

Keynote Address

“REINVENTING AIR FORCE SPACE”

by

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Headquarters, Air Force Space Command

and

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Colonel Hal E. Hagemeyer is Chief of the Plans Division at Air Force Space Command headquarters, Peterson Air Force Base, Colorado. He is responsible for long range planning, space strategy and doctrine development, space and missile science and technology advocacy, and wartime contingency planning. Over his Air Force career, he has had assignments in Strategic Air Command, Air Force Systems Command, the Defense Intelligence Agency, the Office of the Secretary of the Air Force, the Strategic Defense Initiative Organization, and Air Force Space Command.

Col Hagemeyer is a graduate of the National War College and holds a BSEE from the University of Texas at Austin and a MSEE from the Air Force Institute of Technology at Wright Patterson Air Force Base, Dayton, Ohio. He is a member of IEEE, the Optical Society of America, the National Society of Professional Engineers, and is a registered Professional Engineer in the state of Ohio.

Dr. Richard O. Arvizu is currently Special Assistant for Reinventing Space, Directorate for Developmental Planning, Space and Missile Systems Center, Air Force Materiel Command, Los Angeles Air Force Base, California.

A graduate of the Defense Systems Management College, Dr. Arvizu holds an Acquisition Professional Level III Certification in Program Management and Developmental Engineering, as well as BS, MS and PhD degrees in Electronics Engineering and a Master's degree in Business and Public Engineering. Recent posts have included Senior Technical Advisor for the Space Technology Center Liaison Office; Deputy Program Manager for Systems Engineering for the Space Based Interceptor Program; Director of Engineering and Program Management for the Hughes Aircraft Company, Air Force Plant Representative Office; and Assistant Director for Specialty Engineering and Test at Air Force Space Division.

Reinventing Air Force Space

by

Dr Richard O. Arvizu

Air Force Materiel Command (AFMC)

Space and Missile Systems Center (SMC)

Directorate for Developmental Planning (XR)

Los Angeles Air Force Base, California 90245-4659

The Reinventing Air Force Space Action Team was directed by Air Force Space Command (AFSPC/XP) and Space and Missile Systems Center (SMC/CC) to jointly develop a new comprehensive and innovative approach for developing and deploying Space capabilities for the 1990s and beyond. The team was chartered to "Identify specific implementable actions which focus Air Force Space programs and structures, roles and responsibilities, planning and associated processes at the Major Command and lower level leading to an integrated business strategy and accompanying implementation plan." The main objective of the Reinventing Air Force Space Action Team was to define organizational responsibilities, programs, policies and funding profiles for providing an integrated, coherent program to solve the Air Force's most pressing Space mission needs. The initial discovery phase was conducted on 15 August through 6 September 1994 and the planning phase from 7 September through 29 September 1994.

Our Space management and operations are optimized on Cold War imperatives and outdated technical and industrial paradigms. The resultant "overhead" is undermining our ability to invest in the future. External ad hoc agencies are running our business while we play catch up. Culture change is mandatory for the Air Force to accomplish its mission. The Reinventing Air Force Space Action Team identified over 550 issues (essential elements of the problems and essential elements of the solutions), aggregated them into 21 specific actions and recommendations, and evolved those into five "Centers of Gravity", five Supporting Plans and six Supporting Recommendations:

A. Centers of Gravity:

1. Comprehensive Architecture -- An optimized set of Space capabilities that satisfy warfighters and national security requirements in a resource constrained environment. Unity of effort focus restores critical mass of authority and accountability which enables comprehensive, coherent and consistent Space advocacy. The Comprehensive Architecture includes a Space Architect which is responsible for policy and resource allocation; a Space Mission Architect which is responsible for mission design and execution; a Space System Architect which is responsible for system definition and integration; and supported by a refocused technology, product and program base, and empowered by an interactive forum.

2. FRONTIER ARENA -- The interactive forum for Space operations and modernization. This interactive forum will enable an aggregation of all stakeholders in Space to perform structured human-in-the-loop, hardware-in-the-loop, technology-in-the-loop; technical, financial, and operational; experiments, demonstrations, and exercises to support the Space Architecture decision-making, and education and training. FRONTIER ARENA will be continuously operating in virtual/real environment for making needs, concepts, technology, affordability, and utility trades.

3. Integrated Requirements Process -- Two cross-coupled requirements definition processes which together support and generate 25-year roadmaps for Space. One process to actively seek out Commander-in-Chief (CINC's), Services' and Agencies' needs to better understand and correlate them; and the other to seamlessly link the Mission Area Plans (MAP)/Technical Planning Integrated Product Teams (TPIPT)/Technology Master Process (TMP) processes together to facilitate formal requirements definition. Both of these two cross-coupled requirements processes require senior leadership to discipline the overall process to produce Mission Need Statements (MNS) which describes needs not solutions, and Operational Requirements Documents (ORD) which describe requirements not designs.

4. Horizontal Engineering -- Acquires Space capabilities as an integrated system rather than an aggregation of systems. It is an approach for maintaining quality and performance in a sharply resource (manpower) reduced environment which divests itself from encumbering overhead.

5. New Partnership With Industry -- Defense is no longer the majority stakeholder in Space, thus we must move the Department of Defense (DOD) to do what DOD does best and do only what DOD must do, and let industry become full partners in support of Space requirements.

B. Supporting Plans:

1. Joint Training -- A single office for the centralized management of all DOD Space education and training activities. This office would be responsible for the joint education, training and personnel resources that support United States warfighting. The single education and training organization would provide focused advocacy in building curricula with the Air Education and Training Command (AETC), including manning support to ensure Space has its place in training.

2. Commonality, Standardization and Interoperability (CS&I) -- An engineering approach which enables horizontal engineering; optimizes effective use of limited resources; underwrites economies of scale; and increases competition by reducing number of "proprietary players."

3. Consolidated Research and Development (R&D) Management for Space (Washington D.C. area) -- Establishment of centralized management function for all Secretary of the Air Force (SAF/Headquarters United States Air Force (HQ USAF) Space R&D planning and budget activities. This would ensure that Space R&D is tied to the Space Architecture; provide budget integrity for future system technology; more defensible budget; and enhance DOD Space R&D position in National Space R&D dialog.

4. Ground Operations Consolidation -- Consolidate ground operations for telemetry, tracking and control (TT&C) mission operations data distribution. This consolidation of TT&C ground operations would save resources; increase efficiency; decrease training and support costs; and underwrite ground segment product line concept.

5. Combined Test Force -- Create a single Test and Evaluation (T&E) organization for on-orbit Developmental Test and Evaluation (DT&E), Initial Operational Test and Evaluation (IOT&E) and Operational Test and Evaluation (OT&E). This single T&E organization would optimize T&E assets and capability and eliminate unnecessary redundancy. Space systems would be tested once through combined DT/OT with the user and other independent organizations, as needed. Requirements testability would be addressed from the outset of acquisition. Finally, test rigor would be matched to validated program risk.

C. Supporting Recommendations:

1. Fortify Space Doctrine -- Develop a comprehensive and coherent Space doctrine across the USAF to create common understanding, shared knowledge, and move to joint execution.

2. Transition Space Warfare Center (SWC) to Joint Space Warfare Center (JSWC) then to Space Applications Warfare Center (SAWC) -- Transition the Space Warfare Center to a Joint Space Warfare Center. Currently, United States Space Command is in the process of converting the Joint Space Warfare Center and the National Test Facility (NTF) into the Joint Space and Missile Defense Warfare Center (JSMDWC). The JSMDWC mission is to lead the focus of Space support to the warfighter and support Ballistic Missile Defense (BMD) at both the theater and national levels.

3. Inculcate Space in Warfighting -- Develop a full range of Space capabilities that must inculcate into warfighting from planning through execution. Initiate an Integrated Product Team (IPT), hosted by the warfighter, to focus on Space capabilities improvements on end user requirements. Also, provide a "24-hour hot line" through the SAWC for the warfighter to obtain information and help on Space assets and products.

4. Transition to a "Single Launch Service" for Expendable Vehicles -- Establish a single organization to perform all current squadron functions as we transition to the Evolved Expendable Launch Vehicle (EELV).

5. Tailor Financial Management Rules for Realities of Space -- Establish as policy that ensures incremental versus full funding for launch, and for funding mission incentives less than funding expiration time away.

6. Acquisition Improvements -- Continue acquisition reform and streamlining to facilitate rapid Space modernization and acquisition. Put the full force of leadership behind integrated requirements and FRONTIER ARENA processes; mandate that Mission Need Statements (MNS) describe mission needs not implementations, and that Operational Requirements Documents (ORD) define requirements not designs; have program directors and managers take full advantage of the DOD/AF waiver authority process; and continue and reinforce best practices and benchmarking.

The initiatives and strategies of Reinventing Air Force Space is mandatory for survival during these times of decreasing budgets and increasing user requirements. We can no longer afford to do business as usual. We simply must embrace the new paradigm of Reinventing Air Force Space to accomplish our important mission. The bottom line of Reinventing Air Force Space is that it improves mission accomplishment and improves Space stewardship. Reinventing Space is a path, not a destination. Under this new paradigm, we can have Global Presence, more tightly integrated Concepts of Operations (CONOPS), better joint execution, a common body of knowledge, improved warfighter-technologist partnerships, better resource allocation, more compelling advocacy, dramatically improved Interoperability, reduced acquisition timelines and budget resiliency.



REINVENTING AIR FORCE SPACE

IEEE

**1995 AEROSPACE APPLICATIONS
CONFERENCE**

***Space and Missile Systems Center
Directorate for Developmental Planning
Los Angeles AFB, CA***

DR RICHARD O. ARVIZU



What's Changed ?

- **The Original Foundation for US Space is Gone**
- **Maturing Commercial Sector**
- **Multi-National Investment in Space**
- **Rapidly Advancing Technological Base**

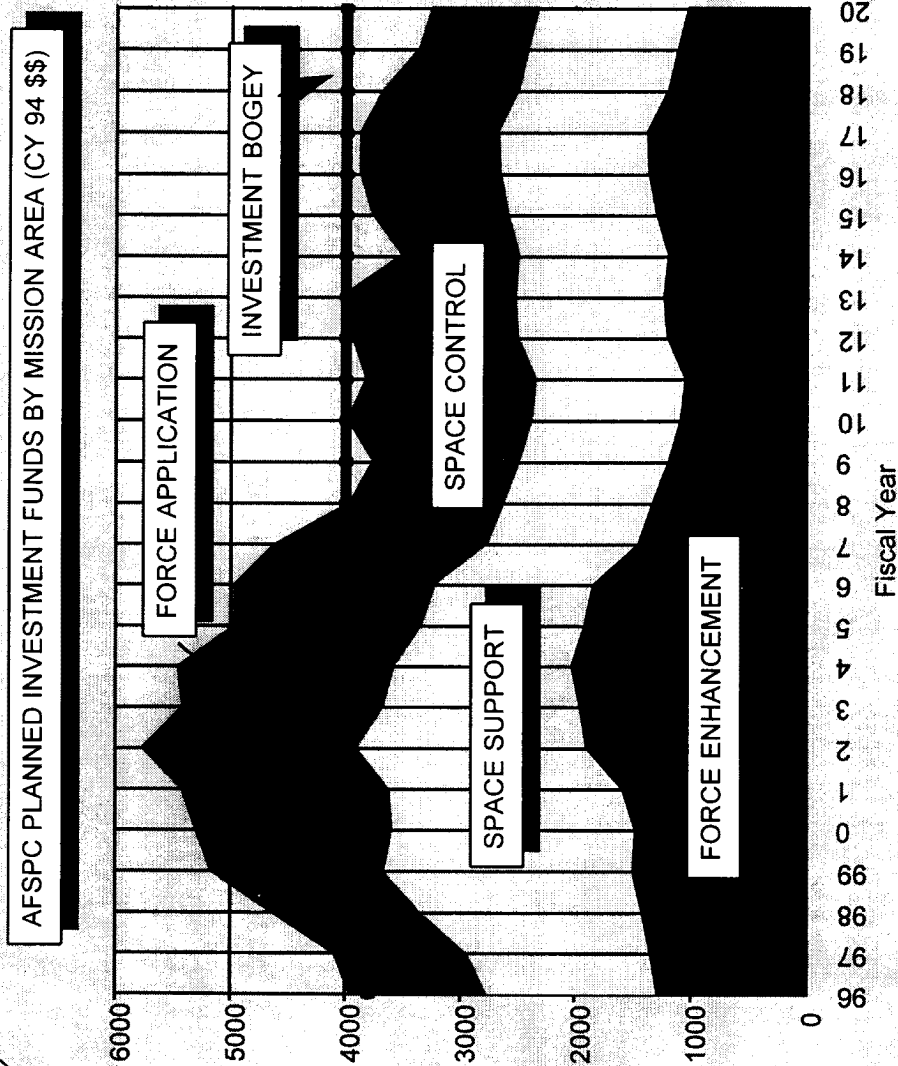
“This new context for the U.S. space program is so dramatically different, that a comprehensive reexamination of the fundamental premises and principles upon which U.S. space policy and organization have been based is warranted.”

The Wilkening Report, Dec 92

SOURCE: XPX INDUSTRY DAY BRIEFING



The Harsh Fiscal Reality



- Congressional Funding Direction
- Inability to Generate & Sustain New Starts
- Continuously Re-Assessing Investment Decisions

Creates a Perpetual Funding Bow Wave

SOURCE: XPX INDUSTRY DAY BRIEFING



Other Realities

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- **Since 1989 Space Has Been Managed By “External Ad-Hocracy”**
 - MILSTAR Restructures, Bottom Up Reviews, Milsatcom TSG, TW/AA TSG, Launch Modernization Study, SBIR...
 - Departmental and Congressional Bureaucracies Have Exploited the Seams and Gaps in Our Articulation of the Issues
- **Our Ability to Articulate the Issues Has Been Mediocre**
 - No Coherent Voice, No Common Frame of Reference, Institutional Legacies, No Respected Analytical Capability
- **The Most Common Pressure Point Has Been Requirements**
 - Those Based on Old Threat Were, by Decree, Wrong
 - Those Based on New Threat Were Immature at Best
 - All Were Over-Specified and Not Well Tied to Military Utility
- **The Harsh Fiscal Reality Masks the Personnel Reality**
 - ~40% Cuts in Modernization Personnel Coming



Terms of Reference

a/o 15 Aug

Charter

Identify Specific Implementable Actions Which ...

- Focus AF Space Programs, Structures, Roles & Responsibilities, Planning and Associated Processes at the MAJCOM and Lower Level

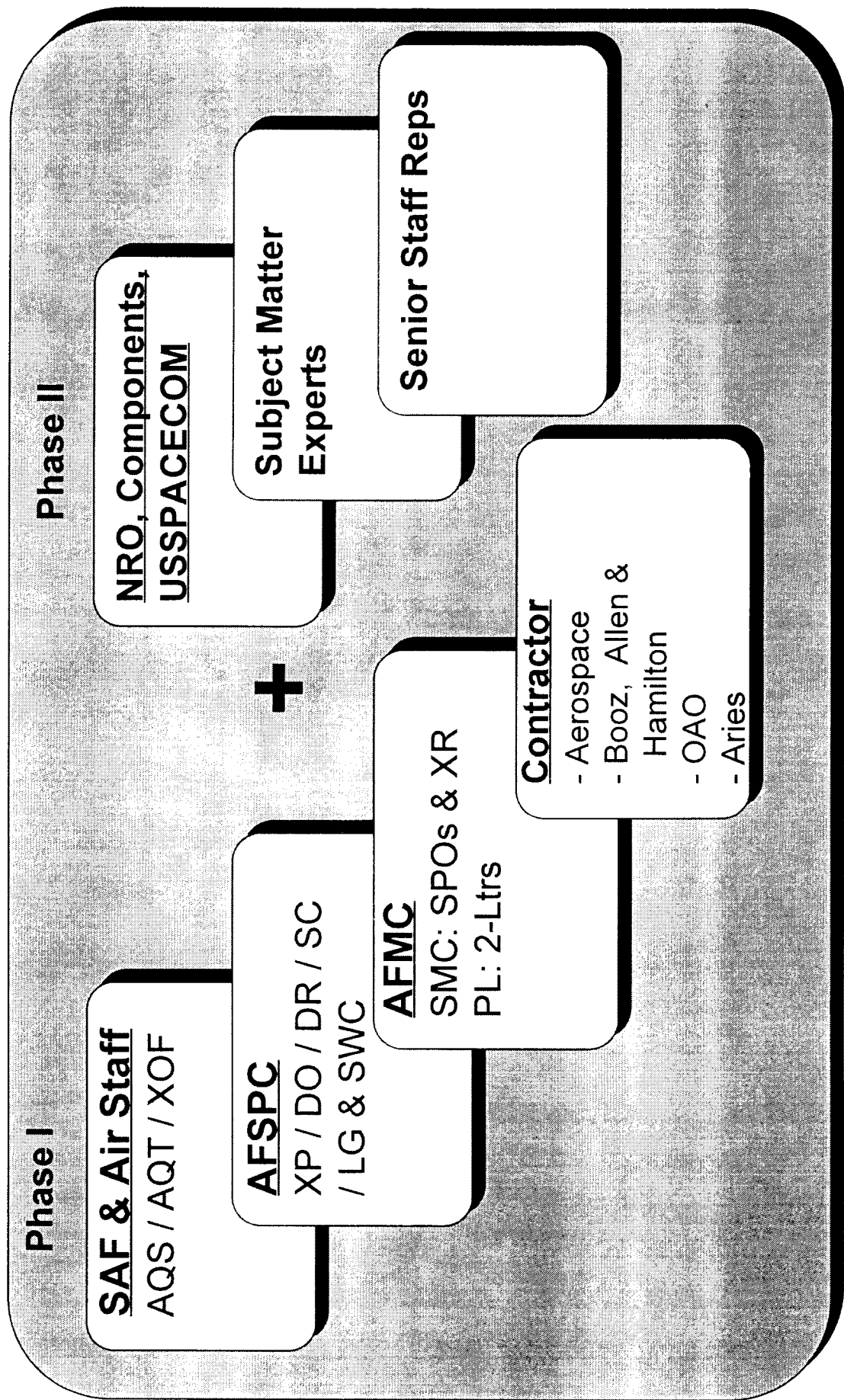
Leading to ...

An Integrated Business Strategy

Accompanying Implementation Plan



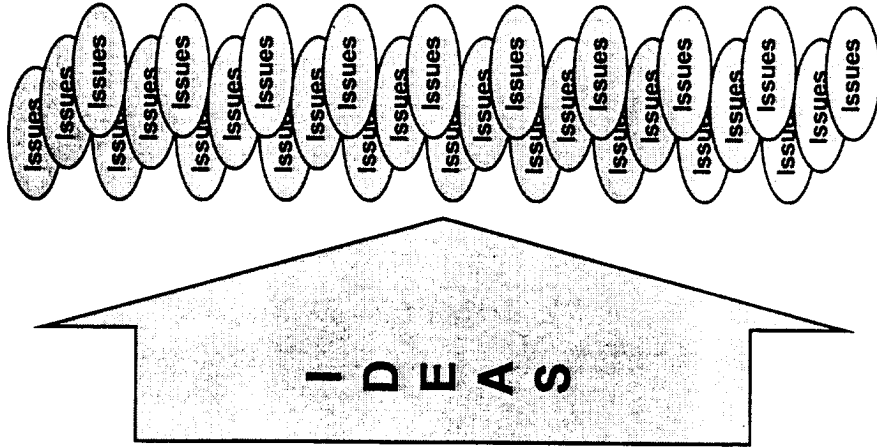
Action Group Participation





Phase I Generated Over 500 Issues →

Phase I



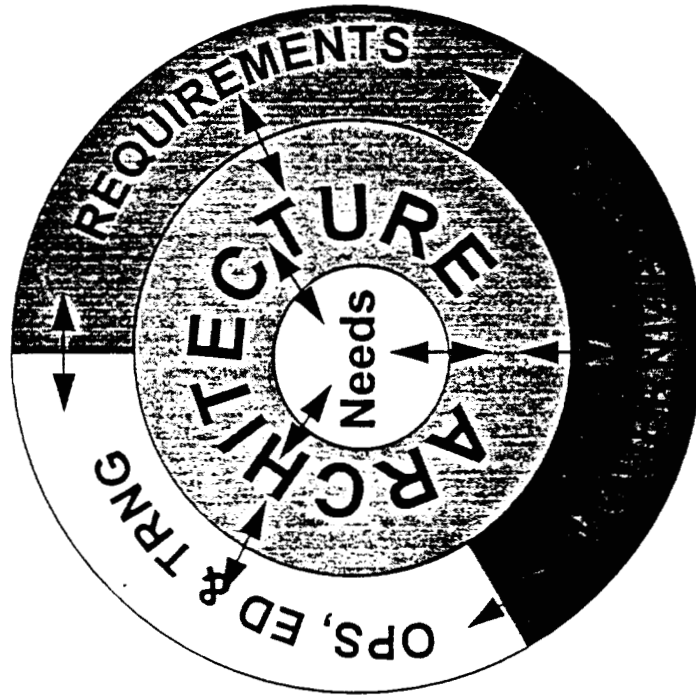


Issues Flowed Into a New Construct for Phase II

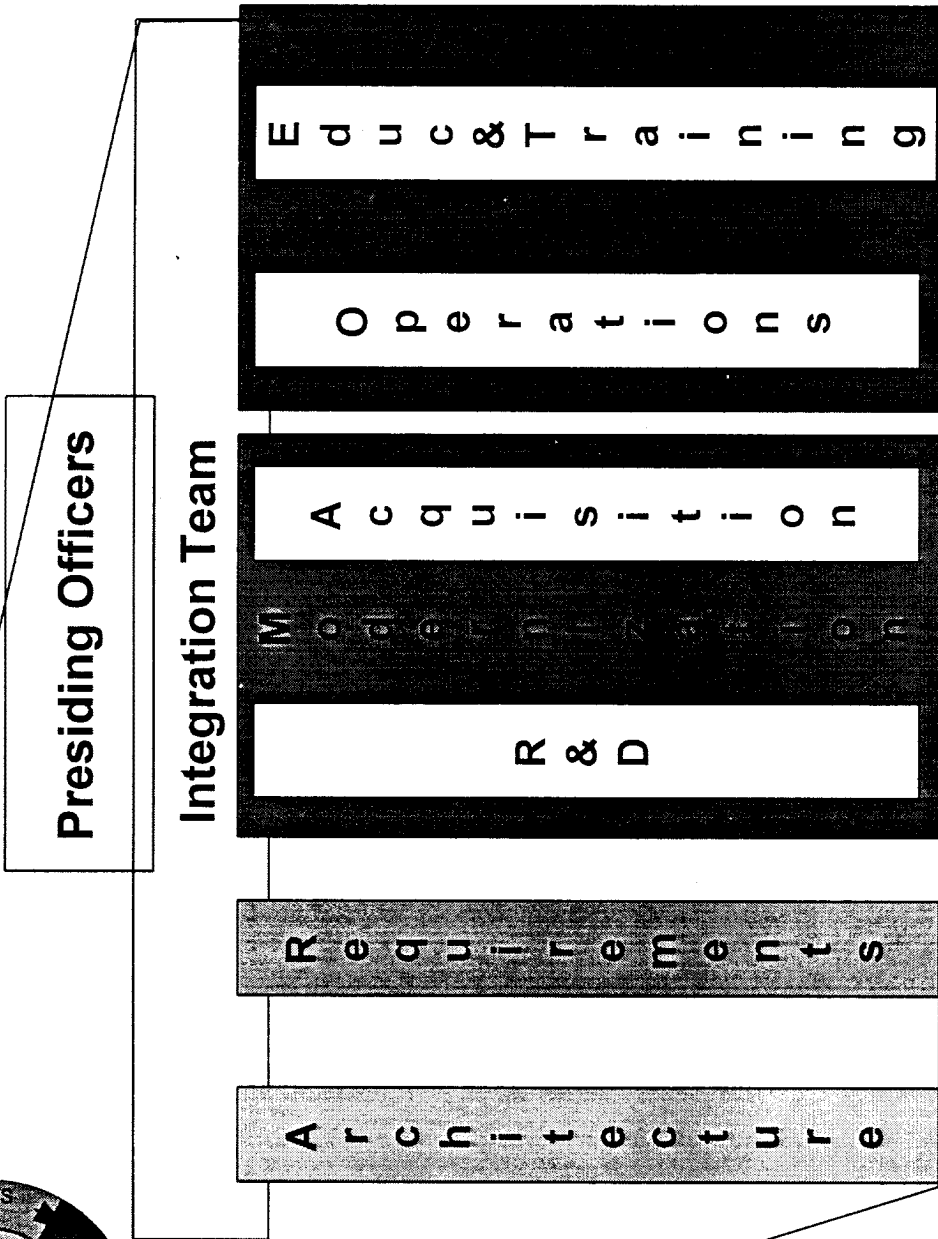
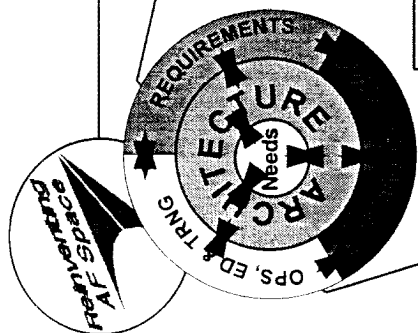
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- Needs Derive From Strategy & Doctrine
- Architecture Flows From and Is Bound to Needs
- Functional Responsibilities Flow From and Are Bound to the Architecture and Each Other
- Provides Foundation For
 - A **REAL** "New Way of Doing Business"
 - **Visibly** Improved Stewardship of the Nation's Space Capability

BEST COPY AVAILABLE



From The Construct We Organized



Allowed Early Focus on Action Ownership



Leadership & Membership



Presiding	Col Waln (SMC), Mr Spreen (PL), Col(Sel) Hagemeyer (AFSPC) [Maj Stevens (AFSPC)]
Architecture	Maj Hall (SMC), Maj Johnson (AFSPC) [Lt Col Eilers (SMC)]
Requirements	Lt Col Correia (AFSPC)
R&D	Mr Sciabica (PL)
Acquisition	Col Imler (SMC)
Operations	Lt Col Kaufhold (AFSPC)
Ed/Training	Lt Col Kaufhold (AFSPC)

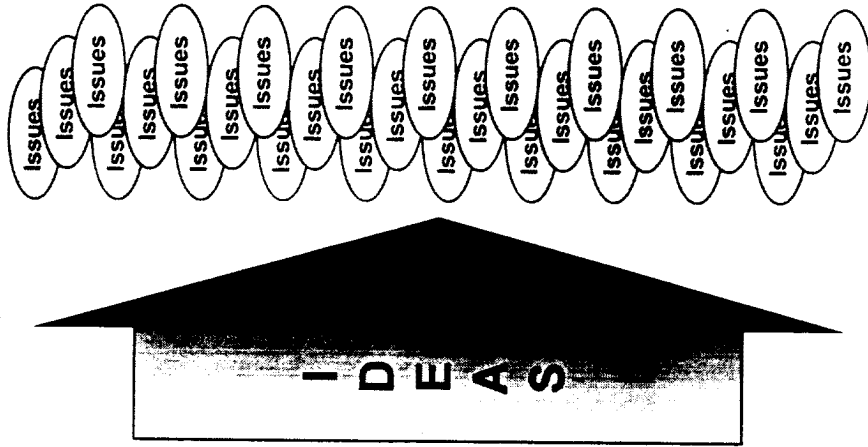
51 of the Finest in the Business

Made Best Integrated Use of Functional Expertise

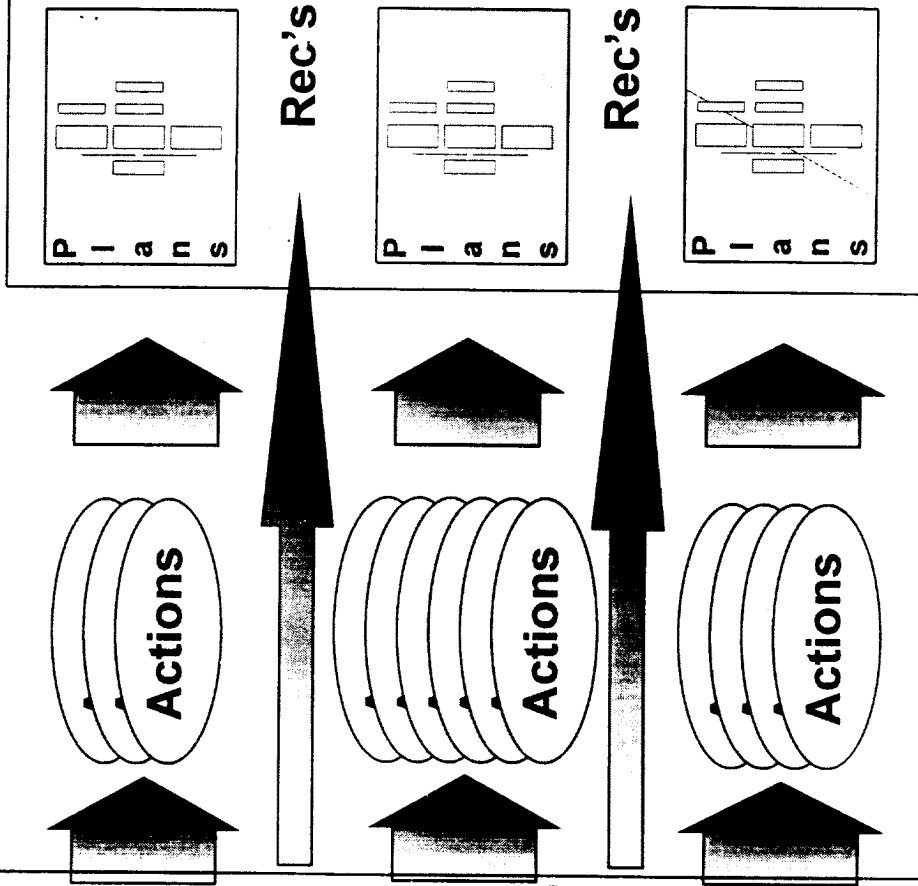


Executive Summary Target -- 27 Oct 94

Phase I



Phase II



Text Report
Exec Summ
Problem
Process
Product

Annotated Charts
+ Annexes

Briefings

15 Jun 15 Aug 7 Sep 16 Sep 7 Oct 27 Oct



Reinventing AF Space is a Path, Not a Destination

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- **Action Team is the Spearhead Effort**
 - Phase I Search For Opportunities
 - Phase II Develop Plans to Leverage the Best
- **Beyond Phase II**



Reinventing AF Space is a Path, Not a Destination

- **Action Team is the Spearhead Effort**

- Phase I Search For Opportunities
- Phase II Develop Plans to Leverage the Best

- **Beyond Phase II**

Real Culture Change
requires
Constancy of Purpose



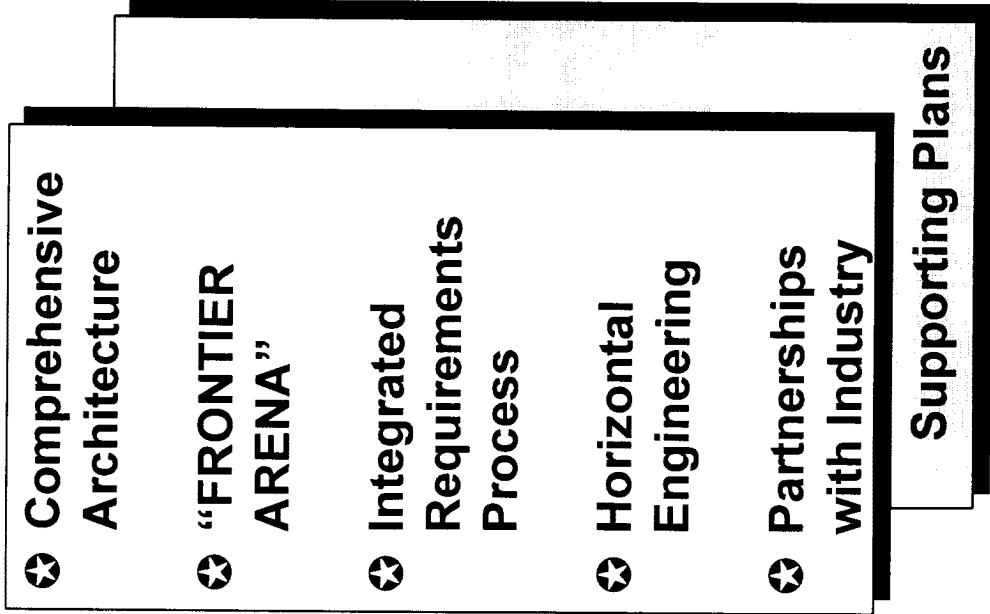
The Core of Reinventing Space



- ★ Comprehensive Architecture
- ★ “FRONTIER ARENA”
- ★ Integrated Requirements Process
- ★ Horizontal Engineering
- ★ Partnerships with Industry

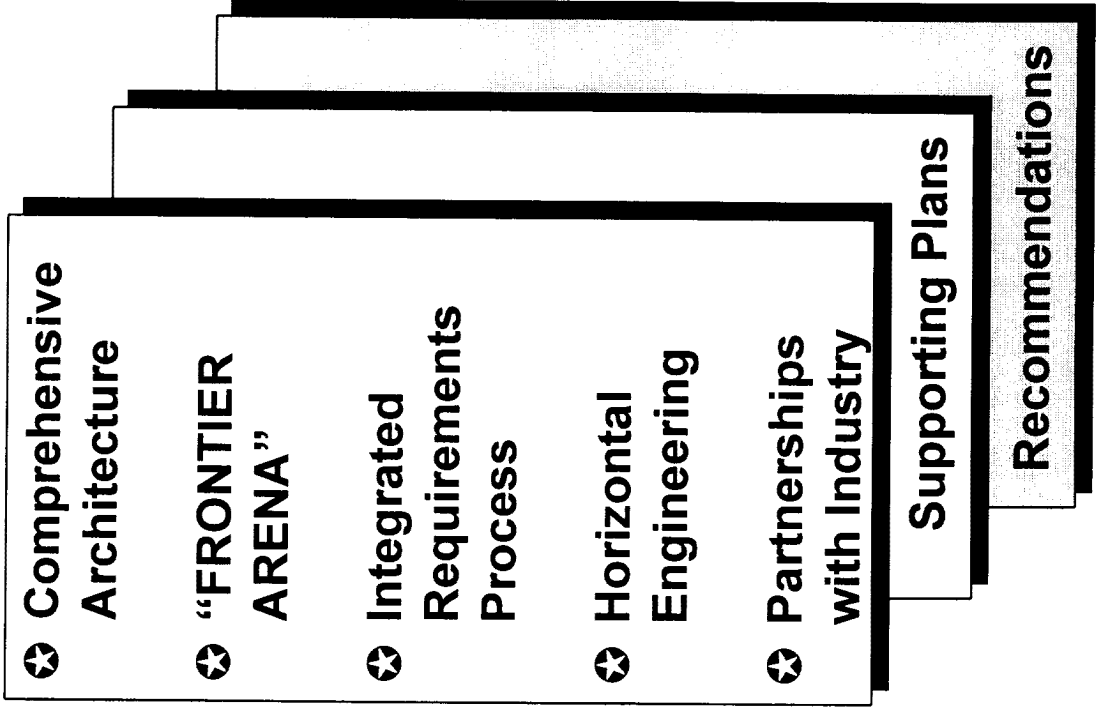


The Core of Reinventing Space



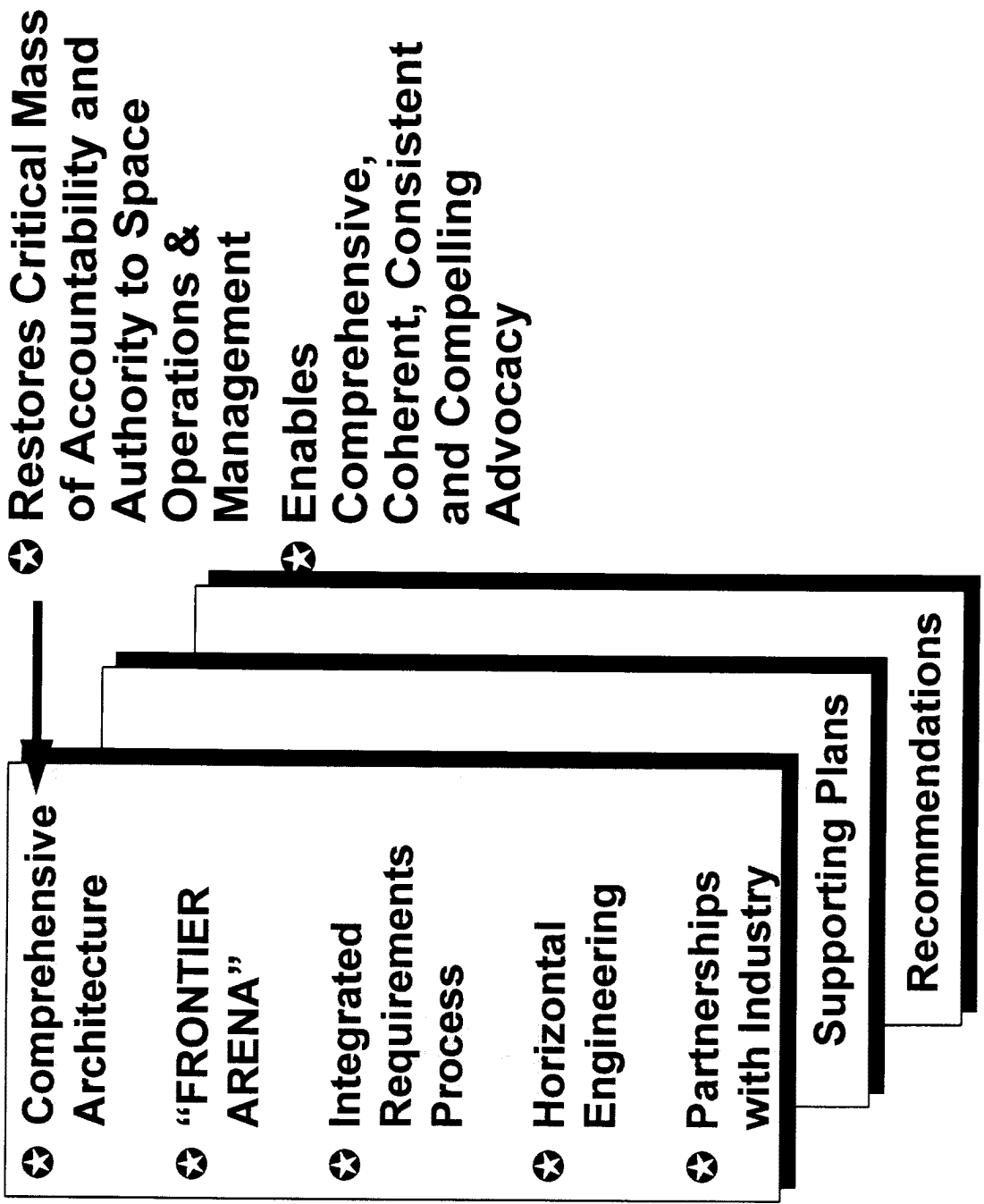


The Core of Reinventing Space





The Core of Reinventing Space





Comprehensive Architecture

Action

Develop and Implement a Comprehensive, Integrated Space Architecture

Define an optimized set of Space capabilities that satisfy warfighter and national security requirements in a resource constrained environment

Motivation

- Space systems are not well linked to military utility
- Requirements definition process is too slow
- Acquisition timelines are too long
- Current implementations do not promote interoperability across Space/End User community

How/Who/When

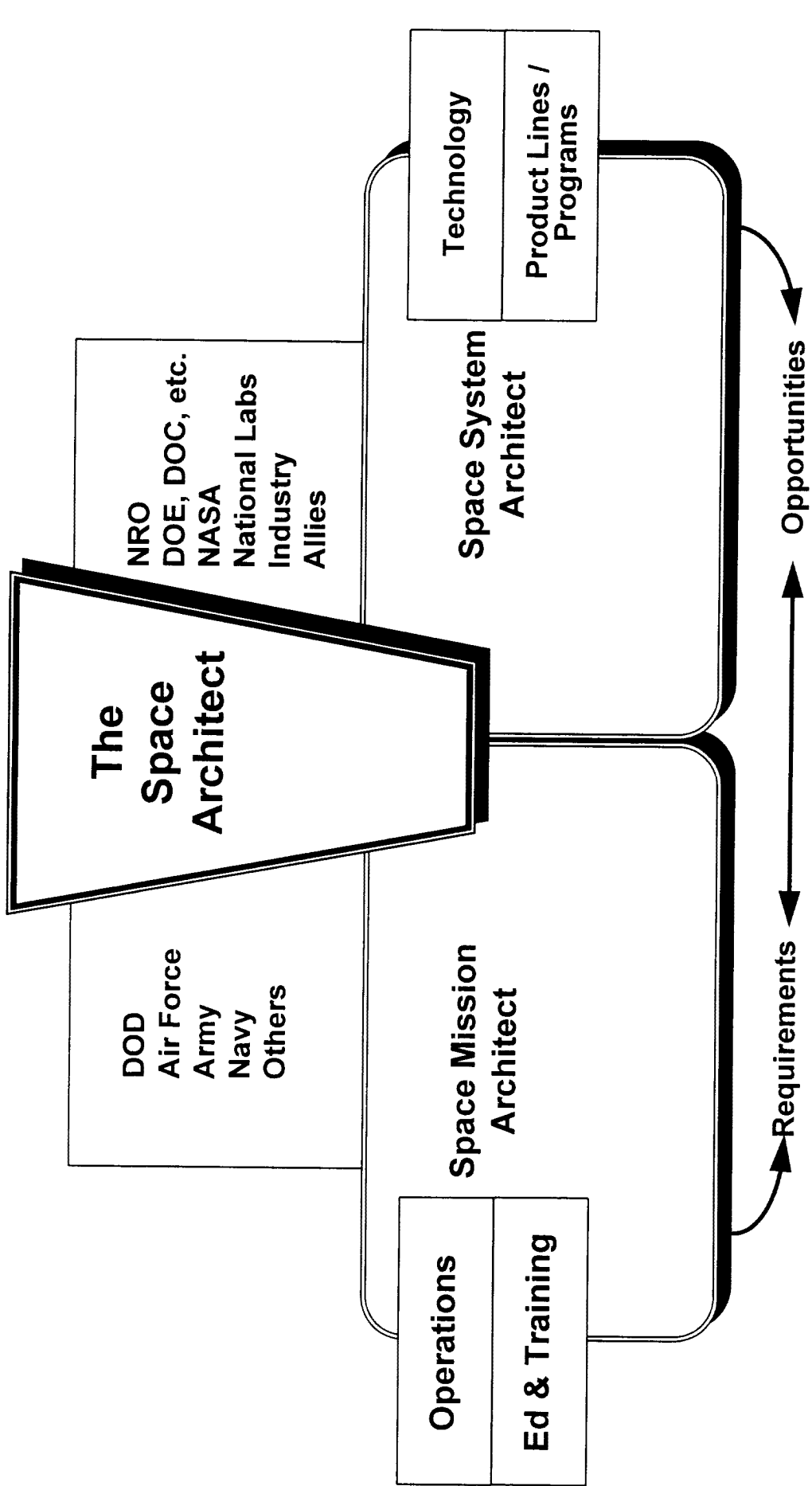
1. Identify Provisional Space Architect, (SECAF, Now)
2. Create initial Space Architect Cadre -- draw personnel from -- Senior Staffs -- MAJCOMs -- NRO and Other Services (SA, FY95)
3. Employ *Reinventing Space* Construct to create a transitional Integrated Space Architecture to drive FY95 cost constrained MAPs (Cadre, FY95)
4. Institutionalize single architecture concept via integrated investment strategy (SA, FY96)

Benefits

- Empowers a single spokesman for Space
- Shortens acquisition cycle
- Underwrites more affordable systems
- Promotes System of Systems solutions to warfighter and National Security needs
- Visibly improves our stewardship of space
- Improves internal dialog
- Disciplines Risk Management Process

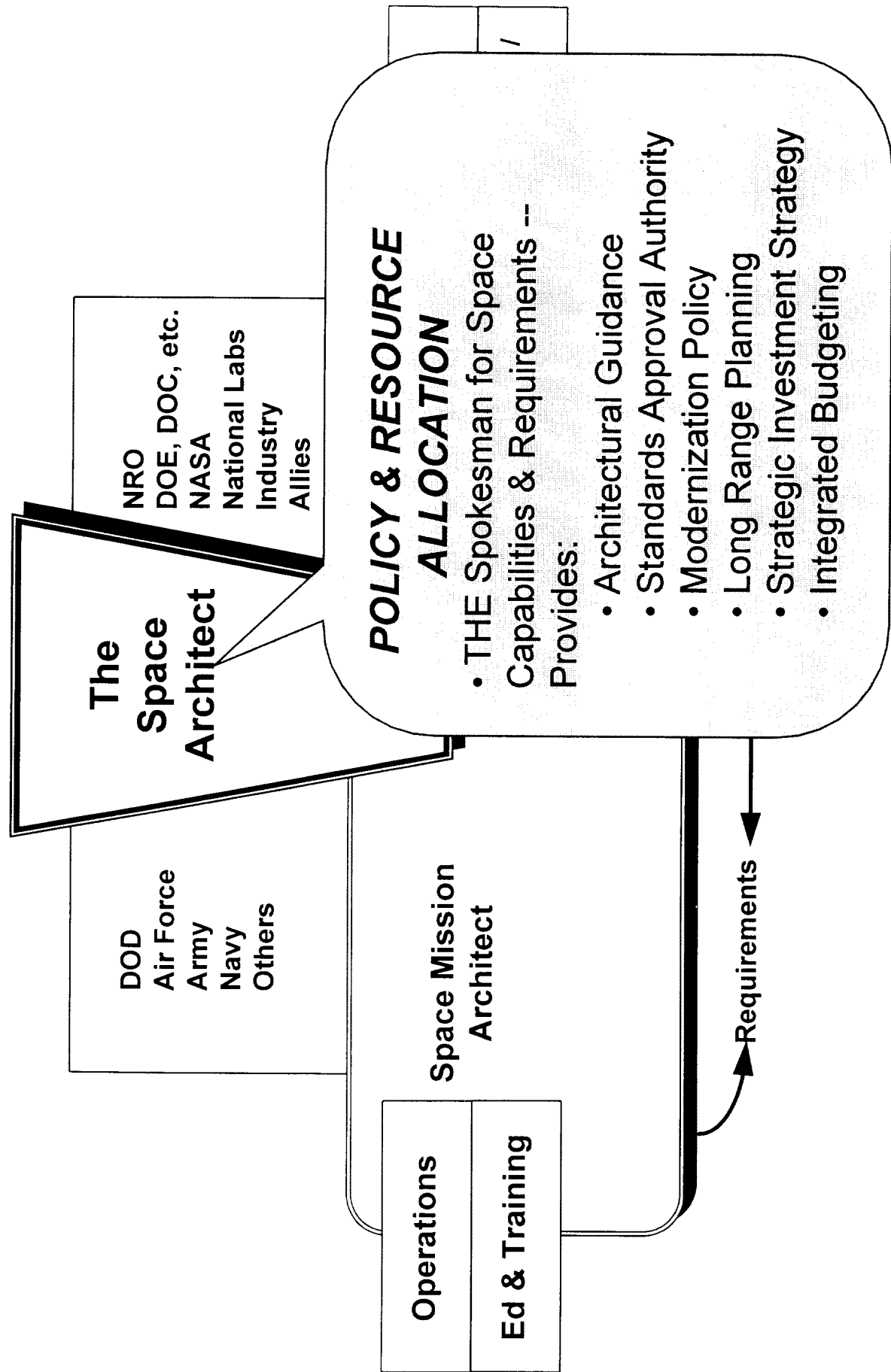


Proposed Architectural Construct





Proposed Architectural Construct





The Space Architect



- **Completely Responsible for the People, Processes, and Products Required to Generate Air Force Space Capabilities in Support of National Security Objectives**
- **The Air Force Voice for Space in Dialog with Other Space Stakeholders; Air, Land, & Sea Architects; and Resource Allocation Bodies**
- **Performs the Grand Scale Integration of Space Forces and Systems required to Execute AF Missions**

The “Golden Ruler”



Propose

MISSION DESIGN & EXECUTION

- Force Structure Characterization
- Requirements and CONOPS Development
- Mission Architecture Development & Integration
- Mission Standards Identification
- Technology Advocacy
- Military Utility Analyses
- Systems Exploitation
- OT&E (via Combined Test Force)

DOD
Air Force
Army
Navy
Others

Operations

Ed & Training

Space Mission Architect

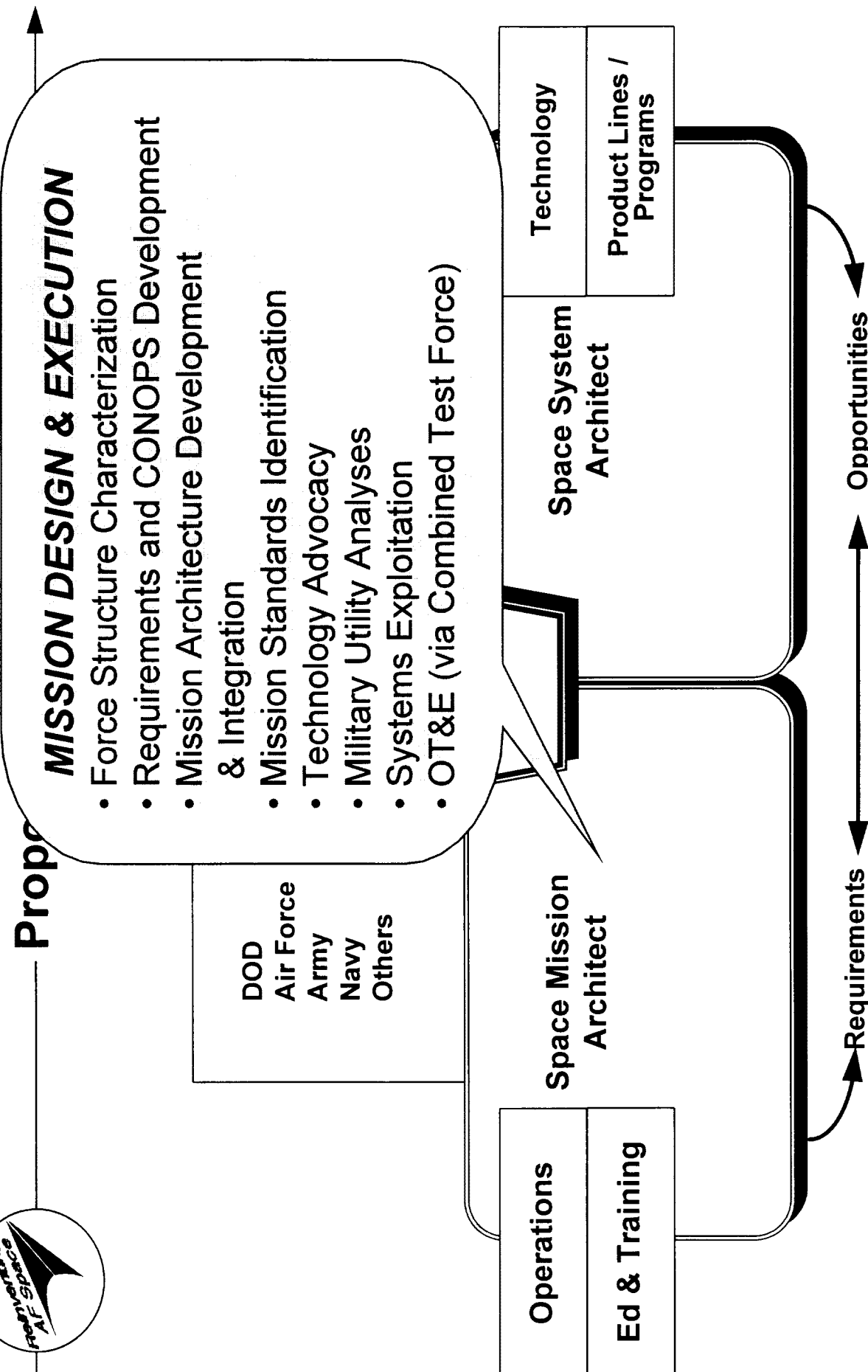
Space System Architect

Technology

Product Lines / Programs

Requirements

Opportunities



SYSTEM DEFINITION & INTEGRATION *

- Physical Architecture Development, Integration, & Evaluation
- Overarching Acquisition Strategy
- Coherent Advanced Planning
- Standards Deployment
- Systems, Cost, & Engineering Analysis
- DT&E (via Combined Test Force)

*Within the System Architecture, Program Management Authority & Accountability Remains with PEO/DAC

Construct →

C, etc.

Labs

Operations

Ed & Training

Space Mission Architect

Space System Architect

Technology

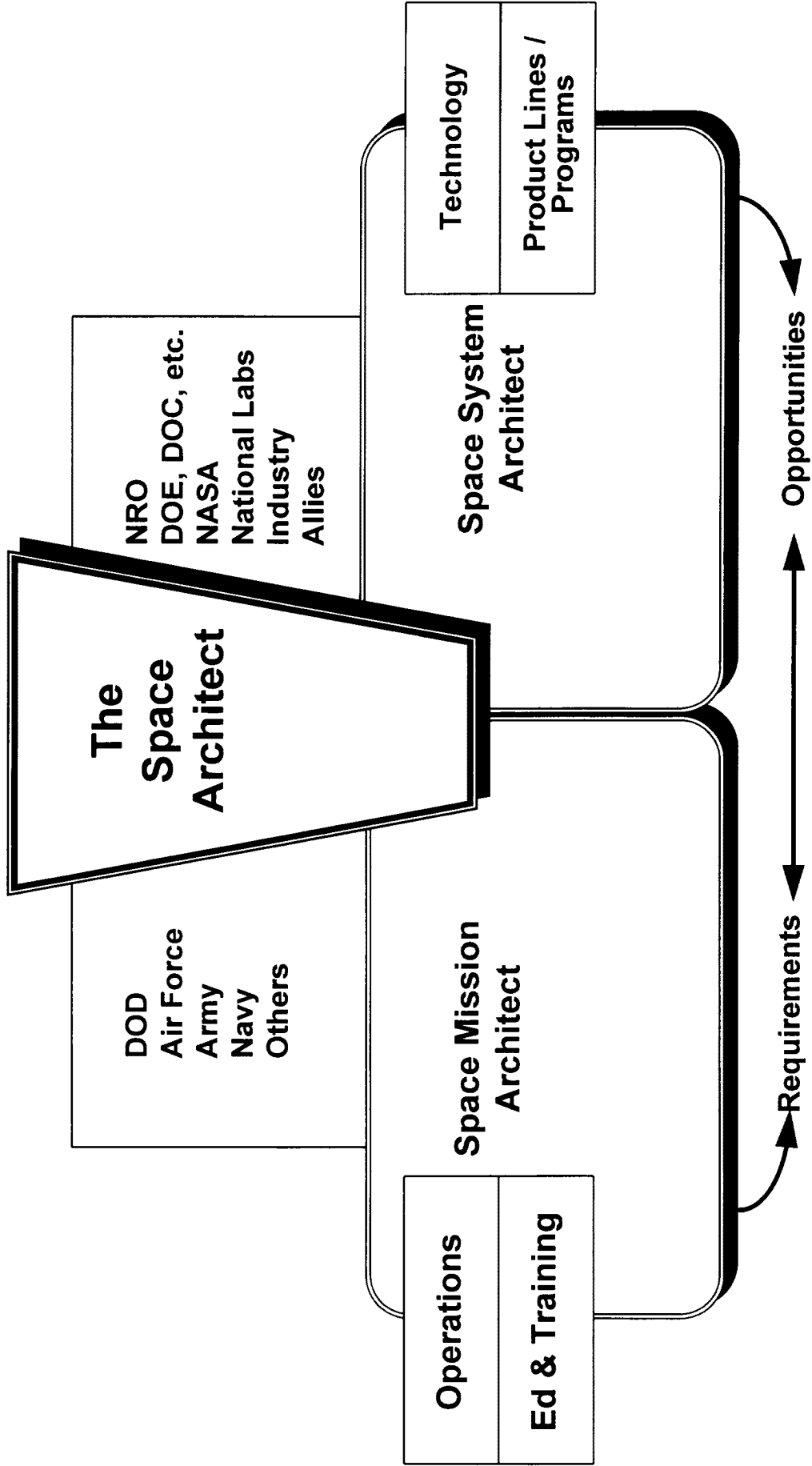
Product Lines / Programs

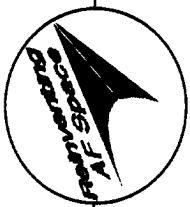
→ **Requirements** ←

← **Opportunities** →

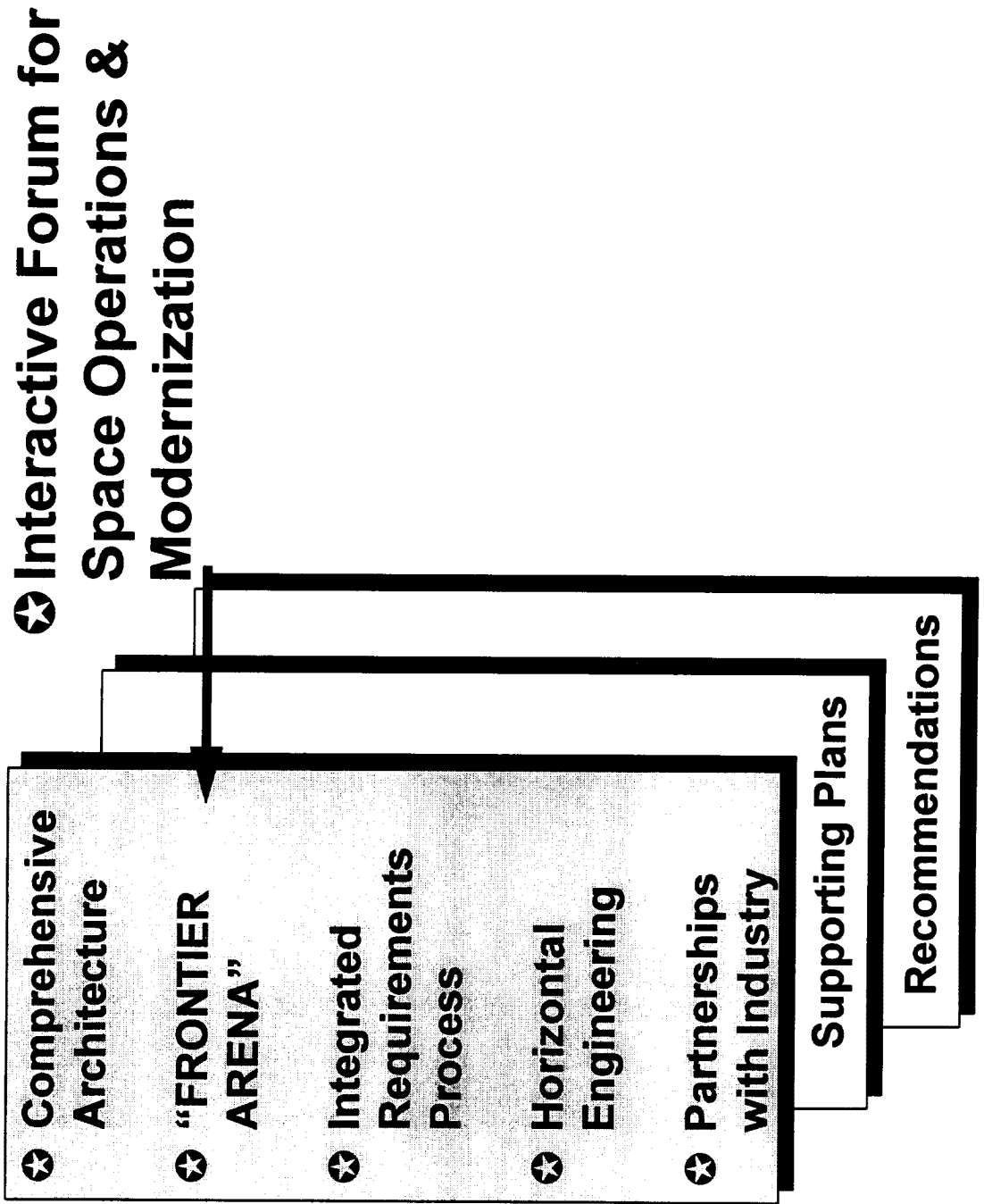


Proposed Architectural Construct





The Core of Reinventing Space





“FRONTIER ARENA”

Action

Motivation

Establish “FRONTIER ARENA” to support:

- Doctrine and tactics formulation
- Operational concepts evaluation
- Mission needs analysis
- Requirements development/refinement
- Technology evaluation
- Education/training and exercise
- Space exploitation

- Lack of a common frame of reference for evaluating Space options
- Disjointed requirements process
- Uncoordinated technology development
- Independent system development and execution

How/Who/When

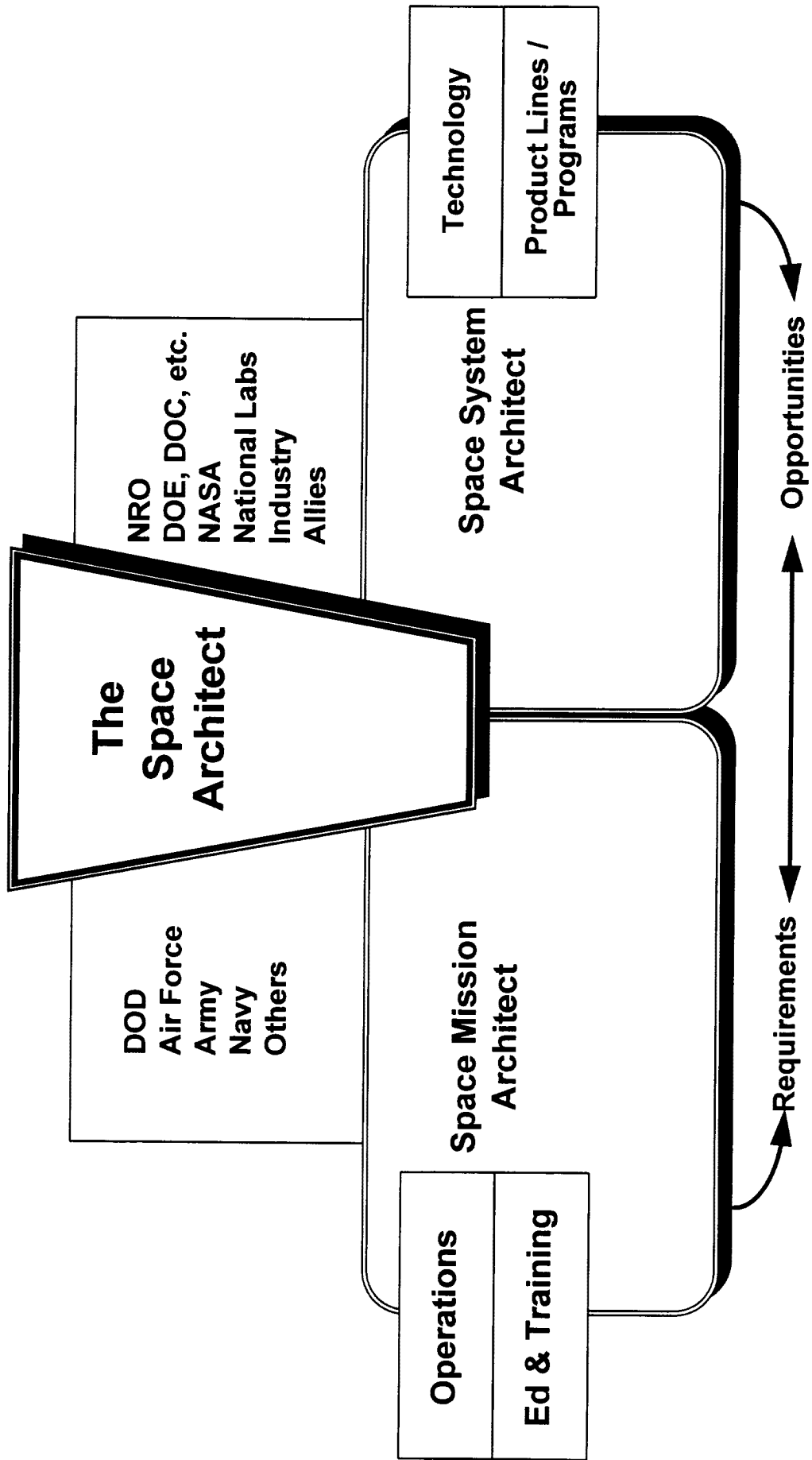
Benefits

1. Establish FRONTIER ARENA Cadre & complete “P-Plan” (SA, 1Q95)
2. Host at SWC operated by joint team reporting to Space Architect (IPT, 1Q95)
3. Combine and enhance existing network capabilities (IPT, 3Q95)
4. Develop open systems architecture for plug & play models/sims & other tools (IPT, 4Q95)
5. Establish user-friendly multi-media production & presentation capability (IPT, 2Q96)

- Enables synergy among stakeholders and players in meeting national objectives in space
- Leverages our shrinking resource base
- Trains the Troops



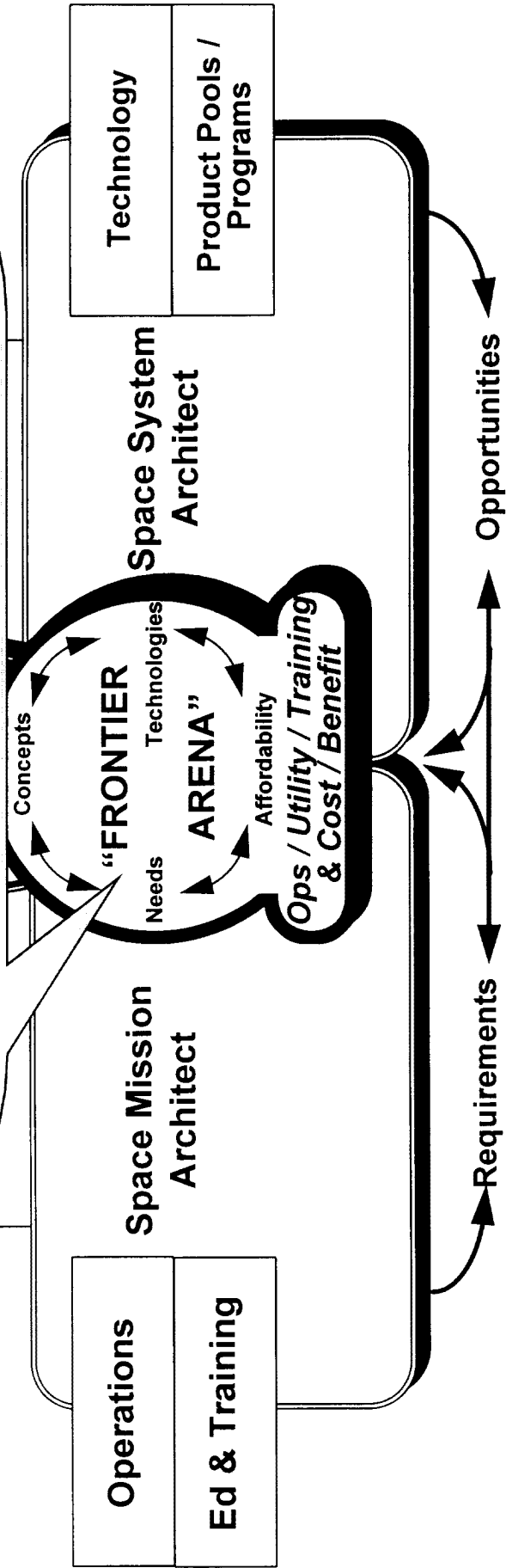
Proposed Architectural Construct





INTERACTIVE FORUM

- An Aggregation of All Stakeholders in Space
- Linked to the End Users
- Enable Technical, Financial, and Operational Experiments, Demonstrations, and Exercises
 - Designed to Support Hardware / Technology / Humans in the Loop
- Principal Environment for ATDs & ACTDs
- Multiple Security Levels for Maximum Utility





FRONTIER ARENA



- Can be Started by Linking Existing Resources
-- << \$\$ Required
- Can be Matured by Designing and Expanding Interfaces to Non-Traditional Users -- ~ \$50-100M over FYDP & \$10 to 15M/yr
- Can Be Perfected Over Time by Pursuing a Concept of Shared Ownership

**Saving One Year of Wasted Effort in Each of
Four Major Programs Pays the Tab**

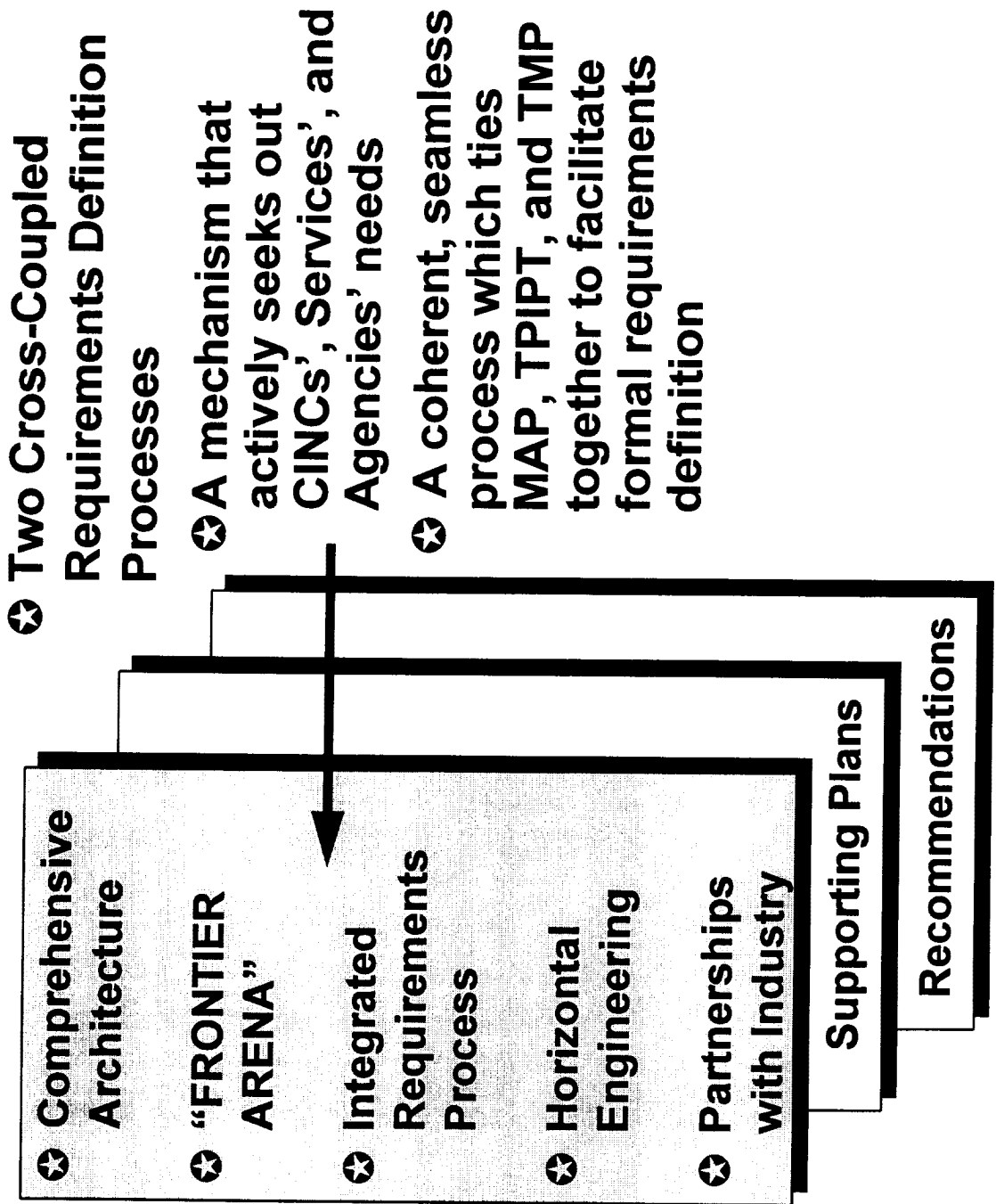


“FRONTIER ARENA”

- ★ Merge Virtual & Real Space
- ★ Support Space Integration into War-Plans
- ★ Global to “Foxhole”
- ★ Have End Users on the Network
- ★ Integrated Tasking Order Development with Human/HW in the Loop
- ★ Link to Flags & Exercises
- ★ Provide Space Applications Training
- ★ Incorporate Mix of Gov/Civil/Comm
- ★ Provides “Virtual” Fly Before Buy



The Core of Reinventing Space





USAF INTEGRATED REQUIREMENTS PROCESS

MILITARY NEEDS

- CINCs
- Components
- Services

DOD AGENCIES NEEDS

- ARPA
- DISA
- DIA
- DMA
- BMDO

"NATIONAL"

- NRO (Der
- CIO
- NASA
- NSA
- DOE
- DOT
- DOC
- CIA
- DOS
- CMO

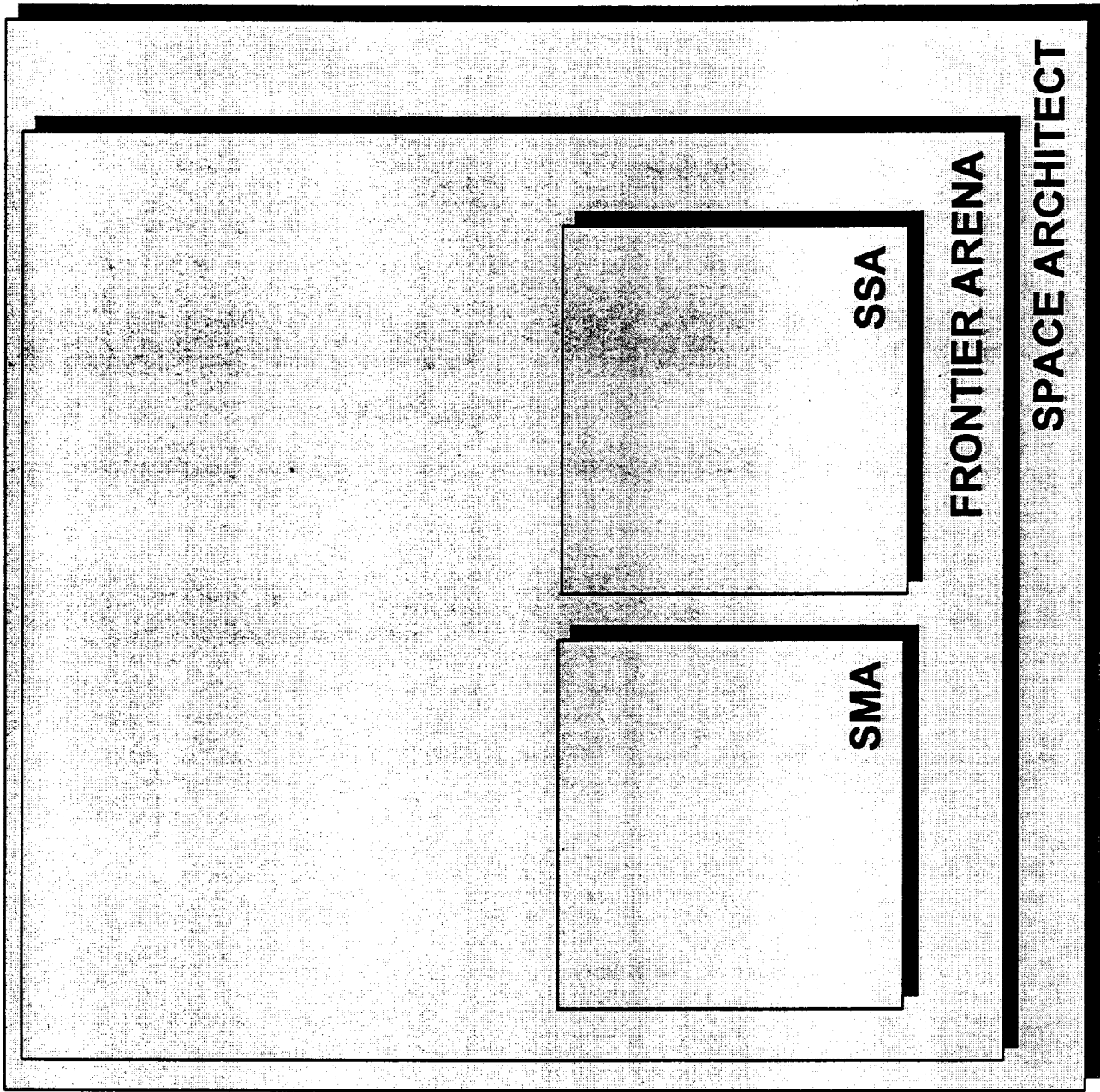


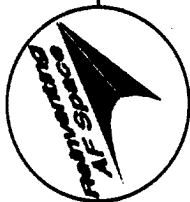
USAF INTEGRATED REQUIREMENTS PROCESS

- MILITARY NEEDS**
 - CINCs
 - Components
 - Services

- DOD AGENCIES NEEDS**
 - ARPA
 - DISA
 - DIA
 - DMA
 - BMDO

- "NATIONAL AGENCIES"**
 - NRO (Der)
 - CIO
 - NASA
 - NSA
 - DOE
 - DOT
 - DOC
 - CIA
 - DOS
 - CMO





USAF INTEGRATED REQUIREMENTS PROCESS

Collection

MILITARY NEEDS

- CINCs
- Components
- Services

COMMUNICATION

DOD AGENCIES NEEDS

- ARPA
- DISA
- DIA
- DMA
- BMDO

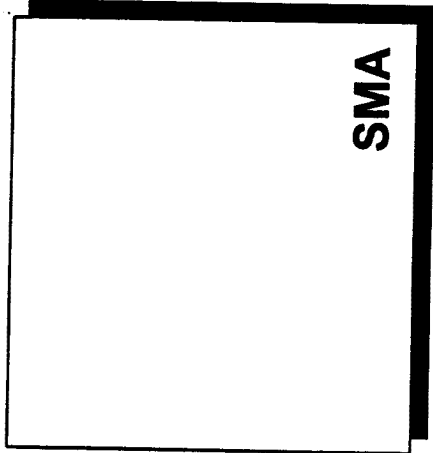
"NATIONAL" NEEDS

- NRO (Derived Reqt's)
- CIO
- NASA
- NSA
- DOE
- DOT
- DOC
- CIA
- DOS
- CMO

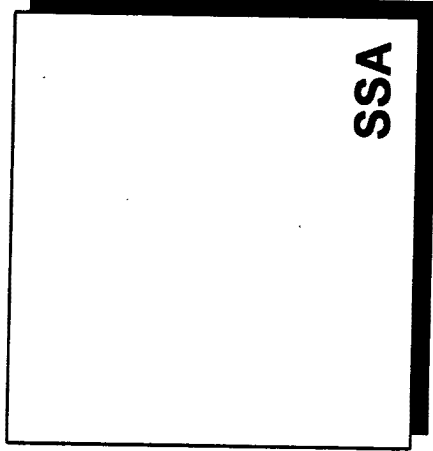
- Facilitator
- Collector
- "Mines" Needs Requirements Steward
- Maintains Overall Situation Awareness

SPACE REQ'TS

USSPACECOM/J-5
 Space Systems Integration Planning (SSIP)
 Low Fidelity



SMA



SSA

FRONTIER ARENA

SPACE ARCHITECT



USAF INTEGRATED REQUIREMENTS PROCESS

Collection

MILITARY NEEDS

- CINCs
- Components
- Services

COMMUNICATION

DOD AGENCIES NEEDS

- ARPA
- DISA
- DIA
- DMA
- BMDO

"NATIONAL" NEEDS

- NRO (Derived Reqt's)
- CIO
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- NASA
- CIA
- NSA
- DOS
- DOE
- CMO
- DOT

USSPACECOM/J-5

Space Systems Integration Planning (SSIP)
Low Fidelity

- Facilitator
- Collector
- "Mines" Needs Requirements Steward
- Maintains Overall Situation Awareness

SPACE REQ'TS

ALL REQ'TS

CROSS Coupling

Seamless MAP/TPIPT/TMP High Fidelity

SMA

SSA

FRONTIER ARENA

SPACE ARCHITECT

USAF INTEGRATED REQUIREMENTS PROCESS



Collection

MILITARY NEEDS

- CINCs
- Components
- Services

COMMUNICATION

DOD AGENCIES NEEDS

- ARPA
- DISA
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- BMDO

"NATIONAL" NEEDS

- NRO (Derived Reqt's)
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- Facilitator
- Collector
- "Mines" Needs Requirements
- Steward
- Maintains Overall Situation Awareness

SPACE REQ'TS

USSPACECOM/J-5

Space Systems Integration Planning (SSIP) Low Fidelity

ALL REQ'TS

Cross Coupling

Seamless MAP/TPIPT/TMP High Fidelity

SMA

SSA

FRONTIER ARENA

SPACE ARCHITECT

- IPL
- IAR
- CSPAR
- MNS
- ORD
- Other



Integrated Requirements Process

Action	Motivation
<p>Create a proactive mechanism that seeks out and appropriately incorporates CINCs', Services' and Agencies' needs for accommodation in the MAP/TPIPT/TMP processes.</p> <p>How/Who/When</p> <ol style="list-style-type: none">1. AFSPC request USSPACECOM/J5 serve as requirements collection focal point (AFSPC/CC, 1Q95)2. JSWC "mine" warfighter needs from O-Plans and forward to J5 (JSWC, 1Q95)3. AFSPC/XP/DR and J5 continue and expand dialogue on integrated requirements process and refine mechanisms (J5, 1Q95)	<ul style="list-style-type: none">- No vehicle to effectively understand and integrate and correlate all customer Space requirements <p>Benefits</p> <ul style="list-style-type: none">- Correlates MAP/TPIPT/TMP into USSPACECOM's Space System Integration Planning (SSIP) process- Builds End-User trust- Provides linkage between IPL's, Service-specific MNSs, ORDs, etc.



Integrated Requirements Process

Action

Establish and enforce a coherent and seamless process which ties the MAP, TPIPT, and TMP together to facilitate formal requirements definition.

Motivation

- Linkages among concepts, systems, technologies and requirements are weak
- Articulation of military utility is weak in the resource allocation process and has been unpersuasive

How/Who/When

1. Identify and transfer appropriate advance planning responsibilities from DAC/PEO programs to the Space System Architect (DAC/PEO, 2Q95)
2. AFSPC/CC, SMC/CC and PL/CC MOA to establish working relationship Across the MAP/TPIPT/TMP processes (AFSPC/SMC, 3Q95)
3. Establish a master schedule to bridge the MAP & TMP process via the TPIPT (AFSPC/SMC, 1Q95)

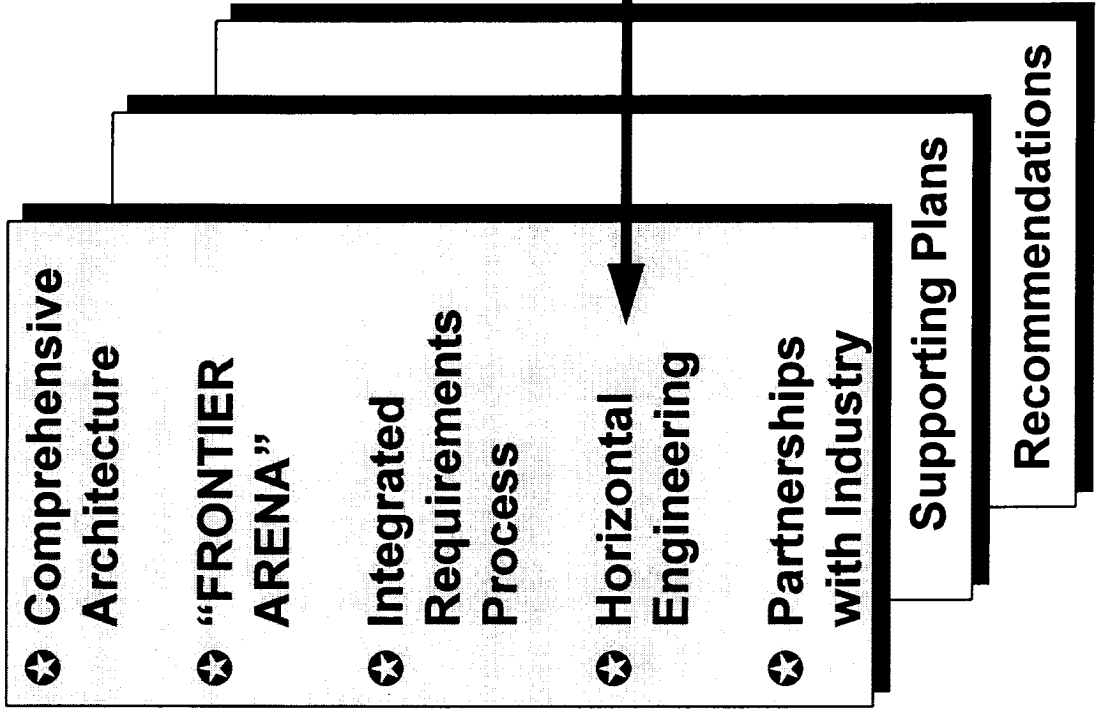
Benefits

- Rationalizes mission planning and technical planning
- Facilitates more timely ORD production



The Core of Reinventing Space

- ✧ Acquire Space Capabilities As an Integrated System Rather Than an Aggregation of Systems
- ✧ An Approach to Maintaining Quality and Performance in a Sharply Reduced Resource Environment
- ✧ Divest Encumbering Overhead, Both Staff and Program Office





Horizontal Engineering

Action

Motivation

**Adopt Horizontal Engineering
As Standard Business Practice
for Space**

- Interoperability is Missing Across Space Systems
- Paying for Excess Overhead From Duplication of Effort Across Product Centers
- Expertise Not Shared Well

How/Who/When

1. Link Planning, Functional Engineering, & CS&I Management (SMC, 1QFY96)
2. Set-up Product Lines (SMC, PL, 3QFY96)
3. SPOs Divest Excess Overhead Functions (SMC, 3QFY96)
4. Modify Program Doc's As Required
5. Structure Metrics to Emphasize:
 - Customer Needs (SPOs, AFSPC, etc..)
 - Continuous Process Improvement (Functional Areas, 1QFY95)
6. Deploy Concept in Education and Training Base (SMC, FY95)

Benefits

- Improves Resource Utilization and Enables CS&I Implementation
- Provides a More Flexible Technical Support System Between Programs
- Optimizes Talent Available to SPOs
- Increases Lessons Learned Flow Across Products and Programs
- Amplifies the Benefits of a System Architecture
- Enhances Competition in a shrinking Industrial Base



Horizontal Engineering

Key Elements

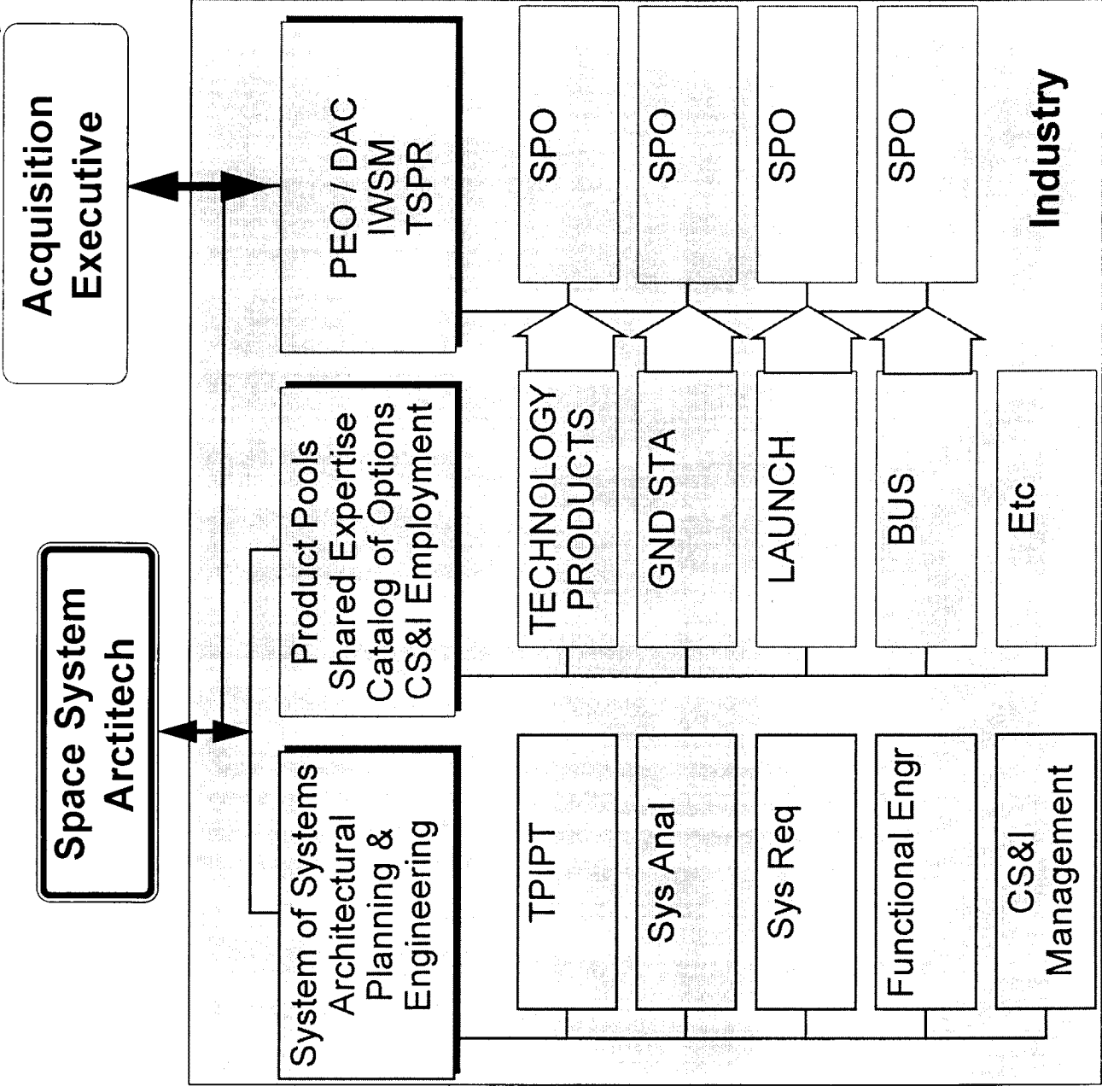
- Integrated Product Development
- System of Systems Engineering
- Reduced Staffs
- Product Pools
- Strong CS&I

Management Features

- Coherent Advance Planning
- Tech Development/ Demo before EMD
- Combined On-Orbit Test & Evaluation

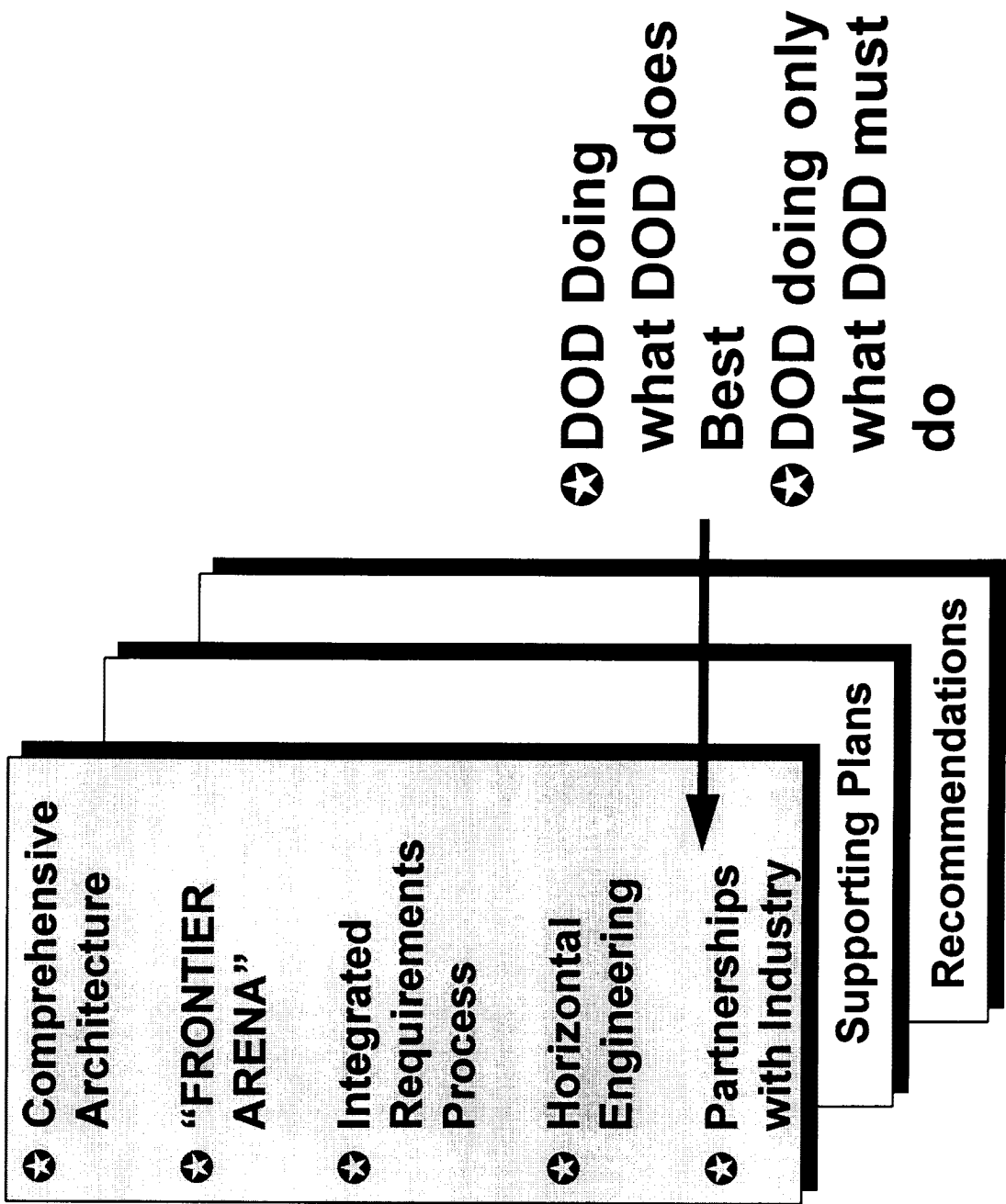
Benefits

- Reduced Overhead both Staff & SPO
- Shared Expertise Across Programs
- Reduced Overall Risk





The Core of Reinventing Space



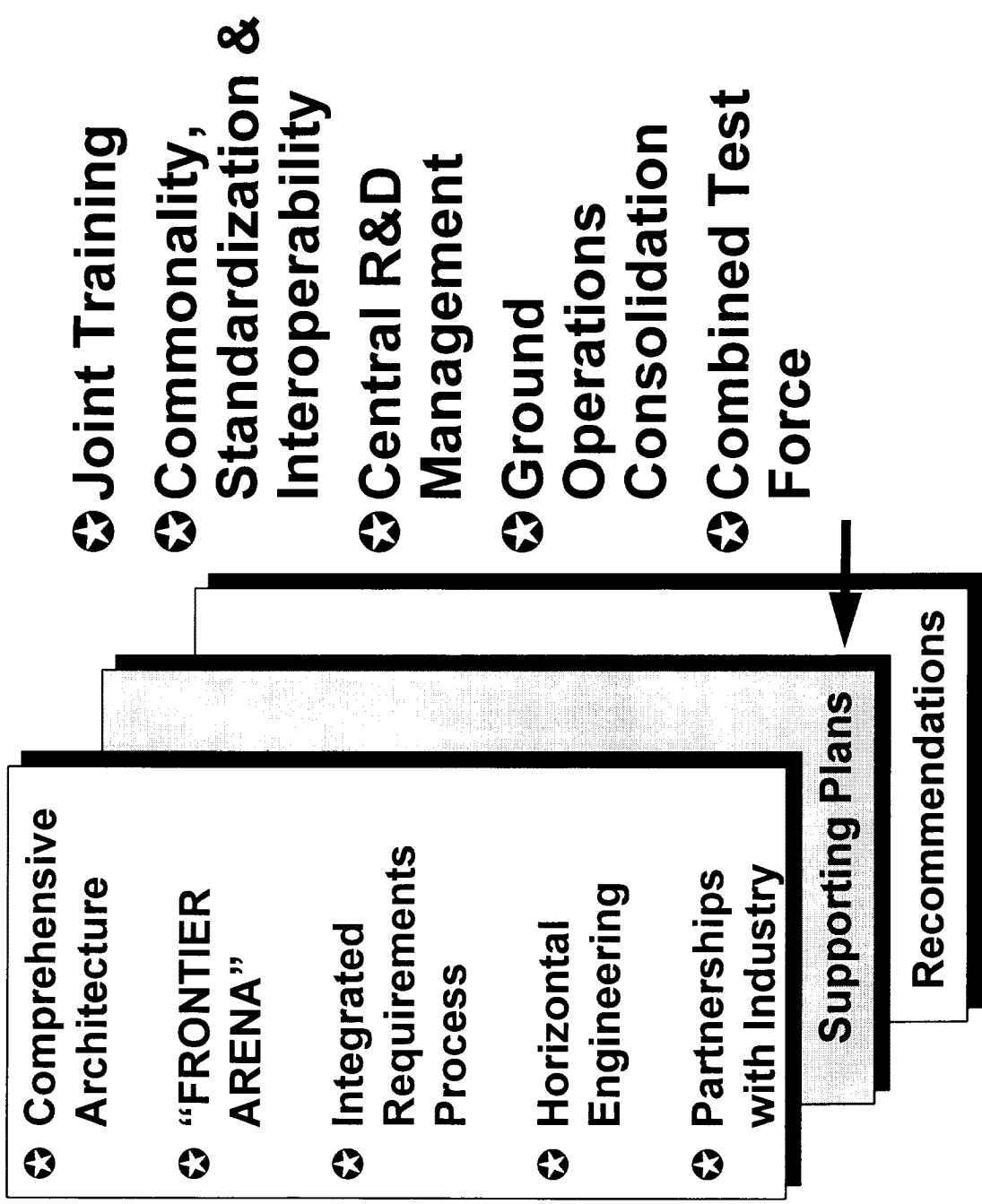


Partnerships with Industry

Action	Motivation
<p>Promote Partnerships with Industry to explore:</p> <ul style="list-style-type: none"> • “CRAF”ing • Commoditization of Systems, Components, & Services • Anchor Tenant Agreements • Joint Developments • Manufacturing/Productibility R&D <p>How/Who/When</p> <ol style="list-style-type: none"> 1. Build Government Team (SMC, 1Q95) 2. Team Issue RFI to Industry (Jan 95) <ol style="list-style-type: none"> a. Recommendations for partnership options b. Incentive/Consideration options 3. Establish Gov/Industry roundtable on new Opportunities (SSA, Feb 95) 4. Direct Implementation of High Payoff Ideas (SA/SSA, Jul 95) 	<ul style="list-style-type: none"> - Industry is progressing more rapidly than government in many areas -- (software, displays, µelectronics) - Shrinking DOD resource base <p>Benefits</p> <ul style="list-style-type: none"> - Reduced cost of Acquisitions and Operation - Increased flexibility for military operations - Increased surge Capacity and Capability - Takes advantage of untapped knowledge Base in commercial industry



The Core of Reinventing Space





Joint Space Training

Action	Motivation
<p data-bbox="422 1127 535 1893">Provide an integrated joint space training capability</p> <p data-bbox="812 1340 860 1702">How/Who/When</p> <ol data-bbox="893 1064 1347 1915" style="list-style-type: none">1. Merge Service training into joint space undergrad/grad programs (OSD/FY 97)2. Set two-way "Space Gates" (SAF/FY 97)3. Use "FRONTIER ARENA" to educate, train, & exercise (OSD/ FY 97)4. Infuse basic space orientation and training in all Services accession sources, PME, and specialty training (All)	<ul data-bbox="422 297 633 978" style="list-style-type: none">- No sense of "Corporate Space"- Systemic need for Teamwork- Need core of knowledge <p data-bbox="812 446 860 638">Benefits</p> <p data-bbox="1039 404 1185 744">Esprit-de-Corps <i>And</i> Competence</p>



Develop and Deploy CS & I

Action

Motivation

Develop and Deploy Commonality, Standardization, and Interoperability (CS&I) within the Space Architecture

- Duplication of effort is unaffordable
- Unique items are long lead/high risk
- No forum for “lessons learned”

How/Who/When

Benefits

1. CS&I mandated for AF Space Systems (SA, 2Q95)
2. Draft CS&I guidance developed & forwarded (STI, 2Q95)
3. RFP’s modified for CS&I (SSA, 2Q95)
4. CS&I standards adopted (SMA, 3Q95)
5. CS&I required for new contracts (SSA, 3Q95)

- Enables Horizontal Engineering
- Optimizes Effective use of limited resources
- Underwrites Economies of Scale
- Increases competition by reducing number of “proprietary players”



Centralized R&D Management

Action

Establish a centralized management function for all SAF/HQ USAF Space R&D Planning and Budget activities.

Motivation

- Multiple R&D funding modes have led to fragmented and duplicative efforts -- R&D unduly vulnerable to cuts
- Too many DOD Space R&D "Focal Points"

How/Who/When

1. Direct central R&D management transition plan (ASAF(S)/CVAF, 1Q95)
2. Finalize Implementation Plan (SA, 2Q95)
3. Identify & Establish Space Technology Integrator (STI) (SA, 2Q95)
4. Redirect, initiate, and terminate projects as necessary (SA, 2Q95 through 4Q95)

Benefits

- Ensures Space R&D is tied to Space Architecture
- Provides budget integrity for future system technologies
- More defensible Budget
- Enhances DOD Space R&D position in the National Space R&D dialog



Ground Segment Consolidation

Action

Consolidate Ground Operations for Telemetry, Tracking, & Control Mission Operations Data Distribution

Motivation

- Poor Interoperability -- Limited Standards
- Inefficient use of resources
- System upgrades costly and complicated

How/Who/When

1. "Lights Out" (Auton Ops) (AFSPC, 2004)
 - a. Complete Current Concept 1995
 - b. Establish Autonomous Data Relay 2001
2. Establish National Satellite Comm & Control Network (NSCCN) (Gov/Civ/Com'l, 2010)
 - a. Merge GPS Into Network 1997
 - b. Arrange Fee for Service 2005
3. Consolidate DMSP/NOAA Network (DOC, 1997)
4. Mandate Interoperability of New Programs (SMA, 1996)

Benefits

- Saves Resources
- Increases Efficiency
- Decreases Training and Support Costs
- Underwrites Ground Segment Product Line Concept

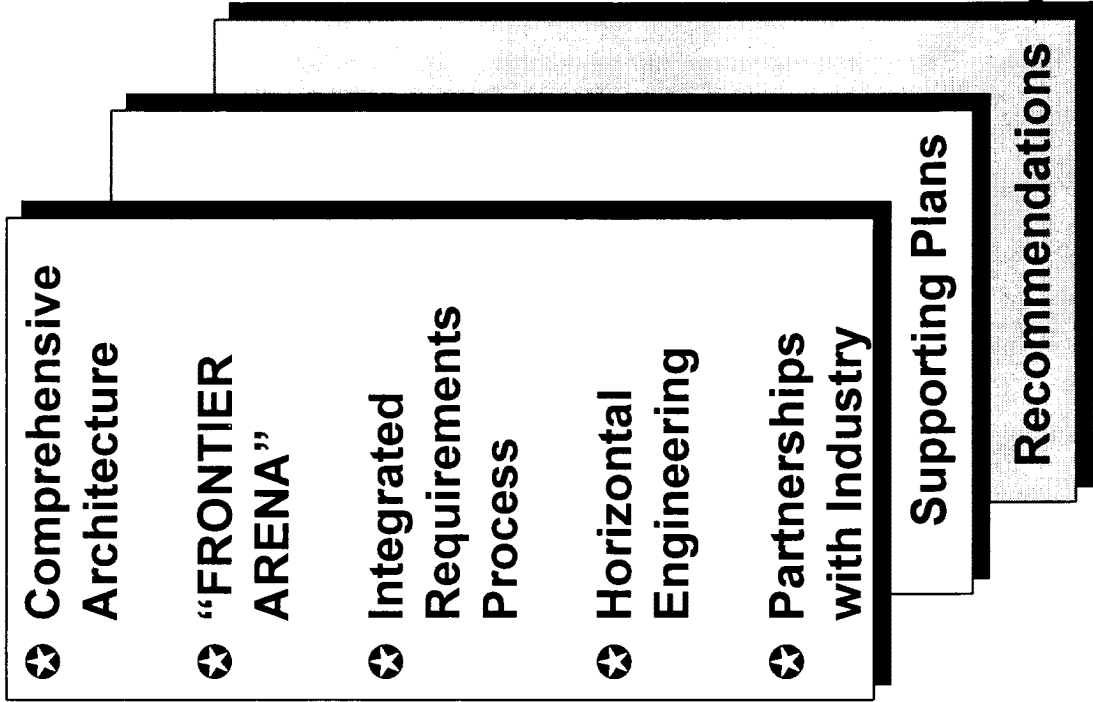


Combined Test Force for Space

Action	Motivation
<p>Create a single T&E organization for On-Orbit DT&E, IOT&E & OT&E</p> <p>How/Who/When</p> <ol style="list-style-type: none"> 1. Combine common T&E elements of SPOs into a single T&E support organization (SMC, FY95) 2. Determine role and responsibility of AFOTEC and AFSPC with Space CTF organization (SA, FY95) 3. Prepare MOA with Users and AFOTEC in T&E process -- designate CTF for Space - AFFTC model (SMC, 3QFY95) 4. Require CTF organization to certify ORD requirements are testable in MAP/TPIPT/TMP process (SA, FY95) 	<ul style="list-style-type: none"> - The Space T&E is fragmented, uncoordinated and duplicative - No critical mass of Space T&E expertise - Requirements for testing are not well documented - Test requirements not well documented - User involvement is late in T&E process <p>Benefits</p> <ul style="list-style-type: none"> - Optimize T&E assets and capability and eliminate unnecessary redundancy - Systems would be tested once through combined DT/OT with user, other independent organizations as needed - Requirements testability addressed from outset of acquisition - Test rigor matched to validated program risk



Core of Reinventing Space



- Support to all the Reinvention Implementation Plans



Supporting Recommendations

- ✧ **Fortify and Deploy Space Doctrine Across the USAF**
 - ✧ *Create Common Understanding*
 - ✧ *Build to Shared Knowledge*
 - ✧ *Move to Joint Execution*
- ✧ **Transition SWC to JSWC and Then to SAWC**
 - ✧ **In Staffing**



Supporting Recommendations

- ✧ **The Full Range of Space Capabilities Must Be Inculcated into Warfighting From Planning Through Execution**
 - ✧ *Warfighters Should Host Space IPT's to Focus Space Capability Improvements on End User Requirements*
 - ✧ *Provide 24 Hr Support Through the SAWC*
- ✧ **Transition to a "Single Launch Service" for Expendable Vehicles**
 - ✧ *Establish a Single Organization to Perform All Current Squadron Functions As We Transition to EELV*

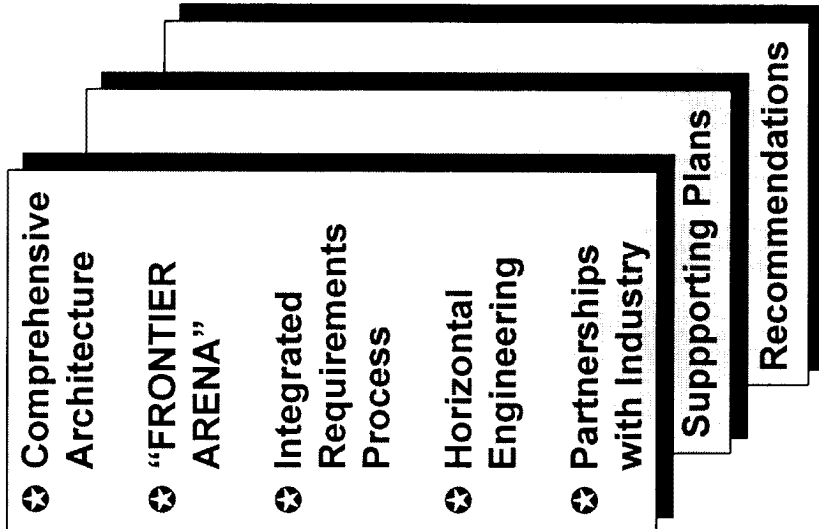


Supporting Recommendations

- ✧ Tailor Financial Management Rules for Realities of Space -- Establish as Policy
 - ✧ *Incremental vs. Full Funding for Launch*
 - ✧ *Fund Mission Incentives Less Than Funding Expiration Time Away*
- ✧ Acquisition Improvements
 - ✧ *Put Full Force of Leadership Behind Integrated Requirements and FRONTIER ARENA Processes*
 - ✧ *Mandate MNS that describe Mission Needs not Implementations -- ORDs that define Requirements not Designs*
 - ✧ *Seek Fullest Possible Application of DOD Process Waiver Authority*
 - ✧ *Continue & Reinforce Best Practices and Benchmarking*



The Value of Reinventing Space





The Value of Reinventing Space



Improved Mission Accomplishment

- ☆ Global Presence -- A Post Cold War Imperative
- ☆ More Tightly Integrated CONOPs
- ☆ Better Joint Execution
- ☆ Common Body of Knowledge
- ☆ Improved Warfighter - Technologist Partnerships
- ☆ DOD doing only what DOD must do

⊗ Comprehensive Architecture

⊗ "FRONTIER ARENA"

⊗ Integrated Requirements Process

⊗ Horizontal Engineering

⊗ Partnerships with Industry

Supporting Plans

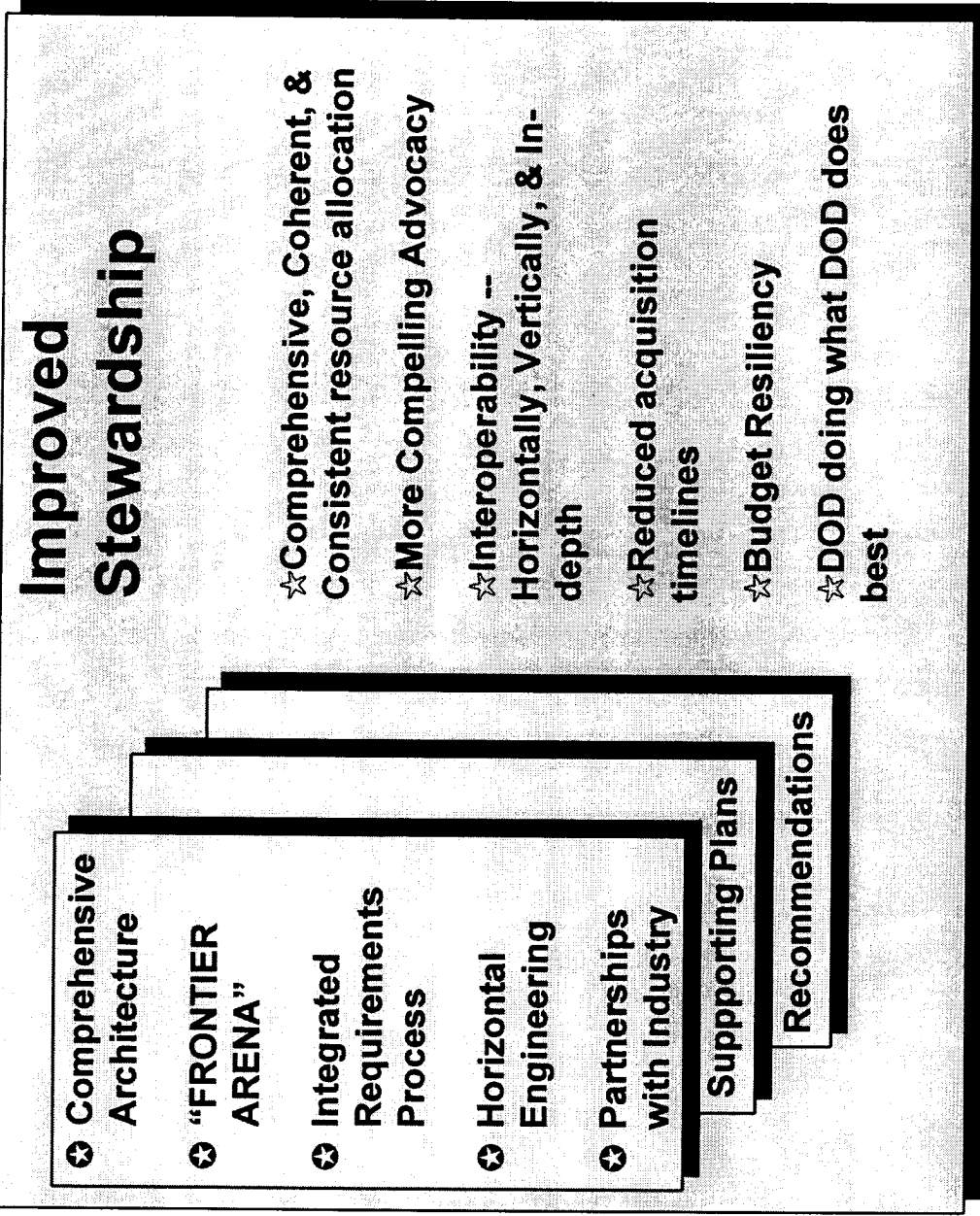
Recommendations



The Value of Reinventing Space

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The Bottom Line of Reinventing Space →

Improved Mission Accomplishment

- ☆ Global Presence -- A Post Cold War Imperative
- ☆ More Tightly Integrated CONOPs
- ☆ Better Joint Execution
- ☆ Common Body of Knowledge
- ☆ Improved Warfighter - Technologist Partnerships
- ☆ DOD doing only what DOD must do

Improved Stewardship

- ☆ Comprehensive, Coherent, & Consistent resource allocation
- ☆ More Compelling Advocacy
- ☆ Interoperability -- Horizontally, Vertically, & In-depth
- ☆ Reduced acquisition timelines
- ☆ Budget Resiliency
- ☆ DOD doing what DOD does best

⊛ Comprehensive Architecture

⊛ "FRONTIER ARENA"

⊛ Integrated Requirements Process

⊛ Horizontal Engineering

⊛ Partnerships with Industry

Supporting Plans

Recommendations

New Capabilities -- More Affordably



Constancy of Purpose

78

☉ ***Re-Inventing Space is a Path, Not a Destination -- To Keep to the Path Requires Committed, Knowledgeable Professionals -- Much As the Air Corps Tactical School Had***

Identify a “Team” of Senior Majors, Lt Cols, Junior Colonels and Comparable Civilians to Carry on This Effort on a Permanent Duty Basis

Deploy These Champions Into Positions of Significant Authority Throughout the USAF

Support Them in the Face of Institutional Resistance

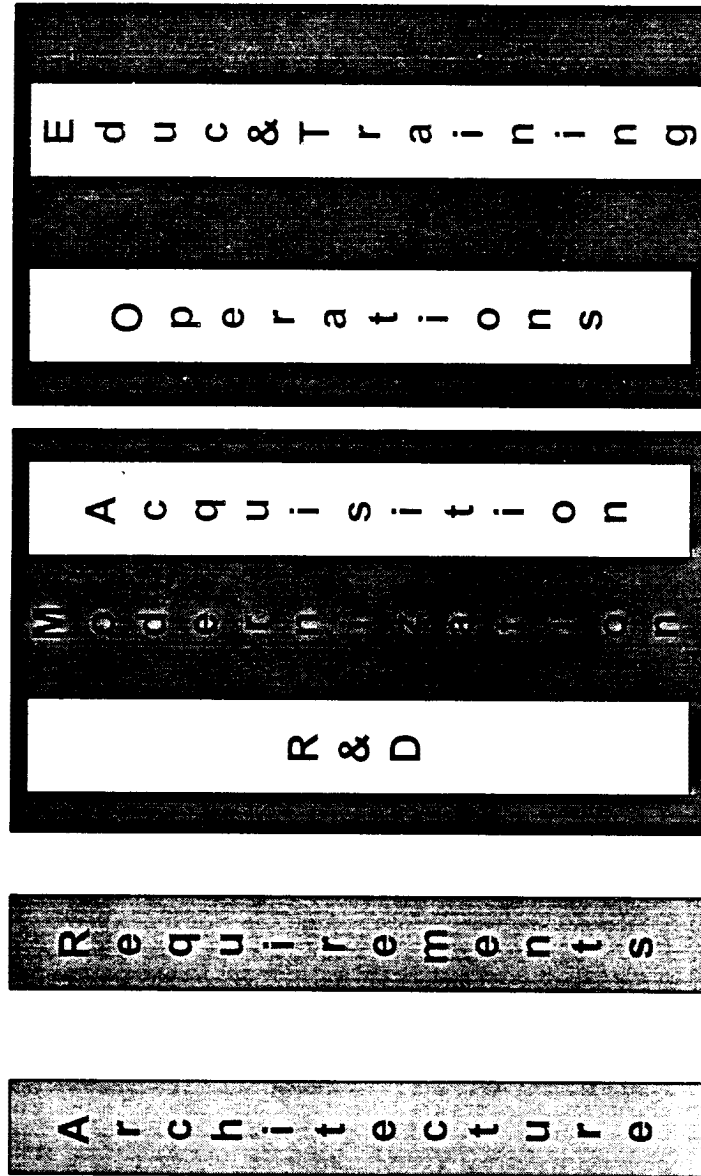
The “Hap” Arnold Model



Summary



- **Specific Actions/
Implementations
For FY95/96**
- **Implementers
Being Produced**

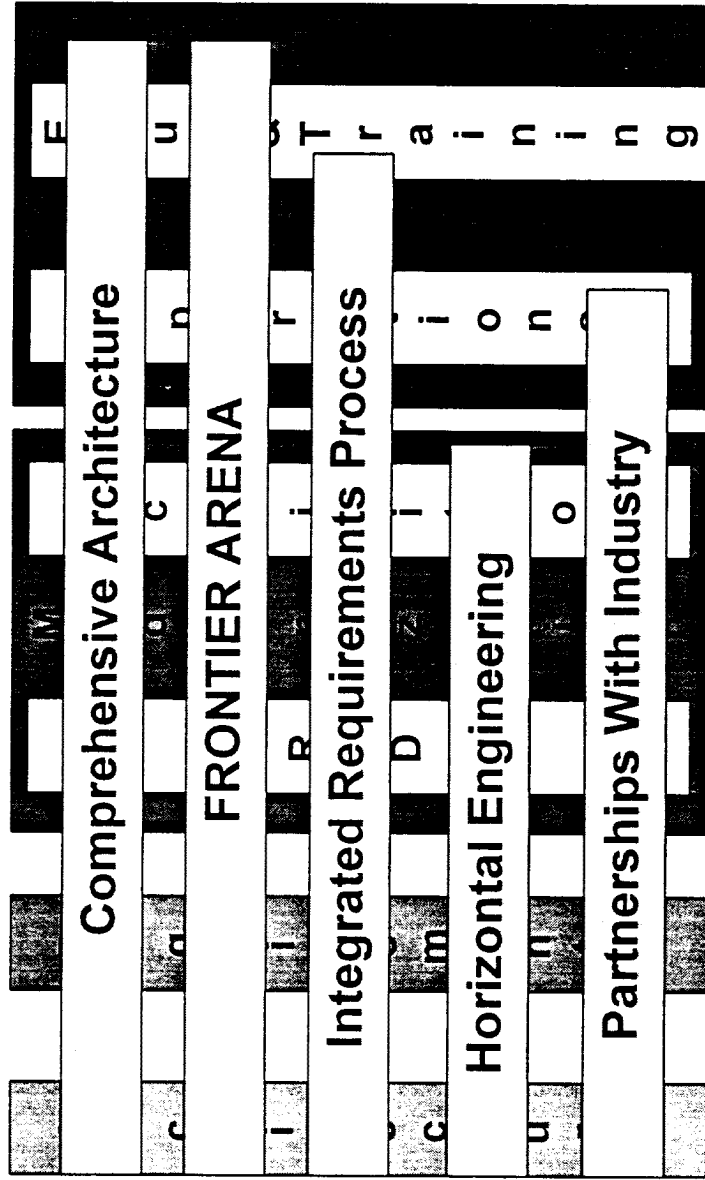


Focus is on Functional Content & Interactions



Summary

- **Specific Actions/Implementations For FY95/96**
- **Implementers Being Produced**
- **Five Central Themes Directly Linked to the Construct**



Focus is on Functional Content & Interactions



Conclusion



Our Charter Required Focus On

- AF Space Programs & AF Structures** ✓
- Roles & Responsibilities** ✓
- Planning and Associated Processes** ✓
- MAJCOM and Lower Level** ✓
- An Integrated Business Strategy** ✓
- Accompanying Implementation Plan(s)** ✓

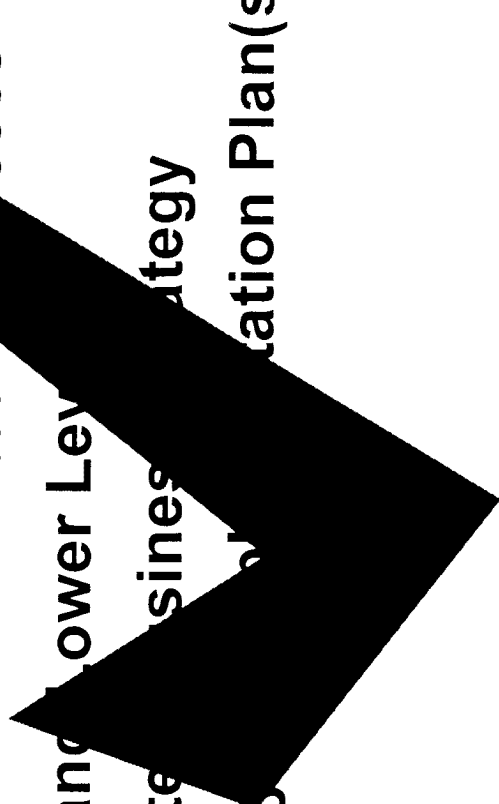


Conclusion



Our Charter Required Focus On

- AF Space Programs & AF Structures ✓
- Roles & Responsibilities ✓
- Planning and Associated Processes ✓
- MAJCOM and Lower Level Strategy ✓
- An Integrated Business Strategy ✓
- Accompanying Communication Plan(s) ✓



Action Team Mission Accomplished