OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
1400 DEFENSE PENTAGON
WASHINGTON, DC 20301-1400

PUBLIC AFFAIRS

01 JUL 1997

Ref: 92-F-0294

Ms. Kate Doyle
The National Security Archive
Gelman Library, Suite 701
2130 H Street, NW
Washington, DC 20037

Dear Ms. Doyle:

This responds to your February 2, 1992, Freedom of Information Act (FOIA) request to this Directorate. Our February 19, 1992, interim response refers.

The Director for Defense Research and Engineering, the Defense Science Board, and the Joint Staff have reviewed the requested document. It has been determined that this record can now be released in its entirety and is attached herewith.

There are no fees for processing this request in this instance.

Sincerely,

A. H. Passarella
Director
Freedom of Information
and Security Review

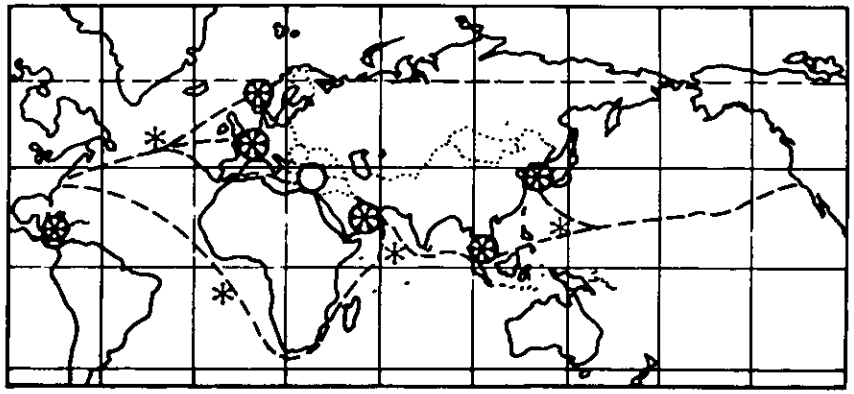
Enclosure:
As stated

#879

~~SECRET~~

FINAL REPORT

DEFENSE SCIENCE BOARD TASK FORCE:



TECHNOLOGY FOR U.S. RAPID DEPLOYMENT FORCES (U)

Office of the Under Secretary of Defense
for Research and Engineering
Washington, D.C. 20301

2 July 1982

#879

Classified by Executive Officer
Defense Science Board
Declassify on: 2 July 1988

DECLASSIFIED BY AUTHORITY OF
DSB 4 APR 1994 MEMO
TO DASD(PA)
DATE 1 Jun 97 CASE # 92-F-0294

~~SECRET~~

OFFICE OF THE SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301

DEFENSE SCIENCE BOARD

20 July 1982

MEMORANDUM FOR THE SECRETARY OF DEFENSE
THE DEPUTY SECRETARY OF DEFENSE
THE CHAIRMAN, JOINT CHIEFS OF STAFF

THROUGH: UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING

SUBJECT: Final Report of the Defense Science Board Task Force on U.S. Rapid Deployment Forces

I am forwarding herewith the report of the DSB Task Force on U.S. Rapid Deployment Forces (RDF), requested by the Chairman, JCS. Over the past seven months, this senior 14-man Task Force has reviewed RDF limitations and deficiencies as specified by the Services and the operational commands, and, where appropriate, identified suitable technology for their alleviation. The DSB Task Force has been impressed with the dedication and motivation of the forces which comprise the RDJTF. Nonetheless, this critical appraisal has uncovered more problem areas than expected. In many cases, the solutions do not lie within the technology domain. In others, available technology could easily be applied—given appropriate priorities and resources.

The Task Force was somewhat surprised to learn how unique many of the RDF problems are, and how much they are exacerbated by long-standing joint and cross-Service difficulties. RDF needs and priorities are not a simple subset of NATO needs and priorities. Substantial funding will be required to achieve our stated long-term national objectives, although more modest near-term expenditures could help eliminate some crucial current RDF deficiencies. The Task Force was particularly concerned by the apparent neglect of several basic "warfighting" aspects of these forces, and by the occasional failure of the Services to reflect joint/CINC priorities—in such areas as transportation, mobility, and communications.

The Task Force recommends adopting a set of temporary management devices to foster attention to, understanding of, and a constituency for, RDF needs, while enabling the solution of specific RDF-peculiar and cross-Service problems. I strongly recommend that you accept the Task Force proposal to establish a broad-based ad hoc working group under the DRB to review the Task Force's work and oversee the implementation of those items recommended.

The present organization is deficient when cross-Service R&D programs and joint Service plans are involved. Where one Service is responsible for funding a function supporting another Service, or when one Service funds development of systems for joint use, the priority in the funding Service is lower than the overall DoD priority. Related to this is the fact that the users, e.g., the CINCs, do not yet have an effective way of getting their priorities reflected in the budgeting process. Thus, the proposed ad hoc DRB RDF working group consists of all the Services, the JCS, the OSD, and the CINCs to insure RDF priorities are based upon overall DoD requirements.

This report has been approved by the Defense Science Board, and I commend to your attention the executive summary and the impressions and recommendations at the end. The implementation of these recommendations should be one more clear signal of your committment to rapid deployment forces, and the RDF working group can transmit this signal throughout the Department.

Norman R. Augustine
Chairman

Attachment:
As Stated

DEFENSE SCIENCE BOARD

OFFICE OF THE SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301

25 June 1982

MEMORANDUM FOR THE CHAIRMAN, DEFENSE SCIENCE BOARD

SUBJECT: Final Report of the Task Force on Technology for U.S. Rapid Deployment Forces

On behalf of my task force members, I am pleased to submit herewith our final report on technology for U.S. Rapid Deployment Forces (RDF). The subject turned out to be broader than expected, and we were forced to sacrifice depth and specificity in order to cover the full gamut of problem areas. Our conclusions and recommendations are summarized in the Executive Summary: they are primarily managerial rather than programmatic.

I would like to express my deep gratitude to the hundreds of people who in some way contributed to this rather concentrated effort. My thirteen cohorts gave extensively of their time and their mature judgment. Each member assumed responsibility for one of our day-long sessions and became thoroughly immersed in the other sessions as well. We received almost 140 briefings from 70 different defense organizations and 11 defense contractors.

Coordination of these meetings and briefings fell to LtCol Ernest F. Hasselbrink, USAF (OJCS, J-5/R&D) and to LCdr Ralph Chatham, USN (OUSDRE/DSB). They did a remarkable job, and I believe they are largely responsible for the unstinting cooperation received from all quarters.

We are also indebted to the RDJTF command staff who not only helped to guide our education, but who also made available their headquarters at MacDill AFB for our final formative deliberations. The deputy commander, MajGen Robert C. Taylor, USAF, attended almost every one of our sessions and did his level best to keep us on the track.

In the face of such evident competence, dedication, and enthusiasm, it is all the more difficult to be critical. Nonetheless, our RDF units are probably the most likely U.S. forces to be drawn into combat. Our sole intent is to provide constructive suggestions that will enhance their chances for success.

Best regards,

Leonard Sullivan, Jr.
Chairman, DSB Task Force
Technology for U.S. RDF

TABLE OF CONTENTS

viii EXECUTIVE SUMMARY

I-1 INTRODUCTION
I-2 Rationale
I-3 Task Force Membership
I-4 Task Force Experience
I-5 Participating Organizations
I-6 Task Force Timing
I-7 Task Force Charter
I-8 Task Force Chairman's Ground Rules

P-1 THE SCOPE OF THE PROBLEM
P-2 RDF Limitations & Deficiencies
P-3 Issues Beyond Science....And Our Pay Grade
P-4 Force Level Inadequacies
P-5 Task Force Filtering of Problem Areas
P-6 Selected RDF Issues
P-7 Selected RDF Issues (Cont)
P-8 Selected RDF Issues (Cont)
P-9 Selected RDF Issues (Cont)
P-10 Issues Set Aside
P-11 Character Of The Opposition
P-12 Character of RDF Objectives
P-13 Organization For Movement
P-14 Variability in Arrival Conditions
P-15 Transportation Interdependence
P-16 Major Strategic Lift Issues
P-17 Major Strategic Lift Issues (Cont)
P-18 Major Intra-Theater Lift Issues
P-19 Transportation Shapes
P-20 Equipment Density and Cost
P-21 Cumulative Costs & Weights of Ground Forces
P-22 Mobility Mode Costs (NOM)
P-23 Shipping vs Prepo Costs
P-24 Shipping/Prepo Costs vs Days Available
P-25 Airlift vs Sealift Costs
P-26 Total Airlift Capability
P-27 Average Age Of Airlift Aircraft In 1985
P-28 Technological Bloat Factor
P-29 Technological Bloat (Cont)
P-30 Technological Bloat (Cont)
P-31 Typical Mobility Demands
P-32 Typical Mobility Demands
P-33 Typical Composition Of Army U.E.
P-34 Typical Sizing Of Army U.E.
P-35 Typical Resupply Requirements
P-36 Impact of Consumption Rates
P-37 Typical Lift Capabilities
P-38 Typical Mobility Shortfall
P-39 Importance Of Timing
P-40 High Technology Mobility Fixes
P-41 Low Technology Mobility Fixes
P-42 The Scope Of The Problem

S-1 THE QUEST FOR SOLUTIONS
S-2 Mobility: More Airlift
S-3 Commercial "Guppies" For Outsized Loads
S-4 Mobility: More Refueling Capability
S-5 CRAF DC-10 Freighter Costs
S-6 Mobility: More Sealift
S-7 Modern Technology LASH Ship
S-8 Mobility: More Amphibious Lift
S-9 Mobility: Lighter, Less Bulky Equipment
S-10 Existing Armed Scout Helicopter
S-11 In Transit Logistic Accountability
S-12 Mobility: Improved "Transloadability"
S-13 Mobility: Improved "Retail Delivery"
S-14 Updated CH-54 For Logistics Support
S-15 Mobility: Improved "Retail Delivery" (Cont)
S-16 Storable, Airliftable Truck

TABLE OF CONTENTS (Continued)

S-17 Mobility: Improved Packaging
S-18 Helicopter Towing
S-19 Mobility: Explosives & Propellants
S-20 Mobility: Fuels & Fuel Consumption
S-21 Survivability in Transit
S-22 Modular SEA SPARROW For Merchantship Defense
S-23 Force Effectiveness--Munitions
S-24 Force Effectiveness--Vehicles
S-25 Bradley M2 25 mm Turret on M-113 APC
S-26 Force Effectiveness--Sensors
S-27 Force Effectiveness--Tacair
S-28 Product Improved F-111 For PGM-Interdiction
S-29 Force Effectiveness--Fire Support
S-30 Guided 120 mm Mortars For Anti-Armor Patrols
S-31 Force Effectiveness--Air Defense
S-32 Combined Anti-Aircraft/Anti-Tank Unit
S-33 Force Effectiveness--Hi Tech 9th InfDiv
S-34 Relative Theater Sizes
S-35 Sustainability: More/Better Prepositioning
S-36 Product-Improved C-130 "Repositioner"
S-37 Sustainability: Lower Consumption Rates
S-38 Better Environmental Suitability--For Machinery
S-39 Better Environmental Suitability--For People
S-40 Better Equipment Maintainability
S-41 Communications: Planned Assets
S-42 Communications: Planned Assets (Cont)
S-43 Communications: Planned Assets (Cont)
S-44 Communications Summary
S-45 Airborne Radio Relays
S-46 Intelligence Summary
S-47 Training & Planning: Exercise Limits
S-48 Training & Planning: Exercise Trends
S-49 Training & Planning: Exercise Lessons Learned
S-50 Training & Planning: War Games & Simulators
S-51 Materiel Support: Development Responsiveness
S-52 Acquisition Responsiveness
S-53 Testing Responsiveness
S-54 Direct Engineering Support to RDJTF

IMPRESSIONS & RECOMMENDATIONS

R-1
R-2 Task Force Perspective
R-3 Task Force Ground Rules
R-4 General Task Force Impressions
R-5 General Impressions (Cont)
R-6 General Impressions (Cont)
R-7 Inadequate RDF Emphasis
R-8 Inadequate Warfighting Focus
R-9 Good Technological Opportunities
R-10 Poor Technological Opportunities
R-11 Task Force Dilemma
R-12 Recommendations
R-13 Major DRB Resource Issues
R-14 RDF Prototype Fund
R-15 RDF Limited Procurement Fund
R-16 Cross-Service Program Offices
R-17 RDF Issue Analysis
R-18 RDJTF Technical Advisor
R-19 DRB Working Group

APPENDIX

A-1 Charter

Intentionally left blank

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) This report presents the results of a Defense Science Board Task Force set up during the final months of 1981 to explore opportunities where technology might help in the development of U.S. rapid deployment forces.

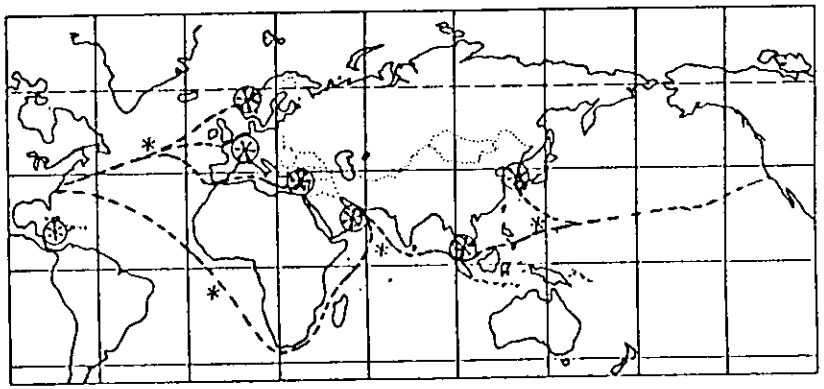
(U) This task force was established in response to a request by the Chairman of the Joint Chiefs of Staff to the Under Secretary of Defense for Research and Engineering. It was agreed at the outset that the task force should, if possible, complete its work within the first half of 1982.

(U) There is frequent confusion between U.S. Rapid Deployment Forces (RDF) in general, and the more limited set of forces assigned to the Rapid Deployment Joint Task Force (RDJTF)--a specific command, headquartered at MacDill AFB, with regional contingency planning responsibilities in Southwest Asia (SWA).

(U) This task force was intended to look across the spectrum at all rapid deployment forces. However, it is clear that the major focus is on the RDJTF and the relatively high priority it currently enjoys. Our task force was unable to avoid concentrating on these RDJTF needs for several reasons: a) they are new and relatively high priority; b) they seem to represent a critical case in size and remoteness; and c) the RDJTF staff was unstinting in their support of our efforts.

FINAL BRIEFING

DSB TASK FORCE:



TECHNOLOGY FOR U.S. RDF

(U) This final report has been prepared in the form of an annotated briefing in the hopes of making it easier and more interesting to read or scan. Explanatory text is on the left of each page, while these captions expand on the charts themselves.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

EXECUTIVE SUMMARY

(U) The important elements of the task force's charter are summarized on the attached chart. We were asked to address technology for rapid deployment forces that would protect U.S. national interests outside the NATO area, by projecting U.S. military power in areas remote from U.S. territory.

(U) We were specifically requested to address issues based on limitations and deficiencies expressed by the operational commanders. In short, we were not encouraged to invent our own problems for which our technology might be well suited!

(U) We were asked to address both the near-term and the far-term, and both new technologies and existing technologies across a broad spectrum of recognized problem areas. This delineation of problem areas established the overall topics of our various sessions.

(U) We were also asked to look specifically at opportunities for technical support to the RDF organizational structure, and to seek means to insure the rapid transition of new technology to the RDF. We have, in fact, concluded that we must place more emphasis on the process for alleviating deficiencies than on trying to specify individual solutions to the myriad problems uncovered.

TASK FORCE CHARTER

...“concentrate on the role technology can play to improve U.S. RDF capabilities, to include:

-- commanders' views of current/future limitations and deficiencies

-- technological innovation (including existing technologies) by 1985 and 1990-95, concerning:

* reconnaissance regime
* transportation
* weapons firepower
* energy
* logistics
* training
* C^3I

-- scientific/engineering support to RDF organizational structure and means to insure rapid transition of new technology to the RDF"

(U) This charter is summarized from a memorandum to the Chairman of the Defense Science Board, Mr. Norman Augustine, from the USDR&E, Dr. Richard DeLauer, and dated 17 November, 1981 (attached as an appendix).

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) In addition to our charter, these are the ground rules we set for ourselves. These are described in greater detail in the introduction.

(U) We were not expected to look at the RDJTF as the sole U.S. deployable capability. We were to concentrate on issues raised by the CINCs, and on problem areas, not success stories.

(U) Within the time and resources available, the task force had to opt for breadth, not depth. We had to avoid some very influential issues--such as base availability--and to set aside other crucial problem areas such as our RDF posture for chemical warfare.

(U) We also accepted the notion that many problem areas do not need fresh technological solutions if other means are available. This has had the effect of limiting the overall technological tenor of this final report.

(U) Based on these ground rules, then, the task force makes no bones that its results are neither complete, balanced, nor thorough. We have certainly not unearthed all the problems, and we certainly have not found all the best solutions. Nonetheless, we may have taken a more comprehensive, unfettered, look across the entire RDF spectrum than any prior committee. Clearly, it is not enough, and we hope others will go on from here.

TASK FORCE GROUND RULES

Based on task force chairman's ground rules and our charter:

- Avoid total focus on RDJTF
- Focus on commanders' views of limitations/deficiencies
- Concentrate on problem areas--not successes
- Concentrate on broad problems--not specific details
- Avoid problems above our pay grade--force level, bases, etc.
- Set aside problems which are: -under study elsewhere
  -not primarily RDF-oriented
- Don't propose new military technology if problems can be solved by:
  -- better management
  -- resource reallocation
  -- existing military technology
  -- existing civil technology

TASK FORCE RESULTS ARE NEITHER COMPLETE, BALANCED, nor THOROUGH

(U) This chart summarizes the ground rules which constrained the efforts of this task force. We do not pretend to have addressed all the problems, or even just the most important ones.

x

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(S) By the time the task force had finished its work, the litany of "inadequacies" in capabilities, resources, focus, training, responsiveness, etc., had grown to seemingly overwhelming levels. Before summarizing our overall impressions and recommendations, then, it is essential to put some perspective on our efforts.

(U) The facts of the matter are that the U.S. continues to have the greatest force deployment capabilities of any nation on earth, and much experience in fighting wars many thousands of miles from our own continent.

(U) Furthermore, the forces and headquarters that have been assembled into the RDJTF are making great strides towards being prepared to meet their objectives. Their planning and their training are improving every day. Many of the issues we raise in this report are already well known to them. If circumstances require, U.S. rapid deployment forces could do a very creditable job under many realistic scenarios.

(C) But the fact does remain that our current political objectives for RDF could well exceed U.S. military capabilities relative to growing world threats and continuing U.S. security obligations elsewhere. Improving our RDF capabilities, then, is surely a worthwhile objective.

TASK FORCE PERSPECTIVE

- U.S. CAPABILITIES & EXPERIENCE IN WORLDWIDE FORCE DEPLOYMENTS REMAIN UNPARALLELED:
  - -- strategic lift
  - -- tactical lift
  - -- amphibious capabilities
  - -- force versatility
  - -- World War II
  - -- Korea
  - -- Vietnam
  - -- NATO rapid reinforcement
- FORCES ASSIGNED TO RDJTF ARE COMPETENT, ORGANIZED & CONFIDENT:
  - -- designated units
  - -- maturing oplans
  - -- unit/joint training
  - -- detailed TPFDLs
  - -- regional awareness
  - -- fine leadership
- BUT CURRENT POLITICAL OBJECTIVES FOR RDF COULD WELL EXCEED REALISTIC U.S. MILITARY CAPABILITIES RELATIVE TO:
  - -- growing Soviet/client/Third World threats
  - -- concurrent security obligations elsewhere

(U) This chart tries to put in perspective many of the concerns that will be expressed subsequently. Our forces are clearly more capable than any others of rapid worldwide deployment. Relative to the problems they face, however, there is still room for improvement.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) On this chart we summarize the eight major impressions gleaned by the task force from their observations. These are summarized here and discussed in greater detail throughout the report.

(U) We conclude, for instance, that there are substantial differences between typical RDF operations and those planned for NATO. Many of the problems seem to arise in cross-Service areas which are not as prominent for NATO contingencies.

(U) In many instances, RDF priorities conflict with service norms. Their problems run the complete gamut, and a robust capability will require very substantial funding.

(U) In areas outside the RDJTF itself, and above the level of the operational commanders, we found the emphasis on RDF concerns to be lacking, and considerations of real warfighting demands to be rather limited. These assertions will be further explained on subsequent pages.

(U) Finally, and more directly to our task force charter, there are many areas in which technology can help the RDF. Most of it already exists, and a large portion of it exists in the commercial sector.

(U) This task force could not justify a crash high-technology effort in order to implement U.S. RDF objectives.

GENERAL TASK FORCE IMPRESSIONS

Substantial RDF-peculiar problems do exist:

- ★ RDF operations differ substantially from NATO planning
- ★ RDF deficiencies often reflect cross-Service problems
- ★ RDF priorities often run counter to Service norms
- ★ RDF problems run the full gamut of defense issues
- ★ A robust RDF capability will require substantial funding
- ★ There is ample evidence of inadequate RDF emphasis
- ★ RDF problems are amplified by lack of warfighting focus
- ★ Technology can help some, but is not the major issue

(see pages R-5 through R-10 for greater detail)

(U) The task force developed eight basic impressions from this investigation. These are listed above and elaborated in the body of this report. Many of the problems are only peripherally related to applications of technology.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) It is easier to draw conclusions than to formulate practical or original recommendations for eliminating the limitations and deficiencies found. Based on the rationale of the preceding chart, the task force has elected to propose management devices for raising Pentagon awareness and attention to RDF issues. This chart summarizes the seven specific recommendations that are discussed in greater detail at the end of this report.

(U) First, some RDF issues are very large, very basic, and very tough. The Pentagon has instituted the mechanism of the DRB for coming to grips with these. We suggest it address seven specific areas of concern.

(U) Next, we propose to set up certain budget line items for accommodating smaller RDF development and procurement issues. We also propose the establishment of special cross-Service program offices to solve three specific and fundamental issues related to RDF use.

(U) We suggest further studies to increase RDF awareness and understanding, and the addition of a Technical Advisor to the staff of the RDJTF command.

(U) New and unique problems often deserve special emphasis at the outset, and the designation of those expected to share the responsibility for action. We recommend a combined OSD/JCS working group to report to the DRB for 2-3 years.

RECOMMENDATIONS

IF DoD wishes to increase emphasis on rapidly deployable forces:

- ★ Bring selected issues before Defense Resources Board
- ★ Establish an RDF Product Improvement/Prototype Line Item
- ★ Establish an RDF Limited Procurement Line Item
- ★ Establish direct-funded cross-Service Program Offices
- ★ Encourage more analysis of RDF issues
- ★ Establish a Technical Advisor on RDJTF Command Staff
- ★ Establish an OSD-JCS Working Group under DRB

(see pages R-13 through R-19 for greater detail)

(U) This chart summarizes the seven recommendations of this task force. They are explained in greater detail in the final pages of this report. They represent seven specific ways to increase management focus on issues relevant to RDF capability improvements.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) This report has been divided into four major parts.

(U) Following a descriptive introduction which lays out the composition and objectives of the task force, the first major part deals with scoping the problems we were asked to address. This involves delineating the presently perceived RDF limitations and deficiencies, and then characterizing the overall segments of a rapid deployment operation from the standpoint of organizations, equipments, timing, and costs. This general background essentially amounts to conducting a very rudimentary "mission area analysis."

(U) Once the major problems have been identified and placed in the context of the overall operation, the second major part of the report deals with the quest for specific solutions, identifying those which are or are not susceptible to the application of either existing or emerging technology. It might as well be stated from the outset that the majority of the issues addressed are either not technological in nature, or can be solved with existing military or commercial technology. In those cases, we do not press for the unnecessary application of technology.

(U) The final part of the briefing provides our overall conclusions and recommendations.

BRIEFING OUTLINE

PART I: INTRODUCTION

PART II: THE SCOPE OF THE PROBLEM

PART III: THE QUEST FOR SOLUTIONS

PART IV: IMPRESSIONS & RECOMMENDATIONS

(U) This chart indicates the major subdivisions of this task force briefing. In general it follows the sequence in which the task force conducted its business.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) There seems to be very little question about the need to improve the capabilities of U.S. rapid deployment forces, for the four reasons shown on this chart:

(U) There appears to be a growing worldwide threat of adventurism from the Soviets and their allies and clients;

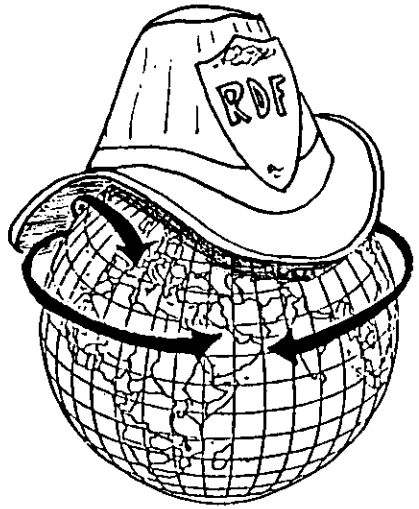
(U) There are not enough allied forces in the threatened regions, and hence it will be necessary to move forces to the threatened areas as crises arise;

(U) There are not enough U.S. forces at the present time that could be rapidly deployed that are not already committed to other reinforcement roles to either NATO or Northeast Asia;

(U) There does not seem to be any lessening in the need for forward deployed U.S. forces in either Europe or the Republic of Korea, and hence we cannot count on a realignment of current U.S. force dispositions.

(U) There is nothing implicit in this task force effort to suggest that the U.S. is attempting to adopt a role of the "world's policeman." There does appear, however, a continuing need to accept a role as one of the world's firemen.

RATIONALE



- *Growing worldwide threat from Soviet/client adventurism*
- *Insufficient allied forces in the threatened regions*
- *Insufficient forward-deployable U.S. forces not already commited*
- *Continuing demand for already forward-stationed U.S. forces*

Not the world's policeman -- just one of its firemen

(U) It should be noted that this task force addressed itself to U.S. rapid deployment forces in general, and not just to the forces presently assigned to the Rapid Deployment Joint Task Force (RDJTF). In fact, however, the RDJTF and its needs were emphasized.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) A total of 16 people formed the Task Force, under the chairmanship of Leonard Sullivan, Jr., a veteran of 12 years in the Pentagon from 1964 to 1976. Mr. Sullivan has had extensive experience in DDR&E trying to tailor U.S. equipments to the needs of the war in Southeast Asia, and had also been closely involved in the equipping of Israeli forces prior to the 1973 Arab-Israeli war.

(U) Mr. Sullivan chose six of his members from the current Defense Science Board roster. Most of the rest had close prior associations with the task force chairman, primarily during those years of Pentagon service. All were picked for their extensive knowledge and experience in the issues to be addressed by the task force. Mr. Harris Eisenhardt, for instance, had recently spent 4 months at the RDJTF headquarters learning firsthand about many of their problem areas.

(U) Serving on the Task Force were also retired senior flag officers from each of the services who had extensive prior experience in related areas. They made very valuable contributions to efforts of the group.

TASK FORCE MEMBERSHIP

• George Blanchard	* Josh Lederberg
• Joe Braddock	* Reuven Leopold
[• Jack Catton]	* Hal Lewis
* Russ Dougherty	• Milt Lohr
• Harris Eisenhardt	• Gerry Miller
[* Dan Fink]	• Phil Shutler
• Don Fredericksen	* Len Sullivan, Chairman
• Bob Gibson	• Dave Israel

*DSB Members
[] withdrew

•*Ernie Hasselbrink, CJCS Rep.*
•*Ralph Chatham, Executive Sec.*

(U) Two of the initial members were forced to withdraw during the course of the task force program. Gen Jack Catton resigned for fear of possible conflict of interest, and Dan Fink was ill and withdrew.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The total aggregate experience of the task force members was quite impressive. A profile of the "average" member is shown on this chart.

(U) The "average" member was 57 years old, and had had 14 years of military service, 17 years in defense-related business, and 4 years in DoD as a civilian employee. All have excelled in a professional career.

(U) Four of the task force members were able to attend every one of the sessions. The overall attendance rate was well above 67%, discounting those forced to withdraw for other reasons. This attendance rate is exceptional in view of the number of meetings held over a relatively short period of time.

(U) The size of this group, and the rapidity with which it has attempted to complete its business, are not typical of DSB studies--nor should they become the norm. Those who made the most conscientious effort to attend regularly found their other business obligations in growing disarray. Those who did not attend regularly became somewhat less productive through lack of continuity.

(U) Whether or not this report will be useful cannot be judged by this task force. In any event, smaller groups with narrower subjects seem more likely to make more measurable contributions, as a general rule.

TASK FORCE EXPERIENCE

TOTAL		AVERAGE
905 yrs	Age	57
225 yrs	Military Service	14
67 yrs	DoD Gov't Service	4
266 yrs	Defense Industry	17
40	Earned Degrees	2½
5	3-4 Star Military Officers	
7	Senior Executive Service or above	
9	Company Presidents or VPs	
2	Professors	
1	Nobel Laureate	

(U) These statistics were prepared for the full task force roster. They do not vary much after the withdrawals, since one had military experience and the other had industry and government experience.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) This task force received massive and exemplary cooperation from an extraordinarily broad and diverse spectrum of Defense Department organizations. In all, well over 130 separate presentations were given to the Task Force.

(U) Briefings were received from several unified and specified commands, from the planning and operations staffs of all the Services, as well as from the intelligence community and the RDT&E world. A few defense contractors were requested to present specific technology opportunities, and several briefings were received from various operations analysis organizations within OSD and the military departments.

(U) A minimum of at least 5000 manhours must have been committed to the preparation of these briefings, and there is no way to realistically express the task force's appreciation for these efforts.

(U) As usual, however, it is both informative and gratifying to be exposed to the full range of dedicated military and civilian personnel who choose to serve their country in senior positions.

(U) Many things will be said in this report which are in some way critical of current RDF capabilities. None of this criticism should be interpreted as a lack of sincerity or competence on the part of those who briefed us.

PARTICIPATING ORGANIZATIONS

JCS	OSD	Army	Navy Dept	Air Force
ACJCS	USD(P)	ODCSOPS	OP-03	AF/PR
OJCS/J-3	DPA&E(TAP)	ODCSLOG	OP-37	AF/LE
OJCS/J-4	MRA&L	AARDCOM	OP-04	AF/SA
OJCS/J-5	ASD(HPPS)	MERDCOM	OP-40	AF/XO
OJCS/C^3S	DUSD(S&TNF)	TACOM/LAV	OP-06	AF/RD
OJCS/C^3CM	OUSDRE(DSB)	AMSAA	OP-94	ASAF(RDL)
CINCLANT	OUSDRE(OT&E)	AVRDCOM	OP-95	AF/XOK
CINCPAC	OUSDRE(R&AT)	TRADOC	NORDA	AF/NB
CINCRED		DARCOM	CNA	
COMRDJTF		ACSI	MC-L	Agencies
SAGA	Other	CATRADA	MC-PL	DIA
JLC/HFWG	MARAD	XVIII Corps	MC-POP	NSA
	GAO	9TH InfDiv	MC-A	DCA
TOA	IDA	TPTN School	MC-RD	DLA
MTMC	11-Defense Industries	CAA	MC-INT	DARPA
MSC		USAWC	MC-CCP	
MAC			MCDEC	

(U) Each of the organizations listed above by their unintelligible acronyms, provided at least one briefing on subjects pertinent to this task force's efforts, and received a letter of acknowledgement for their cooperation.

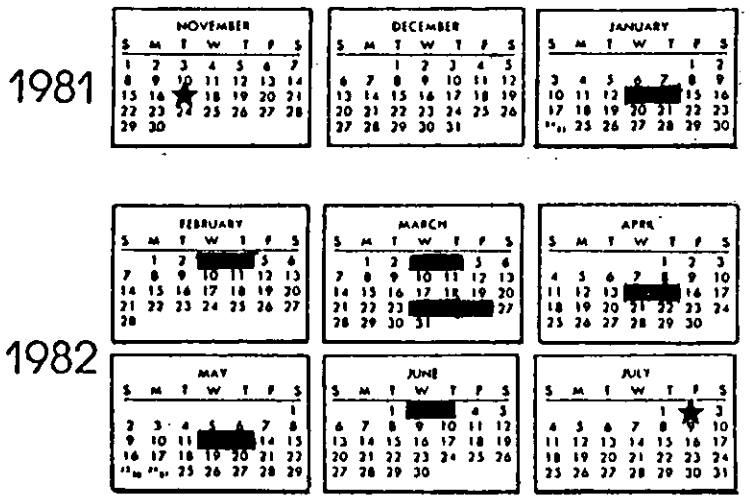
DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) Without constraints, it is evident that this task force could have continued to hold meetings and receive briefings almost indefinitely. The charter, as discussed on the following page, was broad enough to allow exploration of virtually every facet of all of our general purpose forces.

(U) It was decided at the outset, that it would be more important to have a timely product than one in scholarly detail over a much longer period of time. Hence, both the total length of time, the total number of meetings, and the total length of this final report have been constrained. We have attempted to deliver a responsive and intelligible output, timed to the changing commands, the Pentagon budget cycle, and the DSB annual schedule.

(U) As indicated on the adjacent chart, there were seven multi-day sessions involving a total of 16 separate day-long meetings. All were held in the Washington area, except the wrap-up session which was held at MacDill AFB, away from Pentagon diversions, and closer to the operational headquarters we hoped to help the most--or at least damage the least.

TASK FORCE TIMING



Chartered:

November 17, 1981

7 2-day Meetings

Jan-Jun, 1982

Final Report:

July 2, 1982

(U) Our fourth session, on technology, was stretched out to encompass three days. The fifth session included split simultaneous meetings of differing classification to cover intelligence and industry inputs.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The important elements of the task force's charter are summarized on the attached chart. We were asked to address technology for rapid deployment forces that would protect U.S. national interests outside the NATO area, by projecting U.S. military power in areas remote from U.S. territory.

(U) We were specifically requested to address issues based on limitations and deficiencies expressed by the operational commanders. In short, we were not encouraged to invent our own problems for which our technology might be well suited!

(U) We were asked to address both the near-term and the far-term, and both new technologies and existing technologies across a broad spectrum of recognized problem areas. This delineation of problem areas established the overall topics of our various sessions.

(U) We were also asked to look specifically at opportunities for technical support to the RDF organizational structure, and to seek means to insure the rapid transition of new technology to the RDF. We have, in fact, concluded that we must place more emphasis on the process for alleviating deficiencies than on trying to specify individual solutions to the myriad problems uncovered.

TASK FORCE CHARTER

...“concentrate on the role technology can play to improve U.S. RDF capabilities, to include:

-- commanders' views of current/future limitations and deficiencies

-- technological innovation (including existing technologies) by 1985 and 1990-95, concerning:

* reconnaissance regime
* transportation
* weapons firepower
* energy
* logistics
* training
* C^3I

-- scientific/engineering support to RDF organizational structure and means to insure rapid transition of new technology to the RDF"

(U) This charter is summarized from a memorandum to the Chairman of the Defense Science Board, Mr. Norman Augustine, from the USDR&E, Dr. Richard DeLauer, and dated 17 November, 1981 (attached as an appendix).

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) In the somewhat jaundiced view of the task force chairman, there is a tendency to try to apply technological solutions to non-technological problems. This is a national cultural problem, and not a criticism of the DSB per se.

(U) Nonetheless, it was apparent from the outset that many of the limitations and deficiencies of our fledgling RDF forces are neither the product of, nor the justification for, the indiscriminate application of unproven technology.

(U) For these reasons, the chairman established a set of ground rules to exhort the membership to constrain its enthusiasm for new or original technology to those areas where there were no other more readily available or realistic solutions.

(U) It will become clear that many of the current RDF problems flow almost entirely from management and decision-making voids, and from as yet unresolved procurement and resource application problems. Moreover, there is a vast reservoir of existing technology, both military and civil, which is directly applicable to many of the first-order RDF limitations and deficiencies. These opportunities should take clear precedence over the application of immature new technologies.

TASK FORCE CHAIRMAN'S GROUND RULES

We will NOT propose new military technology to solve:

- Pentagon management/decision-making problems
- Pentagon procurement/resource allocation problems
- problems already solved with civil technology
- problems already solved with existing military technology

We WILL undertake:

- a rudimentary RDF Mission Area Analysis

(U) The task force found it advisable to conduct a rudimentary "mission area analysis" in order to rank order the broad spectrum of problems associated with assembling, transporting, deploying, and sustaining a force of expected numerical disadvantage.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) From the very first meeting, it was apparent that the work of this task force could be expanded to include virtually all the problems faced by general purpose forces both now and into the future. Our first problem was to limit the scope, and to make sure that we could understand the problems within the context of likely contingency operations for rapid deployment forces.

(U) As established in our charter, the task force first heard from the operational and Component commanders tasked with developing, fielding, and using these forces. We then listened to descriptions of various intelligence estimates and war games to understand how a typical real-world scenario might unfold. We were also fortunate in having quite detailed recent analyses available by which to understand the relative sizes, costs, and importance of the many aspects of the problems raised by the "users."

(U) The summary of this educational process is provided in this part of the briefing. For those already intimately familiar with the basic issues for RDF forces, we suggest you jump forward directly to the following section in which we address potential solutions to the problems raised.

BRIEFING OUTLINE

PART I: INTRODUCTION

PART II: THE SCOPE OF THE PROBLEM

PART III: THE QUEST FOR SOLUTIONS

PART IV: IMPRESSIONS & RECOMMENDATIONS

(U) This section deals with the background material and statement of the problem areas as perceived by both the operational and Component commanders. It forms the basis within which the task force has tried to find practical solutions.

SECRET

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) During our first session, the task force was briefed by GEN Paul Gorman, Assistant to the Chairman, JCS, and other elements of the JCS, by the DUSD(policy), GEN Stillwell, by senior representatives from four CINCs, and by each of the four Services.

(U) From these briefings, we developed our list of important issues. The attached chart shows the commonality of these issues between the various expert sources. After filtering and sorting, these issues will be spelled out in greater detail on subsequent charts.

(U) There had been no cross-checking between the various organizations that expressed these concerns: it is felt that if each had coordinated with the next, then there would be more black dots across the chart. There were no issues (at this level of generality) that were unique to one agency, and there was certainly no indication of disagreement concerning these issues.

(U) We recognize that this listing is significantly biased by what each organization felt was appropriate to bring to the attention of a DSB task force on technology. It should not be assumed to be either complete or authoritative. The similarity of views expressed, however, is of interest.

SECRET

RDF LIMITATIONS & DEFICIENCIES (U)

SOURCE: / ISSUES:	ATC, JCS	USD(P)	J-4	J-5	CINCLANT	CINCPAC	CINCRED	CMC RDJTF	ARMY	NAVY	MARINES	AIRFORCE
Force Levels	•	•	•	•	•	•	•			•		
Bases/Allies		•		•		•						•
Mobility	•	•	•			•	•	•	•		•	•
Survivability					•	•	•	•		•	•	
Effectiveness	•				•	•		•	•		•	
Sustainability	•	•	•	•	•	•	•	•	•		•	
Communications						•	•	•			•	
Intelligence		•	•	•	•	•	•	•			•	
Planning			•	•			•					•
Training	•				•			•				

SECRET

(U) Across the top, this chart shows the agencies that briefed the task force on RDF deficiencies and limitations. Down the left side are the major issues. The dots indicate which commands emphasized which issues. The commonality of issues is of interest.

SECRET

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) Three of the issues mentioned by the CINCs and others were clearly beyond the scope of this DSB task force--and beyond science for that matter. They include the following:

(C) There was general agreement that U.S. force levels are not adequate to meet the demands of existing commitments plus the additional needs for rapid deployment forces to other parts of the world. All the forces assigned to the RDJTF, for instance, are "double-hatted" for possible utilization in several other types of contingencies as well as the reinforcement of NATO.

(C) There was also general agreement that rapid deployment forces cannot realistically be expected to conduct sustained combat tens of thousands of miles from the CONUS without bases along the way and some sort of land jump-off points within a few hundred miles of the objective area. Such bases and facilities abroad are a prerequisite to successful RDF operations.

(U) Lastly, there was mention made of the need for some sort of dependence on allies in the objective area--not so much to reinforce our own combat elements as to provide bases, logistic support, and some form of cultural bridge to the people and geography of the region.

ISSUES BEYOND SCIENCE....
....AND OUR TASK FORCE SCOPE

- ★ LARGE FORCE LEVELS
  ....with less "double-hatting"
- ★ MORE ASHORE BASES/FACILITIES ABROAD
  ....to provide way stations and jump-off points
- ★ MORE CAPABLE AND COOPERATIVE ALLIES
  ....to help share the burden

(U) These three limitations and deficiencies in current RDF operations planning are probably more serious--and basic--than any of the issues dealt with subsequently. Nonetheless, they are not considered to be within the purview of this task force.

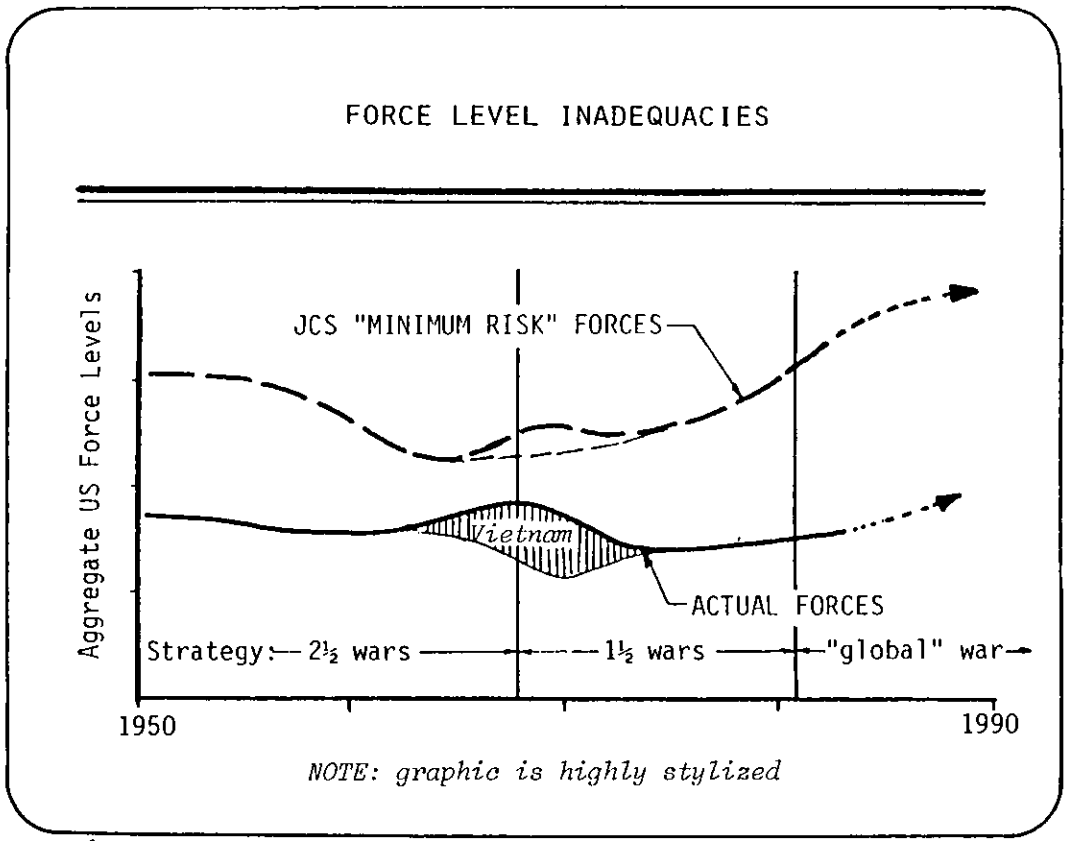
SECRET

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(C) As nearly as we can tell, U.S. military commanders have never been satisfied with the level of forces available to carry out the strategies of their times. There has always been a deficit between JCS "minimum risk" forces, and the actual forces supported by the Defense Department.

(S) This graphic suggests the extent of the shortfall over the past decades since the end of World War II. There have been three major U.S. strategies during that time: starting from a "2½ war" strategy while the PRC was still aligned with the Soviet Union, and progressing to the current concept of a "worldwide conflict with the Soviets," either growing from, or expanding to include, additional operations against Third World nations sympathetic to our adversaries.

(U) This disparity between available and required forces is important from the standpoint of recognizing that the U.S. will not have the luxury of tailoring rapid deployment forces to the extent that they become ineffective in other contingencies. Furthermore, there should be a considerable premium on minimizing the total force levels required to accomplish the RDF missions. Finally, RDF units must be ready to fight anywhere, anytime--requiring a level of readiness and sustainability at least as high as any other U.S. conventional forces.



(S) This chart shows the classic disparity between forces needed and forces available to carry out U.S. strategy over the years. The task force was unable to get reliable values here, and this graphic is highly schematic.

SECRET

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) Each of the organizations which briefed our task force on deficiencies and limitations also presented "laundry lists" of problems which varied in magnitude from a shortage of ships and aircraft down to the need for better diving gear for the Navy's unconventional warfare units.

(U) It was thus necessary to filter out some of these specific items in order to keep the task force effort manageable. We therefore adopted three separate criteria for ignoring specific problems. We agreed to ignore issues that:

-- were not really peculiar or unique to rapid deployment forces;

-- were so detailed that the task force could not treat them individually. In this case, we felt that the real problem lay with the requirements process itself; or

-- were already being covered by other DSB task forces which could afford to cover them in greater detail.

(U) Several very important issues were dismissed on the basis of this selection process. It must be stressed that their elimination was not based on relative importance. We neglected several first-order problems on the basis that they would distract us from RDF-unique issues.

TASK FORCE FILTERING OF PROBLEM AREAS

PROBLEMS HAVE BEEN SET ASIDE WHICH ARE:

- Not primarily peculiar to rapid deployment
- Too detailed & reflect generic problems with requirements process
- Being covered by other DSB Task Forces

(U) These three criteria were used as the basis for rejecting detailed consideration of some of the problems brought before the task force. Some of the culled items are described on a later chart.

SECRET

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The next four charts spell out in greater detail the major deficiencies and limitations of RDF forces as perceived by the operational commanders that the task force felt were primarily related to rapid deployment to areas beyond NATO, thereby meeting our criteria.

(S) Virtually no aspect of U.S. mobility capabilities appears adequate to permit a rapid, sustained, deployment of a large (several divisions) force to a relatively remote place which has little existing U.S.--oriented logistic infrastructure. We looked individually at all ten of the aspects called out on this chart. Our findings for each are discussed subsequently.

(U) It was also important for us to note that the operational commanders appear to take much more seriously the threats to en-route survivability than do those organizations charged with providing the necessary assets and their defenses. We will return to this subject later in this report, but will mention here that the lack of stated concern within the supporting agencies for the real "warfighting" capabilities of the RDF led us to adopt the phrase that U.S. forces appear to be preparing to wage "immaculate warfare" in which losses are not a consideration.

UNCLASSIFIED

SELECTED RDF ISSUES

★ MOBILITY....

- more airlift
- more refueling capability
- more sealift
- more amphibious lift
- lighter, less bulky equipment
- improved accountability
- improved "transloadability"
- improved "retail delivery"
- improved packaging
- improved energy efficiency

....& SURVIVABILITY IN TRANSIT

- better AAW & ASW LOC defense/countermeasures
- better port defense
- better mine-sweeping capabilities

UNCLASSIFIED

(U) This is the first of four charts delineating in greater detail the major areas of concern of the operational commanders. These formed the basis for the subsequent briefings, and provide the organizational structure for the body of this report.

SECRET

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) Closely related to the problems of moving our forces to the scene of the action, is the question of deriving the maximum effectiveness from the early deployed units, so that an unfavorable outcome can be forestalled until the later arrival of stronger U.S. forces.

(U) Of course, there exists the faint hope that technology might be able to make substantial--even order of magnitude--reductions in the weight and bulk of equipment required to support a U.S. expeditionary force. Our task force was unable to divine any such missed opportunities. Rather, it appears to require a very diverse combination of efforts to bring about a major improvement in overall RDF capabilities.

(U) There is a very clear requirement, therefore, to create special, highly agile, initial forces to provide stop-gap capabilities which will slow the advance of the opposing forces. Enemy advances are most likely to involve either rapid armor thrusts on the ground, or rapid thrusts by airborne forces, towards objectives that would deny U.S. entry or reinforcement. Interdiction to slow the enemy becomes a primary objective for technological initiatives.

(U) Moreover, the vast bulk of the total transportation requirements involves the sustaining of committed forces. As will be discussed further, decreasing the size of the "tail" is possibly more important than whittling down on the "teeth."

SELECTED RDF ISSUES (CONT)

★ FORCE EFFECTIVENESS....

- lighter "stop-gap" anti-armor forces
- longer range tacair
- better land mines/delayers

....& SUSTAINABILITY

- more/better prepositioning
- lower consumption rates
- better environmental suitability
- better equipment maintainability

(U) "Stop-gap forces" are those required to slow the rate of enemy advance until U.S. reinforcements can reach the objective area. "Environmental suitability" relates to ability of U.S. equipments to operate in non-NATO environments such as jungle, desert, etc.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(S) Operational commanders faced with the problems of deploying forces into new and remote areas are unanimous in their concern for the adequacy of both communications and intelligence capabilities.

(S) The vast majority of all U.S. military communications and intelligence has grown up over the years to support the more or less permanent requirements of U.S. forces in the NATO area or, to a lesser extent, in the Pacific. Intelligence assets are also trained primarily on the Soviet Union with less emphasis on other regions under the control of their allies and clients. Many regions of the Third World receive precious little attention of any sort.

(S) Moreover, the Soviets have devoted substantial efforts to the conduct of electronic warfare. Their capabilities to penetrate insecure communications and to jam or deceive U.S. assets has grown enormously. The fragility of hastily assembled U.S. C^3I for operations with RDF forces is a matter of substantial concern.

(U) It was also recognized from the outset that one possible substitute for more rapid deployability would be the exploitation of better early warning that would allow longer reaction times. The task force therefore explored the possibilities of trade-offs between intelligence assets and mobility assets.

SECRET

SELECTED RDF ISSUES (CONT) (U)

★ COMMUNICATIONS....

- better portable long-haul communications
- better secure communications (UHF & SHF)
- better jam-resistance and interoperability
- more/better linguists
- easier connectivity to DCS and WWMCSS

....& INTELLIGENCE

- more worldwide intelligence outside NATO, USSR
- more space assets
- more useful pre-deployment reaction time
- better portable, shallow water ASW surveillance
- more remote battlefield surveillance

SECRET

(U) Five areas within each communications and intelligence were identified by the operational commands as matters of serious concern, and were subsequently explored by the task force. WWMCCS stands for Worldwide Military Command and Control System.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The operational commanders also indicated the need for more sophisticated joint planning and training for contingencies outside the NATO area. In all likelihood, the concerns for the failed hostage rescue mission contributed to this. Beyond this, however, was the frequently stated concern for the preoccupation with the NATO scenario, more irreverently referred to as the "Fulda Gap Mentality." Non-NATO contingency planning and training might be an area where technology could offer some important new capabilities.

(U) On the other side of the coin, our task force charter requested that we consider the entire matter of responding to RDF requirements and providing them with technical support. This was certainly consistent with the task force's inability to deal separately with each issue raised during this exploratory effort.

(U) The scope and variety of problem areas considered to be within the charter of this task force is probably as great as has ever been considered in a single DSB study. This is not stated as a boast. Rather, it is intended as an explanation for the very broad--and seemingly superficial--nature of our task force results. We have been forced to address a multitude of diverse issues, some on a virtually anecdotal basis, while restraining ourselves from plunging too deeply into any single one.

SELECTED RDF ISSUES (CONT)

★ BETTER TRAINING & PLANNING....

- more troop and CP exercises
- better war game simulators
- better staff training
- better rapid contingency planning

.... & MORE RESPONSIVE MATERIEL SUPPORT

- more responsive RDT&E community
- more responsive procurement community
- more maintainable and interoperable equipment

(U) These RDF-oriented issues were also raised both by the operational commanders and by our task force charter. As on the prior pages, a task force one-day meeting was dedicated to each of the two major topics outlined above.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) This chart spells out nine of the specific problem areas which our task force elected to set aside--for any of the three reasons explained earlier.

(U) It should be clearly reiterated that many of these issues are of first-order priority and need to be solved to have an effective RDF. The matters of chemical warfare, satellite defense, electromagnetic pulse (EMP) protection, and the whole area of battlefield ECM and jamming could all be prime determinants in the outcome of rapid deployment operations. However, because of the force-wide nature of these problems, we believe they would be better treated in greater detail by task forces oriented toward these special technologies.

(U) Other issues, such as equipment requirements for the special forces, the development of better disease immunization capabilities, and the availability of better road maintenance equipment, appear to be too specific for this task force and indicative of shortcomings in the overall requirements process.

(U) Finally, the very important requirements for fresh water and for better "command support" are being covered by other DSB task forces. With so many other issues to address, we elected not to duplicate ongoing efforts.

ISSUES SET ASIDE

	FORCEWIDE PROBLEM	RQMTS PROBLEMS	COVERED ELSEWHERE
• Water Requirements			x
• C/B Warfare (Off & Def)	x		
• Special Forces Requirements		x	
• Better Command Support			x
• Satellite Defense	x		
• EMP Protection	x		
• Battlefield ECM/Jamming	x		
• Better Disease Immunization		x	
• Better Road Maintenance Equipment		x	

(U) This chart displays nine particularly important problem areas that this task force chose to set aside for the reasons indicated across the top--which were explained on Chart P-5.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) There is, of course, no one well-defined threat force against which U.S. RDF forces must be able to hold their own. Unlike the NATO or Northeast Asia scenarios, the size and nature of the opposition could vary from a relatively small Third World terrorist force, to a large, well-orchestrated Soviet invasion of one of their neighbors on the Eurasian continent.

(U) The task force was briefed on a variety of potential scenarios that need not be repeated here. The fundamental point is that RDF forces are competing across the seas with an enemy force most likely attacking across a land border with ground or airborne forces. The forces may be Soviets or their clients, and the attack may be as large as 10-15 mechanized or armored divisions.

(U) There was considerable debate over the probable sophistication level of enemy equipments. We concluded that RDF forces should be prepared to go against modern--but not necessarily the very latest--Soviet or European equipment including aircraft, missiles, and electronic warfare. Given the likely geography and client states, however, it seems reasonable to assume that these modern equipments will not be used in the same densities, or with the same expertise, as might be expected in the standard NATO scenario.

CHARACTER OF THE OPPOSITION

- U.S. GOAL: Thwart aggression from some outside power against a regime requesting U.S. support

-- *in some rather remote, undeveloped place overseas*
-- *with little hope of help from allies/friends*
-- *and little useful warning time (a few days or weeks)*

- AGGRESSORS: Soviet and/or Soviet client forces, up to and including multi-divisional units

-- *generally attacking overland, probably with armor*
-- *maybe with airborne units trying to pre-empt U.S. entry*

- EQUIPMENT: Generally modern Soviet or European weaponry with aircraft, missiles, and EW

-- *not necessarily the very latest models*
-- *probably at lower densities than expected in NATO*
-- *probably used by less skilled operators*

(U) This chart attempts to describe the general characteristics of the potential opposition to RDF forces, indicating that they will probably be less capable than Warsaw Pact forces--but by no means trivial in their size, equipage, or capabilities.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) Our task force was never told, in so many words, what RDF combat objectives would be. We specifically avoided viewing current oplans. Nevertheless, it appears to be desirable to create some notional objectives to indicate the nature of the operations.

(U) Initially, the RDF must gain some toehole which they can then expand into a full-blown base of operations. The RDF must simultaneously try to slow the rate of enemy advance, while developing secure and robust lines of communications, and demonstrating an evident will to persevere. These are quite different from initial NATO-scenario requirements.

(U) Subsequently, the RDF must amass sufficient forces to destroy the enemy's confidence in victory and wrest from him the tactical initiative, while continuing to fight at a numerical disadvantage. This must be done without inviting expansion of the conflict by lowering our guard elsewhere. These considerations led us to a concept of "asymmetric warfare" in which the RDF would avoid matching enemy weapons, tactics, or goals.

(U) Finally, the RDF must be able to sustain combat--and non-combat--losses for an indefinite period of fighting, which may be moderate in intensity.

CHARACTER OF RDF OBJECTIVES

- INITIAL: Quickly establish toehold in theater from which to develop base of operations

-- while slowing enemy rate of advance
-- developing reliable lines of communication to/over shore
-- demonstrating commitment to resist aggression

- INTERMEDIATE: Amass sufficient force to change enemy's perception of his capability to succeed

-- denying him the tactical initiative on his favored terms
-- while continuing to fight at a numerical disadvantage
-- without lowering deterrent elsewhere in world

- EVENTUAL: Display a level of sustainability such that enemy cannot hope to outlast RDF

-- in the face of real combat & non-combat casualties
-- under moderate intensity combat conditions
-- with no assured conflict termination date ahead

(U) This chart attempts to summarize the basic characteristics of a U.S. RDF operation, in order to make the point that its objectives are by no means equivalent to those that would govern a NATO confrontation. The forces will thus need to be different too.

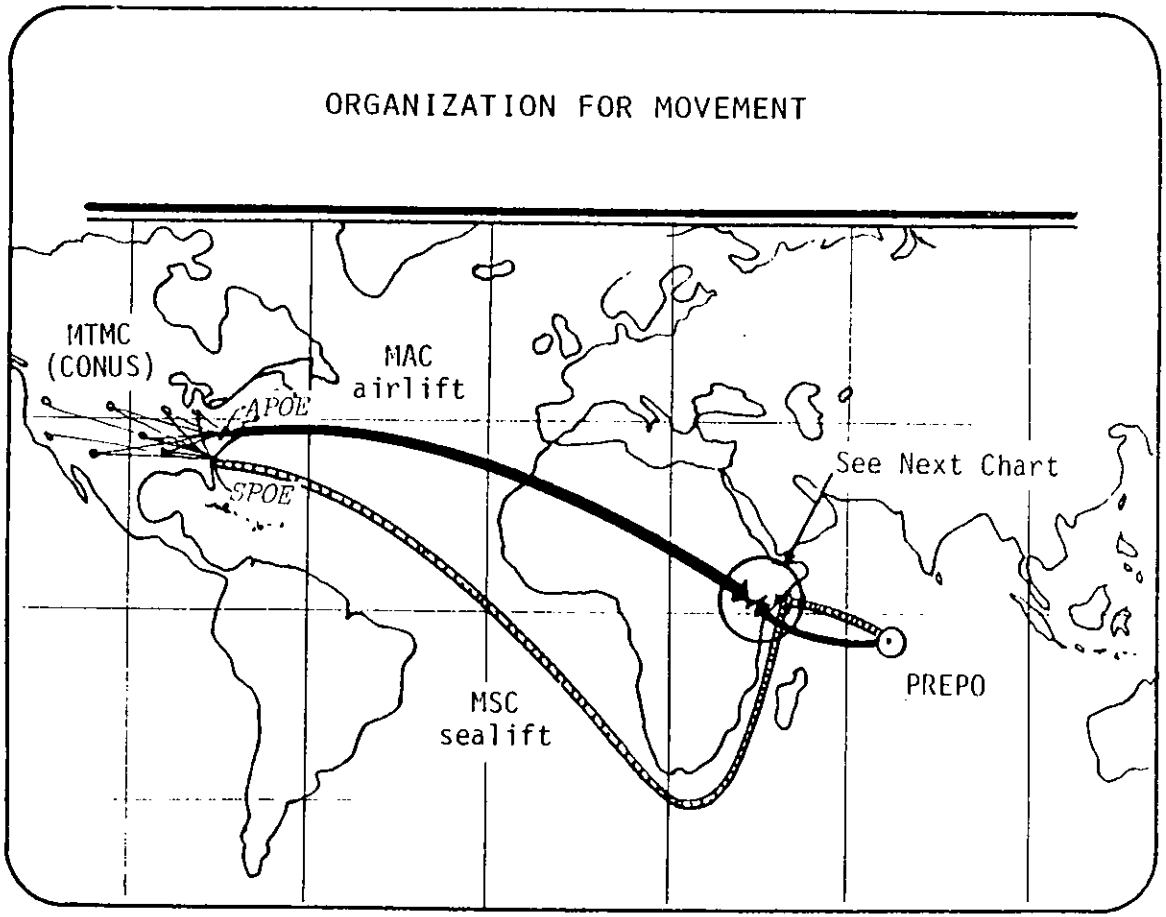
DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The second two-day session of the task force was devoted entirely to trying to improve our understanding of the transportation and mobility requirements of rapid deployment forces. Limitations in these areas aggravate the need for specially tailored equipments, units, and tactics for RDF.

(U) This first chart simply indicates the major organizational elements involved in the "wholesale" movement of U.S. forces to a theater of operations, such as the East coast of Africa.

(U) Possibly the least known of these organizations is the Military Traffic Management Command (MTMC) charged with delivering U.S. military materiel and personnel to Ports Of Embarkation (POE), from which the Military Airlift Command (MAC), or the Military Sealift Command (MAS), moves them to Ports Of Debarkation (POD) in or near the theater of operations. All of these commands use a mix of military transport and assets drawn from the civil sector.

(U) This chart also tries to show the possibly important contribution to be played by material prepositioned (PREPO) nearer to the combat theater. In this hypothetical example, the use of Diego Garcia provides a logistics base as much as 12,000 miles closer to the objective area. This chart does not represent any known or anticipated war plan.



(U) This chart shows a schematic of the manner in which troops and materiel are collected at the sea- and airports of embarkation (SPOE/APOE) and transported by strategic lift to the war zone. The following chart deals with aspects of "retail" delivery."

CONFIDENTIAL

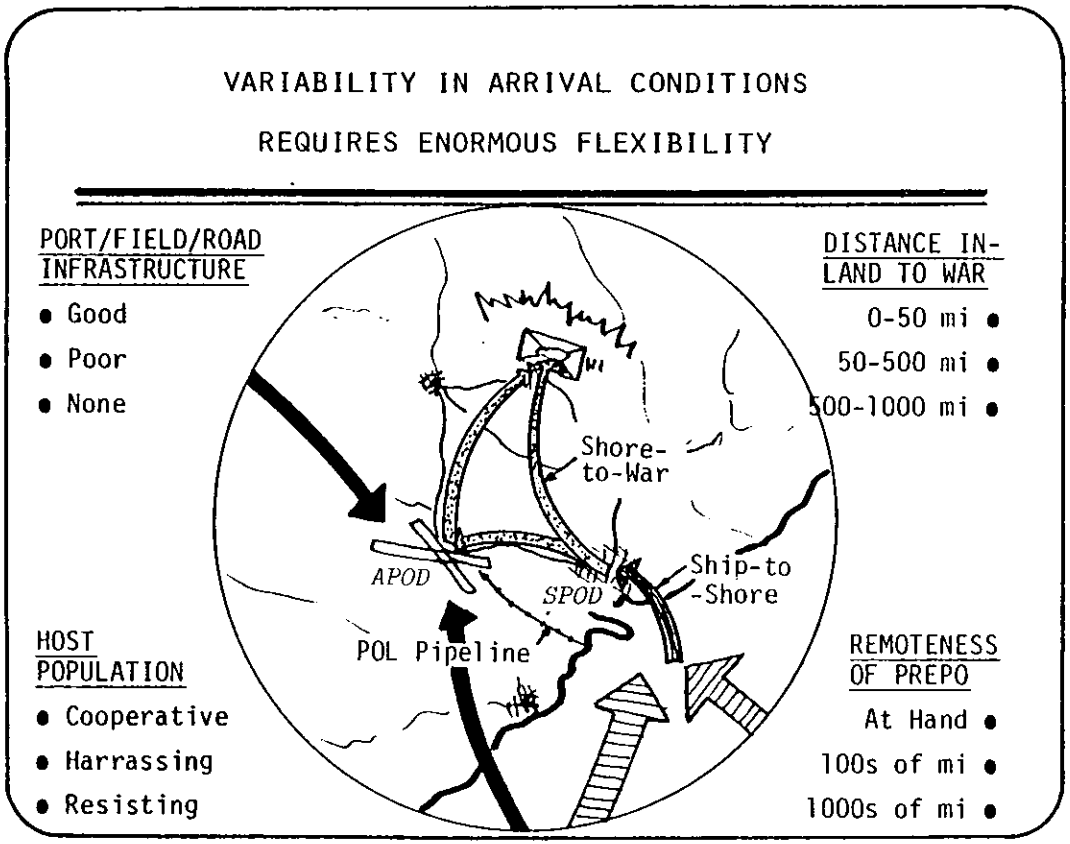
DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The task force rapidly became aware that the problems of "retail delivery" can well be more demanding than considerations of strategic lift alone would indicate.

(U) The problems of getting from ship to shore in undeveloped regions, plus the problems of getting from "shore-to-war" are by no means inconsequential. Moreover, keeping the forces and the airfields provided with petroleum products (POL) is no mean job.

(U) Also, there are sure to be vast uncertainties concerning the most likely arrival conditions for any particular RDF operation. The host transportation infrastructure may vary from good to none, and the host population may vary from cooperative to resistant. Additionally, the distances involved are expected to be very different than those faced in either NATO or South Korea. The conflict may be engaged many hundreds of miles inland from the nearest seaports, and the nearest prepositioning may be well over 1000 miles distant.

(C) The questions of negotiating these interfaces from "wholesale" to "retail" delivery, under such a variety of initial conditions, is surely one of the most unique problems facing RDF forces. And it is clearly aggravated by inadequate coordination among the many split and overlapping cross-Service and interagency responsibilities.



(U) This crowded schematic attempts to portray the major aspects of "retail delivery" for RDF forces, and to indicate the broad variety of problems which may confront them at their air- and seaports of debarkation (APOD/SPOD).

CONFIDENTIAL

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) One of the most surprising realities brought to the attention of this task force is that "nobody gets themselves to the war." Virtually every military component is dependent on some other organization somewhere in the total transportation loop.

(U) For instance, everyone is in some way dependent on MTMC to move people and supplies to the departure points. And strategic lift is provided by separate agencies and commands under the JCS and the Services. Even in-theater, the Army depends on the Air Force for intra-theater airlift, and the Air Force depends on the Army and Navy to bring them most of their fuel and their bombs. And the Marines are dependent on both if they move inland much more than 25 miles from the coastline. Even the Navy must depend on MAC and MSC for their logistic resupply, which must compete in priorities with the needs of other deployed forces.

(C) The task force quickly became convinced that none of the Services fully appreciated nor placed very high priority on solving the requirements of their sister services, and that the separate transportation commands had little priority or attention within the military departments charged with developing and/or procuring their transport equipment. This will be discussed further.

TRANSPORTATION INTERDEPENDENCE

		(COLLECTION) INTRA CONUS	(WHOLESALE) STRATEGIC/ INTER-THEATER			(RETAIL) INTRA-THEATER					
						ARMY			AF	NAVY	MARINE
		MTMC	MSC	MAC	SELF DEPL	TRK	HELO	PIPE (POL)	A/C	AOE/AOR	ASSETS
ARMY	UE	x	x	x		●	●		x		
	RESUP	x	x	x		●	●	●	x		
NAVY	UE				●						
	RESUP	x	x	x						●	
USMC	UE	x	x		●	x	x		x		● *
	RESUP	x	x	x		x	x	x	x		● *
USAF	UE		x	x	●						
	RESUP	x	x	x		x		x	●		

● using own assets
* only within about 25-50 mi of coast

(U) This chart shows the Services down the left, and the transportation entities for wholesale and retail delivery across the top. The "x's" indicate where each depends on another for some aspect of moving its unit equipment (UE) or resupply (RESUP).

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The next three charts summarize our views of major transportation issues gleaned from our extensive briefings from both the "carriers" (MTMC, MAC, and MSC) and the operational forces to be shipped. The distinctions between the two sets of organizations surely create some of the problems identified for RDF forces.

(U) The carriers appear to have little or no say in what is to be shipped, nor can they insist on the use of standard containers--or whatever else might ease their tasks.

(U) The carriers have little or no authority to develop, prototype, or procure new assets unless it meets the approval and priorities of the Services--which may not themselves benefit from those procurements. Moreover, they do not interface sufficiently with the U.S. civil transportation sector to stimulate their expertise and assistance.

(U) Moreover, since the wholesale carriers have no direct responsibility for the subsequent retail distribution of their cargos, they tend to "suboptimize" for their own leg of the trip without adequate consideration of arrival port limitations, repackaging needs for retail delivery, or even the possibility of en route losses.

MAJOR STRATEGIC LIFT ISSUES

(FROM MANAGEMENT VIEWPOINT)

★ THE CARRIERS (MTMC, MAC & MSC) HAVE VIRTUALLY NO SAY IN THE SIZE AND BULK OF THE STUFF SHIPPED

- can standardize containers but not force their use, for instance

★ THE CARRIERS HAVE LITTLE OR NO AUTHORITY TO DEVELOP, PROTOTYPE, OR PROCURE NEW TRANSPORT TECHNIQUES OR ASSETS

- cannot really stimulate or benefit from civil sector

★ THE CARRIERS TEND TO OPTIMIZE FOR ECONOMY OF WHOLESALE TRANSPORT WITHOUT ADEQUATELY CONSIDERING:

- arrival port limitations
- "retail delivery" re-packaging needs
- en route or destination attrition

(U) This chart presents some of the task force's conclusions concerning the inadequacies of the methods of managing U.S. strategic lift responsibilities. It is continued on the following page. "Suboptimization" appears to be a plague of the Components.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) This chart presents three more major strategic lift issues from the management standpoint.

(C) First, the carriers appear preoccupied with maximizing loading efficiency and accountability because there simply aren't enough lift assets--or enough material to move for a "real war." Under certain circumstances there are planned restrictions on flying partially loaded aircraft, even if full loading causes departure delays.

(U) Second, the carriers have no meaningful criteria by which to improve logistics movement decisions. They were unable to provide meaningful estimates of the value or costs of containerization, airlift vs sealift, or even the real costs of a prepositioning alternative.

(C) Finally, the whole issue of when, where, or how to preposition materiel nearer to the expected theaters of operations remains imprecise. There are no firm guidelines for choosing between prepo and fast lift, and the carriers do not appear to contribute to the debate. The Air Force, which might have easier access to the airlift, is increasing its levels of prepo. The Army, claiming Congress will not fund additional equipment buys for prepo, is pressing for more air or sealift. RDF capabilities suffer from the indecision.

MAJOR STRATEGIC LIFT ISSUES (CONT)

(FROM MANAGEMENT VIEWPOINT)

★ THE CARRIERS ARE PREOCCUPIED WITH MAXIMIZING LOADING EFFICIENCY & MINUTE-BY-MINUTE ACCOUNTABILITY BECAUSE OF

- inadequate lift assets
- inadequate warfighting materiel (i.e., War Reserves)
- lots of computers (but not enough)

★ THE CARRIERS HAVE NOT EVOLVED MEANINGFUL CRITERIA BY WHICH TO IMPROVE LOGISTICS DECISIONS--SUCH AS:

- value of fitting into standard containers or cargo spaces
- real costs of airlift vs sealift
- real costs of prepositioning

★ THE CARRIERS DO NOT CONTRIBUTE USEFULLY IN DEVELOPING PREPOSITIONING ALTERNATIVES OR TECHNIQUES:

- few groups do outside OSD!

(U) This chart continues to show major management issues associated with strategic lift to RDF forces. Organizational and Service interfaces currently create extensive inefficiencies which the JCS can neither identify nor solve without resources or authority.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(C) There is no absence of major issues concerning intra-theater lift capabilities either. Again, such assets tend to receive low priority within their parent Services which may not be the major benefactors of their availability.

(C) There is no evident plan to replace the aging C-130 fleet even though it is widely recognized as a pressing problem. In a similar vein, the Army seems little interested in developing a substantial capability to deliver operational UE equipment across an undeveloped beach, although they are working at a low pace on port development assets.

(C) There also appears to be little interest in prepositioning the trucks of the non-organic truck companies that fill the intra-theater ground lift role, and there seems to be very little priority on improving our minimal tactical pipe-laying capabilities.

(C) There appears to be no rationale for, or urgency associated with, the improvement of our helicopter airlift capabilities, and very little thought seems to have been given as to how to get these ungainly, but essential, machines into the war zone. The Army does not seriously compromise their helo designs for airlift, and the Air Force doesn't significantly compromise their airlift designs for helos.

MAJOR INTRA-THEATER LIFT ISSUES

(FROM MANAGEMENT VIEWPOINT)

- ★ WHY IS THERE NO C-130 REPLACEMENT PROGRAM?
- ★ WHY IS THERE SO LITTLE EFFORT TOWARD OFF-LOADING AWAY FROM DEVELOPED PORTS?
- ★ WHY AREN'T TRUCKS PREPOSITIONED?
- ★ WHAT ARE THE INCENTIVES TO IMPROVE TACTICAL PIPE-LAYING ASSETS?
- ★ HOW SHOULD HELO AIRLIFT BE SIZED?
- ★ HOW CAN HEAVY HELO BE TRANSPORTED INTO WAR ZONE?

(U) This chart poses a series of simple but basic questions which stemmed from the task force's briefings on intra-theater lift capabilities. Again, many of the deficiencies and shortfalls appear to arise from the interservice nature of the problem.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

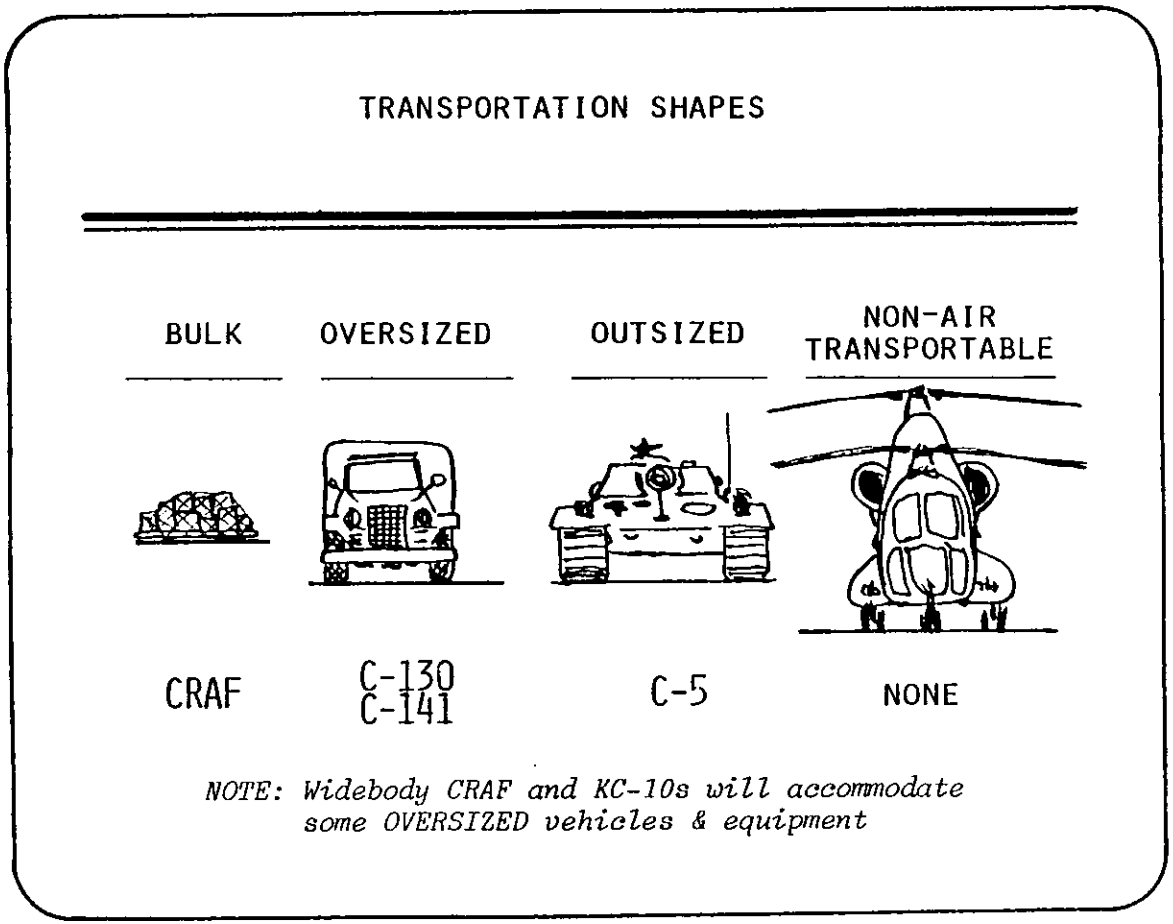
(U) Subsequent charts will discuss airlift requirements in terms of the size and shape of the equipments and materiel to be moved.

(U) This chart simply shows the basic categories prevalent in the terminology of the shipping community.

(U) Bulk material tends to be handled on pallets, in sacks, or whatever, and can generally be transported by any available system.

(U) On the other hand, "oversized" equipment does not fit standard shipping dimensions and requires air shipment in either the C-130 or the C-141, but is not generally suitable to commercial airliners. "Outsized" equipment will not fit the C-130 or the C-141, or the widebody CRAF, and must go by C-5, or by ship. The level of outsized equipment in all our operational units is steadily increasing.

(U) There are, of course, some very large materiel items, such as engineer equipment or heavy lift helicopters, that cannot be airlifted at all unless severely disassembled. These items must either be prepositioned within self-deployment range, or sent by sealift--unless reassembly facilities can be made available in or near the theater.



(U) These simple drawings depict the categories of equipment that can be shipped by various airlift assets. The Civil Reserve Aircraft Fleet (CRAF) are regular civil airliners which are on-call for government use in times of military crisis.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) There are vast differences in both the density and the costs of the various equipments organic to combat units. This chart simply shows that range.

(U) Helicopters are by far the least "dense" (at 15-30 kilograms per cubic meter) and thus are difficult to transport by air, even though they are some of the most important elements associated with both the mobility and the resupply of the early-deploying units of an RDF force. Moreover, with costs ranging from several hundred thousand to a few million dollars per ton, it is unlikely that it would be economically feasible to preposition duplicate sets.

(U) In the middle of the density spectrum, and the low end of the cost spectrum, are the ubiquitous trucks and engineer equipment that must accompany any military operation. They would appear to be obvious candidates for prepositioning rather than fast lift.

(U) The real heavyweights, of course, are the armored vehicles which, like ammunition, weigh in at several hundred kilos per cubic meter. They tend to cost on the order of 10 to 50 thousand dollars per ton. Whether they should be lifted or prepositioned depends on available timing and shipping costs.

EQUIPMENT DENSITY AND COST

	DENSITY (kg/m^3)	COST ($/ton)
Helicopters	15-30	$100,000-2,000,000
Trucks & Engr Equip	150-300	$5,000-10,000
Armored Vehicles	300-500	$10,000-50,000

(U) This chart illustrates the relative cost-per-ton and overall "density" of various ground force equipments which must be deployed in quantity with RDF forces. Such considerations should influence shipping and prepositioning decisions.

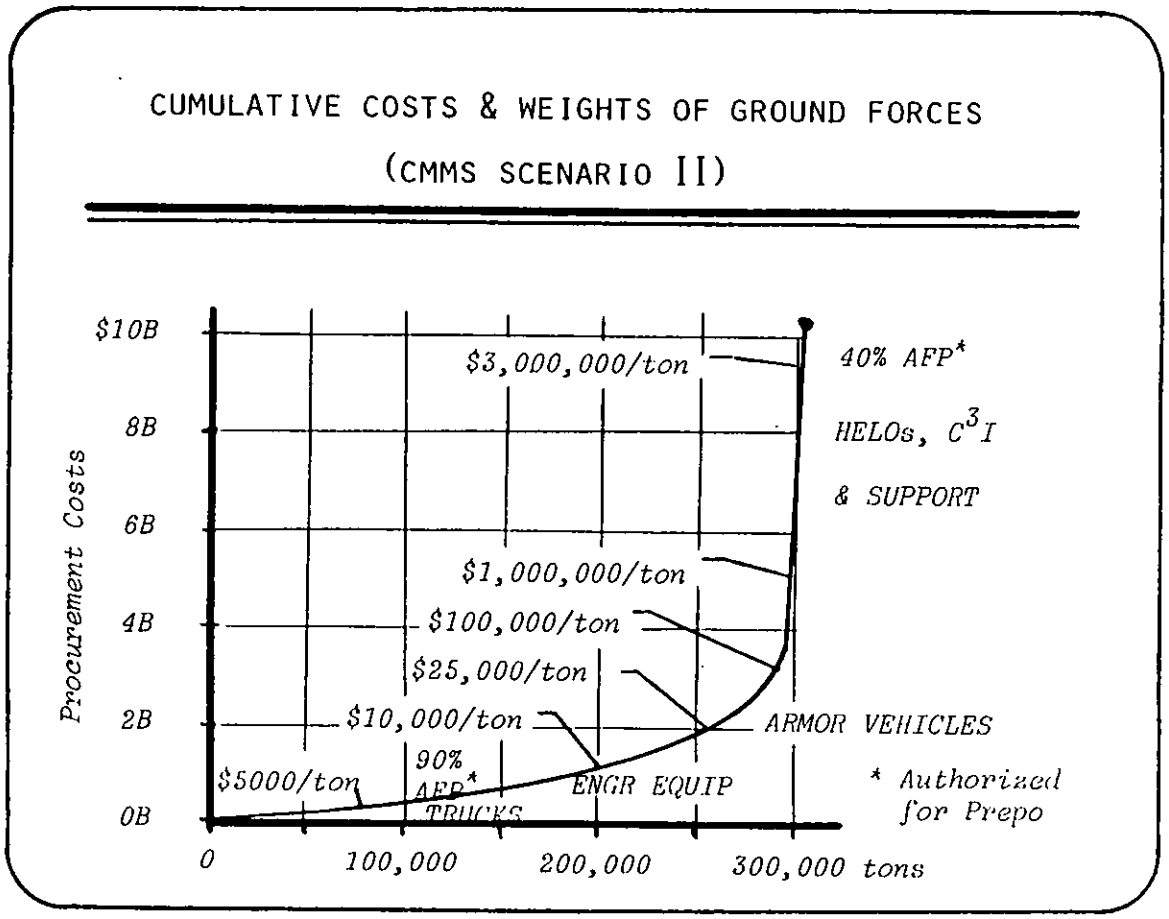
DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) We will subsequently discuss the total lift demands of a multi-division force used to analyze U.S. military lift requirements under a Congressionally Mandated Mobility Study (CMMS). One scenario within that study required the deployment of a relatively large force into the Persian Gulf area on short notice.

(U) This peculiar chart shows the cumulative procurement cost of everything sent in that notional force as a function of the cumulative weight of all that equipment. Equipments are aggregated in the order of increasing unit costs per ton.

(U) The total weight of the unit equipment of this composite Army/Marine force was almost exactly 300,000 tons, and its total replacement value was on the order of $10 billion dollars. The relationship is, however, far from linear. The first 200,000 tons cost roughly $1 billion, and the next 50,000 tons cost another billion. The next 40,000 tons cost another $2 billion, and the last 10,000 tons of helicopters, C^3I equipment, and sophisticated maintenance equipment cost another $6 billion.

(U) It should be noted that all Army equipment is specified as to whether it is suitable for, and hence authorized for, prepositioning. In general, the lower the per-ton cost, the more "prepoable" it is.



(U) This chart shows the total cost and weight of a notional RDF force aggregated in order of increasing per-ton cost. It clearly suggests that there should be no difficulty in establishing criteria for shipping modes, or prepositioning.

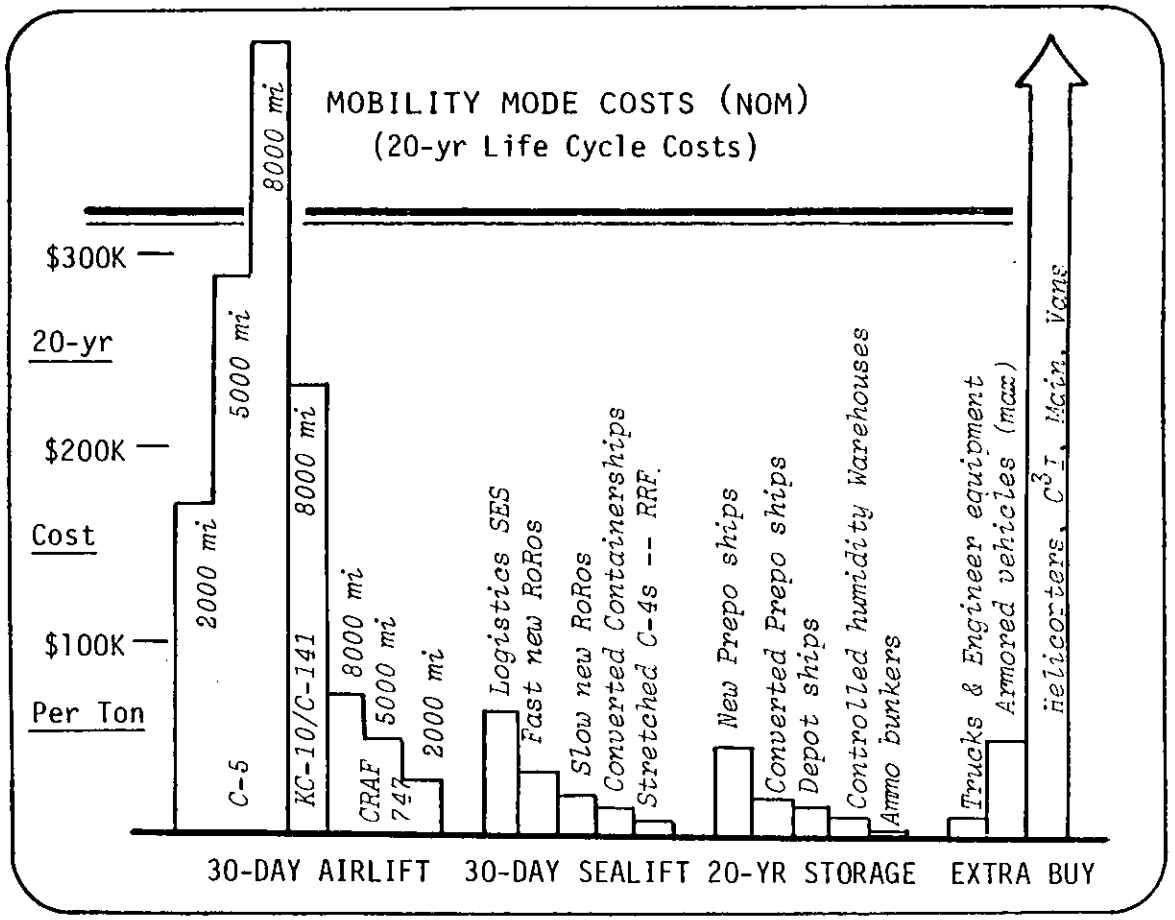
DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) Like the previous chart, this chart derives from briefings received from OSD(PA&E) related to their CMMS study work and other mobility analyses.

(U) It shows the total 20-year life cycle costs associated with developing and retaining the lift capabilities to move a ton of material to some remote location within 30 days. Aircraft are of course sensitive to both distance and time available, while the ships are assumed able to make only 1 one-way trip from CONUS (or prepo) to the delivery point.

(U) New C-5s will cost the nation about $400,000 per ton moved 8000 miles, while the C-141 or KC-10 will cost about $230,000 per ton. Civil-owned CRAF aircraft costs could get as low as $70,000 and compete with surface-effects ships (SES) operating from a nearby prepo site. These aircraft costs would triple, however, if required to deliver each ton in 10 days instead of 30.

(U) Conventional ship costs will vary from around $40 K for new fast RoRos, down to less than $10 K for existing bulk-cargo ships now in the Ready Reserves. The costs of various kinds of prepositioning are also shown--along with another display of the costs associated with buying the extra equipments for prepositioning. Prepo and storage costs must be added before equating to lift costs. And costs alone, of course, do not provide any measure of operational utility.



(U) This composite bar chart compares the relative total 20-year costs of airlift, sealift, and prepositioning with extra procured equipment. The vast differences in cost are evident.

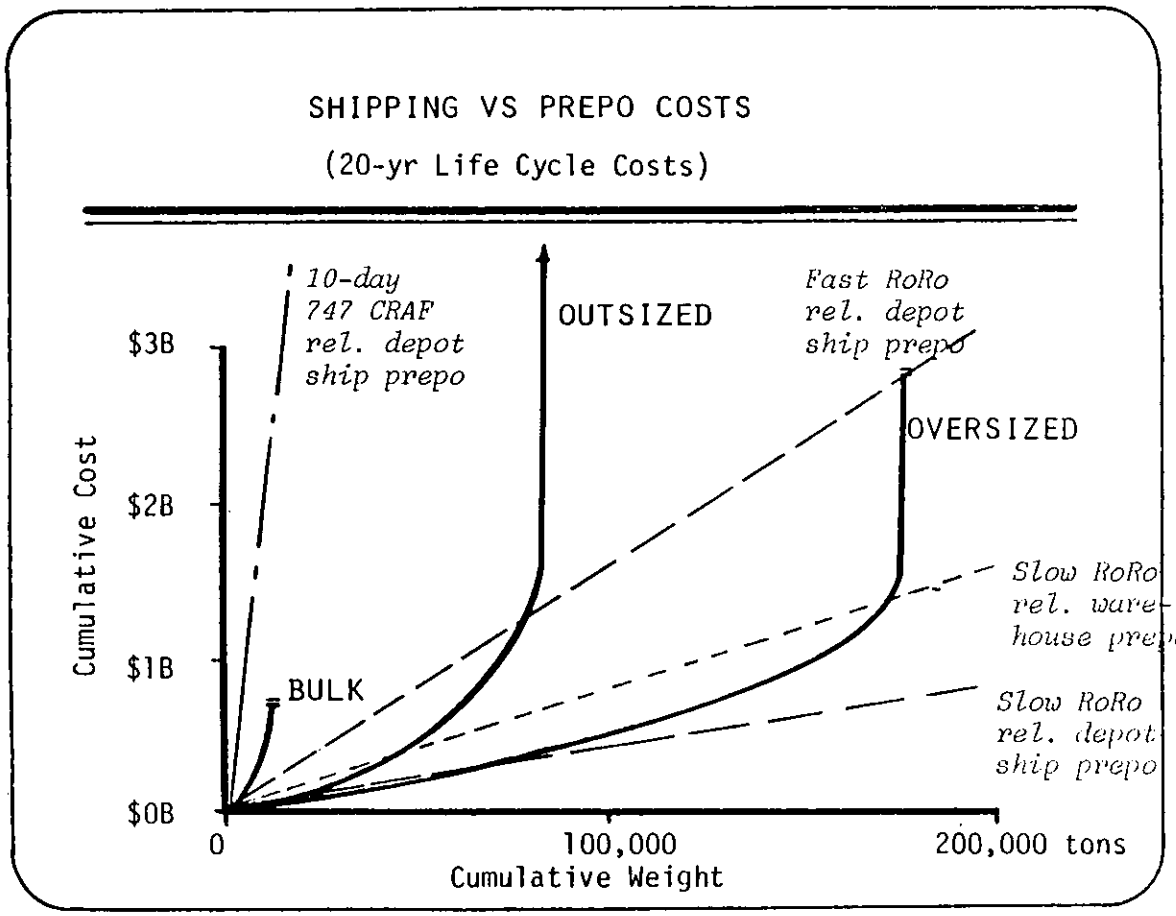
DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) This chart expands on the data presented on the previous two. The cumulative costs vs cumulative weight chart has been broken out by the size of the unit equipments to be shipped. Resupply requirements, mostly bulk, are not included. The majority of the equipment by weight is clearly oversized; by cost, outsized.

(U) These curved lines, then, can be viewed as the cost of an additional set of equipment for prepo. The sloping straight lines, on the other hand, represent the cost of shipping by various modes such as 747 CRAF or RoRo ships, less the 20-year storage costs on depot ships or in warehouses. Thus, where a straight and a curved line intersect, the total costs of the two modes are equal.

(U) Hence, the cheapest form of air transport (747 CRAF), minus the 20-yr costs of prepoing on a depot ship, is always more expensive than buying additional equipment. At the other extreme, the "net" cost of slow RoRo transport is almost always less than buying another set of equipment for prepo.

(U) In between, the chart indicates it is cheaper to buy and prepo the first 80,000 tons of outsized in a depot ship than to ship the original set by fast RoRo. It is no more costly to buy and prepo an additional set of all the oversized equipment than to use fast RoRos.



(U) This chart devises a means of showing the relative cost of various shipping and prepo modes, relative to the cost of unit equipment itself (here representing the cost of an additional set for prepo). Prepo is cheaper below each sloping line; shipping above.

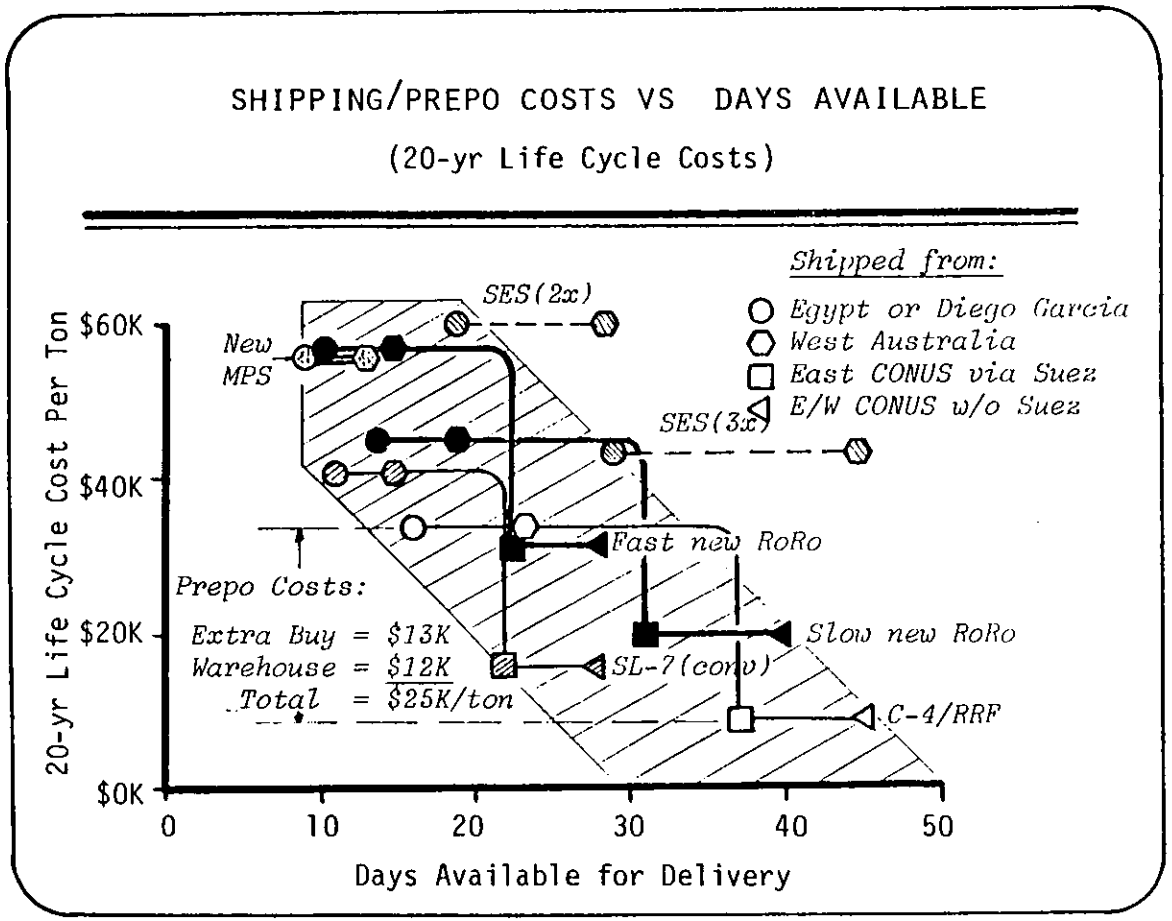
DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) This chart expands on the total costs of shipping and/or prepositioning as a function of the days available for delivery--which, for RDF forces is generally more important than the relative shipping costs alone.

(U) Again, the chart is severely complicated by the range of alternatives available. For each of six alternatives, different transit distances are shown by the symbols. When the time available is less than that required to transit from the CONUS to the objective area (here, the Persian Gulf), then the costs are increased by that required to provide an additional equipment set and 20-year warehousing costs.

(U) This shows for instance, that the converted SL-7s in the current Navy/MSC program are relatively inexpensive. If 22-28 days are available, the ships can make it from CONUS with or without using the Suez Canal. While not as cheap as the older C-4s in the Ready Reserve Fleet (RRF), they are cheaper than slow or fast RoRos, or the SESs making two or three roundtrips from Diego Garcia or Australia.

(U) If less time is available, then the prepo costs must be added, and the ships should shuttle from the prepo site. Fast new RoRos and the Maritime Prepositioning ships offer the fastest capabilities, and are still slightly cheaper than the SES approach.



(U) This chart shows how shipping or shipping + prepo costs increase as the days available for delivery decrease. If delivery is required within 10 days, costs between $40 K and $60 K per ton are likely. If 30-50 days are available, costs may drop to $6-20 K.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

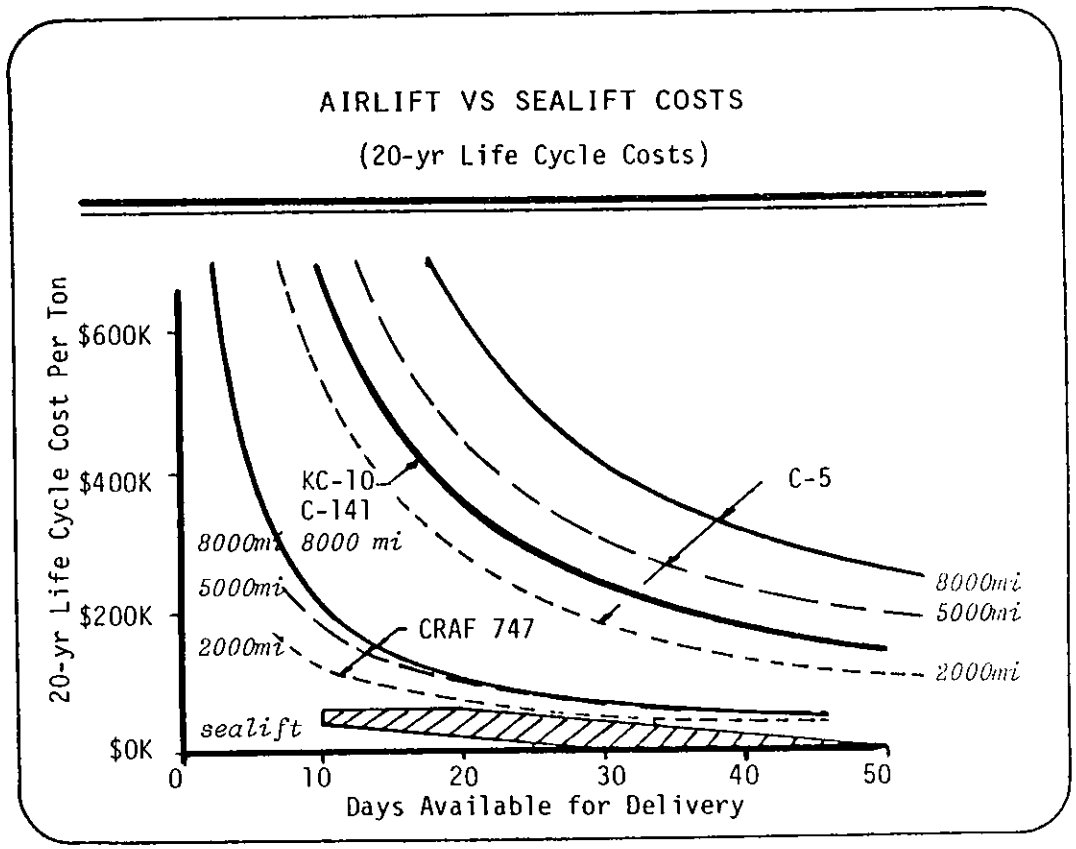
(U) Airlift costs are far more sensitive to shortened delivery times, but have the unmistakeable advantage of being able to deliver something very fast indeed.

(U) Whenever practical, the cheapest form of airlift would be widebody CRAF, since neither the acquisition nor the operational costs are borne by the DoD during peacetime. The impact of reducing time available and of increasing distance are clear however. Costs of well over a million dollars per ton could be required to get any of the military-owned solutions down to less than a week. Furthermore, the C-5 is substantially more costly than the C-141 or newer KC-10.

(U) It would appear almost irrefutable that airlift should be constrained to the minimum essential to meet the delivery time requirements, that it should be flown over the shortest possible distance, and wherever practical, commercially owned aircraft should be used.

(U) Specifically, the possibility of airlifting prepo from some nearby logistics base appears to be an extremely attractive alternative. In Air Force parlance, this is known as "repositioning." It has been recognized in both Air Force and RDJTF planning as a preferred mode, but does not appear in the rationale for acquisition or resource planning.

(U) Note there is no allowance for en route attrition in these calculations.



(U) This chart shows the relative costs of different kinds of airlift over differing distances within various acceptable delivery times. CRAF and C-5 are shown for 3 distances, KC-10 and C-141 for 8000 miles only. The sealift envelope from the prior chart is shown at the bottom.

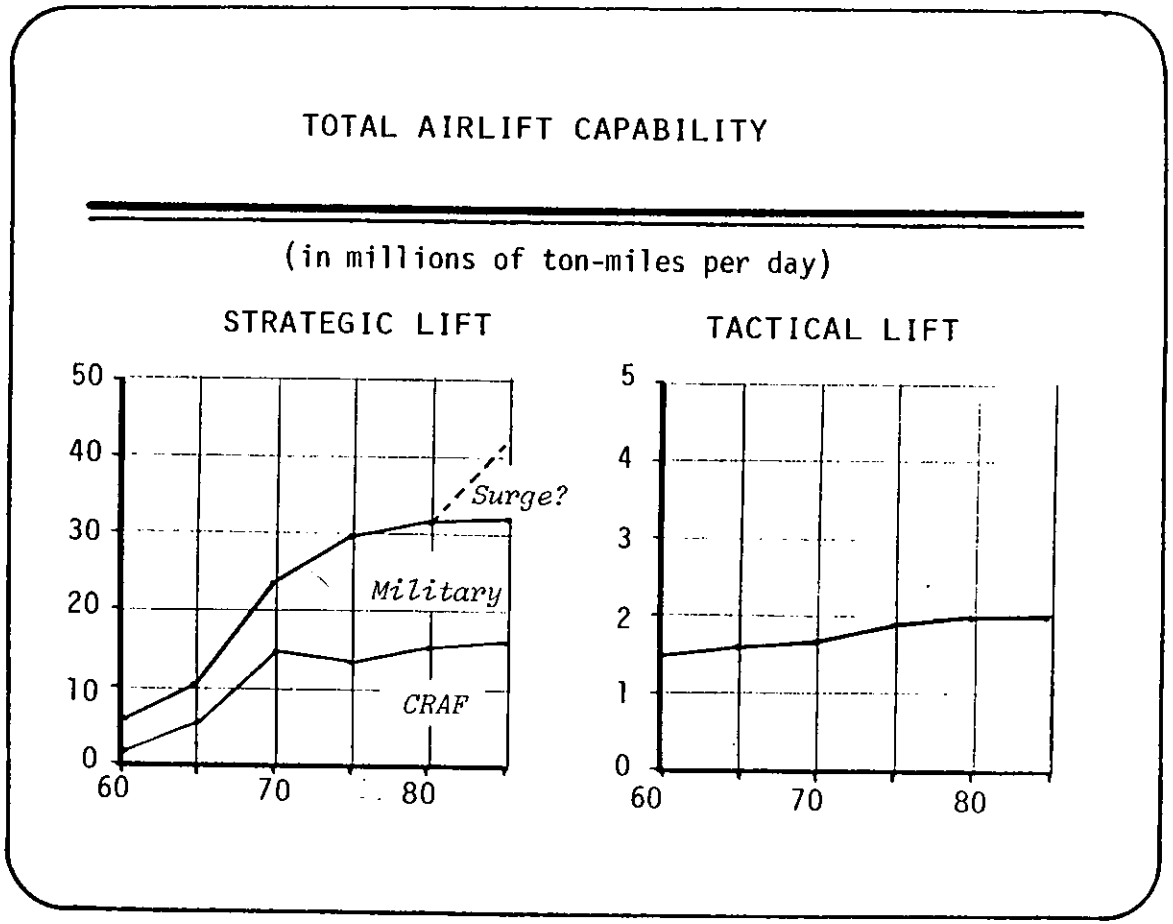
DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) There has been very little growth in the total U.S. military airlift capacity since the completion of C-5 production in the middle 1970s. Moreover the contribution of the Civil Reserve Aircraft Fleet (CRAF) to that total has remained relatively constant. This is shown on the graphs on this chart.

(U) By increasing manning and buying more spares, it is possible to achieve greater fleet utilization without adding more aircraft. This is shown by the dotted line above the strategic lift total. This does not really add to total capacity: only to the utilization of the existing capacity. Moreover, the C-141 stretch program does not here show an increase in capacity, since these graphs portray ton-miles per day, assuming each aircraft is used to its weight limit, not its volume or floor space limit.

(U) The growth in tactical lift capacity has also been very slight over the past decade. There is certainly nothing implicit in either of these graphs to indicate that there has been a shift in strategy to emphasize greater force mobility. This is due in part to the fact that new production airlift assets will not yet be in the fleet by 1985.

(U) These trends do not parallel the growth in commercial air transport which is now far more able to support military needs.



(U) These graphs show the total strategic and tactical airlift capacity in terms of millions of ton-miles per day for U.S. military and CRAF aircraft. There has been little meaningful growth over the past decade.

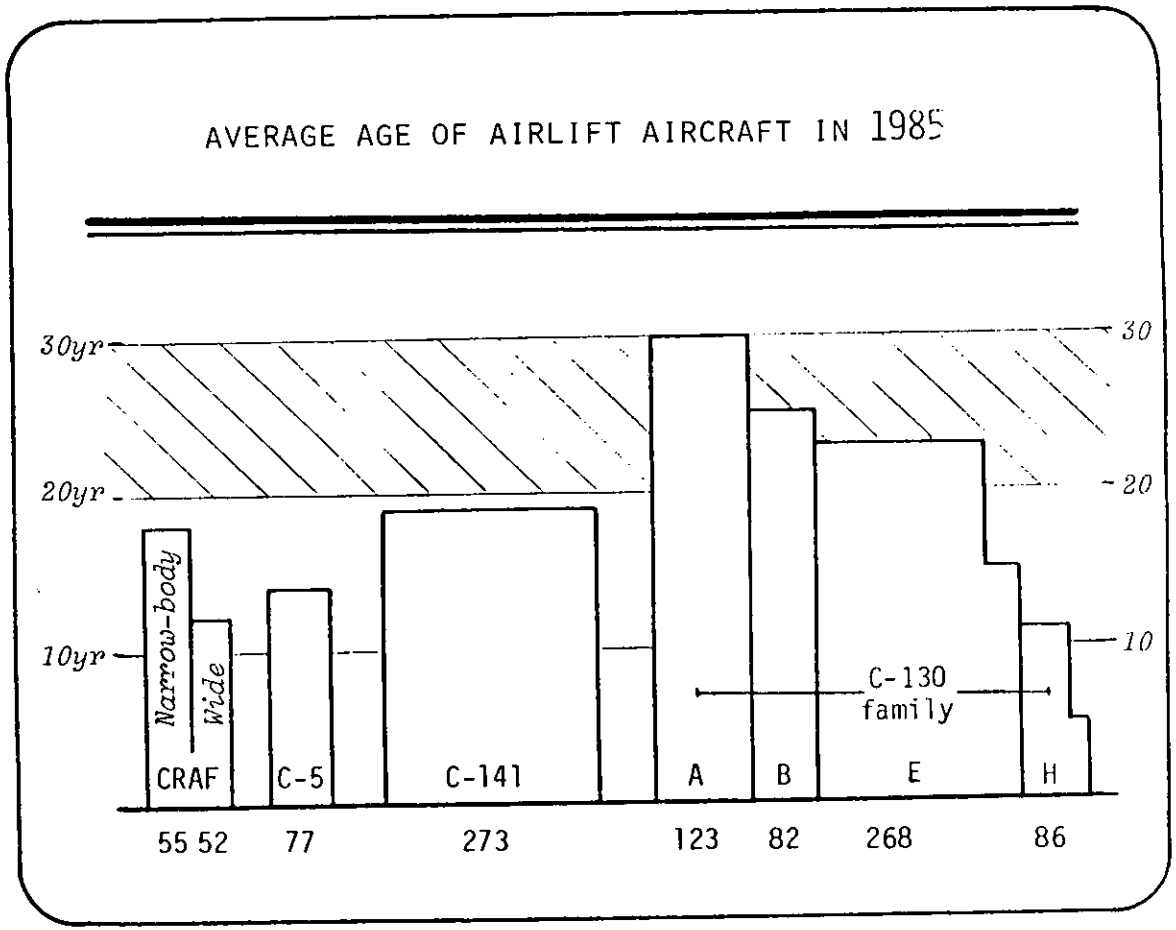
DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) One indicator of the state of modernization of airlift assets is the average age of various components of the air transport fleet. This is shown on this graph.

(U) Commercial air transports are normally "written off" over a period of 11 years. Military airlift aircraft are used far fewer hours per day, and hence can be expected to last longer, or until they become technologically obsolete--from the standpoint of fuel consumption, metal fatigue, or inability to maintain on-board systems. If the fleet is to have a total useful life of roughly 40 years, then its average age at any time should not exceed 20 years.

(U) Using these criteria, then, it is clear that the narrow-body CRAF assets will exceed their life-expectancy (by commercial standards) by 1985. While the military strategic lift assets will still be within limits, over 75% of the tactical airlift fleet will be more than 20 years old, and almost 25% will have reached 30 years old. There would appear to be a very good chance that this tactical fleet will approach block obsolescence before a replacement program can be implemented.

(U) The Air Force apparently still hopes that the C-17 program can be pursued to satisfy this requirement for a C-130 replacement.



(U) The height of the bars on this chart indicate the average age of each type of airlift asset to be in the U.S. inventory by 1985. The width of each bar approximates the total numbers available--as noted below each bar.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) One of our Air Force briefings brought out the very interesting point that technology and force modernization is not currently reducing the weight or size of ground forces combat equipment. In fact, the opposite appears to be the case.

(U) This chart shows both the total weight of each kind of Army division, and the fraction of its equipment that is "outsized" (i.e., requires C-5 transport) in both 1980 and 1986.

(U) If one averages by weight the annual rate of change in either total weight or outsized fraction, the result is a 4% annual rate of growth.

(U) We have dubbed this the "technological bloat factor." It is apparently not dissimilar from the "technological growth factor" found to exist in virtually all defense equipment unit costs (in constant dollars) over the past three decades. To a first approximation, USDR&E long-range planning studies are showing an annual Army procurement unit cost growth of 4.5% yearly since the 1950s. The correlation between cost, weight, and size growth is uncanny--and very possibly suspect because of its superficiality.

(U) The fact remains, however, that if technology is going to be used to reduce ground force equipment weight and bulk, it will require a reversal of much recent experience.

TECHNOLOGICAL BLOAT FACTOR

GROWTH IN EQUIPMENT WEIGHT & BULK:

	1980		1986	
	TONS	OUTSIZED	TONS	OUTSIZED
Airborne Div	16,700	1%	20,400	9%
Infantry Div	30,400	21%	37,500	23%
Mechanized Div	51,200	40%	63,800	52%
Armored Div	54,400	46%	70,800	56%
Average	38,200	34%	48,200	43%

ANNUAL BLOAT RATE = 4% (in weight & size)

(U) This chart, developed by the Air Force, illustrates the rate at which Army divisional equipments are growing in weight and size, primarily to meet NATO-oriented requirements. RDF requirements would seek to reverse this trend.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) These next two charts elaborate on the summary findings concerning "technological bloat" which surfaced on the previous chart.

(U) Here are shown the past- and new-generation equipment weights and sizes for a cross-section of Army equipments. Only in cases where an arrow is shown, are either weights or sizes decreasing.

(U) The new Bradley fighting vehicle destined to replace the trusty old M-113 armored personnel carrier is one of the most exaggerated examples of growth: 102% in weight; 49% in floor space from the older to the newer generation. In fact, the M-2/3 has so grown in size that its external armor must be partially removed if it is to fit in a C-141.

(U) The growth in tank weight appears somewhat more constrained, but nevertheless real. The task force was concerned to learn that the fuel consumption of the M-1 is roughly twice that of the M-60.

(U) Growth in weight and size of helicopters has also been substantial. In all three categories (attack, troop, and cargo), both weights and sizes are increasing in the newer series. We do not question the greater effectiveness of the newer equipments in any category--only the difficulty of deploying them.

TECHNOLOGICAL BLOAT (CONT)

GROWTH IN EQUIPMENT WEIGHT & BULK:

TYPE	OLD	NEW	WT GROWTH	SIZE GROWTH*
APC	M113A1 ('60)	M-2/3 ('82)	+102%	+49%
Tank	M60A1 ('59)	M-1 ('81)	+ 14%	+ 9%
Troop Helo	UH-1H ('68)	UH-60 ('79)	+104%	+49%
Attack Helo	AH-1S ('66)	AH-64 ('79)	+ 59%	+79%
Cargo Helo	CH-53D ('69)	CH-53E ('80)	+ 38%	+ 9%

*floor space

(U) This chart shows the weight and size growth between older and newer ground force equipments, indicating the designation and year of introduction of each. Size is measured in terms of representative floor space required: the primary airlift determinant.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The trend in armored vehicles and helicopters are also evident, but to a lesser extent, in trucks and artillery systems.

(U) This chart shows the growth in the size of the Army's new 5/4-ton vehicle over the jeep, but a more encouraging trend is the size constraints of its heavier trucks. Note that the weight of the 10-ton truck has grown by 41%, however.

(U) Newer technology appears to have resulted in a substantial weight reduction for the Army's newer self-propelled 8" howitzer, although its size has grown 15%. On the other hand, no equivalent savings are apparent in the smaller and more deployable 155 howitzer which, due to its versatility is likely to be the choice for early deployment of RDF forces.

(U) The existence of this technological bloat factor does not really mean that newer technology cannot make ground force weapon systems easier to transport. More likely, it only implies that the requirement for greater transportability has not been afforded high priority in recent NATO-oriented modernization programs. As will be discussed again subsequently, Army systems do not seem to be designed for convenience of Navy or Air Force lift.

TECHNOLOGICAL BLOAT (CONT)

GROWTH IN EQUIPMENT WEIGHT & BULK:

TYPE	OLD	NEW	WT GROWTH	SIZE GROWTH*
Jeep	M151 ('50)	HMMWV ('80)	+20%	+53%
$2\frac{1}{2}$-ton Trk	M35A2 ( )	M35A2C ( )	+ 4%	+ 2%
5-ton Trk	M54 ('60)	M813 ('70)	- 1% ◆	- 3% ◆
10-ton Trk	M520 ( )	M985 ( )	+41%	- 7% ◆
155 Howitzer	M114 ('51)	M198 ('72)	+20%	+17%
SP 8" How	M55 ('52)	M110 ('77)	-36% ◆	+15%

*floor space

(U) This chart continues the theme of the preceding one and illustrates the change in weight and size of successor generation military equipments for ground forces. On balance, mobility has not been considered as important as other improvements.

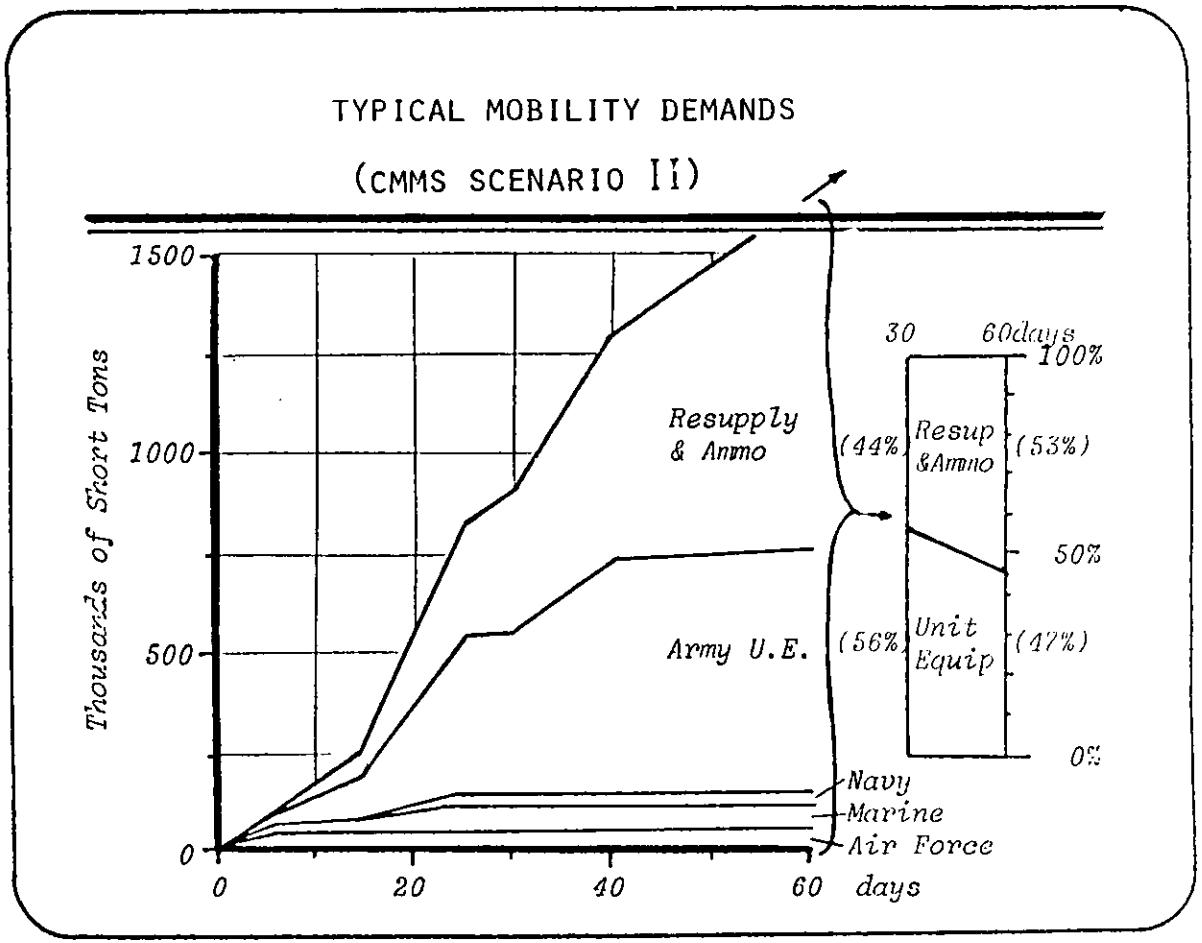
DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) This next series of charts is intended to continue the rudimentary "mission area analysis" by which the task force members enhanced their own understanding of the deployability needs of RDF forces.

(U) The next 11 charts are all plotted to the same scale, showing tons of equipment either wanted or delivered as a function of time, for a typical RDF scenario. It involves the deployment of a multi-divisional force to the Persian Gulf area, with the intent to be able to forestall an advance by Soviet/client forces towards the coast.

(U) The data are derived almost entirely from the Congressionally Mandated Mobility Study previously mentioned. It is a current study; it does not violate real military planning, and it is primarily unclassified for Congressional consumption. The computer models on which the study is based are generally well-known and used by PA&E, OUSDR&E, and JCS(SAGA). We have concentrated on only one of the four scenarios used in that study: the one most clearly representative of a major non-NATO RDF contingency.

(U) This first chart shows the cumulative tonnage demand over the first 60 days and the proportions of the total tonnage between unit equipments and resupply items (excluding fuel).



(U) This chart shows that on a typical large RDF contingency, there could be a cumulative demand for over 1.5 million tons of equipment and resupply needed within the first 60 days. It is split roughly 50-50 between unit equipment and resupply/ammunition.

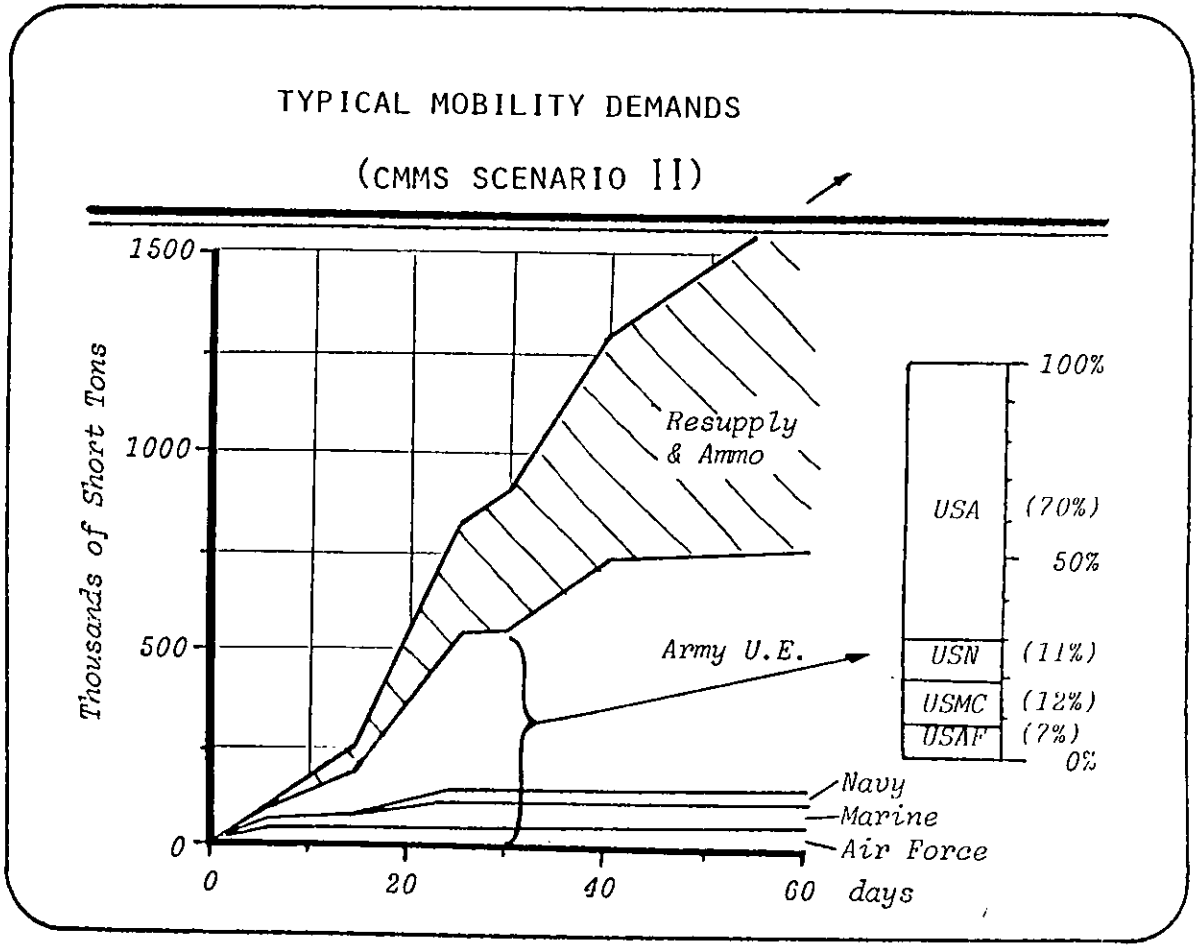
DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) These charts only indicate the tonnage of equipment that must go by "common carrier," as it were. In other words, the material carried aboard naval or amphibious vessels is not included in the totals. Likewise, Air Force aircraft that can be flown to the theater of operations are not included--only munitions, food, spares, and other resupply items.

(U) In the early days, it is clear--and obvious--that there is a greater requirement for unit equipment than for resupply. It is this early unit equipment which needs to have good enough performance capabilities to delay enemy progress until larger U.S. forces can arrive.

(U) By Service, this chart shows that Army unit equipment delivered by common carrier far exceeds that required by the others: 70% of the total, compared to 11-12% for Navy and Marines, and only 7% for the Air Force. For the purposes of this analysis, we can take at face value that the distribution of force components is appropriate and representative.

(U) Equally important, however, is the recognition that it is also the Army that is the most dependent on the other Services and commands to provide the necessary lift. And therein lies the rub: little incentive to minimize the need or maximize the "liftability."



(U) This chart concentrates on the unit equipment part of the lift demand, and indicates that the preponderance of the total cumulative requirement is generated by Army forces.

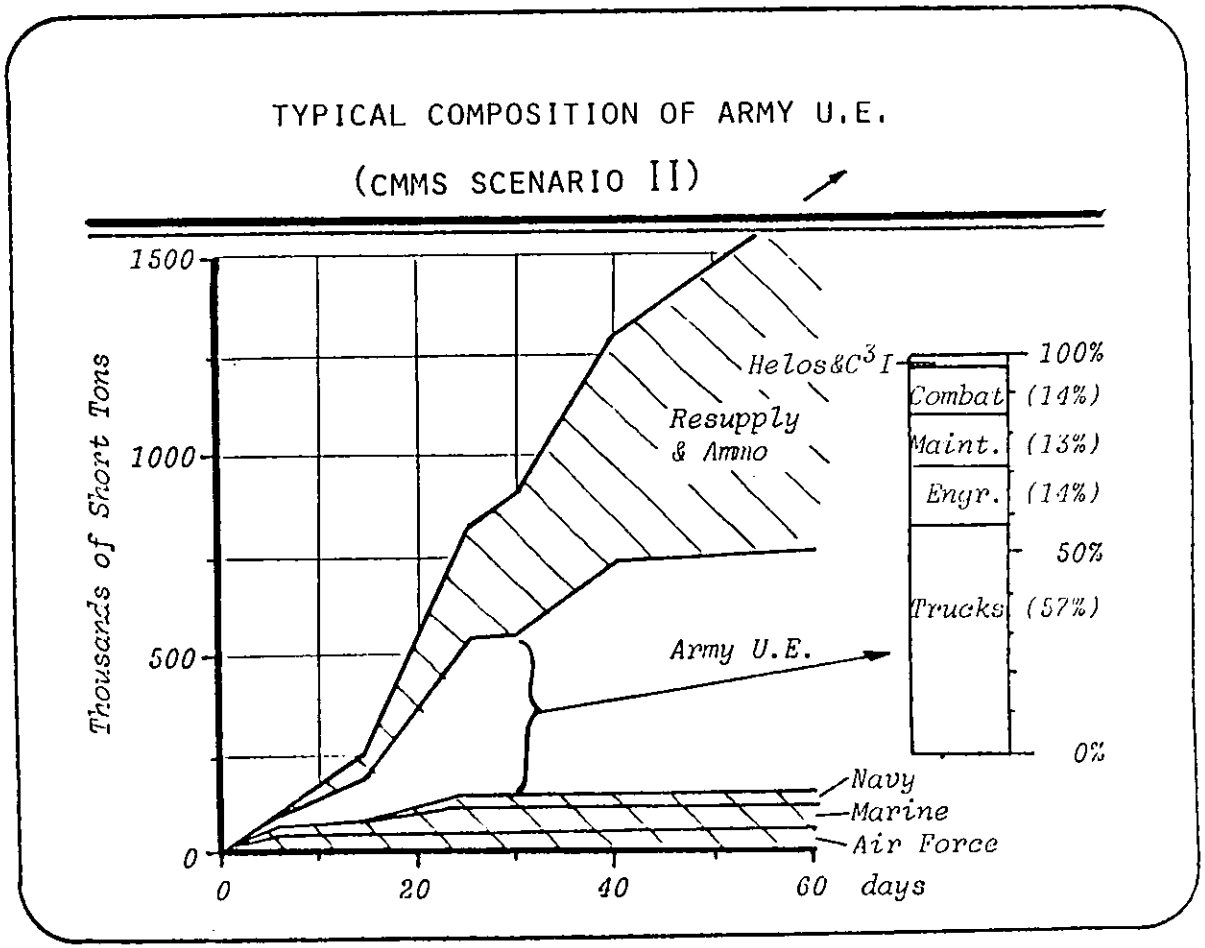
DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The third chart in this series concentrates on the composition of the Army unit equipment planned for deployment--and arrival--within the first 60 days of a Southwest Asia (SWA)/Persian Gulf notional contingency.

(U) The important and surprising element of this chart is the distribution of equipments between combat and combat support. The fact that over 50% of the total equipment delivered is trucks generally comes as a surprise to the high technology community which prefers to focus its attention on the 14% combat equipment, or the 2% in helicopters.

(U) Trucks are absolutely essential to any operations on another continent, particularly if the combat zone is spread out over large distances. Almost every briefer felt obliged to show the task force a map of the SWA superimposed on a map of the United States. Clearly, the distances are severalfold as great as those in the NATO arena.

(U) Moreover, with an undeveloped transportation infrastructure typical of most potential RDF areas of interest, there will also be large requirements for engineer equipment. Additionally, all U.S. equipments require extensive maintenance support. Hence maintenance and engineering requirements alone exceed the total weight of combat equipment.



(U) This chart shows that of the Army's 70% of total deployed equipment, 84% consists of trucks, engineer and maintenance equipment, not combat equipment. This is an important perception to gain. Moreover, these weights do not include the POL for these equipments.

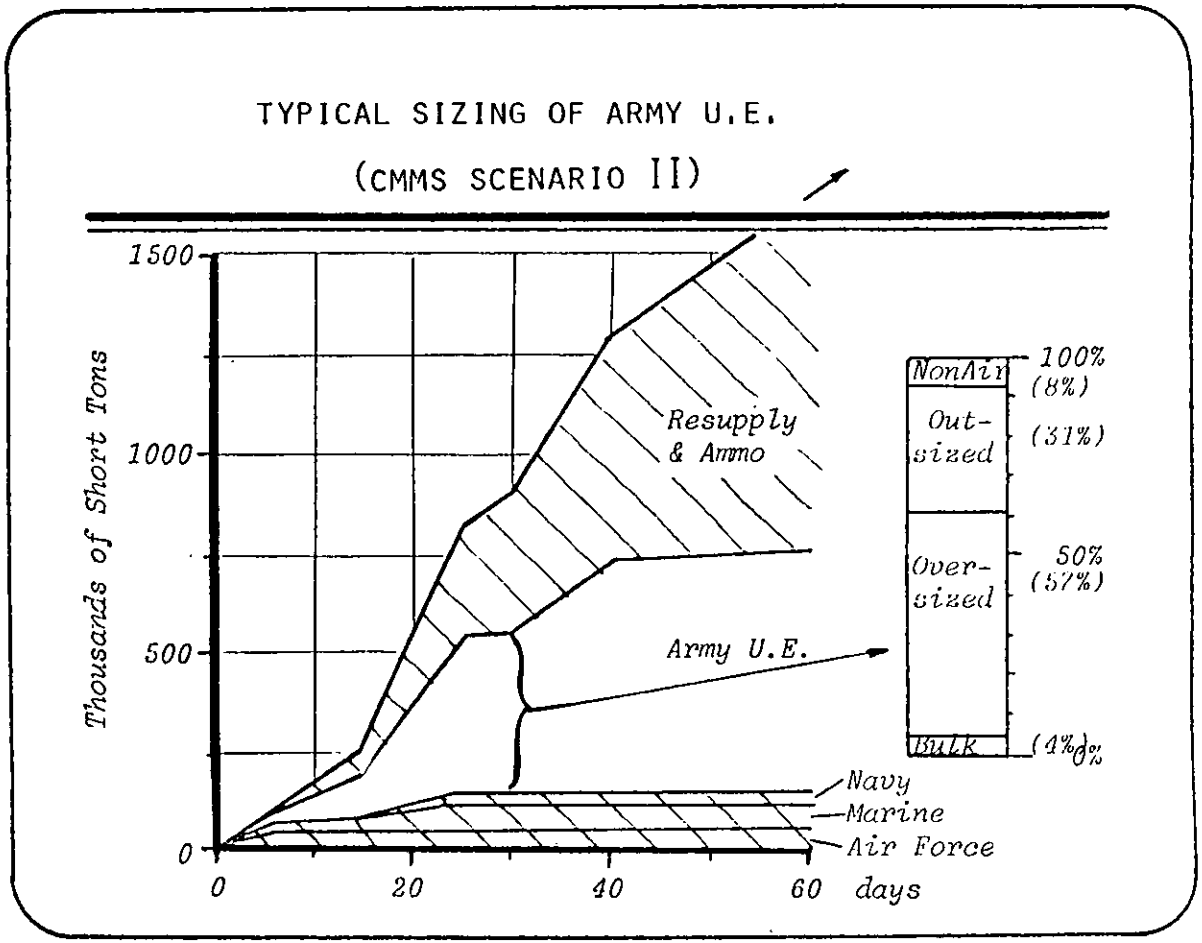
DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) It is, of course, interesting to note that much more of the Army's unit equipment is either outsized or oversized (see chart T-7), while the vast majority of its resupply requirements are simple "bulk" that can be carried more easily by a wider variety of available transport assets.

(U) This chart shows that approximately 31% of all the Army's equipment (by weight) is outsized and must go by C-5, if it is to go by air at all. Only 4% is bulk (which could go by CRAF), while the majority (57%) is oversized.

(U) This again shows that the most important items to get to the combat zone rapidly are the most difficult to transport by air. It is not, however, necessarily the most expensive of the materiel to be committed.

(U) There seems to be an almost overwhelming case for the prepositioning of all possible oversized and outsized equipment, unless its procurement and storage costs are excessive. The task force was exposed to all the concerns about the vulnerability of prepo, the fact that it "could be in the wrong place," the fact that we might not get title to the needed real estate, etc. While these arguments are surely more than just excuses, we concluded that there are compelling reasons for putting greater emphasis on prepositioning. The Army appears to be moving in this direction.



(U) This chart shows that the vast majority of the Army's unit equipment is either oversized or outsized, and thus more difficult to transport by air, even though it is needed as soon as possible in the theater of operations.

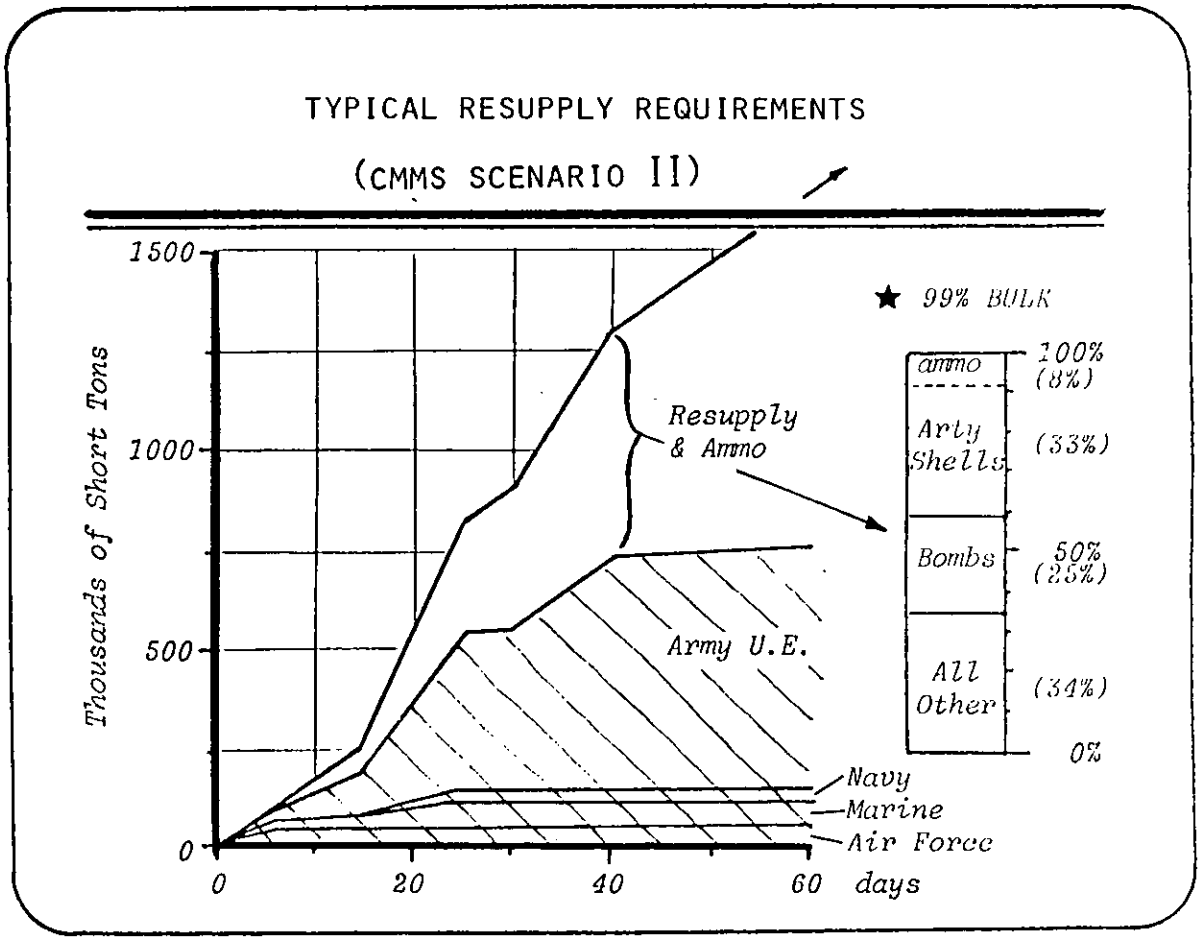
DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) This next chart shifts from the Army's unit equipment problems to their resupply needs. As was mentioned earlier, the vast majority of this non-POL resupply is bulk materiel which can be transported by a very wide variety of transportation systems.

(U) Not too surprisingly, the major demand is for ammunition (41%) of which artillery shells alone comprise 33%. Bombs for aircraft delivery constitute another 25%, and all the rest (food, medical, spares, construction materials, PX supplies, etc.) amount to 34%.

(U) While not specifically discussed here, it should also be recognized that as much as 40-50% of the total weight of ammunition is caused by its shipping containers rather than the rounds themselves. Again, it becomes evident that solving some of the problems at the lower end of the technological sophistication spectrum could be more valuable in alleviating the overall transportation/mobility problems than attempting to raise the weight-efficiency of the higher sophistication weaponry itself.

(U) It might be noted here that we do not have high confidence in the assumptions concerning ammunition consumption rates. Nevertheless, we see no reason to concentrate on reducing ammunition use as a means of increasing RDF power.



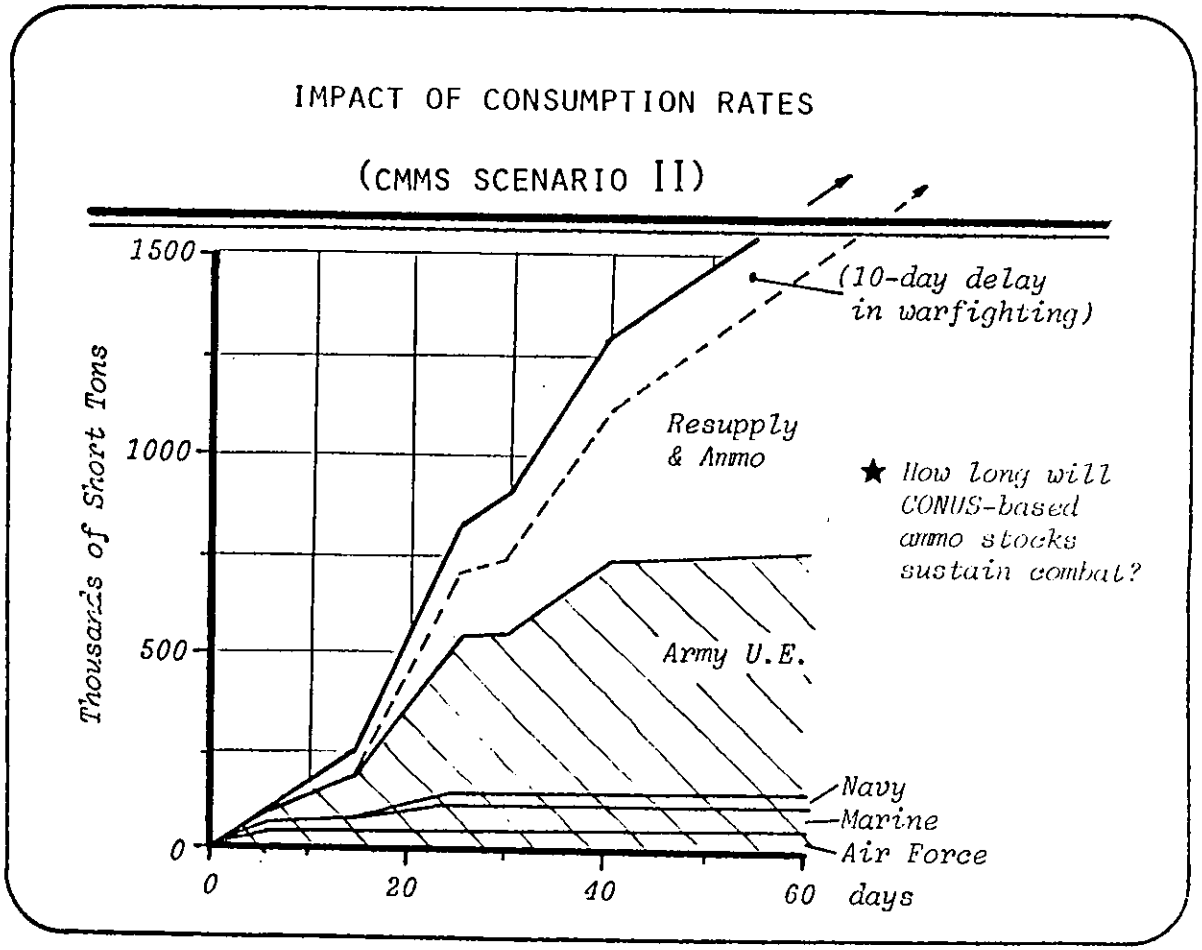
(U) This chart shows how much of the non-POL resupply requirements are driven by ground and air ammunition--and by artillery shells in particular. Shells and bombs dwarf all other resupply needs.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) Another way to avoid large resupply requirements for ammunition would be to delay (or avoid) the onset of combat. This graph shows the impact of a 10-day delay in the beginning of large scale ammunition consumption rates relative to the total demand.

(U) Since steady-state consumption rates for resupply items approach 20,000 tons a day for a multi-division operation, a delayed onset of battle could obviously decrease the early resupply requirements. Whether an operational force would be willing to insert itself without substantial levels of resupply on hand is, of course, another matter. The Marines clearly are unwilling to do so. The Army, on the other hand does not appear to have worked out as stringent a requirement. Unlike the Marines, the Army does not move ashore with 15 days worth of resupply organic to the units.

(U) In any event, the task force interprets this reduced consumption not as an opportunity to reduce lift, but as a bonus to be derived from somehow delaying the onset of major unit conflict. In other words, it raises the premium on interdicting the aggressor force earlier and more remotely. The concept of "stop-gap" forces arises again.



(U) This chart indicates that there would be a considerable savings in resupply requirements if the onset of large-scale combat could be delayed for a significant period of time. This appears to raise the premium on successful early interdiction.

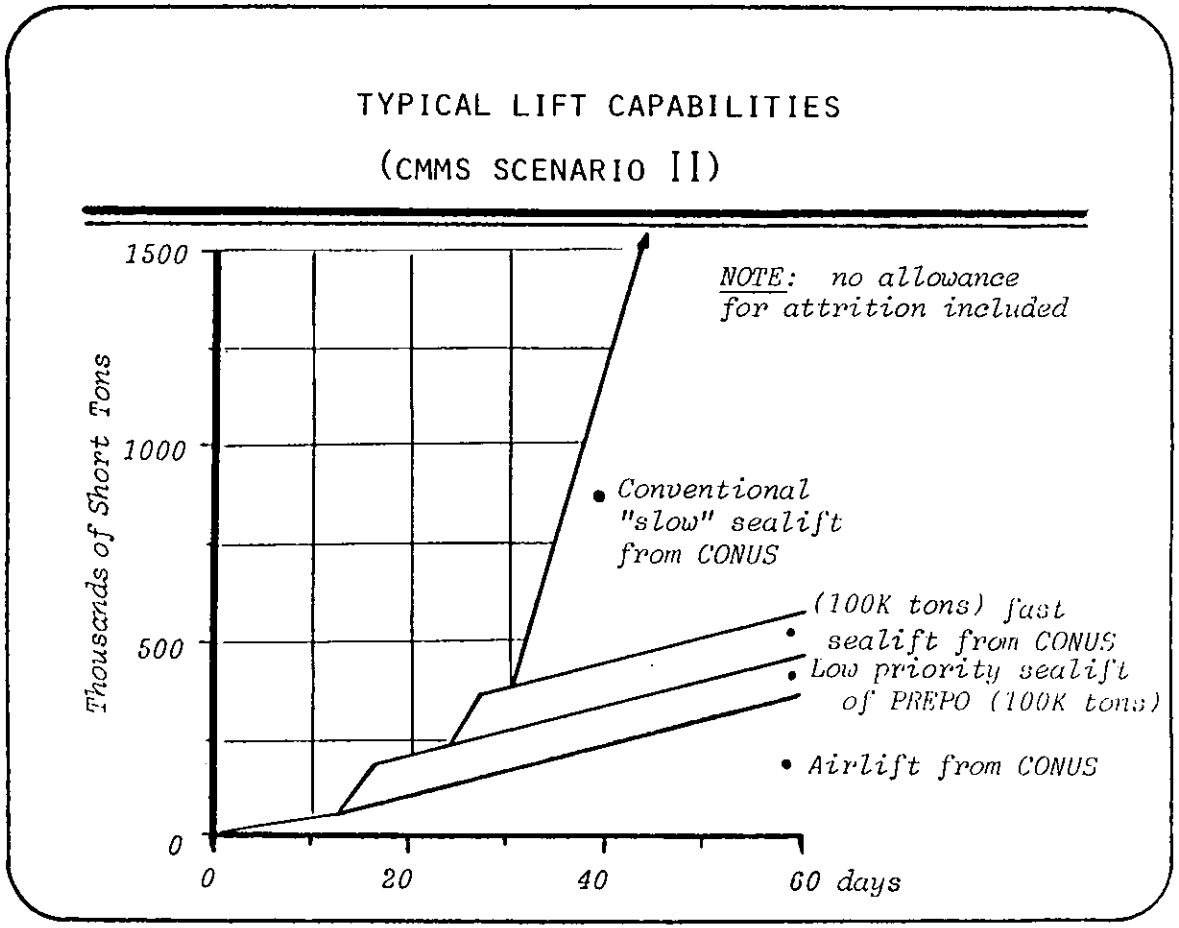
DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The prior charts have all dealt with the demand for lift in this particular scenario, regardless of the ability of U.S. lift forces to meet the demand. This chart now turns to an oversimplified display of typically available lift to support an SWA RDF contingency--assuming no attrition.

(U) To the same scale as the prior charts, this graph illustrates the lift contribution made by each of the major classes of transport in supporting a multi-divisional deployment into the Indian Ocean. Again, it is the proportions rather than the absolute magnitude that is important.

(U) The first means of getting anything into a remote area will, of course, be airlift. The bottom wedge on this chart clearly shows the typical ramp-shaped buildup possible using the very rapid round-trip air assets. The steeper slope at about the 12th day is the result of reserve augmentation of the active airlift support forces.

(U) The next wedge of equipment to arrive will almost certainly come from nearby prepositioned equipment, brought in by, say, fast prepositioning ships on which the materiel was stored. These tonnages tend to arrive en masse, as is typical of ships. Next will come the fast sealift from the CONUS, and finally, the large deliveries will come by conventional "slow" sealift.



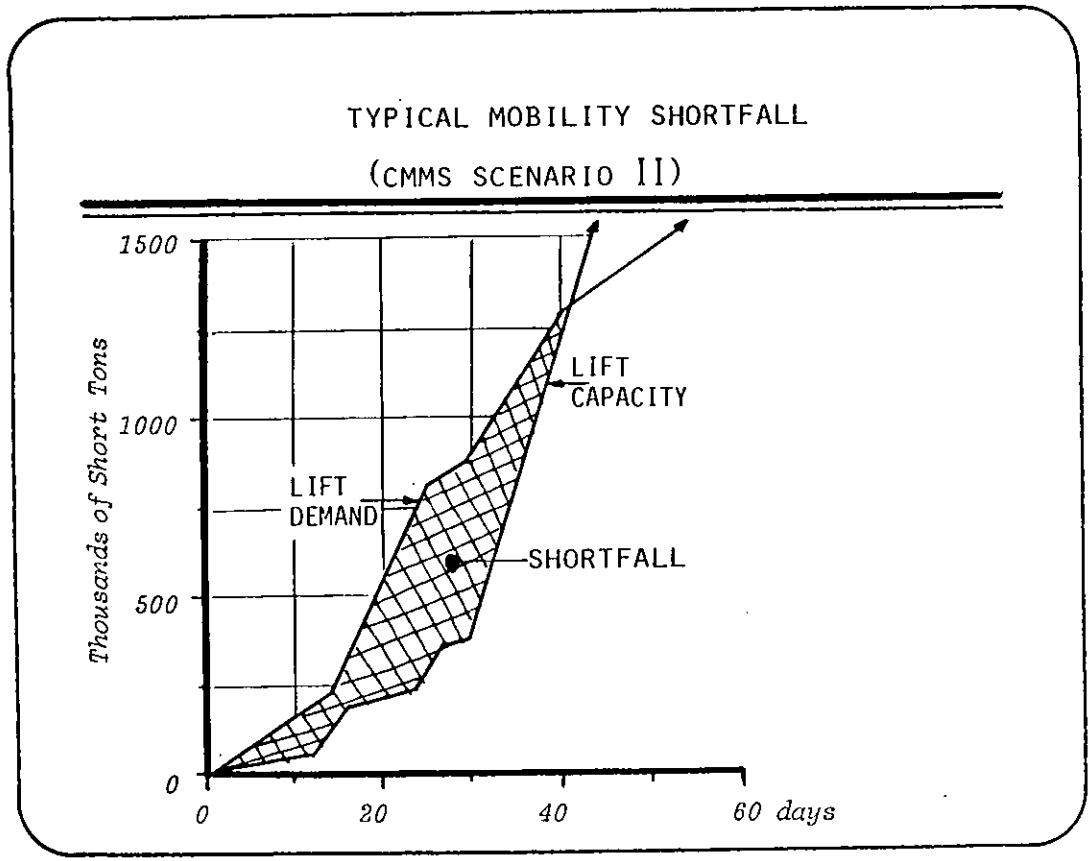
(U) This chart shows a typical rate of buildup of supplies in-theater using currently available lift assets and a limited amount of near-theater prepositioning. The major issue, of course, is how to improve the near-term arrival rates.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(C) The gap between the amount of lift needed (Charts P-31 thru 36) and that available (Chart 37) constitutes the shortfall in current U.S. capabilities to meet this particular hypothetical RDF contingency. In this specific case, demand exceeds capability by more than 50% for the first 40 days of the campaign--until slow shipping can get loaded, deploy halfway round the world, and unload. There is no allowance for en route attrition, nor is the impact of the shortfall in the early days reflected in later requirements.

(U) There appear to be four separate approaches available to rectify this shortfall: 1) we can try to reduce the weight of stuff needed over the first 40 days; 2) we can try to enhance our overall lift capabilities; 3) we can try to shift the delivery capability to the left by starting sooner on the basis of better early warning of the need; or 4) we can try to devise means to lower the need for so rapid a buildup in U.S. forces.

(U) All of these options are explored superficially on the following pages. It might be noted incidentally, that it was analyses similar to this in the CMMS study that led to the requirement for new sea- and airlift assets to support the RDF.



(U) This chart overlays the top lines of the two prior charts to illustrate the potential gap, or shortfall, before lift demand and lift availability. Minimizing this shortfall through technology becomes the major objective of this task force study.

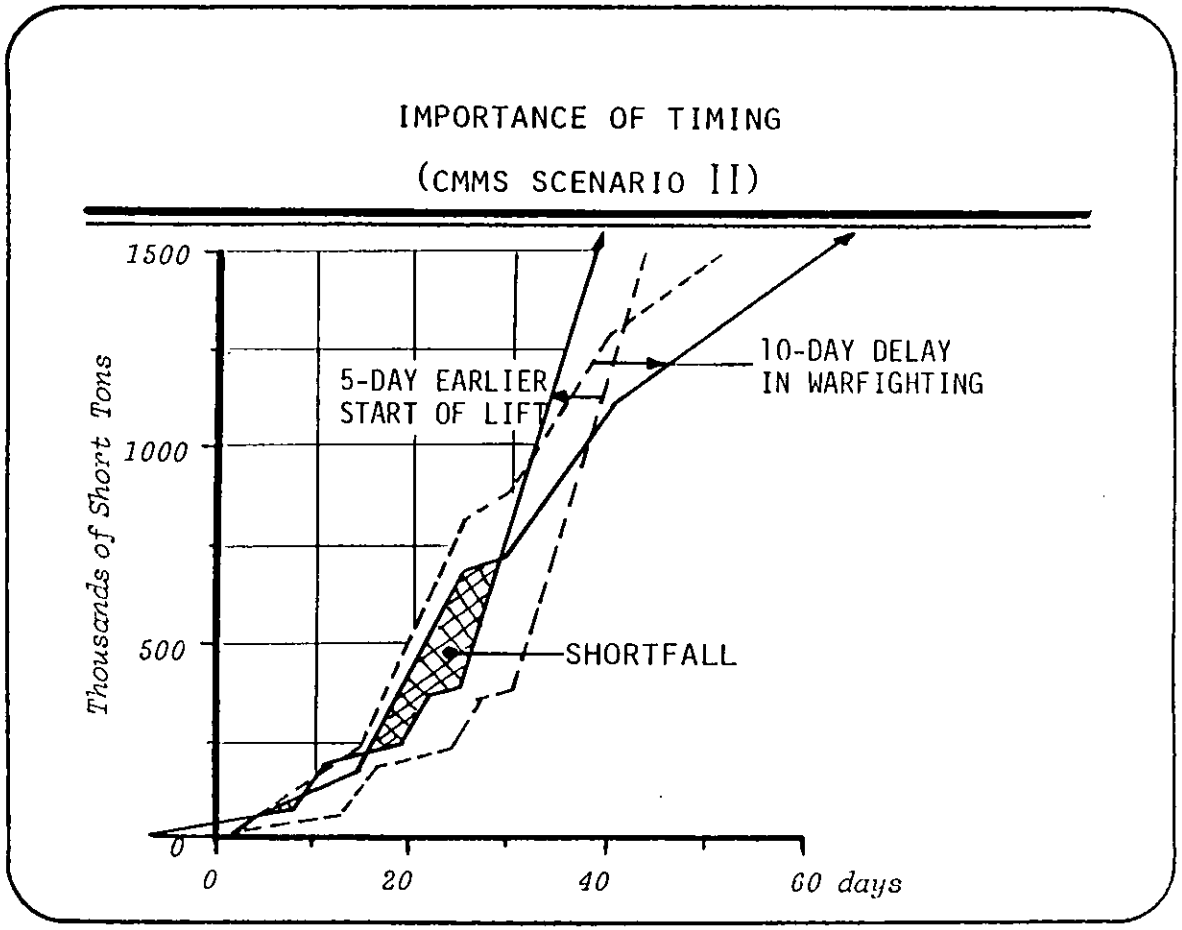
DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The first variation on the shortfall depicted on the prior chart, indicates the advantages to be gained by delaying the onset of warfighting by 10 days (chart P-36) on the one hand, while also beginning the lift just 5 days earlier, on the other hand.

(U) These two actions alone, were they plausible, could eliminate the majority of the shortfall demonstrated for this particular scenario. Whether or not either alternative is practical is not known. In view of the very high costs associated with the proposed lift add-ons (tens of billions), there would appear to be a very high premium on innovations that would permit movement in both of the directions indicated.

(U) Specifically, the task force has probed the need to be able to slow down very substantially the rate of advance of enemy forces early-on, while also looking at the possibilities for extending intelligence early-warning indicators as a means of getting the lift under way sooner.

(U) It must also be remembered that this particular notional attrition-free scenario, does not represent any ultimate scenario against which to establish U.S. force requirements. It is by no means clear that our RDF problems would disappear if no shortfall at all remained on this chart.



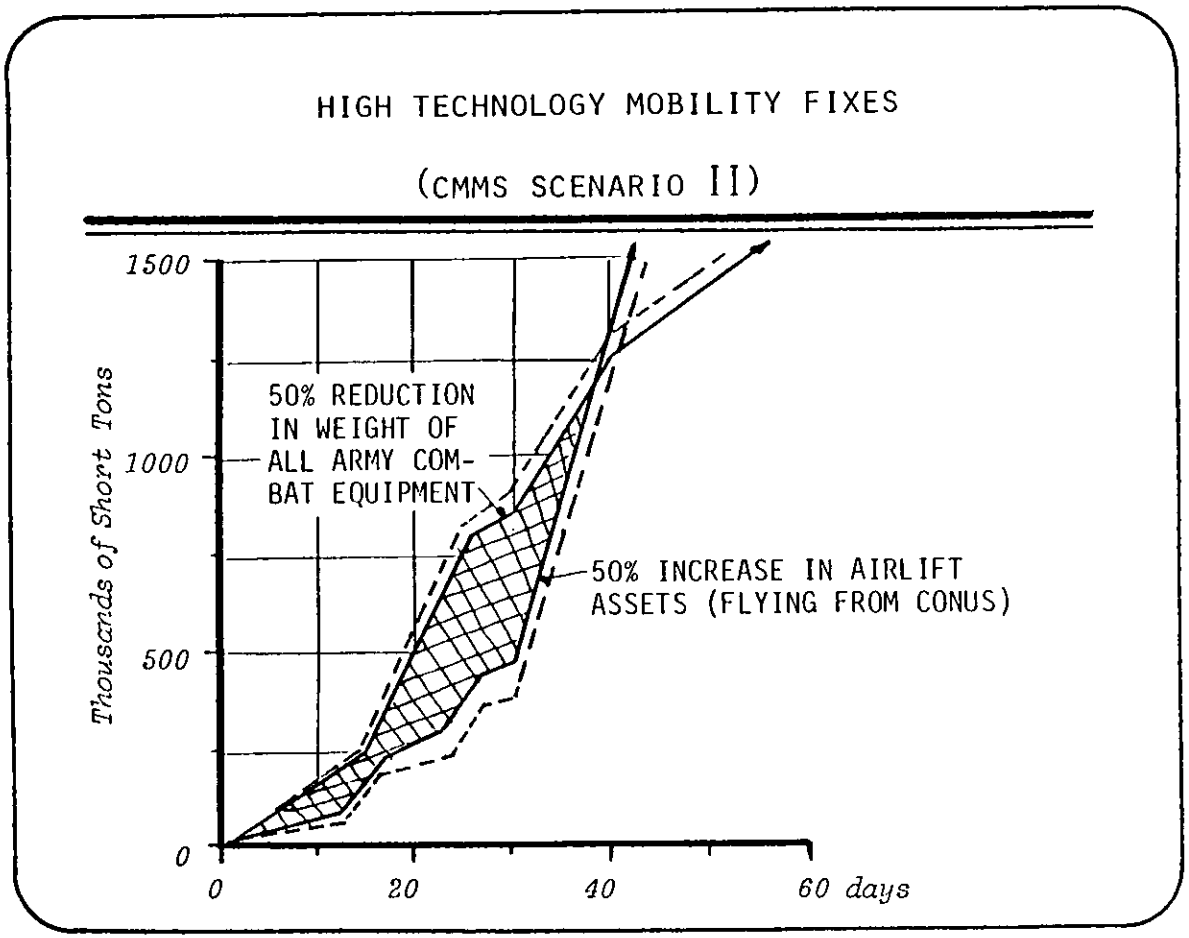
(U) This chart slows down the onset of warfighting and speeds up the initiation of force deployment to demonstrate how a few days more warning and a few days delay in enemy rates of advance can reduce the shortfalls seen in this particular RDF scenario.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) This next chart attempts to eliminate the perceived shortfall in RDF mobility capabilities by working on the high technology end of the total lift spectrum. It derives directly from the insights gained on chart P-33 concerning the relatively small weight of "teeth" compared to the large weight of "tail," and from chart P-37 that shows the contribution of airlift to the total tonnage moved.

(U) In short, a 50% reduction in the weight of all Army combat equipment, coupled with a 50% increase in the total level of airlift assets flying all the way from the CONUS to SWA, doesn't make a significant difference in the overall shortfall in mobility capabilities.

(U) There may be other reasons for making both of these high technology fixes. For instance, reducing the weight of the Army's combat equipment may add greatly to its in-theater operational mobility--a consideration not assessed in this strategic lift model. By the same token, there may be very valid reasons to increase total airlift capacity if only to permit a substantial increase in"repositioning" capability (discussed subsequently) or to compensate for attrition. The point is that the rationales for accomplishing these other objectives should be developed on their own merits and not confused in their application.



(U) This chart shows that a 50% reduction in Army combat systems weight as well as a 50% increase in total airlift capabilities do not do much to eliminate the perceived U.S. mobility shortfall--although they may be valuable for other reasons.

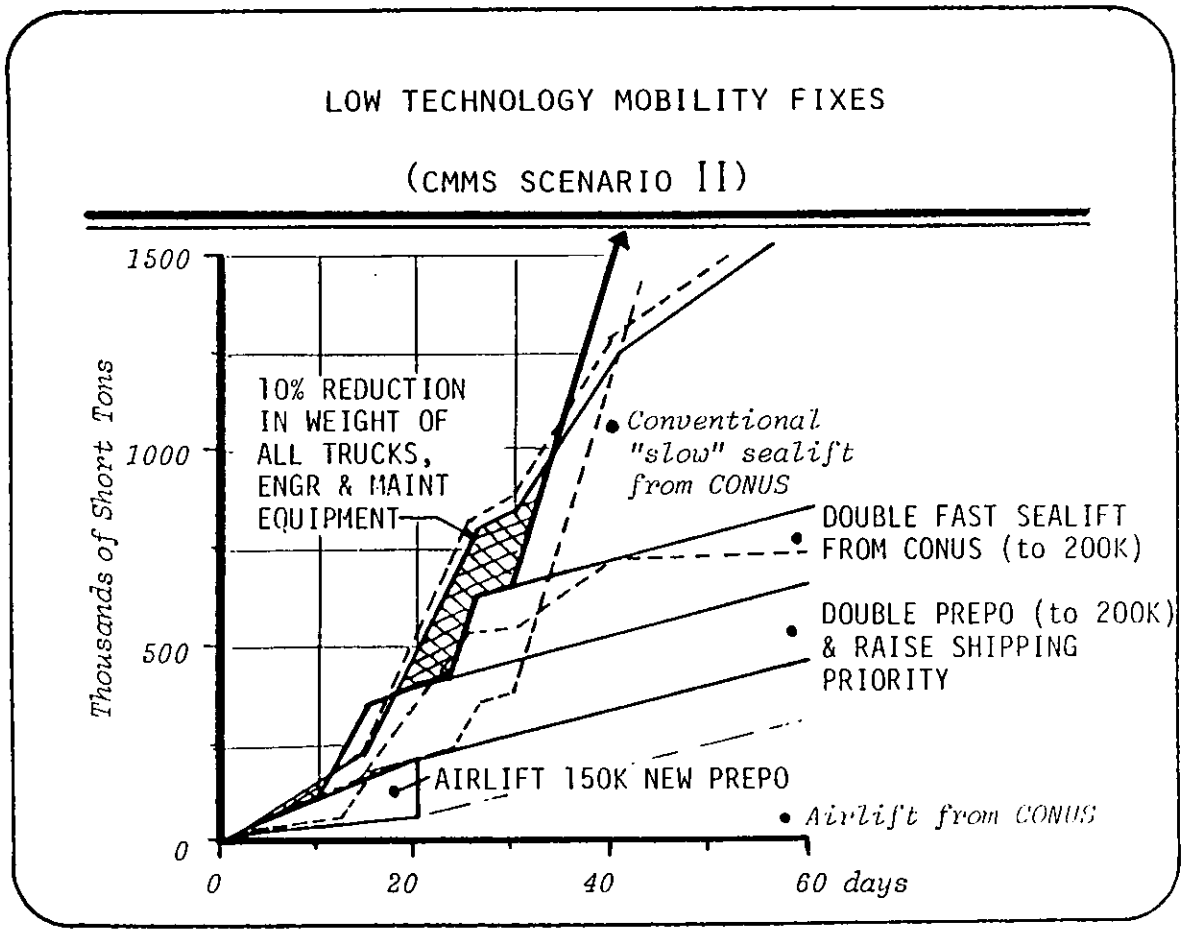
DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) As a corollary to the last chart, this one explores the impact of successfully attacking the lower technology end of the mobility spectrum.

(U) In this case, the tonnage demand is reduced by making 10% savings in all the Army's non-combat equipments--such as trucks, engineer, and maintenance equipment (re: chart M-3 again). At the same time, several alternative steps are taken to increase U.S. lift capabilities. First, 150,000 tons of airliftable prepositioning is procured and stored at forward bases, and half the existing U.S. airlift capability is used to reposition this materiel before returning to the CONUS to engage in the longer-range CONUS-SWA airlift. This is only one of the ways to impact on the very early shortfall. Next, the current prepositioning levels of roughly 100,000 tons is doubled, and transferred into theater by high priority, fast shipping not previously allocated to this job. Finally, the fast sealift from the CONUS is doubled in size by the addition of less than a dozen more speedy ships.

(U) The composite impact of these changes, which might entail 2-5 billion dollars, is to very greatly diminish the shortfall--essentially the same way that the timing changes did on chart P-39.

(U) There are, of course, many other alternatives that could be explored.



(U) This chart shows the impact of reducing the weight of Army non-combat equipment while increasing prepositioning and sealift, and using airlift to "reposition" the highest priority forward-stored materiel. These lower technology fixes appear effective.

CONFIDENTIAL

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) This chart summarizes the major considerations that seem to scope RDF problems, as identified in the preceding section of this report.

(U) It is clear that RDF problems run the full gamut of U.S. conventional force capabilities in the eyes of the operational commanders. It is also clear that RDF objectives, as well as the forces most likely to oppose them, are not a simple extension of NATO planning.

(C) Getting to the war across the seas and then across the beach may be RDF's toughest problem, and unsolved cross-Service issues are magnified in this regard. Transportation costs to deploy RDF are extremely high, and airlift is surely the highest of all. Tradeoffs between airlift, sealift, and prepositioning can have important impacts on both transit times and costs.

(U) It is clear that the bulk of the materiel to be transported is support equipment and ammunition: most of these items are candidates for prepositioning. A 10% reduction in support equipment weight is more valuable lift wise than a 50% weight in combat equipment.

(U) Finally, it is clear that RDF tactics--and thus their equipment--may be substantially different from that required in the early stages of a NATO war in Europe, where opposing forces are already largely in place.

THE SCOPE OF THE PROBLEM

- RDF problems run the gamut of U.S. military capabilities
  --mobility--survivability--effectiveness--sustainability
  --C^3I--training--planning--testing--materiel support
- RDF opposing forces and objectives are somewhat unique
  -- and are not a simple extension of NATO planning
- Getting there in time may be the toughest RDF problem
  -- complicated by unsolved cross-Service issues
- Transportation costs may exceed equipment procurement cost
  -- and long-range airlift is by far the most costly
- The RDF tail is much harder to deploy than the teeth
  -- further emphasizing the desirability of prepositioning
- High initial force effectiveness is essential
  -- to buy time for subsequent reinforcement

(U) This final chart in this section of the report summarizes the major issues that comprise the total scope of RDF problems as viewed by this task force. These are by no means the same problems faced by U.S. forces assigned to NATO.

CONFIDENTIAL

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) Armed with the limitations and deficiencies identified earlier, and in the context of the threat, scenarios, and analyses just discussed, the task force set out to explore systematically the potential opportunities for improving RDF capabilities.

(U) The course of our investigations is paralleled by the outline of this major section. We tried to assess the validity of the problems, the adequacy of steps already in progress to alleviate them, and the opportunities to apply new technologies where necessary.

(U) In cases where it seemed that the requisite technology was abundantly available, we asked selected contractors and government agencies to show us what they had to offer. Some of the results of this informal "show & tell" are included at the appropriate points.

(U) The vast predominance of our briefings were from appropriate Defense development entities. We were thus able to assess not only what is possible, but what priority is currently being applied by "management," and whether there is a common view of the RDF needs. Clearly, there is not, and we will comment on this where proper.

BRIEFING OUTLINE

PART I: INTRODUCTION

PART II: THE SCOPE OF THE PROBLEM

PART III: THE QUEST FOR SOLUTIONS

PART IV: IMPRESSIONS & RECOMMENDATIONS

(U) This is the beginning of the third section of this report. Here, we will summarize our findings for each of the problem areas spelled out on charts P-6 through P-9.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) There was little question in the minds of the task force that additional strategic airlift would be valuable to hasten force deployments. Improvements to the C-141 and C-5 fleet appear sound, and the production of additional C-5s appears more practical than undertaking an all-new C-17. We were unconvinced by enthusiastic briefings that the C-17 would provide sufficient advantages to warrant its additional costs. We were particularly skeptical that it would ever be widely operated in an intra-theater role.

(U) We were not uniformly satisfied, however, that the airlift community or its beneficiaries had worked very hard to tailor the airlift to the most important tasks: i.e., the shipment of Army cargos too complicated or too costly to preposition, and more than likely outsized. Things like large helicopters, C^3I vans, and some maintenance equipment, appear to require very large internal volume, while more dense equipments and resupply items can take a much smaller volume. Designing to an "average" may optimize the airlift for Army trucks, for which the justification of airlift will be difficult indeed.

(U) Commercially available technology seems perfectly adequate to meet realistic airlift needs, and the CRAF program should be pursued wherever possible (discussed again later).

MOBILITY: MORE AIRLIFT

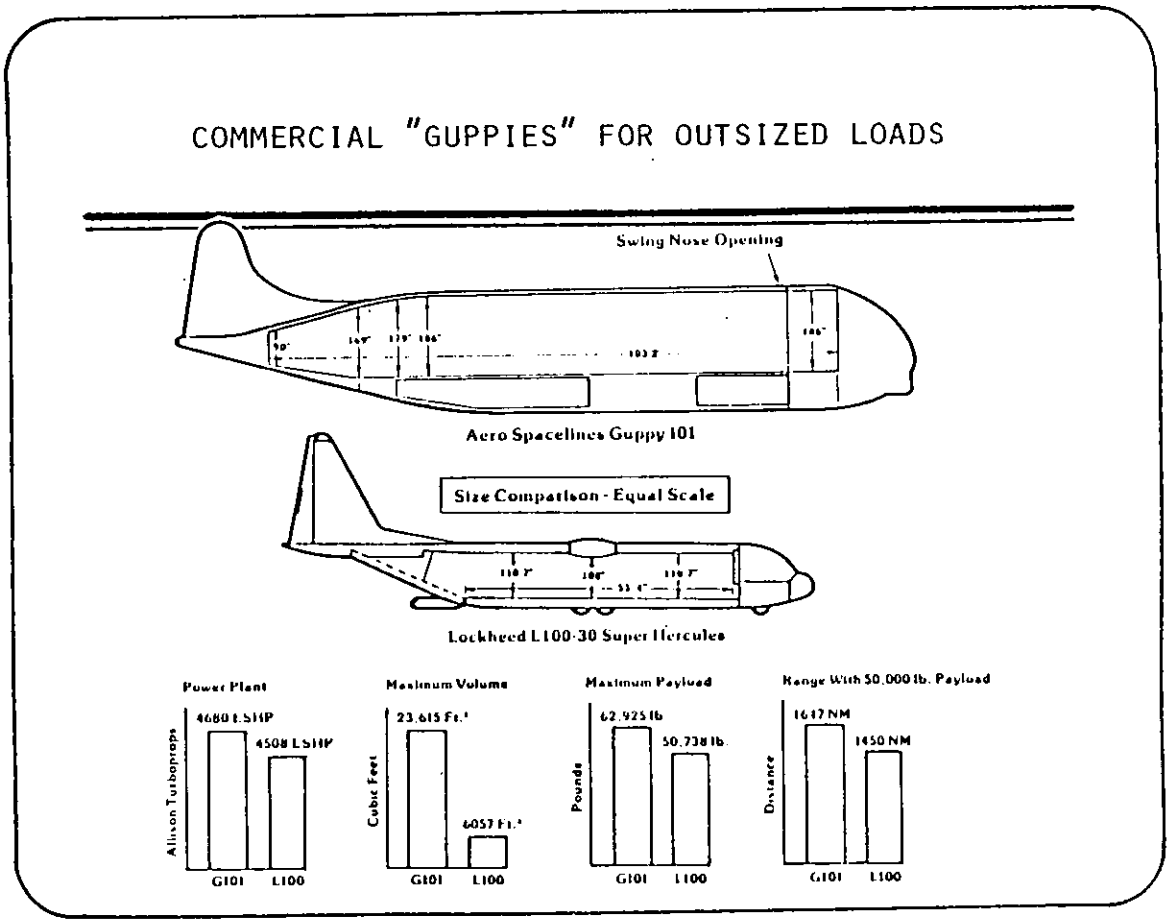
- Need appears to exist
- C-141 stretch & C-5 Wing mod are "naturals"
- For new aircraft, highest lift priority appears to be for Army cargo early combat & mobility that is:
  - -- too complicated to prepo...
  - -- ...and too expensive to prepo...
  - -- ...and oversized or outsized, (i.e., helicopters, C^3I, and maintenance vans)
- C-5B appears to be good, rapid solution
- The C-17 appears to be an unrealistic composite solution to broadly different requirements
- Enhanced CRAF is by far the most cost-effective alternative
- Commercial technology appears adequate

(U) This chart summarizes the task force views on strategic airlift. There are no apparent technological limitations which should prevent RDF forces from attaining their objectives in this regard. Intra-theater airlift is addressed separately.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The task force was briefed by the manufacturers of the oversized "Guppy" aircraft, derived from C-97 airframes, to meet special NASA and commercial shipping requirements. While we doubt that the skies will ever be black with Guppies, it is also abundantly clear that it is practical to modify existing older airframes to meet certain peculiar lift requirements--such as hauling CH-47 helicopters around the world without dismantling them first. Moreover, to the extent that there is a civil demand for this type of machine, then there is little reason why it should be kept in military inventories between emergencies.

(U) At first inspection, there appears to be no basic reason why the same type of fuselage enlargement could not be applied to the Boeing 707s now leaving civil inventories due to age and EPA restrictions. A fleet of 20 such modified aircraft, either kept in the reserves or maintained by some commercial concern, might be exceptionally useful for specialized RDF requirements. They could presumably be made available in a relatively short period of time for a fraction of the development costs of an all-new militarized aircraft.



(U) This chart shows the relative size and performance of the existing "Guppy" aircraft compared to the well-known C-130. This "show & tell" item was intended to demonstrate the practicality of special solutions to special problems at reasonable cost.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) For some of the extreme distances associated with some RDF contingencies, and in view of the uncertainty of intermediate airfield availability, aerial refueling capability appears certain to continue to be needed.

(U) The task force felt that the plan to re-engine the KC-135 and keep the machine in inventory for another few decades appears eminently sensible. Furthermore, the KC-10 derivative of the commercial widebody jet also seems to provide a realistic solution to increasing strategic lift refueling capabilities.

(U) There seems to be no question that the requisite technology is well in hand, and it would further appear that there are several other missions for which the tanker-sized airframe would be very valuable. These are listed on the chart. Some of them might be conveniently pursued after the major airlift requirements have been met--in a given contingency.

(U) It might also be noted in passing that several other countries are beginning to add tankers to their inventories. These are derivatives of either DC-8s or 707s retired from commercial service. Such mod programs might be a low cost alternative for RDF forces too.

MOBILITY: MORE REFUELING CAPABILITY

- Need appears to exist
- KC-135 re-engining appears sensible
- KC-10 appears to be very sensible solution to solve both Air Force & Navy refueling needs
- Alternate missions for tankers appear practical:
  - -- intelligence gathering
  - -- commo relays
  - -- ocean surveillance
  - -- TACAMO
  - -- etc.
- Adequate technology exists

(U) The task force found no technological handicaps in the provision of additional aerial refueling capabilities for RDF airlift purposes. Moreover, there do appear to be opportunities for additional uses for large, long-endurance craft like the KC-10.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) At the request of the task force, the McDonnell Douglas company provided a letter describing the differences in cost associated with converting an existing, in-fleet commercial DC-10 to a CRAF configuration compared with installing the modifications as the aircraft is initially manufactured.

(U) The task force was concerned that there appeared to be too little interest on the part of the military in expanding the size and capabilities of the CRAF in view of the clear cost advantages of this approach. We had been told by some briefers, perhaps inaccurately, that plans for additional CRAF-enhancement funding had been abandoned as "too expensive." This appeared anomalous in view of the quoted costs for a new C-17 program, for which widespread support had been evidenced over the past year.

(U) This chart shows that there are clear cost advantages in including the CRAF-enhancements at the time of aircraft construction. It also shows that the total costs are very low indeed compared to the far higher costs of procuring and owning airlift assets for life.

(U) The task force was unanimous in urging greater use of the CRAF approach wherever practical.

CRAF DC-10 FREIGHTER COSTS

	RETRO-FIT	ON-LINE MOD
CONFIGURATION CHANGES		
Heavy Floor, Loading Door, etc.	$10.2	$ 5.6
AIRLINE REIMBURSEMENT		
16-yr Operating Costs	5.8	5.3
Landing Fees, Tire Wear, etc.	1.7	1.6
Out-of-Service Lost Revenue	4.2	-
$FY82 TOTAL	$21.9 M	$12.5 M

(U) This chart shows the major cost items associated with adding CRAF-enhancements to a commercial DC-10 design. The cost savings of catching the aircraft on the production line rather than subsequently standing it down for rework are evident.

CONFIDENTIAL

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(C) Although not reinforced by the order of these charts, the task force agrees that the backbone of any RDF operations will be fast, modern, sealift--not airlift. We were rather discouraged to find the low priority being accorded by the Navy to the valid sealift requirement. The fact that the Navy has not even been able to fully fund the modifications required for the recently procured SL-7s stood in stark contrast to the budget request for two nuclear aircraft carriers.

(U) There is no absence of available technology in the commercial world--and particularly among foreign countries maintaining competitive merchant marines. The only new U.S. technology, in Surface Effects Ship (SES), seems very unlikely to have any major payoff, except possibly in "repositioning" forward-stored materiel. Such forward prepositioning was considered by the task force to be far more appropriate afloat, and the use of barges in this regard should be carefully explored.

(C) The limited Navy priority on providing sealift appears to extend to a lack of genuine understanding of the need for self-offloading, perhaps offshore, as well as the need to consider survivability both through active defenses and precautionary "spread loading" to minimize losses. Warfighting needs appear to have been afforded low priority.

MOBILITY: MORE SEALIFT

- Need unquestionably exists
- Hi-speed SL-7 mod program is sound but underfunded and overplayed compared to total needs
- More sealift needed, adapting current designs like:

  LASH SEA BEE Stretched C-4 RoRo FloFlo Mini RoRo
- Maritime Prepo should be expanded--including use of barges
- Inadequate attention to:
  - -- total needs
  - -- offloading
  - -- survivability: spread loading, AAW & ASW defensive needs
- Limited priority still evident
- SES technology offers limited use for high speed/short range
- Adequate technology exists in civil sector

(C) The task force was extremely impressed by the variety of civil technologies now being applied to modern sealift--primarily outside the U.S.--and surprised by the lack of priority with which the Navy has approached national sealift needs for MSC.

CONFIDENTIAL

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

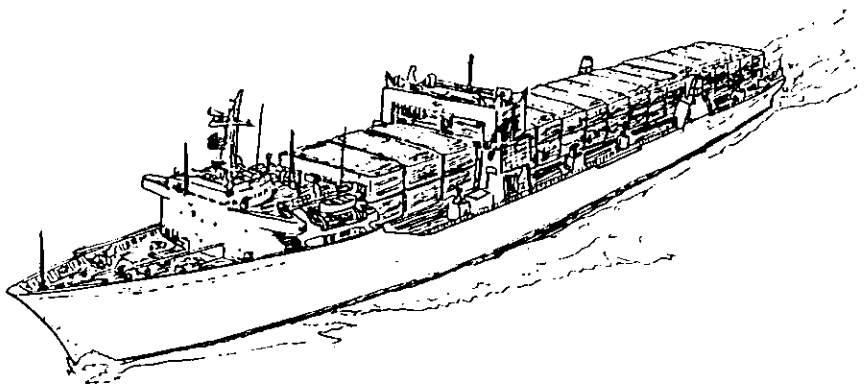
(U) Several different types of new technology ships have come into commercial use over the past two decades. The most common of these, of course, is the containership, which is by far the most common type for the transport of finished goods worldwide. At present, there is somewhat of a glut of these ships, and they could easily be made available for military missions.

(U) One of the most extraordinary new ship classes is the "Lighter Aboard Ship" (LASH) configuration shown here. It is used to transport large barges which can be stacked/unstacked by a giant on-board crane, and dropped into the water off the stern. Tugs and landing craft can be carried like the barges.

(U) Like giant containers, these barges can be used to transport very heavy materiel, and can easily be floated ashore one at a time. The mission of the ship can be specialized by varying the content or configuration of the barges. For instance, one can easily visualize a LASH ship being converted into a tactical pipeline-laying vessel--or an oilfield repair vessel. Using different barges, it could readily become a "kit" for carrying all the major elements of an off-shore causeway for unloading across the beach.

(U) We found little or no indication that the full capabilities of this functional new technology are being exploited for RDF purposes.

MODERN TECHNOLOGY LASH SHIP



(U) This sketch shows one of the new LASH ships capable of carrying up to 89 barges. Each barge is 30' wide, 60' long, and over 11' deep--and can be loaded with up to 500 tons. It has a broad variety of potential military uses, as yet unexplored.

CONFIDENTIAL

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(C) The task force recognized that operational commanders repeatedly point to a shortage of amphibious lift capability, which limits the rate at which Marines can be deployed in any contingency where an opposed entry may be faced.

(U) In fact, however, the task force spent little time exploring the problems of amphibious ships other than being briefed on the new follow-on design to the LHA. This billion-dollar-plus ship certainly testifies to the availability of technology both for the ship itself and for the landing craft it will carry.

(U) This is another case where Navy priorities appear to be too low, but also where the application of technology may possibly be excessive. Several of the smaller coastal shipping designs briefed to us by the Maritime Administration would indicate that there are less sophisticated alternatives to getting equipment and supplies across an undeveloped beach. The smaller coastal roll-on/roll-off designs (Mini RoRos), and the more specialized float-on/float-off barge carriers (FloFlos) are two cases in point.

(U) The task force saw no technological limits to enhancing U.S. amphibious capabilities--only a lack of interest.

MOBILITY: MORE AMPHIBIOUS LIFT

- Need certainly exists
- Priority too low in Navy
- Possible Adaptation of Mini RoRos?
- Technology exists

(C) The task force spent little time exploring technological limits on amphibious shipping. There are none. We were however, depressed by the lack of priority afforded to this mission, and to the application of interesting new civil technologies.

CONFIDENTIAL

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The generally stated need for lighter, and less bulky equipment is certainly a noble objective with which the task force would readily sympathize. It is by no means clear, however, that new technology is the answer. In fact, it would appear that the older technologies provide the lighter equipment, based on the "technological bloat" discussed earlier. In a more serious vein, however, there is a real question as to whether some of the older equipments might not be better suited to RDF needs from the standpoint of both mobility and maintainability.

(U) More generally, however, the majority of the task force was not convinced that the Army has taken its own mobility requirements seriously. There seem to be abundant opportunities to tailor existing forces and their TOE to enhance mobility. Replacing unarmed LOH helicopters with armed LOHs provides a striking immediate increase in early deployed firepower, for instance. Moreover, there is a big difference between assuring that a machine can barely be fit into an aircraft, and striving for maximum airliftability--or sealiftability, for that matter.

(U) There is no shortage of existing technology to enhance equipment transportability. The experiments of the 9th Infantry Division should demonstrate this.

MOBILITY: LIGHTER, LESS BULKY EQUIPMENT

- Need certainly exists
- Most trends in opposite direction:

  Technology bloat ≅ 4%/per year
- Army has not emphasized mobility requirements
- Army only beginning to tailor forces for mobility

  "Fulda Gap mentality" is dominant
- Many opportunities to change TOE mix seem to exist:
  - -- substitute armed for unarmed scout helicopters
  - -- trade 105's for more capable 155's
  - -- trade smaller trucks for fewer larger ones
  - -- etc.
- Technology exists--9th InfDiv focus may help apply it

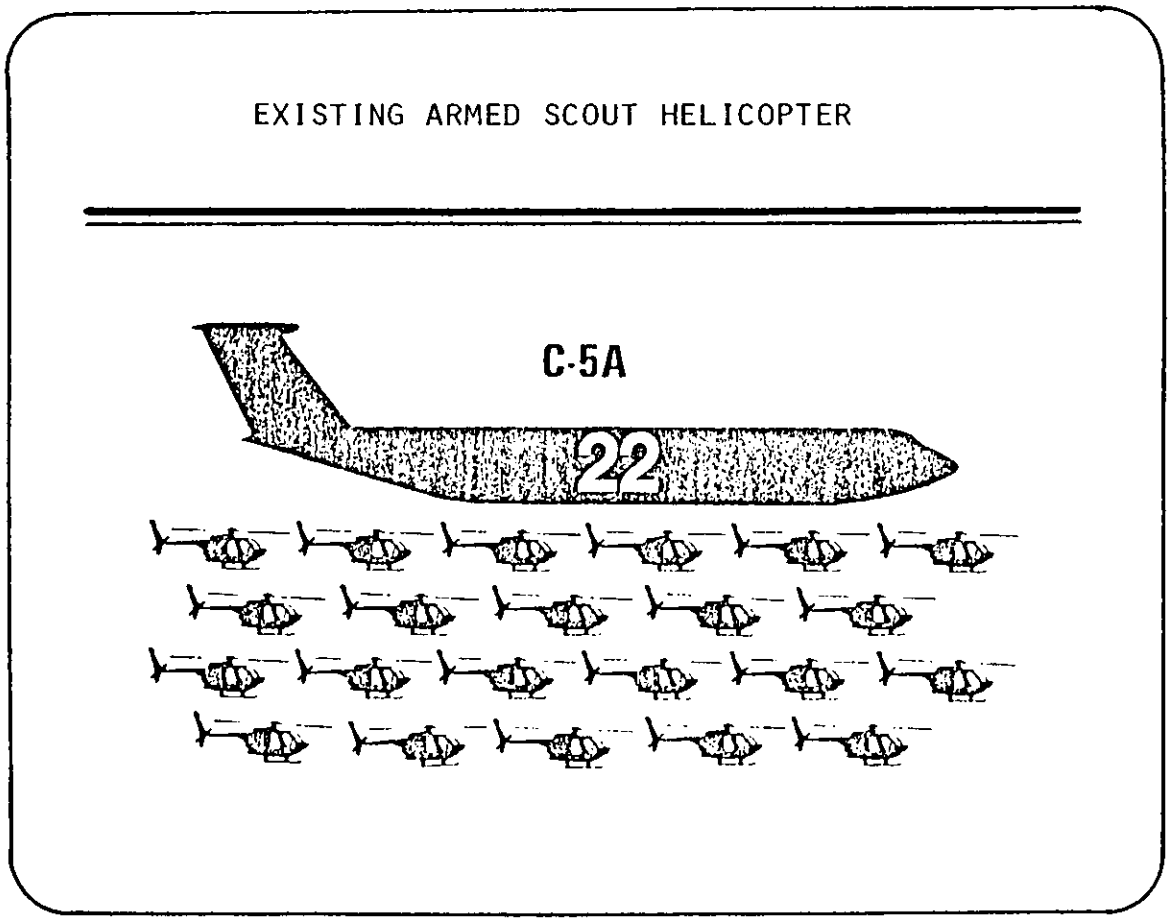
(U) The development of lighter and less bulky equipment seemed to the task force to depend less on the application of new technology than on re-configuring forces and equipment to meet the limits imposed by scarce lift assets.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The task force explored several avenues for increasing early deployable, mobile, firepower. The model 500MD, a derivative of the OH-6, already in operational inventories in at least three foreign countries with applicable environments (Korea, Israel, and Kenya), is particularly amenable to airlift, as shown on the attached chart.

(U) For moderate threat environments, where there is an extremely high premium on early combat power and high mobility to interdict an advancing enemy force, the acceptance of weapons such as this would appear to be inevitable. Whether they are more effective than the Army's current two generations of armed helicopters is not really the point: the question is whether they would be more effective than unarmed scout helicopters which now abound in both of the light Army divisions programmed for immediate deployment with RDF forces.

(U) As in the case of other "show & tell" items reviewed by the task force, the DSB in no way considers that it has the expertise to recommend specific acquisition decisions to the military departments. We only wish to use these examples to demonstrate that much of the needed technology is already "on the shelf" and available for application.



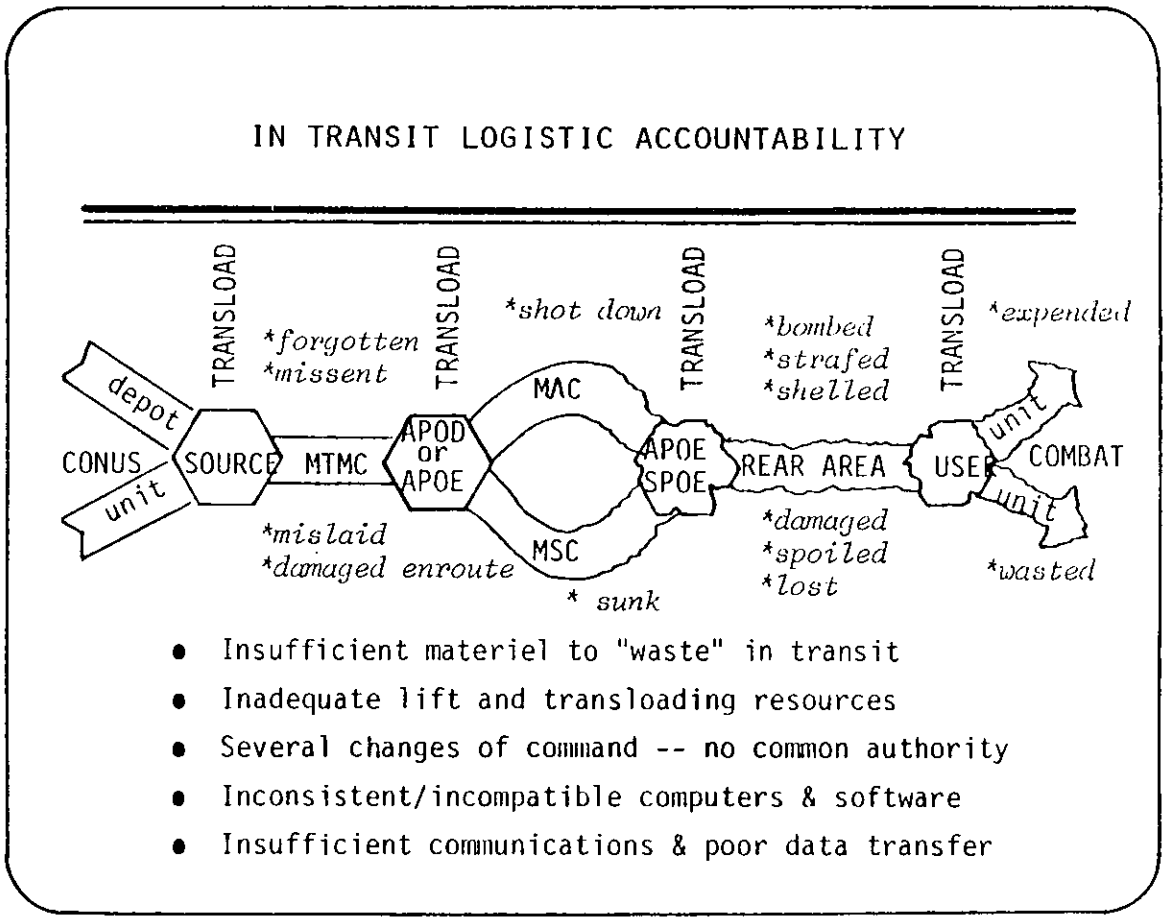
(U) The Model 500MD helicopter was briefed to the task force as an example of existing technology (already used abroad) which could well be used to enhance early-deploying RDF firepower because of its easy air transportability.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The logistic "accountability" associated with shipping vast quantities of materiel rapidly was one problem area where we failed to accomplish our objectives. This chart is intended to show the scope of the problems.

(U) The RDF problem is accentuated by the convergence of at least five different difficulties. First, there isn't much to send, and the right things must get to the right place in the right order. Second, there are shortages in shipping assets, and in "transloading" (including "ship-to-shore" and "shore-to-war"). The system must not become clogged with low priority items. Third, the material changes hands (and commands) several times. Fourth, there is no commonality in computers or software for "tracking" the materiel sent--or lost. Finally, there is a shortage of communications, and no developed mechanism for automated data transfer. Extraneous dialogue concerning logistics probably will not be tolerated.

(U) These considerations combine to suggest the need to be able to provide high-grade accountability of equipment "in the pipeline." These are not basically technological problems, but we do not see the efforts under way, nor the mechanisms in place to assure their satisfaction. As with so many other RDF issues, there is a large cross-Service element involved here.



(U) The matter of "accountability" in shipping what is needed, only what is needed, and when it is needed, is a valid RDF concern. The task force did not address it in detail. This chart indicates the scope of the problems. The technology exists to solve them.

CONFIDENTIAL

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The matter of "transloadability," and bridging the artificial interfaces between "wholesale" and "retail" delivery in areas lacking a developed transportation infrastructure, represents one of the most obvious and pressing RDF problems brought before this task force.

(U) It should be self-evident that RDF forces will have to be able to plunge ashore without available developed ports. The task force was surprised to find how little emphasis is being placed on this relatively plebeian subject, despite the ready availability of modern civil "offshore rig technology."

(U) The Army appears bent on only developing ports, while the Navy and Marines appear unwilling to accept responsibility beyond the portable needs of a relatively small expeditionary Marine force. The development agencies of both Services have suffered low priorities for a long time. They are unaccustomed to addressing major systems problems--and opportunities--presented by the need to bring several divisions across the beach in the early weeks of an operation half a world away. They are very knowledgeable about the problems involved, but have little expectation of being encouraged to provide near-term operational solutions. Exciting ship and equipment technologies exist, waiting to be applied.

MOBILITY: IMPROVED "TRANSLOADABILITY"

- Essential to eliminate dependence on developed ports
- Developed across-the-beach components not being bought in sufficient quantities
- Navy buying some components for Marines--none for Army
- Army stressing port upgrades--not UE-across-the-beach
- Army addressing resupply handling for the '90s:
  - -- avoid the beach with big amphibians and air cushion vehicles
  - -- only 50% containerized resupply
- No systems approach to getting components to the site
- Marine components must be reusable--cannot fill Army needs
- Technology exists: systems approach missing

(C) The matter of getting UE equipment and resupply across undeveloped shores is a serious problem receiving inadequate attention even though civil and military technology exist in abundance. A major cross-Service effort is probably warranted.

CONFIDENTIAL

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The lack of emphasis within Defense on in-theater transport struck the task force as rather odd, in view of the higher apparent interest on strategic lift. Several briefers indicated that "uncertainty in requirements" were impeding Service progress towards enhancing--or at least modernizing--existing intra-theater air- and ground lift.

(U) The task force was unable to discern why the intra-theater lift requirements were any less certain than the inter-theater needs. Again, much of these lift assets would benefit forces other than those of the acquirer, and in this regard, priorities appear to suffer.

(U) Both fixed and rotary wing airlift assets are aging and in need of modernization, even if total ultimate requirements cannot yet be "proven." We were unable to ascertain why the Air Force has not proposed a more practical modernization program. As mentioned previously, we were not enthusiastic about the C-17 program. Some Army programs appear to be no more robust: the CH-47 upgrade program is strung out over a decade, with no equivalent program for the CH-54. In addition, truck, tactical pipe for POL delivery, and roadway maintenance capabilities all appear slated for very gradual improvements. There are no evident technological barriers here.

MOBILITY: IMPROVED "RETAIL DELIVERY"

- Uncertainty in "requirements" for intra-theater lift and movement appears questionable
- Aging tac airlift assets must be modernized
- C-17 in retail delivery mode is not convincing
- Too little emphasis on:
  - -- helo airlift
  - -- total truck needs
  - -- tactical pipe assets
  - -- roadway maintenance/stabilization
- Army program to upgrade CH-47 appears sound but very protracted: no equivalent for CH-54;

(U) There is no shortage of technology to upgrade U.S. intra-theater capabilities. There does seem to be a lack of priority inhibiting a more rapid modernization of existing Service assets.

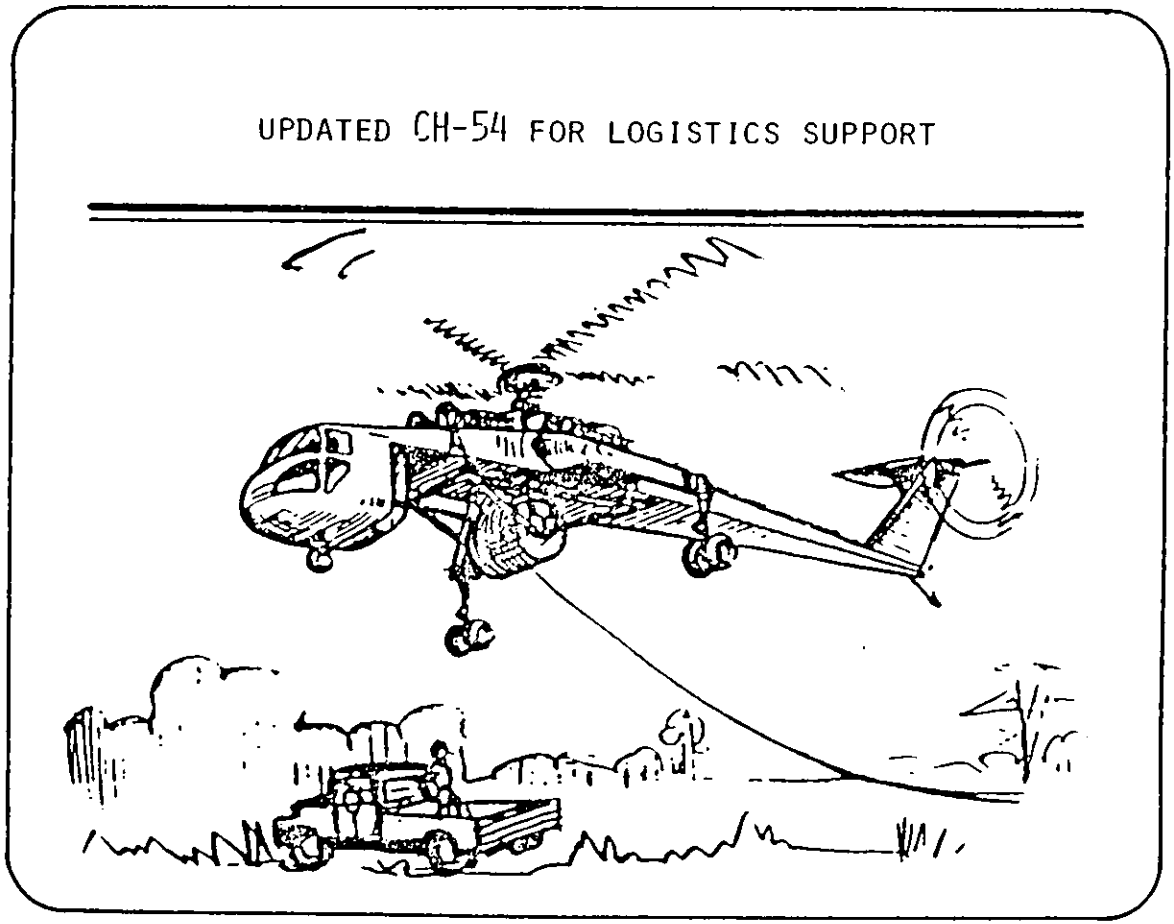
DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) As a matter of curiosity, the task force sought to determine what the manufacturer of the CH-54 "Flying Crane" considered to be the opportunities to upgrade that helicopter, so familiar to Vietnam veterans.

(U) The resulting notional presentation indicated that an upgrade would be possible that should extend the life of the CH-54 perhaps to the end of this century. One commercial model of the flying crane has already been used on civil projects (including ship unloading) on the Arabian Penninsula.

(U) Several other specialized missions also come to mind to which the CH-54 might be adapted--with no particular loss to other military missions. Among these is the laying of tactical hose or pipe to provide needed fuel in the forward areas. Another might be to convert some of the 70-odd available helicopters to minesweeping to augment our very slim national mine-countermeasures capabilities.

(U) While the task force is in no position to evaluate the CH-54 per se, it does appear to represent another mature, existing capability that could well be tailored to "another life" of special application to RDF forces. It is not an inconsequential capability, even though it is not at the leading edge of modern technology.



(U) The CH-54 is currently assigned to the Army National Guard with only modest modernization plans ahead. The task force suggests it might find some valuable specialized mission applications with the RDF forces before it is retired from the inventory.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) Intra-theater ground transport by truck and pipe also appears to lack high priority. There seem to be no technological impediments to bringing U.S. military truck capabilities up to civil standards, or bringing our pipe-laying capabilities up to Soviet standards.

(U) In both cases, our briefings primarily indicated that the sense of urgency is not prevalent, and that a full understanding of RDF-peculiar needs has not yet developed. Having found that trucks represent over half the tonnage of an RDF movement, while POL accounts for more than half of total resupply requirements, we felt obligated to explore the extent to which these "drivers" were benefiting from a place in the sun.

(U) The Army's truck program is clearly driven by requirements pre-dating the U.S. interest in RDF. The Army pipe program, on the other hand, does partially reflect increased RDF attention--but not much funding, and an unfortunate tendency to seek technology different from that available--and used--in the civil sector. The only briefer of this task force that mentioned robotics was the fellow responsible for upgrading tactical pipe-laying capabilities. It would appear a dubious first military application of this brand new technology.

MOBILITY: IMPROVED "RETAIL DELIVERY" (CONT)

- Army truck modernization program appears long overdue: good emphasis on commercial designs, but little on:
  - -- constraining weight or tailoring TOE
  - -- minimizing dimensions for air shipment
  - -- detail design for dead storage (prepo afloat/ashore)
  - -- detail design for RDF environment
- Army tactical pipe program appears marginal:
  - -- pipe laying technology behind the Soviets'
  - -- making off-shore terminals airliftable vice prepo
  - -- can't bring POL from more than 2 mi offshore
  - -- hope to double unit pipe-laying speed to 15-18 mpd
  - -- avoid use of available commercial storage bladders
  - -- will only have 1200 mi of pipe by '87
  - -- but planning to double POL truck companies by '87
- Commercial technology almost certainly ahead of military

(C) There are substantial needs to further upgrade ground vehicle and pipe-laying assets for the RDF. Neither area appears bound by technological limits, and neither currently seems to take advantage of current civil technologies.

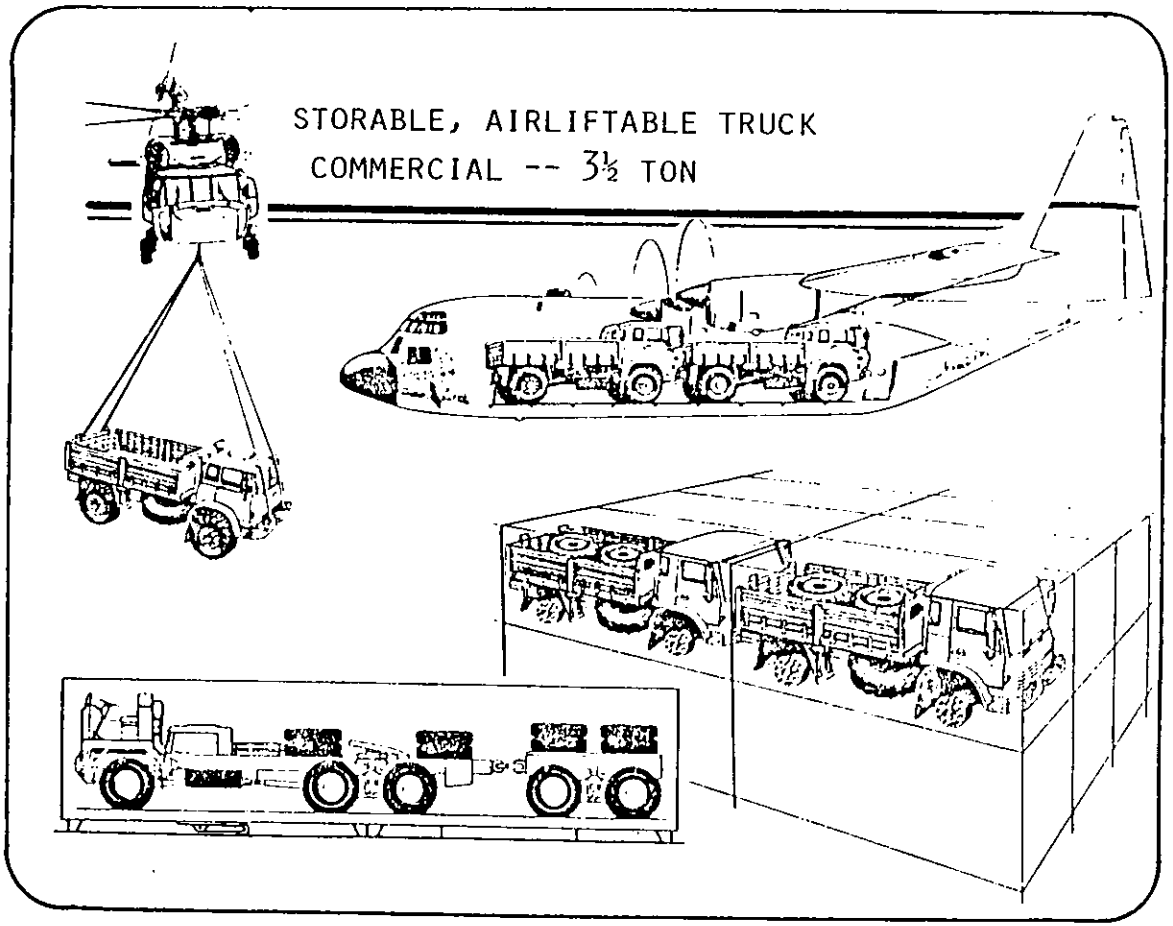
DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The truck division of General Motors responded to a request from the task force to show us the latest in commercial trucks, with emphasis on transportability, "prepo-ability," and reliable operation in a desert sand environment. The result was a briefing on a GM truck currently made in England and sold to Saudi Arabia, among others.

(U) It is a cab-over-engine design which improves packing density. It can be stored for long periods in a standard container. As a matter of fact, a larger version uses its own trailer body as its storage container. The design is both lighter and carries more than the current Army "deuce-and-a-half" which has been around for more than a generation. This particular design also happens to exceed Army nuclear/biological warfare (NBW) standards. Moreover, it appears suited to being lifted by relatively small helicopters.

(U) This is another outstanding example of a real RDF problem area for which the solution is commercially available. While we cannot vouch for this particular design, we were most certainly favorably impressed by the on-target responsiveness of the concept already being applied commercially.

(U) This may be one of the only means to achieve a 25% weight reduction in 57% of the Army's RDF U.E.!



(U) This "show & tell" item depicts a commercially available 3½ ton truck which is 27% lighter than the current Army 2½-ton payload truck and is suitable for helo airlift and sustained storage in containers. It is today's technology.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) Possibly the only other area in which it might be possible to make very substantial gross weight savings is in the area of packaging. Even without weight savings, mechanisms which improve capabilities to move, handle, store, and transload materiel are of real value to the RDF.

(U) The commercial world moves in containers. There is a glut of high speed container ships. There are hundreds of thousands of available containers around the world. OSD is establishing military container standards, but there is little evident emphasis on requiring that anything fit in them. We are, in fact, "uncontainerizing" the SL-7 ships to make them more useful to Defense cargos.

(U) The Marines have developed an excellent container family suitable for subdivision for retail delivery, but it has not been accepted by the Army. The two services cannot even agree to standardize shelters.

(U) Most exciting are the apparent opportunities to reduce the weight of the packaging which adds 40-100% to the shipping weight of Army ammunition. The technology is currently being applied to "optimize" packages for CONUS boxcar shipment, which are incompatible with international container standards.

MOBILITY: IMPROVED PACKAGING

- DoD pressing greater container standardization to match commercial progress, port and handling gear
  - *-- but no requirement to fit equipment into them*
- Forced to "uncontainerize" ship to accept DoD loads: flat racks, sea sheds, etc.
- Marine FLS modular container program well thought out even though requiring some dedicated assets
  - *-- USA/USMC shelters not standardized after 2-yr effort*
- Packaging adds 40-100% to ammo weight; but Army favoring:
  - -- peacetime CONUS rail shipment demands
  - -- boxcar and NATO metric standards vice containers
  - -- convenience of shipper vice combat user
- Commercial and military technology exists--discipline to focus on warfighting requirements does not:
  - *-- insufficient management attention*

(U) The commercial world is far ahead of the military in the use of standardized containers and advanced low-weight packaging. Roughly half the weight of Army ammunition is in its packaging. Substantial reductions may be possible.

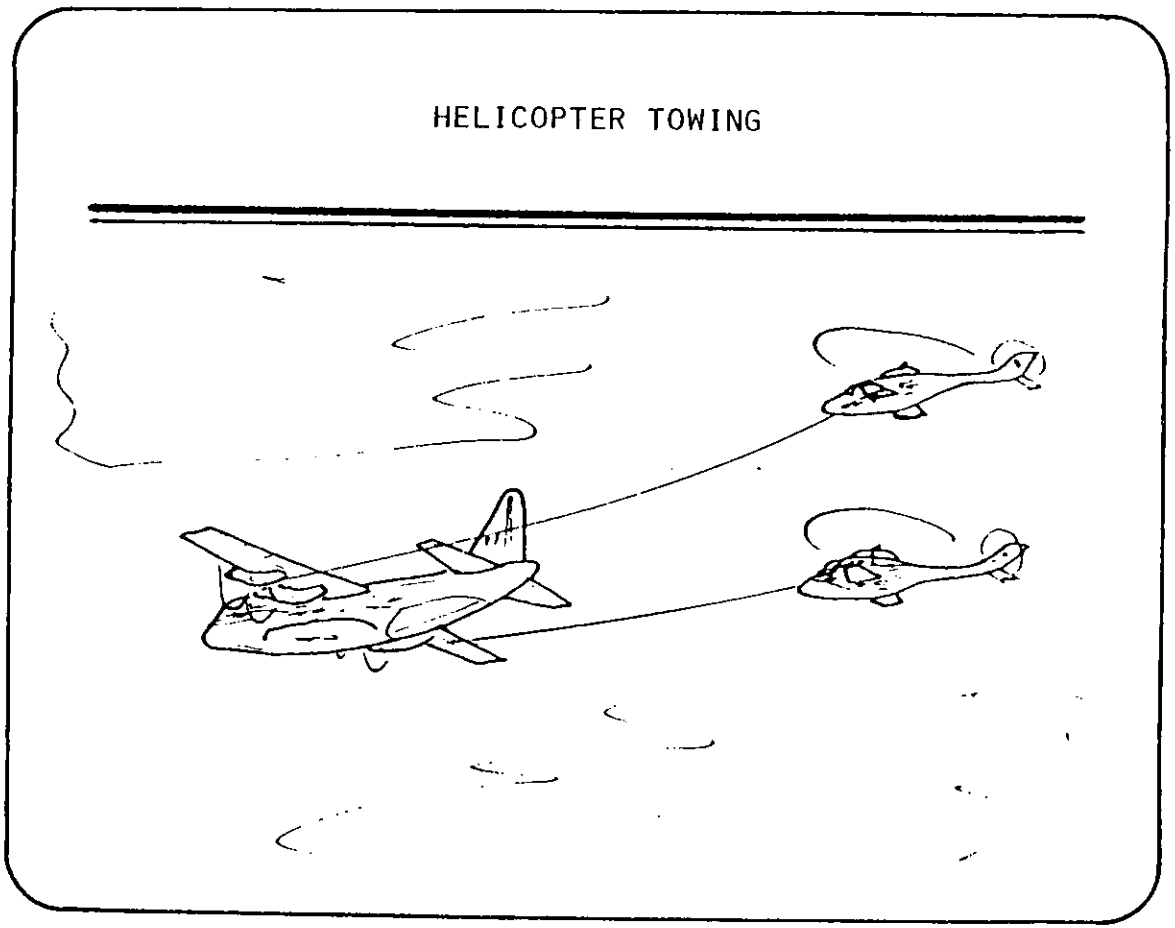
DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) Some very important RDF early-delivery items do not lend themselves to tight or efficient packaging for transportation. Yet they are essential to the conduct of high-mobility interdiction and resupply operations of stop-gap forces. The most worrisome article among these is helicopters.

(U) At the request of the task force, the Army briefed us on some rudimentary experiments that had been conducted to tow helicopters behind fixed-wing aircraft. Additional studies using the C-130 as a tow aircraft had been subsequently conducted with an eye towards certain special operations.

(U) There is no fundamental reason why a modern helicopter could not be towed in some sort of autorotation mode for considerable distances. Quite possibly the ease and practicality of such operations could be improved by the development of suitable engagement/disengagement hardware, and through the addition of some sort of stabilizing autopilot to lower the burden on the pilot.

(U) One can envision this technique being used for both inter- and intra-theater mobility, as an alternative to partially disassembling the machine for air transport. One can also envision this technique as a means of stretching the range of combat loaded, armed or troop helicopters involved in high-mobility tactical operations.



(U) This simplistic chart is intended to suggest the ability of fixed wing transport aircraft to tow helicopters for extended ranges on either combat or administrative deployment missions. The technology is thought to be available but unexploited.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The task force was asked to look for long-term technological opportunities that would be useful to RDF forces. In the mobility field, the most important benefits might well result from major improvements in the weight effectiveness of explosive and propellants, since these constitute a major portion of the resupply requirement.

(U) Based on briefings from the technology communities in DDR&E and the Army, there do not appear to be any substantial "breakthroughs" in the offing. There may be some reductions in the sensitivity of both propellants and explosives, but this will improve survivability more than it will reduce weight.

(U) There is some possibility that stronger explosives and propellants with some structural capabilities could reduce weight. The same would be true for caseless ammunition. Neither option appears imminent. There are also some interesting developments under way in "traveling charges" which should increase muzzle velocities, but not reduce weight much.

(C) We were also briefed on the electromagnetic gun programs. We concluded that this development had a long way to go, and would be unlikely to be applied to RDF needs first. In short, we found no promising avenues for important progress for RDF forces in improved explosives or propellants to benefit RDF forces.

MOBILITY: IMPROVED ENERGY EFFICIENCIES

EXPLOSIVES & PROPELLANTS

- Low vulnerability propellants and insensitive explosives may improve survivability of tanks, dumps, etc.
- Structural explosives could permit thinner walled projectiles and warheads
- Caseless ammo could reduce small caliber weights by 50%
  - -- *if Germans solve practical problems of vulnerability, moisture, etc.*
- Traveling charges could increase muzzle velocities
- Electromagnetic gun requires far more development
- Technology not RDF-unique
  - -- *substantial near-term progress unlikely*

(U) This chart shows the major task force conclusions in the fields of improved explosives and propellants. Although there is some interesting work under way, none offers high promise of easing RDF mobility problems in the foreseeable future.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) Higher energy fuels, or significantly improved engine fuel consumption could make RDF forces much easier to deploy and sustain. Based on the briefings received from OSD and the Army, no big improvements are foreseen. This chart indicates how the fuel is consumed by operational Army units. Power plants for helicopters, vehicles, and generators appear to be becoming more fuel efficient at the rate of somewhere between 1% and 2% annually.

(U) The hitch, of course, is that earlier analysis indicates military equipments are becoming larger and heavier at a rate of about 4% per year. The net result, borne out by statistics, is that military equipments are becoming more fuel-consuming rather than less. Certainly, new machines such as the M-1 tank or the AH-64 helicopter would confirm this trend.

(U) It does not appear practical to use additives to increase the energy content of fuels. However, the most important avenue for the Army may be to improve the fuel tolerance of its engines so they can use a broader variety of fossil-based fuels. Many army engines have a very low tolerance and apparently will not even run satisfactorily on 10% gasahol.

(U) No technological breakthroughs, nor the wider use of solar power, appear likely to benefit RDF forces.

MOBILITY: IMPROVED ENERGY EFFICIENCIES

FUELS & FUEL CONSUMPTION

• Primary Army fuel consumers:	53% wheels & tracks	45% diesel
	28% aircraft	30% jet fuel
	16% power generation	24% mogas

- Engine SFCs improving 1-2% per year at best
  - -- *not matching 4% technological bloat*
- More practical to adapt engines for wider range of fuels: synthetics, coal shale, heavy crude, etc.
  - -- *current Army engines won't run on 10% gasahol*
- Unlikely to improve energy content of fuels very much
- Solar power limited by weight of accompanying batteries
- Technological breakthroughs not predicted:
  - -- *focus on: limiting growth*
    broadening fuel tolerances
    old engine retrofits

(U) This chart summarizes the task force's exploration of new fuels and more efficient propulsion units. The "bottom line" is that the Army should concentrate on constraining weight growth, broadening fuel tolerance, and replacing less efficient engines.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) Issues surrounding survivability of RDF forces in transit were a source of some frustration to the task force. While the operational commands and the shippers evidenced concern, some Navy briefers appeared relatively indifferent to the problems.

(S) There appear to be practical alternatives in defending merchant ships against a modest Third World air threat without involving scarce naval escorts, but virtually no means of avoiding a lurking diesel submarine. Our ASW review was far from exhaustive, but we strongly believe this area deserves more serious consideration. Task force members were exposed to at least two development programs (ocean environment calibrator, and shallow water weapon) which are firmly supported by at least one CINC, but are not currently being implemented. Higher priority on RDF sealift defense is certainly warranted.

(S) Similarly, port defense and mine-sweeping appear to be other areas where there is a Service tendency to ignore the potential problems. There are no new near-term technologies to be applied, but we saw no shortage of available techniques to solve these problems--only a lack of assets and a lack of interest in tailoring special assets to meet them.

(U) In the absence of better defenses, the RDJTF would do well to insist on spread loading and redundant shipping.

SURVIVABILITY IN TRANSIT

- Sealane threats exist from Soviets, their clients, and Third World forces:
  - * AAW & ASW LOC defense:
    - -- may be able to arm merchantmen for close-in AAW
    - -- modular self-contained ASW packages less practical
    - -- torpedo countermeasures not promising
    - -- may need P-3 or frigate escort
  - * Port defense:
    - -- no new technology appears imminent
    - -- see Force Effectiveness--Air Defense
  - * Mine-sweeping:
    - -- no new near-term technologies apparent
    - -- more assets probably needed
- *AVOID SHIPPING SCARCE EGGS IN TOO FEW BASKETS*

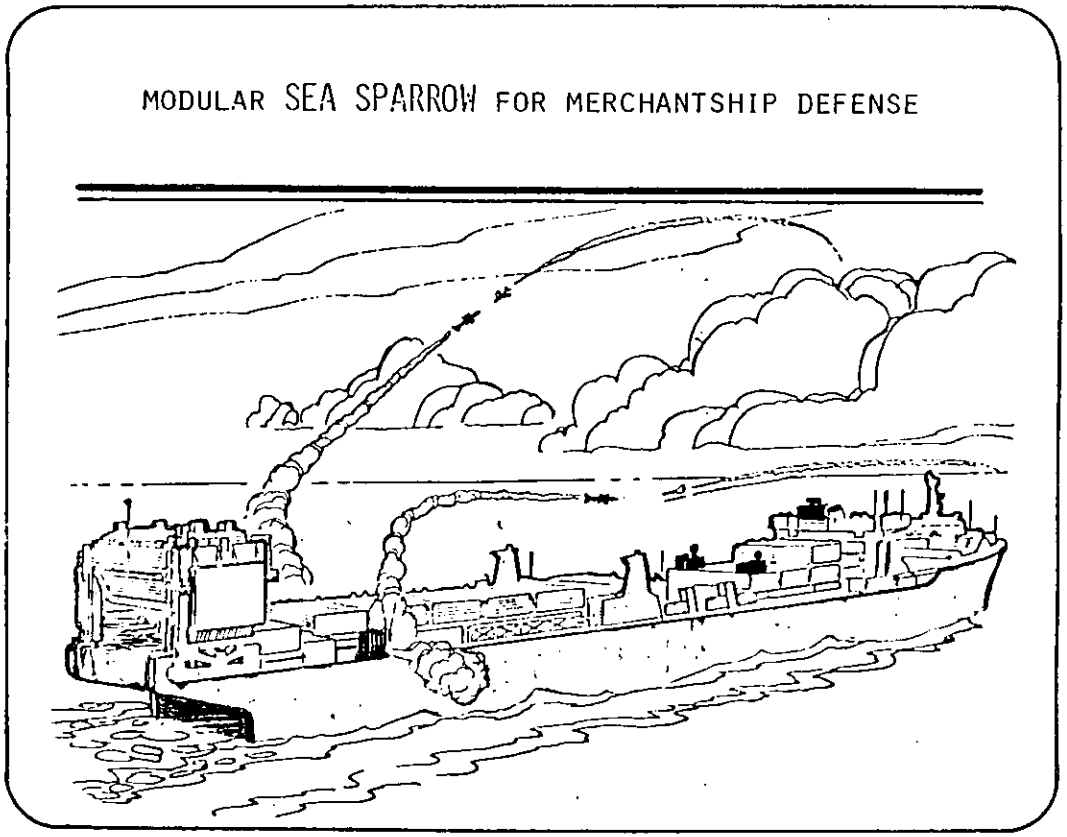
(U) The task force looked briefly at the problems of transit vulnerability, and concluded that a real threat exists at and below the level of Soviet interposition. We concluded that shippers should avoid putting all their eggs in one basket for "economy of scale."

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The task force sought to explore means for merchantship self defense. One concept looked at whether the NATO SEA-SPARROW system could be modularized and placed aboard merchantships such as the LASH vessel shown on this chart. All air defense elements would be self-contained and operable independent of ship's power or personnel. The intent would be to provide some vestigial defense against aircraft or cruise missile attack. This is the same air defense missile system that is currently aboard most of the Navy's major fleet resupply ships--for the same purpose.

(U) Some members of the task force had hoped to find an equivalent set of modular equipments which would provide some defense against marauding submarines. Third World countries might elect--or be encouraged--to harrass an American RDF. We were more than a little disappointed by the apparent lack of initiatives indicated in Navy R&D circles. The notions of towing TACTASS, or containerizing ASROC, or even putting LAMPS helicopters on commercial ships, were discouraged or dismissed. No more worthy alternatives were put forward by the Navy, however.

(C) We feel that we have inadequately addressed the overall problem of RDF vulnerability in transit. The Navy or its advisory panels should be encouraged to undertake a serious study along these lines.



(C) This chart shows an artist's concept of a merchant ship defending itself against air attack with modularized NATO SEA-SPARROW units similar to those on Navy resupply vessels. The task force was not satisfied with its review of RDF vulnerabilities in transit.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The task force next turned its attention to technological opportunities for increasing RDF force effectiveness, concentrating on those aspects which could enhance the ability of light stop-gap forces to slow the enemy's initial rate of advance.

(U) In the realm of armor and armor penetrators, we judge that progress is certain to be made in both areas, and at about the same rate, leaving the same kind of standoff as exists today. New kinetic energy rounds and shaped charges are on the way, and so is better armor to defeat them. Primary armored combatants are virtually certain to continue to grow in size and cost, although some of the new lighter weight armors do now offer the possibility of lightly protecting shelters and vans against fragments and small arms fire--at the cost of increased weight, of course.

(C) There are no major new systems expected to be fielded in quantity during this decade that will provide substantial new anti-armor capabilities. Among those further down the road, however, are those that attack armored vehicles from either the top or the bottom, where the armor is less heavy. These developments could result in a substantial problem for tanks, APCs, and self-propelled artillery which cannot afford to put frontal-weight armor all over their vehicles. In this respect, technology may favor anti-armor forces during the 1990s.

FORCE EFFECTIVENESS--MUNITIONS

LIGHTER "STOP-GAP" ANTI-ARMOR FORCES

- Penetrator technology expected to continue to improve
  - -- *kinetic energy and shaped charge*
- Missile/submunition attacks from atop becoming practical
- New rocket-launched and air-dropped guided submunitions and smart mines not expected in this decade
- At best, armor improvements may hope to match penetrators
- Lighter tanks unlikely against growing threat
  - -- *technological bloat will continue*
- But new armor technology may increase the use of:
  - -- lighter armored vehicles in other roles
  - -- shelters & vans hardened against small arms/fragments
  - -- *thereby increasing total unit weight*

(U) This is the first of a series of charts on technological opportunities to enhance stop-gap force effectiveness. It suggests that improvements will be made both in armor and penetrators, but that the major advance may result from attacking from above or below.

CONFIDENTIAL

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) One of the few areas in which technology is apparently being focused on RDF problems is in the area of new lightly armored vehicles, for deployment--and tactical mobility--by air. This seems to be a valid requirement, if the lightweight is not oversold.

(C) The task force is concerned that these vehicle requirements are being driven primarily by helo transportability requirements, and by a preference for wheels over tracks, rather than by the threat these vehicles will face. While both DARPA and Army studies have indicated that a near 20-ton vehicle is required to defeat the common 12.7 mm threat, the joint Marine/Army Light Armored Vehicle (LAV) program is pursuing a lighter vehicle that can be lifted by CH-53E. At 14 tons, it will provide only limited protection--even with the newest armor. The task force felt that one alternative should involve further product improvements of the M-113 APC--which is not considered a contender.

(U) The task force also learned that the weight of the M-1 will grow substantially in its next version, requiring all new rail and road transporters, and further decreasing its RDF utility. There would seem to be a growing question whether equipment designed for armor-intensive combat in NATO is suitable for RDF operations.

FORCE EFFECTIVENESS--VEHICLES

LIGHTER "STOP-GAP" ANTI-ARMOR FORCES

- Need exists if prepositioning is not acceptable
- DARPA ACVT program indicated ~ 20-ton vehicle weight needed to survive pervasive 12.7 mm rapid-fire threat
- Quick-reaction Marine/Army LAV program based on product improving existing designs is commendable, although:
  - -- *will not provide a real assault vehicle*
  - -- *survivability compromised to get wheels and meet CH-53E 14-ton lift limit*
  - -- *exclusion of M-113 seems very unfortunate*
- M1E1 will continue trend towards heavier tanks
  - -- *requiring all-new road and rail transporters*

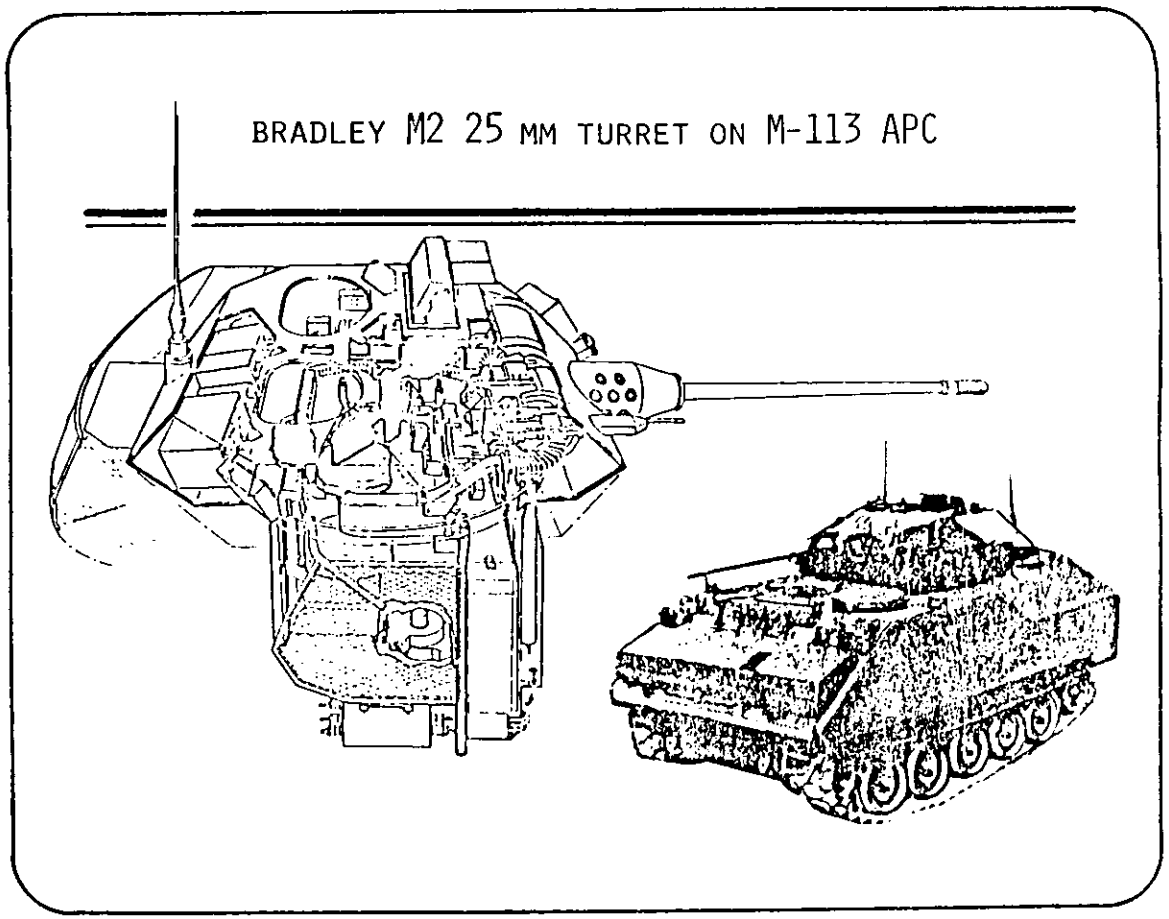
(U) This chart indicates some of the progress being made in lightly armored vehicles. The task force is worried that the interest in new lightly armored vehicles is driven not by the threat but by helo transportability as an end in itself.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The task force became concerned that derivatives of the standard M-113 APC are no longer being considered in the Army/Marine competition for a light armored vehicle. It is not even a standard of comparison in the runoff tests.

(U) The basic objective of the LAV program--to field rapidly a new capability by combining elements of existing systems with minimal RDT&E time and cost --is certainly worthwhile. The DSB has no intent to interfere in this acquisition program. Nonetheless, we did elect to ask FMC if they had any candidate derivatives of the ubiquitous M-113, which has been used so extensively around the world for so long. The result was a briefing showing an M-113 modified to take, without major changes, the 25 mm turret from the new M-2/3 Bradley fighting vehicle. This design appears to offer another alternative to those already being evaluated. All the candidate designs are well under the 14-ton limit. In fact, it may be that this version of the M-113 could take additional new armor and still meet the weight limits.

(U) As mentioned previously, there may be some inherent advantages in seeking product improvements of more mature designs to satisfy near-term RDF requirements. They frequently offer lighter weight, as well as a better known maintenance and sustainability record. More detailed analysis appears warranted.



(U) This graphic is derived from a contractor presentation on a further upgrade of the Army's M-113 APC, with the Bradley's 25 mm turret added. It appears to offer one attractive option for RDF forces, with only minor deviation from current TOE equipment.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The RDF could clearly benefit from the use of more capable battlefield sensors, particularly those that would allow better stand-off in-depth observation of the expected enemy advances.

(U) The development of the PAVE MOVER stand-off motion detection radar has great appeal if it allows unambiguous indication of enemy routes of advance. These routes may be quite restricted in relatively undeveloped countries with poor transportation infrastructures--or inhospitable terrain. The main limitation on these standoff radars may be their susceptibility to spoofing.

(C) Our task force briefings also indicate that we can look forward to substantially more capable long-range infrared (IR) imagery, and some new seekers using mosaic focal plane arrays to better discriminate individual targets.

(U) There also appears to be an opportunity to improve deployed radar capabilities by netting them together through new technology. This could be particularly valuable for "thin" early-deployed anti-aircraft units.

(U) We noted the potential of the Global Positioning System (GPS) in the long term, but were surprised to find no plans for an interim theater navigation system such as LORAN C/D from Vietnam days.

FORCE EFFECTIVENESS--SENSORS

LIGHTER "STOP-GAP" ANTI-ARMOR FORCES

- PAVE MOVER standoff radar should provide excellent warning and aircraft or weapon guidance
  -- *if not decoyed!*
- IR imaging may provide target recognition out to 20-30 km
- Mosaic focal plane arrays may provide improved seekers
  -- *development will allow use in top-attack of tanks*
- Netted radars could substantially improve light force C^3I
- GPS could provide excellent navigation capability eventually
  -- *No plans for interim deployable LORAN C/D*

(C) There appear to be some new sensor technologies on the way which will add to RDF force effectiveness, as well as a valuable new theaterwide navigation system. These technologies still appear to be at least several years away, if not longer.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) In all likelihood, the first combat forces to go into action in an RDF contingency would be self-deploying tactical air forces used in an interdiction role. Because of the longer distances involved in many potential conflict areas outside NATO, longer-range tacair will also be highly desirable.

(U) We could not discern any high-priority programs specifically tailored for RDF operations. There are several new anti-armor programs in development, but not specifically for the non-NATO scenarios. Better dispensers, night attack systems, weapon and delivery systems, and anti-armor gun pods all promise to improve tacair effectiveness, and will become available in due course.

(C) Meanwhile, however, there are several disturbing signs that the tacair community is really not addressing some of its most basic problems. The EW/CAS tests, for instance, indicated that our air forces are poorly prepared to operate in extensive electronic jamming. Our Navy/Marine forces have very few precision guided munitions (PGMs) in stock, and none of our forces appear ready for wartime consumption rates or battle damage repair capabilities. Sustainability continues to enjoy low priority.

(U) We were not exposed to any new technology programs that could qualify as "breakthroughs."

FORCE EFFECTIVENESS--TACAIR

LIGHTER "STOP-GAP" ANTI-ARMOR FORCES

- EW/CAS tests prove tacair difficulties in jamming
- Navy/Marine PGM inventories and training inadequate
- Spares & maintenance capabilities appear based on peacetime usage and no battle damage
- Sustainability issues appear to be given low priority
- New delivery systems and weapons should help some:
  - -- F-16 LANTIRN & A-10 night attack capabilities
  - -- ARBS to improve A-4 & AV-8 dumb bomb delivery accuracy
  - -- GATOR mine dispenser to slow armor advance
  - -- 30 mm anti-armor pod for minimum logistic burden
  - -- Maverick, LGB, and Hellfire for interdiction
- No imminent tacair breakthroughs
  - -- *programs seem to be business-as-usual*
  - -- *30 mm gun pod might be most useful add-on*
  - -- *plus adding PGM capability to RDF-assigned F-111s*

(U) This chart summarizes tacair-oriented technology. Producing the new 30 mm gun pod in quantity, and wiring the F-111 fleet for PGMs appear to offer some near-term advantages for the RDF. In general, the tacair programs appear to represent "business as usual."

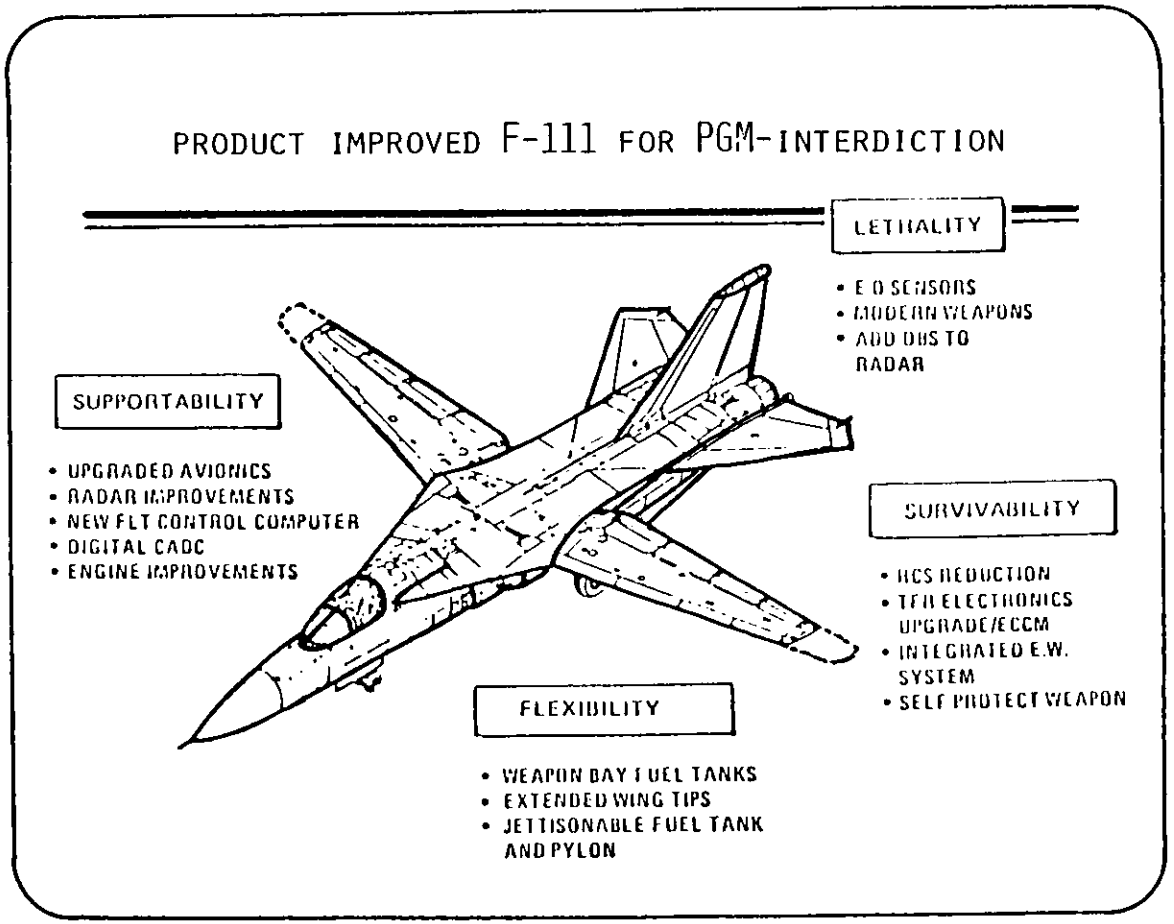
S-28

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) This task force has tended to assess DoD efforts toward the RDF as insufficient if not pursued with the vigor of an ongoing conflict. To some extent this approach reflected the task force chairman's background in expediting technology for the war in Southeast Asia 15 years ago. Clearly, current DoD programs do not accord RDF that priority.

(U) In this particular case in point, the task force gave brief consideration to what could be done to upgrade the F-111 for RDF operations. The F-111 is our longest-legged tactical aircraft, and should be able to provide a unique RDF interdiction capability. We were somewhat surprised to learn that the F-111s assigned to the RDJTF lack any PGM capability at all. The more capable F-111s are assigned to NATO, and the Air Force plans to further reduce the number of F-111s assigned to the RDJTF, despite their range advantages.

(U) There appear to be quite a diverse series of practical updates which could not only improve F-111 range and weapon delivery, but eliminate some of its worst maintenance problems. In this case, already available new technology (as currently used in the newer F-16) could substantially improve the older F-111's utility.



(U) This chart is drawn from a contractor briefing on possible modernizations to the F-111 for RDF interdiction roles. There are significant opportunities to upgrade this aircraft into a special long-range PGM-carrying interdictor, with better maintainability.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The task force also reviewed the opportunities to apply new technology to the area of fire support, including the utilization of armed helicopters. No major breakthroughs appear to be on the way. Nonetheless, there are some promising applications of lighter, longer-range rockets and barrage weapons, using a variety of new bomblets and submunitions. These will allow either higher accuracy, or more controlled dispersion against relatively hard targets.

(U) The Army does appear to have a worthwhile program to standardize munitions for its armed helicopters, and also to arm its UH-60s. However, there appears to be less than adequate planning for helicopter sustainability and battle damage repair.

(U) Two of the most interesting fledgling notions involve a concept for a light anti-tank vehicle armed with vertically launched anti-tank rockets, and a "smart mortar" capable of seeking out and homing on enemy vehicles. This latter idea is described on the following page.

(C) There was some limited discussion on the use of decoys and deception as a means of diminishing the disadvantage of numerically inferior forces. These would play on specific weaknesses in enemy reconnaissance and targeting. We found no enthusiasm for this concept among those who briefed us.

FORCE EFFECTIVENESS--FIRE SUPPORT

LIGHTER "STOP-GAP" ANTI-ARMOR FORCES

- Army studying potential of multi-purpose helo for RDF:
  - *-- armed scouts*
  - *-- store stations on UH-60*
- Little expressed concern for armed helo sustainability
  - *-- even less for battle damage repair*
- Army analyses see high RDF potential for:
  - * tungsten bomblets
  - * guided mortar shells
  - * terminally guided 155
  - * terminally guided MLRS
  - * light wt 155 how & MLRS
  - * vertical launch tank breaker
  - * containerized corps supt wpn
  - * wide-area influence mines
- Little consideration of decoys/jammers/other countermeasures
  - *-- by Soviets: to defeat our PGMs*
  - *-- by U.S. RDF: to mask small initial force size & location*
- No imminent technological breakthroughs for fire support:
  - *-- smart mortar may be best bet to help RDF interdict enemy*

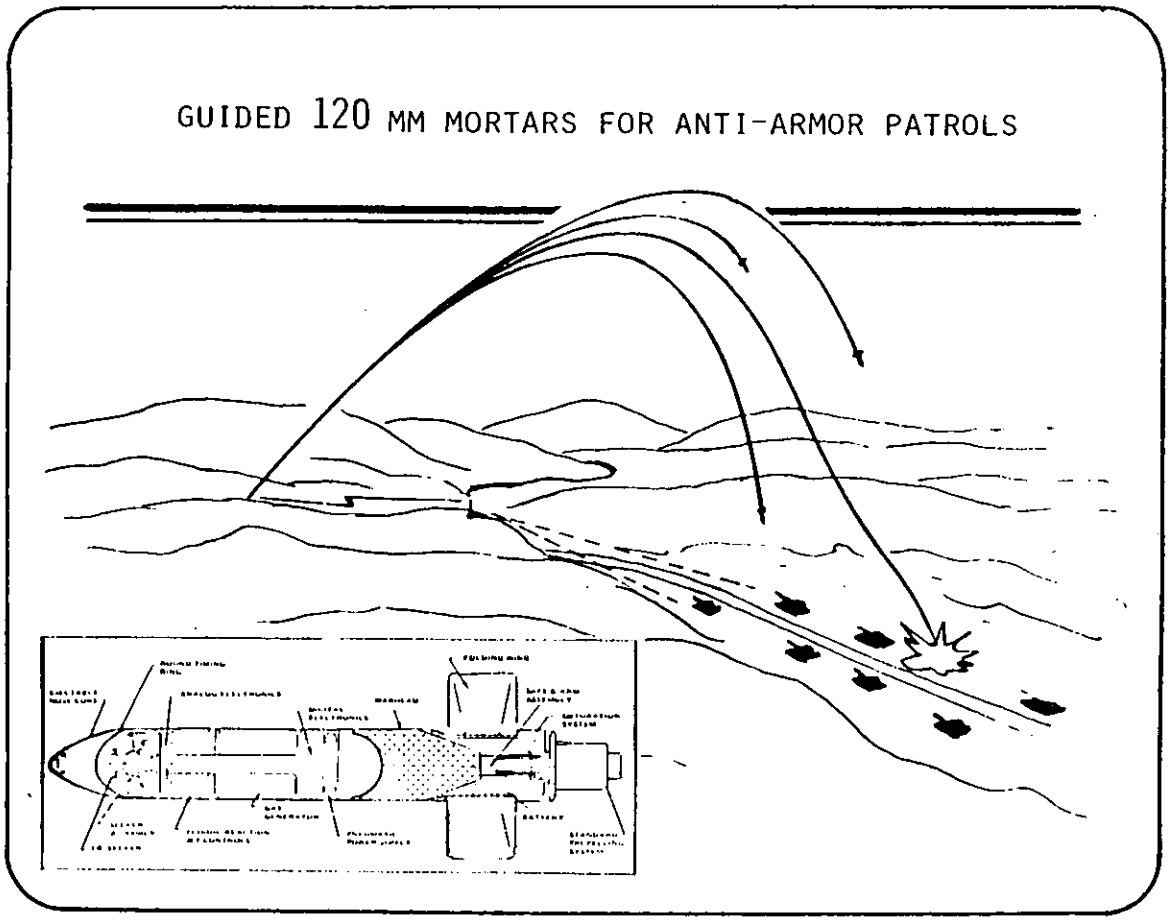
(U) This chart provides a summary of task force views on new opportunities for RDF-oriented fire support weapons. In general, some progress in submunitions is expected, but no other major breakthroughs in our ability to hit the enemy indirectly.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) Possibly one of the most intriguing new ideas now within the technological horizon involves the use of "smart mortars" to allow indirect attack of armored columns from a considerable stand-off distance.

(U) The task force was briefed on a research program to add a two-color IR seeker to a 120 mm mortar round. This would allow it to be launched towards a target based on forward observer information. The round itself would scan and pick its own target after launch, requiring minimum cooperation from the scout. Such a combination appears to be ideally suited to behind-the-lines interdiction operations, in which the scouting force cannot be obliged to carry their own weapons against a vastly superior advancing force. The scout patrol could thus be inserted in some inaccessible spot for covert observation, while the weapon launching force could be several miles away outside the screen of the advancing force. This relatively low burden system appears to incorporate the essential characteristics of a good RDF solution. We found few other items with this appeal.

(U) It should be noted, however, that this technology is not just around the corner. Considerable effort will be needed to convert this early development into an affordable, operational item.



(U) This sketch is intended to portray the operational utility of a guided mortar system. It would permit forward observers to locate targets which would subsequently be independently re-acquired by the seeker of a mortar shell, fired from several miles away.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) Another important capability for RDF forces would be the availability of a truly mobile air defense system that minimizes the demand on early airlift both to and within the theater of operations.

(U) Based on briefings provided by elements of the Army, the task force gained the impression that little emphasis was being placed on this RDF need. There have been some efforts to tailor a "get-light HAWK" system, achieved mainly by leaving some components behind. There is also talk of the virtues of both STINGER and CHAPARRAL with the latest IR seeker.

(U) We were briefed on some Army studies which left the unfortunate impression that the Army was hoping somebody else would solve the air defense problem for them. We learned virtually nothing, for instance, on the possible applicability of West European light air defense systems. This should be classed as another area in which the task force's work was far from exhaustive. An in-depth study by some Army group appears to be in order.

(C) We were reminded on several different occasions that HAWK missile inventories are inadequate to meet RDF needs (the sustainability issue again). Furthermore, the lack of a good cross-Service "interconnected" airspace control system was noted as a potentially serious problem.

FORCE EFFECTIVENESS--AIR DEFENSE

LIGHTER "STOP-GAP" ANTI-ARMOR FORCES

- Army does not appear to have come to grips with problems--which appear real
- Best near-term solutions may be:
  - -- "get-light HAWK"
  - -- CHAPARRAL and STINGER with POST seeker
- Army studies show virtues in passing buck to:
  - -- Ship-borne SAMs on cruisers & destroyers
  - -- Air Force fighters
  - -- Indigenous forces
  - -- Shoulder-fired weapons against FENCERS
- HAWK inventories unacceptably low

(U) This chart summarizes the task force's limited findings in the area of RDF air defense systems. While the need appears real, the task force can only suggest that some other group take a far more comprehensive look at practical solutions.

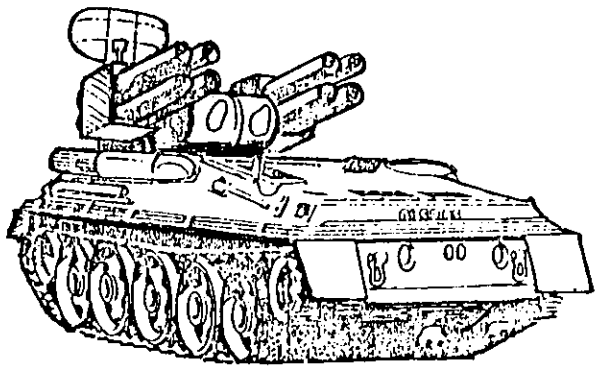
DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) In quest for higher effectiveness air mobile equipment, the task force was briefed on a new combined air defense/anti-tank system (ADATS) which is being developed for a private Swiss firm. It involves a relatively simple radar and a laser beam-riding missile which will go after any target at which the laser is pointed. A compromise warhead size has been selected to give the system substantial capabilities against aircraft or tanks. ADATS is now in early flight-test.

(U) There are two particularly interesting aspects to this development. One is that it is being done completely as a private capital venture, and the other is that it is non-U.S. capital. It suggests that the technology base is now broad enough to permit non-government sponsored weapon development with considerable sophistication. It also suggests that such private developments are probably carried out with more modest funding--using more austere management, and probably more mature technology. These could also be the hallmarks of any special developments directed towards urgent near-term RDF problem areas.

(U) This development also indicates the possible practicality of developing dual mode systems to meet the uncertain requirements of RDF operations--as long as one does not reach too far.

COMBINED ANTI-AIRCRAFT/ANTI-TANK UNIT



(U) This is a sketch of a contractor-sponsored development of a light weight, highly mobile composite anti-aircraft/anti-tank system using a laser beam-riding missile. Its dual use makes it an attractive concept for weight-limited RDF systems.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) On three separate occasions, the task force was briefed by elements of "High-Tech" 9th Infantry Division staff. This division-sized effort seems to be following the early patterns of the air-mobile division concept. It was initially started to find a way to increase the firepower and effectiveness of U.S. infantry divisions without taking on the overall weight and bulk of a heavy armored division. It still retains the basic goal of serving as a model for equipping U.S. infantry units, which increasingly appear under-armed, but which are still needed as reinforcement in the NATO scenario.

(U) While the task force admired these objectives of creating a high-mobility force, introducing new technology more rapidly, and shifting the focus away from the emphasis on NATO-only heavy units, several of the members were skeptical about some of the program emphasis. It appears to assume a level of in-theater mobility support from the Air Force that is unwarranted. It seems to place too much stress on total movement by C-141 (why not prepo?) and on in-theater lift by UH-60 (where are the CH-47s?), while giving less attention to its own logistic tail (what about trucks, ammo, and fuel?).

(U) Despite task force concerns, we recognize the importance of trying something new and different and encourage the continuation of this activity.

FORCE EFFECTIVENESS--HI TECH 9TH INFDIV

LIGHTER "STOP-GAP" ANTI-ARMOR FORCES

- Goal is prototype for modernizing & mechanizing infantry units for RDF and rapid reinforcement of NATO
  - *--seeking more combat capability and less airlift*
- Adopting "Air-Land 2000" approach of high-mobility tactics
- Probably too much emphasis on:
  - -- Air Force providing in-theater mobility (no AF plans?)
  - -- Total strategic lift in C-141s (without prepo?)
  - -- Maximum in-theater lift with UH-60 (not realistic)
  - -- Rapid near-term introduction of high technology
  - -- Combat teeth vs larger/heavier logistic tail
- Praiseworthy effort to:
  - -- shift Army focus toward manning/equipping lighter units
  - -- encourage expedited procurement techniques

(U) This chart summarizes the task force's views of the Army's "High-Tech" 9th Infantry Division experiment. Although we have some concerns over the direction of the effort, we would rather see the effort expanded than curtailed.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

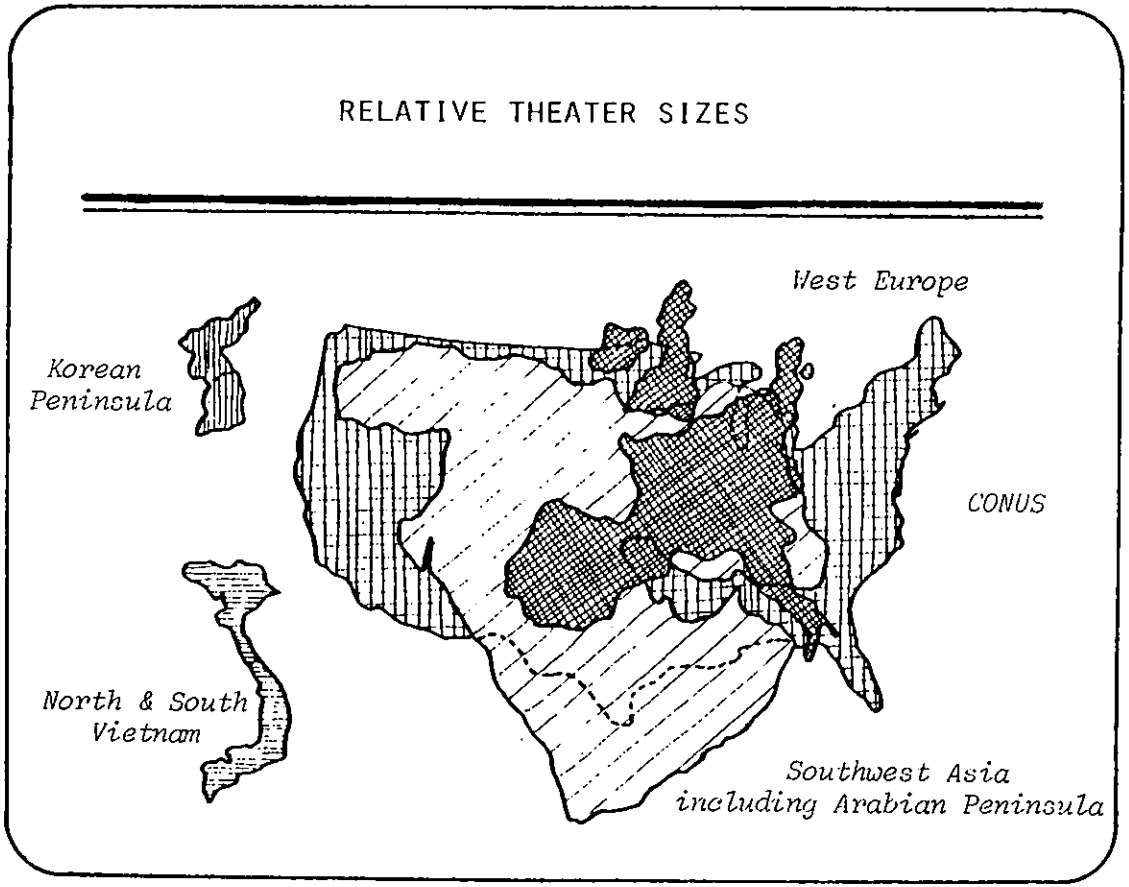
(U) The size of a potential war zone can obviously impact severely on the capabilities of the opposing forces. It is clear that the RDJTF must be prepared for intra-theater operations over much larger areas than would be visualized for combat in the NATO area or in Northeast Asia.

(U) The attached chart indicates the relative sizes of Southwest Asia, including the Arabian Peninsula, compared with Western Europe and the continental U.S. Also shown for comparison are the Korean Penninsula, and the combined Vietnams.

(U) While Korea is about the size of the British Isles, and Vietnam is about the size of the U.S. East Coast, SWA is substantially larger than all of Western Europe, and easily two-thirds the size of the U.S.

(U) This has serious implications for RDF. Intra-theater distances, combined with the lack of a developed infrastructure, impacts heavily on the needs for both air and ground transportation, as well as for communications, and for intelligence gathering. Moreover, the "density" of the combat forces will be far less, and troop mobility requirements far more influential.

(U) These greater distances will place additional stress on tactical air power, reconnaissance assets, helicopter lift capabilities, road-building and pipe-laying needs, and a variety of other combat and logistics aspects.



(U) This chart shows the relative size of the Southwest Asia area compared to the United States and Western Europe. Also shown are the Korean Peninsula and Vietnam. This provides some indication of the distances involved for intra-theater movement and communications.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The task force devoted considerable attention to the matter of prepositioning. For both transport economy and timely arrival, additional prepo seems worthwhile -- even though the Pentagon has not yet accurately quantified the relative costs of the various modes of shipping and storing war materiel.

(U) Most Army equipment is designed for prepo: much is already prepositioned in NATO under the POMCUS program. The Army claims Congress has refused funding for additional prepo equipment. Any further prepo must therefore encroach on active force modernization--unless it constitutes war reserve materiel. It is difficult to believe that DoD cannot persuade the Congress of its real needs.

(U) Assuming funding is provided, we are convinced that additional prepo--better afloat than ashore -- would be very useful, and would permit far more rapid entry into a theater of operations by "aerial repositioning." This not only reduces airlift requirements, but makes existing airlift assets more productive. We recognize that unlike POMCUS, this prepo will probably require U.S. contractor support.

(U) The task force was told repeatedly that forward prepo of refined POL was also sorely needed but we did not explore this in detail. There are no technological hurdles in prepositioning POL aboard ships.

SUSTAINABILITY: MORE/BETTER PREPOSITIONING

- Need appears to exist
- 96+% of Army UE "approved for POMCUS"
- POMCUS results good: 99% start-up rate
  90% reliability in use
- Army/MC prepo probably better afloat than ashore
- Army sees prepo as poor way to raise war reserves
- Army won't buy prepo "out of its hide"--pushing air/sealift
- Regional prepo + aerial REPOSITIONING appears sound
- Prepo vs Repo vs Transpo costs not worked out
- Lack of "host nation support" will require contractors
- Prepo of refined POL appears to be inadequate
- Technology exists now--might be improved for better "shelf life", easier "depreservation"

(U) Despite Army resistance to putting more funds into prepositioning, the task force feels more would be appropriate. There may also be some areas in which technology can improve "shelf life" and ease "depreservation" problems currently experienced.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

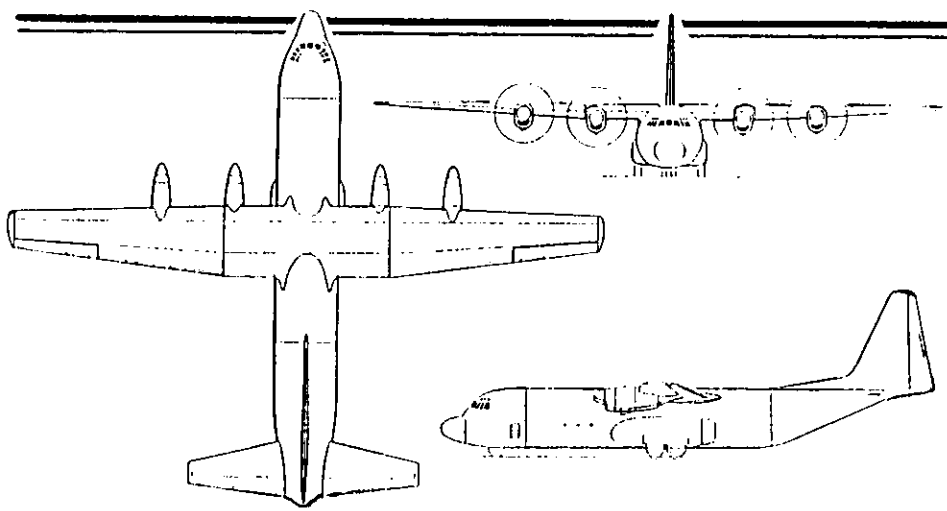
(U) The Air Force had given the task force the impression that the C-130 intra-theater transport could not function at the increased distances associated with SWA contingency operations and that a new design like the AMST or C-17 would be needed.

(U) The task force, on the other hand, felt it should explore the possibilities for further modernization and updating of the widely used C-130. Both, engine, aerodynamic, and equipment modernization could be used to improve the reliability and range performance of this mature aircraft. It is still being produced for foreign and civil customers at three per month.

(U) While the performance quoted here is not supported by MAC (which demands more conservative fuel allowances, landing sink rates, etc.) it is very likely that product-improved C-130s could do a creditable "repositioning" job if the military so desired.

(U) The basic problem was summarized by one Air Force briefer who said "we'll never buy a 25-year old design again." Given overall defense resource shortfalls--and the slow pace of technological advances in this type of aircraft--the task force cannot support the need to start over again with an all-new development in this area. There would appear to be far higher priorities for those marginal funds.

PRODUCT-IMPROVED C-130 "REPOSITIONER"



This "stretched" C-130 with improved engines and landing gear will carry 40,000 lbs 1860 nmi, land on a 2900' field on a hot day, unload, takeoff in 1700' and return 1860 nmi with 5000 lbs--without refueling

(MAC considers these estimates to be optimistic)

(U) This sketch shows a product-improved C-130 transport with stretched fuselage, improved engines (higher power and greater fuel efficiency), and new on-board equipments. It represents one available alternative for intra-theater airlift modernization.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) One possible means for improving RDF sustainability is to lower consumption rates, primarily of ammunition--which represents the largest resupply requirement other than fuel.

(U) The task force was in no position to make a serious evaluation of whether or not currently planned consumption rates are too high or too low: this will clearly vary with different scenarios. There is, of course, the hope that technology and higher accuracy weapons will lower the total numbers of rounds needed. While this may be true in the destruction of some special target classes, we doubt that substantial reductions in artillery requirements, for instance, would result. We do not believe that this is the first place to save on RDF shipping needs, although less packaging weight might offer some practical advantages.

(S) As far as we could determine, the lack of war reserve ammunition and missiles is very serious indeed. We have been unable to obtain from OSD the actual duration of sustainability of the notional CMMS study force (without NATO drawdowns). We doubt they meet guidance, and we doubt the guidance is adequate.

(U) Against this background, this task force is unwilling to suggest that any new technologies will justify scrimping on the stockpiling of RDF-oriented expendables.

SUSTAINABILITY: LOWER CONSUMPTION RATES

- Consumption rates uncertain at best--and will remain so
- Big ticket items are artillery munitions at NATO moderate rate, aircraft bombs, and POL
- Attempts to lower consumption may be penny-wise
- Guided munitions unlikely to lower total need much
- Lack of sustainability at <u>any</u> consumption rate is a paramount national problem
- Lighter packaging may reduce weight without reducing firepower
- Technology unlikely to solve problem

(U) This chart summarizes the task force judgments concerning opportunities to use technology to lower RDF combat consumption rates. We do not feel this is a profitable avenue of pursuit in view of current low levels of war reserves.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) There is ample information to support the view that several different RDF environments could be harder on U.S. equipment than the generally visualized NATO conditions. There are certainly places that are hotter, colder, wetter, drier, and sandier--though not, of course, all at once.

(U) At the same time, reliable logistic support at the end of a long, thin resupply route to a region with little host nation mechanical aptitude, could become a major, and possibly unexpected, limitation on sustained operations. The importance of assured high life components, or at least fully-predictable failure rates, should not be overshadowed by the urge to embrace immature new technologies. Again, we find the operating commands more concerned than the acquirers in this regard.

(U) We sense that more testing is required, and that, in many areas, commercial enterprises (such as the oil companies) have already solved problems such as excessive component wear. The military should be able to benefit from their experience.

(U) We also suspect that this may be a valid argument for resisting the equipage of RDF forces with the latest weapons, rather than more mature systems with a known maintenance track record. Even these old equipments, however, need to be tested in the new environment.

SUSTAINABILITY: BETTER ENVIRONMENTAL SUITABILITY
-- FOR MACHINERY

- RDF environments probably worse than Europe
- Need more operational testing in realistic environments
- High-life parts can probably be developed and substituted
- Commercial operations have applicable machines & experience
- Technology exists: concern appears limited

(U) This chart summarizes the task force's concern for providing RDF forces with high-reliability, predictable maintenance equipment. Solutions favor more mature equipments and current commercial experience wherever available. Testing is essential.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) Environmental impacts on equipment are probably less serious than the impact of those same strange environments on the effectiveness of people. Based on a task force briefing, it appears that this area deserves major additional emphasis.

(U) Strange lands tend to "devour alien armies," and casualties due to lost health can well exceed combat losses. Moreover, many of these human environmental problems attack judgment and mental acuity--presenting subtle impairments to command proficiency.

(U) The Surgeons General appear very restricted in their ability to establish "requirements" aimed at assuring the health and effectiveness of the RDF forces. Medical issues have no skilled voice at JCS or unified command levels. The RDJTF is only now getting a junior medical officer, with other assigned duties.

(U) Along these same lines, there appears to be little emphasis on the cultural and language problems to be faced in strange lands. Only the Air Force seems to have any program to educate their troops on local customs, taboos, and a few key words. This apparent disinterest in the human equation--friendly, host, or enemy--could substantially impair RDF operations at the other end of the world. Chemical warfare issues in tropic/arid climates are also crucial.

SUSTAINABILITY: BETTER ENVIRONMENTAL SUITABILITY -- FOR PEOPLE

- Inadequate attention to health problems

  Regions devour alien armies
- Very high casualties possible: major replacement problem
- Human environmental problems abound: jet lag, disease, no sleep, vision, heat, etc.
- Command effectiveness as vulnerable as troops--probably more so
- Total lack of attention to cultural and language problems
- Medical requirements not represented at JCS or unified command levels: CW issues frightening
- Surgeons General cannot establish their own medical/cultural "requirements"
- Much technology exists--genetics may create vaccines

(U) The task force concluded that many important human problems are being neglected for the strange environments of RDF operations. In the main, the necessary technology is in hand, though the new field of genetic engineering may help create new vaccines quickly.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) Lack of good equipment maintainability is a defensewide problem that will be magnified for RDF operations. There are valid arguments for suggesting the use of more mature equipment with better known maintenance needs and foibles. Further, it should be possible to product-improve these older systems to eliminate the really "bad actor" components. Several of our "show & tell" items emphasized the practicality of this alternative. Brand new systems should be assigned to the RDF on only rare occasions of overwhelming need.

(U) As mentioned earlier, there seem to be many areas where commercial equipment may already be designed to the special RDF environments. In any event, the provision of necessary maintenance facilities in undeveloped areas may present novel problems. One imaginative solution to such a problem in Southeast Asia involved the use of a retired jeep carrier as a helicopter maintenance base. For RDF operations, such make shift solutions will be needed from the outset of hostilities.

(C) The task force members were repeatedly surprised by the lack of evident interest in the wartime problems of battle damage repair. One Air Force briefer indicated that among tacair types, only the A-10 could be repaired in theater at all. If so, RDF forces may run out of equipment faster than anticipated.

SUSTAINABILITY: BETTER EQUIPMENT MAINTAINABILITY

- Defensewide problem: worse for RDF forces
- Suggests advantages in using mature equipment with known maintenance track record and spares requirements
- May be better to "down rate" mature systems to eliminate bad actors than embrace uncertainties of the latest developments
- Commercial systems appear to achieve higher reliability
- Army only beginning to look at floating/prepo'd maintenance facilities
- Virtually no consideration of BATTLE DAMAGE REPAIR needs
- No technological crutches are evident

(U) RDF forces are likely to be exceptionally vulnerable to excessive maintenance requirements--caused in part by the use of immature technologies. Battle damage needs could further aggravate this situation. Greater consideration of this area is warranted.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) Inattention to basic issues of sustainability may be exceeded only by evident lack of concerted effort to solve recognized communications problems. While the Services appear to feel that "communicators want too much," or that "no one is in charge" of C^3 needs, the result is that RDF forces face serious inadequacies in communications.

(U) The task force was briefed on six distinct elements of RDF C^3 which are summarized on the next four charts. Problems exist in each aspect.

(S) The JCSE is a special communications detachment organic to the JCS which has been used repeatedly to establish contact with suddenly deployed small U.S. forces (such as an airlift operation into Zaire). It is an overused asset suffering from inadequacies in staffing and modernization. It is also vulnerable to more sophisticated enemy forces. And it may not be available to an RDF operation if already committed elsewhere.

(U) The RDJTF epitomizes the needs of an RDF headed into an area with no extant U.S./allied communications infrastructure. For this purpose, the planned portable command center appears to lack many of the elements needed to provide a modern mobile headquarters suitably linked to both its operational units and its parent organizations back home. These are not technological problems, and can be solved on demand.

SECRET

COMMUNICATIONS: PLANNED ASSETS (U)

★ JOINT COMMUNICATIONS SUPPORT ELEMENT (JCSE)
(mobile JCS unit for initial JTF hookup to Components & DCS)

- established for other purposes--and heavily utilized
- very valuable, but another case of "double-hatting"?
- limited entry to DCS or Components--"very thin line"
- JCS-urged upgrading not programmed ('81-'87: $55 M)
- no anti-jam features: vulnerable to known threats
- total unit = 33 C-141 sorties; with TRITAC goes up to 60!

★ RDJTF COMMAND CENTERS & EXECUTIVE AIDS
(AF is providing deployable 2000-man field hq for RDJTF)

- no truly "mobile" command center planned for RDJTF
- few high speed terminals; no automatic message routing
- no plans for automated data bases
- no plans for hardening of modules

SECRET

(U) This is the first of several charts summarizing shortcomings in currently available and programmed RDF communications capabilities. Solutions appear to involve providing the necessary resources--and putting someone in charge to implement available technology.

SECRET

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(S) The Services' organic communications assets appear satisfactory only in the limited geography, dense environment of NATO, to which most of their equipments are committed. There is pathetically little interoperability between Services (until TRITAC arrives). Their equipments enjoy limited security, are easily jammed and physically vulnerable. Satellite terminals for their own long-haul lines are in short supply, and there is an apparent unwillingness to share scarce resources such as the WSC-3 secure terminal among RDF elements. Despite these shortcomings, Service programmers are relatively candid in admitting that they do not intend to increase their spending on C^3 problems--which they seem to view as an insatiable demand.

(U) Remarks concerning shortcomings in operational command communications must of necessity spill over into the areas of logistic support, which depend on the same channels to control resupply activities. The rather remote Defense Logistics Agency (with no direct in-theater responsibilities) predicts serious difficulties both intra-theater and inter-theater in this regard. In-theater COSCOM (logistics unit) activities must be considered in the development of a fully operational RDF warfighting capability. It is through these logistics commo links, coupled with modern executive aids (i.e., computers), that logistic "accountability" will ultimately be achieved (chart S-11).

SECRET

COMMUNICATIONS: PLANNED ASSETS (CONT) (U)

★ EXISTING/PROGRAMMED COMPONENT COMMUNICATIONS
(tactical commo with limited connectivity to rear areas)

- designed for dense, short-range NATO scenario--inadequate for longer distances
- most existing equipments committed to NATO theater
- limited security, easily jammed, physically vulnerable
- Component interoperability very limited until TRITAC
- UHF satellite terminals in short supply
- existing equipments (like WSC-3) not being shared

★ INTRA-THEATER SUPPORT COMMAND COMMUNICATIONS
(basic commo for in-theater COSCOM logistic activities)

- not addressed, likely to be a serious problem for the same reasons

SECRET

(S) The task force concludes that the Services are not providing their own operational and logistics elements with communications adequate for the unique RDF operational environment. The problem centers more around resource allocation than technology.

SECRET

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) U.S. military communications for RDF operations must eventually connect with the full-blown Defense Communications System (DCS) which reaches to all parts of the world with permanent U.S. presence, but not to the most likely areas of RDF utilization.

(U) One major current issue is how and where to extend the multi-channel, multi-option DCS with its requirements for relatively large and permanent sites. Additional terminals and spares for the DSCS II satellite system could be useful in a contingency but are not planned, while the more capable DSCS III is still years away. For the forseeable future, then, RDF assets will have to stretch to the DCS, rather than DCS extending itself towards the contingency zones. This would appear to put the burden on the wrong shoulders.

(S) Both CINCRED and the communications community recognize that the first-deployed JCSE would need to be supplanted by a more robust and permanent RDF theater-wide communication system as that which "grew" through Southeast Asia. A Joint Multi-Channel Trunking & Switching System (JMTSS) has thus been established as a JCS requirement, and is being "architected" by the Defense Communications Agency (DCA). At this time, the program is totally unfunded by the Services, and appears to lack any real sense of urgency, even though it would be vital to warfighting outside NATO.

SECRET

COMMUNICATIONS: PLANNED ASSETS (CONT) (U)

★ EXTENSION OF DEFENSE COMMUNICATIONS SYSTEM (DCS)
(wide band trunk to CONUS & other CINCs with rear-area switching, etc.)

- would require fixed sites--or dedicated ships
- few DSCSII terminals or spares--some being bought
- no contingency system augmentation planned
- extension in planning stages only--future unclear

★ JOINT MULTI-CHANNEL TRUNKING & SWITCHING SYSTEM (JMTSS)
(permanent theater rear-area commo: supplant JCSE & provide some forward area tactical commo)

- would link to DCS and Components using TRITAC elements
- could extend forward to augment Component capabilities
- planning in progress at DCA for REDCOM--not funded
- little sense of urgency or of Service support

SECRET

(S) Plans appear woefully incomplete either to extend the primary Defense Communications System (DCS)--for "wholesale" communications--or to create a new JMTSS for RDF in-theater "retail" communications. Neither effort is circumscribed by missing technology.

SECRET

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(S) In summary, it appears that RDF communications capability to regions such as SWA will be very limited indeed, with little apparent Service progress in rectifying the situation. (The Services must pay for joint and Component communications assets.)

(U) Technology exists to provide at least make shift solutions to most of these problems such as primitive anti-jam capabilities; satellite ground terminals; communications ships; and, possibly most immediately useful, airborne radio relays. Some of these equipments are commercially available.

(U) Moreover, to the extent that the CINCs are required to plan their own communications needs, they lack the technical planning staffs to do so--and hence to compete with the Services.

(S) Assuring the adequacy of essential communications appears to this task force as one vital aspect of preparing for warfighting. To the extent that the leadership, focus, priority, and funding are lacking, it detracts from the credibility of the entire RDF strategy. In particular, perpetuating the known vulnerabilities of the C^3 equipment could be fatal. Such an approach is even more inexplicable if our estimates are correct that less than a billion dollars is required to eliminate most of the first-order problems.

SECRET

COMMUNICATIONS SUMMARY (U)

- Current & near-term Southwest Asia capability very limited
- Technology exists to fix problems--some commercially
  - -- limited A/J fixes for current satcoms
  - -- ground terminals for satcom use
  - -- dedicated ships for DCS extension
  - -- airborne relays for dispersed forces (#1 priority?)
- Lack of technical planning staffs at CINC-level
  - -- limits on implementation capability/authority
- Evident lack of management focus, priority, and funding
  - -- lack of emphasis on ECCM and survivability could be fatal
  - -- vast majority of problems can be cured for under $1 B
  - -- planned buys lack urgency and joint application
  - -- another seriously neglected warfighting consideration (both defensively and offensively)

SECRET

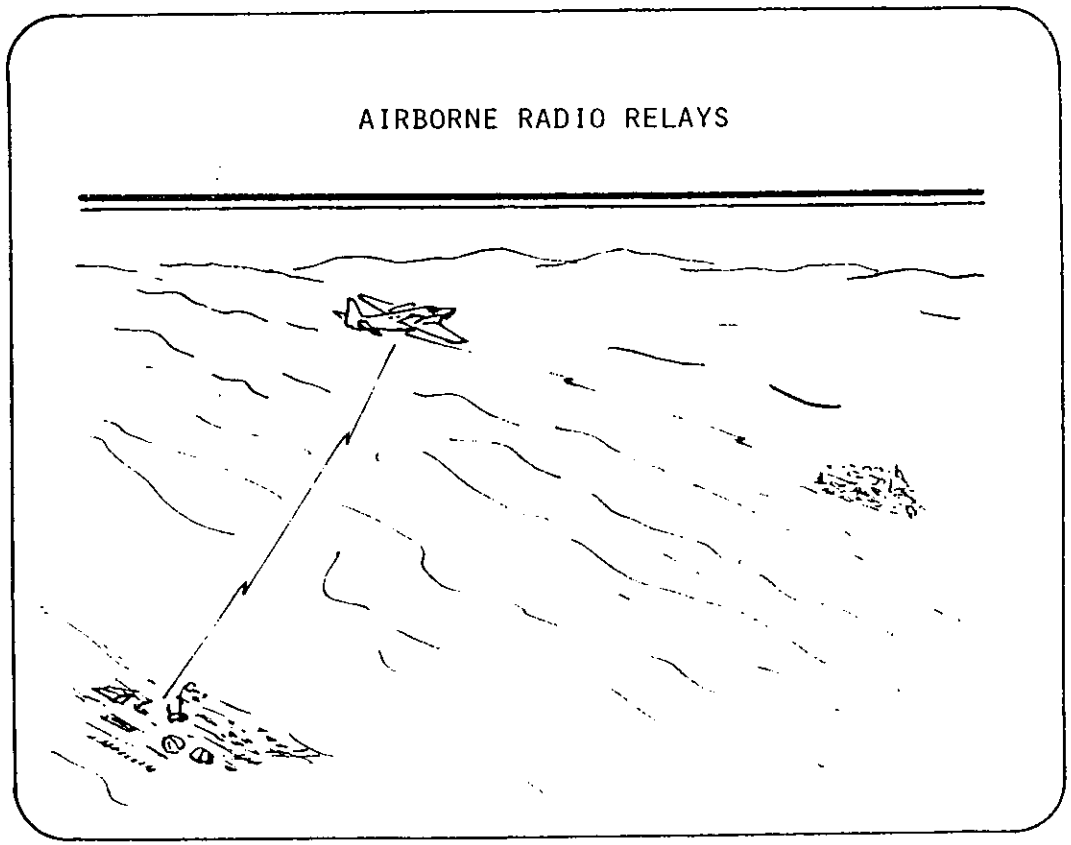
(U) The task force was somewhat alarmed by the apparent lack of attention to solving RDF communications problems--particularly when the costs would be relatively tolerable, and the technology is readily available--in part commercially.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(S) One of the most serious shortcomings for RDF ground forces may be their inability to communicate over the distances and terrain associated with places like Southwest Asia. Distances of several hundred miles between related units, with intervening mountain ranges, can be expected. Current organic communications simply cannot span these distances without some airborne- or space-borne-radio relays. While satellites may present a high technology solution, more mundane and cheaper solutions are available. At frequencies above HF (which may deserve renewed interest!), VHF, and UHF, tactical communications can be greatly extended by the simple expedient of airborne relays.

(U) Any number of relatively available aircraft--from C-12 size on up--can carry the 10-20 cubic feet of electronics and antennae needed to provide adequate relay capabilities. Similar packages can be installed on mountain tops (as in Vietnam) or even balloon-borne, if militarily acceptable. The questions, of course, are who would sponsor this development, and who would operate the aircraft?

(S) Configuring a fleet of perhaps a dozen self-deploying aircraft to serve as radio relay platforms appears to offer a virtually immediate solution to a pressing problem. The mechanisms and management flexibility are sorely needed to permit rapid solutions like this.



(U) This chart symbolizes the need of RDF forces to extend the range of their organic combat communications through the use of airborne radio relays. The task force feels DoD should maintain a capability to satisfy such specialized but modest RDF needs.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) One half of the task force spent 1 day receiving very highly classified briefings on RDF intelligence needs. This material will be summarized in a separate annex to this report.

(S) This single chart is intended to provide a rudimentary summary of the conclusions of that day's work. The basic conclusions are of considerable significance. First, there appears to be little practical opportunity to trade away strategic lift assets in return for longer warning times of planned enemy aggression. (See chart P-39)

(U) Second, top intelligence gathering priorities for the combat forces should be directed towards improving U.S. capabilities to interdict effectively enemy advances as far to the rear and as early as possible.

(U) Third, such intelligence efforts do not require additional "national assets" but rather the allocation of more available tactical recce assets.

(S) There is a general assessment that our RDF intelligence processing capabilities are worse than our collection shortages, and that our ability to communicate the final intelligence may be worse than our processing capabilities. Lack of cultural/language skills could be very serious.

(U) Finally, little thought seems to have been given to assuring the survivability of in theater intelligence assets.

SECRET

INTELLIGENCE SUMMARY (U)

- Useful warning time probably cannot be extended
  -- *cannot expect to reduce mobility requirements*
- Top intelligence priority needed on early interdiction
  -- *against air and ground avenues of enemy advance*
- Tactical intelligence assets for RDF forces limited
  -- *national assets may be good enough, if shared*
- Processing capabilities worse than collection shortages
  -- *cultural/language limitations may be serious*
- Intelligence communications probably worse than processing limits
  -- *essential to beef up JCSE, etc.*
- Little emphasis on survivability of equipments
  -- *drones seem to be a "natural" to conserve airlift and better serve local commanders*
- Technologies exist: stand off sensors could help

SECRET

(U) The task force has reached some general conclusions concerning problems with RDF intelligence assets. The greater use of drones and stand off sensors may provide useful technological opportunities--in conjunction with better processing and communications gear.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The task force charter requested that we explore the application of technology to RDF training requirements and the CINCs identified limitations in their ability to perform rapid contingency planning. These next four charts address these issues.

(U) Based on briefings received from the training and exercise communities, it is clear that there are very real limitations on both Service unit training exercises and joint command exercises. These are spelled out on this chart. In general, the two categories conflict with each other, but both are probably stretched near the limits of both funding and facilities.

(C) Limits on O&M funds, as well as shortage of space and unit availability tend to limit exercise effectiveness--as does the shortage of communications. There is reticence to use scarce ammunition and spares on too many exercises. In one extreme case, we were told by the Marine Corps Development Center that they even lacked the bus fare to transport Marines from San Diego to 29 Palms to practice unloading and "depreserving" over-packed prepo equipment. This novel new RDF-related training requirement apparently represents the straw that breaks the back of Marine training resources!

TRAINING & PLANNING: EXERCISE LIMITS

- Joint RDJTF exercises are placing additional burdens on subordinate commanders:
  - -- limits on exercise budgets (O&M dollars for transport)
  - -- conflict between joint and Component exercises
  - -- conflict between training and exercising
  - -- lack of communications capacity, even for exercises
  - -- cost, complicity, and resources for exercise control
- Service unit training now includes RDF-related work, but is constrained by:
  - -- limits on operating/flying hours
  - -- shrinking exercise areas and airspace
  - -- lack of funds for ammo expenditures--or bus fares!
  - -- cost of consumption of scarce parts

(U) The task force explored the need for more joint RDF-related training exercises. We conclude that there may be only limited opportunities to expand these expensive operations, in view of other force demands and resource limitations.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) There seems to be virtually no question but that large scale command and field exercises provide extremely valuable lessons learned for which there are probably no substitutes. These lessons span the gamut from command and control, communications and intelligence, to operations, sustainability and materiel operability. Joint tests provide unique opportunities to develop headquarters command skills--and to uncover serious problems in interoperability.

(U) We were pleased to note that some of the emphasis is currently shifting away from the primary consideration of combat forces towards a focus on the logistic supporting forces.

(U) In view of their cost and inherent scarcity, it would appear unlikely that there can be any large expansion of major unit or joint exercises. This would seem, then, to place a steep premium on finding means to enhance the value and effectiveness of those exercises that are run. Two mechanisms may be available to help here, and both have some technological content.

(U) It may be possible to improve the benefits derived from the lessons learned, and distributed in the after-action reports. It may also be possible to improve the content and effectiveness of the exercises through closer coupling with war games and simulators. These are discussed on the next chart.

TRAINING & PLANNING (CONT)

EXERCISE TRENDS

- Lessons learned considered extremely valuable in all aspects:
  - -- joint operations
  - -- command and control
  - -- communications and intelligence
  - -- operations and sustainability
  - -- materiel operability--and interoperability
- Exercise emphasis shifting to include supporting forces
- Scope and extent of large scale exercises unlikely to grow much more
- Technology may offer avenue for greater interaction between war games/simulators and full-scale exercises

(U) This chart summarizes the major trends in large-scale exercises and the span of benefits derived from them. Since their scope is unlikely to expand, technology might well be applied to making current exercise efforts more productive.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) Whether or not it may be possible to increase the scope and extent of major exercises, their cost and inherent scarcity would seem to make it particularly important to assure the maximum dissemination of exercise results for future training, exercises, range development, war games, materiel deficiency correction, and future budget priorities. This chart indicates the areas of major impact for lessons learned, and what levels of command need to be made aware of their results.

(U) It was by no means evident from the course of our discussions about the exercises themselves, that the after-action reports were receiving the attention they deserve throughout the defense community. We cannot claim to have performed a serious "market survey" concerning the full impact of RDJTF after-action reports. We think perhaps somebody should. We found at least fragmentary evidence that neither the test community nor the Service programmers takes the time to read after-action reports. This would in some measure explain the apparent indifference to CINC--and RDJTF--needs.

(U) The American commercial sector has no peers in the business of visual and media displays. The marginal costs of media-grade exercise coverage and reporting of lessons learned would probably be money well spent.

TRAINING & PLANNING (CONT)

EXERCISE LESSONS LEARNED

- Vital to assure maximum dissemination of lessons learned for:
  - -- training/educating other troops, staffs, commands
  - -- generating more realistic Component exercises
  - -- improving/expanding exercise ranges
  - -- improving content of war games/simulations
  - -- initiating corrections for materiel deficiencies
  - -- improving future budget priorities
- After-action reports could and should have greater impact on:
  - -- Service materiel commands
  - -- Service programmers/budgeters
  - -- Joint headquarters
  - -- OSD and DRB decision-makers

Commercial technology (video tapes, etc.) might help spread the word, attract attention, educate the commands

(U) The total benefits to be derived from full-scale exercises are probably not being achieved due to difficulties in disseminating lessons learned. Commercial technology should be able to help solve this problem in effective communications.

S-50

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) There is a notable trend towards greater use of war games and simulators for a variety of purposes. In some measure, they can substitute for more expensive exercises. They should also help improve the exercises, particularly in planning exercise control, and synthetic exercise expansion.

(U) CINCRED seems to be undertaking a very useful initiative in establishing an analytical support group charged with improving war game modelling, using various Service and military school inputs. It appears to be getting good cooperation and deserves support.

(U) Several briefings indicate that the Services' use of trainers and simulators is expanding rapidly to compensate in some measure for decreasing live weapon testing. The real problem seems to be keeping up with civil technology in mini-computers, video disc displays, and electronic games.

(U) It appears that it will soon be possible to provide "wardroom models" for various aspects of command training. Such devices, if they can be made interesting, could be very beneficial in providing staff training for various new missions such as RDF operations.

(U) These same new technologies should also make it easier to draw up new contingency plans on short notice, using mini-computers and video disc data storage for unit capabilities and logistic requirements.

TRAINING & PLANNING (CONT)

WAR GAMES & SIMULATORS

- CINCRED has analytical support group to improve war gaming:
  - -- utilizing military colleges to improve models
  - -- getting good inter-Service, inter-agency cooperation
- Service use of trainers/simulators expanding rapidly:
  - -- wide use now of trainers for individual/unit training
  - -- "wardroom" models for command training coming along
- Major technological contributions available commercially in:
  - -- mini-computers--video disc displays--electronic games--
- Combinations of above should allow substantial gains in:
  - -- STAFF TRAINING and
  - -- QUICKER, BETTER, CONTINGENCY PLANNING

(U) The task force senses that modern technology is already inspiring greater interest in, and uses for, war games and simulators. These should not only improve weapon training and staff training, but improve both exercise and contingency planning and control.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The final subject to be addressed by this task force involved looking into defense responsiveness to RDF materiel support needs. We have divided this into four separate elements concerning development, acquisition, testing, and technical advice.

(U) We could not discern any special R&D efforts devoted to the unique requirements of RDF forces. As noted here, it seems that RDF needs are being used to justify ongoing programs rather than to stimulate new ones.

(U) We found very little quick reaction effort to solve current force deficiencies, even though the Services do retain some QRC capabilities both for and beyond the needs of electronic warfare.

(U) We were impressed by the existence of a small CINC C^3 Initiative Fund which allows the major commands to expend minor funds to satisfy specific needs in the communications area. Equivalent funds for broader usage could be very productive indeed.

(U) Finally, we consider that both DCA and DARPA have management and procurement systems which would allow them to conduct quick reaction developments for specialized, non-standard, RDF equipments in the absence of suitable Service motivations. We do not believe this should become the "normal" way of doing business, however, due to persistent difficulties of transfering the output to Service operational use.

MATERIEL SUPPORT:
DEVELOPMENT RESPONSIVENESS

- RDF mission appears to be new justification for current programs--rather than stimulus for new programs
- Few quick reaction efforts under way to reduce current force deficiencies--fresh water provisioning one major exception
- Services do maintain Quick Reaction Capabilities and procedures--not widely recognized or appreciated
- CINC C^3 Initiative Fund provides small but valuable mechanism for fixing minor C^3 problems quickly
- DCA and DARPA both have capabilities--but no charter--to create specially tailored equipments if desired

(U) In exploring DoD's material support responsiveness to the needs of RDF forces, the task force concludes that there is little specialized, quick reaction development pointed towards unique RDF needs, though the mechanisms exist if the needs are supported.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The matter of acquisition responsiveness is a trickier issue to address, because larger sums are involved and Service prerogatives are at stake.

(U) We wondered whether the Defense Resources Board addressed issues such as procurements for RDF forces, and conclude that they certainly do: recognizing particularly the role of OSD and JCS in sponsoring cross-Service programs on which the Services usually procrastinate.

(U) Very major programs such as C-5 buys or SL-7 modifications appear certain to be addressed by the DRB. Lesser items may be missed, however, unless they are raised by the CINCs--who, for the first time, are being given some direct, albeit minor, voice in DRB deliberations during budget formulation.

(U) We applaud the move to enhance the voice of the CINCs, but are generally skeptical that they can fundamentally shift the mind sets of the Service programmers and budgeteers in the allocation of scarce resources. Their needs probably should be translated to the language of affordability through some OSD-level agent. We see great promise in the CINC Readiness Fund for O&M items (such as exercise expansion), but not for development or procurement.

(U) We concluded that the Defense Logistics Agency (DLA) probably cannot be drafted to provide special end-item procurements for the CINCs.

MATERIEL SUPPORT (CONT)

ACQUISITION RESPONSIVENESS

- DRB is trying to assure RDF needs are considered in PPBS process--"cross-Service" needs can be championed by OSD staff or JCS
- CINCs are being given more chance to state needs--but can't compete with Service-dictated budget priorities and choices under guise of "affordability"
- Programs below DRB threshold remain the domain of the Services--unless highlighted by OSD, JCS, or a CINC
- CINC Readiness Fund offers high promise to provide special funds for O&M contingencies--but not for development or procurement
- DLA has some minor procurement action for RDJTF--but in consumables/expendables, not major end items

(U) The task force tried to assess the opportunities for RDF-related issues to impact on the budget formulation process. We conclude that it will be the smaller items, below DRB threshhold, that may be overlooked--and ignored by the Services.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The next aspect of materiel support for the RDF deals with maintainability and interoperability. In this regard, we looked to the test community to see how well they were attuned to RDF needs. In this area, we were not encouraged by what we found.

(U) The Operational Test & Evaluation Group bears a responsibility to assure that new equipment will work as advertised under realistic scenarios. They accept no residual responsibilities for mature systems, however, and admitted that they did not read RDJTF after-action reports. In this respect, we doubt that the OT&E community is really as yet oriented to specific RDF equipment problems.

(U) We also looked into the status of joint testing. We had previously heard how valuable tests like EW/CAS had been, although its origins precede RDF emphasis by several years. We were also a bit concerned by RDJTF willingness to include materiel suitability testing in their exercises--a practice which appeared to some task force members as a dangerous step towards "endorsement" of immature systems for RDF use.

(U) We reluctantly conclude that the joint test development business is now so cumbersome, and entails such long lead times as to be of modest value for RDF purposes in the near-term. In the example on the chart, it will have taken 9 years to rerun a pertinent logistics-over-the-shore (LOTS) test.

MATERIEL SUPPORT (CONT)
TESTING RESPONSIVENESS

★ OPERATIONAL TESTING

- No involvement by OT&E in RDF-peculiar testing
  - -- or by RDJTF in OT&E test planning
- Exercise after-action reports apparently not being read by the OT&E Community
- RDJTF offering to include materiel suitability in exercises: -- a possibly inappropriate incentive to the developers

★ JOINT TESTING

- Tests such as EW/CAS have been exceedingly valuable,
- But 4-6 years lead times seem excessive:
  - -- unsuccessful FY75 LOTS I test produced FY79 JCS request for follow on: now set for FY84

(U) The task force was not favorably impressed by the attention being given by the testing community to the special needs of the RDF for either new or existing equipment. A more thorough look into this area by some other group may be warranted.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) Finally, our charter asked specifically "does the RDF organizational structure have an adequate mechanism for obtaining scientific/engineering support?" We have interpreted this in the narrower sense of whether the RDJTF does or should have organic technical advisors.

(U) We believe that operational headquarters can benefit from the presence of a technical advisor on the commander's immediate staff--as several CINCs now have or once had. We also believe this to be a two-way street--and that the technical community can also benefit from access to operational headquarters. The benefits to each are summarized on this chart.

(U) These advisors can provide valuable links to and from the RDT&E communities--OUSDRE, the Services, DARPA, and industry. It must be recognized, however, that the usefulness of such an advisor is directly related to his access and respect within the operational headquarters--and within the R&D community.

(U) It is essential, then, that the operational commander want to have such an individual on his immediate staff, and that the technical community provide a seasoned, informed individual with experience in the areas of major command concern. The advisor's staff can be usefully augmented by appropriate on-loan government laboratory or staff personnel.

MATERIEL SUPPORT (CONT)

DIRECT ENGINEERING SUPPORT TO RDJTF

★ A TECHNICAL ADVISOR ON A CINC STAFF CAN PROVIDE....

- Benefits to Operational Command:
  - -- "interpreters" for technical problems
  - -- in-house technical/materiel trouble-shooting
  - -- pipeline to government labs, contractors, etc.
  - -- quicker responses to technical "lessons learned"
  - -- a conscience for materiel operability
  - -- coupling to test & analysis communities
- Benefits to technical community:
  - -- first hand exposure to technical operational problems
  - -- opportunities to observe tests/exercises
  - -- visibility into man/machine interfaces
  - -- informal pipeline to real "user" views
  - -- visibility into joint/interoperability problems
  - -- better foundation for tests and analyses

....IF THE COMMANDER HIMSELF SUPPORTS THE EFFORT

(U) This chart displays the benefits that can accrue to both an operational command and to the technical community by the presence of a technical advisor on the commander's staff--if the commander willingly encourages such staff augmentation.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) On the basis of all the foregoing, the task force has drawn up a set of conclusions and recommendations for future actions. This is the subject of the final section of this briefing report.

(U) Task forces and review boards such as this are bound to concentrate on areas in which dissatisfaction with the current situation can be expressed. After all, if there are no problems, then there is no need for task forces or for new technological solutions. Progress, it might be said, is produced by discontent and optimism blended in the proper proportions.

(U) This DSB task force was quite discontent with many of its findings, but is optimistic that there are readily available solutions to a great many of the problems raised. We are thus hopeful that this report can help to stimulate progress towards more capable American rapid deployment forces--worldwide.

(U) We sense that many of the current problems arise from the fact that the RDF concept, measured in terms of bureaucratic time, is still in its infancy. Moreover, the "time constant" involved in reorienting towards new priorities is inescapably long for defense assets which last 25-50 years. Other problems may be more basic, however, and rooted in the American psyche and culture. These will not easily be solved by fiat--or a Defense Science Board task force.

BRIEFING OUTLINE

PART I: INTRODUCTION

PART II: THE SCOPE OF THE PROBLEM

PART III: THE QUEST FOR SOLUTIONS

➡ PART IV: IMPRESSIONS & RECOMMENDATIONS

(U) The remaining 18 pages summarize the conclusions and recommendations of this task force. They are necessarily broad and superficial in view of the scope and timing of this effort. Nevertheless, they point to some fundamental issues for Defense management.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(S) By the time the task force had finished its work, the litany of "inadequacies" in capabilities, resources, focus, training, responsiveness, etc., had grown to seemingly overwhelming levels. Before summarizing our overall impressions and recommendations, then, it appears desirable to put some perspective on our efforts.

(U) The facts of the matter are that the U.S. continues to have the greatest force deployment capabilities of any nation on earth, and much experience in fighting wars many thousands of miles from our own continent.

(U) Furthermore, the forces and headquarters that have been assembled into the RDJTF are making great strides towards being prepared to meet their objectives. Their planning and their training are improving every day. Many of the issues we raise in this report are already well known to them. If circumstances require, U.S. rapid deployment forces could do a very creditable job under many realistic scenarios.

(C) But the fact does remain that our current political objectives for RDF could well exceed U.S. military capabilities relative to growing world threats and continuing U.S. security obligations elsewhere. Improving our RDF capabilities, then, is surely a worthwhile objective.

TASK FORCE PERSPECTIVE

- U.S. CAPABILITIES & EXPERIENCE IN WORLDWIDE FORCE DEPLOYMENTS REMAIN UNPARALLELED:
  - -- strategic lift
  - -- tactical lift
  - -- amphibious capabilities
  - -- force versatility
  - -- World War II
  - -- Korea
  - -- Vietnam
  - -- NATO rapid reinforcement
- FORCES ASSIGNED TO RDJTF ARE COMPETENT, ORGANIZED & CONFIDENT:
  - -- designated units
  - -- maturing oplans
  - -- unit/joint training
  - -- detailed TPFDLs
  - -- regional awareness
  - -- fine leadership
- BUT CURRENT POLITICAL OBJECTIVES FOR RDF COULD WELL EXCEED REALISTIC U.S. MILITARY CAPABILITIES RELATIVE TO:
  - -- growing Soviet/client/Third World threats
  - -- concurrent security obligations elsewhere

(U) This chart tries to put in perspective many of the concerns that will be expressed subsequently. Our forces are clearly more capable than any others of rapid worldwide deployment. Relative to the problems they face, however, there is still room for improvement.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

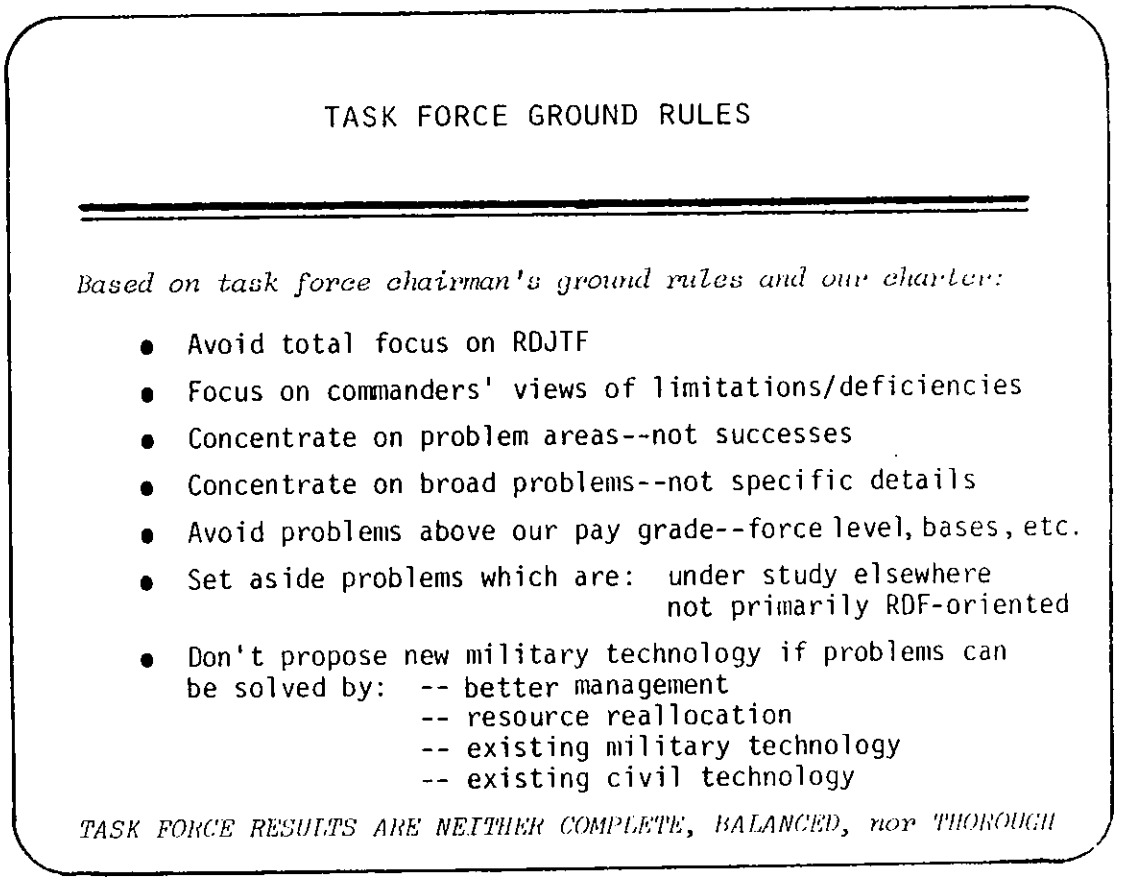
(U) It also seems appropriate to review the ground rules we set for ourselves. These were described in greater detail in the introduction.

(U) We were not expected to look at the RDJTF as the sole U.S. deployable capability. We were to concentrate on issues raised by the CINCs, and on problem areas, not success stories.

(U) Within the time and resources available, the task force had to opt for breadth, not depth. We had to avoid some very influential issues--such as base availability--and to set aside other crucial problem areas such as our RDF posture for chemical warfare.

(U) We also accepted the notion that many problem areas do not need fresh technological solutions if other means are available. This has had the effect of limiting the overall technological tenor of this final report.

(U) Based on these ground rules, then, the task force makes no bones that its results are neither complete, balanced, nor thorough. We have certainly not unearthed all the problems, and we certainly have not found all the best solutions. Nonetheless, we may have taken a more comprehensive, unfettered, look across the entire RDF spectrum than any prior committee. Clearly, it is not enough, and we hope others will go on from here.



(U) This chart summarizes the ground rules which constrained the efforts of this task force. We do not pretend to have addressed all the problems, or even just the most important ones. We know that our work has not been complete, balanced, or thorough.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) On this chart we summarize the eight major impressions gleaned by the task force from their observations. These are summarized here and expanded on the following pages.

(U) We conclude, for instance, that there are substantial differences between typical RDF operations and those planned for NATO. Many of the problems seem to arise in cross-Service areas which are not as prominent for NATO contingencies.

(U) In many instances, RDF priorities conflict with service norms. Their problems run the complete gamut, and a robust capability will require very substantial funding.

(U) In areas outside the RDJTF itself, and above the level of the operational commanders, we found the emphasis on RDF concerns to be lacking, and considerations of real warfighting demands to be rather limited. These assertions will be further explained on subsequent pages.

(U) Finally, and more directly to our task force charter, there are many areas in which technology can help the RDF. Most of it already exists, and a large portion of it exists in the commercial sector.

(U) There is no way this task force could justify a high-technology "binge" in order to implement U.S. RDF objectives.

GENERAL TASK FORCE IMPRESSIONS

Substantial RDF-peculiar problems do exist:

- ★ RDF operations differ substantially from NATO planning
- ★ RDF deficiencies often reflect cross-Service problems
- ★ RDF priorities often run counter to Service norms
- ★ RDF problems run the full gamut of defense issues
- ★ A robust RDF capability will require substantial funding
- ★ There is ample evidence of inadequate RDF emphasis
- ★ RDF problems are amplified by lack of warfighting focus
- ★ Technology can help some, but is not the major issue

(U) The task force developed eight basic impressions from this investigation. These are listed above and elaborated on the following pages. Many of the problems are only peripherally related to applications of technology.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The differences between the customary NATO scenario and the most popular RDJTF scenario were far more extensive than first apparent to the task force members. Geography, environment, logistics, tactics, communications, mobility, and other aspects, are all very different. In fact, there do not appear to be common Service views on how important these contrasts are. As these differences emerge, it becomes more difficult to reconcile the "double-hatting" of forces to both contingencies.

(S) Most important, however, is the gradual realization of how difficult it will be for U.S. forces to deploy rapidly and sustain themselves in areas of the world where there is no U.S. or allied supporting base. Deployability, "transloadability" (from wholesale to retail delivery across the beach), major logistics interdependences, far more difficult communications, are all cross-Service issues exacerbated by RDF requirements. Extensive field exercises provide perhaps the only way to illuminate them.

(U) Moreover, RDF priorities appear to be quite different than the current Service norms. Their emphasis must be on maintainability and sustainability rather than major system modernization. Weight and bulk become more critical than the last few percent in performance, and operational delaying/interdiction tactics are different than the frontal defense requirements for the NATO theater.

GENERAL IMPRESSIONS (CONT)

★ RDF OPERATIONS DIFFER SUBSTANTIALLY FROM NATO
- remoteness, geography, and environment
- less commonality of Service experience & planning
- difficulty reconciling force "double hatting"
- lack of allies and modern cooperative infrastructure

★ RDF DEFICIENCIES OFTEN HIGHLIGHT CROSS-SERVICE DIFFICULTIES
- deployability and "transloadability" problems
- inter- and intra-theater logistic interdependences
- communications difficulties
- need for elaborate field exercises

★ RDF PRIORITIES OFTEN RUN COUNTER TO SERVICE NORMS
- sustainability/maintainability vs modernization
- weight/bulk of support and combat equipment
- dispersed, in-depth delaying tactics vs frontal defense

(U) This chart summarizes some of the major differences between RDF and NATO-oriented emphasis and priorities. These differences tend to highlight cross-Service difficulties, and to suggest a set of priorities quite different than the current Service norm.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The task force gradually became more and more impressed by the breadth of the issues confronting RDF forces, and by the inability of our group to focus on a few specific, quantifiable problems.

(C) As indicated on this chart, RDF problems run the gamut from small- to large-scale operations against major or minor opposition, and apply to both the teeth and tail of the forces. There are issues of sustainability, battle damage repair, medical precautions, C^3I, and training. And the solutions run the gamut from R&D to procurement.

(U) Equally important, there is a very large "dynamic range" in funding requirements. Some items are too small to warrant management attention; others, in the areas of strategic and tactical lift, could consume tens of billions within the next few years. The task force made absolutely no attempt to cost out any specific program solutions, and this report does not mention particular dollar sums. But the issues involve scores of ships, hundreds of aircraft, and thousands of vehicles.

(C) The summary conclusion to be taken from this is simply that RDF needs are not minor, nor are they simply a "subset" of NATO force requirements. Failure to recognize this will significantly delay the attainment of the desired capabilities.

GENERAL IMPRESSIONS (CONT)

★ RDF PROBLEMS RUN THE GAMUT
- few battalions to many divisions
- second-rate client to first-rate Soviet opposition
- combat--combat support--logistics
- sustainability/maintainability/medical
- communications/command & control/intelligence
- training/doctrine/cultural diversity
- R&D--T&E--Product Improvement--Acquisition

★ ROBUST RDF WILL REQUIRE SUBSTANTIAL RESOURCES
- from multi-billion dollar lift/prepo augmentation....
- ....to few million dollar special procurements

RDF NEEDS ARE NOT MINOR, NOR A SIMPLE SUBSET OF NATO NEEDS

(U) This chart summarizes more of the task force's general impressions concerning RDF issues. The "bottom line" is that RDF needs are neither small, nor a subset of equivalent requirements for our more conventional forces.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(C) Our assertion that the Pentagon emphasis on RDF capabilities is inadequate is based on comments made in each of the areas tabulated on this chart. There is little point in repeating those criticisms here.

(U) The basic point to be gleaned from this list, however, is that the vast predominance of these issues relate to capabilities that are either cross-Service in nature, logistic as opposed to combat, or procedural rather than program oriented.

(U) With the exception of what we consider to be too little design emphasis on the special role of interdiction in early RDF operations, most of these subjects are really very mundane. It is difficult at best to be enthused by requirements for tactical pipeline, or packaging 2.75" rockets in drums so they can be moved by rolling--without forklifts. Even the more basic issues of sealift and intra-theater airlift seldom attract the real trend-setters in or out of uniform.

(U) Nevertheless, these are the issues that will spell success or failure for the RDF forces. We are obliged, then, to formulate recommendations consistent with the need to emphasize these down-to-earth matters. Moreover, many of these are issues on which our American civil sector thrives: we need not be ashamed to turn in that direction for many of the solutions.

INADEQUATE RDF EMPHASIS

Shortcomings in these areas suggest inadequate RDF emphasis:

- communications
- sealift type & numbers
- airlift optimization
- use of prepositioning
- intra-theater lift
- across-the-beach needs
- tactical pipeline
- mobile intelligence assets
- efficient interdiction
- equipment tailoring
- packaging for mobility
- containerization
- unique environments
- maintainability
- navigation aids
- special item QRC
- test & evaluation
- exercise lessons learned

(U) This chart lists those areas covered in the body of this report where current efforts to support RDF appeared inadequate to this task force. Other areas not addressed by this group are thought to exist too (scatterable mines, airspace control, etc.)

SECRET

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The question of whether our RDF force preparations reflect adequate consideration of warfighting is difficult at best to address. It is not, in the first place, clearly the domain of a DSB task force. Yet by raising these several issues in this context, we hope to court controversy as a means of focusing attention on this serious matter.

(U) There are many who do not believe that nuclear war is likely. There are many others who do not really think that there will ever be bloodshed between NATO and the Warsaw Pact. Strategies developed for these contingencies tend to concentrate on technology more than warfighting.

(U) But RDF forces, if and when deployed, are very likely to have to fight in a battle of poorly constrained scope, duration, or even nationalities. They are the kinds of fire fights that could grow into WW III. They are a test of nerve between North and South. They must be predicated on the ability to fight--by almost any set of rules--and to persevere util some peaceful outcome can be arranged.

(S) The deficiencies summarized on this chart tend to suggest that much DoD emphasis on RDF favors posturing rather than warfighting.

CONFIDENTIAL

INADEQUATE WARFIGHTING FOCUS

Shortcomings in these areas suggest lack of focus on warfighting:*

- unique equipment and units for delaying actions
- en route attrition: defense and/or dispersion
- mine sweeping capabilities
- vulnerable intra-/inter-theater communications
- replenishment spares & maintenance/damage repair
- combat consumables (ammo, missiles, etc.)
- medical preparations and cultural understandings
- materiel packaging & administrative loading

CONFIDENTIAL

(U) This chart summarizes areas in which we found problems that can only be rationalized by an assumption that we do not really expect RDF forces to have to fight--on short notice in a strange place. Others may exist which we did not find.

* *Dr. Lederberg feels we have glossed over the crucial importance of early replacement of battle losses*

SECRET

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) This chart tabulates those areas discussed in the body of this report in which we could readily apply technology in order to improve RDF capabilities. The subsequent chart delineates those areas where we advise the operational forces that technology is unlikely to alleviate their problems.

(U) There are many more areas where we believe that technology can produce positive results than areas where we must acknowledge no imminent breakthroughs. And it is not very exotic technology.

(U) Of possibly greater interest is that among the 16 areas where technology is available for use, only a few are really predicated on new military technology (e.g., smart mortars, sensors, or lightweight armor). All the rest can benefit from existing technology in the civil sector, abroad, or already applied to the newer systems. This suggests that many RDF problems are closely related to problems already faced by the commercial world in the pursuit of commerce. If this is so, the U.S. should be able to excel.

(U) It might be noted here again that many other potential problem areas were not addressed either because they were not highlighted by the operational commanders, or because they were not unique to RDF. Chemical warfare, ECCM, airspace control, and several others would fall into this category.

GOOD TECHNOLOGICAL OPPORTUNITIES

These areas provide promising technological opportunities:

- modern logistic systems
- lighter vehicles/trucks
- specialized airlift
- existing equipment updates
- lightweight air defenses
- stand off weapons & sensors
- desensitized munitions
- commo components/relays
- improved interoperability
- improved countermeasures
- smart mortars
- engine fuel tolerance
- vaccines & medicines
- lightweight packaging
- lightweight armor
- war games & simulators

(C) As on the prior charts, this one summarizes the findings in the body of the report. In this case, we indicate those areas in which technology can be expected to help with RDF limitations and deficiencies. More often than not, civil technology holds the key.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) This chart is a companion to the preceding one and identifies five areas in which there does not appear to be much hope that technology can provide substantial operational improvements.

(U) The first two deal with major elements of the resupply problem: the provision of munitions and POL. The task force concluded that there are no major opportunities to reduce the weights of these commodities, per se. Nor do we see any significant opportunities to reduce their consumption rates.

(U) The third issue deals with the vulnerability of essential shipping to attrition en route. Although there appear to be some modest steps in technology which should be pursued, they do not offer a guarantee to eliminate losses at sea from submarines.

(U) The last two topics refer to the efficiency of the transport systems themselves. Again, no breakthroughs appear to be imminent. Because improvements in either aircraft or ship efficiency would have immediate applications in the commercial world, we doubt that any significant opportunity has been overlooked. As a matter of fact, we doubt that propulsion efficiency will increase fast enough to offset increases in the performance demanded from the transportation systems. Hence fuel consumption requirements are more likely to increase than decrease.

POOR TECHNOLOGICAL OPPORTUNITIES

These areas hold little promise for technology in the foreseeable future:

- significantly lighter explosive or propellants
- better fuels or alternative energy sources
- systems to provide anti-torpedo defense
- significantly higher logistic ship speeds
- significantly more efficient airlift

(U) The five areas indicated above do not appear to offer good opportunities for substantial technological improvements within the foreseeable future. They are fundamental to the successful deployment of RDF forces. We do not see the job getting any easier.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The majority of this task force would clearly have preferred to present OSD and JCS with a set of recommendations for specific items for hardware development or procurement, complete with a convincing rationale for their need and priority.

(U) We were faced with a clear dilemma, however, since we have not prepared quantitative substantiation, budget-grade costing, or even programmatic affordability. In fact, we cannot perform the necessary option trade-offs, nor can we be assured that we fully understand current DoD priorities. Certainly, we do not have the mechanisms for transferring to the Pentagon many of our concerns and impressions. In many respects, like the CINCs, we cannot hope to compete with Service and OSD program argumentation.

(U) Our second alternative, then, was to recommend a set of ad hoc procedural changes that may be useful in solving the institutional problems we sense exist in awareness and acceptance of the special needs of RDF forces. We are also deeply concerned by the number of serious cross-Service problems that hinder RDF effectiveness, and the apparent inability of the CINCs to influence the PPBS process. We also realize that we have not come to grips with all the problems, nor put them in priority order. Our final choice, then, was inescapable: we would address management, not hardware.

TASK FORCE DILEMMA

The Task Force had to choose between:

RECOMMENDING A FEW SPECIFIC ACQUISITION PROGRAMS....

- -- without rigorous quantitative substantiation
- -- without knowing budgetary implications
- -- without considering programmatic "affordability"
- -- without performing option trade-offs
- -- without confirming DoD strategic priorities
- -- without tranferring rationale to implementers

....OR RECOMMENDING A SET OF AD HOC PROCEDURAL CHANGES:

- -- to help raise OSD/JCS/Service awareness of RDF Issues
- -- to hasten institutional acceptance of RDF Needs
- -- to expedite solution of crucial cross-Service problems
- -- to improve CINC/RDF inputs to PPBS cycle
- -- to avoid prejudging/discarding "lesser" importance items
- -- to avoid shutting out additional worthy programs

WE CHOSE THE LATTER

(U) This chart attempts to spell out the two alternatives open to this task force in preparing their final recommendations. Reluctantly, the task force agreed that it could not make specific recommendations beyond the realm of management procedures.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) It is easier to draw conclusions than to formulate practical or original recommendations for eliminating the limitations and deficiencies found. Based on the rationale of the preceding chart, the task force has elected to propose management devices for raising Pentagon awareness and attention to RDF issues. This chart summarizes the seven specific recommendations that will be expanded on the concluding pages of this report.

(U) First, some RDF issues are very large, very basic, and very tough. The Pentagon has instituted the mechanism of the DRB for coming to grips with these. We suggest it address seven specific areas of concern.

(U) Next, we propose to set up certain budget line items for accommodating smaller RDF development and procurement issues. We also propose the establishment of special cross-Service program offices to solve three specific and fundamental issues related to RDF use.

(U) We suggest further studies to increase RDF awareness and understanding, and the addition of a Technical Advisor to the staff of the RDJTF command.

(U) New and unique problems often deserve special emphasis at the outset, and the designation of those expected to share the responsibility for action. We recommend a combined OSD/JCS working group to report to the DRB for 2-3 years.

RECOMMENDATIONS

IF DoD wishes to increase emphasis on rapidly deployable forces:

- ★ Bring selected issues before Defense Resources Board
- ★ Establish an RDF Product Improvement/Prototype Line Item
- ★ Establish an RDF Limited Procurement Line Item
- ★ Establish direct-funded cross-Service Program Offices
- ★ Encourage more analysis of RDF issues
- ★ Establish a Technical Advisor on RDJTF Command Staff
- ★ Establish an OSD-JCS Working Group under DRB

(U) This chart summarizes the seven recommendations of this task force. They are elaborated on the following final pages of this report. They represent seven specific ways to increase management focus on issues relevant to RDF capability improvement.

SECRET

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) This first recommendation deals with problems that are simply too big and too central to Defense resource allocation to be handled any differently than other major defense issues--head-on--through the DRB and PPBS processes. This chart identifies those issues that are both urgent and not susceptible to any special off-line treatment. We believe these issues are well enough defined for early DRB consideration.

(S) These first-order problems relate to major airlift and sealift programs, to intra-theater lift (which the task force feels is in dire straits), and to the issue of prepositioning which is so sensitive because of the need to buy duplicate equipment.

(S) There are additional major issues surrounding force sustainability from the standpoint of war reserves--both of munitions and spares. CINC preferences have never been followed in this regard. There is also a very important--though unglamorous--issue of providing means to transfer an army across the beach. This deserves a full-blown systems approach and the application of modern technology.

(U) Lastly, the nagging issue of acquiring adequate joint and long-distance communications has defied solution for a generation. RDF cannot effectively accomplish their objectives unless this issue is resolved once and for all.

MAJOR DRB RESOURCE ISSUES

★ BRING THESE MAJOR RESOURCE ISSUES BEFORE DRB
(as soon as they can be properly prepared:)

- sealift quantity and character
- airlift quantity and character
- intra-theater lift assets, air & ground
- prepositioning policies & criteria
- sustainability objectives for RDF forces
- total across-the-beach assets
- joint communications acquisition
- *

(U) First, the task force recommends that the series of issues summarized above cannot be resolved without direct and serious DRB involvement, if the RDF is to be a success. There are no management devices to avoid attacking these problems head-on--at the top.

* *Gen Dougherty believes that "long range, all-weather attack/ interdication aircraft" belongs here rather than page R-17*

SECRET

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) Throughout our effort, we found many areas where relatively small programs and force improvements might be very useful. The task force suggests that one of the best ways to stimulate attention to this area would be to set up RDF Product Improvement/Prototype line items within Service (and DARPA?) RDT&E budgets to permit priority funding of various demonstration programs. Each line item might reach $100M a year and be used only for RDF-related programs--as characterized on this chart.

(U) These prototypes could subsequently lead to production programs tailored to the specific needs of RDF. Many of our "show & tell" items could be given a chance to prove themselves under such a streamlined prototype program at relatively low cost.

(U) Our past Pentagon experience with prototypes has been very good, and has provided a valuable stimulus to the defense industry to address new problems.

(U) The chart shows several candidate programs for illustrative purposes. The task force recognizes that it has not undertaken a rigorous evaluation of any of these items. It is consequently in no position to make specific program recommendations. We believe that the existence of such a funded line item would soon surface deserving candidate programs with Service backing.

RDF PROTOTYPE FUND

★ ESTABLISH AN RDF PRODUCT IMPROVEMENT/PROTOTYPE FUND....
(within Service RDT&E budgets--and DARPA (?)--for:)

- tailoring mature/existing equipment to RDF needs
- demonstrating RDF-related new technology quickly
- assembling RDF-specific systems from existing pieces
- testing commercially available technology & systems
- improving maintainability/sustainability

....CANDIDATE PROGRAMS INCLUDE:

- 500MD helo tests
- C-130 mod prototype
- F-111 mod prototype
- air/def radar netting
- various vaccines
- new packaging concepts
- "guppy-ized" 707 prototype
- shallow water torpedo & decoy
- *

(U) This second recommendation proposes establishing prototype development funds to address the kind of technological opportunities raised throughout this report. These funds could provide a valuable stimulus to the RDT&E community. Illustrative samples are shown.

* *VAdm Miller would add "ocean environment calibrator" to this candidate list*

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) This task force also recommends the establishment of a parallel RDF limited procurement line item in each Service for procurement programs well below the DSARC threshhold, particularly aligned to few-of-a-kind procurements.

(U) Although it is not clear that the Congress would provide a blank check for these efforts, the intent is to set up a mechanism by which RDF-related items can be surfaced in a manner that does not require competition with all non-RDF-oriented programs. By definition, only RDF-related items would be welcome here. $100-200M per Service should be ample to start with.

(U) A variety of candidate programs could be drawn from our own task force observations. Relatively minor items like special operating forces (SOF) equipment, communications components, commercial computers, and even radio relay aircraft kits could be procured from this fund. Again, we do not consider that any of our illustrative candidates are necessarily the most appropriate items.

(U) The existence of this type of special line item would also provide a device through which the CINCs can "apply" for consideration of small procurement items without worrying about whether they rank in importance with nuclear carriers and strategic bombers. It is intended to offer a solution compatible in size with the problem.

RDF LIMITED PROCUREMENT FUND

★ ESTABLISH AN RDF LIMITED PROCUREMENT LINE ITEM....
(within Service Procurement budgets for:)

- small buys ($50 M) of non-standard RDF equipments
- special items for JCS/CINC headquarters mechanization
- special operating force equipment
- commercial communications adjuncts, etc.

....CANDIDATE PROGRAMS INCLUDE:

- satellite terminals
- secure commo links
- digital data links
- SOF equipment
- commercial computers for hq use
- cultural training films
- simulators for exercise control
- radio relay aircraft

(U) The third recommendation proposes establishing Service limited procurement line items restricted to small, RDF-oriented procurements. It is intended to provide a special focus for small programs that should not have to compete with the DoD giants.

CONFIDENTIAL

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The development and procurement programs indicated on the previous two pages would generally be carried out through normal Service acquisition processes. The task force feels, however, that some RDF-related cross-Service problems will never be solved through individual Service channels.

(C) We therefore propose the very selective establishment of cross-Service Program Offices funded from and reporting to Defense agencies outside normal Service channels. These would be used to solve the most important inter-Service problem areas. We believe only three qualify: joint communications, logistics assets, and civil reserve transport assets for military use in crises.

(U) These special offices would benefit from the use of Service program and technical expertise, but avoid the depressed priorities repeatedly assigned by the Services in these areas.

(U) Furthermore, the funding should not be allocated to, and then fenced from, Service use. This leads to the "out-of-our-hide psychoses" which often afflict the Services on joint programs. Rather, the funds should never go to the Services in the first place. They should instead be held at OSD or Defense Agency level and never be considered part of any Service's natural inheritance. DCA, DNA, JDA* (or the TOAs), or even DLA might be used for these purposes.

CROSS-SERVICE PROGRAM OFFICES

★ ESTABLISH DIRECT-FUNDED CROSS-SERVICE PROGRAM OFFICES:
(with funds programmed to Defense Agencies:)

- outside Service management/budget channels
- generally using existing contract administrators
- using skilled Service/Agency personnel
- for a few carefully chosen/explained purposes

....TO DEVELOP AND PROCURE SYSTEMS IN THESE THREE AREAS:

- RDF-related joint communications (JSCE/JMTSS/DCS)
- TOA transloadability and across-the-beach assets
- civil reserve asset modification (MAC/MSC/MARAD)

(U) This chart summarizes the task force recommendation to conduct a few large projects outside Service channels through special cross-Service Program offices. These would use skilled Service personnel, but be protected from Service usurping of funds.

* *Gen Shutler does not believe that JDA should become involved in acquisition matters*

CONFIDENTIAL

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The needs and opportunities for RDF forces have not yet been studied to death. There are many areas where this task force failed to come to grips with assigned problems, and many others which we disregarded from the outset as beyond our capabilities. These are summarized on this chart from prior discussions.

(U) Unlike the NATO battlefield which has dominated a generation of analytic studies, there is no such background resource for the RDF. We identified several areas where improved analysis could contribute to RDF aims. The first, of course, is to breed a fuller understanding of RDF characteristics. This is clearly still lacking.

(U) Second, better analysis can contribute the foundations for better war games, exercise control, operational planning, etc. Again, data, techniques, assumptions, terrain models, etc., exist in abundance for the NATO theater, but not for the RDF.

(U) Third, there are some basic decisions concerning whether to transport or to preposition, and the preferred modes for each, that are susceptible to analysis and modelling. Decision-making can be improved by analysis in this relatively virgin turf.

(U) Finally, program priorities, consumption rates, battle repair needs, and a host of other basic programmatic issues can be aided by suitable analysis.

RDF ISSUE ANALYSIS

★ ENCOURAGE MORE ANALYSIS OF RDF ISSUES:

- to support increased understanding of RDF
- to improve war games, exercise control, etc.
- to improve lift/prepo cost estimating
- to clarify RDF program priorities

....MAJOR EFFORTS ARE WARRANTED IN ALL THESE AREAS:

- full-cycle logistics
- enroute attrition
- RDF air defense
- long-range interdiction
- C^3 needs & vulnerabilities
- T&E support to RDF
- amphibious ship needs
- lift vs prepo costs

o C/B warfare
o EW warfare
o SOF needs
o decoys & deception
o health problems
o cultural issues

o = issues "set aside" by task force

(U) The chart indicates many areas which would benefit from further analysis, and suggests elements of the decision-making process that would be improved thereby. These areas have not yet been "studied to death."

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) Even though many RDF-related problems do not entail fresh technological solutions, they nonetheless have a high technical content. As previously discussed, there are substantial advantages in providing technical expertise on the staffs of operational commands. Both the command and the technical community can benefit--if the commander sees this association to be valuable.

(U) This task force believes that the RDJTF would gain from the presence of a suitably qualified technical advisor and, based on a hint of command willingness, we so recommend. We believe this individual/office can insure a more rapid transition of new technology to the RDF and probably improve the operational effectiveness of older technology as well.

(U) This chart suggests the qualifications and access (both at RDJTF and within the technical community) that a technical advisor must have. This is by no means an honorific or casual assignment. Moreover, the chosen individual must be fully knowledgeable of--and dedicated to--government RDT&E procedures, infrastructure, etc. Ideally, the individual would come from, and return to, a responsible DoD position.

(U) Finally, the technical advisor must have a broad charter to interface with both operational and support units, and to engage the RDT&E community in the full gamut of RDF activities.

RDJTF TECHNICAL ADVISOR

★ ESTABLISH A TECHNICAL ADVISOR ON THE RDJTF COMMAND STAFF with:

- recognized credentials & service in defense RDT&E circles
- personal access to USDRE & Service/DARPA RDT&E hierarchy
- personal access at RDJTF command level
- charter that encourages:
  - -- monitoring JTF and component technical activities
  - -- involving RDT&E community in tests & exercises
  - -- pursuing lessons learned/after action reports
  - -- improving RDT&E community understanding of RDF needs
  - -- ad hoc staff augmentation from DoD staffs and labs

(U) The sixth recommendation proposes to add a technical advisor to the staff of the RDJTF headquarters as a means of improving the technical contribution to RDF operations--as well as improving the RDT&E community involvement in, and understanding of, RDF needs.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

(U) The final recommendation provides a means for assuring the timely accomplishment of the preceding ones. The chairman and several members of this task force have participated in OSD-level committees convened for the specific purpose of highlighting a particular issue--such as Vietnamization or rearming the Israelis. This approach has been successful when sponsored at a high level in OSD.

(U) We suggest the formation of an "RDF Enhancement Working Group" reporting to the DRB and DepSecDef, with regular membership from those organizations involved in either defining or solving RDF-related problems. Chaired by a general officer picked by the JCS, it would provide an important forum for inserting and "translating" CINC requirements outside Service channels.

(U) The working group should emphasize the need to institutionalize RDF matters. If it is authorized to: impact on the PPBS and DRB Processes; review and start small programs; influence funding and testing; commission studies and disseminate RDF exercise lessons learned; there is no conceivable reason why RDF-related matters should not soon occupy a far more visible--and rational--place in the hierarchy of Pentagon issues. In fact, the working group's tenure should be limited from the outset, with residual functions returning to some permanent organization--possibly the JCS staff--within two or three years.

DRB WORKING GROUP

★ ESTABLISH AN "RDF ENHANCEMENT WORKING GROUP" UNDER DRB:

- chaired by JCS-picked general officer, with members from:
  - -- OSD Staff; JCS; CINCs; Services; Defense Agencies
  - -- 3-5 man administrative staff from RDJTF WLO
- reporting to DRB directly, and with authority to;
  - -- impact on Defense Guidance documents
  - -- raise DRB-level issues during POM cycle
  - -- suggest funding re-allocations if necessary
  - -- impact on Service equipment interoperability
  - -- influence exercises/tests/simulations
  - -- monitor ongoing and potential RDF Programs
  - -- champion additional small RDF-related programs
  - -- disseminate after-action reports
  - -- commission selected studies and analyses
- with "sunset provisions" to disband within 2-3 years
  - -- or devolve back into JCS staff function

(U) This chart shows the desired composition and authorities of a special temporary working group to address RDF issues at OSD/JCS level. A similar approach has been used before to highlight and resolve unique issues of substantial importance.

DSB TASK FORCE: TECHNOLOGY FOR U.S. RDF

Intentionally left blank

THE UNDER SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

RESEARCH AND ENGINEERING

17 NOV 1981

MEMORANDUM FOR CHAIRMAN, DEFENSE SCIENCE BOARD

SUBJECT: Defense Science Board Task Force on Rapid Deployment Forces

You are requested to organize a Defense Science Board (DSB) Task Force on Rapid Deployment Forces (RDF) with special emphasis on the use of technology to improve the U.S. RDF's capability over the next 5-15 years.

For the foreseeable future the national strategy of the U.S. will require it to maintain what are now termed "rapid deployment forces"--joint (multi-Service) forces manned, equipped, and otherwise supported for the purpose of protecting U.S. national interests, outside the NATO area, by projecting U.S. military power in areas remote from U.S. territory. Military planning for contingencies involving the use of these forces will have to proceed with uncertainties concerning political circumstances, locales, and the kind and amount of force needed. In spite of these uncertainties, force planners will have to provide capabilities sufficient to deter or to counter intervention by the armed forces of the USSR, or third-parties equipped with advanced weapon systems. Improvements in the tactics, doctrine, fire power, mobility, survivability, C^3I, and supportability of future rapidly deployable forces are needed.

This study should concentrate on the role technology can play to improve U.S. RDF capabilities. It should be predicated on the following as provided by the Organization of the Joint Chiefs of Staff: The current posture of the Army, Navy, Air Force and Marines to deploy rapidly and sustain forces in any area in the world, and projected posture for the future.

The study should answer the following questions:

1. What are the major current and future limitations/deficiencies of the RDF, as expressed by the operational commanders?

2. What technological innovations, including innovative use of existing technologies, could be used to significantly improve the U.S.'s rapidly deployable force capabilities by 1985 and in the 1990-1995 time frame? What technology development and other R&D have to be accomplished to assure Service integration by each time period? Specifically, but not exclusively, consider the following:

- The reconnaissance regime of the mid-1990s, seeking to identify the degree to which space-based sensors, RPVs, and other advanced means for locating and ascertaining the position of

ships, aircraft, or land forces are likely to assist or to inhibit planned modes of operation on land, in or on the oceans, the air, or in space.

- Transportation technologies likely to influence strategic (inter-contentinental), or tactical (intra-theater or battlefield) mobility.

- Training technology which might facilitate the training as well as exercising personnel in their wartime functions.

- Energy applications or other solutions to free the force of heavy, bulky impedimenta now associated with solid-chemical propellants, high mass projectiles, and petroleum.

- Logistic support systems.

- Weapons fire power.

- Command, Control, Communications and Intelligence technology and procedures, including special considerations for ad hoc multi-national operations.

3. Does the RDF organizational structure have an adequate mechanism for obtaining scientific/engineering support? If not, recommend a mechanism to insure rapid transition of new technologies for use by the RDF.

This Task Force will be sponsored by General David C. Jones, USAF, Chairman, Joint Chiefs of Staff. The Honorable Leonard Sullivan, Jr., Consultant, has agreed to serve as Chairman of the Task Force and LCDR Ralph E. Chatham, USN, Military Assistant to the DSB will serve as Executive Secretary. Lt. Col. E.F. Hasselbrink, USAF will be the Chairman, JCS' representative to the Task Force.