS VII

<table>
<thead>
<tr>
<th>ITEM</th>
<th>OBJECTIVE (60-DAY REQ)</th>
<th>NOW O/H</th>
<th>15 MAR 91 O/H</th>
<th>15 APR 91 O/H</th>
<th>15 MAY 91 O/H</th>
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</thead>
<tbody>
<tr>
<td>ABRAMS TANKS</td>
<td>429</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>M1M1 = 209</td>
<td>(259)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1IP = 220</td>
<td>(170)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2 / M3</td>
<td>356</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
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<tr>
<td>ARTILLERY</td>
<td>144</td>
<td>22%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>MORTARS</td>
<td>54</td>
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<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
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<td>1815</td>
<td>39%</td>
<td>41%</td>
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<td>61%</td>
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<tr>
<td>VEHICLES</td>
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<tr>
<td>WATER EQUIPMENT</td>
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<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>AVIATION</td>
<td>194</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

**BOTTOMLINE:** EQUIPMENT & LIFT AVAILABILITY CONTINUE TO HAMPER TIMELY ARRIVAL

(d) Issues/Observations:

(1) During ODS, visibility of Class-VII equipment assets was initially impaired due to rapidly changing force structure and priorities, and cross-leveling of equipment. Army supply systems are based on a monthly cycle which feeds the Continuing Balance System - Expanded (CBS-X). The Requisition Validation (REQVAL) - PLUS, a PC based program, also runs on a monthly basis and contains on-hand inventory and authorization data for corps and below materiel managers. The data in the system could often
be 60 days old, which was not timely enough for Desert Shield actions. ODCSLOG in conjunction with the AMC Systems Integration Management Activity (SIMA), developed a change to the monthly CBS-X. The improvement enabled units to transmit property book changes as often as daily to SIMA in Chambersburg, Pennsylvania. Within 24 hours of receipt of the CBS-X transaction, SIMA retransmitted the changes back to the personal computer-based REQVAL-PLUS system at the division, corps and theater materiel management centers (MMC). This gave materiel managers visibility of subordinate unit assets and authorizations within 24 hours of a change being reported. This improvement in daily equipment asset visibility provides materiel managers at all levels with timely information for equipment decisions.

(8) Class VIII. The Army was tasked as the Class VIII Executive Agent for the entire theater.

(a) The in-theater forces being provided medical supply support consisted of: 7+ Army divisions, 2 Marine divisions, 44 hospitals, 15 Air Force hospitals, 2 Navy hospitals, and 2 Navy hospital ships.

(b) Prepositioned equipment and supplies in-theater provided initial stockage for the deployed 32d Medical Supply Optical and Maintenance (Medsom). These assets included:

1. Conventional field hospitals.

2. Two corps level resupply sets (each set supports 15,000 soldiers for 30 days less potency and dated items).

3. Three resupply sets, two sets for division level support (5,000 soldiers for 30 days less potency and dated items) and one corps level set (15,000 soldiers for 30 days less potency and dated items) prepositioned on ships.

(c) Host Nation Support. The Saudi Arabian market provided limited support of certain items through existing distributors. Lab reagents and X-Ray products were available in limited quantities. However, the capabilities were inadequate to support the deployed medical structure.

(d) The medical CSS support structure developed during ODS as follows.

1. C+30 - 32d Medical Supply Optical and Maintenance (Medsom) operating under the 44th Medical (MED) Brigade (BDE) in the 1st Corp Support Command (COSCOM) provided all the theater medical logistics support. At C+60 the 32d MEDSOM assumed the role of Single Integrated Medical Materiel Management (SIMM) for the entire theater.

2. C+90 - 32d MEDSOM and 47th MEDSOM tasked organized into the U.S. Army Medical Materiel Center, Saudi Arabia
(USAMMCSA). USAMMCSA operated under the 44th MED BDE in the 1st COSCOM and continued performing the SIMM mission.

3. C+180 - 32d MEDSOM moved forward to support the 18th Airborne Corps units. The 32d MEDSOM continued to operate under the 44th MED BDE. The 428th MEDSOM deployed from Europe and supported the 7th Corps units. The 428th operated under the 322d MED BDE of the 2d COSCOM. The 145th MEDSOM deployed and assumed support for echelon above corp (EAC) units in the western region of the theater. The 47th MEDSOM and 980th MEDSOM tasked organized to make up the USAMMCSA. The USAMMCSA continued to provide theater wide support to all services to include support to the other MEDSOMS, and area support to EAC units in the Eastern Region of the theater. The 47th, 980th, 145th MEDSOM operated at EAC under the 3d Medical Command (MEDCOM) provisional. The Class VIII medical force structure deployed in support of ODS is shown on the next chart.

**DESERT STORM**

**CLASS VIII CHAIN OF COMMAND**

![Class VIII Chain of Command Diagram]

(e) Medical Air and Sea Lines of Communication (LOCs).

1. Requisitions from USAMMCSA were passed to the U.S. Army Materiel Center, Europe (USAMMCE). Requisitions which could be filled from USAMMCE stocks were air shipped to theater through Rhein Main AB. Selected bulk items were surfaced shipped.
Requisitions that could not be at least 50% filled at USAMMCE were passed to the Defense Personnel Support Center (DPSC) in the continental United States (CONUS). Medical materiel was primarily air shipped using medical air LOC. The pallets were built at Defense Depot, Mechanicsburg (DDMP) and flown to theater from Dover AFB. Low priority and bulk items such as bandages and fluids were primarily shipped via surface. Modernization equipment was transported by air via Tinker AFB. Emergency requisitions were shipped via Desert Express from Charleston AFB.

2. Desert Express worked well. Due to the requirement to ensure proper transfer of materiel to the Desert Express System, it was necessary to stage direct vendor deliveries at an Army location. For instance, Fort Jackson was used on a number of occasions as a medical transshipment point for Desert Express.

3. Intra-theater Class VIII was distributed using both COSCOM and contracted ground transportation assets (40 foot flatbeds). Both of the forward deployed MEDSOMS used these assets to pickup and push Class VIII materiel to designated forward supply points. Military airlift routinely moved "redirected" Class VIII materiel between the two primary aerial ports of Debarkation (APOD) at Dhahran and King Kahlid Military City.

(f) Support Relationships. As described above, the USAMMCSA was created from two MEDSOMS and provided theater level support. The 32d and 428th MEDSOMS were in support of 18th Airborne Corps and 7th Corps respectively. The 145th MEDSOM provided area support to EAC units in the Riyadh region.

(g) Sustainment shortfall over time. The medical logistics structure was tasked to provide initial operating stocks to each deploying hospital. The hospitals were issued from prepositioning of materiel configured to unit sets (POMCUS) and primary mobilization (PRIMOB) stocks with ten days or less of consumable supplies and no potency dated items. Packages of potency dated items were pushed to theater to provide 3-10 days of start-up supply. The medical logistics structure was tasked with bringing hospital levels to approximately 30 days while simultaneously building theater levels to 30 days. The hospitals also developed stockage requirements for significant amounts of medical supplies not originally provisioned in the Deployable Medical Systems (DEPMEDS) equipped hospitals. More than 50% of the lines ultimately stocked in theater were not DEPMEDS items. The buildup of medical supplies required a combined flow of approximately 100 medical ALOC pallets per day to theater from CONUS and Europe. Temporary shortfalls in flow were experienced as the primary supporting DLA depot expanded operations to accommodate the increased pallet build equipment. In addition the lack of adequate airlift during mid-December caused some shortages in essential medical materiel.

(h) Force Structure Issues. The current MEDSOM structure proved inadequate to handle the volume of support
required for the force build-up. The USAMMCSA was tasked organized to handle the volume of supplies flowing into theater. ODS validated the need to convert the MEDSOM to the Medical Logistics Battalion forward and rear structure which provides additional personnel and better MHE to provide Theater and Corps level support. It also has a modular structure which is designed to allow forward platoons to operate well forward, and this reemphasized the need to convert to the Medical Force 2000 which would have facilitated integration with the LOG Base Operations. The MED LOG BN rear has roughly twice the personnel of the MEDSOM with improved MHE capability. This increased capability is absolutely vital when additional workload represented by quad-service support is considered. The task organization of the USAMMCSA approached the structure of a medical logistics battalion rear.

(i) Deviations from medical doctrine or policy. The task organization of the MEDSOMs into a USAMMCSA was the major deviation from existing doctrine, but approximated the structure of a medical logistics battalion rear contained in the Medical Force 2000 structure. The mission of single integrated medical materiel manager is not currently recognized. The success of the SIMM mission in ODS by the Army medical department should be doctrinally recognized.

(j) Logistics Automation.

1. The 32d MEDSOM deployed with the medical logistics module of theater Army medical management information system (TAMMIS MED LOG) operating on the TCU (ATCCS-CHS) hardware. Although TAMMIS MED LOG performed well, it became obvious that the TCU hardware was not going to support the theater level volume of business. A CTASC-II hardware system was deployed to theater on C+20 and was operating TAMMIS MED LOG for the theater by C+75. TAMMIS MED LOG operating on the CTASC-II was a true success story. This software and hardware configuration was vital to theater wide management for all services of the build-up of medical supplies. The system provided real time access to medical logistics information. The TAMMIS/CTASC-II configuration provided the capability to interface with supported units operating TAMMIS, and the SAILS-ABX system in Europe. The CTASC-II system remained at the USAMMCSA. The 32d, 428th, and 145th MEDSOMs operated using TAMMIS MED LOG on the TCU with remote terminals added. The TAMMIS MED LOG system was also used by the Navy fleet hospitals, and the Marine Corps. TAMMIS MED LOG was fielded to the majority of the division medical supply offices, and deployed hospitals. The later units supporting VII corps and EAC were supported using tailored reorder lists and management reports from the supporting MEDSOM.

2. LOG Automation Shortfalls. Time did not permit the fielding of TAMMIS MED LOG to all units. Time, personnel, and equipment issues prevented the fielding of CTASC-II systems to all the MEDSOMS.
(k) Hospital Modernization Efforts. Modernization efforts in support of ODS commenced on 24 September 1990 with the intent to modernize in-theater four (4) active component medical unit self-contained transportable (MUST) configured combat support hospitals and one (1) conventional field hospital. A DEPMEDS combat fielding and training team was organized and deployed to execute this mission. Between 1 Nov 90 and 15 Dec 90 the DEPMEDS medical materiel sets and nonmedical associated support items of equipment (ASIOE) required to fully equip these five (5) hospitals were received from CONUS. The DEPMEDS fielding team received, distributed, and fielded the equipment to the hospitals in Saudi Arabia. As each fielding was completed the DEPMEDS training team performed the necessary new equipment training at each hospital site. The modernization of these five (5) hospitals was completed on 20 Dec 90. An additional five (5) active component MUST configured hospitals were DEPMEDS trained prior to their deployment to SWA. Three (3) of these hospitals were based in CONUS while the other two (2) were forward deployed VII Corps hospitals. The two (2) VII Corps hospitals were DEPMEDS equipped with POMCUS assets and trained prior to their departure from Europe. The three (3) CONUS based hospitals deployed to SWA without their MUST equipment. The units were trained in CONUS and were then DEPMEDS equipped in theater with POMCUS and PRIMOB assets. Finally, DEPMEDS equipment for an additional nineteen reserve component hospitals was shipped from POMCUS and PRIMOB assets. The DEPMEDS modernization team was tasked to stay in Saudi Arabia and deliver the DEPMEDS equipment shipped from PRIMOB and POMCUS assets for the additional 24 hospitals. In addition, the team was tasked with the responsibility for the receipt and distribution of "shortage" packages (potency and dated packages, X-Rays, LAB packages, ship-short packages, water distribution systems, etc...) that were being airlifted into the theater. This massive effort was accomplished by opening and operating the DEPMEDS consolidated staging facility in AD Damman, Saudi Arabia. This facility allowed for the smooth transition of hospital materiel from both the seaport of Debarkation and APOD and for its final distribution to locations far north along the Iraq and Kuwait borders. By 15 Feb 91, the DEPMEDS modernization was complete. There were numerous lessons learned in this operation by the modernization teams. Some of the more critical ones are as follows:

1. The need for a dedicated equipment staging facility for receipt and distribution of medical equipment was essential to the successful modernization effort.

2. Autonomy of the modernization team and the specific unique talents of the key members was essential to this effort.

3. Lack of organic materiel handling equipment in hospitals units puts a tremendous burden on the hospitals ability to operate.

4. Understanding of the Army transportation system is
essential to this type of deployment operation. The medical logistics officer, in general, does not receive this type of training.

5. The need for medical procurement and contracting personnel with warrant authority is critical. It took many months before this type of expertise was available in theater.

6. Organic transportation in Army hospitals is severely lacking. Hospitals must get Army transportation support in order to complete their missions.

7. Lack of potency and dated items to support POMCUS/PRIMOB hospitals caused immediate problems when hospital sets arrived in theater. This has always been a concern, and in ODS it became a reality that caused significant sustainment problems.

8. The in-theater modernization effort has provided the best equipped hospitals the Army has ever deployed. However, there are still modernization and equipage shortages in these hospitals that need to be addressed.

(1) Support to Other Services. CENTCOM tasked the Army with theater wide Class VIII support commencing on C+90. USAMMCSA provided support to Air Force hospitals, Marine support Group, Navy Fleet hospitals (shore-based units) and Navy hospital ships.

(m) Industrial Base. DLA through DPSC is the wholesale manager of Medical Materiel. The accelerated buildup for Operation Desert Shield/Storm placed a tremendous amount of stress on the Industrial Base. Most manufacturers were capable of satisfying the increased demands placed on them, however, some were not. The latter was especially evident with some suppliers of chemical defense materiel. The materiel required (Mark I kits, pyridostigmine bromide tablets, etc.) are not common. In fact, stocks of these very items within the AMEDD are relatively limited. As a result, the AMEDD is dependent on the Industrial Base for these supplies. This creates a serious dilemma for the AMEDD; whether to maintain an increased stock of chemical defense materiel (most of which have short shelf-lives), or continue to depend on the Industrial Base and accept long production lead-times. This situation is common to most medical equipment and supplies as well. In general, efforts to surge the Industrial Base during ODS proved successful. Items of specific interest include:

1. In the initial stages of ODS, STI, the sole source for the Mark I kit, had some difficulty in meeting their promised delivery quantities. Assistance was required from 7th MEDCOM to build new kits (about 50K per week), using clips from expired Mark I(s) with new atropine and 2-PAM in stock. DPSC contracting officers worked with this issue and by early Feb 91, STI was producing as promised.
2. DUPHAR and its American subsidiary, Kali-Duphar, were especially prompt and responsive to our needs. Production of PBT and rapid adjustments to secure the needed protective covering caused them to work through the holiday season. Duphar was also the base that successfully completed for the Diazepam contract. To meet Operation Desert Storm needs, they cooperated with U.S. Army Materiel Development Activity (USAMMDA) in producing the unflanged variety of the auto-injector in a very timely manner.

(n) FMS programs for medical equipment in support of SWA countries. The Office of the Surgeon General in conjunction with the United States Army Security Assistance Command agreed to the sale of four mobile Army's surgical hospitals to the Ministry of Defense, Saudi Arabia Land Forces. The hospitals have been sold complete with medical as well as non-medical equipment required by the table of organization and equipment. As of 15 Feb 91, the medical equipment had been received by the Saudis.

(9) Class IX.

(a) ODS generated a massive amount of unit requisitions for repair parts. As of Apr 91, over 1.9 million requisitions had been received valued at over $5.5 billion, (see charts on next page). AMC was able to meet the requisitioner's need by shipping the requested items to SWA in over 88 percent of the cases. In addition, the operational readiness rate for nearly every Army combat weapon system in SWA was maintained above the 90 percent level. Despite the success of these efforts, the Class IX system as it operated in-theater did not function well. Effective supply distribution was constrained by the lack of supply companies to process shipments and poorly coordinated transportation. Automated supply systems were difficult to put in place primarily because of the limited communication links and incompatible CSS hardware. Simply getting requisitions into the supply system was sometimes difficult for units. Storage of Class IX presented a considerable challenge in the desert without standard ASL containers. The transportation requirement to move ASLs exceeded unit capabilities, resulting in a Class IX system that could not keep pace with the AirLand Battle.

(b) Issues/Observations.

1. Class IX visibility in Southwest Asia was hampered by the inability of the Combat Service Support (CSS) infrastructure to smoothly transition from a peacetime to wartime throughput system. Tremendous amounts of Class IX were staged at sea and air ports, while the in-country distribution system was transforming to meet the unparalleled dispersion of materiel to several Army divisions. Visibility of Class IX materiel remained assessable until arrival and discharge from the carrier. In-country automation capability was inadequate to provide in-transit visibility from the ports to corps and division MCCs and MMCs.
2. Units had difficulty maintaining visibility of requisitions and shipments. The Services need the capability to match supply and transportation data. The distribution systems
must be able to identify and locate critical materiel within the supply pipeline. DOD MILSTAMP procedures need to be improved and enforced to simplify data input and improve asset visibility.

3. ASLs containing the repair parts needed to maintain deployed equipment were frequently not on hand, when required, due to scheduling of ASLs to arrive late in the deployment flow. As theater level stocks of Class IX had not yet been established in large quantities, this resulted in an initial sustainment shortfall in the AOR. In addition, ASLs for RC maintenance units were not being ordered until support relationships were determined after the RC maintenance unit arrived in-theater. Filling the Class IX requisitions to create ASLs magnified the problems for the theater, as theater stockage levels were initially limited. ASLs must be deployed early enough to meet sustainment needs, and support relationships must be identified early-on for RC maintenance units so that appropriate ASLs can be assembled and carried with the RC maintenance unit when it deploys.

4. Direct Support System and Air Line of Communication (DSS/ALOC) distribution procedures were used in SWA. ALOC distribution problems included: a lack of a theater tracking system to provide intransit visibility of assets; initial poor alignment of Supply Support Activities (SSAs) with their supported customers; and the use of container shipments with multiple consignees overloading the break bulk points, which operated with a limited number of personnel and material handling equipment. Theater distribution plans need to be established at initial deployment and automated systems supporting requisitioning and distribution must be deployed early-on to track and process materiel shipments.

5. Initial poor alignment of Supply Support Activities (SSA) with their supported customers was a major factor contributing to ALOC distribution problems. In Jan 91, the ratio of Supply Support Activities (SSAs) to customers was eight times greater in SWA than in Europe. The SSA relationships were:

<table>
<thead>
<tr>
<th></th>
<th># of ARMY DODAACs</th>
<th># of SSAs</th>
</tr>
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<tbody>
<tr>
<td>USAREUR</td>
<td>5000</td>
<td>240</td>
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<tr>
<td>SWA</td>
<td>3000</td>
<td>1200+</td>
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As a result of the greater number of SSAs, ALOC pallets built at New Cumberland Army Depot (NCAD) included far fewer throughput pallets and a correspondingly greater number of mixed pallets. Mixed pallets cause the break bulk point (BBP) to be congested. The BBP was located at an unimproved site where working conditions were aggravated by dust, heat, and a limited number of personnel and MHE. Cargo was frequently misrouted, frustrated, and delayed. Establishment of a larger number of SSAs in SWA was based on a number of circumstances. The XVIII Corps had many units added to its CONUS organization. These included some which
had no prior alignment with the Corps such as 1st Cavalry Division (1CD) and 3d Armor Cavalry Regiment (3ACR), and numerous reserve component (RC) units. Many combat service support RC units were added as separate companies without regard to previous CAPSTONE affiliation. A majority of the echelon above corps (EAC) units were RC units in brand new organizations. Many units arrived without knowing their support SSAs. Some RC units were unfamiliar with requisitioning procedures and did not include the supplementary address on their requests. SSA support alignments in conjunction with deployment or reorganization of a unit is essential. The alignment is equally important for the deployed forces and the consolidation and containerization point. Both need it to ship and distribute supplies efficiently. The system, which establishes this relationship and makes it available to operators in the areas of supply, transportation, and distribution needs improvement.

6. DODAAC address changes need to be initiated for deploying units in accordance with AR 725-50 and MACOM directives both prior to deployment and after a unit's location is established in-theater. Failure to initiate the required DODAAC changes in a timely manner contributed to delays in the movement of supply materiel. In addition, once DODAAC address changes are submitted to the Army Central Service Point (ASP) per Chapter 9, AR 725-50, steps need to be taken to ensure all users of DODAAC (NICPs, Depots, Distribution Centers, Customers) receive timely change updates. A CASCOM review of the DODAAC update process reveals two examples of problems which highlight the importance of DODAACs.

(a) USAREUR depot operations provided many valuable automotive major assemblies prior to and during the ground war. They shipped major assemblies in response to materiel release orders directed by the National Inventory Control Point using Standard Depot System (SDS) automated procedures. In January the SDS data at the USAREUR depot still reflected pre-deployment addresses for all units in SWA. This included units that had been deployed since Aug 90, five months before. Because the depot knew the addresses in SDS were not all correct, it shipped all major assemblies to one address in SWA that the depot confirmed was recognized by the transportation system. All shipments went to the 403d Supply Company, XVIII Corps. This resulted in congestion, double handling, and delays. Current addresses became available in January 91 and the problem was corrected.

(b) Initially, most units deployed to SWA were supported by the Aerial Port of Debarkation (APOD) at Dhahran. As units moved north in preparation for the ground war, the 22d SUPCOM changed their Air Terminal from Dhahran to King Khalid Military City (KKMC). Moving the APOD brought air-lifted supplies over 500 kilometers closer to the supported units. Not only is the distance significant by itself, but there are only two, two-lane roads from the main logistics base and sea port at Dhahran-Dammam to KKMC. These roads were congested with units moving water,
ammunition, fuel and other supplies north. The line haul truck fleets were taxed to move sufficient quantities of supplies. Weeks after broadcast of the APOD changes, SDS for a major depot still showed the old APOD. Major assemblies destined for units north of KKMC were delivered to the APOD at Dhahran in spite of the change made to the DODAACs. Again, this caused unnecessary delay and a burden on the line haul trucks, moving essential repair parts north. The current system of broadcasting DODAAC updates must ensure timely corrections are made to all SDS users.

7. Early in the deployment phase, it became necessary to ensure materials were flowing to the alerted to deploy and to the deploying units. A means used to gain visibility throughout the logistics system was to assign project codes. These project codes can be used to expedite requisition processing for materiel need, by identifying specific materiel requirements and the desired distribution, and to gain visibility over costs associated with ODS. The Joint Chiefs of Staff J-4 assigned three project codes at the request of the Services: 9AU, 9BU, and 9BY. The first project code assigned was 9BU and it was used to give "materiel distribution and movement priority to ODS units, beginning 14 days before deployment and while deployed in SWA". The second project code assigned was 9AU and its purpose was to enable CINCENT activities "to clearly articulate NOT MISSION CAPABLE SUPPLY (NMCS) needs" and to receive premium distribution handling such as dedicated airlift to AOR. The third and last JCS project code assigned was 9BY and it was used to give "materiel distribution and movement priority to Operation Provide Comfort". The Army assigned two project codes: EYY and FAR. EYY enabled both "alerted to deploy" and "deploying" units to receive expedited materiel distribution and handling until 14 days before deployment. FAR enabled the Army to track costs associated with reconstitution of the force. Each of these project codes served as an excellent tool to enable the Army to focus support to units during critical time periods and to ascertain the overall cost of ODS.

8. Accountability of supplies throughout the in-theater supply distribution system was very poor. The break bulk points at the aerial ports were overwhelmed by the volume of materiel flow and the lack of adequate personnel and equipment to effectively accomplish break bulk operations. Documentation was separated from containers and not reported as received to the Logistics Intelligence File (LIF). This resulted in materiel shipments losing their identification and the visibility needed to reach proper destinations (ultimate consignees). Seaport operations were hindered by the slow movement of supplies from the ports. The short duration of the deployment, the rapid buildup of forces in-theater, and the movement of CSS elements in late stages of the deployment flow exacerbated the problem of establishing supply accountability over the materiel flowing into theater.

9. High priority assigned to a requisition relates the importance of the materiel being requested to an end item of
equipment and operational readiness. The procedures for assigning priorities to requisitions were abused by units. In supply class IX alone, high priority (issue priority designator 01 to 08) requisitions averaged between 65 and 85 percent of total requisitions submitted to the wholesale system on a daily basis. Distribution resources had to be diverted and devoted to expediting materiel requirements that did not need expedited premium transportation. These actions caused delays in the shipment of other critical supplies. High priority requisitioning must be held to the bare minimum if the distribution system is going to be responsive in expediting the transportation of critical assets to deployed forces.

c. Transportation.

Victory is the beautiful, bright colored flower. Transport is the stem without which it could never have blossomed.

Winston Churchill:
The River War, viii, 1899

(1) Background.

(a) In parallel with deployment operations that deliver combat capabilities to an overseas theater, sustainment systems require early-on resourcing with the delivery means to provide food, fuel, ammunition, repair parts, and other consumables necessary to maintain the combat power of the deployed force. For ODS the primary sources of sustainment materiel were CONUS, Europe, HNS, and Afloat Prepositioned (PREPO) ships. The deployment distances to SWA are:

Air
- East Coast to SWA - 6,000NM
- West Coast to SWA - 8,225NM

Sea
- East Coast to SWA - 8,450NM
- Gulf Coast to SWA - 8,800NM
- West Coast to SWA - 11,225NM

Airlift to Dhahran from East Coast air bases averaged 17 hours, while average Sealift shipping times were 30-35 days to SWA. PREPO ships, stationed at Diego Garcia, began reaching the sea port of debarkation (SPOD) at C+10. The tonnage on the initial lift of the eight Fast Sealift Ships (FSS) totalled 123,590 tons. The eight FSS were uploaded and sailing by 22 August 1990.

(b) The magnitude of the transportation requirement in support of ODS can be seen in the following numbers for the first 180 days of ODS: over 293,000 passengers and 175,000 tons of materiel were deployed to the theater by air; over 2,800 passengers and 2,105,000 tons deployed by sea. Cargo included
12,457 tracks, 103,441 wheeled vehicles, 1,922 aircraft, 27,491 containers and over 300,000 tons of ammunition.

(2) Airlift.

(a) During ODS the Military Airlift Command's (MAC) capacity to move cargo by air was 2400 ST per day. CENTCOM’s priority for movement was established, in order, as: unit deployment, mail, and sustainment. CENTCOM allocation for sustainment cargo was initially 1400 ST/day, raised to 1600 ST/day in Feb 91. The Army's allocation for daily air shipment of sustainment cargo was 425 ST. In Feb 91 this allocation was raised to 655 ST by CENTCOM. Desert Express flights which began 30 Oct 90 from CONUS and 8 Dec 90 from Europe provided the means for "express" delivery of 25-35,000 lbs of critical sustainment materiel. MAC was also able to use NATO, volunteer charter, and air cargo carriers to service peak demands in ODS.

(b) Civil Reserve Air Fleet (CRAF). The use of CRAF was very successful in augmenting MAC airlift capability. For the first time in its 39 year history, CINC MAC activated stage I of the CRAF. This action taken on 17 Aug 90, was based on the fact that the air taskings from DOD exceeded the joint capability of organic military assets combined with those of civil air carrier volunteers.

1. The CRAF Program, established in 1952 but never activated, has 506 commercial aircraft. Stage I, which can be activated by CINC MAC, consists of 38 long range international passenger and cargo aircraft. Carriers have 24 hours to make aircraft available after Stage I activation. Stage II, which may be activated by the Secretary of Defense, consists of 187 aircraft. Carriers have 24 hours to respond. Stage III may be activated by the SECDEF in time of war. It includes all 506 CRAF aircraft. Aircraft must be available in 48 hours.

2. CRAF II was activated on 17 Jan 91. Actual CRAF aircraft used during stage I and II activations were:

<table>
<thead>
<tr>
<th>ACFT</th>
<th>PAX</th>
<th>CARGO</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRAF I ACFT</td>
<td>17 PAX</td>
<td>21 CGO</td>
<td>38</td>
</tr>
<tr>
<td>CRAF II ACFT</td>
<td>60 PAX</td>
<td>19 CGO</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>117 ACFT</td>
</tr>
</tbody>
</table>

3. As of 28 Feb 91 over 3,093 commercial flights were flown to support ODS requirements. Airlift actual cost data, available as of 15 Feb 91, is shown below:

<table>
<thead>
<tr>
<th>ACFT</th>
<th>COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-5s</td>
<td>$337.4M ($266K/C5)</td>
</tr>
<tr>
<td>C-141s</td>
<td>$256.6M ($90K/C141)</td>
</tr>
<tr>
<td>COMM</td>
<td>$585.4M ($300K/COMM ACFT)</td>
</tr>
<tr>
<td>C-130</td>
<td>$1,180.1M ($22K/C130)</td>
</tr>
</tbody>
</table>

(3) Sealift.
(a) Over 90 percent of the Army supplies and equipment shipped to SWA went by sea. 523 ship loads of materiel were used to carry unit equipment, force modernization stocks, and communication to theater. 217 of these ships originated from OCONUS sources and 306 from CONUS. The 523 ships represent 26.9 million square feet of cargo space. To visualize the amount of cargo loads consider that this equates to 748 football fields filled with equipment parked bumper-to-bumper and door-to-door.

(b) The peak number of ships in use on a single day, either loading, enroute, discharging, or returning for additional cargo, was 220 ships. Shown below are the sealift assets in use by type and number on 19 Jan 91.

<table>
<thead>
<tr>
<th>TYPE</th>
<th># OPCON MSC</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAST SEALIFT</td>
<td>8</td>
</tr>
<tr>
<td>READY RESERVE</td>
<td>51</td>
</tr>
<tr>
<td>PREPO SHIPS</td>
<td>7</td>
</tr>
<tr>
<td>MPS</td>
<td>5</td>
</tr>
<tr>
<td>CHARTER/U.S. FLAG</td>
<td>24</td>
</tr>
<tr>
<td>CHARTER/FOREIGN FLAG</td>
<td>89</td>
</tr>
<tr>
<td>TANKERS/U.S. FLAG</td>
<td>20</td>
</tr>
<tr>
<td>NO COST SHIPS</td>
<td>7</td>
</tr>
<tr>
<td>TOTAL</td>
<td>214</td>
</tr>
</tbody>
</table>

(c) 40 foot containers loaded on commercial carrier container vessels, were the primary means used to moved sustainment cargo. The Military Sealift Command negotiated the Special Middle East Sealift Agreement (SMESA) with U.S. flag commercial container carriers. The vessel capacity of U.S. flag carriers participating in SMESA was 3,400 containers per week. SWA requirements in Feb 91 called for delivery of approximately 1500 containers, a quantity SMESA had no problem supporting.

(d) As of 26 Feb 91 actual sealift costs were as follows:

<table>
<thead>
<tr>
<th>FY 91</th>
<th>$1,527.6M</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 90</td>
<td>$119.6M</td>
</tr>
<tr>
<td></td>
<td>$1,647.2M</td>
</tr>
</tbody>
</table>

(4) Issues/Observations.

1. Although approximately $7 billion was invested to improve sealift during the 1980's, there was insufficient sealift available to rapidly transport Army forces in time to respond effectively had Iraq continued the attack into Saudi Arabia. The shortfall was caused by the lack of large RO/RO ships and by the slow response of ships in the RRF. For example, the 24th Mechanized Division's last unit arrived at the port of Savannah on C+12 but had to wait seven days before a ship arrived.

2. The TPFDD lists do not include force sustainment
packages, and the TPFDD was the primary basis for allocating airlift to the force. Accordingly, sustainment had no immediate priority for airlift. The CINCCENT's operational intent made force closure paramount. Requests were received and goods were shipped to APOE's, only to sit and accumulate. When airlift became available, port operators could not determine shipping priorities from the backlog, so goods were shipped based upon age (first-in, first out). Sustainment requirements and priorities must be communicated to all agencies early in a contingency operation, and transportation must be appropriately allocated or denied. Otherwise, the sustainment machine will plug away, creating backlogs at POEs and obscuring actual priorities for movement.

3. Documentation for seavan container shipments received in theater, except for class V, inadequately identified contents. This fact hindered expeditious throughput by requiring the opening of containers in the vicinity of the port to ascertain cargo contents. Military Standard Transportation and Movement Procedures (MILSTAMP), DOD 4500.32R Vols I & II, provide detailed procedures that should be followed by all shippers. During ODS, shippers faced with increased requirements and the compressed timeframes generated by the contingency opted to provide minimal MILSTAMP documentation that accompanied shipments. Consequently, detailed trailer records were not created for all shipments stuffed into containers. The absence of MILSTAMP detail below general water commodity code required the theater distribution managers to delay onward movement of supplies by opening containers. As an example, when the only information available via the ocean cargo manifest indicated subsistence, repair parts or general cargo containers, the containers were held to ascertain actual contents thereby creating delays for delivery. This was exacerbated by the inability of the in-theater movements structure to effectively communicate or coordinate distribution requirements. The family of transportation ADP systems that routinely process MILSTAMP data needs to be capable of handling detailed trailer record information and provide distribution managers that information. Theater materiel managers must have visibility of container contents in enough detail to determine the priority as to which containers should be delivered, staged at port, or rerouted to other destinations as priorities change--especially in a fluid situation.

4. Combatant commands must inform AMCCOM early as to how to ship ammunition, i.e., breakbulk or containerized. This must be based upon theater capabilities for shipment and handling. The use of containerization is standard operating procedure (SOP), and AMCCOM initially shipped this way.

5. The majority of requisitions from SWA were high priority (TP1 or 999) warranting air movement, which exceeded MAC airlift capability. Army Airlift Clearance Authority (ACA) at Logistics Control Activity (LCA) were overwhelmed with air cargo and gave air clearance on what amounted to a "first-come-first-cleared" basis. The result was that the Army sustainment airlift
allocation was generally filled a few hours after ACA began taking phone calls each day. The theater MMC needs the capability to monitor requisitions sent to NICPs, and take action to enforce supply discipline on requisitions. The theater must establish a unified set of air clearance of sustainment cargo priorities enabling NICPs and ACA to use in air challenge and air clearance procedures. In addition, ACA needs to establish, early on, procedures that provide an overview of cargo denied air clearance, as well as cargo granted air clearance, and furnish this overview to the theater logistics manager or CONUS representative so managers can determine whether air clearance priorities are being followed, and possibly adjust those priorities to meet current needs.

6. Effective movement control in-theater was significantly restricted by lack of communications capabilities and lack of adequate mobility needed to operate across the expanse of the battlefield. The size of the battlefield required the Movement Control Centers (MCCs) to task organize and locate Movement Control Teams (MCTs) at each Corps Support Group to manage and control transportation in and across their areas of responsibilities. By TOE/MTOE, MCCs are authorized only FM radios and commercial vehicles (CUCVs). The expansive and mobile battlefield dictates that the TO&E for MCCs must be changed to include longer range communications assets, more vehicles for personnel assigned to the MCTs, and off-road vehicle capability for MCTs.

d. Maintenance.

(1) Background. The combination of time, distance, and harshness of the desert presented an exceptionally difficult sustainment challenge for maintenance operations. The overall policy for maintenance support in ODS was accomplished based on established maintenance policies and procedures.

(2) Maintenance Support - Corps.

(a) In SWA, there were two corps supporting the divisions. In the chart that follows on the next page, the units listed in each corps are the CSG supporting their divisions. Some of the common maintenance units that were assigned are shown. More heavy maintenance battalions (HEMCOs/LEMCOs) were located in the 2d COSCOM since they were supporting heavy armor divisions. Note that the 16th CSG had 3 LEMCOs and 1 HEMCO with a Recovery and Evacuation Support Detachment.
(b) Each CSG had a non-divisional, DS maintenance company which provided repair parts supply service commensurate with stated capabilities for non-divisional units assigned to, or passing through the corps and theater areas. It also provided backup support for divisional units. The Electronic Warfare/Intercept Equipment Repair Team provided (GS) maintenance for electronic warfare/intercept equipment in support of the theater army supply system. The COMSEC Repair Team provided (GS) maintenance for communications security equipment in support of the Theater Army Supply System. DS HAWK Ordnance Co provided DS maintenance for three HAWK Missile System and associated air defense identification friend or foe systems and associated power generator air conditioning equipment.

3. Maintenance Support - EAC. The organic GS units that were assigned to the ASGs are shown on the chart below. The ASG
provides DS supply and maintenance to units located in or passing through the area. The 593rd Area Support Group structure is typical of the type of units that were assigned to each ASG in the EAC. Repair facilities ranged from partially fixed to totally fixed facilities. Items repaired were returned to the supply system. The PATRIOT Maintenance Companies were in the EAC. The 301st ASG with its 5 Heavy Maintenance Companies were located close to the 1st COSCOM which also provided GS support for the heavy armor divisions.

DESSERT STORM MAINTENANCE SUPPORT EAC

NOTE: SHADED BOXES INDICATE RESERVE COMPONENT HEADQUARTERS

4. United States Army's Support Group (USASG). The USASG served as the theater retrograde processing point for unserviceable reparables and serviceable excesses. To permit effective and responsive processing, the Automated Retrograde Receipt Processing Program used at the European Redistribution Facility was modified for use at the USASG. USASG began retrograde operations of unserviceable reparables on 11 November 1990, using manual processing procedures. Initially, all retrograde shipments were sent to Mainz Army Depot (MZAD),
because it was the closest Standard Depot System facility. This procedure led to delays in availability of materiel for repair. On 1 December, procedures were modified to ship other than TACOM items to appropriate CONUS repair facilities. All TACOM managed items were being evacuated to MZAD. In Nov 90, AMC formed their own area support groups with non-organic units that provided an immediate supply point and maintenance repair for critical weapon systems.

5. Non-Organic Maintenance Support. Non-organic units included the Army Oil Analysis Program with two mobile teams. The concept of oil analysis consists of the sampling and analysis of a small quantity of an item of equipment's used oil. The oil is analyzed for wear metal content, water, and oil condition. The log assistance personnel and special repair activity contractors were located throughout the theater providing technical expertise and repairs on supply and maintenance matters. In host nation support, Saudi Arabia provided significant support to US forces such as facilities, beddown locations, airfields, fuel, water, transportation, food, sanitation, and tentage. A small theater reserve of equipment was established in the EAC. The following chart depicts non-organic elements providing maintenance support at EAC, corps, and division level.

![Diagram showing non-organic elements providing maintenance support]

6. AMC Maintenance Initiatives. AMC organized the USASG in Nov 90 to assure that essential sustainment support to SWA
the theater of operations was in place. Originally conceived as a supply point and a source of critical component repair, the USASG expanded its charter during each month of operation. USASG deployed over 1100 military and civilian employees from 10 DESCOM depots and from 15 other Army elements. While the number on the ground rose and fell, this group accomplished its assigned mission plus the M1A1 "rollover" program. The USASG provided the highest level of support in the theater of operations and provided repair as far forward as the division with their contractors. Repairing in SWA saved the time of having items, especially critically needed items, from being shipped back to the depot level, repaired, and returned to the supply system. USASG served as the theater retrograde processing point for unserviceable reparables and serviceable excesses. The M1A1 rollover program modernized armor units in SWA. Modifications applied included; armor plating, fire extinguisher check valves, NBC heat exchanger, engine fire shield, optical improvement, and CARC paint. All units were provided M1A1 or the M1A1HA (heavy armor) tank version, except 120 M1's in a mechanized division and 706 M1's in theater reserve. Quick Reaction Teams were working with SWA units to resolve readiness problems. Battle Damage Assessment Teams provided technical support to improve survivability rates of critical weapon systems. Special repair activities operated throughout the theater to provide specific support not available in maintenance units.

7. Special Repair Activities (SRAs). The type and number of SRAs are shown on this chart. There were 460 contractor personnel in SWA providing various levels of maintenance support to forces deployed in SWA. In some instances the support covered all levels of maintenance from DS to depot level throughout the theater.
8. ODS Maintenance Unique Actions.

(a) Due to the extreme heat, wind, and sand conditions in SWA, equipment maintenance procedures/activities were continuously scrutinized to ensure immediate and maximum performance. To assist commanders, the publication, TB 43-0239, "Maintenance In the Desert" was revised and issued to SWA units.

(b) Many of the PS monthly magazines had articles on taking care of equipment operating in Desert Storm. Pre-Combat Checklists (PCLs) for 16 of the top combat systems were used by units in SWA. These systems include the M1A1 main battle tank, M2A2/M3A1 Bradley fighting vehicle, M109A2/3 howitzer, M113 armored personnel carrier family, M88A1 recovery vehicle, M728 combat engineer vehicle, M163A1 air defense gun, M548 ammunition carrier, M60A3 tank, M110A2 howitzer, and M578 recovery vehicle.

(c) AMC accelerated production and repair of shortage equipment for units in SWA ranging from protective masks to tanks. Numerous modifications were made to equipment in order to have a longer survivability in SWA.

9. Aviation Maintenance During ODS.

(a) Aviation Environmental Fixes. Aircraft were particularly susceptible to the harsh desert environment. Of particular concern was the damage to rotor blades caused by blowing sand. Rotor blade tape kits were applied to the blades thereby enabling the blades to retain their normal service life. Due to sand ingestion, aircraft engines were modified with Improved Particle Separators. Windscreen repair kits were provided for acrylic and polycarbonate windscreens damaged by blowing sand.

(b) Aviation Contractor Support. Aviation forces deployed to the area of operations with an austere force structure and no existing aviation support infrastructure. Contractor capability had a positive impact on the deployed aviation forces ability to maintain an aircraft availability rate near 90 percent in the harsh desert environment. Aviation contractor support is critical and must be fully considered for employment in future operations. Shown on the next page is the AVSCOM level of support to ODS as of 9 April 1991.
AVSCOM SUPPORT TO SWA
OPERATION DESERT SHIELD / STORM
(AS OF 9 APRIL 1991)

CIVILIAN
62

MILITARY
47

CONTRACTOR
655

TOTAL PERSONNEL IN SWA 764

CONTRACTOR SUPPORT

CFSR's
- MARTIN MARIETTA
- BOEING
- SIKORSKY
- McDonnell Douglas Helicopter Company
- GENERAL ELECTRIC
- BELL
- GRUMMAN

- PETROLEUM HELICOPTER INC.
- SIKORSKY INTERNATIONAL PRODUCTS INC.
- JOHNSON CONTROLS WORLD SERVICES INC.
- McDonnell Douglas Electronics Co.
- Lockheed Support Services Inc.
- BEECH AEROSPACE SERVICES INC.
- AEROMARITIME

- DYNCORP
- GENERAL ELECTRIC
- HUGHES AIRCRAFT
- SHORT BROTHERS
- HONEYWELL
- LYCOMING
- SIKORSKY
- SANDERS
- AGUSTA
- SCIENTIFIC·ATLANTA
- GENERAL INSTRUMENTS
- LITTON (CECOM SRA)

(c) Aircraft Depot Maintenance in SWA. The repair cycle
time for critical high dollar value components was significantly
reduced by the establishment of depot repair facilities in the
AOR. ODS clearly showed the need for maintenance of aircraft
readiness integrated into operational units at division, brigade,
battalion, or separate company level. The capability to repair
and perform limited depot level maintenance for engines,
components, and Mission Equipment Packages (MEP) needs to be
placed at the Corps or Theater level. The forward deployment of selective depot level maintenance proved to be extremely effective in fast turn around of these items thereby significantly increasing readiness and reducing costs of high value aviation inventory.

(d) The Aviation Maintenance Force Structure established for ODS is shown on the chart below.
10. ODS Maintenance Costs. Maintenance costs for ODS are estimated at $6.1 billion. The costs are derived from such areas as:

- **In-country support** $4.7B
  - AMC and DS/GS Army Support Group Facility
  - Contractor assistance
  - Tank roll-over system
  - Tank up-grade
  - Additional OPTEMPO from wear/tear of environment on equipment

- **Equipment Maintenance** $1.4B
  - Purchase of combat vehicle secondary items
  - Rebuild of chemical protective masks
  - Rework of 2.75 rockets
  - In-house contract and depot level maintenance of aircraft and other equipment
  - Wheel vehicle components

11. Operational Readiness.

(a) The following is taken from the ARCENT LOGSTAT Report No. 178, DT 022000ZMAR91:

"Combat Systems Report - ARCENT forces were able to project enormous amounts of combat power on the battlefield during the 100 hours of the ground campaign. The capability survivability, and repairability of our systems have been proven...During the campaign, there was no significant degradation, in the readiness of any fleet. Of significant note is the ability of our systems to operate successfully in a degraded mode. The VII Corps reported combat capable (move, shoot, communicate) an additional 7 of their M1A1 fleet during the campaign."

(b) A senior logistician from one of the Corps was asked to explain how the Corps consistently maintained 90% OR rates despite high ASL zero balance and difficulties with Class IX. The following were articulated as factors contributing to maintenance of a high OR rate in spite of maintaining a high ASL Zero Balance rate that averaged 30-35%.

- An ASL built in peacetime contains many parts such as windshields, seats, wipers, and lights, that are not combat essential and do not affect OR, however, they do affect the zero balance rate.
- Cross-leveling was used extensively to meet NMC requirements.
- ASL is not built to reflect customer unit equipment density in SWA.
- Receipts are not processed in a timely manner to
records.
- Much of the Corps equipment deployed at greater than 95% OR due to efforts prior to deployment.
- War causes a higher commitment to readiness by the crew.
- Desert Express was very successful.
- AMC provided FUPPS and MIs for parts.
- Maintenance swapout program by SUPCOM just prior to G-Day.
- Units brought more parts than reflected in records.
- 4000 V-Packs obtained by Armor Center.
- Canibalization Point and 988th repair parts company (which assisted the USASG in retrograde and evacuation directly behind the deployed forces) provided parts.


(a) On initial deployment, some units deployed without their Tactical Army Combat Service Support Computer System (TACCS), which were deployed later by surface means. Current maintenance operations are dependent on Standard Army Maintenance System (SAMS) which operates on TACCS. SAMS interfaces with the wholesale supply system through DS4 and by direct maintenance data transfer to Materiel Readiness Support Activity (MRSA). These interfaces expedite the issue and receipt of repair parts and provide invaluable planning data for maintenance management evaluation by MRSA and subsequent output, in relation to repair parts consumption and stockage data and manhours, to the field. Materiel Management Centers and G4s must ensure that TACCS devices are included in deployment plans of subordinate units and the systems have required power, communication links, and support to be placed in operation immediately upon arriving in the AOR.

(b) The USASG allowed for the projection of the wholesale system into the theater of operations and provided the structure by which to manage civilian and contract maintenance support. The USASG concept should be formalized in Army doctrine, and procedures established to allow for the rapid deployment of support from the wholesale system on future contingency operations.

(c) The Saudi Arabia Redistribution Facility (SARF) was established to process all Class II, III(P), IV, and IX excess materiel and to redistribute it within SWA, USAREUR, CONUS, or the Defense Reutilization Management Office (DRMO) system. Redistribution of assets began in November 1990. By the end of May 91, the SARF had processed 64,000 receipts valued at $800 million. Personnel staffing for the SARF was made up of AMC civilians and military personnel from the 199th Repair Parts Company. Establishment of the SARF greatly improved asset visibility and accountability over retrograde and excess materiel in SWA. Redistribution facility operations should be planned for and resourced during contingency operations in support of the large scale deployment of forces and materiel.
(d) During initial deployment and buildup, in country laboratories were not available to check oil samples in accordance with Army Oil Analysis Program (AOAP) procedures. It was necessary to put out a change to policy whereby units had to change oil (nor-aviation equipment) at twice the frequency required by the lubrication order rather than as directed by AOAP checks of oil samples. As initial attempts to deploy AOAP equipment were made, it was found that adequate equipment and trained personnel were not available. Ultimately, two mobile labs, staffed by a combination of contractor and Army personnel provided support. AOAP equipment and trained personnel are needed early-on to deploy in support of contingency operations.

(e) Field Services. ODS demonstrated that contingency forces are not self sufficient. This is particularly apparent with field services. Whatever the size of the contingency force, there is a CSS support slice that must run ports, move supplies, and provide essential field service support.

(1) Graves Registration (GRREG) support.

(a) Current GRREG force structure is limited. It does not provide essential capabilities at battalion, brigade, division, corps, and echelons above corps (EAC) to meet battlefield requirements. The GREGG capability in both the divisional and armored cavalry regiment (ACR) force structure is based upon receiving MTOE augmentation personnel and equipment in the DISCOMS and support squadrons. However, these augmentations have not been resourced. In order to support ODS, an ad hoc structure was developed. All EAC GREGG personnel resources (MOS 57F) were pooled to create 38 GREGG collection points. Each collection point was staffed by seven GREGG qualified soldiers. The collection points were allocated four to a division and one to an ACR. The remaining resources were redistributed to create a GREGG capability at EAD and EAC. MTOE equipment required at the 38 collection points was authorized by the DCSOPS and provided for from Army wholesale assets. The ability to establish near-real-time tracking and reporting of the status of remains at the collection points did not exist. To improve this situation, the Air Force's Mass Fatality Management Information System was fielded on an emergency basis to all collection points in the Area of Operations. Lack of dedicated communications links hindered reporting. However, the use of modem-to-modem (E-mail) information transfers from the APOEs at KKMÇ and Dhahran to the Dover Mortuary validated the system's capability.

(b) The U.S. Army does not have a published doctrine for handling chemically and biologically contaminated human remains. At the start of Operation Desert Shield (ODS) the U.S. Army had no procedures, no standardized force structure, and no effective materials and equipment on hand to decontaminate chemically or biologically contaminated human remains. DA ODCSLOG developed procedures, which were subsequently agreed upon by all Services, the Joint Staff, TRANSCOM, and CENTCOM, to effectively decontaminate human remains in a theater of operations in...
preparation for final disposition in CONUS. Procedures are being refined by TRADOC for incorporation into Joint doctrine. For Operation Desert Shield, $2.2M was spent to purchase 48 line items of materiel to equip four graves registration decontamination sites with required stocks to decontaminate remains and prepare the remains for return from theater to CONUS for final disposition. Handling of CB contaminated remains must be part of the overall planning effort on contingency operations.

(c) An adequate GREGG capability requires:

1. The GREGG augmentation in the division and ACR in the forward deployed and contingency corps must be resourced at ALO 1 in peacetime with personnel and equipment in order to be able to perform missions. Experience in ODS demonstrates that one battalion headquarters with four GREGG companies can support one corps if deployed at ALO 1 vice ALO 5.

2. The TOE of all GREGG units must be augmented with refrigerator vans (20 X 8 X 8 FT) in order to provide an adequate interim capability to maintain remains.

3. The Army must further improve the means for rapid transmission of fatality data throughout an area of operations. Further development of the Army's automated system, Mass Fatality Field Information Management System (MFFIMS), is required. This will expedite evacuation and control of remains from the AO to final disposition at the mortuary.

4. An improved capability to conduct Search and Recovery operations, processing of chemical and biological casualties, and processing of personal effects must be established and become an integral part of GRREG training (at unit level) and force structure.

(2) Laundry.

(a) TAACOM supply and service units provide laundry and renovation of clothing for units in the COMMZ and in support of the supply system. In the corps area, laundry and clothing renovation services are provided by non-divisional supply and service companies and by GS field service companies. Laundry and renovation service in the COMMZ may also be obtained from HN facilities.

(b) Operation Desert Shield validated that the M532 Laundry units must be replaced with the newer M85 laundry units. According to the Logistical Assistance Representatives (LARs) in SWA the Operational Readiness rates (OR) for M532 laundry units was 20% - 40% and the repair part replacement percentage was 35% in stock or in the system. Machinists built most of the needed parts. TROSCOM was able to produce 119 M85 Laundry, Trailer Mounted (LTM) units to support ODS. In addition, 5 M85 LTM were installed with Water Recycling Kits (WRK) with 15 additional kits ready to be installed. These WRK cut the water usage...
requirement by 50% (6000 gal per unit to 3000 gal per day per unit). 150 WRK are being programmed for M85 LTM units with arid mission requirements. The WRK cost $5,200 a unit but can save many dollars in storage, transportation and field water requirements.

(c) HNS laundry assistance in built up areas was available in SWA. HNS laundry support handled the requirements for at least 60,000 soldiers.

(d) Clothing repair and renovation needs added attention. There are currently 88 Clothing and Renovation Trailers in the system.

(3) Bath.

(a) The standard is to provide at least a weekly bath for each soldier. Supply and service units in the corps and TAACOM provide this service through the use of bath teams.

(b) Host Nation Support (HSN) showers were used extensively, but were difficult to keep filled with warm water and were difficult to deploy to forward areas. There were 9,000 - 3 head showers built by HNS. The 9-head shower is a replacement for the current 8-head showers, but there are not enough in the system to replace all 8-head showers. 84 9-head shower units were sent to SWA.

(4) Bakery. 5 bakery units were taken to SWA, but only 2 were used. The present bakery is from the World War II era and difficult to maintain. The Army needs to re-look bakery unit needs for the future.

(5) Delousers. 34 systems (10 gun hose system) were sent to SWA and all systems functioned. Currently, medical researchers at Fort Detrick are developing a new gun spraying unit and are researching new disinfectants.

(6) Airdrop.

(a) Airdrop resupply for EAC and VII Corps was done by the 53rd QM Detachment, the 861st QM Company, and the 421st QM Company. Support to XVIII ABN Corps was provided by 612th AD Company, 1st COSCOM.

(b) Several resupply missions of Class III (bulk) and CI III (package) were dropped along with rations, clothing and medical items. Although the cease fire had been in effect for several days, airdrop operations continued. In support of the maneuver plan only XVIII ABN Corps planned for any air drop operations. Airdrop was used successfully and the riggers flexibility was demonstrated by successfully airdropping bottled water; 120 mm ammo, CPOGS, Hellfire missiles and MLRS pods.

(7) Enemy Prisoners of War (EPWs) and Refugee Support.
(a) As Operation DESERT SHIELD transitioned to Operation DESERT STORM, it was evident that planning and executing the logistics support for EPW was insufficient. It also became evident that there was insufficient support planned for refugees fleeing the conflict and subsequent civil unrest in Iraq.

(b) There were no supplies available to support EPWs or refugees at the beginning of DESERT SHIELD. The possibility of such a large EPW population was not foreseen nor expected. Requirements to support the EPWs were not identified until the military police command that had been given the mission arrived in Jan 91. In addition, the unit had some initial difficulty processing their requisitions. Lack of prepositioned stocks necessitated intensive negotiations for Host Nation Support and in some cases requisitions were passed to CONUS telephonically. Once requirements were identified, the logistics system was successful in providing the necessary supplies or substitutes. However, the late identification and requisitioning of requirements resulted in the use of precious airlift and fast sealift assets to meet theater demands. The large continuing requirements to support refugees was also unexpected. Initial stocks to support EPWs and refugees must be available early on during a contingency operation. Host Nation Support was successful in providing the majority of the required supplies. A project stock of supplies would also have alleviated the difficulty of supporting EPWs and refugees.
V. War Reserve Stocks.

a. Theater Reserve Stockpiles. Operation Desert Storm demonstrated the need for modernized theater reserves. The Army used six of its 14 OCONUS prepositioned theater reserve stockpiles and two of its three CONUS-based theater reserve stockpiles to provide coalition forces with preferred warfighting equipment and munitions such as tanks, trucks, chemical protective clothing, 155MM munitions, TOW missiles, Multiple Launch Rocket Systems and Stingers. Over $469M worth of clothing, packaged oil and lubricants, and repair parts from CONUS Reserves were issued. A portion of the total Class I support requirement for T-Rations, MREs, and "B" rations were drawn from prepositioned ship (MREs only) stocks and USAREUR/CONUS theater reserve stocks.

b. Prepositioning Of Materiel Configured to Unit Sets (POMCUS). Issues of POMCUS stocks to support Desert Shield began as early as 18 August with the shipment of 10 laundry trailers, but remained very limited until mid-October. Rationale for limiting issues was originally to maintain POMCUS set integrity pending final decision on where and how they were to be utilized in support of possible unit rotations. With the decision in October to modernize the deployed units, issues from POMCUS began in earnest. Significant issues from POMCUS were as follows:

<table>
<thead>
<tr>
<th>ITEM</th>
<th>ISSUES FROM POMCUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1A1 TANKS w/MG's and RADIOS</td>
<td>865</td>
</tr>
<tr>
<td>M3A2 BFV</td>
<td>116</td>
</tr>
<tr>
<td>HMMWV</td>
<td>1073</td>
</tr>
<tr>
<td>OTHER TACTICAL WHEELED VEHICLES</td>
<td>467</td>
</tr>
<tr>
<td>TRAILERS</td>
<td>233</td>
</tr>
<tr>
<td>FLOODLIGHTS SETS (TRLR MNTD w/GEN's)</td>
<td>454</td>
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<tr>
<td>TELEPHONE SETS</td>
<td>100</td>
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<tr>
<td>RADIOS</td>
<td>6769</td>
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<tr>
<td>GEMMS (Mine scattering system)</td>
<td>2</td>
</tr>
<tr>
<td>DEPMEDS</td>
<td>13</td>
</tr>
<tr>
<td>4K ROUGH TERRAIN FORKLIFTS</td>
<td>30</td>
</tr>
<tr>
<td>10K ROUGH TERRAIN FORKLIFTS</td>
<td>27</td>
</tr>
<tr>
<td>16,000 LB LOADING RAMPS</td>
<td>3</td>
</tr>
<tr>
<td>HOWITZERS</td>
<td>108</td>
</tr>
</tbody>
</table>

c. Prepositioned (PREPO) Ships.

(1) In the 1980 timeframe, the proposal to establish a Near Term Prepositioning Force (NTPF) in support of CENTCOM was initiated. This program proposed storing NTPF cargo on 17 ships which would be strategically positioned and moved to support CENTCOM contingencies. A Memorandum of Understanding (MOU) dated 1 December 1987 between TUSA, WESTCOM and AMC granted final authority for the prepositioning of four ships (decreased from 17 ships due to funding availability) to store theater reserve materiel in support of Southwest Asia (SWA). Due to limited access rights, all four PREPO ships were ported at Diego Garcia and are identified on the below:
Three Lighter Aboard Ship (LASH) Vessels
  -- Green Harbor
  -- Austral Rainbow
  -- Green Island

One Heavy Lift Prepo Ship (HLPS)
  -- American Cormorant

(2) The PREPO ships stationed at Diego Garcia proved indispensable during the first days of Operation Desert Shield by providing a readily available source of critically-needed supplies to the AOR. The war reserve cargo placed on board these ships included Class I (subsistence), II (general supplies and equipment), III(P) (packaged POL products), IV (construction and barrier equipment), V (ammunition), and VIII (medical materiel) supplies. The one heavy lift prepositioned ship carried Class VII (major items) port operating equipment.

(3) Shown below are the amounts of supply and port operating equipment that were stored on the four preposition ships.

| CARGO ABOARD GREEN HARBOR/AUSTRAL RAINBOW/GREEN ISLAND (THREE LASH VESSELS) |
|-----------------|-----------------|
| CLASS I         | 110,000 CASES OF MREs |
| CLASS II        | 5,000 REMAINS POUCHES |
| CLASS III       | 70,768 CASES OF ASSORTED PKG PRODUCTS |
| CLASS IV        | 2,000 ROLLS OF CONCERTINA |
|                 | 1,000 ROLLS OF WIRE, BARBED |
|                 | 500 SHORT PICKETS |
|                 | 500 LONG PICKETS |
| CLASS V         | CONVENTIONAL |
| CLASS VIII      | 1 MEDICAL RESUPPLY KIT (CORPS LEVEL SPT PKG) |
|                 | 2 MEDICAL RESUPPLY SETS #1 |
|                 | 625 BLANKETS |
|                 | 5,000 LITTERS |
|                 | 5,000 RESTRAINT STRAPS |

| CARGO ABOARD AMERICAN CORMORANT (HEAVY LIGT PREPO SHIP) |
|-----------------|-----------------|
| 4 - 100 FT TUGBOATS |
| 2 - 100 TON FLOATING CRANES |
| 4 - LANDING CRAFT UTILITY (LCU) |
| 10 - LANDING CRAFT MECHANIZED (LCM) |
| 8 - 50K ROUGH TERRAIN CONTAINER HANDLERS |
| 5 - 6K ROUGH TERRAIN FORKLIFTS |
| 13 - CARGO HATCH KITS |
| 10 - WATERCRAFT & MHE REPAIR PARTS CONTAINERS |
d. Operational Projects. Operational Projects, which contain stocks of supplies and equipment above the normal allowance levels a unit is authorized to maintain, are designed to support specific operations, contingencies, and war plans. To help meet ODS requirements, assets from a total of 22 (43%) of 52 Operational Projects were called forward from every Major Command except SOUTHCOM. The types of supplies and equipment items drawn from Operational Projects included: hot weather clothing and equipment, water support equipment, life support supplies, port clearance watercraft, materiel handling equipment, POL distribution system, clothing, organizational clothing and individual equipment (OCIE) items, and aluminum aircraft matting.

e. Importance of War Reserve Stocks. Theater and CONUS war reserve stockages, both ashore and afloat, POMCUS, and operational project stocks proved critical during ODS to the rapid resupply of deployed forces. The Army needs to replenish, modernize, and strengthen current stockage levels in order to reestablish and provide an acceptable sustainment capability for the "next fight".
VI. Modernization Efforts during ODS.

a. Background. The equipment modernization objectives for ODS focused on providing the deployed force with the most modern and lethal equipment available to facilitate achieving a swift, decisive victory with minimum casualties. To accomplish the modernization objective required expedited fielding of new equipment as well as some modification upgrades to existing equipment. In some cases the new equipment fielding and the modification actions on existing equipment were accomplished prior to the unit's deployment to SWA. However, extensive new equipment fielding and modification actions had to be conducted to upgrade unit's already in Saudi Arabia. Shown below are the equipment items on which expedited fielding and modernization efforts centered.

**EXPEDITED FIELDING & MODERNIZATION**

- M1/M1A1
- M2A2/M3A2
- MLRS
- ATACMS
- NBC SUIT
- AIRCRAFT MODS
  (JAMMER, FILTERS)
- BALLISTIC LASER
  EYE PROTECTION
- TYPE II REMAINS
  POUCH
- UH-60 BLADE
  EROSION KIT
- M9 ACE
- HETS
- AVENGER
- STINGRAY
- LAV
- M551
- Arid Augmentation System
- Aircraft BDA & Repair Kit
- Improved Particle Separator & Engine Air Particle Separator

- JSTARS
- BCS
- WATER STORAGE
  (TANKERS, TRLRS,...)
- 40K POL
  DISTRIBUTION SYSTEM
- PURE FLEET HMMWV
- LEWDD (LT WT EARLY WARNING DETECTION DVC)
- SLGR
- NBCRS
- AMMO
- TENCAP
- PATRIOT II MISSILE
- UAV
- MCS (MNVR CNTRL SYS)
- 600 GPH ROWPU
- 3K GPH ROWPU
- DEPMEDS
- 6K VRRTFL
- Aircraft Vibration Analysis Kit

b. Key Weapon Systems Modernized for ODS Forces.

(1) Shown on the next page are the major weapon systems issued during the ODS modernization efforts. The "INITIAL" quantity represents ODS end items density before modernization, and the "MODERN" column represents equipment densities after modernization.
(2) Tactical wheeled vehicle off-road mobility became a critical factor during Operation Desert Shield. To meet mobility requirements for divisions and regiments, units were pure fleeted with enhanced mobility vehicles such as High Mobility Multipurpose Wheeled Vehicles (HMMWV), five ton trucks with central tire inflation system (CTIS) and Heavy Expanded Mobility Tactical Trucks (HEMTT) to supply fuel and ammunition to maneuver units. The tactical mission to move a unit's weapon systems "to the battlefield" was added for the Heavy Equipment Transporter (HET), which traditionally had been focused on carrying out the mission of recovery and evacuation "from the battlefield". The charts on the next page show the HEMTT and HET arrival forecast for SWA as ground hostilities concluded (28 Feb 91).

(3) The modification efforts to upgrade equipment in theater parallel the special maintenance missions accomplished by AMC elements and the USASG, which are described below.

(a) Reactive Armor - During the period 11 Sep - 27 Oct 90, 13 Anniston Army Depor (ANAD) personnel deployed to Saudi Arabia to apply Reactive Armor to 75 USMC M60 Series Tanks.

(b) M1/M1A1 Abrams Tanks - During the period 6 Nov 90 - 10 Mar 91, 1,032 M1/M1A1 series Abrams Tanks were upgraded to FMC/TM 10/20 standards in support of deploying units and the establishment of a Theater Reserve. In addition to the FMC/TM 10/20 upgrade, crew survivability was enhanced through the application of additional turret armor plating (1,034 M1A1s), Desert Tank CARC paint (996 M1/M1A1/M1A1-HA), and optic improvements (247 M1A1s). Fire shield/fire extinguisher check valve modifications were applied to 758 M1A1 Rollover Tanks with the theater reserve M1A1s receiving modifications as necessary. A total of 1,210 M1A1/M1A1-HA were rolled over. A peak of 271
personnel were deployed to support this mission augmented by 32 personnel from the USASG.
(c) Battalion Countermine System (BCS) - During the period 12 Nov 90 - 11 Feb 91, 13 sets of M1 Abrams Tank BCS were deprocessed, modified, and issued to deploying units. A total of 9 ANAD personnel were deployed to support deprocessing and a follow-on mission in which one individual remained on-site until 4 Mar 91 to train Active Army personnel in the application of BCS.

(d) M551A1TTS Armored Reconnaissance Airborne Assault Vehicles - During the period 2 Dec 90 - 15 Jan 91, 48 M551A1TTS ARAAVs were deprocessed and handed off to units of the 82nd Airborne Division. A total of 8 personnel were deployed from ANAD to support this mission.

(e) Landing Control Central System An/TSQ 71B - During the period 18 Dec 90 - 21 Jan 91, modifications, to include installation of the air conditioning system, were applied to 7 AN/TSQ-71Bs. A total of 4 personnel were deployed from TOAD to support this effort. Two personnel from the USASG augmented the team.

(f) TOW II Anti-Tank Missile - During the period 19-30 Dec 90, modifications were applied to approximately 310 TOW II Missile Guidance Systems. A total of 3 personnel were deployed from MZAD to support this mission.

(g) Multiple Launch Rocket System (MLRS) Modifications. During the period 15 Dec 90 - 10 Mar 91, 5 reliability Modification Work Orders (MWOs), including the Deep Attack Mod, Blast Panel Retrofit and Azimuth Transducers, were applied to 138 MLRS Launchers. Twenty-five personnel were deployed to support his effort.

(h) Battalion Countermine System Modifications - During the period 2 Jan - 10 Mar 91, 279 Mine Plows and 85 Adapters were modified for application to the M1 Series Abrams Tank. This mission was accomplished in conjunction with the M1A1 Theater Reserve Program.

(i) M1A1 Abrams Tanks - During the periods 8-12 Jan 91 and 19-22 Feb 91, a total of 76 M1A1 Abrams Tanks (60 M1A1-HA, 16 M1A1 Common) were deprocessed and handed off to the USMC. With the exception of 2 personnel deployed from ANAD during the period 8-12 Jan 91, the USMC M1A1 mission was supported by reassigning approximately 18 personnel already in-country.

(j) TACJAM Modifications - During the period 6 Jan - 21 Feb 91, collective Protective Equipment (CPE) modifications were applied to 2 TACJAM Systems. Four personnel were deployed from TOAD to support this effort.

(k) Wheeled Vehicle Fielding - During the period 23 Jan - 10 May 91, a total of 3,868 wheeled vehicles were deprocessed and handed off to deploying units. A total of 62
personnel were deployed to support this mission.

(1) M2/M3 Bradley Fighting Vehicles (BFVs) - Army depots (Mainz and Red River) and civilian contractors upgraded the A2 model of the IFV and CFV with latest technology before shipment. These vehicles arrived in SWA ready to fight less the basic load of ammunition and fuel.

(m) Digital Communications Satellite Subsystem (DCSS) - During the period 11 Mar - 11 Apr 91, 5 TEAD personnel operator maintenance training on an AN/GSC-52 Strategic Satellite Communications System.

(n) Customer Assistance - The USASG was tasked by ARCENT with providing 6 DACs and the 170th/900th HEMCOs to assist the 593rd ASG in the retrograde of M1s and M2/3s to CONUS depots for upgrade. Additionally, 12 DACs provided technical expertise to VII Corps units in repainting approximately 8,000 vehicles scheduled for redeployment to Europe.

(4) Army Modernization Programs. The highly successful performance of new equipment, in many cases in combat for the first time, served to validate the Army's past modernization investment strategy. Modernization is a continuing evolving process. ODS observations will be used to identify future modernization upgrades for systems as well as identify the need to replace less effective systems.
VII. INDUSTRIAL BASE

a. Background.

(1) The defense industrial base is composed of the total privately-owned and government-owned industrial production structure of the United States and Canada. It also includes the depot-level equipment and maintenance capacity of the United States, its territories and possessions, as well as capacity located in Canada which is or shall be made available in an emergency for the manufacture of items required by the United States Armed Forces and its selected allies.

(2) The authority making the privately-owned U.S. portion of the North American Industrial Base subordinate to the government in time of emergency or war is the Defense Production Act (DPA) of 1950 (Title 50, USC, App. 2061). This act expired on 20 Oct 90. During Operation Desert Storm (ODS) concern arose over the potential implications of obtaining necessary industrial support and contractor services without the DPA-50. Based on the provisions of the existing Selective Service Act, an interim measure was adopted with the signing of Presidential Executive Order (EO) 12742, 8 Jan 91. The EO extended Title I Priorities and Allocation authority of the DPA and gave the government authority to place priority ratings on contracts or orders. Therefore, regardless of contractor commitments to other parties, their first priority would be to devote production capacity to government requirements for ODS. Both Houses of Congress have agreed that there is a need for a fully restored DPA. Two bills have been drafted but are not expected to be acted upon until after Congress reconvenes in September 1991.

(3) A fully restored DPA with Title I and III Authority is needed to provide the government the authority required during emergencies to task the privately-owned sector for necessary production capacity and resources, and to expand the industrial base by developing domestic capability for critical materials where none currently exists.

b. Activity in Support of ODS.

(1) Industrial Base participation in support of ODS was extensive. Through March 1991, accelerated production and accelerated RDT&E for ODS involved participation of 2,580 contractors for contracts worth $8.8 billion (see chart on the next page). The major portion of contracts let by Army Materiel Command were for conventional ammunition, missiles, water purification and distribution systems, repair parts for aircraft, combat and support vehicles, ground support equipment and electronics and communications equipment. The majority of contracts let by the Defense Logistics Agency in support of Army ODS requirements were for combat rations, medical supplies, chemical defense equipment, DBDUs, fuel and packaged petroleum products and barrier material.
INDUSTRIAL BASE
PRODUCTION SURGE STATUS

<table>
<thead>
<tr>
<th></th>
<th>AMC</th>
<th>DLA</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTRACTORS</td>
<td>1537</td>
<td>1043</td>
<td>2580</td>
</tr>
<tr>
<td>CONTRACT LINES / ACTIONS</td>
<td>23,615</td>
<td>94,507</td>
<td>118,112</td>
</tr>
<tr>
<td>DOLLAR VALUE</td>
<td>$3.9B</td>
<td>$4.9B</td>
<td>$8.8B</td>
</tr>
</tbody>
</table>

BOTTOM LINE: ACCELERATED PRODUCTION, ACCELERATED RDT&E, REALLOCATIONS OF WAR RESERVE STOCKS AND SIX MONTH BUILD UP CONTRIBUTED TO OVERALL SUCCESS

(2) For the most part, the industrial base was not well prepared to begin surge or accelerated production of many urgently required items at the onset of ODS. Part of the problem involved the short term availability of rolling inventory of long leadtime components (LLC) or items (LLI). For Patriot PAC 2 missiles, the LLC limiting production was the fuze. For DBDUs the LLI which initially limited production was availability of
the milled DBDU pattern material itself. For other important items such as T-Rations, production capability could not be quickly expanded.

(3) Many shortfalls in production capability were overcome as a result of the benefit of a 6-month buildup prior to initiation of conflict. This permitted accumulation of larger stockpiles of certain items not because of increased production capability but rather because of time—a luxury that cannot be counted on in the future. Other shortfalls were overcome by: reallocation of supplies and equipment from other theaters (war reserve stocks); accelerated procurement of chemical defense equipment, clothing, food, and munitions; and surge production of selected items including Patriot PAC 2 missiles, 25MM ammunition, maintenance and chemical protective shelters, water chillers, and Reverse Osmosis Water Purification (ROWPU) Overpacks.

c. Issues/Observations. ODS demonstrated that "given time" the industrial base can accelerate production and expand facilities to meet emergency requirements in most cases. However, there are serious shortfalls. The ability to rapidly surge production for many key items such as selected conventional and "smart" munitions, repair parts, and even basic commodities like clothing and rations is limited. In order to be better prepared in the future to meet Army requirements in an emergency the following should be considered:

(1) The establishment of a surge capability for selected "War Stopper" items. This entails adoption of Industrial Preparedness Measures (IPM) to include (a) stockage of a rolling inventory or LLI/LLC to permit rapid sustained accelerated production of key items and (b) the purchase of additional special test equipment and other equipment to be set aside and utilized in emergencies to expand production.

(2) The maintenance of a "warm base" of dedicated contractors. Presently, orders placed with numerous contractors during ODS are being produced as fast as the means of production allows. Even at accelerated rates of production, many contract orders will not be filled until well into 1992. Contracts should be decelerated and delivery of orders spread out over a longer period of time. This will assist in the maintenance of a warm base over a longer period of time. Accepting contracted goods under the ODS schedules would facilitate the creation of another "cold base" before its time.

(3) In light of the time it requires to ramp up production in an emergency, it is imperative that the Army maintain adequate "war reserve stockage" levels to compensate for anticipated consumption rates in future mid-to-high intensity conflicts. This is particularly important for certain items with expected high usage rates for which no warm base will exist in the next few years. A good example is 155MM ammunition. By 1993 there will be no warm base for 155MM ammunition. Similarly, the present helicopter and tank production base will go cold in the
1990s in preparation for start-up production of a follow-on generation of helicopters and tanks.

d. Future Initiatives.

(1) The Secretary of the Army has directed the Assistant Secretary for the Army, Installations, Logistics, and Environment (ASA IL&E) to make an assessment of the adequacy of the industrial base to support Army requirements over the next ten years. The objective of the study is to identify the actions necessary to sustain a strong industrial base capable of supporting Army requirements in future scenarios, to include scenarios of at least the same magnitude of ODS.

(2) An additional major goal of the industrial base assessment will be to articulate the manner by which the concept of Graduated Mobilization Response (GMR) can be applied to future emergencies where warning indicators are responded to in concert with a developing threat to gradually prepare the industrial base for a maximum effort should conditions deteriorate to war. The application of GMR may prove particularly effective in preparation for a potential conflict beyond the mid-intensity range which could require full or total mobilization.
VIII. Security Assistance Programs in SWA during ODS.

a. Background. Security Assistance is vital to the concept of coalition warfare. This was evidenced by the significant increase in the volume and size of Foreign Military Sales (FMS) requests from SWA countries with the initiation of ODS. The FMS requirements surge was not limited to the Arabian peninsula countries. Allied forces from outside the region who either had forces participating in the theater or had defensive roles in other countries bordering Iraq had increased requirements for U.S. military equipment. During the first six months of ODS, FMS requests for Saudi Arabia, Bahrain, Egypt, Oman, and the United Arab Emirates were in excess of $12 billion.

b. Activity in support of ODS.

(1) The significant increase in FMS requests during ODS was an attempt by many foreign customers to overcome planning and stockage shortfalls prevalent in the regions military forces. They therefore submitted the majority of their requests as critical requirements needing immediate fill. This surge in FMS requests coincided with a surge of demands to meet U.S. Army requirements. There were not adequate stocks or production capability to fully satisfy both sets of competing requirements. The consequence was a requirement for a Diversion Decision Consideration (DDC) process to be initiated on nearly every FMS critical request. Over 240 DDCs were received and staffed by the ODCSLOG Directorate for Security Assistance.

(2) Some US planners and policy makers also appeared to believe that Security Assistance was a panacea able to quickly bolster inadequacies in foreign force structure and equipment levels. Although the FMS system is designed to be responsive, that responsiveness is geared towards peacetime tempos and requirements. It is not designed to be an emergency resupply system able to keep pace with war time requirements. The fact that the system was able to meet the majority of the requirements placed on it is due in a large part to the notable responsiveness of the Major Subordinate Commands in identifying equipment availabilities, developing diversion data and developing FMS cases in time spans well under the normal standards. Secondly, the diversion process at the Army Staff level was streamlined within both ODCSLOG and ODCSOPS in order to expedite the consideration process.

(3) The ODCSLOG, Security Assistance Directorate in keeping with established procedures was the action office and clearing house for all diversion requests. ODS diversion requirements were processed, staffed, and tracked by a devoted cell within the ODCSLOG Security Assistance office. Staffing packets were distributed to the cognizant offices within the ODCSLOG and the ODCSOPS. The ODCSOPS, Directorate for Force Development served as the primary focal point and final approval authority within ODCSOPS for diversion requests.
(4) The one notable exception to the diversion process was that established for diversion of chemical protective gear. FMS requests for chemical gear were provided to an ODCSLOG cell which was specifically established to determine availability and allocations for FMS requirements. Allocations of chemical gear availability for FMS requirements were coordinated with the ODCSLOG Security Assistance Directorate and passed to the Defense Security Assistance Agency which divided the allocation between customers.

(5) The listing shown below, in paragraph d., illustrates the magnitude of the diversion requirement and the positive result. Diversions approved totaled over 56% of validated requests. FMS equipment requests included a vast array of equipment from M60A3 to field kitchens and water purification units.

c. Issues/Observations.

(1) While the Security Assistance program in support of Operation Desert Shield/Storm proved to be both responsive and effective, it was due in a large part to the leadtime available prior to the opening of hostilities and the overall short duration of the conflict. Another major factor which contributed to responsiveness was the Presidential determination which eliminated legislative restrictions and notification requirements for selected defense equipment.

(2) Had the buildup to conflict been shorter, it is not clear that the FMS system could have met requirements. The laws under which the Security Assistance system operates and the long production lead times associated with many major weapons systems restrict the ability of the U.S. to satisfy the foreign customer requests for many types of equipment and associated support.

(3) Security Assistance is a long-term program. While the current experience has demonstrated an ability to surge to meet extraordinary circumstances, the positive outcome in this instance was the result of adequate lead time. The time factor is not likely to always be favorable. Thus, it is imperative that the unified commands and Security Assistance organizations in-country emphasize to host countries the importance of planning for required force structures and stockpiling critical items. The FMS customers must be apprised of the FMS process and the associated timelines.

d. Diversion requests and actions (As Of 1 Mar 91). The following listings of FMS diversion requests resulting from ODS shows the item to be diverted, the quantity requested, the country involved, and whether the diversion was (1) approved, (2) disapproved, (3) returned for additional justification to the requesting country, (4) approved but declined by the requesting country, (5) pending action, or (6) canceled.
(1) Approved.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>COUNTRY</th>
<th>QTY</th>
<th>NOTE</th>
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<tr>
<td>PARACHUTE, PERS., T10-C, LIN: N67925</td>
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<tr>
<td>WATER PURIFICATION EQUIP RO 600</td>
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<tr>
<td>TANK ASSEMB. FABRIC, M150, 3K GAL</td>
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<tr>
<td>CAMOUFLAGE SCREENS</td>
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<td>TOW FIELD TEST SET ADAPTER</td>
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<td>OE 254/GRC ANTENNA</td>
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<td>STINGER WEAPON ROUNDS</td>
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<td>STINGER MISSILE ROUNDS</td>
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<td>M140 TEST SET</td>
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<td>COMPUTER GROUP</td>
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<td>FIELD KITCHEN, TRAILER MOUNTED</td>
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<td>M577 COMMAND POST CARRIER</td>
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<tr>
<td>TOOL KIT, VEHICLE FULL TRACK</td>
<td>2</td>
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<td>SHOP EQUIPMENT, AUTOMATIC MAINT AND REPAIR</td>
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<td>SHOP EQUIPMENT ARTILLERY MAINT</td>
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<td>SHOP EQUIPMENT, AUTO MAINT AND REPAIR</td>
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<td>POSITION AND AZIMUTH DETERMINING SYSTEM (PADS)</td>
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<td>M978 HEMTT</td>
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<tr>
<td>GRENADE MACHINE GUN</td>
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<td>SHOP EQUIPMENT, FUEL AND ELECT</td>
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<td>POSITIONING AND AZIMUTH DETERMINING SYSTEM (PADS)</td>
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<tr>
<td>60MM CTG HE M720 W/FUZE M735</td>
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<td>13</td>
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<tr>
<td>CARRIER, AMBULANCE, M113A3</td>
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(3) Diversions returned for additional justification.
(4) Approved but declined.

IMPROVED CONTACT SUPPORT SET 4 SR
M49A2C TRUCK 90 EG

(5) Pending.

TANK, M60A3 1 SR
TRANSMISSIONS, M113 125 EG
TELEPHONES, TA-312A/PT 832 SR
PATRIOT, RADAR SET, AN/MPSQ-53 3 SR
PATRIOT, ENGAGEMENT CONTROL STATION, AN/MSQ-104 4 SR
PATRIOT, LAUNCHING STATION, GM 12 SR
PATRIOT, SHOP EQUIPMENT, AN/TSM-164 3 SR
PATRIOT, SMALL REPAIR PARTS TRANSPORTER, M1032 3 SR
PATRIOT, LARGE REPAIR PARTS TRANSPORTER, HEMTT 3 SR
PATRIOT, GUIDED MISSILE TRANSPORTER, M985A1 3 SR
PATRIOT, ANTENNA MAST GROUP, OA-9054 5 SR
PATRIOT, COMMUNICATIONS RELAY GROUP, AN/MRC-137 2 SR
PATRIOT, PLL/ASL 1375 SR
TRACTOR, 10 TON, M983, FOR PATRIOT 15 SR
TRUCK, 5 TON, M931, FOR PATRIOT 5 SR
PROTECTIVE ENTRANCE, M14, FOR PATRIOT 6 SR
INSTALLATION, M265, FOR PATRIOT 6 SR
GAS PARTICULATE FILTER UNIT, M59, FOR PATRIOT 21 SR

(6) Diversions canceled.

PROJECTILE, 155MM M712 (COPPERHEAD) 2,000 EG
M728 COMBAT ENGINEER VEHICLE 2 EG
TRAINER HANDLING GM LAUNCHER 3 #1 DE
RECHARGING UNIT COOLANT M80 1 #1 DE
CHARGER BATTERY PP 7309 1 #1 DE
PANEL ASSEMBLY (FOR STINGER TRAINER) 1 #1 DE
BASIC STINGER WEAPON ROUND 12 #1 DE
BATTERY PACK 4 #1 DE
BASIC STINGER MISSILE ROUND 12 #1 DE
INTERROGATOR SET IFF 4 #1 DE
PROGRAMMER INTERROGATOR AN/G5X-1A 1 #1 DE
M109A2/A3 TRUCK VAN SHOP 35 SR
SMOKE GENERATORS 100 SR
AN/PRC-126 HAND-HELD RADIOS 1,000 SR
CTG 81MM M374 W/O FUZE 95,000 SR
PROJECTILE 155MM HE M107 109,600 SR
GRENADE, FRAG M67A1 W/FUZE 318,000 SR
CARTRIDGE 7.62 BALL M80 LINKED 60,200,800 SR
CARTRIDGE 81MM ILLUM M301 SERIES 24,078 SR
M49A2C FUEL TANKERS 86 #10 SR
RADIO SET AN/VRC-47 (MLRS) 9 SR
RADIO SET AN/VRC-64 (MLRS) 18 SR
RADIO SET CONTROL GROUP AN/GRA-39B (MLRS) 2 SR
TEST SET, TS-3895A/UV (MLRS) 2 SR

92
NOTES:
#1 - Requirement will be filled by the Netherlands
#2 - USAREUR approval received.
#3 - Offered M548 instead
#4 - Offered M998 & M1025 instead
#5 - Original diversion from procurement not valid; revised to offer Condition Code N assets (emergency combat use only).
#6 - Issue reopened and approved for 2 (150 versus 152) less than request following initial disapproval.
#7 - Screens will be delivered at 1,000 per week beginning 15 Oct 90 from procurement of Saudi peculiar camouflage. U.S. camouflage is not suitable and is not available. Deliveries will be concurrent with deliveries to the U.S.
#8 - Night sights are included with the TOW 2 launchers coming off the conversion line.
#9 - DRAGON 2 missiles have been approved for issue from conversion line, contingent upon replacement with DRAGON 2 to be retrograded from Europe and modified at Saudi expense. ENDP is required to deliver DRAGON 2 to Saudi Arabia; request submitted 8 Nov 90. EUCOM approval to divert pending.
#10 - Diversion approved from EUCOM; materiel not available. Was being reconsidered when USASAC advised that new procurement delivery will be available in Dec 90. OBE.
#11 - Item is substitute for 60mm cartridge HE M720 W/Fuze; EUCOM approval required.
IX. Logistics Automation.

a. Background. ODS occurred at a time of transition for the automation architecture (hardware and software systems) being used at various organizational levels within the Army. The old methods of manually filling out requisition forms and batch processing request to the next higher source of supply is being replaced by hardware and software systems that will process requisitions and status from the company through division/corps/theater/and National Inventory Control Point (NICP) levels by means of electronic data transfer. In SWA, the mix of logistics automation architecture in units ranged in capability from batch processing (SAILS/DS4) to interactive processing (SARSS-0). The lack of tactical communications support for electronic transfer of data resulted in CSS units below division level hand carrying by supply transactions floppy disk or magnetic tape, delaying by days the time necessary to process supply transactions. The sheer volume of ODS requisitions, and the use of not fully optimized objective hardware systems, resulted in long computer run times, processing backlogs, and hard disk saturation (a condition where more data needs to be loaded to the computer than it can hold in memory). The transmission of requisitions from the company level to the wholesale system during ODS averaged between 5 and 15 days. The delays in processing requisitions led to some units losing confidence in the supply system and to abuses of the supply system, as evidenced by: the requisition priority system for which 64.9 percent of all requirements were processed as high priority; the practice of submitting multiple requisitions for the same requirement; and repetitive status requests which served to further exacerbate the run time, backlog, and saturation problems in processing requisitions.

b. Logistics Automation Architecture. The chart shown on the next page entitled "SWA Logistics Automation Architecture" depicts the architecture used in support of ODS. It consisted of the five broad functional areas of end-item, supply, maintenance, ammunition, and transportation.
(1) End Item Management.

(a) Requisition Validation - Plus (REQVAL-PLUS).

1. REQVAL-PLUS was used in SWA to obtain asset visibility for Class VII and for Classes II, V, VIII RIC 2 items. REQVAL-PLUS supported the near time major item requisitioning and distribution process. The data was used to validate unit level requirements and to control the release of equipment. REQVAL-PLUS operated on a non-developmental item (NDI) MS-DOS PC.

2. REQVAL-PLUS ran the CBS-X Availability Balance File (ABF) process to reconcile the CBS-X position for the theater by UIC and stock account with authorizations. The data was made available to the theater materiel managers and was transmitted by E-Mail to the National Inventory Control Points (NICP) and to Systems Integration Management Activity (SIMA) for the CBS-X/REQVAL update.

(b) Standard Property Book System-Redesign (SPBS-R).

1. SPBS-R automated property accountability, management and asset reporting functions, located in separate brigades and in the asset visibility section of the division Material Management Center (MMC). SPBS-R operated on a Tactical Army CSS Computer System (TACCS) (UNYSIS B-36 computer).

2. SPBS-R was also reconciled unit property and produced input to the Continuing Balance System - Expanded (CBS-X) on a floppy disk. The unit CBS-X input was couriered to the two sites operating REQVAL-PLUS in KKMC (800th MMC, VII Corps) or Dhahran (321st TMMC, 22 SUPCOM). Note: REQVAL-PLUS was fielded
in SWA after the redeployment of XVIII Airborne Corps.

(2) Supply Management:

(a) Standard Army Retail Supply System (SARSS).

1. SARSS(O) is the Army's modernization target system. SARSS is a multilevel supply management and stock control system designed to operate in peacetime and wartime at divisional Direct Support Units (DSU) through the Theater Army Material Management Center (TAMMC). SARSS(O) was undergoing Software Acceptance Testing at Fort Bragg in Aug 90 at the start of ODS, and was deployed with the testing units. Both SARSS(O) and SARSS(Interim) (SARSS(I)) run on a TACCS. The 82nd Airborne Division and 1st COSCOM have SARSS(O). The other XVIII Airborne Corps units (101st Abn Div, 24th ID, 197th Bde), VII Corps and III Corps use SARSS(I). SARSS-2A(O) ran on TACCS and automates the division MCC supply management functions. It replaced the Direct Support Unit Standard Supply System (DS4) which operated on the Decentralized Automated Service Support System (DAS3). XVIII Abn Corps operated SARSS-2A/2B(O) on Corps/Theater ADP Service Center Phase II (CTASC-II) (Unysis 5000-95). SARSS-2A/2B(O) automated Corps MCC supply management functions. Requisitions were passed by courier to Corps on floppy disk, and electronically from Corps through the Defense Data Network (DDN) gateway in SWA to the Department of Defense Automatic Addressing System (DAAS) to the CONUS Wholesale system. An advantage of SARSS(O) is that it provides asset visibility across the Corps. Since only Fort Bragg based XVIII Airborne Corps units were fielded, asset visibility was limited to corps non-divisional units and the 82nd Airborne Division.

2. SARSS(O) software was not fully optimized. Not all COBOL and 4GL modules had been converted to ADA. Additional optimization is planned prior to the continuation of the SAT at Fort Bragg and follow-on fielding.

3. TACCS memory and hard disk capacity were identified as too low to adequately support SARSS-1(O). Sporadic system aborts occurred when all hard disk space was utilized. The problem was partially solved by removing all non-essential files, including the tutor for the main DSU system. TACCS-E will solve this problem. The TACCS-E retrofit will upgrade the TACCS processor from an 80186 to an 80386, the hard drive from 57 MB to 320 MB, expands RAM form 1 MB to 4 MB, upgrades the operating system from BTOS to BTOS II, and provides POSIX and MS-DOS compatibility. The first available TACCS-E was not produced until Apr 91. In the interim, PM-TACMIS purchased four non-tactical versions of TACCS-E (Unysis B38 computer) to correct the problem in the four units operating SARSS-1(O). (Note: TACCS-E program was stopped in June 1991 after the first year buy. TACCS/TACCS-E will be replaced by a NOI PC.

4. CTASC-II/SARSS-2A(O) was undergoing SAT at Fort Bragg when the XVIII Airborne Corps was deployed to SWA.
One CTASC-II at Fort Bragg supported XVIII Abn Corps until a CTASC-II was functioning in SWA. The transition of the SARSS-2A(O) data base from the CTASC-II at Fort Bragg to SWA resulted in a transaction backlog consisting primarily of non-critical document history and demand history transactions. The problem was compounded by the daily transaction volume exceeding the maximum daily capacity for the CTASC-II of approximately 60K transactions and a lack of supply discipline. The daily transaction volume ranged from 20K to 266K. From August 1990 to January 1991 the average daily number of requisitions processed were 10,270 with a daily supply pipeline value of $23.9 million. In February 1991 requisitions per day rose to 11,097 with a daily pipeline value of $23.2 million. In March, 8867 requisitions per day were processed with $11.9 million in the daily pipeline. The demand history backlog was of nominal concern because the Logistics Control Agency (LCA) could provide nearly the same information if required. The document history backlog affected the processing of follow-up transactions and other functions such as status output. The backlog was worked off as a result of the implementation of HQDA ODCSLOG recommended management controls and the standardization of parameters to institute supply discipline. A second processor was also installed in the CTASC-II. At the time hostilities ended, a second CTASC-II was awaiting shipment to SWA. The second CTASC-II was to run the non-critical document history and demand history transactions to preclude future transaction backlogs.

(b) Direct Support Unit Standard Supply System (DS4). DS4 operates on a DAS3 (Honeywell Level 6 computer). DS4 is a batch processing system which automated division MMC supply management functions. DS4 will be replaced by SARSS-2A(O). In SWA, requisitions were passed by courier to Corps on eight track magnetic tape.

(c) Standard Army Intermediate Level Supply System (SAILS). SAILS operated on CTASC-I (IBM series 43 computer). SAILS automated both corps and theater MMC supply management functions. SAILS is a batch process system. SAILS does not provide asset visibility across the Corps. SAILS will be replaced by SARSS-2A/2B(O) running on the CTASC-II. In SWA, requisitions were passed to the wholesale system via AUTODIN tape.

(d) The Unit Level Logistics System (ULLS).

1. ULLS operated on an NDI MS-DOS PC, typically a Zenith Z-248 desktop computer or Zenith Z-286 laptop computer. ULLS automates supply and maintenance functions in company and detachment level units that are authorized a Prescribed Load List (PLL). ULLS can interface with either SARSS-1(I) or SARSS(O) on TACCS. Class IX repair part requisitions were passed by courier on floppy disk. Non-divisional direct support units (DSU), which were not converted to SARSS(O), processed ULLS requisitions though SARSS-1(I) on TACCS, through DS4 running on the DAS3 into SARSS(O) running on CTASC-II at Corps. The 24th and 101st
Divisions, not yet converted to SARSS(O), processed requisitions though SARSS-1(I) on TACCS at their division DSU on the DAS3 at the division MMC and into SARSS(O) on CTASC-II.

2. ULLS was fielded to approximately seventy percent of the Active Component (AC) and none of the Reserve Component (RC) at the commencement of ODS. The hardware shortfall for units deployed or identified for potential deployment was determined to be 767 computers. ODCSLOG secured the funding and ordered Zenith Z-286 laptop computers. The computers were being fielded to separate National Guard brigades in CONUS at the time hostilities ended. The remaining Z-286 computers will be fielded to contingency corps units requiring ULLS.

(e) Supply Policy: In late Dec 90, the HQDA DCSLOG directed the Supply Policy Division to establish and standardize management practices and procedures to ensure supply discipline, to reduce overall transaction volumes, and to enhance support. The Supply Policy Division, working with the Logistics Evaluation Agency (LEA), identified nine areas that could be modified to either reduce or eliminate transactions. The modifications included reducing one hundred percent supply status to exception status only, reducing safety level penetration to maximize use of available stockage first, suspending due-out reconciliation, and increasing the purge frequency for history and transaction files. These initial recommendations were provided to ARCENT, along with specific management controls and reports to be used by ARCENT. Guidance was also provided on asset visibility of spares and repair parts at TAACOM level. ARCENT implemented centralized control of major assemblies at theater MMC level.

(3) Maintenance Management:

(a) Unit Level Logistics System (ULLS), previously mentioned under Supply Management, also automates The Army Maintenance Management System (TAMMS).

(b) The Standard Army Maintenance System (SAMS). SAMS automated maintenance management functions. SAMS-1 operated on TACCS at Intermediate DS/GS maintenance activities. SAMS-2 operates on TACCS at FSB, MSB, and MMC, within the division, to provide management reports and information. Note, SAMS-3, when fielded, will operate at corps level on TACCS.

(4) Ammunition Management:

(a) Standard Army Ammunition System (SAAS).

1. SAAS automates ammunition supply management functions. SAAS-Division Ammunition Officer (SAAS-DAO), operated on a TACCS, assisted the DAO in routine management and distribution of ammunition. SAAS-DAO had only been fielded to the 101st Airborne Division. All other DAOs performed this function manually.
2. SAAS-4 automated procedures for recording ammunition receipts, issues and adjustments, and standardized the stock status report to the MMC. SAAS-4 operated one TACCS at DS/GS Ordnance Company Ammunition Supply Points (ASP) and at Corps Storage Areas (CSA).

3. SAAS-1/3 manages munitions at each level while providing information to the NICP. SAAS-1/3 operated on a DAS3 at the corps MMC and theater MMC.

(5) Transportation Management:

(a) Automated Air Load Planning System (AALPS). AALPS automates the planning and execution of unit air movements. AALPS runs on a SUN microcomputer at separate brigade and division level, and at the XVIII Abn Corps.

(b) Transportation Coordinator Automated Command and Control Information System (TC ACCIS). TC ACCIS automates unit preparations for the movement of unit equipment. TC ACCIS maintained a unit equipment data base, and generated all transportation related requirements and documents, to include bar code labels. TC ACCIS ran on a Sperry 6000-80 computer. TC ACCIS was operational in SWA at KKMC and at the port of Dammam.

(c) Automated System for Processing Unit Requirements (ASPUR). ASPUR provided a system to receive, process and store unit movement requirements. ASPUR ran on a VAX 11/780 computer. Information was exchanged between TC ACCIS and ASPUR by courier on floppy disk. ASPUR was operational in SWA at the port of Dammam.

(d) Terminal Support Module (TSM). TSM captured unit movement data, generated load plans, produced cargo manifests and tracked unit cargo. TC ACCIS generated bar code labels are scanned for data input into TSM. TSM runs on an MS-DOS PC. TSM was operational in SWA at the port of Dammam. Information was exchanged between ASPUR and TSM by courier on floppy disk. TSM transmits manifest data via E-mail to a TSM operating at the port of debarkation (POD).

(e) DA Standard Port System-Expanded (DASPS-E).

1. DASPS-E is an automated document system which provides for receipt, planning, inventory accounting, cargo movement and control. DASPS-E ran on a DAS3. DASPS-E is operated by the 7th Trans Group at the ports of Ad Dammam and Dhahran.

2. There is no automated interface between the Standard Army Intermediate Level Supply System (SAILS) and DASPS-E. Data from Materiel Release Orders (MRO) produced by SAILS is used to manually produce the Transportation Control Movements Document (TCMD). The TCMD is then manually entered
into DASPS-E. There are plans to automate this interface with future changes to DASPS-E and the Standard Army Retail Supply System 2A/2B, which will replace SAILS.

(6) Logistics Automation Maintenance. The five major hardware platforms that supported logistics functions in SWA were: Corps/Theater ADP Service Center Phase I (CTASC I); Corps/Theater ADP Service Center Phase II (CTASC II); Decentralized Automated Service Support Center System (DAS3); Tactical Army Combat Service Support Computer System (TACCS); and, Unit Level Computer (ULC) - NDI Z-248 Desktop PC, Z-286 Laptop, or equivalent configured IBM Compatible PC.

(1) The maintenance support plan developed during ODS for each of these systems is outlined in the following discussion.

(a) CTASC-I - Maintenance is full contractor support provided by contract by CCL, a small business contract. Actual maintenance and parts support is provided by IBM on a sub-contract to CCL. The CCL contract contained a war clause, but the sub-contract between CCL and IBM did not. On 31 Aug 90, a verbal agreement between CCL and IBM was made that IBM would provide "War Zone" support.

(b) CTASC II- Was a prototype undergoing initial stages of Operational Testing when the decision was made to deploy to SWA. Nonstandard ADPE unique support was provided by EER contractor. Standard items of equipment, to include trucks, trailers, and environmental control units, will be supported through the standard Army supply and maintenance channels. Depot manufactured unique items, e.g. mounting racks and cables, will be supported by EER for first echelon maintenance with Tobyhanna Army Depot providing backup.

(c) DAS3 - Maintenance was provided by organic Army repairers.

(d) TACCS - Near term maintenance concept calls for Maintenance Repair Center (MRC) to be operated by PM-TACMIS technical personnel with UNYSIS providing parts support, until UNYSIS can man the MRC. Any standard equipment, e.g. printer and power cables, will be supported through standard Army maintenance and supply channels.

(e) The Nondevelopmental Item (NDI) Zenith Z-248 PC and Z-286 Laptop computer had no maintenance contract support plan outside of existing warranty support. PM-TACMIS has a limited contract with EER to provide support for the few Zenith PCs associated with the CTASC II. The contract was amended to have EER provide in country support of Zenith computers.

(2) PM-TACMIS located a contractor in Riyadh with the ability to provide maintenance and parts support for LOGMARS tactical equipment.
The following chart depicts the ODS logistics automation support plan as it evolved over time in SWA.

<table>
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<tr>
<th>SYSTEM</th>
<th>SHORT TERM C+90</th>
<th>MID TERM C+180</th>
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<td>CTASC I</td>
<td>CCL/IBM CONTRACTOR</td>
<td>CCL/IBM CONTRACTOR</td>
<td>CCL/IBM CONTRACTOR</td>
<td>POSSIBLE ARMY MOS 39V IN EVENT CONTRACTOR DEFAULTS</td>
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<tr>
<td>CTASC II</td>
<td>EER CONTRACTOR TOBYHANNA</td>
<td>EER CONTRACTOR TOBYHANNA</td>
<td>EER CONTRACTOR TOBYHANNA</td>
<td>EER PROVIDES UNIQUE NONSTANDARD ADPE SUPPORT</td>
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<tr>
<td>DAS3</td>
<td>ORGANIC ARMY REPAIRERS</td>
<td>ORGANIC ARMY REPAIRERS</td>
<td>ORGANIC ARMY REPAIRERS</td>
<td>EER PROVIDES 1ST ECHELON SUPPORT FOR UNIQUE DEPOT MANUFACTURED ITEMS WITH TOBYHANNA BACKUP</td>
</tr>
<tr>
<td>TACCS</td>
<td>PM-TACMS INTERIM TECHNICAL PERSONNEL MAN MRC</td>
<td>UNYSIS MANS AND OPERATES MRC</td>
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<td>A CONTRACTOR OPERATED REGIONAL SUPPORT CENTER PROVIDED IN COUNTRY MAINTENANCE SUPPORT</td>
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d. Issues/Observations.

(1) The lack of requisition and asset visibility resulted in a loss of accountability for issued assets and
precluded the ability to cross level within the theater. ODS experience highlighted the need for fielding the Objective Supply Capability (OSC).

(2) The current and objective tactical communications architecture provided inadequate support to CSS units below division level. Due to the limited availability of tactical communications support, the logistics STAMIS have become dependant on courier and commercial telecommunications during field exercises. In SWA, the host nation telecommunications infrastructure was limited or non-existent. As a result, the primary means of logistics data transmission was by courier on floppy disk or magnetic tape. This degraded the near real time capability of SARSS(O) to batch processing where requisitions are rolled up each day and sent to the next higher level support activity for processing. The impact on the supply system was loss of manpower, longer order-ship times, loss of confidence in the system, and submission of multiple requisitions.

(3) The current logistics hardware is often unable to take advantage of what tactical communications support is available. Some logistics hardware, such as TACCS and NDI PCs, are not capable of taking full advantage of the emerging objective tactical communications architecture. These computers do not support the 802.3 and X.25 protocols required to connect to the Data Distribution Network (DDN) and Tactical Packet Switch Network (TPN). The long term solution will be the migration of logistics STAMIS to the Army Command and Control System (ACCS) Common Hardware and Software (CHS) or comparable NDI PCs.

(4) Inflexibility of the software to adapt to a wartime environment.

(a) Logistics software systems are a complex integration of modules performing a variety of functions. The software is constantly evolving as changes are made to reflect software fixes, add new management features, and incorporate regulatory changes. The software provides many nice to have features that are desirable in a garrison environment. In wartime, these same nice to have features are not all required and add to longer processing times. The software modules are often written in more than one language.

(b) Example: SAAS provides for regulatory requirements (e.g. serial number accounting) and management functions desired in a peacetime environment. In a wartime environment with high volume of transactions, these added functions equate to longer processing times. In SWA, the problem were exacerbated by attempts to short cut the system, resulting in system failure and the requirement to rebuild files. What most units required in wartime was a simple checkbook system to track requests and receipts. Some units found it easier to perform this process manually, resulting in the loss of Class V asset visibility at higher echelons.
Experience in SWA highlighted the problems caused by bringing together units with different management philosophies. Such problems can be eliminated with the standardization of management controls and parameters across the Army. There are also regulatory requirements, non-critical document history transactions, financial operations, and management functions that are not required in a wartime environment.

Command unique changes to STAMIS software.

(a) One corps MMC modified the SAILS Job Control Language (JCL) by adding local unique steps which increased the daily cycle processing time. SDCL/CASCOM representatives provided on site assistance to perform the desired functions and return to the standard JCL.

(b) There were instances of units not on the current ULLS baseline or using a locally modified baseline. These units could not readily load subsequent software changes without losing their command unique capabilities. Conversion to the current baseline, in some cases, did not occur until after deployment to SWA. Units must load ICPs/SCPs when received.

Many RC units were operating on an incorrect SAMS baseline. Based on observations during visits by SDCL/CASCOM, it appeared that the majority of RC units experienced problems due to a lack of trained operators, correct master files, and current user manuals.

SARSS-2A/2B(O) users demonstrated a lack of understanding of SARSS-1 that hampered overall operations.

DAS3/DS4 experienced long run times and hard disk saturation in two divisions. These problems were due to higher wartime transaction volumes, establishing a high ASL and to internal command unique procedures. This problem was corrected by the implementation of DA ODCSLOG recommended management controls and standardized parameter settings. In one case, the situation was compounded by the attachment of a third brigade which stressed the capabilities of the system. This situation was corrected by utilizing the separate brigade's organic DAS3. A second commercial hard disk was acquired for all DAS3 to double system capacity. (Note: DAS3/DS4 will be phased out with the fielding of TACCS-E/SARSS-2A(O).)

The CTASC-II experienced a system saturation problem when the daily transaction volume exceeded approximately 60K transactions.

Despite saturation issues, the hardware performance met or exceeded the designed performance criteria. TACCS and CTASC-II performed especially well. The TACCS far exceeded its predicted mean time between failures (MTBF). The operational availability rate for the CTASC-II exceeded ninety-nine percent. The initial concerns of high ambient temperatures and the dust-
like sand on computer operation proved to be less of a problem than originally anticipated. The operation of a contractor operated regional maintenance facility proved successful.

(12) The fielding of SPBS-R to brigade level did not support task force organization. To support split elements (battalion and lower), authorization data should be provided/maintained by derivative UICs. This would allow property records to be readily transferred to a new host site or to maintain accountability separately during the conduct of an operation. SPBS-R will eventually migrate from TACCS to a smaller, more powerful Light Weight Computer (LCU) or Common Hardware and Software (CHS) computer.

(13) ODS revealed a greater Army wide requirement for automated air-load planning capability. There are many units with an air-load planning mission that are not scheduled to receive AALPS, but that could use the system. The AALPS Basis of Issue Plan (BOIP) should be reviewed to ensure this capability is provided to all units with a potential air movement requirement.

(14) There were a number of non-standard automation systems in-theater which required a repair and maintenance capability. Some contracts were in place for the in-theater repair of this equipment, but there was not an adequate system established to provide for the maintenance of this equipment. Support of future contingency operations must give consideration to the early establishment of an automation repair capability, along with other communications repair facilities, since automation is now an integral and vital part of effective military operations.

e. Future Initiatives.

(1) Expedite efforts to transition software to an open systems environment (OSE) by converting to more efficient languages (i.e. Ada) and operating systems (i.e. POSIX).

(2) Modularize software to allow more efficient processing during war time. "Nice to have" management features, desirable in a garrison environment, may not be required and add to longer processing times. The software should be designed so that functions not required in a wartime environment can be readily turned off and on as required.

(3) Optimize software to maximize advantage of electronic data transmission (i.e. tactical packet switching).

(4) SARSS-2A/2B training should include SARSS-1 operations.

(5) Consideration should be given to fielding an SPBS-R capability at battalion and company level to support separately deployed units and maintain support for the remaining units and elements at home station.
(6) Obsolete computer hardware should be upgraded or replaced. To support OSC, CSS computer hardware must have the capability to support interactive processing, support OSE, and be compatible with the supporting communications systems. Expedite the transition plan from the current suite of hardware to CHS II platforms.

(7) Reevaluate SARSS(O) wartime transaction volumes to determine if the CTASC-II will require a processor upgrade to support a five division contingency corps.

(8) The long term solution to the logistics communications shortfall is a study of all Combat Service Support (CSS) communications requirements involving both the logistics and signal communities. This study, which began in April 1991, will assure future logistics and signal architectures are designed to be mutually supportive.

(9) Expedite implementation of OSC. The capability to reduce order-ship time and cross-level will reduce excess and the dollar value of supplies in the pipeline. While actions to implement a Strategic Logistics Agency (SLA) "OSC like" capability in SWA stopped with the end of hostilities, a test on the OSC and the implementation of OSC throughout the Army remains a major DA DCSLOG priority.
ANNEX A

OPERATIONS DESERT SHIELD AND DESERT STORM (ODS) SUSTAINMENT BROCHURE

CHRONOLOGY OF ODS EVENTS
CHRONOLOGY OF OPERATIONS DESERT SHIELD / DESERT STORM EVENTS

1990

AUGUST

2 AUG 0140Z IRAQ Invades Kuwait.
3 AUG Secretary of Defense briefs outline of OPLAN 90-1002.
7 AUG President Bush approves/directs deployment of forces.
7 AUG 1700Z hours C-DAY OPERATION DESERT SHIELD begins.
7 AUG First Prepositioned Ship departs.
8 AUG First flight departs with 2 BDE, 82d ABN DIV Div Ready Brigade (DRB) on two C-141, two C-5, and two DC-10 aircraft.
8 AUG Three SL-7 Fast Sealift Ships activated to deploy to Savannah, Georgia. Estimated closure at port C+4 to C+5.
9 AUG First elements of Army logistics command arrived in Riyadh.
10 AUG First 18 ships of Ready Reserve Fleet activated.
11 AUG First FSS depart CONUS.
11 AUG The following equipment of the XVIII ABN Corps arrived in SWA: 29 C-141s, 2 DC-10s, 12 C-5As, and 1657 passengers.
12 AUG 2 BDE, 82 ABN DIV deployed.
13 AUG 2 BDE, 24 INF DIV (M) completes loading of the USS Capella and sailed one day ahead of schedule. Meanwhile the USS Bellatrix is being loaded with elements of the 1st BDE, 24 INF DIV (M). Each ship is transporting 100 personnel from the division in addition to three Vulcans and two Stingers. Steaming time between Savannah and Dhahran is approximately 12 days. Major weapons systems aboard include 88 M-1, 26 M-2, 12 M-3, 9 MLRS, 3 Vulcan, 6 AH-1S, 4 OH-58.
14 AUG DRB 1, 82d ABN DIV closes in SWA.
14 AUG 7th Transportation Group continues deploying and preparing for deployment of assigned units.

14 AUG ARCENT strength is 50,508. Total: 157,281.

16 AUG ARCENT assumed responsibility for receiving custody of all enemy prisoners of war captured by US forces in theater and for interning those prisoners at facilities within the theater.

16 AUG 1 BDE, 82 ABN DIV had 68% of the brigade (DRB 2) deployed from Ft. Bragg.

17 AUG First Prepositioned Ship arrives in SWA.

18 AUG Civil Reserve Air Fleet, Stage 1 initiated (PAX only).

18 AUG 1 BDE, 82 ABN DIV is expected to be deployed today.

19 AUG Lead elements of 101st ABN DIV (AASLT) Div depart CONUS.

19 AUG 2 and 3 BDEs, 82 ABN DIV began deploying.

19 AUG The USS American Eagle sailed today with a cargo of nine 101mm howitzers, three AH-1s, eight UH-60s, and twenty-six CH-47Ds.

19 AUG USS Antares sailed with elements of the 24 INF DIV (M).

19 AUG Forty (40) ships have been allocated to support operation. To date, four ship have arrived in theater and are unloading troop support items, e.g. water productions, storage, distribution and ammunition, and seven more ships are enroute.

19 AUG The first ship carrying the 101 ABN (AASLT) departed.

20 AUG 38 ships of RRF have been activated by this date.

21 AUG 1 BDE, 82 ABN DIV deployed.

21 AUG Elements of the XVIII ABN Corps deployed for SWA aboard the USS Pollus and the USS Cape Henry during the last 24 hours.

22 AUG President authorizes 200K callup.
22 AUG  210 women in SWA.

22 AUG  Army Materiel Command (AMC) has established a forward support element in Saudia Arabia. Special repair activity and contractor support requirements with the country have been identified. Resupply packages are being developed to insure an uninterrupted flow of supplies.

23 AUG  Special Mid-East Shipping Agreement (SMESA) established.

23 AUG  Elements of the 24 INF DIV (M) left Savannah for SWA onboard the USS Denebola and Cape Hudson.

24 AUG  Alert Order for Presidential Call-Up of Selected Reserve to Active Federal Duty was issued.

25 AUG  USCINCCENT arrives in theater.

27 AUG  First FSS ship arrives in SWA.

27 AUG  The Secretary of Defense has directed Army to assist the Saudis in providing military trucks for the multi-national forces. In addition, host nation heavy truck equipment transport tires are experiencing a high rate of failure in the desert heat. Both FORSCOM and AMC are working to resolve the problem.

28 AUG  The 26 Quartermaster Barge Team has arrived in SWA. However, critical shortage of water supply personnel continues until other designated units arrive.

28 AUG  Host Nation Support is providing approximately 25,000 meals per day to U.S. forces.

28 AUG  Requested 53 Host Nation water tankers for Corps level water distribution. If Host Nation is unable to meet needs, distribution will become a war stopper.

28 AUG  The requirement for purified water is forecast to reach 4 million gallons per day by C+90. ARCENT has confirmed that water purification capability (U.S. and Host Nation) will meet known requirements. A coastal main supply route has been established from Dhahran to Jubayl using Army watercraft from the prepositioned ship American Comorant.

29 AUG  82d ABN DIV deployed.
618 Army women in SWA.

Critical munitions are being carefully managed. In-theater requirements for 155mm DPICM, FASCAM and the MLRS, TOW and Stinger missiles, and 2.75 inch rockets can be met by October 1.

Saudi request for 15,717 TOW 2 missiles will be met by an initial shipment of 1,717 TOW-2 missiles followed by procurement of 14,000 TOW-2A missiles. The Saudis immediate requirement for 200 Stinger missiles have been submitted to Congress.

24th INF DIV (M) combat elements have closed with the exception of attack aviation assets aboard the USNS Altair.

CINCCENT reports 147,786 males and 4,323 females deployed in the theater as of this date.

24 INF DIV (M) deployed in theater with the last shipment of 197th SIB.

The entire 12th Aviation Brigade embarked on three ships.

Three MAC aircraft with critical communications equipment off the FSS Antares arrived in Dhahran.

The 3 ACR completed loading and five ships deployed for SWA.

CINCFOR visit to the 3 ACR revealed that M-1 tanks have not been sand painted prior to deployment. CINCFOR concern is that more effort should devoted to assisting the painting effort in the AOR. Check of DA policy revealed that equipment deployed with the woodland pattern should be repainted sand in the theater.

Desert Battle Dress Uniforms (DBDU) appear to be insufficient quantities in the wholesale system and/or in stocks for distributing each soldier four sets of the uniforms.

The desert camouflage patterned baseball cap is not a standard item of issue and is therefore currently unavailable in the wholesale system. The standard sun hat provides better protection from the sun than
the baseball cap; nevertheless, Army/Air Force Exchange Service (AAFES) indicates that it can provide caps within 60 days. If baseball caps are authorized in the AOR, recommendation made that soldiers purchase the items from MCSS on an optional basis.

16 SEP The average number of strategic airlift flights over the past week was 75-80 flights per day with the Army being allotted 18 to 30. As of this date, 44 vessels were enroute to the AOR with unit equipment, supplies, ammunition and food to support deployed and deploying forces.

16 SEP A total of 21 aircraft with 1,145 passengers, equipment, and supplies deployed from CONUS for the AOR.

17 SEP Fifty ships are currently enroute to the AOR. The Alexander will be delayed 24 hours in Cadiz, Spain for repairs. Two disabled vessels, with cargo belonging to the 3 ACR, 75th Field Artillery Brigade and the 1st Cavalry Division, will be transloaded to the American Condor in Jacksonville.

19 SEP 5th Special Forces Group (SFG(A) deployed.

20 SEP the 1st Brigade, 101st ABN (AASLT) will be deployed today.

24 SEP A total of 785 commercial Japanese vehicles arrived in theater and are being distributed to U.S. forces.

24 SEP With the arrival of final equipment (DISCOM and aviation equipment) of the 197th INF BDE (M) on the USNS Altair, the 24th INF DIV (M) deployed.

25 SEP To date, sealift has moved over 130,000 pieces of general cargo, over 2200 tracked vehicles, nearly 10,000 wheeled vehicles, 310 aircraft and over 600 containers. Currently, four ships are offloading in the AOR; 52 are enroute to the AOR and 14 are returning to CONUS. A total of 20 aircraft with 1,144 passengers, equipment and supplies departed CONUS for the AOR in the last 24 hours.

25 SEP The 3 ACR received its first equipment today.

26 SEP U.S. Navy reports only 14 of 41 ready reserve ships reached port as scheduled for crisis, forcing leasing of foreign ships.
27 SEP  Authority to withdraw equipment from RC delegated from SECDEF to SECARMY (First time in 18 years).

27 SEP  Congress is notified of intention to sell Saudi Arabia equipment that is valued at $6.744 billion. Package includes 150 M1A2 Abrams tanks, 200 Bradley Fighting Vehicles, 9 Multiple Launch Rocket Systems, 6 Patriot Fire units, 12 AH-64 Apache helicopters, 10,000 Tactical Wheeled Vehicles, 150 TOW IIA Launchers, 8 UH-60 Medevac Helicopters and Naval Communique gear.

28 SEP  Personnel in the 12th Aviation Brigade completed deployment.

29 SEP  The 3 ACR (-) continued to offload equipment from the ship Ashley Lykes and to deploy personnel by air while the 101st Airborne Division (AASLT) completed offload of the ship Cape Mohican and prepared to receive equipment aboard the ships Catoche and Cape Alexander.

29 SEP  Helicopter blade erosion kits en route to the AOR will be used to modify rotor blades with anti-erosion tape. Some of the kits will be issued to contractor field maintenance teams for installation on unit aircraft. The remainder will be stocked in Abu Dhabi and Oman for installation on blades delivered there.

29 SEP  Communications and Electronics Command has begun assessment of the M43A1 chemical alarm. Units in the AOR have experienced a high failure rate for the M-24 aviator mask. Inoperable masks have been expedited to CONUS to determine the cause of failure. There are sufficient masks in the AOR to meet anticipated requirements.

29 SEP  Funding for an additional nine Boeing 747 cargo flights has been negotiated with the Japanese, bringing the total number of Japanese funded missions to 18.

OCTOBER

2-5 OCT  Peak sealift period (116 ships) for phase I.

2 OCT  12th AVN BDE deployed.

6 OCT  101st ABN DIV (AASLT) deployed.
14 OCT  3d ACR deployed.
15 OCT  Decision of force modernization in theater.
16 OCT  Decision to deploy CFE tanks for Europe to SWA.
18 OCT  1 CAV deployed.
18 OCT  CINCCENT reports the total number of personnel in the AOR to be 166,023 of which 5,339 are female. Total number of ARCENT soldiers is 51,923, of which 2,525 are female.
18 OCT  Some locations are receiving fuel from Host Nation military, but the majority of requirements for Desert Shield are being provided through the Defense Fuel Supply Center contracts. ARCENT's near term projected consumption is 83,500 gallons per day 6 of 14.
18 OCT  Petroleum units have begun to arrive in theater. Current Army capability is one truck company (POL), 2 petroleum pipeline and terminal operation companies, 1 mobile lab and 2 liaison teams. This provides the Army with the ability to move 450,000 gallons, store 7.2 million gallons, insure quality surveillance and manage theater petroleum distribution.
20 OCT  1 BDE, 101 ABN DIV (AASLT) deployed.
22 OCT  III CORPS ARTY (75th/212th FA) deployed.
23 OCT  1 CAV DIV including 1 BDE, 2 AD deployed ending the deployment of the major combat units.
30 OCT  Desert Express air route established.

NOVEMBER

1 NOV  Authority to withdraw equipment from RC further delegated to ASA(IIE).
3 NOV  11th ADA BDE (~) Patriot deployed.
3 NOV  The remaining 162 of 616 M1A1 tanks staged at Bremerhaven deployed on the ship Jupiter.
4 NOV  XVIII Airborne Corps has completed deploying with the offloading of the ship PVT Fisher which completed strategic deployment.
ARCENT Commander requested 23 AN/GRQ-27 (Goldwing) radios to ARCENT HQs and subordinate units in order to permit additional mobility of newly formed C2 nodes.

The GS water point at Guardian City is operational with a daily capacity of 250K GPD and has potential to expand to 800K+ GPD.

VII CORPS and 1 INF DIV alerted.

CINCCENT issues TPFDD guidance for additional forces.

RC Callup extended to 180 days by Pres Exec Order.

Three of the new 3,000 GPH Reverse Osmosis Water Purification Units (ROWPU) are operational at a well site in Dhahran.

An execute order for the first increment of the reinforcing package (77 units) was issued.

The 1 INF DIV (M) has received eight of their ten authorized 600 GPH ROWPU and the remaining two are scheduled to arrive at Fort Riley today.

The first seven of sixteen trains with unit equipment form USAREUR deploying units arrived at the port of Bremerhaven. Equipment is being staged with upload planned for 17 November.

The Aviation Systems Command (AVSCOM) in coordination with Corpus Christi Army Depot has provided a team of 6 armament personnel to USAREUR to assist in preparing AH-1 aircraft for deployment to the AOR. On a related issue, a deployment assessment team headed by the Deputy Commanding General of AVSCOM arrived at Fort Riley on 15 November to coordinate requirements for deploying 1 INF DIV (M) aviation elements. Additionally, a team of 27 contractors are on site at Fort Riley and performing phase maintenance assistance on deploying aircraft.

The XVIII ABN Corps has received 30 hardwall water tankers which were provided to the US for Operation Desert Shield by the Government of Japan. These tankers are capable of transporting between 6K and 7K gallons of water per tanker.
All critical combat systems are at or near the DA standard. Both the Bradley and the M901 Improved TOW Vehicle are at 90%. The M911 Heavy Equipment Transport is being heavily used and has an operation rate of 75%. The Army Materiel Command (AMC) is developing an Army Oil Analysis support plan to determine the number and placement of oil laboratories in theater.

The equivalent of five C-141 equivalents per day are being made available to support the deployment of the VII Corps.

Host Nation Support (HNS) is providing an average of 4.5 million meals per month. Meals provided include bulk A-rations, A-ration supplements and prepared A-ration meals.

VII CORPS deployment begins.

A total of 26 trains with 2 ACR equipment have arrived at the port of Bremerhaven with the remaining five enroute.

Planning for mortuary affairs in the AOR continue. The Graves Registration (GRREG) collection points are being identified throughout the Corps and Division areas. Army GRREG personnel and equipment will be formed into 38 forward collection points (four per division plus four more in Corps rear areas). Two theater level collection points will be established.

Decision made to allow M1 Tanks to be shipped on Soviet Vessels. Never done.

First unit, 2 ACR, leaves Europe for SWA.

XVIII ABN CORPS deployed.

CRC established for partial mobilization flow.

Forty-two ships have left Europe en route to the AOR.

1 Armored Division has completed deployment of equipment to sea ports of embarkation.

Ninety ships are en route to the AOR. Eighty-six are enroute to CONUS and Europe for loading.
21 DEC
2 ACR deployed.

23 DEC
Sealift Express established.

27 DEC
VII CORPS artillery deployed.

28 DEC
There are 197,745 Army personnel in the AOR.

28 DEC
A total of 115 ships are en route to the AOR, 38 ships are en route to seaports of embarkation and 5 ships are unloading at seaports of debarkation.

29 DEC
ARCENT is currently using the Saudi rail system to transport containerized cargo and ammunition within the AOR.

30 DEC
Current Operational Readiness (OR) Rates are: M1A1-97%; M2-93%; M3-96%; Patriot-92%; MLRS-90%; TOW-99%. Gunner Primary Sight (GPS) Optical have been installed on 445 of the 471 M1A1's already in the AOR. OR rates for the AH-64 (Apache) and UH-60 (Blackhawk) are at 84 and 83 percent respectively.

**1991**

JANUARY

2 JAN
Authority to withdraw equipment from RC extended until 30 June 91.

4 JAN
There are 206,200 Army personnel in the AOR.

5 JAN
The Saudi Arabian government banned exports of jet and diesel fuel from all in-country refineries to ensure maximum fuel is available for all deployed forces.

5 Jan
The first increment of equipment provided to U.S. forces by the Government of Germany arrived in theater today. The equipment includes: 45 heavy equipment transporters, 60 ambulances, 73 five ton trucks, 500 hand held radios, and 750 tons of repair parts and tools. The second Army Oil Analysis Program (AOAP) Lab is scheduled to be shipped on 10 Jan.

6-10 JAN
Peak sealift for phase II and sustainment (189 ships).

9 JAN
Efforts continue to establish Logbase ECHO for VII Corps.
13 JAN VII CORPS HQs deployed.
15 JAN 2 COSCOM deployed.
15 JAN There are 247,298 Army personnel in the AOR.
15 JAN A total of 44 hospitals are either en route or have arrived in the AOR. Thirty-five of these have been modernized with the deployable medical systems (DEPMEDS) and 9 hospitals are deploying personnel to host nation equipped facilities. Thirty-two of the DEPMEDS equipped hospitals arrived in theater prior to 13 Jan while the remaining 3 are scheduled to arrive on 17 Jan.
15 JAN The in-theater M1A1 tank modification continues. Of the 752 tanks received, 731 have been modified, 623 have been handed off, and another 21 are in process.
16 JAN 2400EST hours Bombing started in Iraq and Kuwait.
16 JAN 2400Z hours D-DAY OPERATION DESERT STORM begins C+163.
17 JAN 2400Z hours CRAF, Stage II activated by the SECDEF.
17 JAN There are 249,933 Army personnel in the AOR.
17 JAN CINCUSAREUR has reported all VII Corps equipment and personnel have deployed from Europe.
17 JAN A total of 85 ships are enroute to the AOR; 35 are enroute to SPOEs, and 9 ships are unloading at SPODs. Twenty-one aircraft carrying 2,882 passengers departed for the AOR during the last 24 hours.
18 JAN 2 AR DIV Forward deployed.
19 JAN SECDEF increases Army Mobilization Authorization to 220K for 12 months (10 USC, 673).
19 JAN M-DAY MOBILIZATION Initial 20K IRR called to active duty with effective date of 31 Jan 91.
21 JAN Pres Bush signed Exec Order declaring SA a war zone.
23 JAN VCSA became manager of critical ammunition production and flow.
24 JAN During the period 16-22 January, 108,000 pounds of Army cargo was transported on DESERT EXPRESS.
25 JAN There are 262,594 Army personnel in the AOR.
25 JAN First reports of Enemy Prisoners of War.
26 JAN 1 INF DIV (-) deployed.
27 JAN 1 AR DIV deployed.
27 JAN State Department reports that Iraq may have dumped as much as 6 million barrels of crude oil into the Persian Gulf.
27 JAN CJCS became manager of PAC II missiles.
29 JAN Secretary of Defense Dick Cheney announced that President Bush has nominated MG William G. Pagonis, U.S. Army, for assignment as Commanding General, Theater Army Area Center Command (Operation Desert Storm) and appointment to lieutenant general.
29 JAN The HQDA logistics staff is focusing on the supply and distribution of air delivery equipment to support the AOR requirement. Redistribution of BDOS worldwide is also underway to support the theater's needs.
30 JAN To date, 44,295 VII Corps vehicles have arrived in country.
31 JAN There are 278,329 Army personnel in the DESERT STORM theater of operations.

FEBRUARY
1 FEB Army maintains 5,800 of the 9,353 USCENTCOM hospital beds in the SWA theater.
4 FEB There are 113 of the required 189 refuel-on-the-move kits in theater. These kits (consisting of pumps, hoses, etc.) facilitate refueling vehicles away from normal refueling points.
4 FEB AMC is working with the USMC and others to improve the Mine Clearing Line Charge (MICLIC) and confirm lot reliability.
4 FEB The HQDA logistics staff is concentrating on development and delivery of vehicle "friendly marking kits", management of Graves Registration and Remains Evacuation, and Patriot missile resupply and maintenance.
6 FEB 3 AR DIV deployed.

6 FEB There are 276,714 Army personnel in the AOR.

6 FEB ARCENT's primary Aerial Port of Debarkation (APOD) for air lines of communication/sustainment cargo has been changed from Dhahran to King Khalid Military City.

7 FEB The last ship with equipment of the 3 AD has deployed.

7 FEB The Army maintains 7,593 of the 11,656 USCENTCOM hospital beds in the SWA theater.

7 FEB The Mass Fatality Information Management System, which automates graves registration procedures at division and corps collection points, has arrived in theater. Training and fielding of the system will begin on 8 February.

8 FEB Inspections are being conducted of Bradley Fighting Vehicle transmissions found to have problems shifting into third and fourth gears. 861 transmissions, world-wide, have been identified as potentially defective. 649 have now been inspected and repaired as necessary.

11 FEB There are 282,306 Army personnel in the AOR.

11 FEB To date, 218 EPWs have been transferred to Saudi authorities.

14 FEB Friendly marking kits have been flowing to King Khalid Military City (KKMC) on daily flights. To date, 30% of the ARCENT requirement has been met. Critical ammunition status is: 105,000 rounds of 25mm armor piercing sabot ammunition is being airlifted to KKMC.

21 FEB VII CORPS Arty deployed with ARNG 196th FA BDE.

23 FEB G-DAY GROUND OFFENSIVE started.

23 FEB There are 300,119 Army personnel in the AOR.

23 FEB Media and Service attention focused on 14th QM - a RC unit hit by a SCUD missile.

25 FEB General Norman H. Schwarzkopf reports that more than 5,500 Iraqi prisoners had been taken within the first
10 hours of the ground offensive. After 22 hours, the total number of EPWs was nearing 10,000.

28 FEB 0500Z hours Coalition CEASE FIRE takes effect.

28 FEB CENTCOM estimates that over 50,000 enemy prisoners of war (EPW) have been captured. They continue to be moved to holding areas for processing and transfer to EPW camps. Currently, there are 17,659 in the EPW holding areas and camps. 159 are hospitalized. A total of 733 EPWs have been transferred to host nation facilities.

28 FEB An additional logistics base is being developed in western Kuwait to support operations. The logistics base near Kuwait City will be used to support Kuwaiti reconstruction.

MARCH

2 MAR HQDA team briefs CENTCOM/ARCENT on redeployment policy and plans.

2 MAR JCS issues redeployment order.

2 MAR TF Freedom established in Kuwait City.

4 MAR CINCCENT proposes redeployment.

8 MAR The 14th Quartermaster Detachment returned from SWA; thereby beginning the redeployment of RC units from the AOR.

10 MAR R-DAY REDEPLOYMENT begins.

3 ACR PAX redeployed.

22 MAR U.S. forces captured about 50,000 enemy prisoners of war during Operation Desert Storm, of which 16,000 have been transferred to Saudi control.

APRIL

2 APR 33% of XVIII ABN Corps personnel have redeployed.

6 APR 0001Z Operation Provide Comfort was established.

7 APR U.S. delivers first humanitarian relief to Iraqi Kurds.

9 APR 52% of XVIII ABN Corps personnel have redeployed.
14 APR 101st ABN DIV (AASLT) has completed redeployment with the exception of a rear detachment and a PSA loading ships.

16 APR SECDEF authorized planning for provision of temporary shelters in Northern Iraq for Iraqi refugees.

16 APR 75% of XVIII ABN Corps personnel have redeployed.

16 APR HQDA team deploys to SWA to assist in management of POMCUS and equipment distribution.

21 APR Redeployment of VII Corps from Iraq complete.

22 APR ARCENT VII Corps begins construction of a temporary displaced civilian camp in Saudi Arabia.

23 APR CTF Provide Comfort estimates cost of the three Kurdish refugee camps will be $100,000,000.

23 APR The U.S. firefighters in Kuwait have requested that all remaining heavy firefighting equipment and supplies be staged in mid-May for immediate shipment to Kuwait, on a reimbursable basis, aboard an outward-bound USN Fast Sealift Ship.

25 APR 53.1% of total force has been redeployed.

MAY

6 MAY ARCENT G-4 announces closing its LOGSTAT operation in Saudi Arabia; 22d SUPCOM assumes reporting task.

8 MAY CINC CENTCOM stated before congress, total all services in Gulf is 541,000.

10 MAY United Nation Iraq Kuwait Observer Mission (UNIKOM) accepts DMZ from 3d Armored Division.

11 MAY ARCENT HQs Main Body II redeploy. 98.4% of XVIII ABN Corps personnel have redeployed.

SOURCES: A. DAMO-FDQ Copy of Center of Military History Chronology-last entry dated 6 March 91 (Classified Enteries).
B. OPERATION DESERT STORM (ODS) SIGNIFICANT EVENTS, DAMO-AOC.
C. ODS Strategic Lessons Learned Team.
ANNEX B

OPERATIONS DESERT SHIELD AND DESERT STORM (ODS)
SUSTAINMENT BROCHURE

TASK ORGANIZATIONS
(XVIII AIRBORNE CORPS & VII CORPS)
# XVIII ABN CORPS

<table>
<thead>
<tr>
<th>24ID(M)</th>
<th>25ID ABN</th>
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<td>A/92 FA(MLRS 1X9)(2AD)</td>
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**Summary**

- Armored Bns: 11
- Mechanized Bns: 6
- Light Bns: 18
- CAV Sqn: 3
- ATK Hel Bns: 13
- FA Bns: 26

**18th Corps Arty**

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**12th Avn Bde**

- 5-6 ATK(18 AH64)
- 3-227 ATK(18 AH64)
- CH47D Co(16 CH47D)

**18th Avn Bde**

- 1-227 ATK(18 AH64)
- 1-159 AVN
- 1-58 ATC
- 2-159 AVN
- 4-17 CAV

**11th ADA Bde**

- 2-7 ADA(PATRIOT 4X6)
- 3-43 ADA(PATRIOT 4X6)

**20th Eng Bde**

- 25th Sig Bde
- 16th MP Bde
- 525th Mlbde
- 18th FIN GP
- 1st COSCOM
- 5th SF GRP
### VII CORPS

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**SUMMARY**
- ARMORED BNS-18
- MECH INF BNS-11
- LT INF BNS-0
- CAV SQDNS-6
- ATK HEL BNS-5
- FA BNS - 15(+)

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11/15/90
ANNEX C

OPERATIONS DESERT SHIELD AND DESERT STORM (ODS) SUSTAINMENT BROCHURE

ORGANIZATIONAL DIAGRAMS OF
CORPS & EAC SUPPORT UNITS
ANNEX C

APPENDIX 1

OPERATIONS DESERT SHIELD AND DESERT STORM (ODS) SUSTAINMENT BROCHURE

ORGANIZATIONAL DIAGRAMS OF CORPS & EAC SUPPORT UNITS

22D SUPCOM
APPENDIX 2

OPERATIONS DESERT SHIELD AND DESERT STORM (ODS)
SUSTAINMENT BROCHURE

ORGANIZATIONAL DIAGRAMS
OF
CORPS & EAC SUPPORT UNITS

1ST COSCOM
ANNEX C

APPENDIX 3

OPERATIONS DESERT SHIELD AND DESERT STORM (ODS) SUSTAINMENT BROCHURE

ORGANIZATIONAL DIAGRAMS OF CORPS & EAC SUPPORT UNITS 2ND COSCOM
ANNEX D

OPERATIONS DESERT SHIELD AND DESERT STORM (ODS)
SUSTAINMENT BROCHURE

ORGANIZATIONS CONTRIBUTING
PERSONNEL TO THE USASG
ANNEX E

OPERATIONS DESERT SHIELD AND DESERT STORM (ODS)
SUSTAINMENT BROCHURE

22D SUPCOM SUMMARY
OF
KEY STATISTICS
1. MISSION: Reception, Onward Movement and Sustainment of U.S. Forces Deployed to SWA

2. DATES:
   a. DESERT SHIELD: 8 Aug 90 - 16 Jan 91
   b. DESERT STORM: 17 Jan 91 - 15 Mar 91
   c. C-Day 7 Aug 90 (Deployment)
   d. D-Day 17 Jan 91 (Air Offensive)
   e. G-Day 24 Feb 91 (Ground Offensive)
   f. R-Day 10 Mar 91 (Official Redeployment)

3. RECESSION
   a. 500 + Ships (Discharged)
      Primary SPODs
      Dammam
      Al Jubiyl
      Bahrain
   b. 9,000 + Aircraft Received
      Primary APODs
      Dhahran
      KFIA
      Riyadh
      KKMC
   c. EQUIPMENT RECEIVED AND MOVED FORWARD
      1) Track Vehicles - 12.4 K
      2) Wheel Vehicles - 114 K
      3) Helicopters - 1.83 K
      4) Containers - 33 K
   d. CARGO RECEIVED - 1.8M Stons
   e. AMMUNITION RECEIVED - 350 K Stons
   f. PERSONNEL PROCESSED THRU APODs - 350 K

4. LOG BASE BUILD UP FOR G-DAY
   a. Total Log Bases - 9
   b. Primary Log Bases for Build Up (A, B, C, E and BAGSTOGNE)
   c. Primary Classes of Supply Classes of Supply Pushed to Log Bases
      1) Class I - 70 M Packaged Meals
2) Class II (Bottled Water) - 1.1M Cases  
3) Class III (Bulk Fuel) - 33M Gal on hand/120M Gal pushed  
4) Class III (Package) - 6,375 Stans  
5) Class V - 300 K Stans  

5. MOVEMENT OF MATERIAL AND PERSONNEL FOR G-DAY  

a. Miles of MSR - 2,746  
b. Number Convoys - 3,568  
c. Number U.S. Army Trucks - 1,400  
d. Number Host Nation Trucks - 2,100  
e. Miles of MSR Driven - 35M  
f. HET Moves - 1,739  
g. Low Boy Moves - 5,828  
h. Flat Bed Moves - 10,149  
i. Accomplishments  
   1) Movement of Two Full Corps  
   2) Movement of Material for Log Base Build Up  
   3) Both Accomplished in 21 Days Despite the crossings of the routes of the two Corps  
   4) Seven (7) Convoy Support Centers Provided fuel, food, maintenance, rest and recreation  
   5) During this 21 days, 18 Vehicles would pass any given point each minute 24-hours/day, 7 days/week.  

6. FORCE MODERNIZATION/NEW EQUIPMENT TRAINING (NET)  

a. M1A1 Tank Modernization - 17 Bn Sets (948 Tanks)  
   NET Conducted - 11 Bn Sets  
b. Counter Mine Equipment Modernization - 13 Bn Sets  
c. M2A2/M3A2 Modernization - 11 Bn Sets (836 Bradleys)  
   NET Conducted - 10 Bn Sets  
d. M9 ACE (Armored Cbt Earthmover) Modernization - 99  
e. AH-1F Modernization - 61  
f. UH-60L Modernization - 32  
g. CEV Mine Rake Modernization - 43  
h. SLGR/LORAN-C Installations - 15,018  
i. M939A2 Fielded - 1,977  
j. HMMWV Fielded - 2,642
k. IEW Systems Fielded
   1) J STARS - 4
   2) VAV - 1
   3) ASPO Imagery - 13
   4) TROJAN - 13

7. VII CORPS PAINTING PROGRAM UPON RECESSION
   a. 10,000 + Vehicles Painted
   b. 30,000 Gal Paint Used

8. WEAPONS SYSTEM REPLACEMENT OPERATION (WSRO)
   a. M-1 - 225
   b. CME - 67
   c. M-2 - 104
   d. M-3 - 102
   e. M-88 - 14
   f. M-577 - 6

   TOTAL 451 Track Vehicles

9. CORPS PROJECTED DAILY SUSTAINMENT
   a. Class V
      1) VII CORPS - 450 truck loads / 9,000 Stons
      2) XVIII CORPS - 400 truck loads / 5,000 Stons

   b. Class III (B)
      1) VII CORPS - 400 truck loads / 2.4 M Gal
      2) XVIII CORPS - 480 truck loads / 2.1 M Gal

10. PEAK PERSONNEL STRENGTHS
    a. ARCENT - 303,500
       SUPCOM - 31,679
    b. AIR FORCE - 54,700
    c. NAVY - 83,600
    d. MARINES - 92,800
    e. JOINT CMDs - 6,825
       CENTCOM - 1,200
       SOCCENT - 5,300
       JCSE - 325
    f. TOTAL U.S. - 541,425

11. MEDICAL SUPPORT AT PEAK
    a. HOSPITALS
       1) Field - 3
       2) EVAC - 22
       3) STATION - 1
       4) GENERAL - 1
       5) MASH - 8
       6) CSH - 2
       TOTAL 44
b. Available Beds - 7,300

c. Medical Personnel - 22,000

d. Medical Evac Aircraft
   VH-60 - 50
   VH-IV - 175
   Total 225

e. Ground Ambulance
   U.S. - 408
   GE - 60
   Saudi Bus (Converted For Litter) - 50
   Saudi Bus (For Ambulatory) - 50

12. BATTLE DAMAGE ASSESSMENT (IRAQ IN KTO)
   DIVISIONS - 36 of 43 destroyed
   TANKS - 3847 of 4550 destroyed
   APC - 1450 of 2880 destroyed
   ARTY - 2917 of 3257 destroyed

13. ON GOING MISSIONS
   a. DEFENSE OF KUWAIT (Onward Movement and Sustainment of 11th ACR (-))
      1) Personnel - 9,500
      2) Issue Equipment
         Tracks - 456
         Wheels - 785
         Trailers - 305
         Hvy Engr - 21
         Forklift - 13
      3) Transportation
         HETS - 121
         LOWBOYS - 156
         FLATS - 95
         TOTAL - 372

   b. HUMANITARIAN SUPPORT
      1) RESTORATION OF KUWAIT
         (Tentage/Food/Water/Clothing/Cots/Med Supplies)
      2) UNITED NATIONS IRAQ KUWAIT OBSERVER MISSION
         a. 269 Vehicles
         b. 44 Generators
         c. $5.5 M Expendable Items
3) OPERATION PROVIDE COMFORT (Aid to Kurds)
   a. 928 G.P. Med Tents
   b. 3,380 Bedowin Tents
   c. 84 Kitchen Tents
   d. 278-20' x 40' Tarps
   e. 98 Water Trailers
   f. 1 Ship (510 Containers) + 115 Pallets MRE's
   g. 9 ea - 10k lb. Fork Lifts
   h. 17,000 Batteries
   i. 380 Boxes OFDA Plastic Sheeting For Shelter
   j. 1,200 - 5 Gal Water Cans
   k. 7,461 Cold Weather Shirts

4) REFUGEE CAMP SUPPORT
   a. SAFFWON, IRAQ REFUGEE CAMP
      1) Medical Supplies/Water/A Rations/Tents/Baby Supplies provided by the US.
      2) Operated by 1st Bde, 3rd Armored Division.
      3) Food and Water
         Meals 979,822 each
         Bottle Water 173,906 cases
         Bulk Water 1,136,700 gal
      4) Transients
         Into Sector 55,055 people
         Out of Sector 38,600 people
         Vehicles In 11,559
         Vehicles Out 10,824
      5) Medical Support
         Patients Treated 23,419
      6) EPW's Processed 3,341
      7) Registered
         Transients 13,005
         Requesting Asylum 912
         For Food 11,370
      8) Transfer to Rahfa, Saudi Arabia
         Number of Flights 96
         Number Transfered 8,375
   b. RAFFA, SAUDI ARABIA REFUGEE CAMP
      1) Tents/Water Equipment/Food/Medical Supplies provided by the US.
2) Saudi operated.

5) **BANGLADESH TYPHOON RELIEF**
   (1 Ship (510 containers) MREs/Medical Supplies)

6) **PANAMA**
   (1 Ship (510 containers) MREs)

7) **ETHIOPIA**
   (1 M MREs)

8) **EQYPT**
   (1 plane loads, 36 Pallets, Medical Supplies)

9) **RED CRESCENT (KUWAIT)**
   (Food and Medical Supplies)

10) **CENTRAL AND SOUTH AMERICA**
    (510 containers B Rations & MOREs)

c. **ENEMY PRISONER OF WAR (EPW)**
   1) 800th MP Bde Built & Operated 4 EPW Camps
   2) 70,000 EPWs Processed to Saudi Control
   3) 1,500 Daily Flow Thru Camps

d. **SUPPORT TO OTHER SERVICES**
   1) **MARFOR (SWA)**
      (Classes I, IW, II, V, VI)
   2) **NAVY SEALS**
      (Class IX)
   3) **AIR FORCE**
      (Class V Transportation)

e. **REDEPLOYMENT**
   1) **APOEs**
      Dhahran
      KFIA
      KKMC
      Riyadh

   2) **SPOEs**
      Bahrain
      Dammam
      Al Jubayl

   3) **REDEPLOYMENT ASSEMBLY AREAS (RAAs)**
      KKMC 1 - Wash Site 76 Points
      Dhahran 4 - Wash Sites 384 Points
      KFIA 2 - Wash Sites 168 Points
      Al Jubayl 2 - Wash Sites 154 Points
      Doha, Kuwait 1 - Wash Sites 21 Points
      **Total 782 Points**
4) STERILE STAGING AREA FOR EQUIPMENT PENDING LOADING ON SHIP
   a. Damman - 3,841,388 sq ft
   b. Jubayl - 988,229 sq ft
       4,829,617 sq ft

   NOTE: This is equivalent to 36 miles of 2 lane road with vehicles parked bumper to bumper.

5) PRIMARY PERSONNEL MARSHALLING AREAS

   KKMC
   Riyadh
   Khobar
   KFIA

6) REDEPLOYMENT FIGURES VS PROJECTIONS

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<td>Aircraft departed - 2,264</td>
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<td>Ships sailed - 132</td>
<td>420</td>
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<tr>
<td>Tracked Vehicles - 4,168</td>
<td>12,000</td>
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<tr>
<td>Wheeled Vehicles - 45,901</td>
<td>114,000</td>
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<tr>
<td>Helicopters - 1,038</td>
<td>1,830</td>
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<tr>
<td>Containers - 2,785</td>
<td>33,000</td>
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<td>Personnel - 338,335</td>
<td>541,425</td>
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<td>Cargo (STONS) - 468,320</td>
<td>1,928,000</td>
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7) REDEPLOYMENT TRANSPORTATION REQUIREMENTS
   a. XVIII Corps - 4,786 Lifts
   b. VII Corps - 4,423 Lifts
   c. EAC - 3,186 Lifts
   d. PREPOSITION MATERIAL - 39,241 Lifts
   e. 1st Bde 3rd AD - 628 Lifts

8) VII CORPS CARC PAINTING (Prior to Rtn to Germany)
   a. Tracks 3,130
   b. Wheels 5,014
       Total 8,144

14. MISCELLANEOUS INFORMATION

   a. MEAPO LEASES
       1) U.S. Real Estate Leases (KSA) - 91
       2) MODA Real Estate Leases (KSA) - 33
       3) U.S. Real Estate Leases (Bahrain) - 2
       4) U.S. Real Estate Leases (U.A.E.) - 2
       5) U.S. Real Estate Leases (Kuwait) - 3
           Total 131

E-7
b. CONTRACTS

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<td>ARCENT Simplified Purchases</td>
<td>77,332</td>
<td>106,845,400</td>
</tr>
<tr>
<td>XVIII Contract Awards</td>
<td>242</td>
<td>95,177,542</td>
</tr>
<tr>
<td>XVIII Simplified Purchases</td>
<td>8,852</td>
<td>46,478,023</td>
</tr>
<tr>
<td>TOTAL CONTRACT ACTION</td>
<td>86,678</td>
<td>$1,981,981,772</td>
</tr>
</tbody>
</table>

c. OMA FUNDING (See Chart)

1) ARCENT SPT CMD FUNDING
   a) VII CORPS $ 68,109,753
   b) XVIII CORPS $ 216,831,592
   c) EAC $ 885,188,856
   d) TOTAL $ 1,170,130,201

2) KUWAIT FUNDING $ 22,134,822

d. V.I.P. VISITS

1) PRES Bush - 1
   VP Quayle - 1
   SEC DEF Cheney - 2
   SEC STATE Baker - 1
   SEC ARMY Stone - 1

2) Congress - 175
   Staffers - 250

3) GEN Powell - 3
   GEN Vuono - 3
   GEN Sullivan - 3
   SMA Gates - 3

4) Four Star Gen - 15
   Foreign GO's - 6
   U.S. GO's (BG thru LTG) - 117

e. Mail

1) Received - 30,765 STONs
2) Shipped - 13,004 STONs
   Total 43,769 STONs

f. Responsibility Sharing (As of 1 May 91) (See Chart)

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commitment</td>
<td>$54,557 B</td>
<td></td>
</tr>
<tr>
<td>Receipts</td>
<td>$37,108 B</td>
<td>68%</td>
</tr>
<tr>
<td>Balance</td>
<td>$17,449 B</td>
<td>32%</td>
</tr>
</tbody>
</table>

g. Mortuary Affairs

1) Total Report (See Chart)

2) SCUD Impact Dhahran
   a. 28 KIA
   b. 98 Injured
   c. Members 475 POL Group
h. Subsistence
   1) 94 M meals served (Non-Operational)
   2) 105 Wolfmobiles at Peak

g. Morale Welfare/Recreation
   1) Recreation Centers (Usage as of 8 Jun 91)
      Cunard Princess Cruise Ship - 41,532
      Halfmoon Bay - 90,739
      Hotel California Just Opened
      Oasis - 13,238
      USO Bahrain Just Opened
      DOD Showbands - 67,300
   2) PX Facilities with Local Merchant displays
      a. Major PXs Established
         Riyadh Dhahran
         KKMC Kuwait
      b. PX Trailers
         Outlying Unit Areas
         Redeployment Assembly Areas
      c. Wolfmobiles (105 at Peak)
         Convoy Support Centers
         Outlying Unit Areas
         Redeployment Assembly Areas
   3) MWR Equipment/Facilities
      Basketball Courts
      Volleyball Courts
      TVs
      Video Tape Players & Movies
      Popcorn Machines
      Stereos
      Pool Tables
      Dart Boards
      Ping Pong Tables
      Soft Drinks
      Cards Tables & Cards
      MCC Telephone Centers
      Local Tours/Shopping Visits
      Swimming Pools
ANNEX F

OPERATIONS DESERT SHIELD AND DESERT STORM (ODS) SUSTAINMENT BROCHURE

DECLASSIFICATION GUIDANCE
UNCLASSIFIED (RELEASABLE TO UK, CAN, AUS)
SECTION 1 OF 2
MSGID/SYS.RRM/CENTCOM CCJ3-PS/
AMPN/SUBJ: OPERATION DESERT SHIELD/DESERT STORM DECLASSIFICATION GUIDANCE/
REF/A/SYS.RRM/USCENTCOM REAR/169000ZNOV90/(U) //
REF/B/RMG/USCENTCOM REAR/221402ZNOV90/(U) //
REF/C/RMG/USCENTCOM/28L50ZMAY91/(TS/FP) NOTAL//
REF/D/RMG/JCS/122252ZFEB91/(S/FP) NOTAL/
REF/E/DOC/DOD/O2 FEB 91/1-90-11044//
REF/F/SYS.RRM/USCENTCOM CCJ3/170825ZJAN91/(S) //
REF/G/RMG/JCS/091331ZAUG91/(S) //
NARR/REF A IS USCENTCOM'S CLASSIFICATION GUIDANCE FOR OPERATION DESERT SHIELD/DESERT STORM. REF B IS CHANGE ONE TO REF A. REF C IS USSOCOM'S INPUT FOR SOF RELATED DECLASSIFICATION. REF D IS JCS DOWNGRADE INSTRUCTIONS FOR LIMITED FOCUS POINT PROGRAMS. REF E IS A DOD MEMORANDUM ON SECURITY CLASSIFICATION FOR OPERATION DESERT SHIELD. REF G IS USCENTCOM'S DOWNGRADE OF OPORD 001 FROM TOP SECRET TO SECRET UPON EXECUTION. REF F IS JCS RECLASSIFICATION OF FOCUS POINT CLASSIFICATION DEALING WITH OPERATIONS IN SOUTHWEST ASIA. //
RMKS/1. THE FOLLOWING IS USCENTCOM'S DECLASSIFICATION GUIDANCE FOR DESERT SHIELD/DESERT STORM OPERATIONS, 2 AUG 90 - 31 MAY 91. THIS MSG IS INTENDED TO DEAL WITH PAST OPERATIONS AND IS NOT, REPEAT NOT, TO BE CONFUSED WITH CLASSIFICATION GUIDANCE FOR ONGOING USCENTCOM OPERATIONS.
2. POST DESERT SHIELD/DESERT STORM CLASSIFICATION GUIDANCE IS PROVIDED BY CATEGORIES OF SUBJECTS AND LEVELS OF PROTECTION. THE LEVEL OF PROTECTION LISTED IS THE BASE LINE LEVEL OF CLASSIFICATION/PROTECTION. COMMON SENSE, SUBJECT MATTER EXPERTISE AND OPSEC CONSIDERATIONS MUST BE APPLIED PRIOR TO PUBLIC RELEASE OF ANY INFORMATION. ULTIMATE RESPONSIBILITY FOR DOWNGRADE AND DECLASSIFICATION RESTS WITH THE ORIGINATOR. ORIGINATOR APPROVAL IS REQUIRED FOR ANY DECLASSIFICATION OR DOWNGRADE. USCENTCOM ORIGINATED INFORMATION TO BE CLASSIFIED AS FOLLOWS:
A. UNIT PARTICIPATION DATA:
   (1) IDENTITY OF UNITS DEPLOYED: UNCLASSIFIED.
   (2) GENERAL LOCATION AND PERSONNEL STRENGTHS OF UNITS DEPLOYED (E.G. GENERAL CITY, AIR BASES AND COUNTRY LOCATION) IS UNCLASSIFIED. EXCEPT FOR SPECIAL OPERATIONS UNITS OR PERSONNEL EMPLOYED IN IRAQ PRIOR TO COMMENCEMENT OF OPERATION DESERT STORM.
   (3) SPECIFIC OPERATION DESERT SHIELD/STORM UNIT LOCATIONS (E.G.) GRID COORDINATES ARE UNCLASSIFIED.
   (4) THE DEGREE OF U.S. PARTICIPATION WITH ALLIED OR FRIENDLY NATIONS IN COMBAT OR LOGISTIC/SUSTAINMENT OPERATIONS REMAIN CLASSIFIED AS CURRENTLY MARKED. SPECIFIC CAVEATS AS TO WHICH THIRD PARTY NATIONS MAY HAVE ACCESS TO INFORMATION REMAIN IN EFFECT.
B. LOGISTICS:
   (1) OVERALL LOGISTIC PLAN SHOWING SUSTAINABILITY OF DEPLOYED FORCES IS UNCLASSIFIED.
   (2) MAP REQUISITION. UNCLASSIFIED.
C. FORCE MOBILITY DATA.
   (1) TOTAL AIR/SEA LIFT FLOW IS UNCLASSIFIED.
ACTION DAEN-ZC(2) DAMO(8) DAAR(2) DAE(3) SASA(1) INFO AOCCRISIS 1(1) DAMO-AOC(1) SCB REVIEW(1) AOCCRISIS 2(1) CDR USAITAC WASH DC
(2) TPFFO OVERALL REPORT IS UNCLASSIFIED.
(3) UNIT NAME AND DESTINATION COMBINED IS UNCLASSIFIED.
(4) UNIT NAME AND EAD/LAD COMBINED IS UNCLASSIFIED.
(5) ULN, UIC, AND UNIT NAME IS UNCLASSIFIED.
(6) ULN AND DESTINATION IS UNCLASSIFIED.
(7) ULN AND EAD/LAD IS UNCLASSIFIED.
(8) ORIGIN, UIC, AND ULN IS UNCLASSIFIED.
(9) SINGLE FLIGHT PLAN TO INCLUDE STOPS, DESTINATION, AND LOAD
    DESIGNATION ARE UNCLASSIFIED.
(10) CONUS/OCONUS TRAVEL PLANS OF GENERAL OFFICERS WITH OR
    WITHOUT SPECIFIC ITINERARIES IS UNCLASSIFIED.

D. COMMUNICATIONS/ADP:
(1) COMMUNICATIONS NETWORK USERS, CALL SIGNS, SPECIFIC
    FREQUENCIES, AND IDENTIFICATION OF NET PARTICIPANTS ARE SECRET.
(2) COMMUNICATION EFFECTIVENESS, SUSTAINABILITY, AND
    LIMITATIONS ARE SECRET.
(3) COMPLETE LIST OF CRYPTO MATERIAL SHORT TITLES IS SECRET.
(4) CRYPTO SHORT TITLE WITH ACTIVE EDITION IS SECRET.
(5) CRYPTO SECURITY VIOLATIONS ARE SECRET.
(6) COM/ADP OUTAGES THAT DEGRADE COMMAND AND CONTROL ARE
    SECRET.
(7) WWMCCS USER ID IS UNCLASSIFIED.
(8) WWMCCS PASSWORD IS TOP SECRET.
(9) WWMCCS PRINTER OUTPUT IS CLASSIFIED TOP SECRET UNTIL
    ACTUAL CLASSIFICATION IS DETERMINED BY ORIGINATOR IAW JCS PUB 6-
    03.7.

E. TERRORISM/SECURITY:
(1) TERRORIST THREAT LEVEL/CONDITION WITHOUT ANY SUPPORTIVE
    COMMENT IS UNCLASSIFIED. LEVEL/CONDITIONS WITH SUPPORTIVE
    COMMENTS, THE CLASSIFICATION WILL BE DETERMINED BY THE ORIGINATOR
    BUT MINIMUM OF CONFIDENTIAL. NOFORN OR OTHER CAVEATS ARE NOT
    AUTOMATIC BUT APPLY UNDER THE RULES GOVERNING THOSE MARKINGS.
(2) VULNERABILITY OF U.S. CENTRAL COMMAND INSTALLATIONS TO
    SABOTAGE AND PENETRATION IS SECRET.
(3) PERSONNEL ACCESS ROSTERS ARE FOUO.

F. OPERATIONS:
(1) OPERATION NAMES (E.G. DESERT STORM/DESERT SHIELD, EASTERN
    EXIT) ARE UNCLASSIFIED.
(2) COMBINED U.S./ALLIED OPERATIONS ORDERS AND ORDER OF BATTLE
    ARE UNCLASSIFIED NOTE: ANNEXES/APPENDICES (E.G. SPECIAL OPS) COULD
    BE SECRET OR TOP SECRET AND WITH OR WITHOUT SPECAT CAVEATS. THESE
    ANNEXES/APPENDICES WILL BE DOWNGRADED TO SECRET BUT THE SPECAT
    CAVEAT WILL REMAIN IN EFFECT. FOR SPECIFIC SPECAT DOWNGRADE
    INSTRUCTIONS SEE PARA 2K.
(3) ENEMY ORDER OF BATTLE REMAINS CLASSIFIED AS CURRENTLY
    MARKED.
(4) DECEPTION PLANNING IS SECRET AND ALL SPECAT CAVEATS REMAIN
    IN EFFECT AS MARKED.
(5) PSYCHOLOGICAL OPERATIONS AND PLANNING ARE UNCLASSIFIED.
    SEE PARA 2F6.
(6) SUPPORT FROM OR TO OTHER U.S. GOVERNMENT AGENCIES IS
    SECRET. THOSE OPERATIONS ARE DOWNGRADED TO SECRET WITH SPECAT
    CAVEAT WHERE APPLICABLE.
(7) FRATRICIDE
(8) FRATRICIDE ISSUES ARE FOUO WITH RELEASE AUTHORITY AT THE
    DISCRETION OF USCENTCOM COMPONENT COMMANDERS.
(9) FRATRICIDE INVESTIGATIONS ARE SECRET PENDING RESOLUTION.
(10) TARGETING METHODOLOGY, THE SELECTION PROCESS AND
    RESULTANT TARGET LISTS ARE SECRET.
(11) TARGETS ATTACKED: UNCLASSIFIED. SEE PARA 2G.
(12) COMMAND RELATIONSHIPS, AGREEMENTS, AND MEMORANDUMS OF
    UNDERSTANDING MINIMUM FOUO, CLASSIFIED AS MARKED IF DOCUMENT
    INCLUDES IDENTIFICATION OF A HOST NATION WHOSE LEVEL/TYPE OF
    DOWNGRADE APPLIES.
OPERATIONS SUPPORT DIRECTORATE

BT UNCLAS (RELEASABLE TO UK, CAN, AUS).

FINAL SECTION OF 2

SUPPORT OF ACTIVE PARTICIPATION IS CLASSIFIED BY ANOTHER SOURCE.

SEE PARA 2A(4).

(13) CONCEPT OF OPERATION, TOTAL RESOURCES INVOLVED,

OPERATIONAL AND TACTICAL LEVEL MANEUVERS AND OPERATIONS ARE

UNCLASSIFIED.

(14) VULNERABILITIES AND READINESS OF U.S./ALLIED UNITS ARE

CLASSIFIED CONFIDENTIAL OR HIGHER.

(15) STATUS/DETAILS OF U.S. ALLIANCES, INCLUDING STATUS OF

FORCES AGREEMENTS, DEPLOYMENT RIGHTS, PRIVILEGES, AIRFIELD USE AND

PORT AVAILABILITY ARE CLASSIFIED DIFFERENTLY WITH EACH COUNTRY.

CLASSIFICATIONS VARY FROM SECRET TO UNCLASSIFIED. ALL

CLASSIFICATIONS REMAIN AS CURRENTLY MARKED, NO FORN CAVEATS REMAIN

ALSO IF SO MARKED.

(16) GROSS ESTIMATES OF OPERATIONAL EFFECTIVENESS INCLUDING

INTELLIGENCE, COUNTERINTELLIGENCE, RESCUE (LESS ALL ESCAPE &

EVASION PLUS PROCEDURES FOR PROCESSING RECOVERED PERSONNEL) AND

RECONNAISSANCE ARE UNCLASSIFIED. NOTE:, EXCLUDING THAT WHICH

REVEALS SENSITIVE SOURCES AND METHODS, WHICH REMAIN CLASSIFIED AS

MARKED.

(17) SPECIAL OPERATIONS. SEE REF C.

(A) SOF DEPLOYMENTS/PARTICIPATION ARE UNCLASSIFIED.

(B) SPECIFIC MISSIONS ARE UNCLASSIFIED. NOTE: MISSIONS

CLASSIFIED TOP SECRET WITH SPECAT CAVEATS REMAINING ARE DOWNGRADED

TO SECRET WITH SPECAT CAVEAT IN EFFECT.

(C) SOF OPERATIONS AREAS ARE UNCLASSIFIED.

(18) WEATHER OPERATIONS:

(A) LOCATION OF DEACTIVATED WEATHER FORECAST AND OBSERVATION

UNITS ARE UNCLASSIFIED.

(B) LINKING PROVISIONAL WEATHER GROUP UNITS WITH THEIR

SUPPORTED UNITS IS UNCLASSIFIED.

G. WEAPONS.

(1) CURRENT CLASSIFICATION OF U.S. WEAPONS SYSTEMS

CHARACTERISTICS REMAIN IN EFFECT.

(2) NUMBERS AND TYPE OF AIRCRAFT OR OTHER WEAPONS EMPLOYED ARE

UNCLASSIFIED.

(3) WEAPONS APPLICATION WHEN MATCHED AGAINST SPECIFIC TARGETS

MAY COMPROMISE 2G(1) ABOVE. THESE TARGETS WILL REMAIN CLASSIFIED

AS MARKED.

H. NUCLEAR AND CHEMICAL OPERATIONS.

(1) CW RETALIATORY POLICIES AND PROCEDURES ARE SECRET.

(2) REFERENCE TO U.S. FORCES NUCLEAR CAPABILITIES ARE SECRET.

(3) ASSIGNMENT OF DUAL CAPABLE FORCES TO USCENTCOM IS

UNCLASSIFIED.

(4) BIOLICAL DETECTION AND PREVENTION MEASURES TAKEN ARE

SECRET.

I. CIVIL AFFAIRS OPERATIONS: UNCLASSIFIED.

J. PUBLIC AFFAIRS, ANNEX F. OF ALL USCENTCOM DESERT SHIELD/STORM

OPORDS AND PLANS ARE DECLASSIFIED. PUBLIC RELEASE AUTHORITY IS

RETAINED BY THE OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE FOR

PUBLIC AFFAIRS (OASD: PA) AND USCINCENT PUBLIC AFFAIRS.

K. SPECAT DOWNGRADE INSTRUCTIONS.

(1) ALL NIKE AIR/POST MAN TOP SECRET OPERATION ORDERS HAVE

BEEN DOWNGRADED IN REF F TO SECRET. THESE OPORDS ARE SUBSEQUENTLY

DOWNGRADED TO UNCLASSIFIED.

(2) ALL NIKE AIR/POST MAN, TOP SECRET, EAGER ANVIL OPERATION

OPORDS ARE TO BE DECLASSIFIED, AND THE EAGER ANVIL SUB PROGRAM WILL

BE TERMINATED UPON JCS APPROVAL.

L. PLANS.

(1) USCINCENT OPLAN 1002-90 (SECOND DRAFT, 18 JULY 1990) IS

CLASSIFIED IAW THE OPLAN CLASSIFICATION GUIDANCE OF THAT PLAN.

(2) THE COMBINED OPLAN FOR THE DEFENSE OF SAUDI ARABIA (DATED

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(4) THE COMBINED OPLAN FOR DEFENSE AND RESTORATION OF KUWAIT (DATED 11 FEB 91) DOES NOT CONTAIN SEPARATE CLASSIFICATION GUIDANCE. THIS PLAN REMAINS CLASSIFIED AS DELINEATED BY THE PARAGRAPHS CLASSIFICATION MARKINGS.

(5) THE COMBINED OPLAN FOR DEFENSE OF KUWAIT AND SAUDI ARABIA (DATED 22 FEB 91) REMAINS CLASSIFIED IAW THE OPLAN CLASSIFICATION GUIDANCE.

M. REQUEST ADDRESSEES ENSURE WIDEST POSSIBLE DISTRIBUTION/READRESSAL OF THIS CLASSIFICATION GUIDANCE TO APPROPRIATE ORGANIZATIONS.

3. POC IS MAJ HARVELL, USCENTCOM AV 968-6478, COMM (8) 3) 830-6478.// BT
ANNEX G

OPERATIONS DESERT SHIELD AND DESERT STORM (ODS) SUSTAINMENT BROCHURE

HISTORY OF DESERT EXPRESS
AND
CLASS IX REPAIR PARTS SUSTAINMENT
SUMMARY SHEET, DESERT EXPRESS AND SUSTAINMENT OF CLASS IX

This paper is intended to give a quick history of Desert Express and the part it played in the Army's sustainment of Class IX, repair parts, supply and transportation system.

Desert Express was created by the Department of Defense logistics community to perform the same function as an expedited freight shipper. Like Federal Express or DHL, Desert Express attempted to provide "next day" service for repair parts, especially aviation repair parts.

During research it was discovered that Desert Express worked well offering the user two benefits: 1) 72 hour from time of requisition to parts in hand delivery, and 2) better visibility (due to smaller volume) of the material through the pipeline.

What Desert Express could not do was address these problems within the system: 1) abuse of the supply system priority codes, 2) subordinate commands going outside supply channels for requisitions and tracing, 3) the lack of heavy transportation equipment in the theatre early on, 4) choke points at the APOD(s) to final destination.

Additional factors which limited the effectiveness of Desert Express (and the rest of Class IX sustainment system) were: 1) the effects of a reduction in force which hit the depot system just prior to Operation Desert Shield, 2) the lack of reaction time from political decisions to military action, 3) the lack of a mature theatre to operate within.

Final analysis leads the author to these conclusions: 1) Desert Express and the ALOC worked well. 2) the use of "Tiger Teams" provided the answer to priority and chain of command abuses. 3) greater emphasis needs to be placed on getting transportation, supply and distribution assets into the theatre as part of the initial build up. 4) Desert Express was an attempt to solve a supply and distribution problem with a transportation answer.
DESERT EXPRESS HISTORY

On October 30, 1990, approximately 90 days into the Operation Desert Shield/Storm (ODS) build up, the first flight of Desert Express (DE) took place. DE was established by the Commander-in-Chief, Transportation Command, (CINC TRANSCOM) as a military expedited freight shipper similar to Federal Express or UPS and was designed to support the critical sustainment of Class IX repair parts to deployed units in the Area of Responsibility (AOR), especially aviation units.

Beginning on the 30th and continuing until the date this report began, 10 March 1991, DE flew 161 missions. 135 of those missions went from Charleston Air Force Base (CHS) to Dhaharan (DHA), 26 missions flew from CHS to King Khalid Military City (HBT). The Army tonnage totals are as follows:

CHS - DHA 135 MISSIONS: 1,851,794 LBS (926 ST)
CHS - HBT 26 MISSIONS: 446,780 LBS (223 ST)
TOTAL ARMY LIFT 161 MISSIONS: 2,289,574 LBS (1,149 ST)
DAILY AVG LIFT FOR ARMY: 17,184 LBS (8.59 ST)

While the final value of DE has not yet been determined, it is clear that the system cleared, prepared and delivered a substantial amount of equipment and Class IX repair parts. As such it serves as a model for planning in future contingencies and proves that the services, under joint guidance, can establish and maintain an expedited freight service.

EVENTS LEADING UP TO DESERT EXPRESS

The unexpected move into Kuwait by Iraqi forces on 2 August 1990 caught the United States government (and therefore the armed forces transportation system) by surprise. The quick reaction began with the airlift of the 82nd Airborne Infantry Division into Saudia Arabia beginning 6 August 1990. Use of contingency plans to support the division and the follow on forces began. As a part of that planning an Air Line of Communication (ALOC) was established at Dover Air Force Base, Dover, Delaware, and a second ALOC at Tinker AFB, Oklahoma.
The Dover ALOC was dedicated to air delivery of Class IX requirements, regardless of priority, to Combat Service Support (CSS) units with a repair mission (e.g. a Direct Support Maintenance Company). This 'ALOC within an ALOC' was established due to the peculiar nature of Class IX: great numbers of parts, high turnover/usage, storage and packaging problems, and the correlation between repair parts and readiness rates.

To further supplement the supply system the Army designated New Cumberland Army Depot (NCAD) as a Break Bulk Point (BBP) and as a Consolidation/Containerization Point (CCP) for Class IX and some Class II cargo.

From inception the ALOCs were hampered by three situations: 1) A Reduction In Force (RIF) for all depots in the army system. 2) A dramatic workload increase, especially at the National Inventory Control Points (NICPs) 3) Contingency planning based on a mature theatre.

The kickoff for ODS hit the army depot system less than a month after the completion of a major RIF at NCAD and Red River Army Depot (RRAD) resulting in the loss of more than 200 experienced depot workers at NCAD alone. Since the ALOC operations were centered on these two depots the turbulence in personnel created a situation where a significantly reduced work force was suddenly confronted by a work load double that prior to ODS.

As deployed and deploying units were alerted the NICPs were flooded with telephoned requisitions along with requests for Department of Defense Activity Address Code (DODAAC) changes, and attempts by units to suddenly fill their Prescribed Load Lists (PLL) or for supporting units to fill their Authorized Stockage Lists (ASL) to war time levels. This meant that many requisitions entered the pipeline without the necessary paperwork causing confusion, an inability to trace or confirm these requests or the necessary paper trail to correct problems along the way. All of this took place during a flurry of activity naturally generated by emergency deployment.

ODS build up was so rapid that little ramp up time was available to logistics planners. The contingency planning for DODAAC changes and Timed Phased Force Development (TPFD) that the logistics planners had counted on were designed for a mature theatre. ODS was born one day and demanded to be mature the next. Thus the pre-planning did not/could not make a perfect fit within the context of

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the real world situation.

For these reasons the natural turmoil created by the decision to deploy troops to Southwest Asia (SWA) exacerbated the turbulent situation that was already present within the army depot system. Unlike Vietnam or World War II, the Defense Department’s logistics system had no opportunity for a gradual build up. ODS simply launched the whole logistics community into a game of catch up. (2)

Despite these problems, a review of data from NCAD and the Military Air Transportation Control Unit (MATCU), Dover AFB, shows that cargo, to include Class IX, was flowing through the ALOC. (3) Despite this flow the Army Aviation Systems Command (AVSCOM), stated that from their point of view the system was not quick enough. Acting in the role of proponent for aviation units, the commander of AVSCOM requested permission directly from Department of Army (DA) to go outside the ALOC and obtain expedited freight service from DHL Inc. DA granted permission on two conditions: 1) this (DHL) was a temporary fix. 2) AVSCOM would return to the ALOC as the situation improved.

The DHL proposal presented other problems, the foremost being that the company was not US flagged. (4)

The point to be made at this juncture in ODS is that AVSCOM and the fielded army aviation units were not confident in the ability of the supply and transportation
system to keep up with their Class IX sustainment requirements. The aviation community was looking for ways to modify or improve what they felt was an inadequate ALOC.

Throughout this period of establishing a logistics system to support the fielded units, the political situation kept changing and as a result the build up numbers kept changing also. This meant that the logistics planners were constantly reviewing and changing their requirements to adjust to the needs of the field. The speed of the build up became the driving issue and as it increased it created, among other problems, situations where units deployed before PLLs and ASLs could be brought up to full footing. This problem would remain with the logistics system even after the declaration of a cease fire. (7)

Once the system tolerated the use of telephonic requisitions at the inception of deployment the phone became the accepted way of doing business. As late as February statements appeared in the Situation Reports of supporting commands complaining of the circumvention of the established supply requisition system through phone calls. This led to situations where units bypassed supporting commands and went right to the depot, vendor or shipper. Similar situations arose as units tried to trace their requisitions or shipments through the pipeline. (8)

Prior to the ground phase of Desert Storm the Logistic Control Activity (LCA) went through the Logistics Information File-(LIF) looking for priority abuses involving the Desert Express priority code 9AU and found such ruses as a crate of sand bags listed as "Class IX, aviation repair parts", tents, construction materials, tools, fence posts, Class II items and a myriad other items were all listed as 9BU/999 and 9AU (these two codes were established by Joint Chiefs of Staff to denote extremely high priority cargo) lift requirements. LCA indicated that the actual figure varied but at peak time as much as 90% of the requisitions they were receiving for clearance were marked 9BU/999 or 9AU, the two top priority codes for movement by air. (pre war planning anticipated that 65% of the requests for air lift would use these two codes) (9)
Regardless of the real reasons of why the ALOC did or did not meet the needs of the aviation units in the AOR, the bottom line was that there could not be a margin for error in the critical Aircraft On the Ground (AOG) situation. Thus, the logistics agencies exercised an option to create an expedited air freight system citing the AOG situation as their justification for such action.

The main players, AMC, Military Airlift Command (MAC), TRANSCOM, and the joint logistics chiefs reached agreement and gave Desert Express its charter and a starting point.

DESERT EXPRESS CHARTER

MAC was tasked to provide a daily, nonstop C-141 aircraft to fly from Charleston AFB direct to Dhahran. The goal was to reduce intransit times "end to end" for high priority "show stopper" repair parts. The original Army allocation for each flight was five (5) 463L pallets, 500 cubic feet or 15,000 pounds. The Air Force was allotted four (4) pallets and the Navy and Marines one each. A final pallet was left open for last minute load requirements or to take up any "slight overage" any of the services might have beyond their daily allocation. The Airlift Clearance Agency (ACA) for each service (Army ACA or AACA for Army) was to clear cargo for DE and forward clearances to MATCU at Charleston AFB for action.

All shippers/units were to clear their DE requisitions through LCA. Once LCA cleared the cargo the unit was to use expedited freight service to the Aerial Port of Embarkation (APOE) at Charleston in time to meet the 10:30 Romeo deadline the next day. Units whose cargo was not cleared were allowed to challenge the LCA decision through the G/4 at ARCENT REAR. If approved, the challenged cargo would be entered on the next day’s cleared list. As the system matured LCA increased the amount of cargo cleared and allowed the capacity of the system or the direct representatives of the ARCENT FORWARD G/4 (Tiger Teams) to decide what would move from the cleared cargo. After screening lift requests LCA would datafax a list of cleared cargo to the Charleston MATCU and the APOE. The Aerial Port of Debarkation (APOD) was established at Dhaharan where the bulk of the US forces were located. DHA remained the sole APOD until the movement of VII Corps forces to the west of the AOR forced the addition of a second APOD at King Khalid Military City.
The selection of Charleston AFB was made because of the existence of facilities for sorting and palletizing cargo, the location of a civilian air field next door, connections with LOGAIR and QUICKTRANS systems and daily flights by several air freight companies to feed the DE system.

DESERT EXPRESS RESULTS

The initial response from the field was extremely positive and the Desert Express system seems to have had an immediate impact on the AOG situation. Other critical missions such as the shipping of armor plating, vehicle paint, and desert uniforms (DBDUs) were handled through DE as an emergency shipment system. Because the system was limited to one aircraft, one APOE/APOD, and worked in pounds instead of tons, Desert Express cargo enjoyed greater visibility. This made it easier to trace material from requisition to arrival in SWA. The visibility factor was a consideration in choosing DE over the normal ALOC for these emergency situations. Though the desired results were achieved this way, in retrospect, this usage weakened the system and contributed to problems with backlog at the APOE, in effect delaying the delivery of other critically needed equipment requiring airlift.

By the early part of January there was evidence that the total airlift system at Dover, Charleston and Tinker, was starting to get backlogged. The size of the ODS force had been doubled and new units were arriving constantly during November, December and January. Christmas mail placed an additional burden on the system along with the limitations of the number of airframes and aircrews available. When these factors were added to the problems of abuses of the-priority system, shippers sending cargo directly to Charleston without clearing the cargo or adhering to MILSTRIP guidelines and other attempts to "beat the system" the net result was that DE and the rest of the airlift system could no longer meet their charters. LCA went through the LIF to establish abuses/abusers and again items such as sandbags, duplicating paper (presented to AACA as a gear box and cleared as such by them), barrier materials and tires had been requisitioned using 9AU as a priority code. More than once material listed as a "show stopper" arrived at Charleston after traveling for several days in a truck, completely defeating the purpose of DE to reduce intransit time. (10) While follow up reports show
that these deliberate acts were taken in the belief that this was "to help the fighting units" the reality of these actions was that they hindered the system and thus hurt the very people the abusers sought to help.

DESERT EXPRESS LESSONS LEARNED

The need for an express air freight system over and above the ALOC certainly merits examination and consideration in future planning. Desert Express is positive proof that the services can coordinate all the necessary elements to "make it happen". The distinct advantages offered by DE, rapid response time and greater visibility of cargo throughout the pipeline (due to smaller volume) made it perfect for Class IX. However, as this report shows, DE was just as vulnerable as the ALOC it supplanted to the problems of priority abuse, breaks in the chain of command and the effects of sudden increases in the force structure.

In the final analysis the effectiveness of Desert Express was severely limited by supply problems and a lack of in-country transportation. The addition of a freight express system with 72 hour responsiveness did nothing with regard to facing the issue of priority abuse, the lack of enough Heavy Equipment Transporters (HETs), failure of vendors and shippers to use MILSTRIP, the failure of units in the AOR to exercise the chain of command to check on the status of supplies in the system and the problem of "no hits" at the APOEs.

The logistics data proves that a tremendous amount of Class IX was sent to SWA. If we limit our concerns to the ability of DE and the other components of the sustainment system to move tons of material, everything worked well. At the conclusion of the ground war thousands of containers and hundreds of pallets were finally located by units. Many of these contained Class IX. Even though the system delivered to port, in many instances the system failed in getting the cargo from port to final destination. Future planners may wish to look at this inconsistency and place greater emphasis on the need for HETs with the initial build up and on the early deployment of logistics units at the APODs and with the forward units to assure the correct breakout and delivery of material once it is in the theater.

If DE worked but did not "fix" the system, what was available as a "fix"? The final solution attempted on the
logistics problem was to simply appoint representatives from the forward G/4 at the APOEs and give them the authority to divert cargo despite the priority given by the requestors. These officers had direct contact with the commanders in the field and could therefore immediately force the correct priorities onto cargo making the system as flexible as possible to changing requirements. The ARCENT Tiger Team representatives finally put a real set of teeth into the DE/ALOC system. With their bite, the Tiger Teams gave the system the necessary supply discipline that had been lacking.

The success of these representatives in reducing the backlog at the APOEs indicates that DE requires a means of enforcing supply discipline. When this discipline is added to the transportation system the whole system works.

As to the issue of the success of DE and the rest of the system to meet the Class IX sustainment requirement, the best place to look is the field reports. The first reports back on the performance of weapons systems during ODS show that the operational readiness rates for the M1A1 Abrams Tank, Bradley Fighting Vehicle, AH-64, UH-60, CH-47, and OH-58D helicopters exceeded the Army standards which leads to the conclusion that either the systems are more reliable than hoped for or that the repair parts required to obtain such remarkable rates were there when needed. (11)

In summation, Desert Express was an attempt to solve a supply problem with a transportation solution. It worked well as a temporary "fix" but it eventually required the placement of ARCENT representatives at the APOEs to divert the genuine air qualified 9AU - 9BU/999 cargo from the sandbags, tires, and duplicating paper that should have been sent either by surface or with a lesser airlift priority. This final solution seemed to solve the need for flexibility in tailoring a system that could deliver the goods to the commander in the field and could respond quickly to changes in priorities. In fact the use of Tiger Teams with their ability to communicate directly with the forward G/4 and the authority to divert cargo may have been the key element that will allow future Desert Express/ALOC type solutions to work. (12)
FOOTNOTES

1. DESERT EXPRESS DATA, 30 October - 10 March 1991 obtained from Senior Master Sergeant Belcher, Charleston AFB MATCU, and MAJ Crooks, TRANSCOM CAT

2. Routing Slip, James Salazar, AMCSM-MTS to LTC McFarlin 19 October 1990
   Message, 291530Z Aug 90, FM HQ MAC
   Message, 011626Z Sep 90, FM CDR FORSCOM

3. Message, 141430Z Sep 90, FM CDR 1st COSCOM

4. Message, 272034Z Aug 90, FM HQDA
   Message, 181542Z Oct 90, FM HQ MAC

5. Note, 111030L Sep 90, Cliff Young, AMCSM-MTS
   Message, 121545Z Sep 90, FM CDR AMC
   Message, 191154Z Oct 90, FM CDR AMC

6. Message, 042000Z Oct 90, FM CDR AVSCOM
   Message, 122000Z Oct 90, FM CINTRANS
   Message, 161525Z Oct 90, FM HQDA
   Note, 19 Oct-90, FM MG WILLIAMSON, CDR AVSCOM

7. OPERATION DESERT SHIELD DEPLOYMENT LESSONS (Draft)
   DADCSLOG, 30 Nov 90, pgs 7,8,9 & 18
   SIT REP #62, 22 Oct 90, AMC SWA
   Letter, 28 Jan 91, FM COL(P) Zierdt to LTG Ross

8. Message, 120900Z Feb 91, FM CDR DESCOM

G-10
Message, 281513Z Jan 91, FM CDR AMC
Message, 291810Z Jan 91, FM CINC FORSCOM
Message, 291945Z Jan 91, FM HQDA
Message, 072141Z Jan 91, FM CDR 427 APS, CHS AFB

9. White Tail, 14 Jan 91, FM COL McFarlin to MG Murray

10. Message, Personal MG Murray, 141830Z Jan 91, FM CDR AVSCOM
    Message, 242236Z Feb 91, FM CDR AVSCOM
    Message, 161735Z Feb 91, FM HQDA
    Message, 201500Z Nov 90, FM CINC TRANS
    Message, 221245Z Feb 91, FM CDR FORSCOM

11. Message, 221545Z Mar 91, FM CDRMTMC
    Paper, 13 March 1991, DCSSMT, AMC

12. Message, 120255Z Dec 90, FM CINC TRANS
    Message, 041320Z Jan 91, FM CDR AMC
ANNEX H

OPERATIONS DESERT SHIELD AND DESERT STORM (ODS)
SUSTAINMENT BROCHURE

FOLLOW-ON STUDIES
DESERT STORM FORCE CLOSURE MODEL ..................... H-2
ADEQUACY OF CSS SUPPORT TO DESERT SHIELD ...... H-2
LACK OF PORT PLANNING DATA ................................ H-2
ASSESSMENT OF DESERT SHIELD/STORM LOG FORCE STRUCTURE ........................................ H-3
STANDARDIZED SUPPLY SYSTEM PARAMETERS .......... H-3
ANTICIPATED ROTATION PROBLEMS ........................ H-3
ODS RETURNING SHIPS MANIFEST.......................... H-4
ODCSLOG ODS LESSONS LEARNED OBSERVATIONS ...... H-4
TOTAL DISTRIBUTION SYSTEM ............................... H-4
INDUSTRIAL BASE ASSESSMENT .............................. H-5
RAND ANALYSIS OF ODS DEPLOYMENT & SUSTAINMENT ......................................................... H-5
ODS ARMY AFTER-ACTION REPORT.......................... H-5
HQDA ODS AFTER-ACTION REPORT.......................... H-6
ARMY STRATEGIC MOBILITY PLAN .......................... H-6
A. NAME/TITLE OF ANALYSIS: Desert Storm Force Closure Model
B. CLASSIFICATION: SECRET
C. SPONSORING ACTIVITY: HQDA ODCSLOG, DALO-TSM
D. POINT OF CONTACT: Mr. Larry Smith, DSN 977-7994
E. ABSTRACT: Model that predicted force closure dates and networked the deployment flow from each port-of-embarkation. Used to answer what if questions from senior Army leadership. Modeled both CONUS and Europe deployments.

A. NAME/TITLE OF ANALYSIS: Adequacy of CSS Support to DESERT SHIELD......an analysis
B. CLASSIFICATION: SECRET
C. SPONSORING ACTIVITY: HQDA ODCSLOG, DALO-PLP
D. POINT OF CONTACT: Mr. Kirk W Stanley, DSN 977-6360
E. ABSTRACT: USALEA and CASCOM provided combat service support (CSS) unit analysis for three planned Desert Storm deployments. USALEA provided a scrubbed deployment list to CASCOM who used that list to run the FASTALS model. The resultant CSS unit requirements list was then compared by USALEA to the CSS units scheduled for actual deployment. The final product was a summary showing supportability status (i.e. red; amber; green) by Combat Service Support (CSS) functional area.

A. NAME/TITLE OF ANALYSIS: Lack of Port Planning Data...an analysis
B. CLASSIFICATION: SECRET
C. SPONSORING ACTIVITY: Military Traffic Management Cmd Europe
D. POINT OF CONTACT: Mr. Kirk W Stanley, DSN 977-6360
E. ABSTRACT: MTMC Europe did not have a consolidated file of lift data on U.S. units in Europe required to deploy to SWA. Using available data bases USALEA constructed a (by unit) file that contained actual physical metrics of the U.S. units deploying from Europe. This data base facilitated the planning for/and outloading of these units to SWA.
A. **NAME/TITLE OF ANALYSIS:** Assessment of Operation Desert Shield/Storm Logistical Force Structure

B. **CLASSIFICATION:** SECRET

C. **SPONSORING ACTIVITY:** HQDA ODCSLOG, DALO-PLP

D. **POINT OF CONTACT:** MAJ P K Giles, DSN 977-7762

E. **ABSTRACT:** This analysis was in support of DCSLOG efforts to assess the development of ODS force structure. The purpose of this analysis was to monitor, assess and influence development of the logistics support force structure ensuring sufficient combat service support units were deployed. Functional assessments were conducted to identify impacts and potential risks in terms of force composition, readiness, force deployment and force reduction initiatives.

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A. **NAME/TITLE OF ANALYSIS:** Standardized Supply System Parameters

B. **CLASSIFICATION:** UNCLASSIFIED

C. **SPONSORING ACTIVITY:** HQDA ODCSLOG, DALO-SMP

D. **POINT OF CONTACT:** Mr G. Tuttle, DSN 977-7761

E. **ABSTRACT:** Desert Shield build-up caused a large increase in the response times from automated supply systems due to the very large number of transactions being processed. Recommended systems parameter settings, for automated supply systems, were developed for use by ARCENT. These settings improved the response times from automated supply systems by reducing non-essential status requests and other like transactions.

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A. **NAME/TITLE OF ANALYSIS:** Anticipated Rotation Problems

B. **CLASSIFICATION:** UNCLASSIFIED

C. **SPONSORING ACTIVITY:** HQDA ODCSLOG, DALO-PLP

D. **POINT OF CONTACT:** Dr L. D'Amato, DSN 977-6744

E. **ABSTRACT:** Provided an in-depth analysis of the anticipated rotational problems associated with various categories of logistical units which had deployed to Desert Shield/Storm. ALO and readiness were two of the several categories used in a comparison/evaluation of existing Active and Reserve Logistics units that could be used to replace/rotatate with units already deployed to SWA.
A. NAME/TITLE OF ANALYSIS: ODS Returning Ships Manifests

B. CLASSIFICATION: UNCLASSIFIED

C. SPONSORING ACTIVITY: HQDA ODCSLOG, DALO-TSM

D. POINT OF CONTACT: Dr L. D’Amato, DSN 977-6744

E. ABSTRACT: There existed no single source from which MTMC and HQDA could determine the content of returning ships manifests to facilitate identification of special off-loading requirements. Through a special study USALEA developed a means of providing this data for MTMC, OCAR, DAIG and the Army Operations Center (LOC). This type of data was much needed during the redeployment and has been identified as a report that must be institutionalized in MTMC automated systems.

A. NAME/TITLE OF ANALYSIS: ODCSLOG Operation Desert Shield/Storm Lessons Learned Observations

B. CLASSIFICATION: Secret

C. SPONSORING ACTIVITY: US Army Strategic Logistics Agency, LOSA-SP

D. POINT OF CONTACT: Garry D. Bowen, (703) 355-0192

E. ABSTRACT: The Strategic Logistics Agency has tasked the Logistics Management Institute (LMI) to group, review, prioritize and analyze logistics-oriented ODS Lessons learned to assist in resolution. LMI has developed an automated relational database to associate related lessons and solutions. This process will be used to assist an ODCSLOG Council of Colonels in resolving or passing lessons learned to appropriate agencies.

A. NAME/TITLE OF ANALYSIS: Total Distribution System

B. CLASSIFICATION: Unclassified

C. SPONSORING ACTIVITY: USA Strategic Logistics Agency, LOSA-SP

D. POINT OF CONTACT: Mr. Alan Estevez, (703) 355-0089

E. ABSTRACT: The Total Distribution System (TDS) effort was initiated by Army DCSLOG to identify, analyze, and develop solutions to the shortcomings associated with the in-theater distribution system during Operation Desert Shield/Desert Storm. Organizations throughout the Army, as well as from Defense Logistics Agency, USTRANSCOM, and the General Services
Administration are participating in this effort. The goal is to implement an effective and efficient distribution system with total asset visibility from origin to foxhole. Current milestones call for the identification of potential high payoff initiatives and near-term fixes by the end of November 1991.

A. NAME/TITLE OF ANALYSIS: Industrial Base Assessment
B. CLASSIFICATION: Unclassified
C. SPONSORING ACTIVITY: HQDA DCSLOG - DALO-PLP
D. POINT OF CONTACT: LTC R. Michaels, 694-9735/Mr. J. Wohlfahrt
E. ABSTRACT: Assessment of Operation Desert Storm lessons learned regarding production surge, what was surged, what could/could not be surged, what could have been done differently. Assessment of application of Graduated Mobilization Response (GMR) to Operations Desert Shield/Storm, how done or not done, how can be applied to future such conflicts.

A. NAME/TITLE OF ANALYSIS: RAND ANALYSIS OF OPERATION DESERT STORM DEPLOYMENT AND SUSTAINMENT
B. CLASSIFICATION: SECRET
C. SPONSORING ACTIVITY: ODCSOPS (STUDY AGENCY: RAND)
D. POINT OF CONTACT: WAR PLANS DIVISION (DAMO-SSW), ODCSOPS, CPT BRITTEN, (703) 614-7956
E. ABSTRACT: STUDY WAS INITIATED IN EARLY SEPTEMBER, 1990 AT THE REQUEST OF THE CHIEF OF STAFF, OF THE ARMY. ITS OBJECTIVES ARE TO UNDERSTAND AND REPORT ON HOW THE ARMY’S EXPERIENCES IN ODS MIGHT INFLUENCE THE FUTURE ARMY—ITS PLANNING SYSTEMS, FORCE STRUCTURE, SUPPORT CAPABILITIES, EQUIPMENT NEEDS, AND DEPLOYMENT REQUIREMENTS.

A. NAME/TITLE OF ANALYSIS: OPERATION DESERT SHIELD/STORM ARMY AFTER ACTION REPORT
B. CLASSIFICATION: SECRET
C. SPONSORING ACTIVITY: ODCSOPS (AT DIRECTION OF CSA). PREPARED BY THE DESERT STORM SPECIAL STUDY PROJECT AT THE CENTER FOR ARMY LESSONS LEARNED.
D. POINT OF CONTACT: CONCEPTS, DOCTRINE, AND FORCE POLICY DIVISION (DAMO-FDQ), ODCSOPS, MAJ SCOTT, (703) 697-6747

E. ABSTRACT: COVERS ARMY LESSONS LEARNED AT THE OPERATIONAL, TACTICAL AND STRATEGIC LEVELS.

A. NAME/TITLE OF ANALYSIS: HEADQUARTERS, DEPARTMENT OF THE ARMY DESERT SHIELD/DESERT STORM AFTER ACTION REPORT
B. CLASSIFICATION: SECRET
C. SPONSORING ACTIVITY: ODCSOPS (STUDY AGENCY: CAA)
D. POINT OF CONTACT: CONCEPTS, DOCTRINE, AND FORCE POLICY DIVISION (DAMO-FDQ), ODCSOPS, MAJ SCOTT, (703) 697-6747
E. ABSTRACT: TO DEVELOP LESSONS LEARNED AND RECOMMENDATIONS FOR IMPROVING HQDA, ARMY AND JOINT OPERATIONS IN RESPONSE TO MAJOR CONTINGENCIES THROUGH CHANGES TO DOCTRINE OR PROCEDURES, ORGANIZATIONS, TRAINING, MATERIEL, OR LEADER DEVELOPMENT.

A. NAME/TITLE OF ANALYSIS: Army Strategic Mobility Plan (ASMP)
B. CLASSIFICATION: Unclassified
C. SPONSORING ACTIVITY: HQDA ODCSLOG DALO-TSM
D. POINT OF CONTACT: LTC Mark Henderson, DSN 224-6615
E. ABSTRACT: The ASMP is being developed to insure that well designed, strategic air/sealift assets are made available in sufficient numbers to deploy and sustain the force. Furthermore, an infrastructure must exist to move soldiers, equipment, and sustaining supplies from the CONUS forts/depots, all the way through to the forward foxhole. This complements the Joint Staff’s Mobility Requirements Study (MRS).