

SSD-88-0044-D

STRATEGIC DEFENSE INITIATIVE (SDI)
SYSTEM ARCHITECTURE AND
KEY TRADEOFF STUDIES

PHASE IIC

IDEF₀ FUNCTIONAL DECOMPOSITION FLOWS
APPENDIX D

15 MARCH 1988
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FOREWORD

The Satellite and Space Electronics Division (S&SED) of Rockwell International is pleased to submit this Final Report for Phase IIC of the Strategic Defense Initiative (SDI) System Architecture and Key Tradeoff Studies, in fulfillment of the requirements, as defined in the directed teaming arrangements, of contract MDA903-85-C-0065.

This report presents the results of the Rockwell team's efforts on this contract. These efforts were a continuation of the System Architecture and Key Trade-Off Studies initiated in December 1984, which Rockwell has been a part of since its inception. Rockwell's objectives in these studies have been to refine analysis of previously developed architectures, and to develop and document new architectural variants. This effort resulted in the creation of technical data packages required to support the Defense Acquisition Board I decision and develop the agreed upon baseline architecture documented in the Baseline Concept Description document.

This report is submitted in one volume with eight appendices.

CDRL A009	Final Report
Appendix A	Rockwell SDI ARchitecture Study Document Index
Appendix B	Operations Concept (CDRL B003)
Appendix C	Architecture Evaluation (CDRL B006)
Appendix D	IDEF ₀ Functional Decomposition Flows
Appendix E	Congestion Control Subsystem Software Algorithm
Appendix F	Automated Systems Engineering (EPOS)
Appendix G	AERIE System Concept
Appendix H	Manufacturing Assessment

INTRODUCTION

This appendix contains Rockwell's functional decomposition of the Strategic Defense System (SDS). This document contains a detailed decomposition of the basic function "Provide Ballistic Missile Defense" down to a level of detail adequate to make functional allocations to any variation of the architecture described in the Baseline Concept Description (4 August 1987), and in sufficient detail to be used in any strategic, theater or coupled architecture. Of the five top-level Ballistic Missile Defense functions identified—F1, Develop SDS; F2, Produce SDS; F3, Deploy SDS; F4, Employ SDS; and F5, Decommission SDS—only F3 (Deploy SDS) and F4 (Employ SDS) are further decomposed. Because of the emphasis by SDIO on Function 4 (Employ SDS), it was decomposed in greater detail than F3 (Deploy SDS). The decomposition of functions is complete when either a hardware decision must be made, e.g., a functional description of a Cryo-cooler, or the function could be allocated independent of a hardware concept, e.g., Weapons Fire Control function sufficiently defined to allow it to be allocated to the SSTS, SBI-CV or BSTS. In addition to functional descriptions, this document contains a traceable breakout of requirements derived from specific functions as well as the inputs and outputs that make up the functional process. The ability to allocate the functions described in this document to the elements of any architectural concept was a conscious decision by Rockwell. A functional decomposition was desired that was adaptable to any hardware concept, not one that was forced to conform to an existing concept.

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ACRONYMS AND ABBREVIATION

AATPE	Advance Acquisition, Tracking, and Pointing Experiment
ABL	Airborne Laser
ABM	Antiballistic Missile
ACM	Attitude Control Module
ACP	Airborne Command Post
ACS	Attitude Control System
Ada PDL	Ada Process Description Language
ADC	ANALOG to Digital Converter
ADI	Air Defense Initiative
ADIO	ADCOM Intelligence Officer
ADOC	Air Defense Operations Center
ADOP	Advanced Distributed On-Board Processor
ADPE	Automated Data Processing Equipment
AEM	Arsenal Exchange Module
AERIE	Aerial Intercept Element
AFB	Air Force Base
AFS	Air Force Station
AFSC	Air Force Systems Command
AFSPACECOM	Air Force Space Command
AFSTC	Air Force Science Technology Center
AI	Artificial Intelligence
AIAA	American Institute of Aeronautics and Astronautics
AJ	Antijam

ALCC	Airborne Launch Control Center
ALCM	Air-Launched Cruise Missile
ALERTCON	Alert Condition
ALS	Advanced Launch System
AMOS	Air Force Maui Optical Tracking Station
ANMCC	Alternate National Military Command Center
AOA	Airborne Optical Adjunct
AOS	Airborne Optical System
AOSP	Advanced On-Board Signal Processor
APA	Antenna Point and Acquisition
APU	Auxiliary Power Unit
ARTS	Automated Remote Tracking Station
ASAT	Antisatellite
ASDP	Advanced Sensor Demonstration Program
ASM	Air to Surface Missile
ASW	Antisubmarine Warfare
ASWCCS	Antisubmarine Warfare Command and Control System
ASWOC	Antisubmarine Warfare Operations Center
ATOC	Air Traffic Control Center
A/VLSI	Advanced Very Large Scale Intergration
AW/AA	Attack Warning/Attack Assessment
AWACC	Airborne Warning and Control Center
AWACS	Airborne Warning and Control System
AWDS	Automated Weather Distribution System
AWPDS	Attack Warning Processing and Display System

BBL	Brassboard Level
BCD	Baseline Concept Definition
BeH ₂	Beryllium Hydride
BER	Bit Error Rate
BIC	Bradskill Interceptor Concept
BIS	Bank of International Settlements
BM	Battle Manager
BM/C ³	Battle Management/Command, Control, and Communications
BMD	Ballistic Missile Defense
BMDOC	Ballistic Missile Defense Operations Center
BMEWS	Ballistic Missile Early Warning System
BP	Boost Phase
BPA	Budget Plan Authority
B/PBTBM	Boost/Post Boost Tier Battle Manager
BQ	Beam Quality
BRDF	Bidirectional Reflectance Distribution Function
BSTS	Boost Surveillance and Tracking System
C ²	Command and Control
C ³	Command, Control, and Communications
C ³ I	Command, Control, Communications and Intelligence
CC	Carbon-Carbon
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CELV	Complementary Expendable Launch Vehicle
CEP	Circular Error Probability

CER	Cost Estimating Relationship
CETD	Concept Experiment Test and Development
CHOP	Change in Operational Procedures
CINC	Commander-in-Chief
CINCSD	Commander-in-Chief Strategic Defense
CINCSpace	Commander-in-Chief U.S. Space Command
CJCS	Commander Joint Chiefs of Staff
ClF5	Chlorine Pentafluoride
CM	Countermeasure
CMBA	Cheyenne Mountain Complex
CMEA	Council for Mutual Economics Assistance
CMOS	Complementary Metal Oxide Semiconductor
CO ₂	Carbon Dioxide
COBRA DANE	Shemya, AK Tracking Radar System
COMSAT	Communication Satellite
COMSEC	Communication Security
CONSU	Continental Soviet Union
CORA	Coherent Optical Radar Amplifier Program
CP	Command Post
CPC	Coherent Power Combiner
CPI	Consumer Price Index
CPSU	Communist Party of the Soviet Union
CSOC	Consolidated Space Operations Center
CSO	Closely Spaced Objects
CV	Carrier Vehicle
CW	Continuous Wave

DAA	Direct Ascent ASAT
DAB	Defense Acquisition Board
DABM	Defense Against Ballistic Missiles
DANA	Direct Ascent Nuclear ASAT
DANNKA	Direct Ascent Nonuclear Kill ASAT
DARPA	Defense Advanced Research Project Agency
DASAT	Direct-Ascent Antisatellites
DD&T	Design, Development, and Test
DE	Damage Expectancy
DEFOON	Defense Condition (JCS)
Dem/Val	Demonstration/Validation
DEW	Directed Energy Weapon
DEW	Distant Early Warning
DF	Deuterium Fluoride
DIA	Defense Intelligence Agency
DIDS	Dynamic Interdiction Discrimination System
DMP	Defense Machinery Production
DMS	Data Management System
DMSp	Defense Meteorological Satellite Program (METSAT)
DOD	Department of Defense
DSAT	Defense Satellite
DSCS	Defense Satellite Communications System
DSP	Defense Support Program
DST	Defense Suppression Threat
DT&E	Development, Test and Evaluation

DT&V	Development, Test, and Validation
DYSC	Dynamic Spherical Coordinate
EAM	Emergency Action Message
ECC	Emergency Command Cell
ECCM	Electronic Counter-Countermeasures
ECL	Emitter Coupled Logic
ECM	Electronic Countermeasure
ECMC	Enhanced Crisis Management Capability
ECS	Environmental Control System
EDAC	Error Detection and Correction
EKF	Extended Kalman Filter
EM	Electromagnetic
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interface
EML	Electromagnetic Launcher
EMP	Electromagnetic Pulse
EMRLD	Excimer Moderate Power Raman-Shifted Laser Device
EMSSP	Electromagnetic Standards and Specification Program
ENDO	Endoatmosphere
EOCM	Electro-Optic Countermeasure
EPOS	Engineering and Project Management Oriented Support System
EPS	Electric Power System
ERCS	Emergency Rocket Communication System
ERINT	Emergency Rocket Interceptor
ERIS	Exoatmospheric Reentry Interceptor Subsystem or System

ETEEM	End-To-End Engineering Model
EW	Electronic Warfare
EWB	Early Warning Radar
FBB	Fast Burn Booster
F/C	Fire Control
FCDL	Fire Control Data Link
FDA	Final Documentation and Analysis
FEL	Free Electron Laser
FLAGE	Flexible Lightweight Agile Guided Experiment
FO	Follow-On
FOB	Fractional Orbital Bombardment System
FOC	Full Operational Capability
FOG	Fiber Optics Gyro
FOR	Field of Regard
FORCECOM	U.S. Force Command
FOT&E	Follow-On Operational Tests and Evaluation
FOV	Field of View
FPA	Focal Plane Array
FSD	Full Scale Development
FSED	Full Scale Engineering Development
FT	Fault Tolerance
FTD	Foreign Technology Division
FY	Fiscal Year
FYP	Five Year Plan (Soviet)

G&C	Guidance & Control
G/AIRT	Ground/Air Interface Terminal
GATT	General Agreement on Trade and Tariff
GBL	Ground-Based Laser
GBLRS	Ground-Based Laser Repeater Station
GBLU	Ground-Based Laser Uplink
GBOS	Ground-Based Optical System
GBPS	Giga Bits Per Second
GBPST	Ground-Based Passive Signal Tracking
GBR	Ground-Based Radar
GDR	German Democratic Republic
GEO	Geosynchronous Orbit
GEODSS	Ground-Based Electro-Optical Deep Space Surveillance System
GHz	Gigahertz
GLCM	Ground-Launched Cruise Missile
GLOW	Gross Liftoff Weight
GMCP	Ground Mobile Command Post
GNP	Gross National Product
GOPS	Giga (billion) Operations Per Second
GPPS	Giga Pluses per Second
GPS	Global Positioning System
GSE	Ground Support Equipment
GSTS	Ground Surveillance and Tracking System
GVSC	Generic VHSIC Spaceborne Computer
GW	Gigawatts
GaAs	Gallium Arsenide

HA	Higher Authority
H/W	Hardware
HEDI	High Endoatmospheric Defense Interceptor
HEDS	High Endoatmospheric Defense System
HEMT	High Electron Mobility Transistor
HF	Hydrogen Fluoride
HIBREL	High Brightness Relay
HICAMP	Highly Calibrated Airborne Measurement Program
HIP Be	Hot-Isostatic Press Beryllium
HLG	Hemispherical Laser Gyro
HLLV	Heavy Lift Launch Vehicle
HLV	Heavy Lift Vehicle
HOL	High Order Language
HSSU	High-Speed Search Unit
HTK	Hard Target Kill
HYVINT	Hyper-Velocity Interceptor
I&W	Indications and Warnings
IAW	In Accordance With
ICBM	Intercontinental Ballistic Missile
ICT	Intelligence Cycle Time
ID	Identification
IDHS	Intelligence Data Handling System
ILDC	Integrated Logic Design Concepts
IMF	International Monetary Fund

IMU	Inertial Measurement Unit
INF	Intermediate Nuclear Forces
IOC	Initial Operating Capability
IPP	Impact Point Prediction
IR	Infrared
IR&D	Internal Research and Development
IRBM	Intermediate Range Ballistic Missile
ISP	Specific Impulse
ITUE	Integrated Test Uplinks Experiment
ITW&A	Integrated Tactical Warning and Assessment
IUS	Inertial Upper State
JCS	Joint Chiefs of Staff [also nuclear hardness level specification (i.e., JCS XXX)]
JSS	Joint Surveillance System
JSTPS	Joint Strategic Target Planning Staff
KA	Kill Assessment
KBPS	Kilo Bits Per Second
KED	Kill Enhancement Device
KEW	Kinetic Energy Weapon
kg	Kilogram
KKV	Kinetic Kill Vehicle
KREMS	Kiernam Re-Entry Measurement Site
KSC	Kennedy Space Center
KT	Kilo Ton
KV	Kill Vehicle

KW	Kilo Watts
LADAR	Laser Radar
LANTFLEET	Atlantic Fleet
LAU	Launch
LCC	Life Cycle Cost
LDC	Less-Developed Country
LDR	Leadership
LEO	Low Earth Orbit
LICD	Laser Imaging Component Development
LMF	Large Mirror Facility
LPARDS	Large Phase Array Radar Detection System
LPP	Launch Point Prediction
LRB	Liquid Rocket Booster
LRU	Line Replacement Unit
LUA	Launch-Under-Attack
LWIR	Long Wavelength Infrared
M ₁	Basic Money Supply
MAC	Military Airlift Command
MANTECH	Manufacturing Technology
MaRV	Maneuvering Reentry Vehicle
MBMW	Machine Building and Metal Working
MBPS	Mega Bits per Second
MC	Midcourse Phase
MCC	Mission Control Center (Satellite)

MCP	Mobile Command Post
MDP	Mission Data Processing
METSAT	Meteorological Satellite
MFC	Matched Filter Correlator
MILSTAR	Military Extremely High Frequency (EHF) Satellite Communications System
MIPS	Million Instructions Per Second
MIRV	Multiple Independently Targeted Reentry Vehicles
MIS	Missile
MLC	Mobile Liaison Cell
MMH	Monomethylhydrazine
MMW	Millimeter Wave
MOA	Memorandum Of Agreement
MOE	Measure of Effectiveness
MOM	Measure of Merit
MOPA	Master Oscillator Power Amplifier
MOPS	Million Operations Per Second
MOTR	Multiple Object Tracking Radar
MOU	Memorandum Of Understanding
MRP	Multiple Reentry Payload
MRPKKV	MRP Kinetic Kill Vehicle
MS	Milestone
MISC	Missile and Space Intelligence Center
MSLOC	Millions of Source Lines Of Code
MSSTM	Military Space System Technology Model
MUX	Multiplex
MW	Megawatts

MWC	Missile Warning Center
MWDS	Missile Warning and Display System
MWIR	Mid-Wavelength Infrared
N ₂ H ₄	Hydrazine
N ₂ O ₄	Nitrogen Tetroxide
NASA	National Aeronautics and Space Administration
NASP	National Aerospace Plane
NATO	North Atlantic Treaty Organization
NAVSPASUR	Naval Space Surveillance System
NCA	National Command Authority
NCCS	Navy Command and Control System
NDEW	Nuclear Directed Energy Weapon
NDS	Nuclear Detection System (formerly IONDS)
NEACP	National Emergency Airborne Command Post
NEP	National Economic Plan
NIO	National Intelligence Officer
NKEW	Nuclear Kinetic Energy Weapon
NM	Network Manager
NMCC	National Military Command Center
NMCS	National Military Command System
NMP	Net Material Product
NOP	Nuclear Operations Plan (NATO)
NORAD	North American Aerospace Defense Command
NPB	Neutral Particle Beam
NPES	Nuclear Planning and Execution System

NTF/NTB	National Test Facility/National Test Bed
O&M	Operations & Maintenance
O&S	Operations and Support
OA	Oscillator Amplifier
OAI	Oscillator Amplifier Integration
OAMP	Optical Airborne Measurement Program
OB	Order of Battle
OBP/NM	On-Board Processor for Network Manager
OFVR	Out-of-Field-of-View Rejection
OIS	Orbit Insertion System
OMT	Other Military Targets
OMV	Orbital Maneuvering Vehicle
OSD	Office of the Secretary of Defense
OSIS	Ocean Surveillance Information System
OT&E	Operational Test and Evaluation
OTH	Over-The-Horizon
OTH-B	Over-the-Horizon Backscatter Radar
PACCS	Post-Attack Command Control System
PARCS	Perimeter Acquisition Radar System
PATHS	Precursor Above-The-Horizon Sensor
PAVE PAWS	SLBM Early Warning System
PAXBAR	Pacific Radar Barrier
PB	Post-Boost Phase
PBALL	Precision Ballistics

PBV	Postboost Vehicle
PDR	Preliminary Design Review
PINS	Point In Space
PK	Probability of Kill
POS	Positioner Stage
PtSi	Platinum Silicon
PV-HgCdTe	Photovoltaic Mercury Cadmium Telluride
R ³	Rotary Reciprocating Refrigerator
R&D	Research and Development
RAD	Radiation Absorbed Dose
RAM	Radar Absorption Material
RAM	Random Access Memory
RDT&E	Research Development Test and Evaluation
RECCE	Reconnaissance
REM	Radiation Equivalent Man
RF	Radio Frequency
RFW	Radar Frequency Weapon
RID	Range Insensitive Direction
RLG	Ring Laser Gyro
RMA	Reliability / Maintainability/Availability
ROCC	Regional Operations Control Center
ROE	Rule Of Engagement
ROFT	Rapid Optic Fabrication Technology
ROM	Read-Only Memory
RU	Rubles

RV	Reentry Vehicle
RVF	RV Finder
RV FINDER	Reentry Vehicle Flash Identification and Discrimination Evaluation Research
S & SED	Satellite & Space Electronics Division, Rockwell International
SAC	Strategic Air Command
SACC	Sector Antisubmarine Control Center
SACDIN	Strategic Air Command Digital Information Network
SADMT	SDI Architecture Dataflow Modeling Technique
SALT	Strategic Arms Limitation Treaty
SAM	Surface-to-Air Missile
SAMTO	Space and Missile Test Organization
SATKA	Surveillance Acquisition, Tracking, and Kill Assessment
SBFEL	Space-Based Free-Electron Laser
SBI	Space-Based Interceptor
SBL	Space-Based Laser
SBSP	Space-Based Support Platform
SCF	Satellite Control Facility
SCIS	Survivable Communications Integration System
SCN	Space Communications Network
SCP	System Concept Paper
SDI	Strategic Defense Initiative
SDIO	Strategic Defense Initiative Organization
SDLV	Shuttle-Derived Launch Vehicle
SDR	System Design Review
SDS	Strategic Defense System

SDS-CC	Strategic Defense System Command Center
SDS-OC	Strategic Defense System Operations Center
SECC	Survivable and Enduring Command Center (SAC)
SEER	Sensor Experimental Evaluation and Review
SEO	Survivability Enhancement Option
SEWS	Satellite Early Warning System
SHAPE	Supreme Headquarters Allied Power Europe (NATO)
SHF	Super High Frequency
SIE	SATKA Integrated Experiment
SIOP	Single Integrated Operational Plan
SIOP CINC	U&S Commander with Forces Committed to the SIOP
SIT	Spacecraft Integration and Test
SITREP	Situation Report
SLBM	Submarine Launched Ballistic Missile
SLC	Space Launch Complex
SLCM	Sea-Launched Cruise Missile
SLOC	Source Lines of Code
SMATH	Satellite Material Hardening (standardized)
SNF	Strategic Nuclear Forces
SOA	State Of Art
SOC	Satellite Operations Center/Sector Operations Center
SOCCC	Satellite Operations Center/Submarine Operational Control Center
SOF	Strategic Offensive Forces
SOSUS	Sound Surveillance System
SOVA	Soviet Analysis
SPACETRACK	AF Satellite Surveillance Network

SPADCCS	Space Defense Command and Control Center
SPADOC	Space Defense Operations Center
SPETSNAZ	Covert Soviet Special Forces
SPOC	Space Operations Center
SPR	Spares
SQM	Space-Qualified Model
SRAM	Short-Range Attack Missile
SRB	Solid Rocket Booster
SSBN	Ballistic Missile Nuclear-Energy Submarine
SSC	Space Surveillance Center
SSGN	Cruise Missile Nuclear-Energy Submarine
SSME	Space Shuttle Main Engine
SSN	Space Surveillance Network
SSP	Small Sortie Payload
SSP	Solid State Photomultiplier
SSTS	Space Surveillance & Tracking System
STAR	System Threat Assessment Report
STAS	Space Transportation Architecture Study
STP	Space Test Program
STR	Strategic Forces
STS	Space Transportation System
SU	Soviet Union
SURTASS	Surface Tower Array Surveillance System
SV	State Vector
SVEC	Surveillance, Vulnerability, Endurability and Connectivity
SW	Software

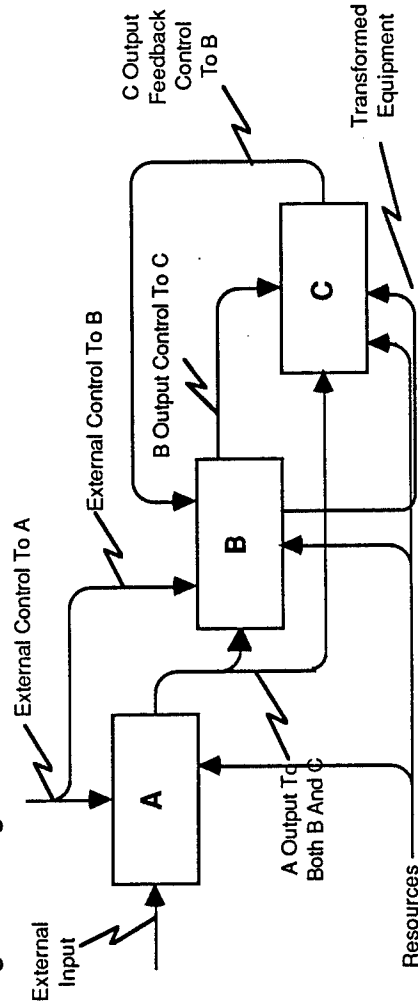
SWHCC	Static War Headquarters Command Center
SWIR	Short Wavelength Infrared
TAC	Tactical Air Command
TAV	Transatmospheric Vehicle
TBD	To Be Determined
TBM	Tactical Ballistic Missile
TBR	To Be Refined
TCN	Terrestrial-Based Communications Network
TDI	Time-Delay Integration
TDRSS	Tracking and Data Relay Satellite System
TEL	Transported Erector Launcher
TRU	Theoretical First Unit Costs
TIR	Terminal Imaging Radar
TMD	Theater Missile Defense
TOF	Time of Flight
TP	Terminal Phase
TPE	Tracking and Pointing Experiment
TRANSCOM	Transportation Command
TRANSIT	Navy Navigation Satellite
TT&C	Telemetry, Tracking, and Communications
TTI	Time-to-Impact
TW/AA	Threat Warning/Attack Assessment
TWT	Travelling Wave Tube
U&S Command	Unified and Specified Commands

UCP	Unified Command Plan
UNAAF	Unified Action Armed Forces (JSC Pub 2)
USCINCEUR	U.S. Commander-in-Chief Europe
USCINCLANT	U.S. Commander-in-Chief Atlantic
USCINCPAC	U.S. Commander-in-Chief Pacific
USEURCOM	U.S. European Command
USLANTCOM	U.S. Atlantic Command
USPACOM	U.S. Pacific Command
USSOUTHCOM	U.S. South Command
USSPACECOM	U.S. Space Command
USSR	Union of Soviet Socialist Republic
U.S.	United States
UV	Ultraviolet
VAFB	Vandenberg Air Force Base
VHSIC	Very High-Speed Integrated Circuit
WBM	Weapon Battle Manager
WIS	WWMCCS Information System
WPI	Wholesale Price Index
WSI	War Support Industry
WWMCCS	Worldwide Military Command and Control System
XRL	X-Ray Laser

SECTION I IDEFO FLOWS

INTRODUCTION TO SECTION I

Rockwell selected Integrated Computer Aided Manufacturing (ICAM) as a means to address the characteristics of the Baseline Concept Description (BCD) architecture. This particular methodology for representing the BCD architecture was selected because of its structured approach to modeling and its acceptance within the SDIO community. For those not familiar with IDEFo (ICAM Definition Zeroeth Order) functional modeling, the position at which the arrow enters a box conveys the specific role of the interface. System controls enter the top of the box, whereas the materials or information acted upon by the system operation enter the box from the left, resulting in the output of the operation, which leaves the right-hand side of the box. The mechanism which performs the operation enters the bottom of the box. The boxes and arrow meanings are used to relate several subfunctions on a diagram comprising a more general function.

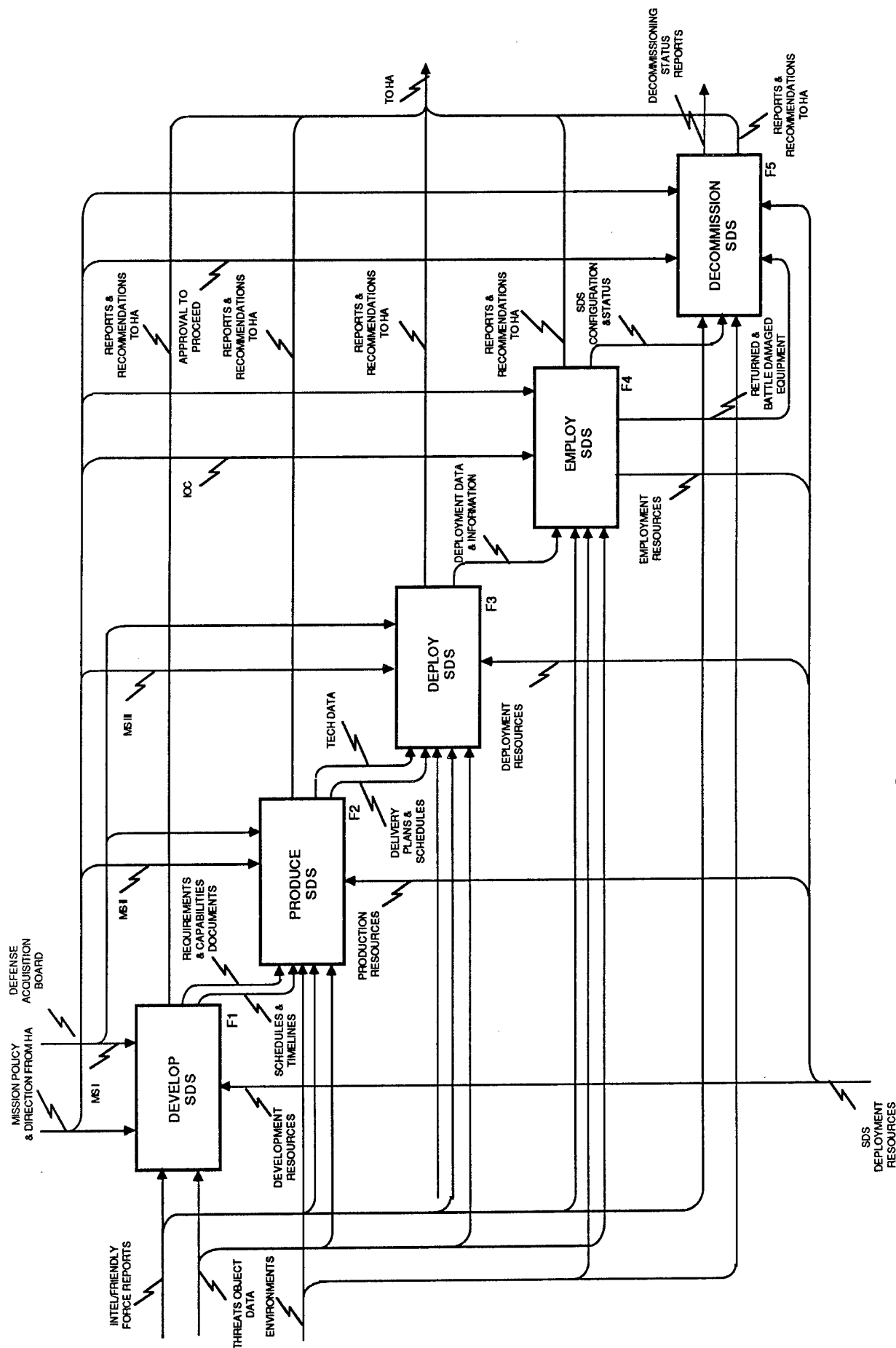


Box B output is a control for Box C, and output from Box C is a feedback control to Box B. Entering Box A is an external control (from the top) and an external input (from the left). Leaving (from the right) Box A is an output going to inputs to both Boxes B and C. Mechanism for A, B, and C enter (and leave) from the bottom.

IDEFo flows presented in this document are a structured functional representation of the Baseline Concept Description Architecture.

STRATEGIC DEFENSE SYSTEM

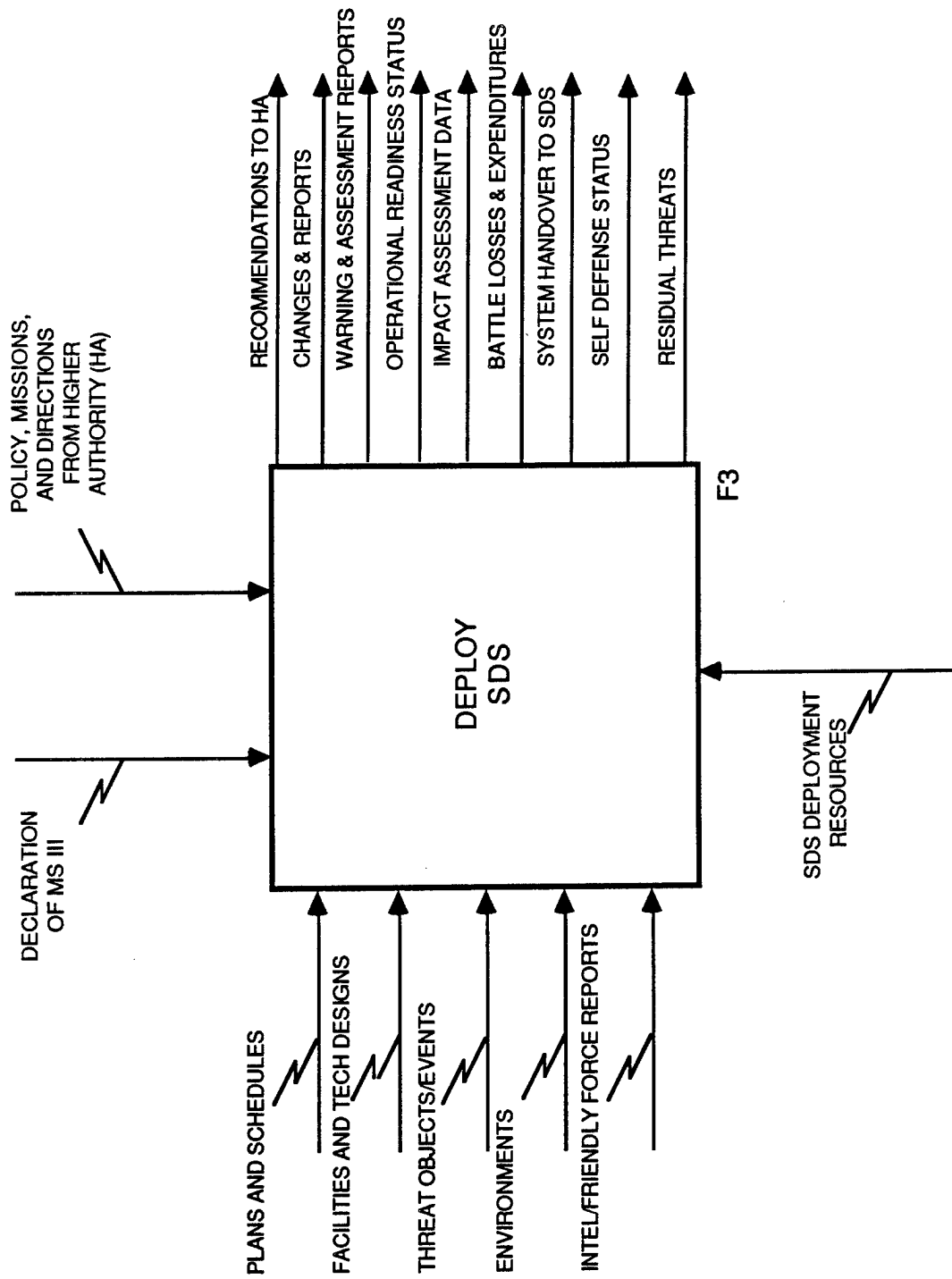
**IDEFo FLOWS
(THE STRATEGIC DEFENSE SYSTEM)**



NODE: F1 thru F5
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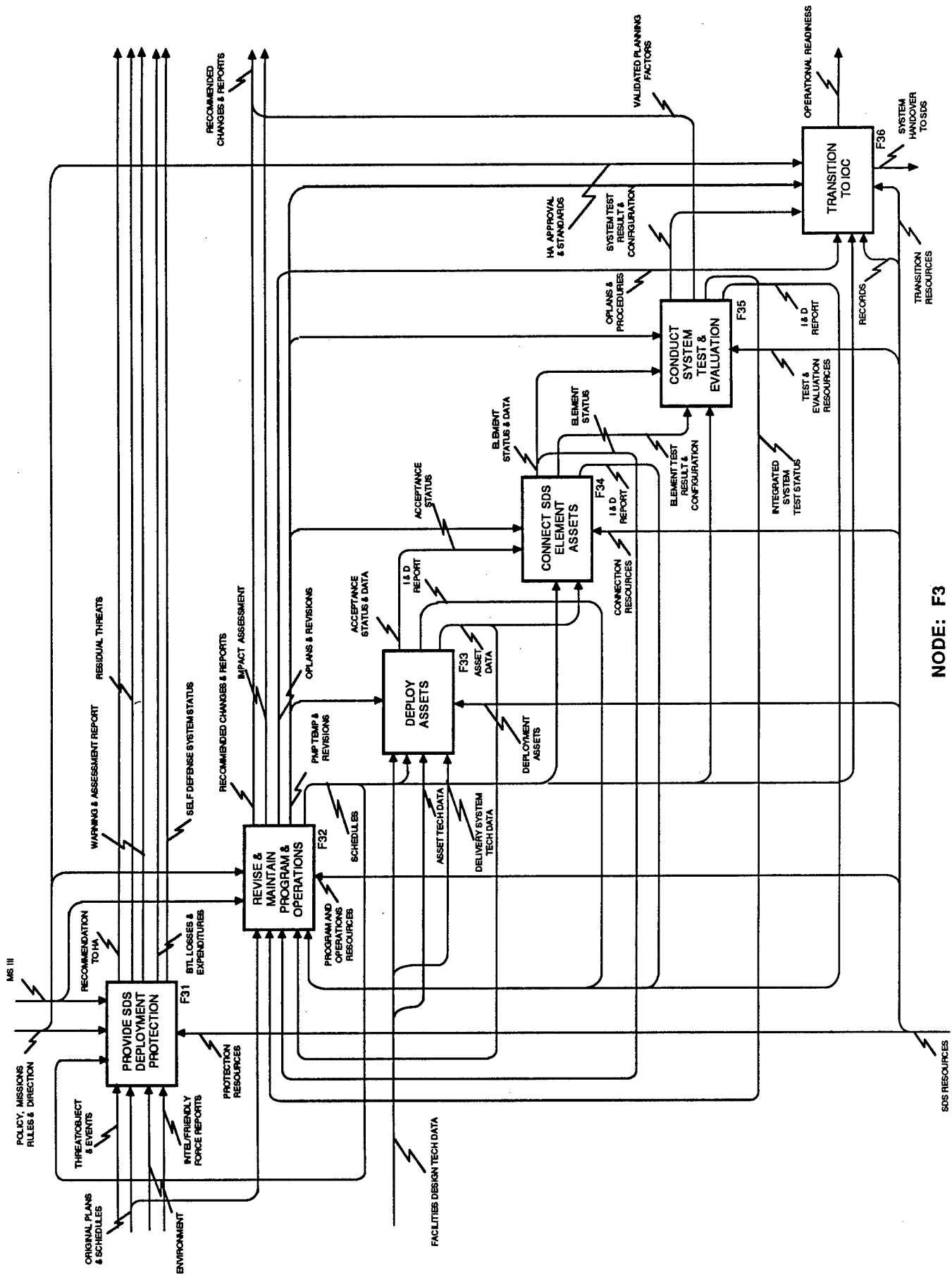
STRATEGIC DEFENSE SYSTEM

IDEFo FLOWS (DEPLOYMENT)

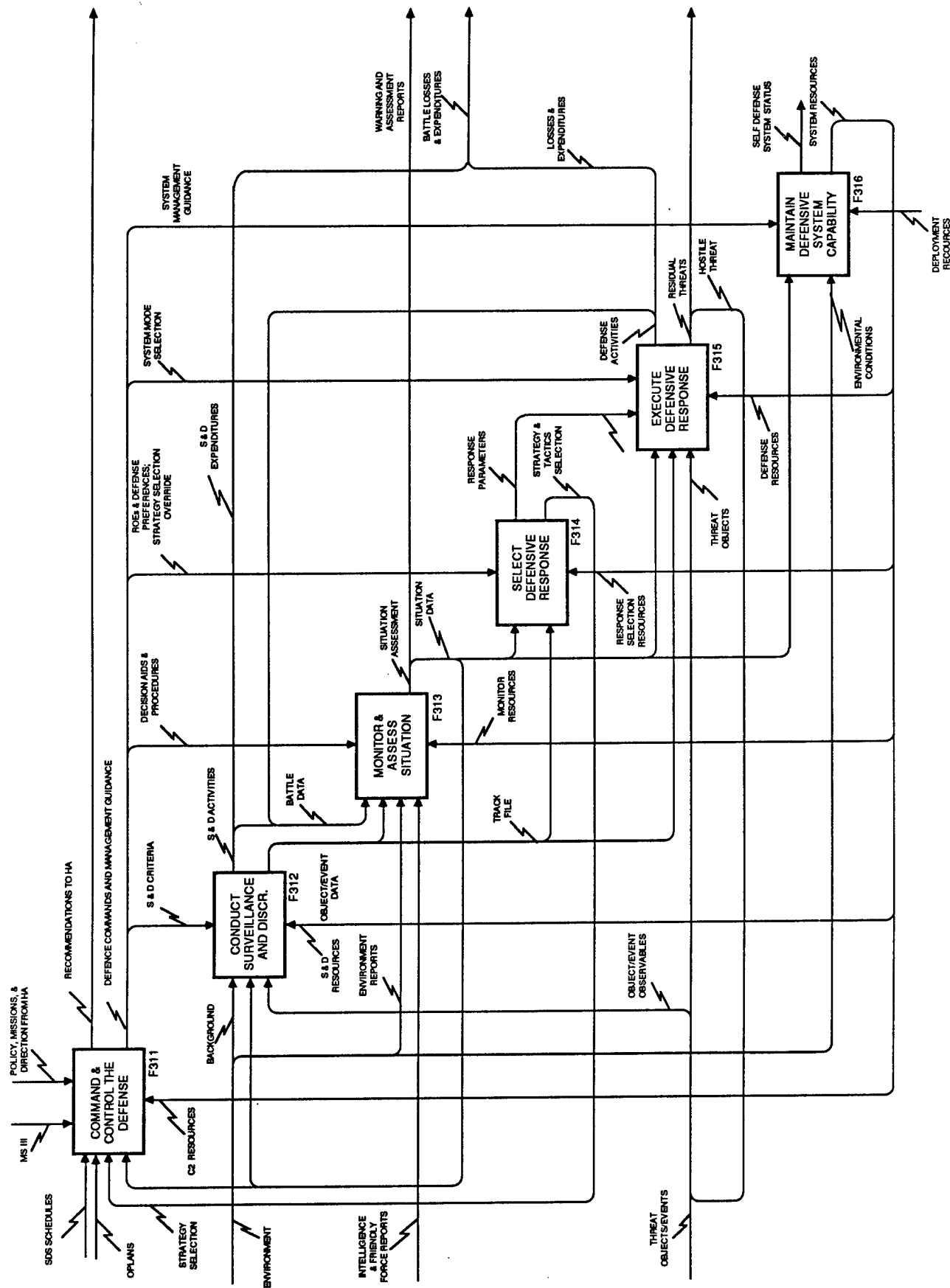


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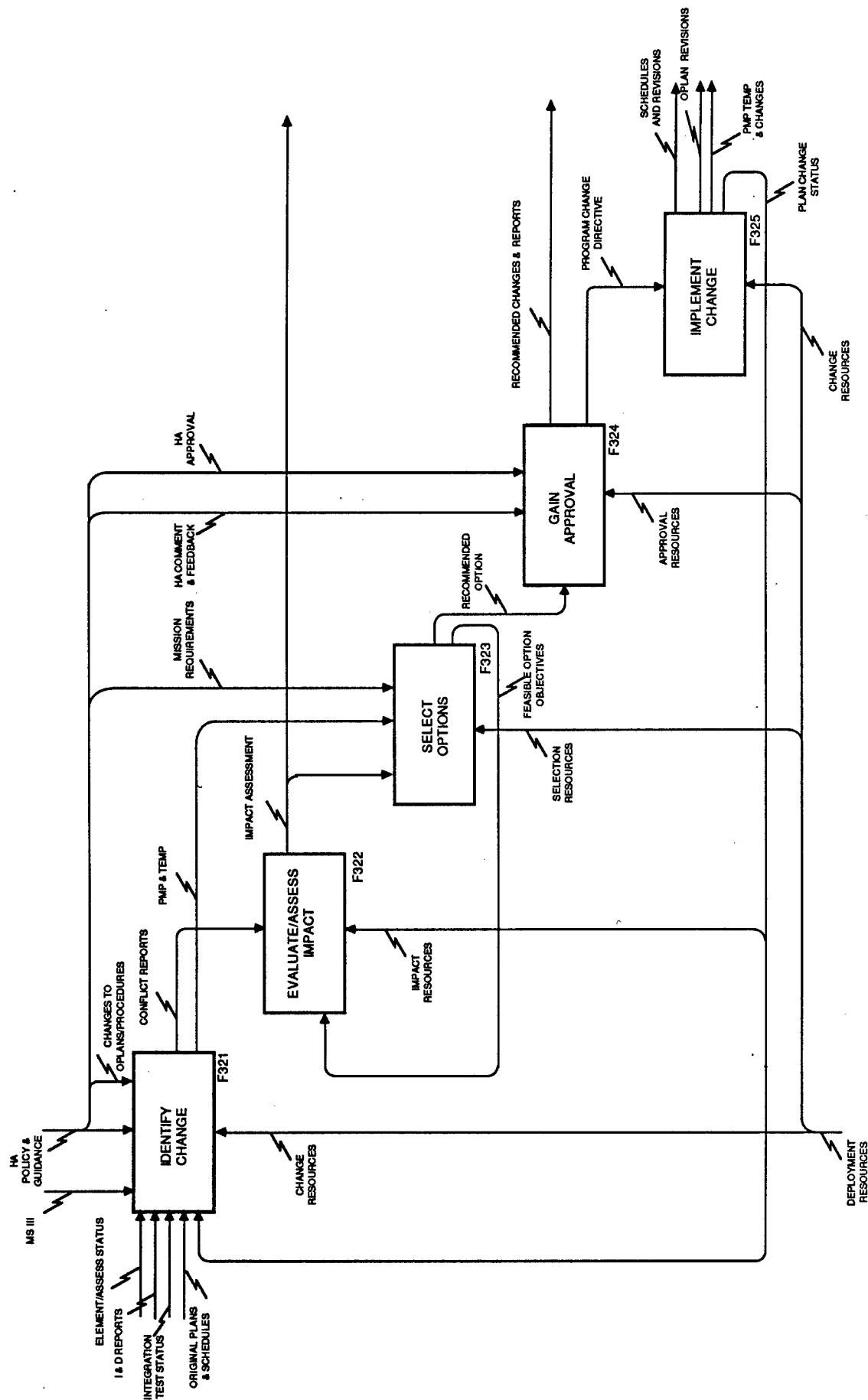
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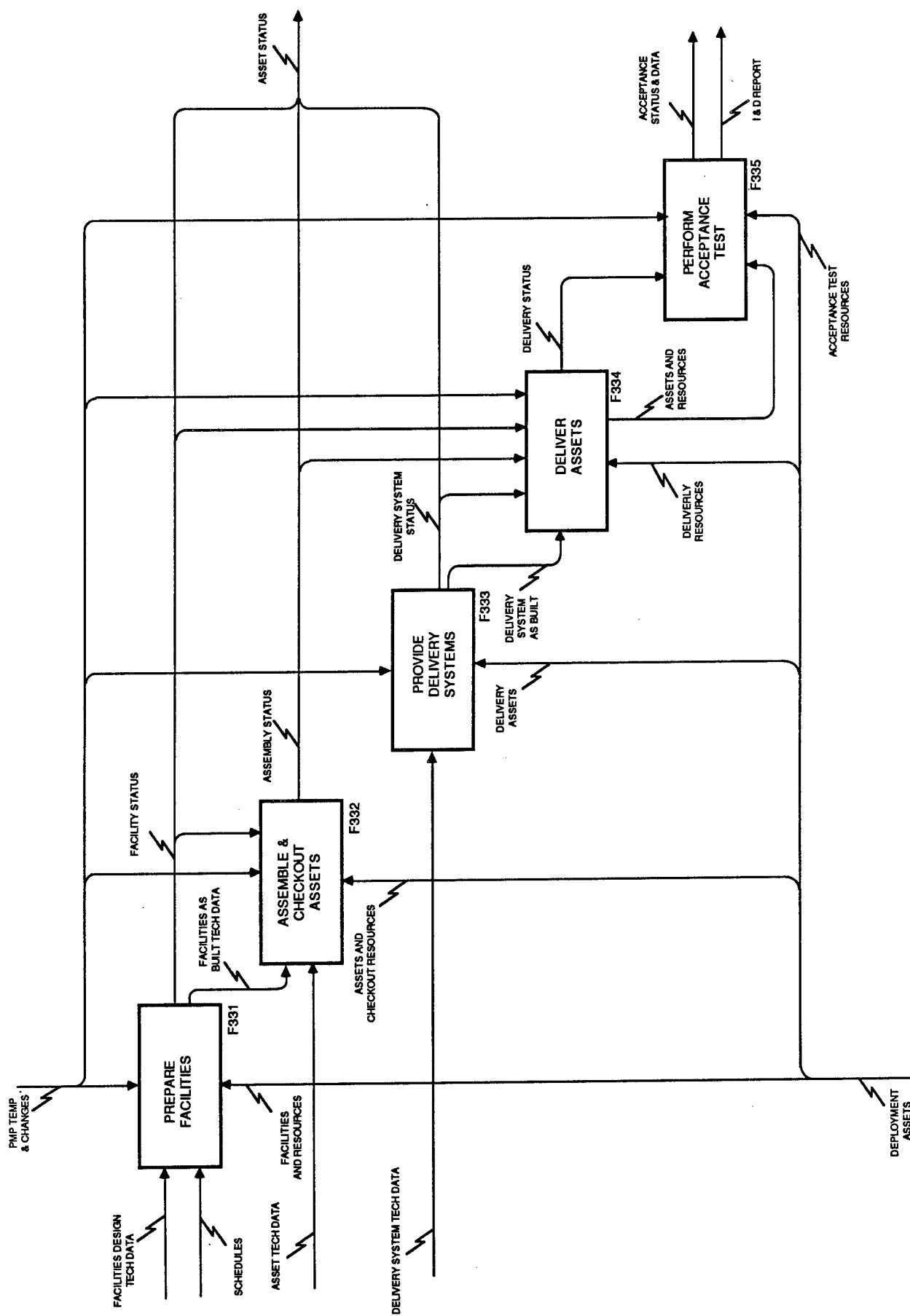
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TITLE: DEPLOY SDS



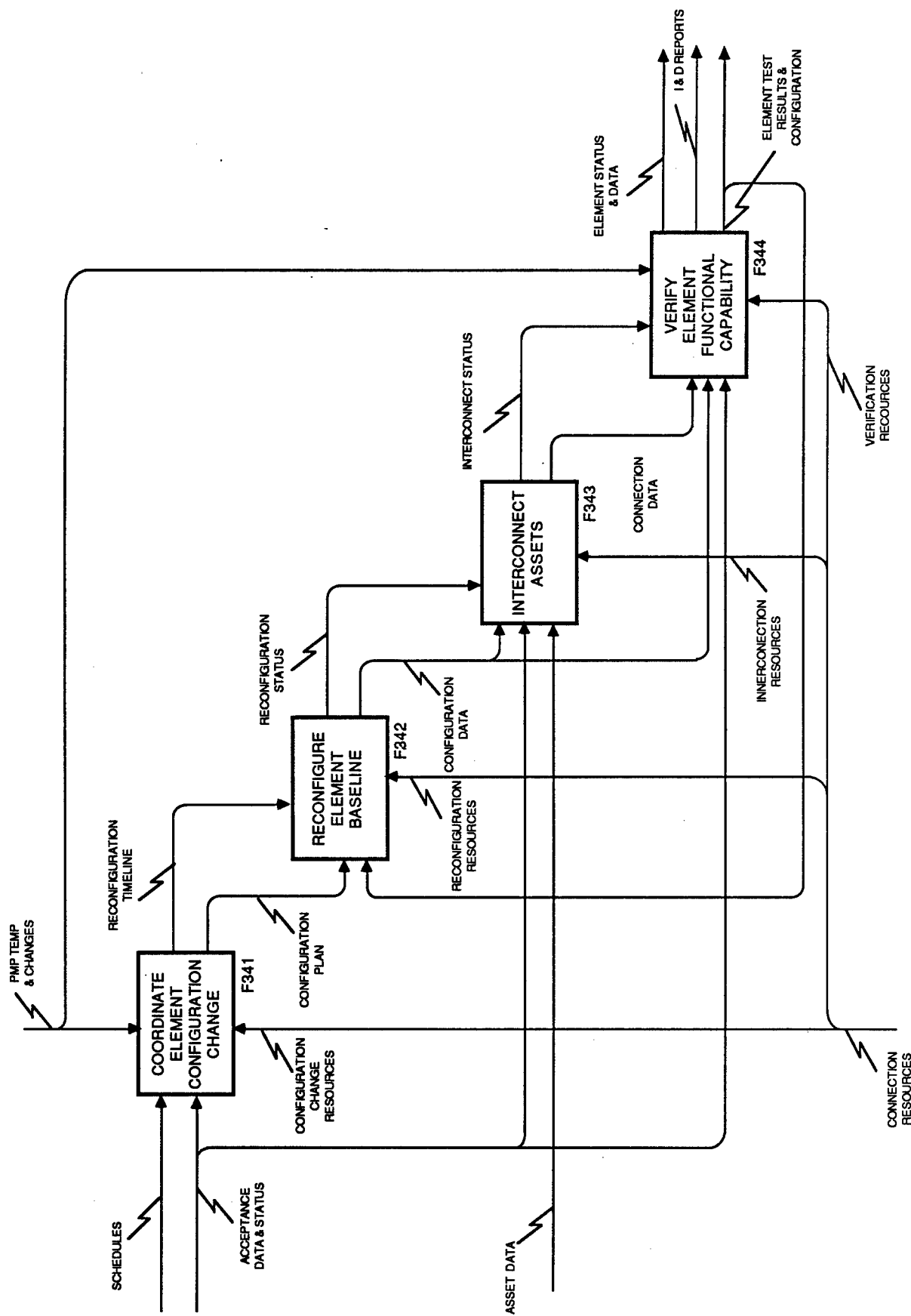
NODE: F31
TITLE: SDS DEPLOYMENT PROTECTION



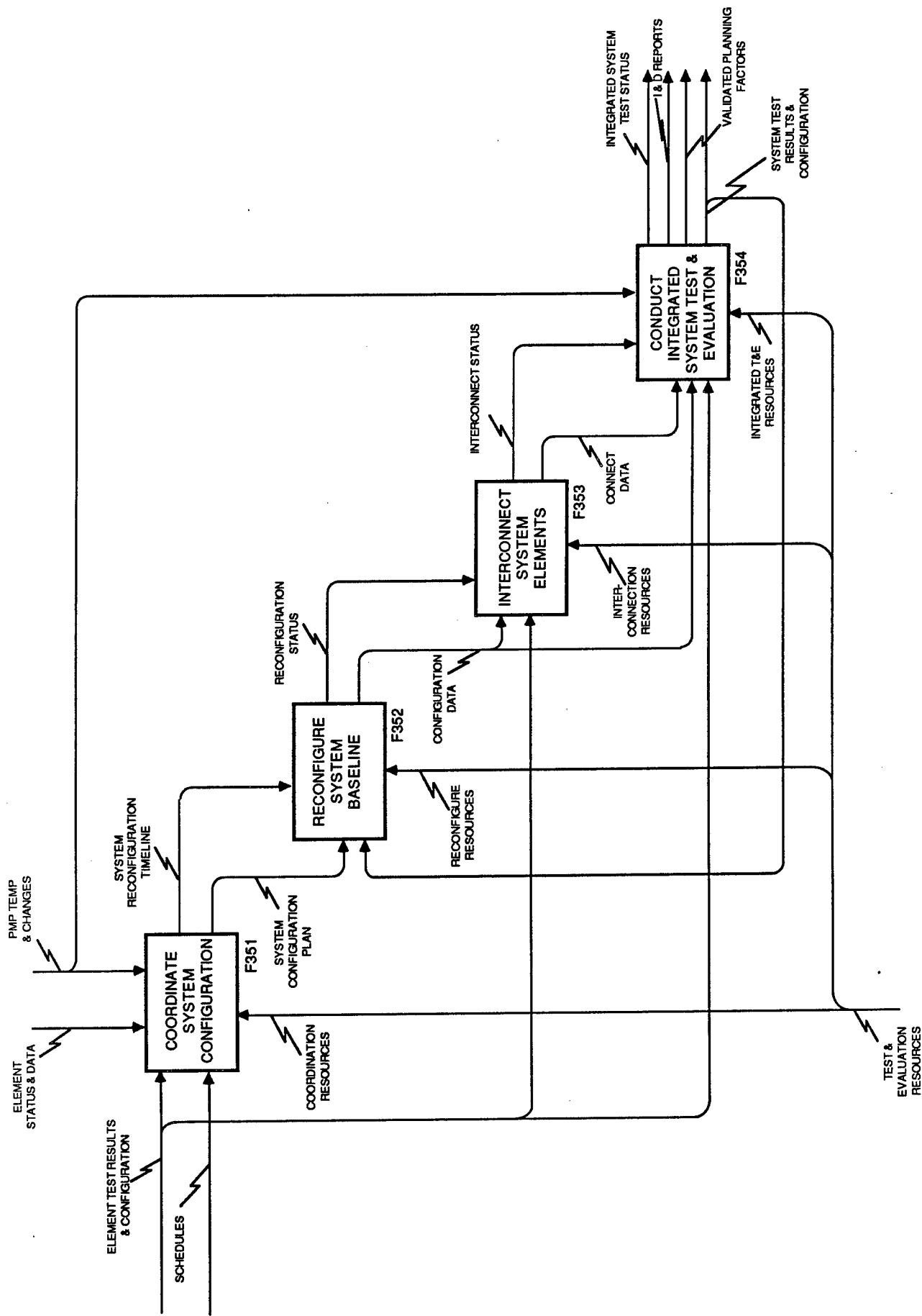
NODE: F32
 TITLE: REVISE & MAINTAIN PROGRAM MASTER PLANS



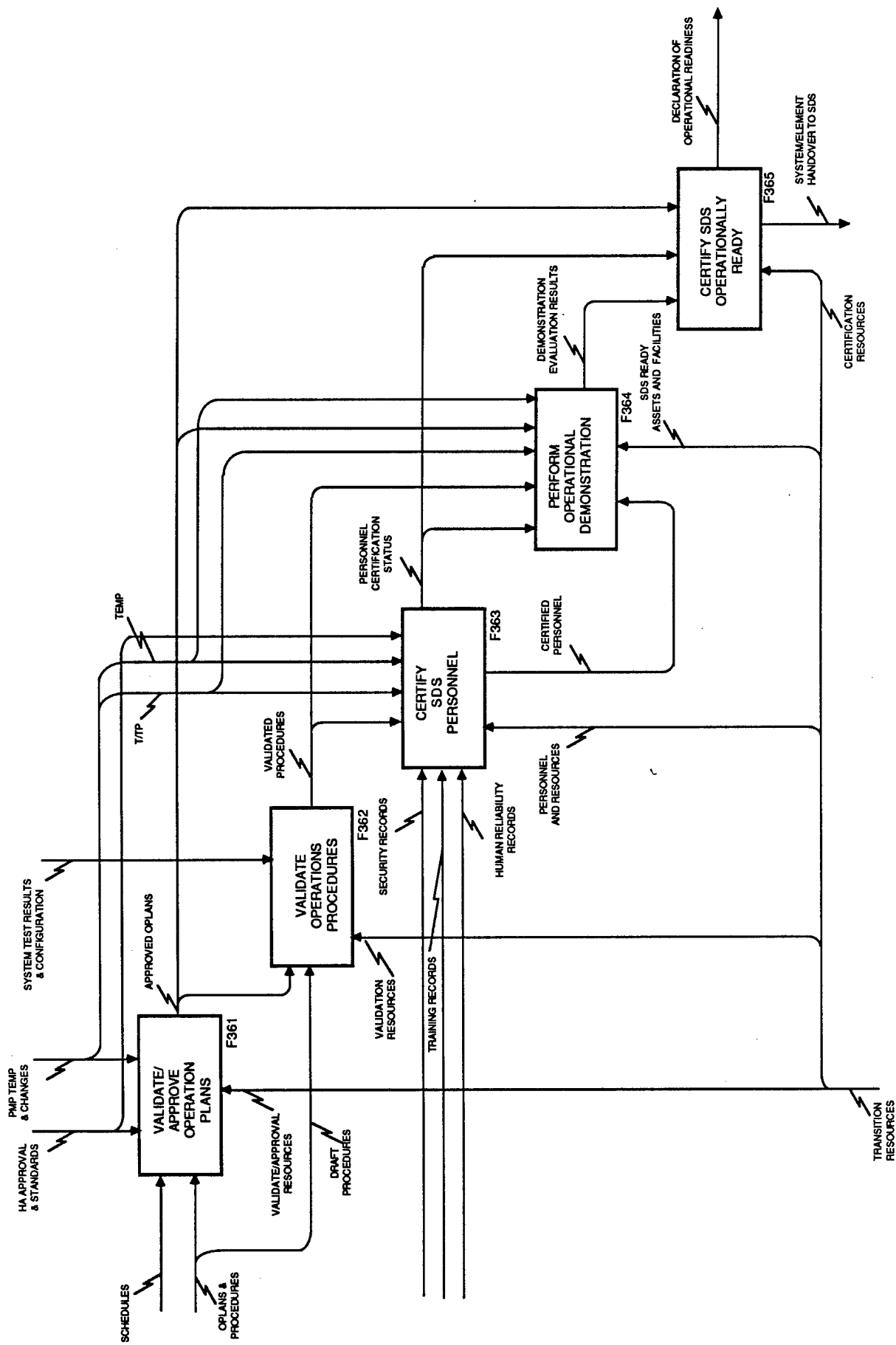
NODE: F33
TITLE: DEPLOY ASSETS



NODE: F34
TITLE: CONNECT SDS ELEMENT ASSETS



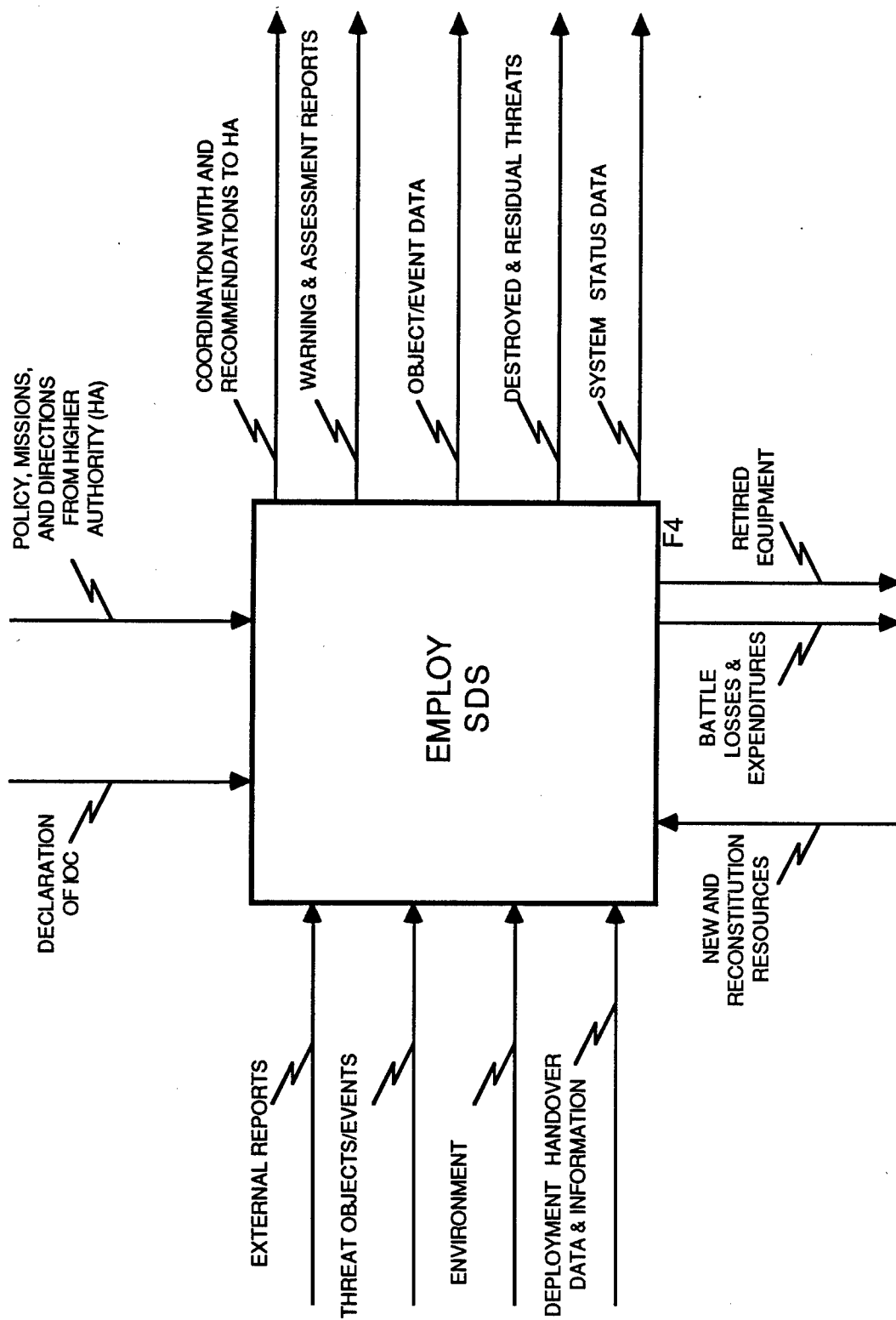
NODE: F35
TITLE: CONDUCT SYSTEM TEST & EVALUATION



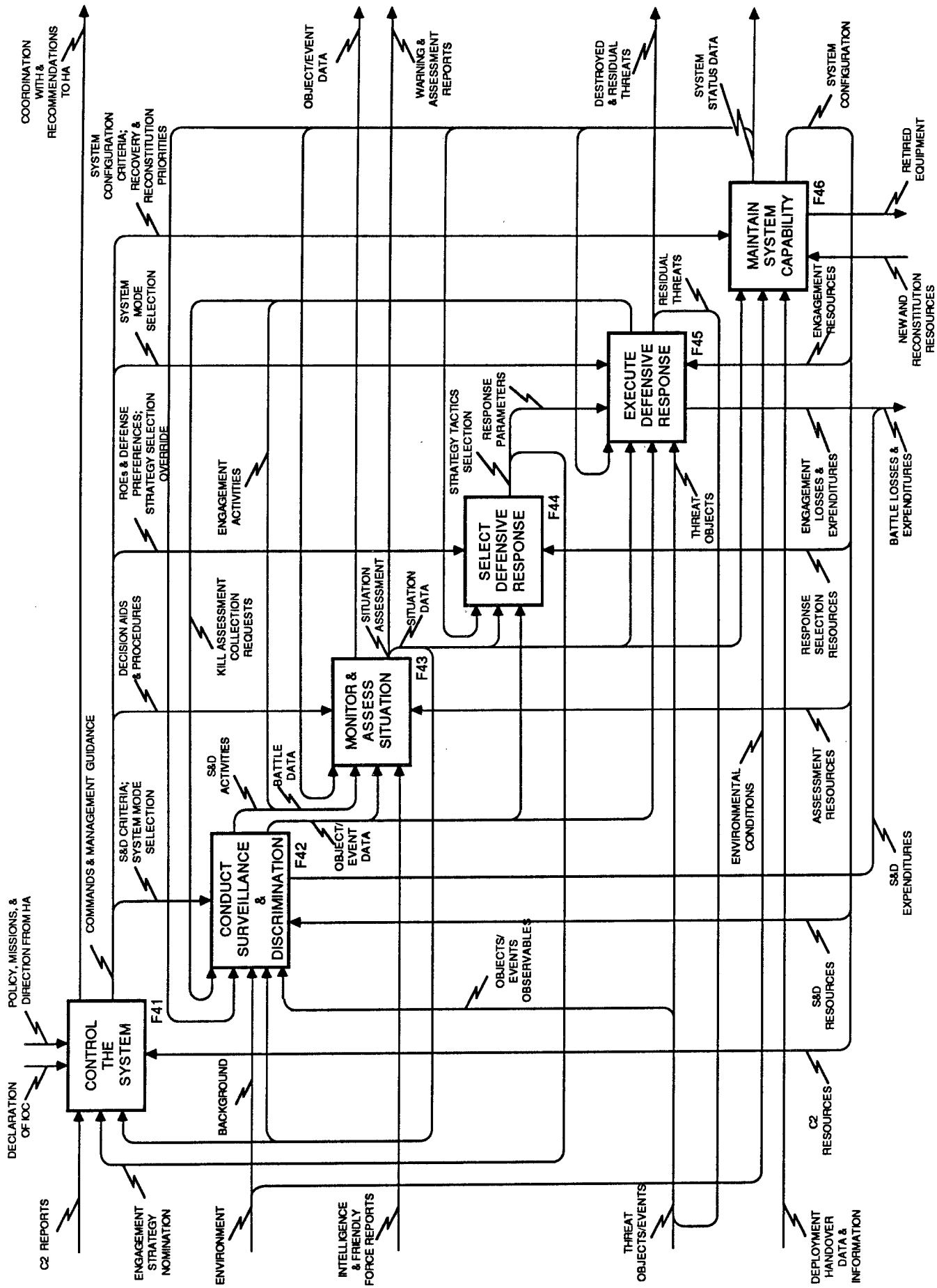
NODE: F36
TITLE: TRANSITION TO IOC

STRATEGIC DEFENSE SYSTEM

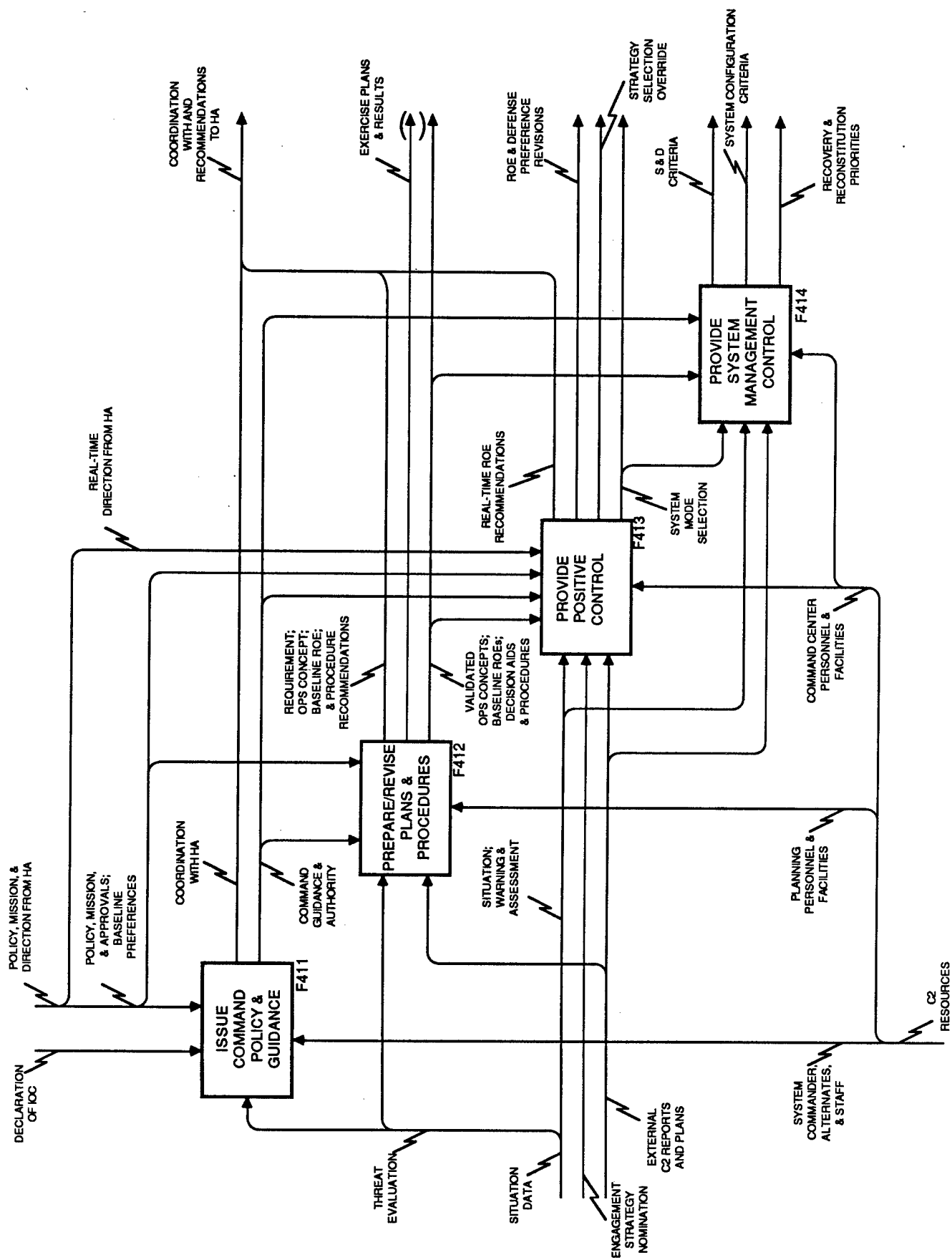
**IDEFo FLOWS
(EMPLOYMENT)**



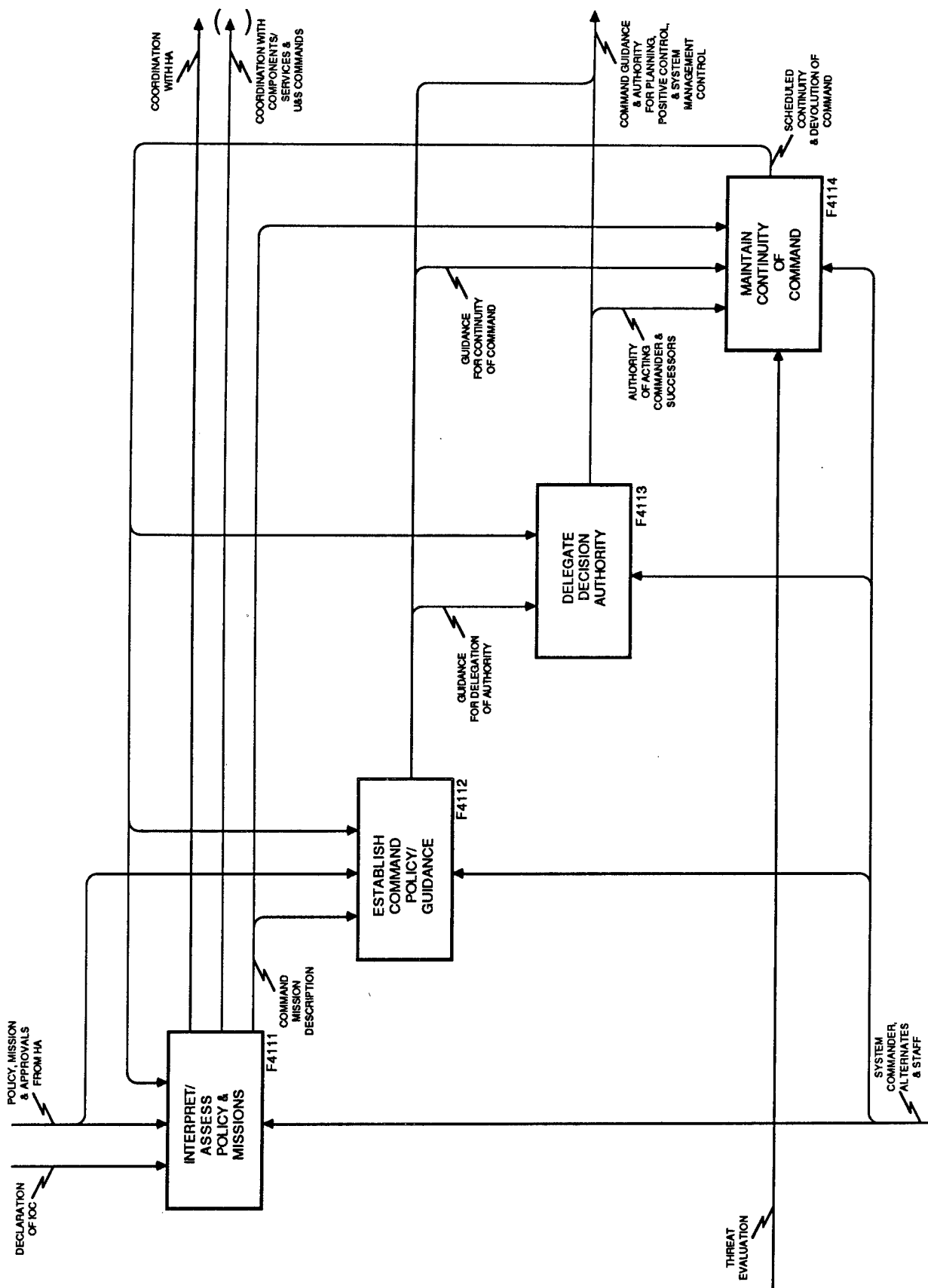
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TITLE: I/O BOUNDARY OF "EMPLOY SDS," F4



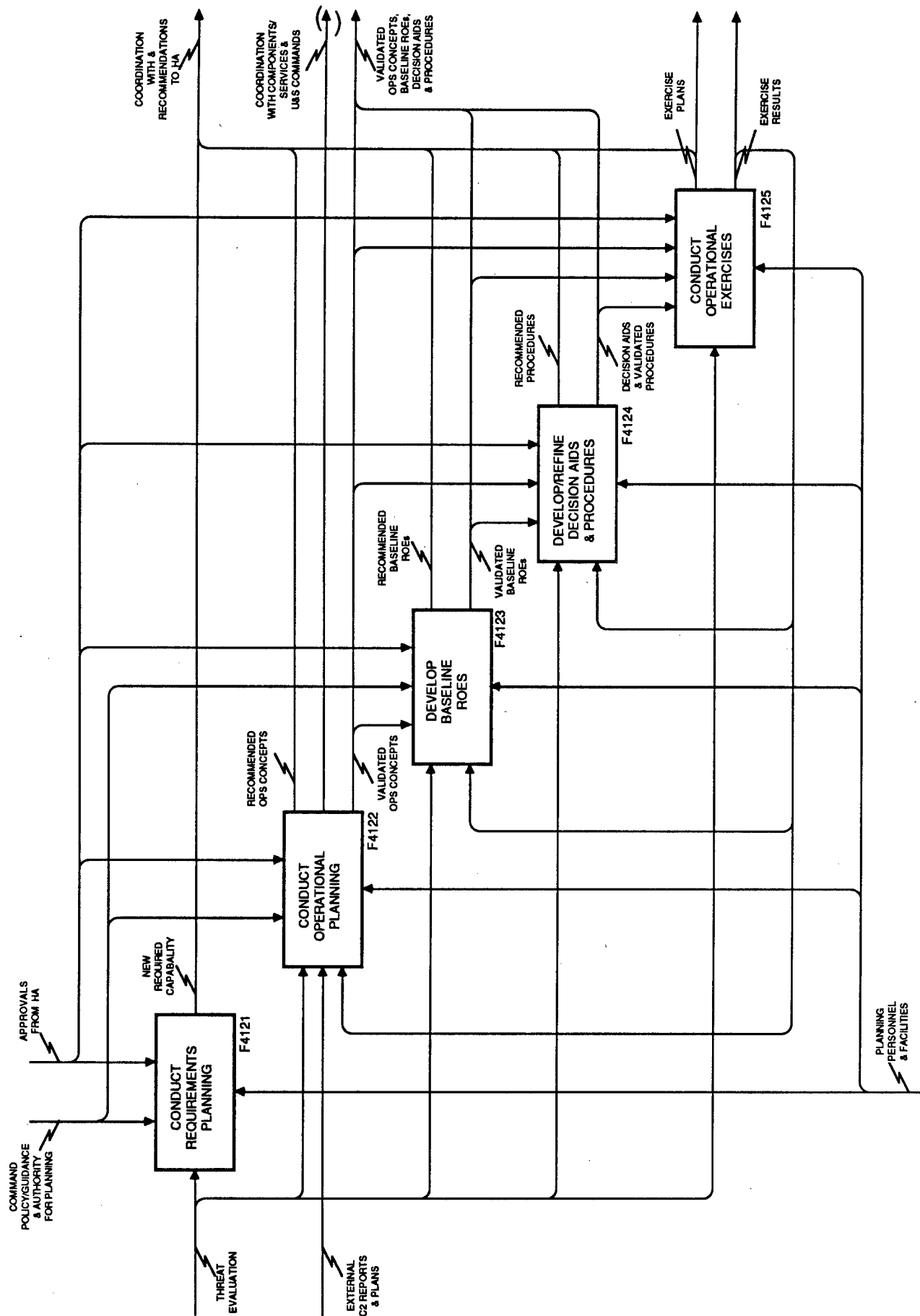
NODE: F4
TITLE: EMPLOY SDS



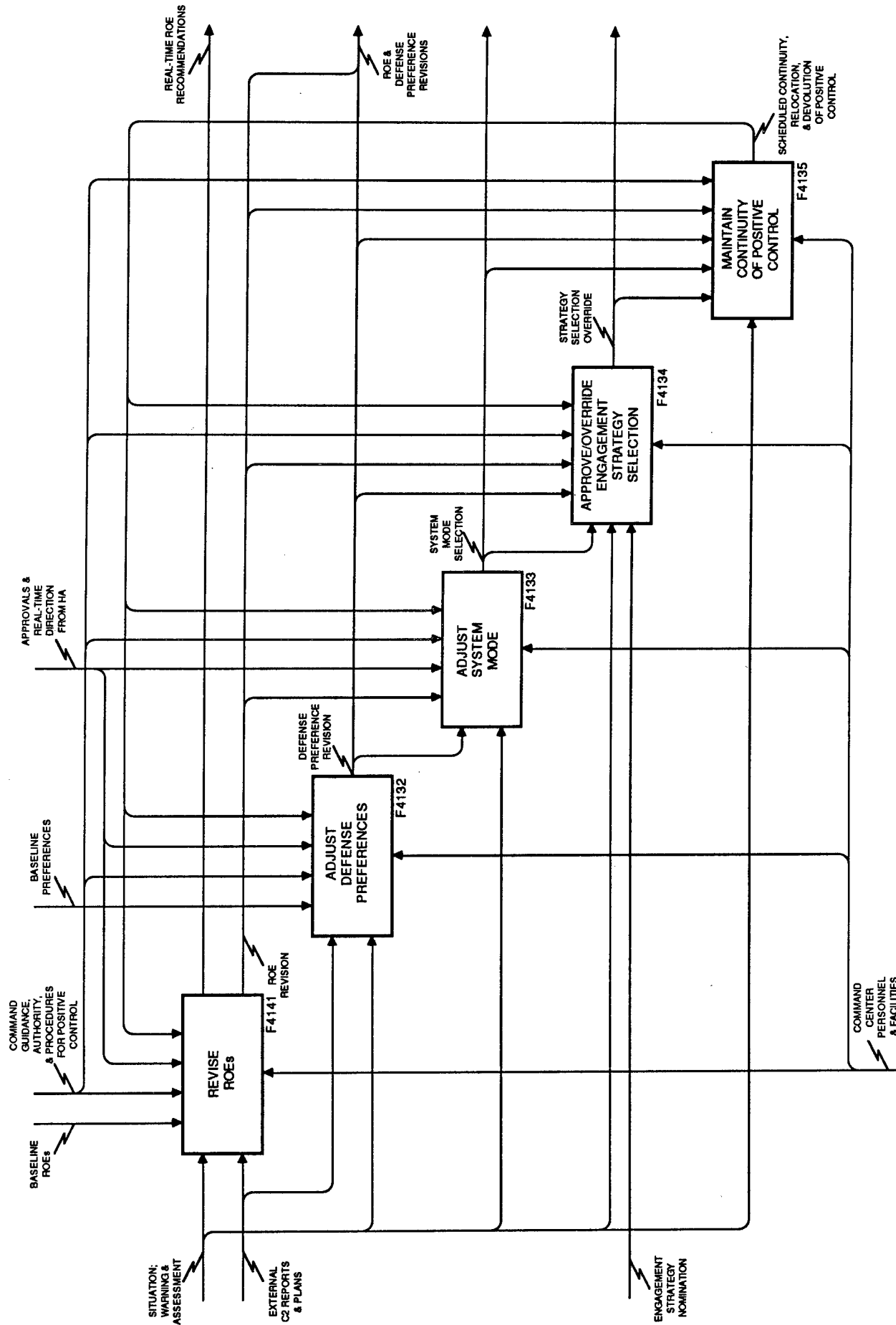
NODE: F41 **TITLE: CONTROL THE SYSTEM**



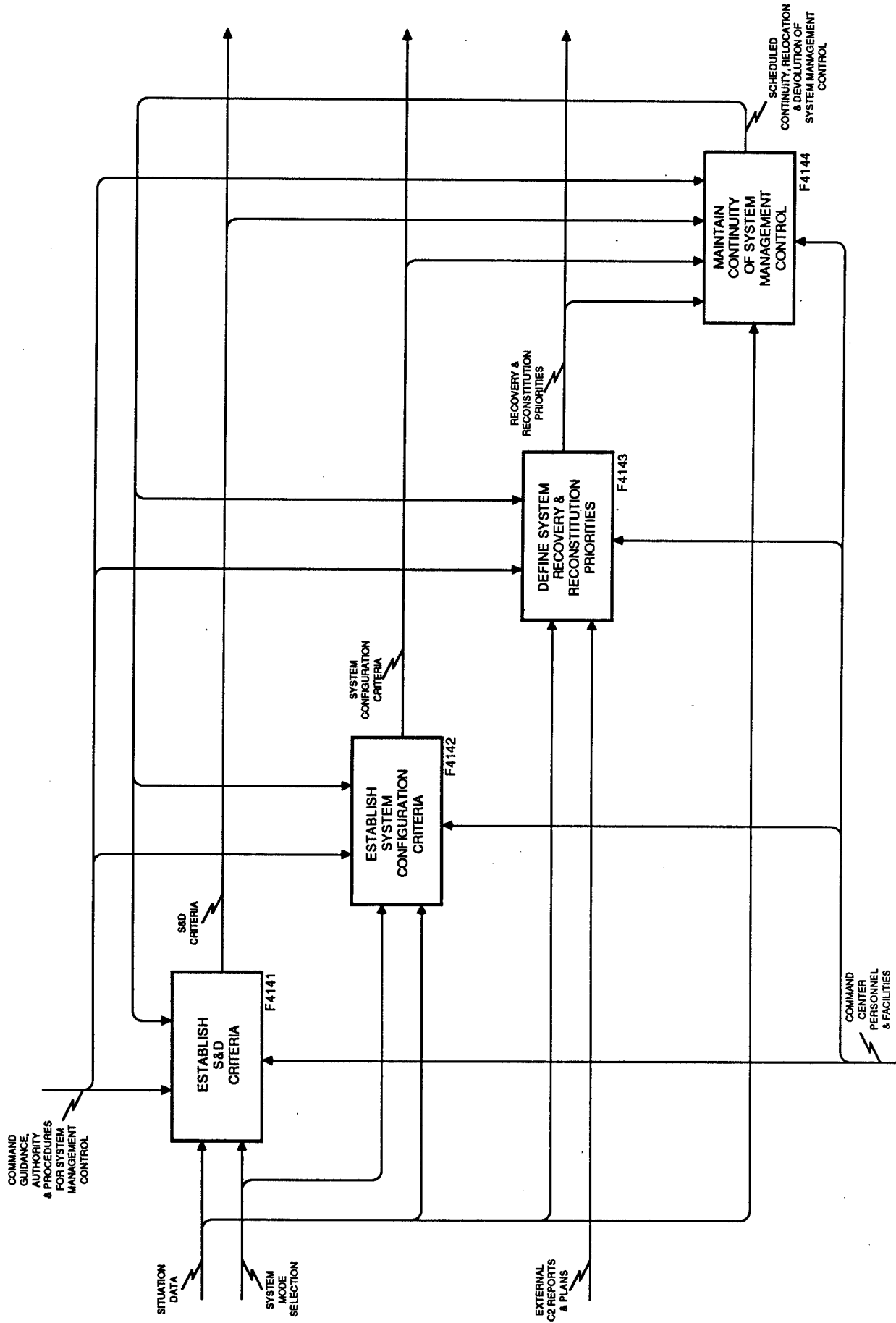
NODE: F411
TITLE: ISSUE COMMAND POLICY AND GUIDANCE



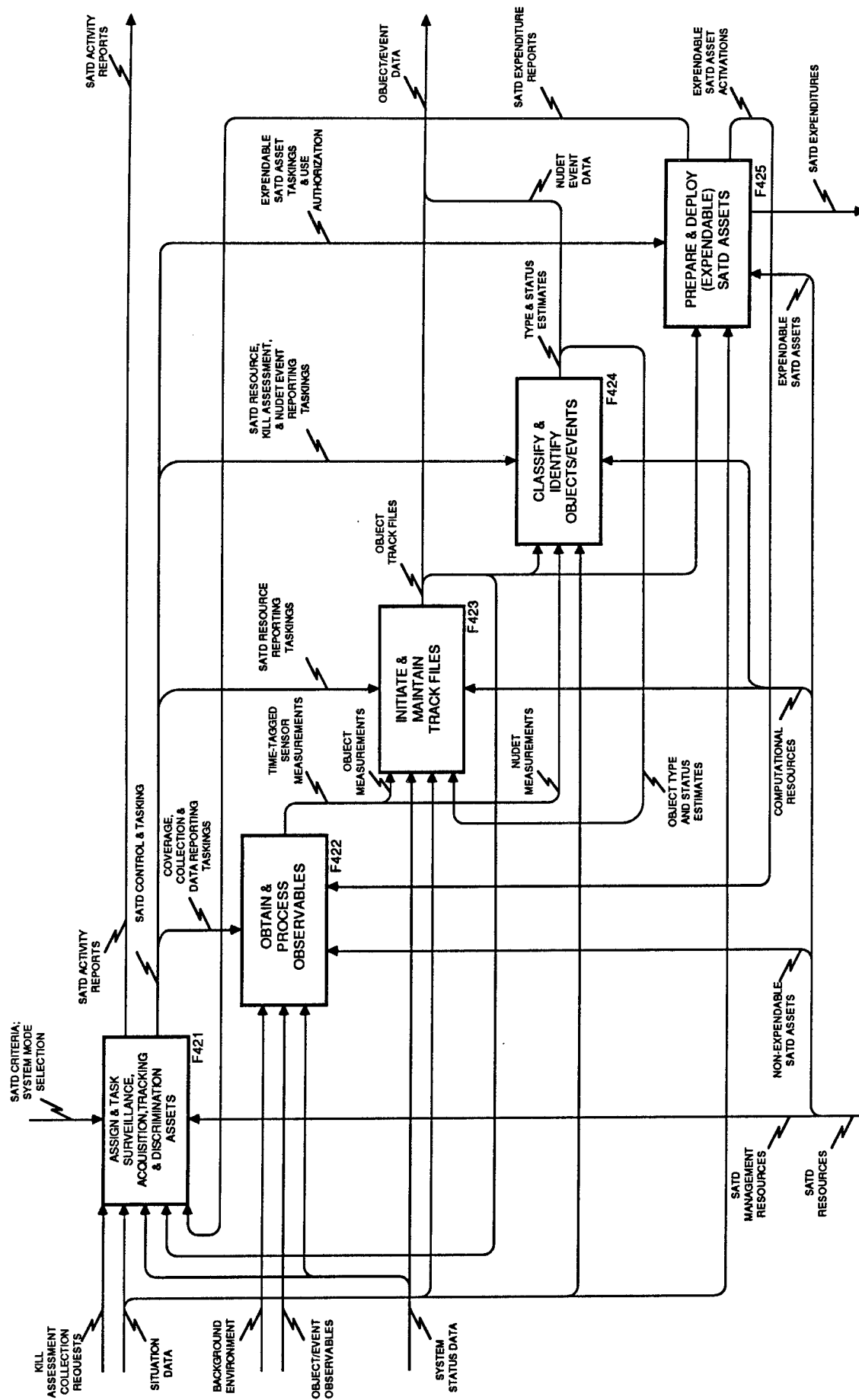
NODE: F412
 TITLE: PREPARE/REVISE PLANS AND PROCEDURES



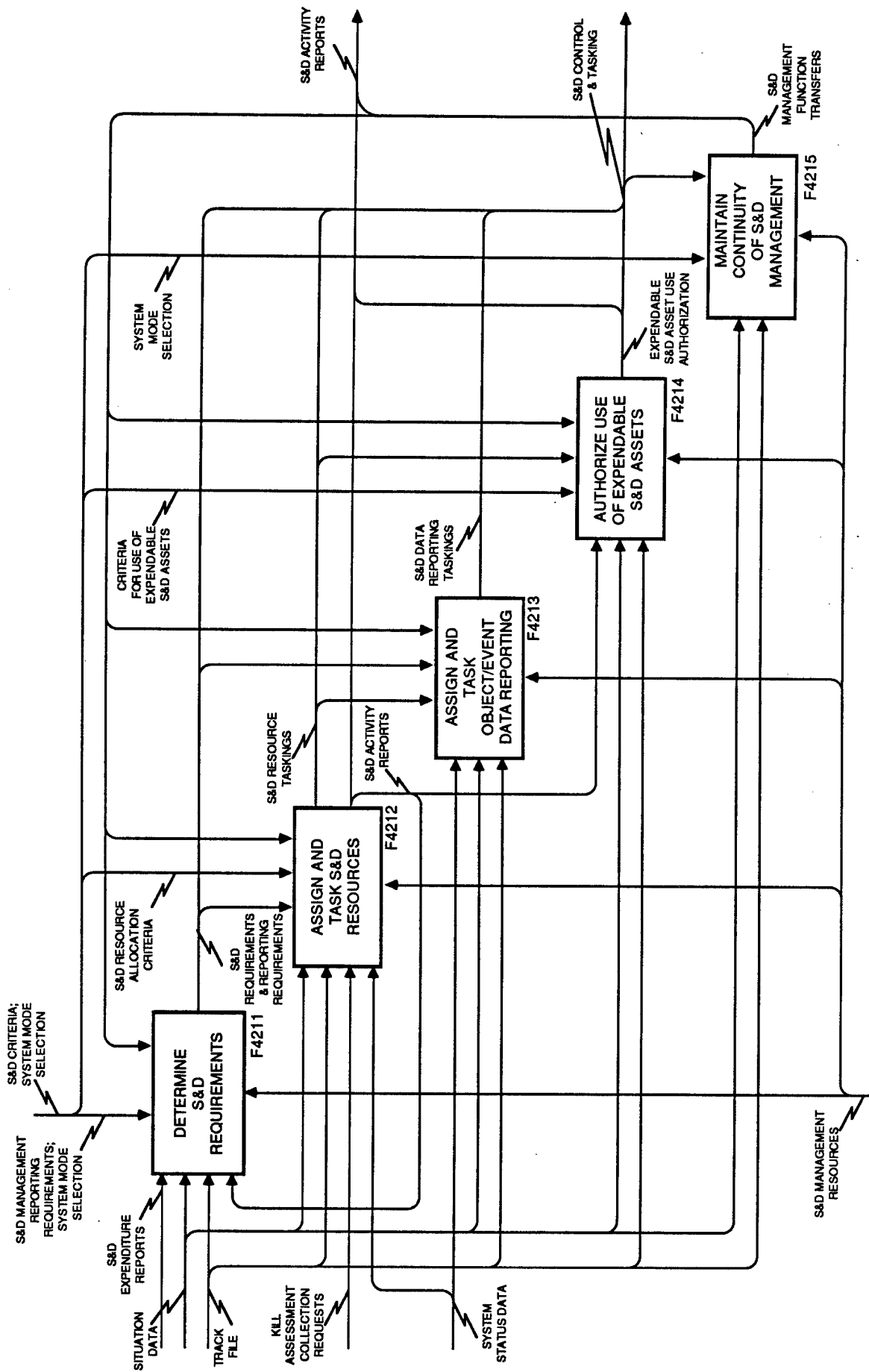
NODE: F413
TITLE: PROVIDE POSITIVE CONTROL



NODE: F414
TITLE: PROVIDE SYSTEM MANAGEMENT CONTROL

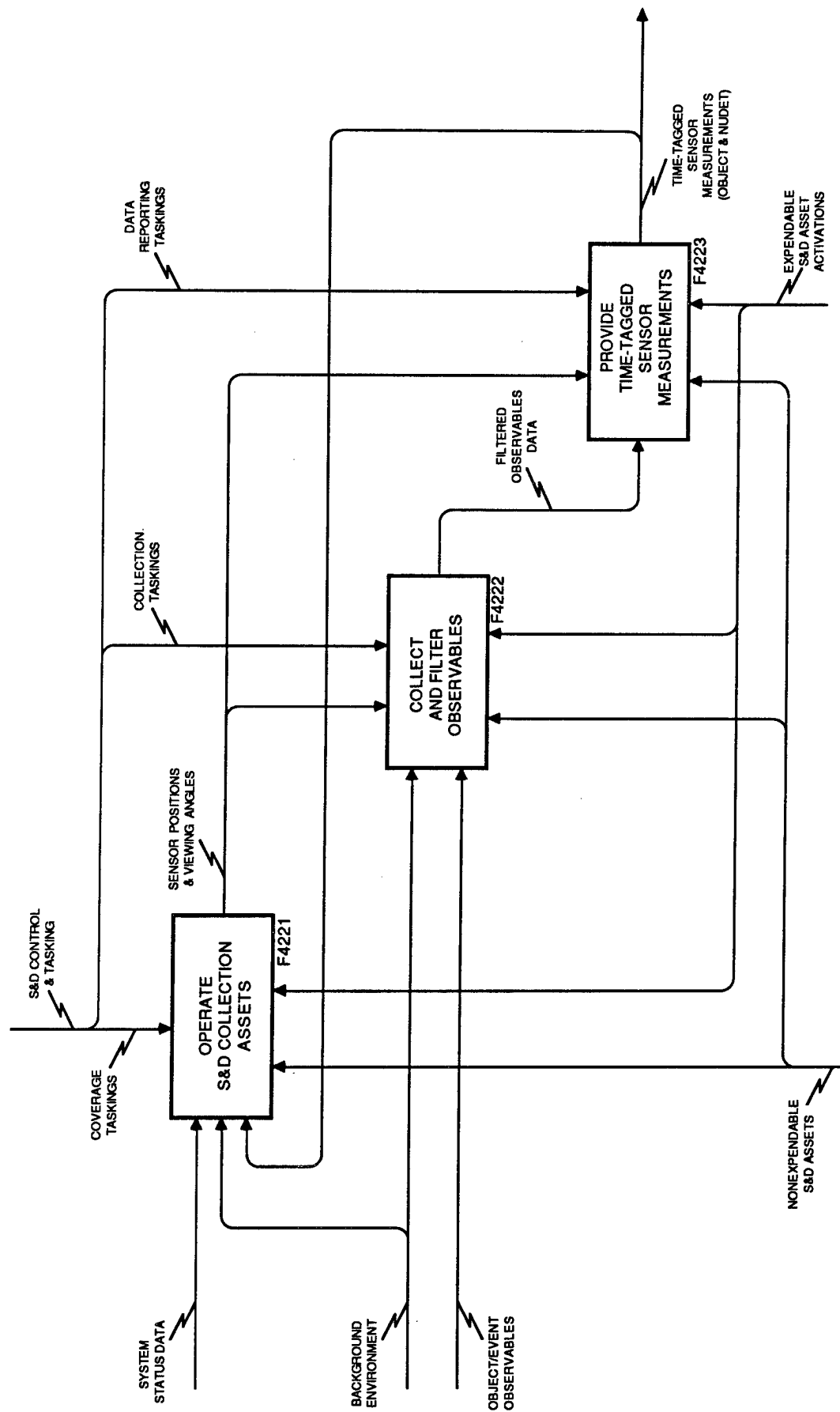


TITLE: CONDUCT SURVEILLANCE, ACQUISITION, TRACKING AND DISCRIMINATION (SATD)
 NODE: F42

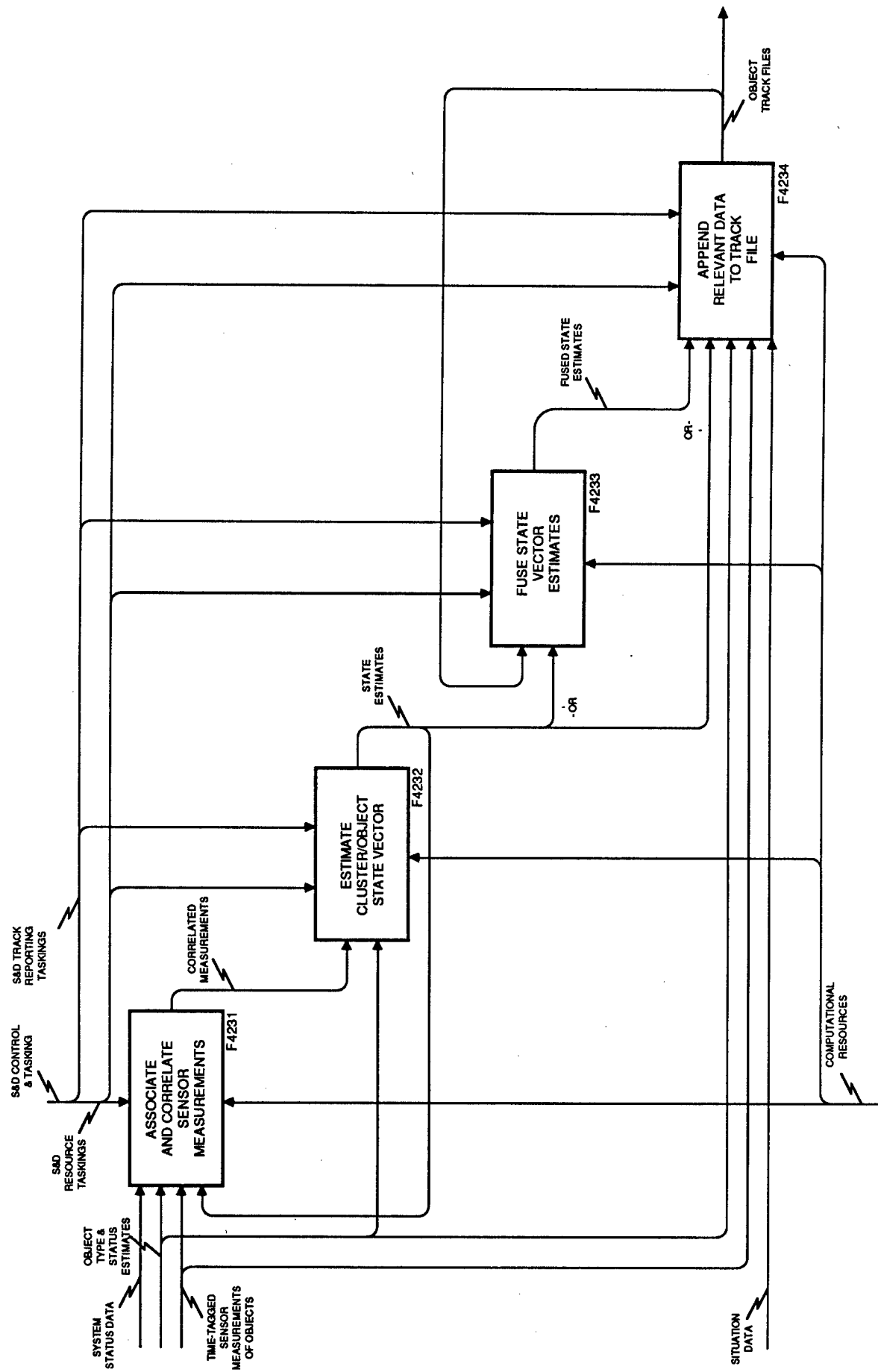


NODE: F421

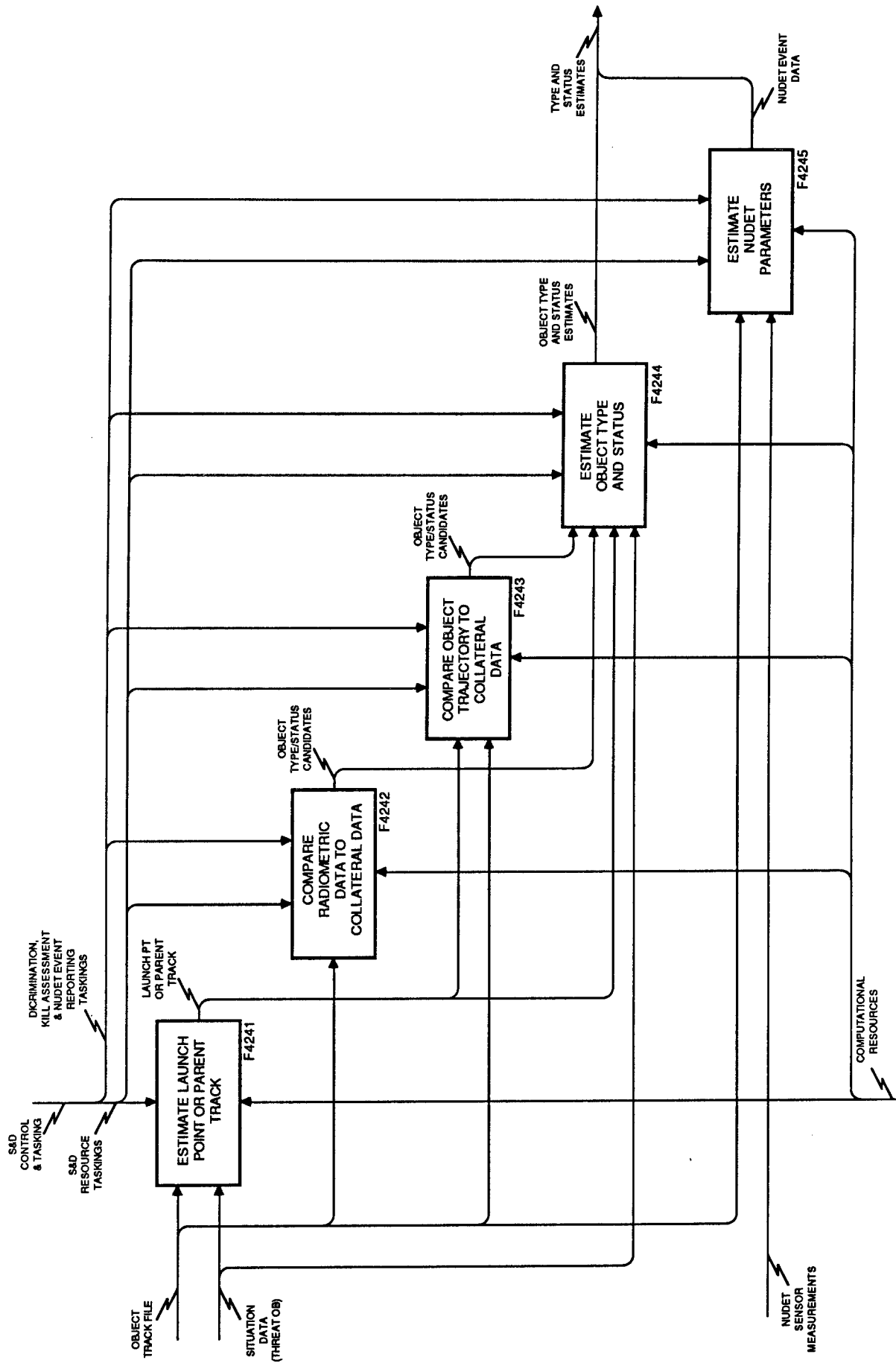
TITLE: MANAGE SURVEILLANCE AND DISCRIMINATION



NODE: F422
TITLE: OBTAIN AND PROCESS OBSERVABLES

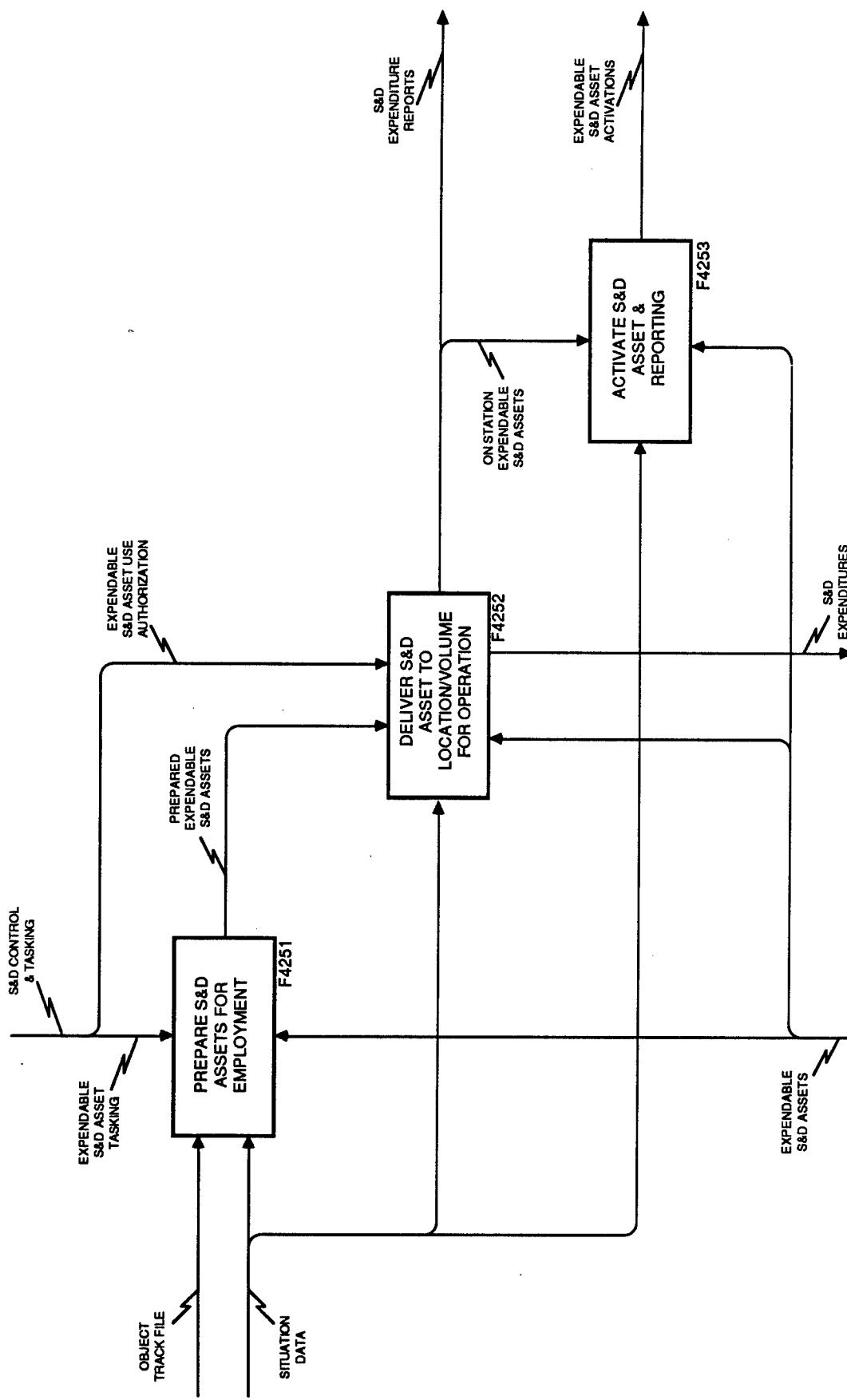


NODE: F423
TITLE: INITIATE AND MAINTAIN OBJECT TRACK FILES

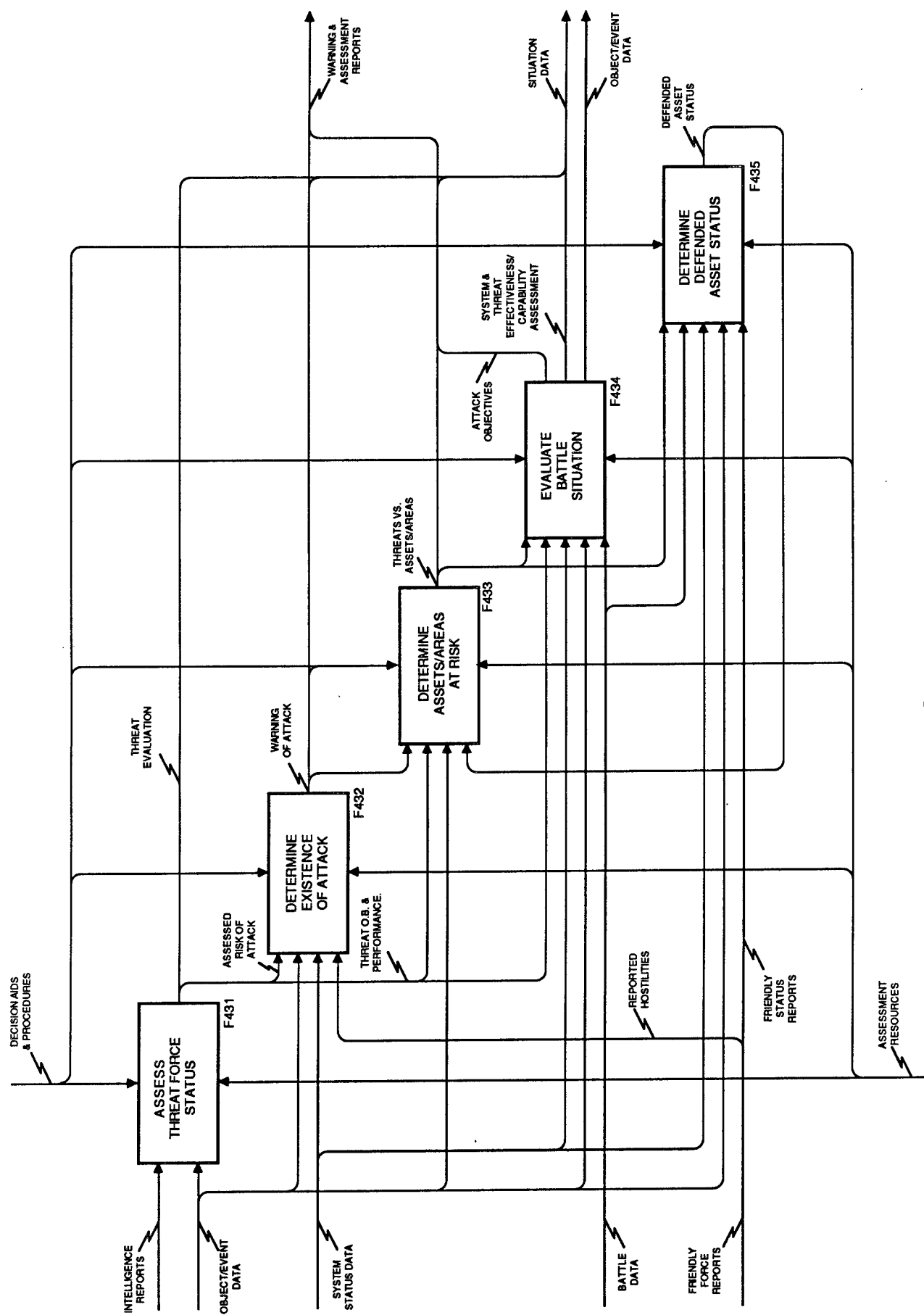


NODE: F424

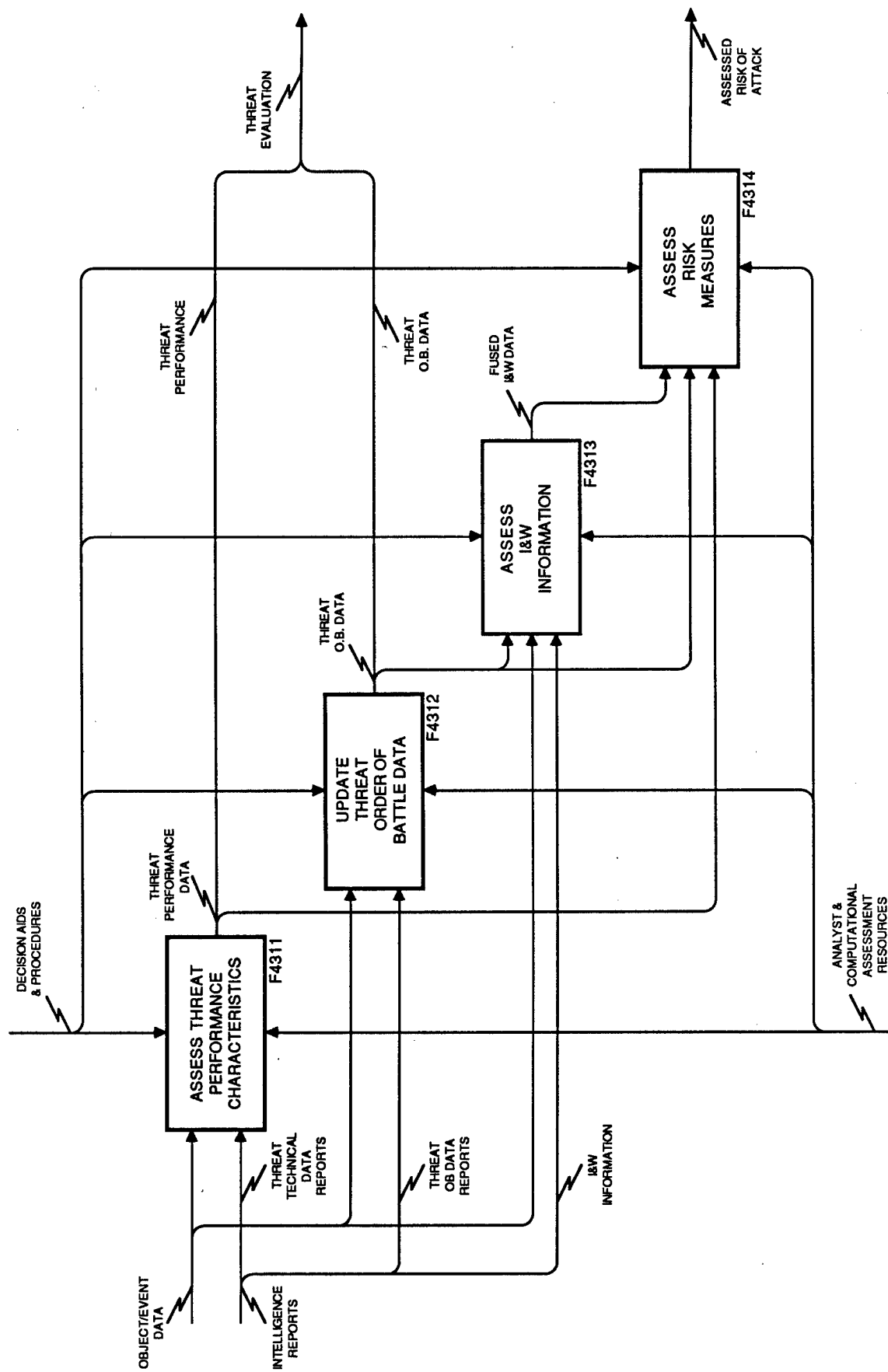
TITLE: CLASSIFY AND IDENTIFY OBJECTS/EVENTS



NODE: F425
TITLE: EMPLOY EXPENDABLE S&D ASSETS

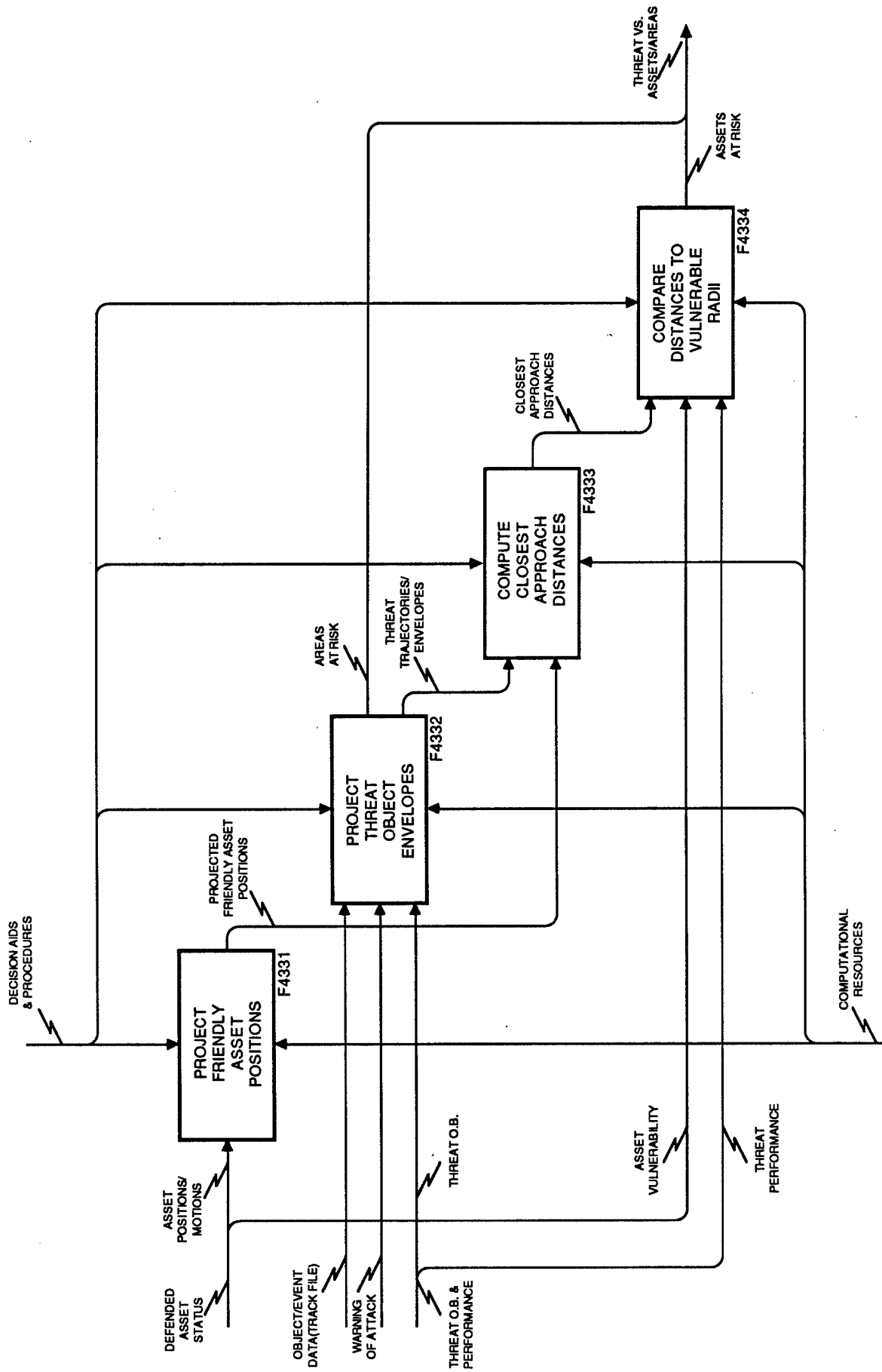


NODE: F43
TITLE: MONITOR AND ASSESS SITUATION

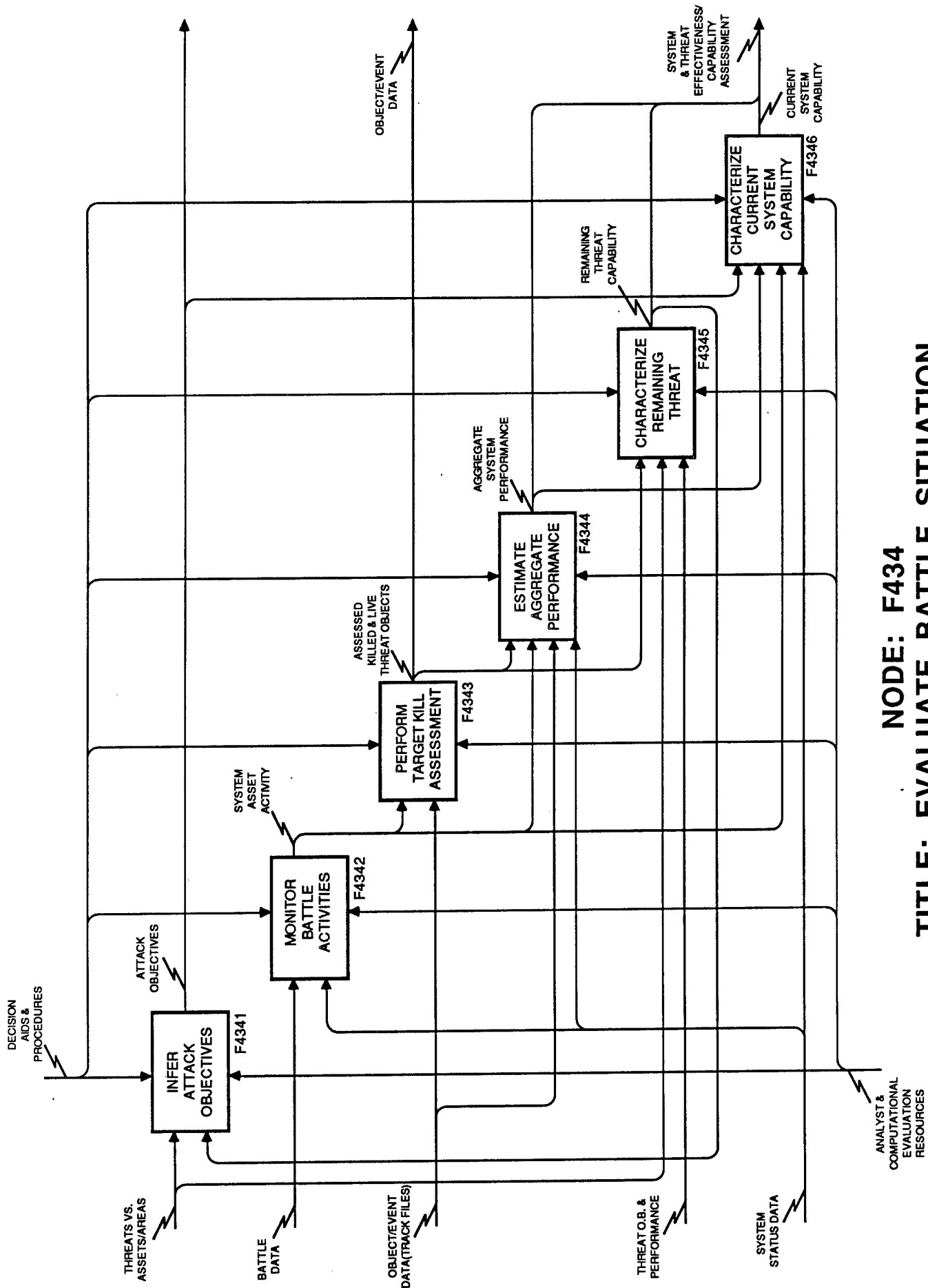


NODE: F431
TITLE: ASSESS THREAT FORCE STATUS

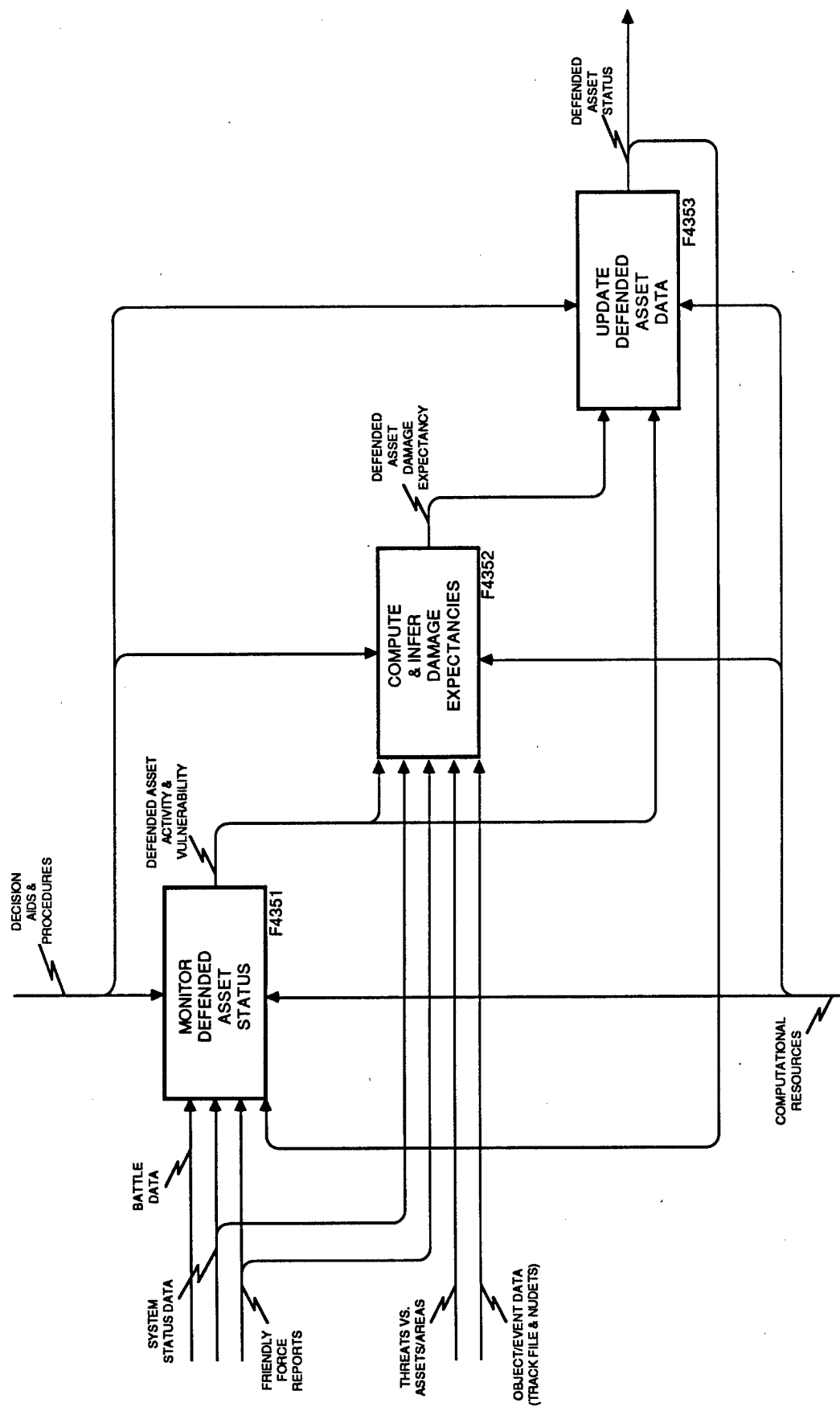




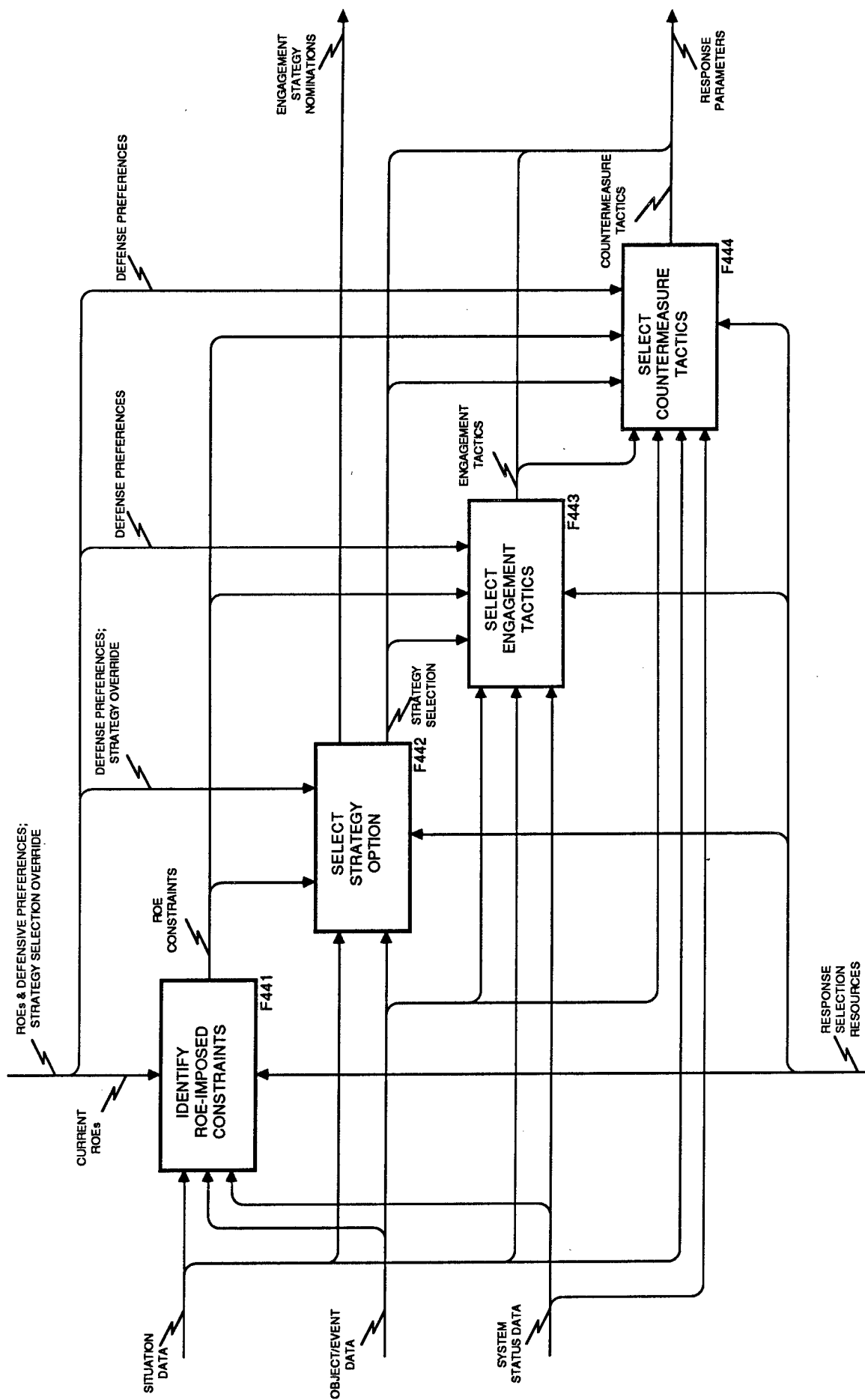
NODE: F433
TITLE: DETERMINE ASSETS/AREAS AT RISK



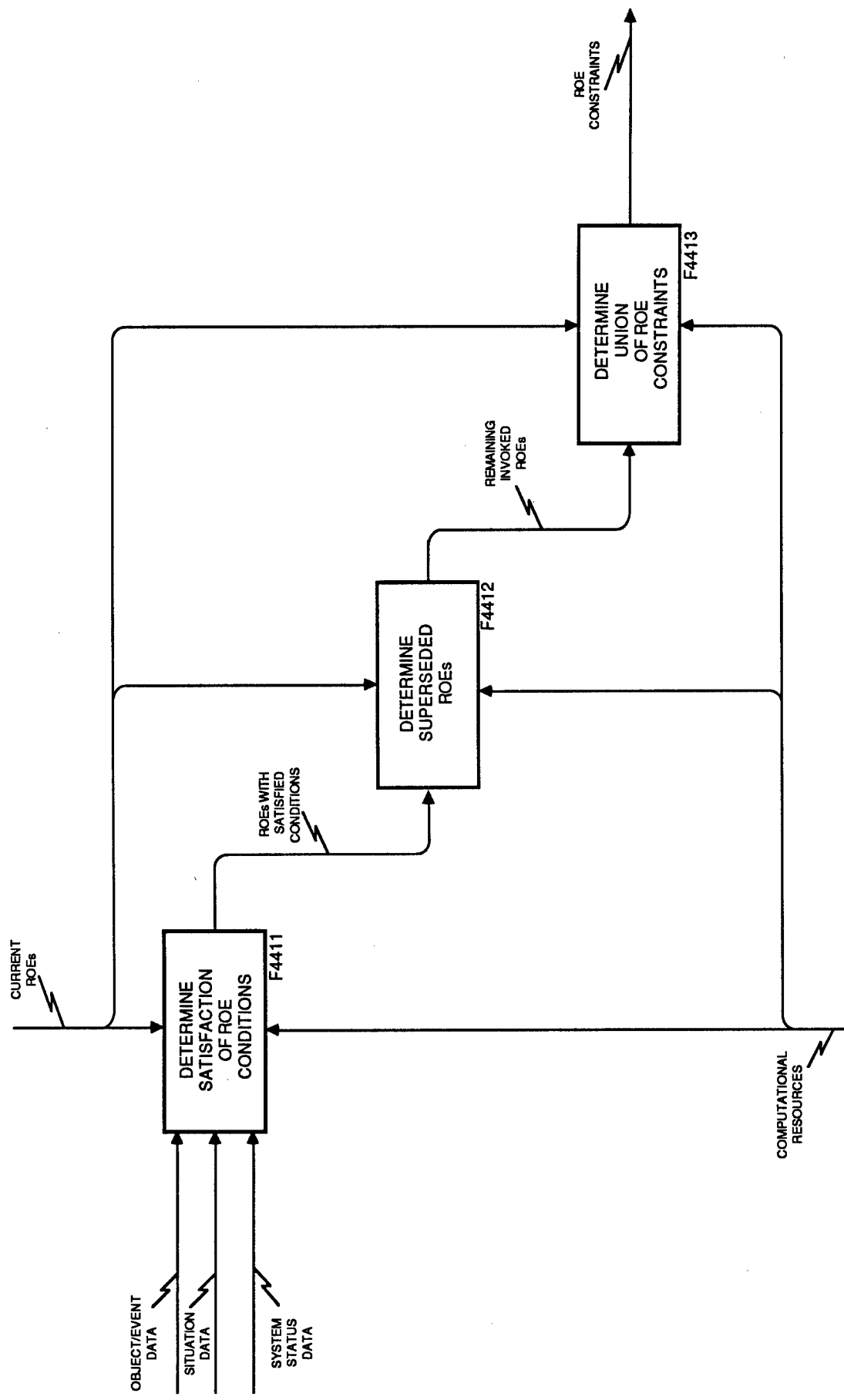
NODE: F434
TITLE: EVALUATE BATTLE SITUATION



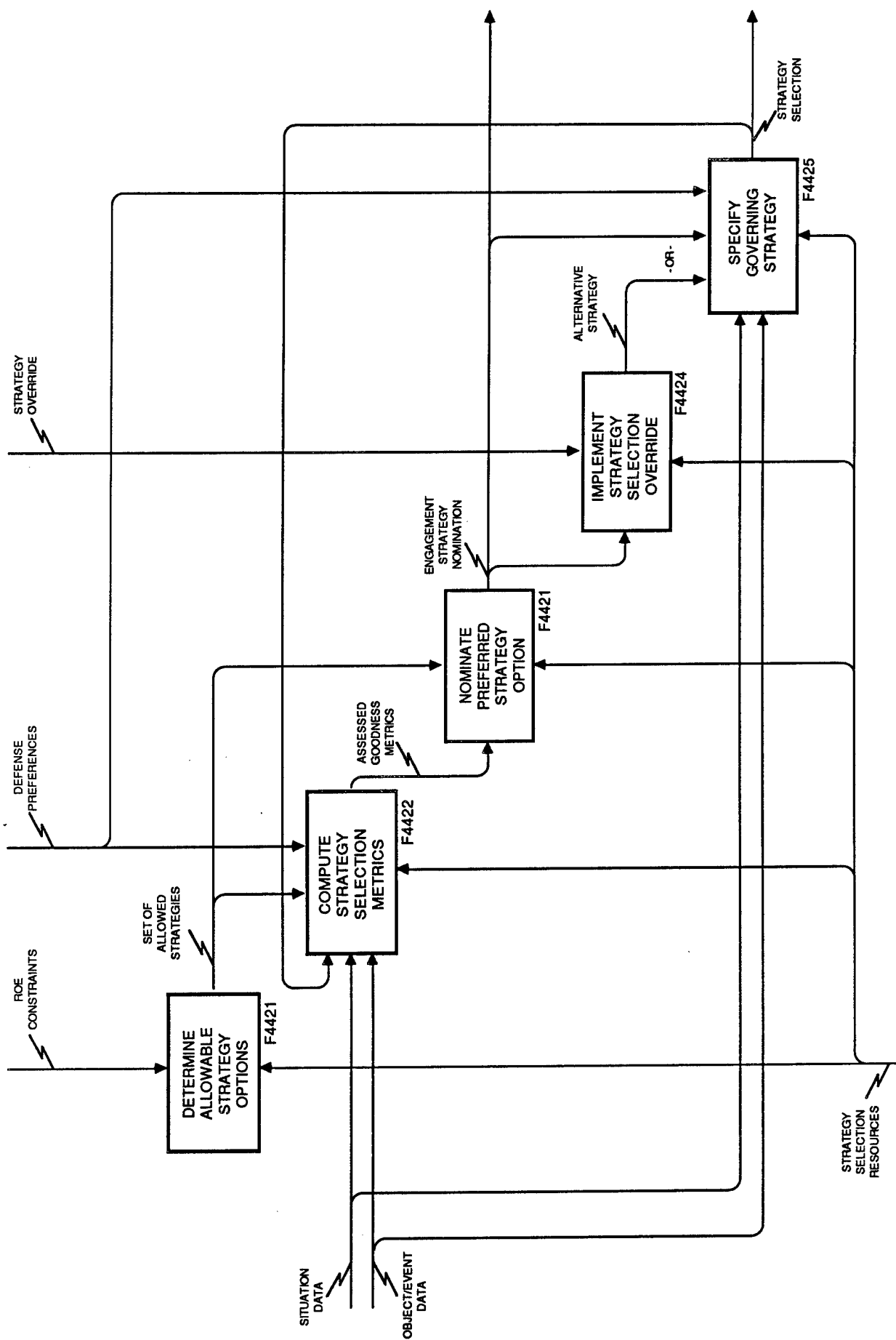
NODE: F435
TITLE: DETERMINE DEFENDED ASSET STATUS



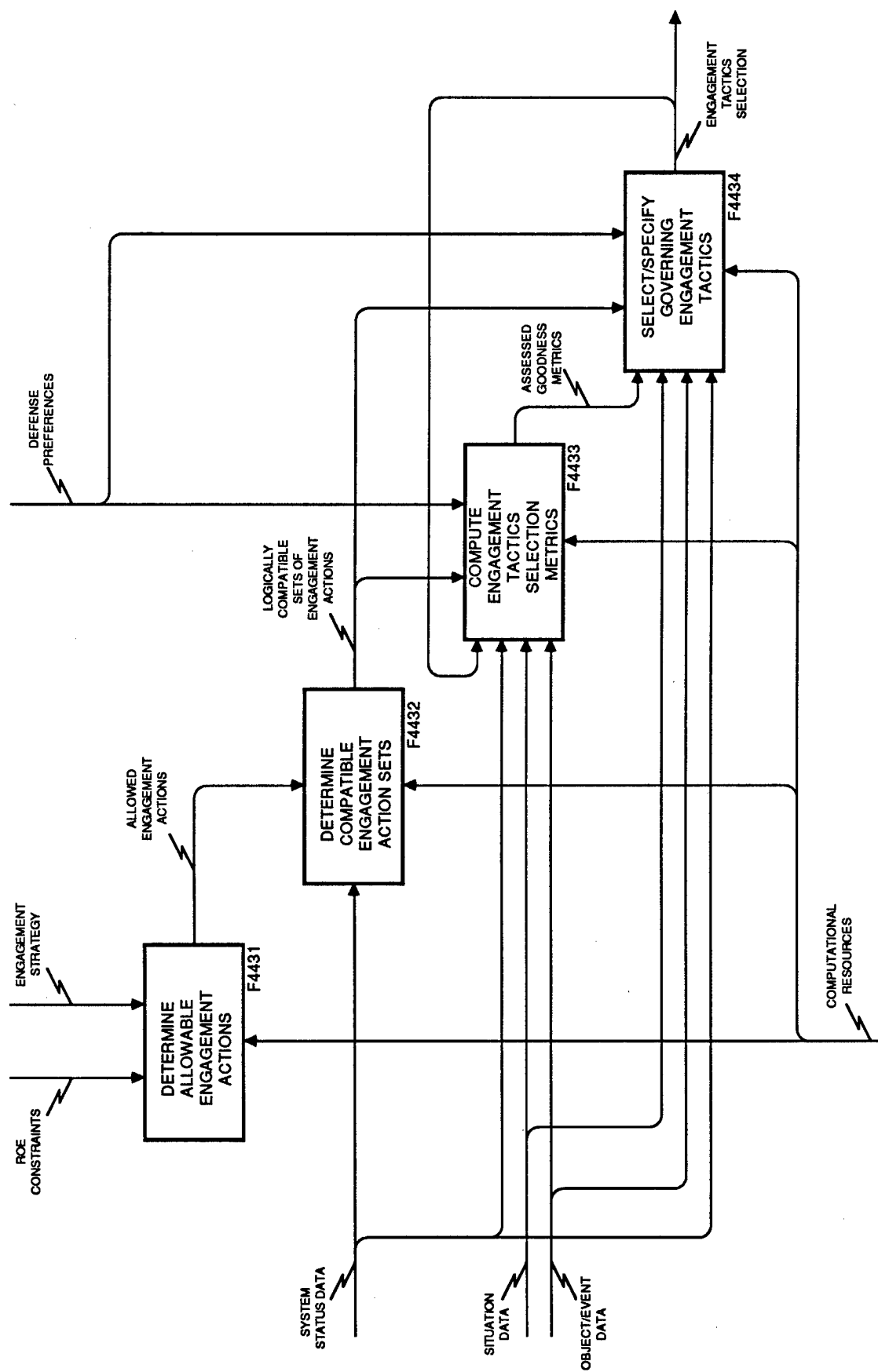
NODE: F44
TITLE: SELECT DEFENSIVE RESPONSE



NODE: F441
TITLE: IDENTIFY ROE-IMPOSED CONSTRAINTS

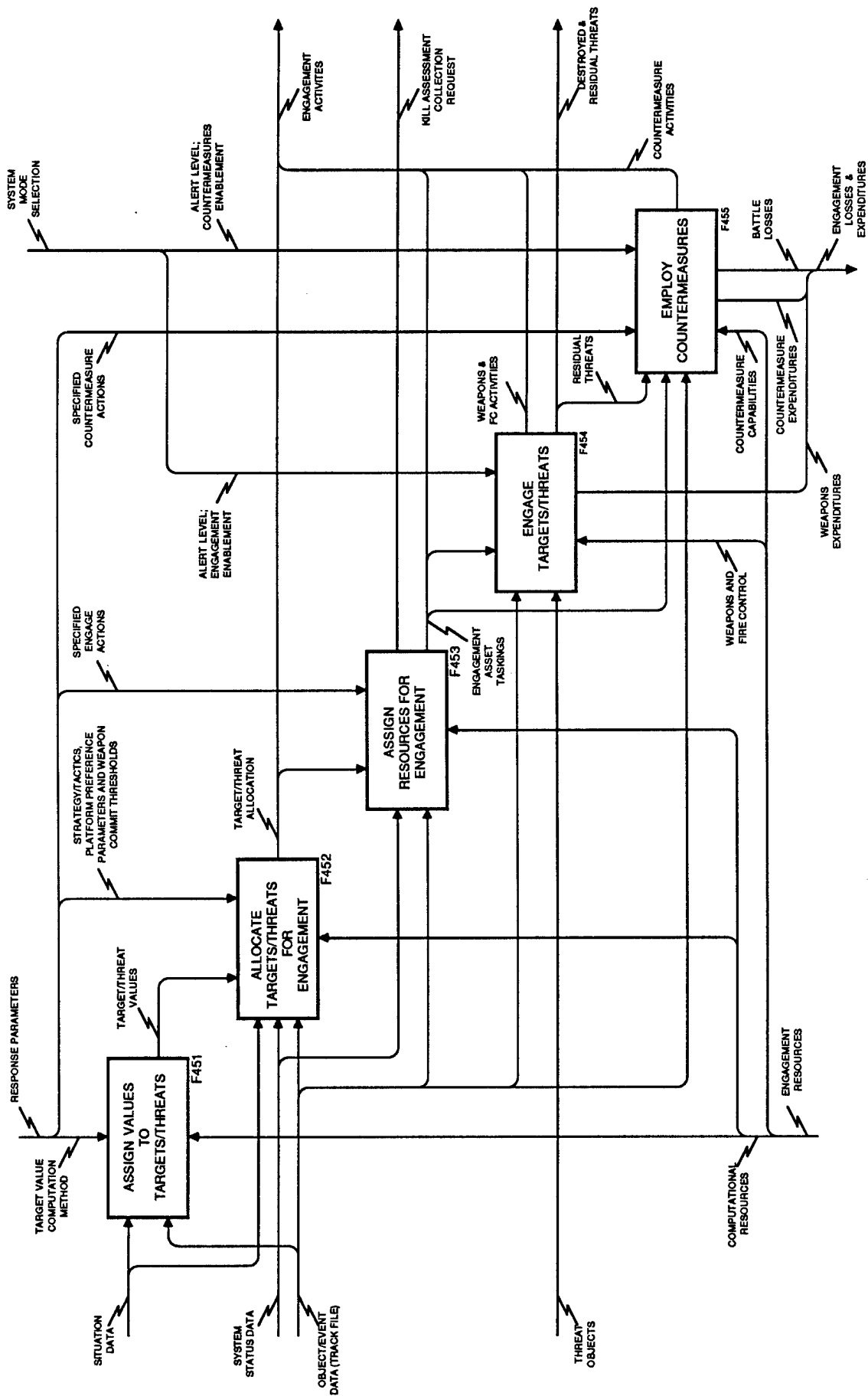


NODE: F442
TITLE: SELECT STRATEGY OPTION

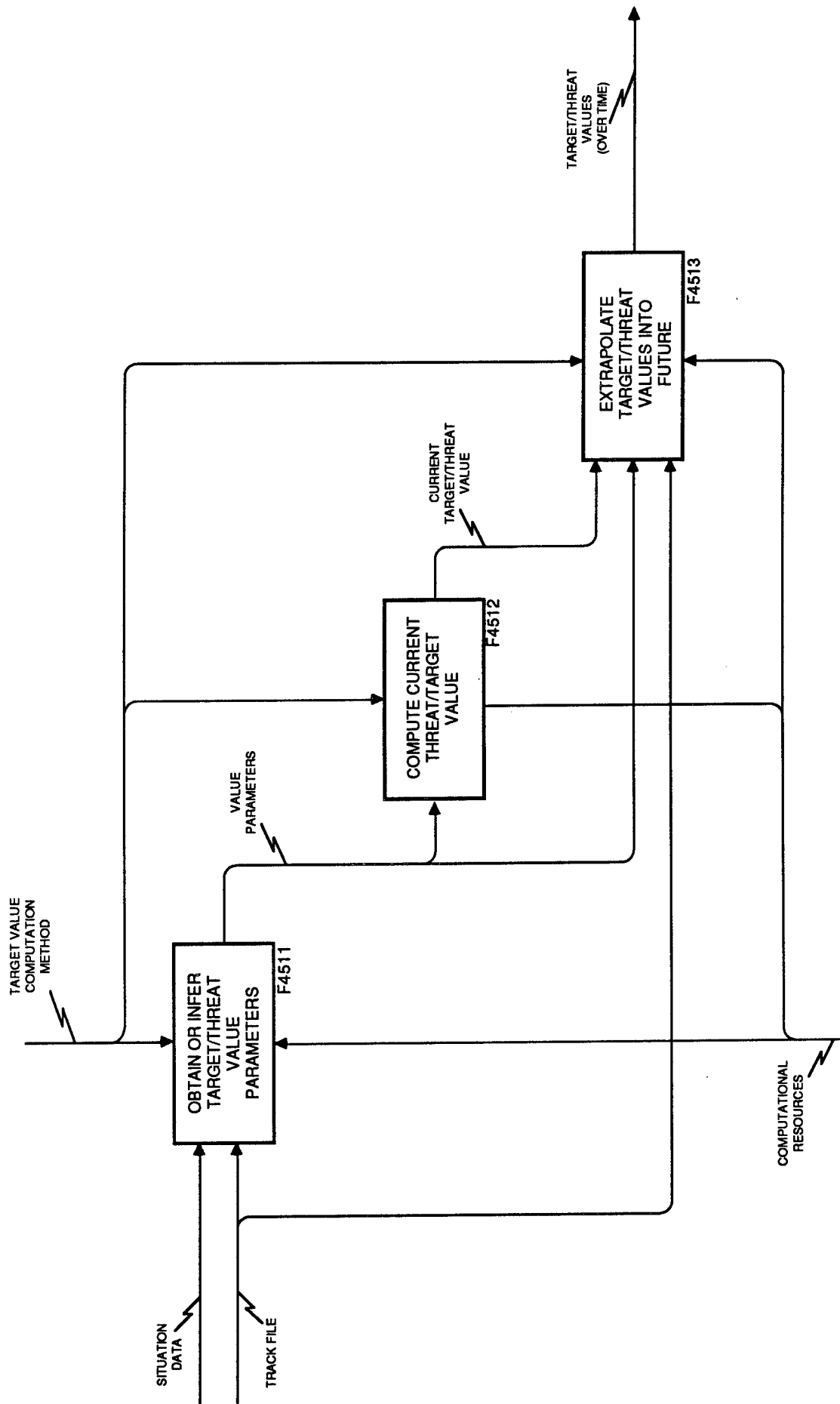


NODE: F443
TITLE: SELECT ENGAGEMENT TACTICS

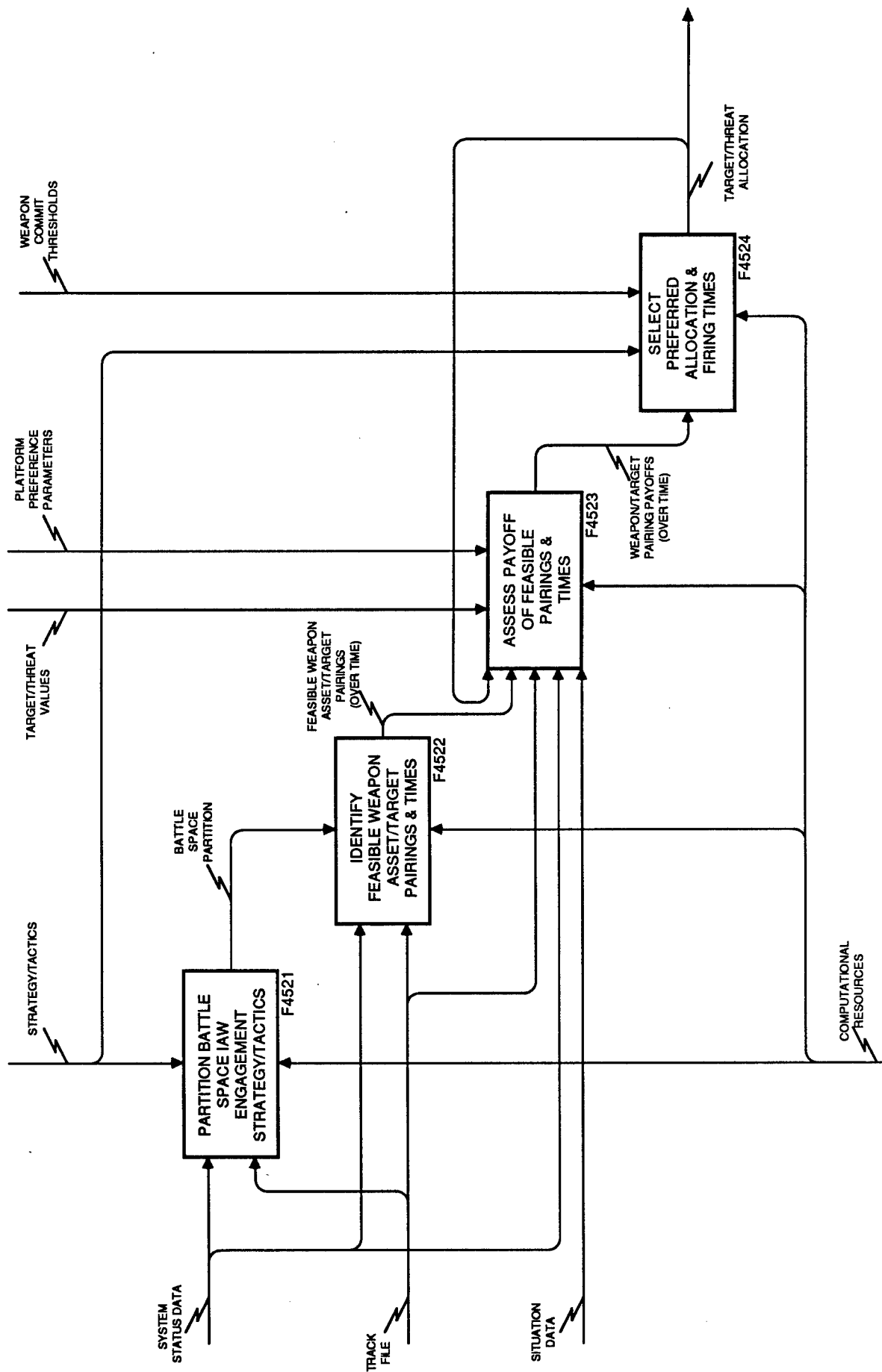




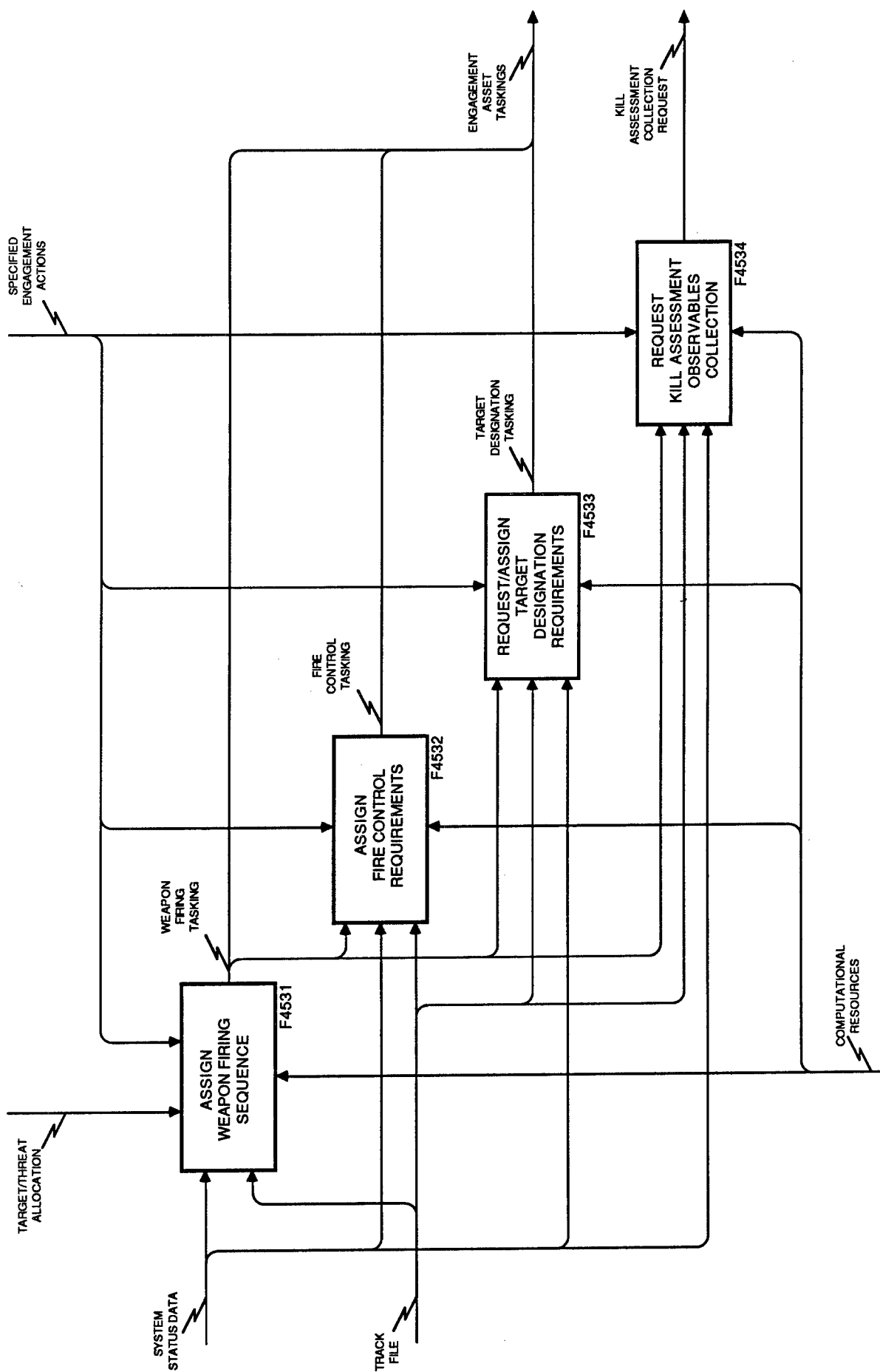
NODE: F45
 TITLE: EXECUTE DEFENSIVE RESPONSE



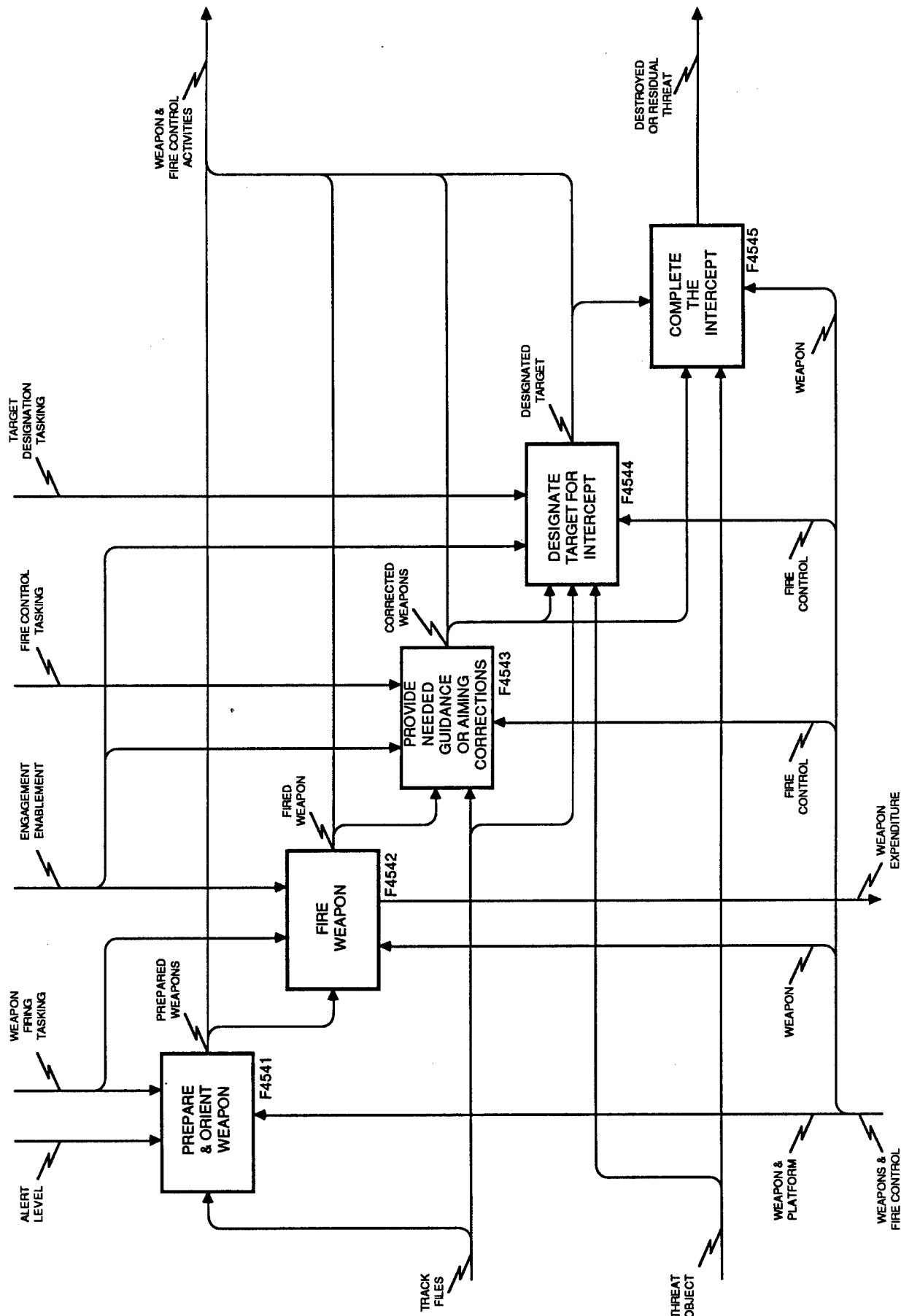
NODE: F451
TITLE: ASSIGN VALUES TO TARGETS/THREATS



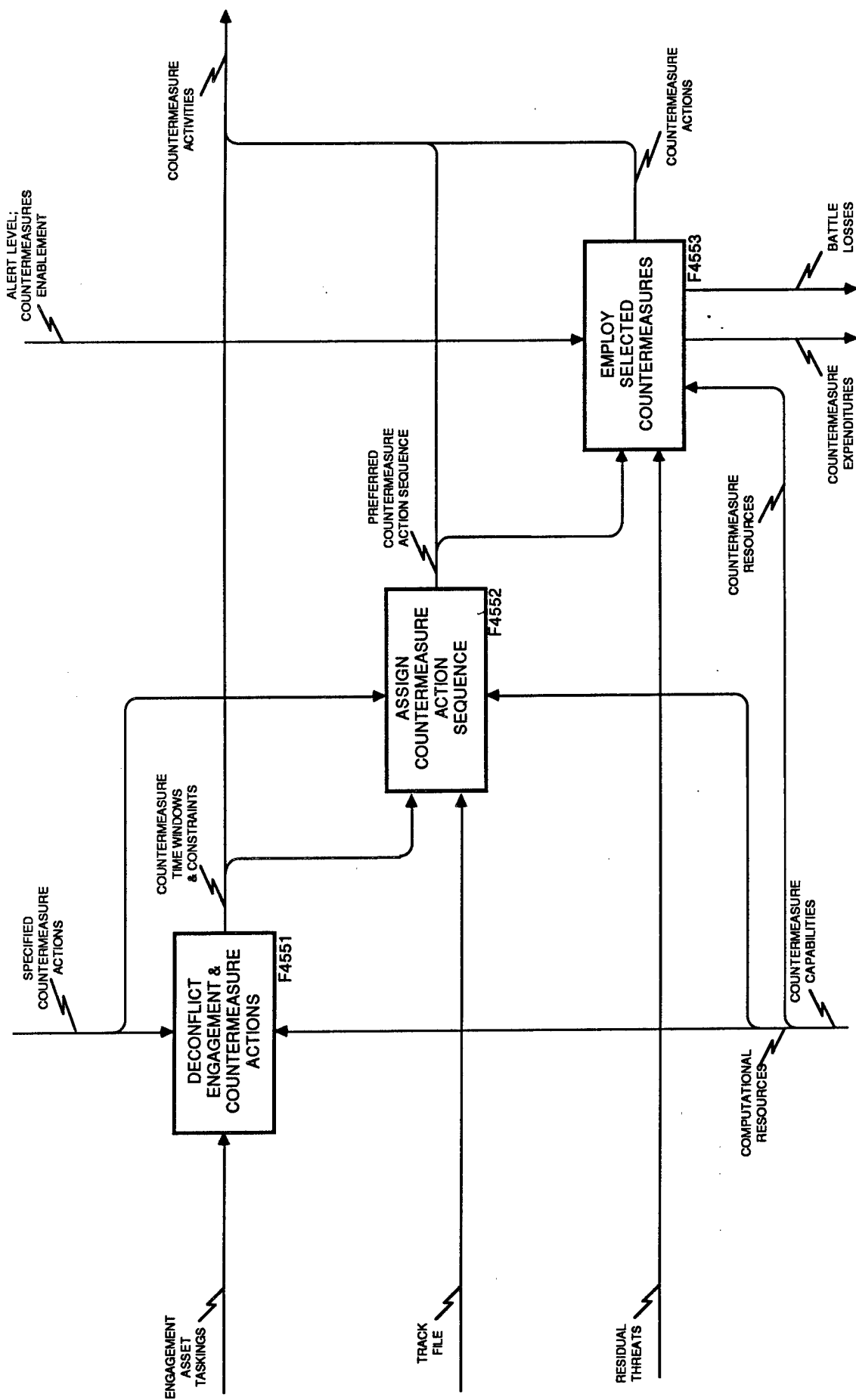
NODE: F452
TITLE: ALLOCATE TARGETS/THREATS FOR ENGAGEMENT



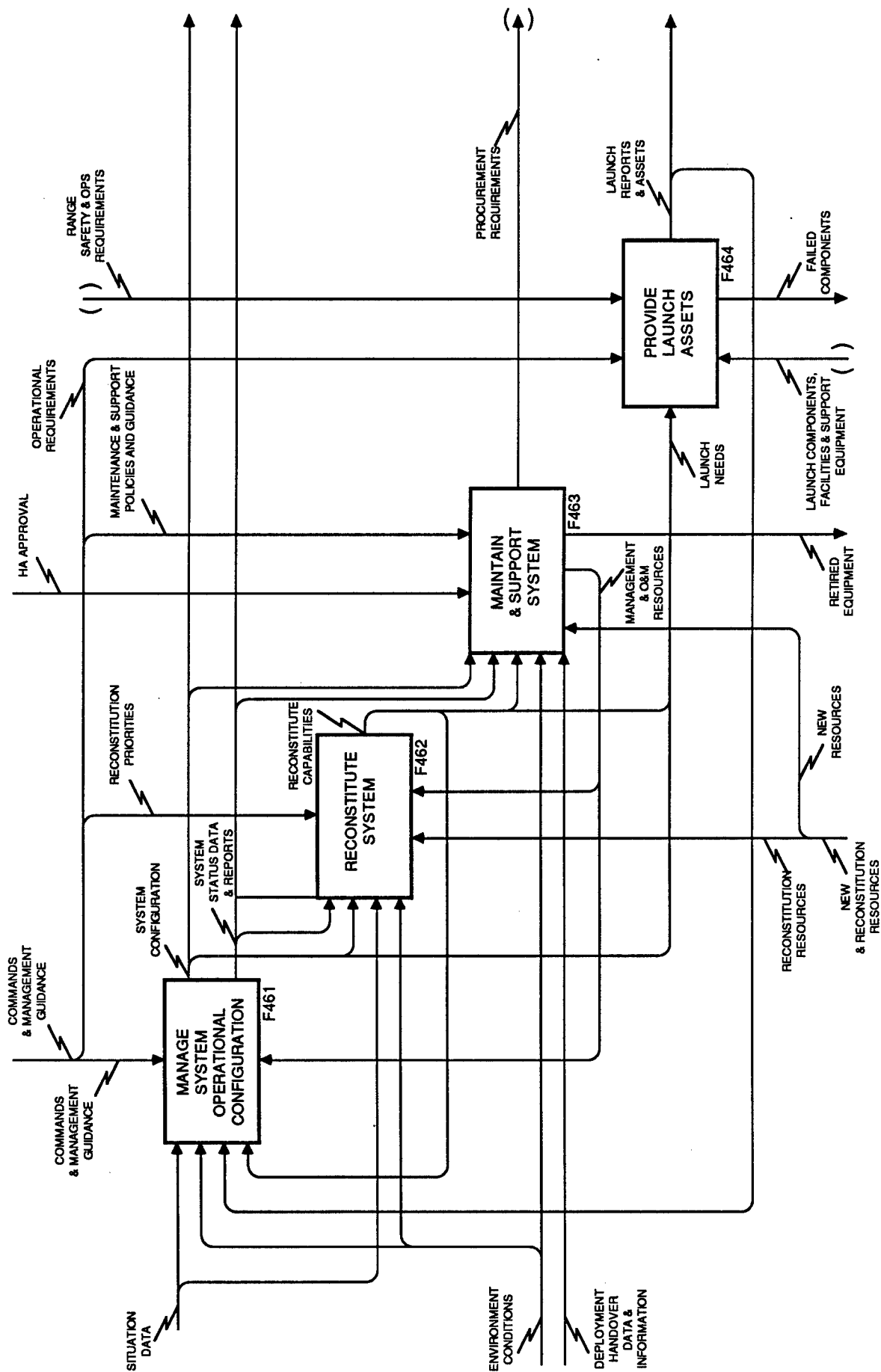
NODE: F453
TITLE: ASSIGN RESOURCES FOR ENGAGEMENT



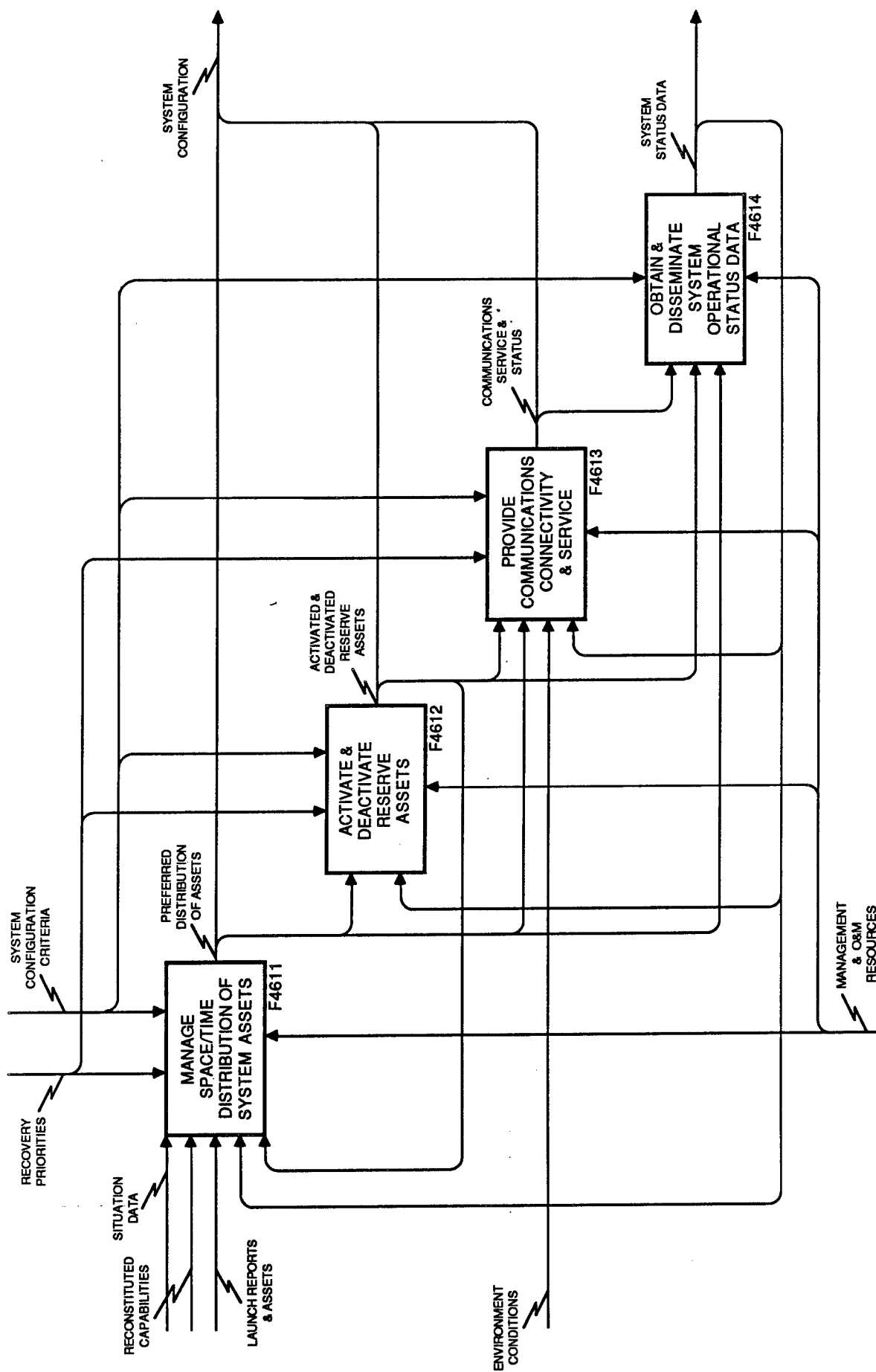
NODE: F454
TITLE: ENGAGE TARGETS/THREATS



NODE: F455
TITLE: EMPLOY COUNTERMEASURES

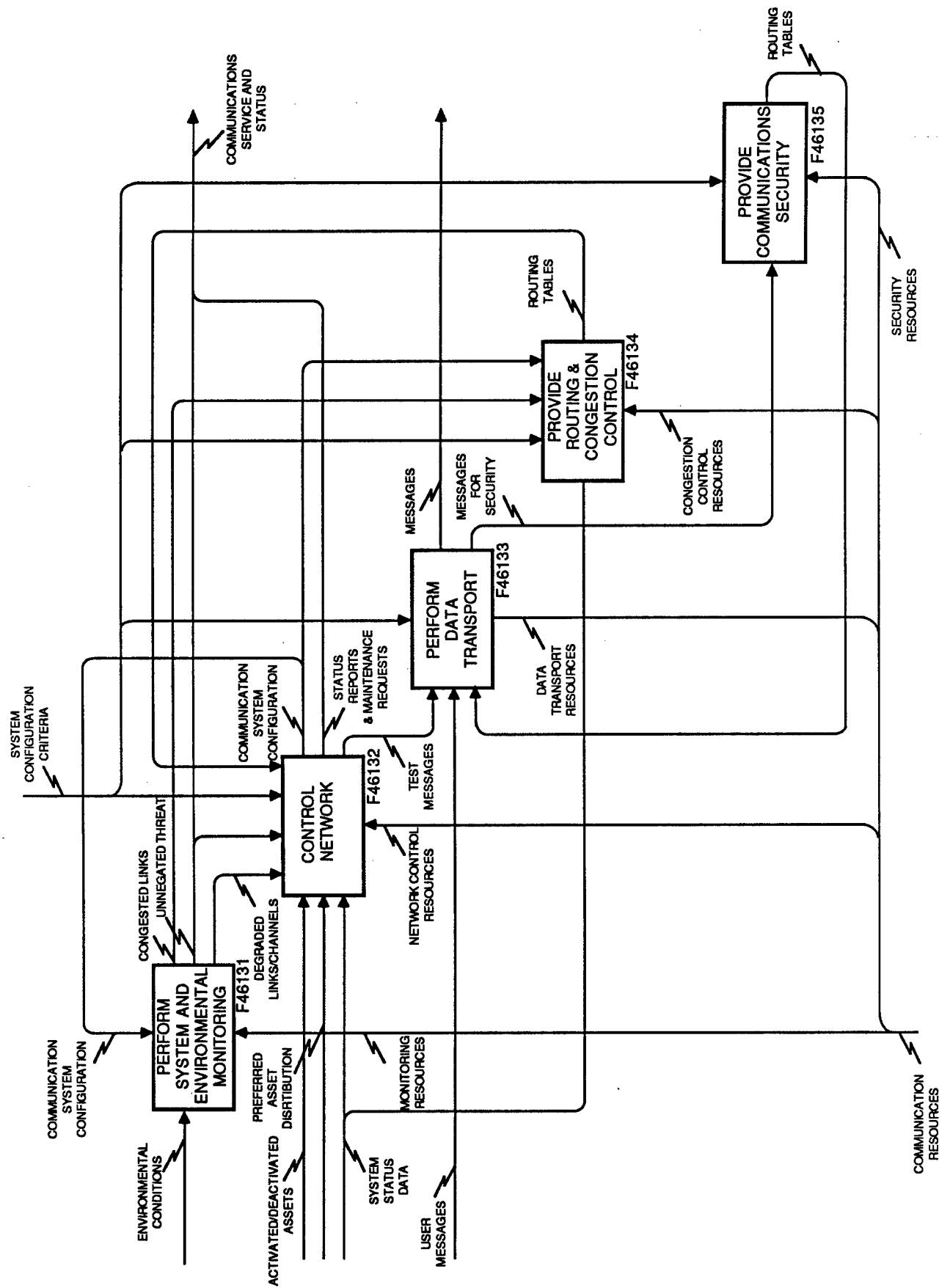


NODE: F46
TITLE: MAINTAIN SYSTEM CAPABILITY



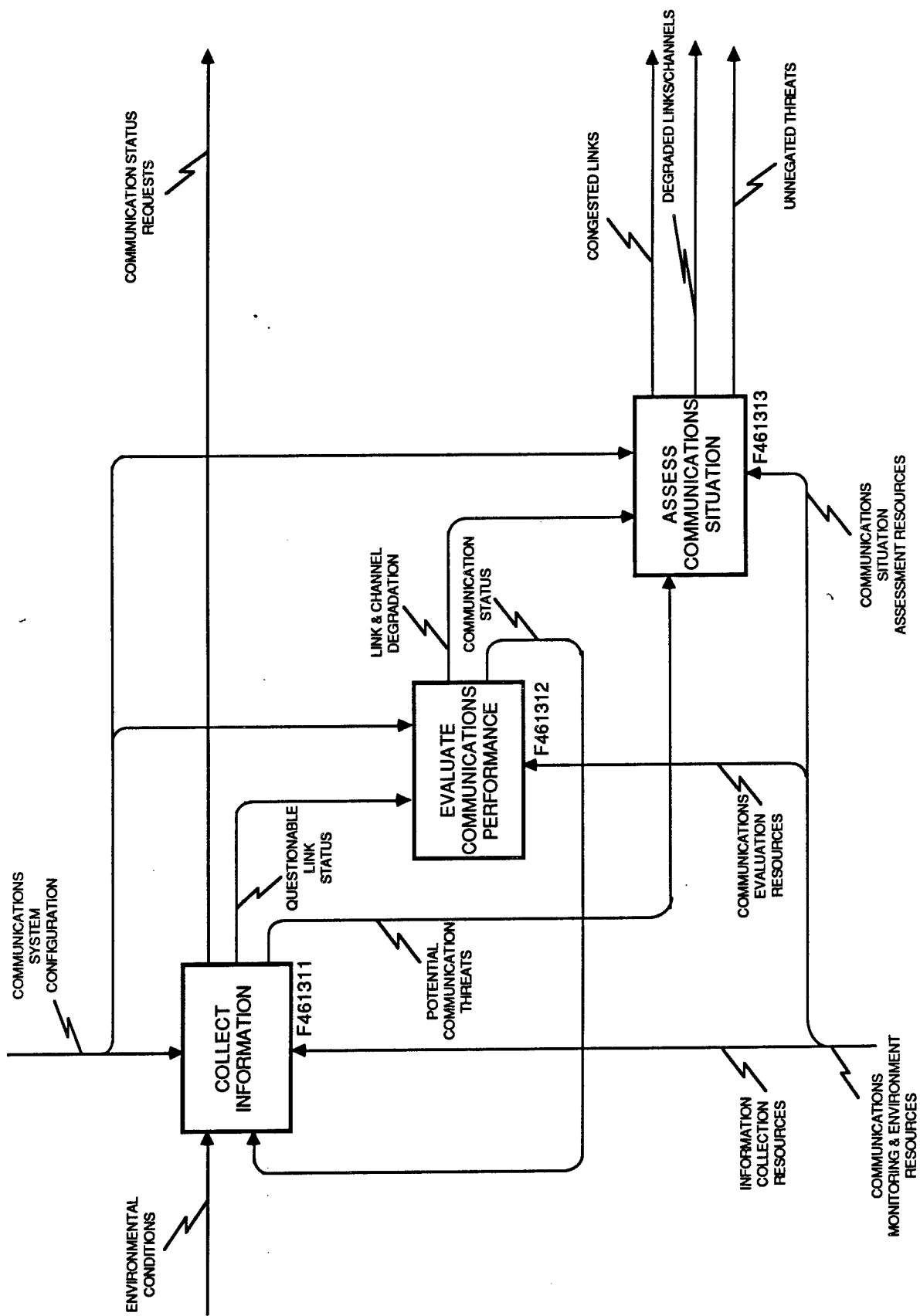
NODE: F461

TITLE: MANAGE SYSTEM OPERATIONAL CONFIGURATION

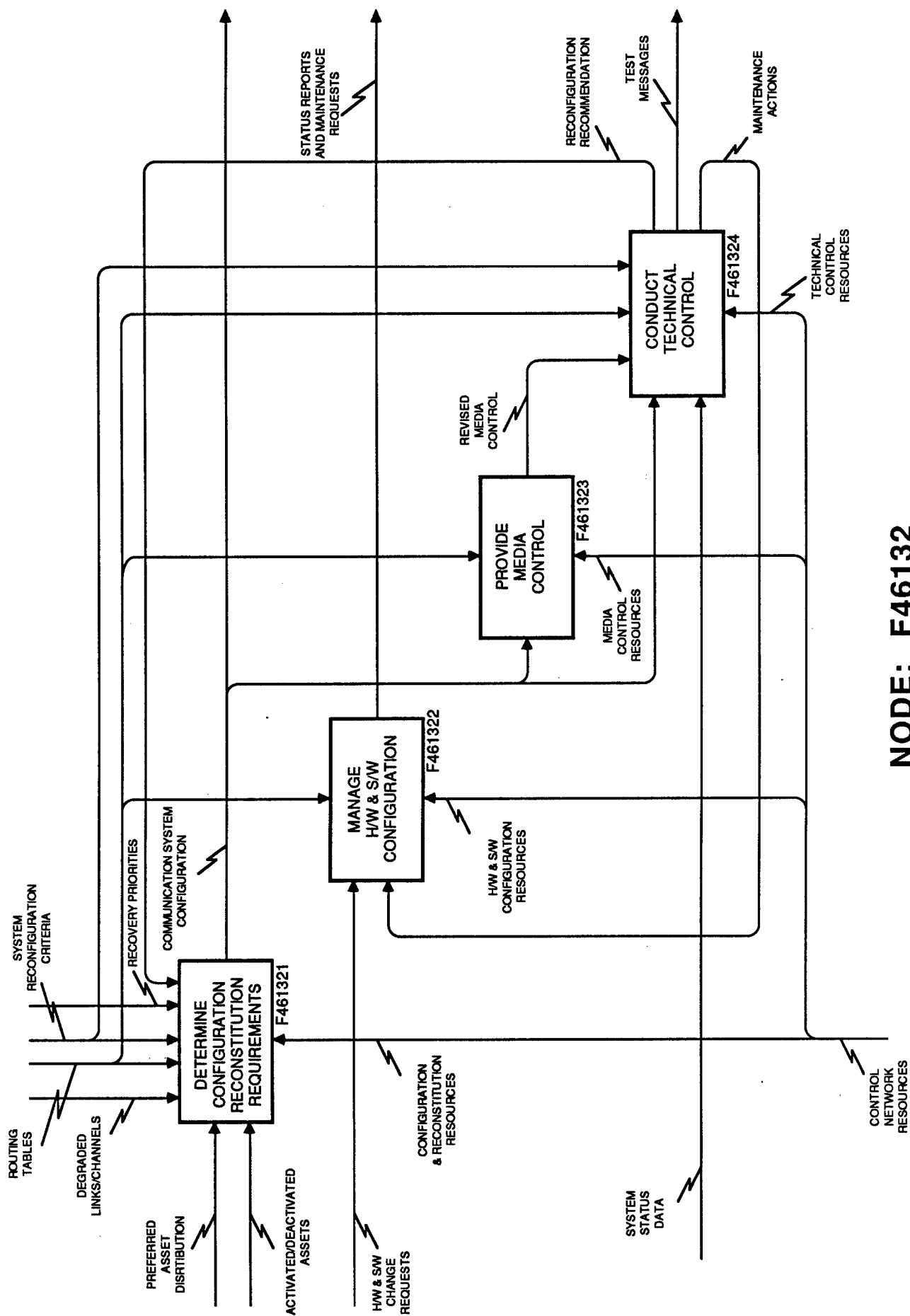


NODE: F4613

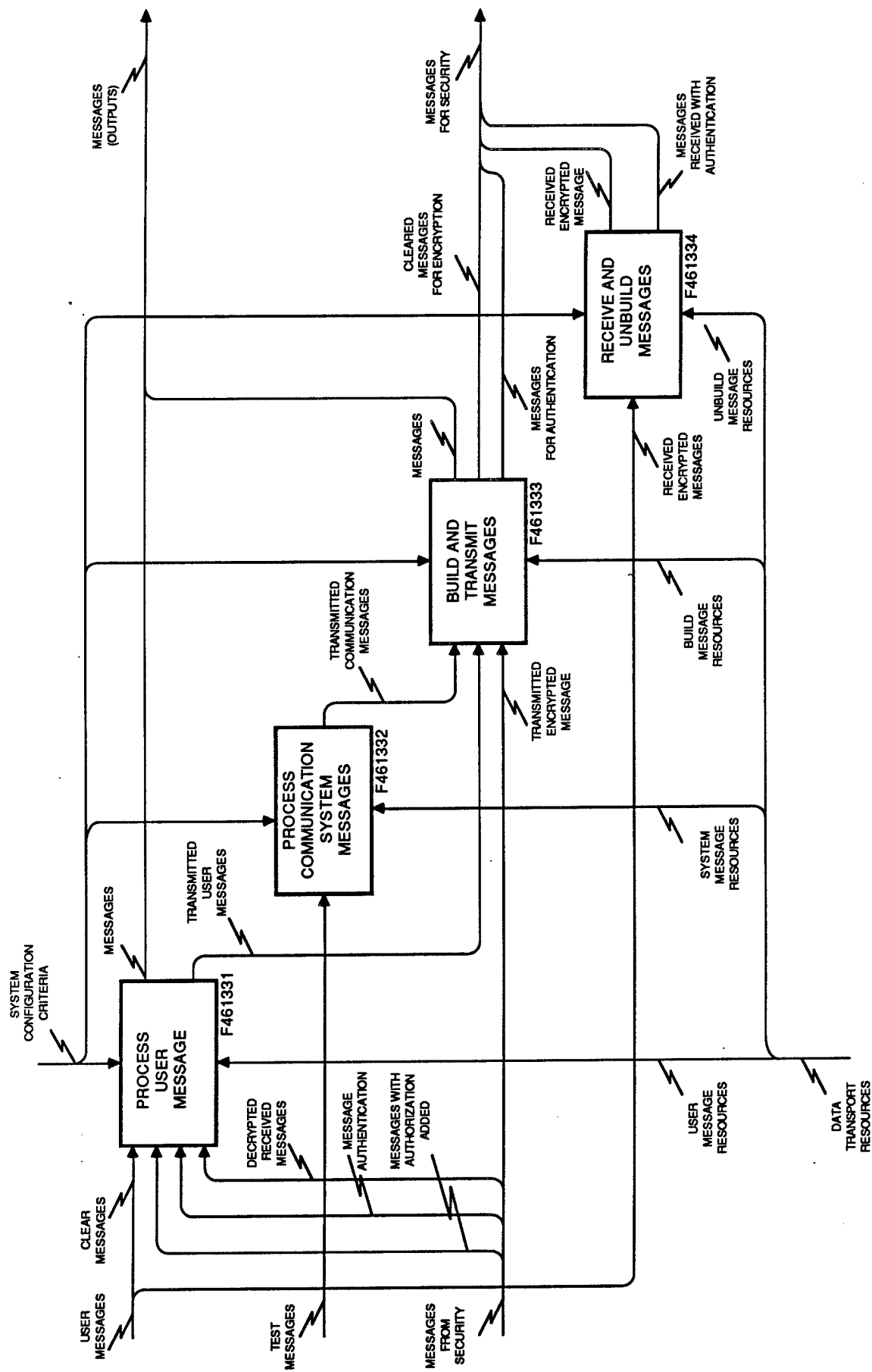
TITLE: PROVIDE COMMUNICATIONS CONNECTIVITY & SERVICE



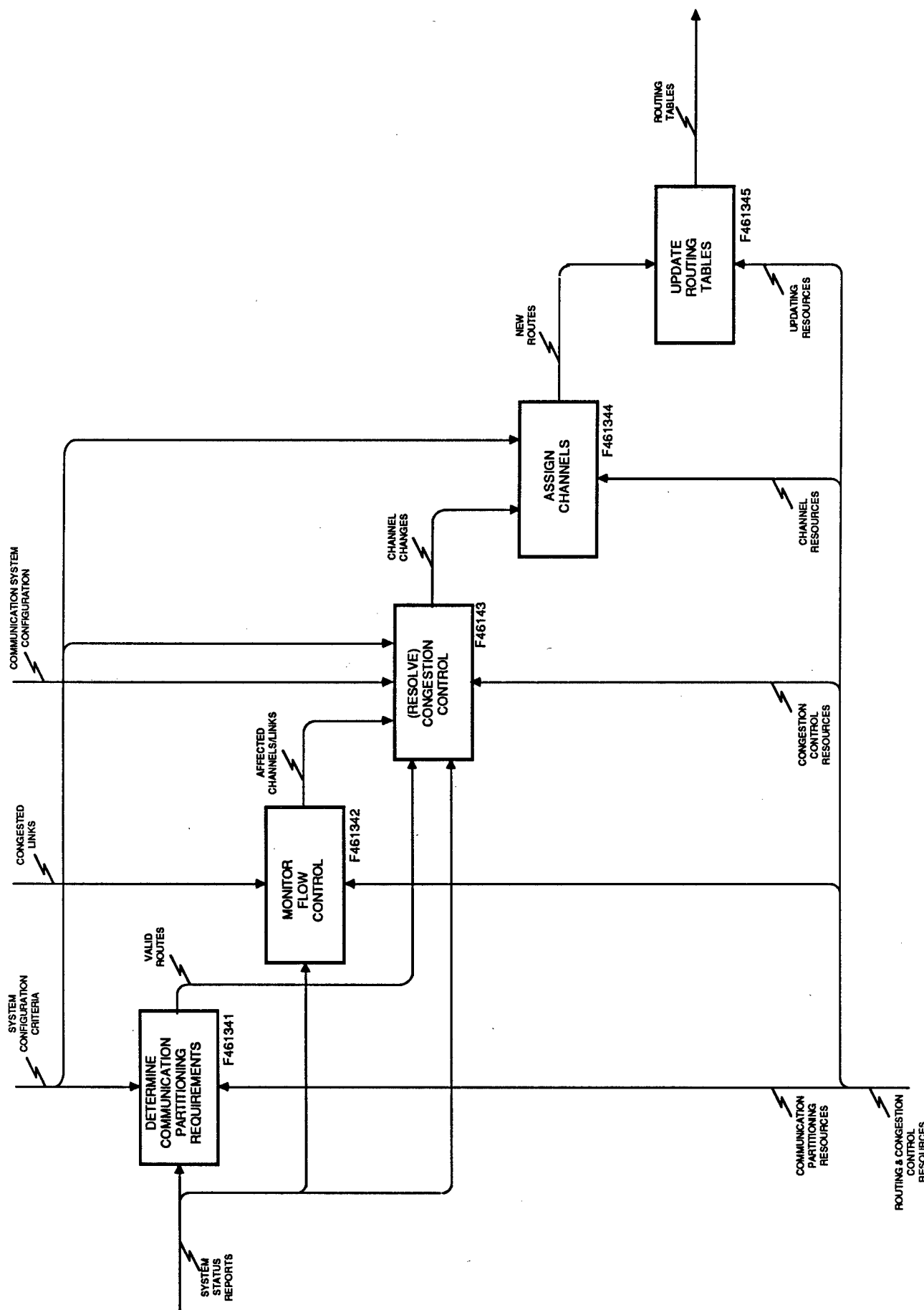
NODE: F46131
TITLE: PERFORM SYSTEM AND ENVIRONMENT MONITORING



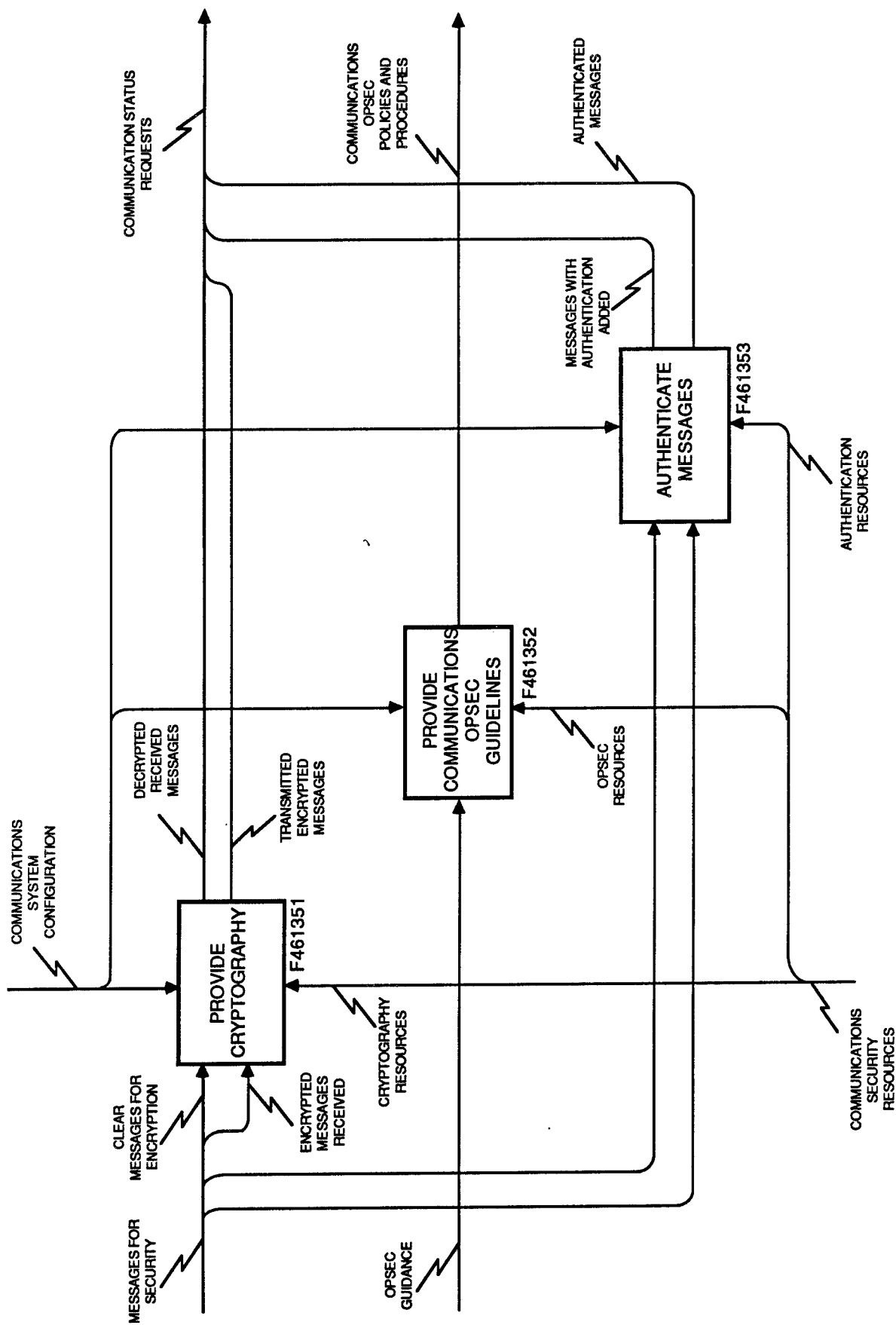
NODE: F46132
TITLE: CONTROL NETWORK



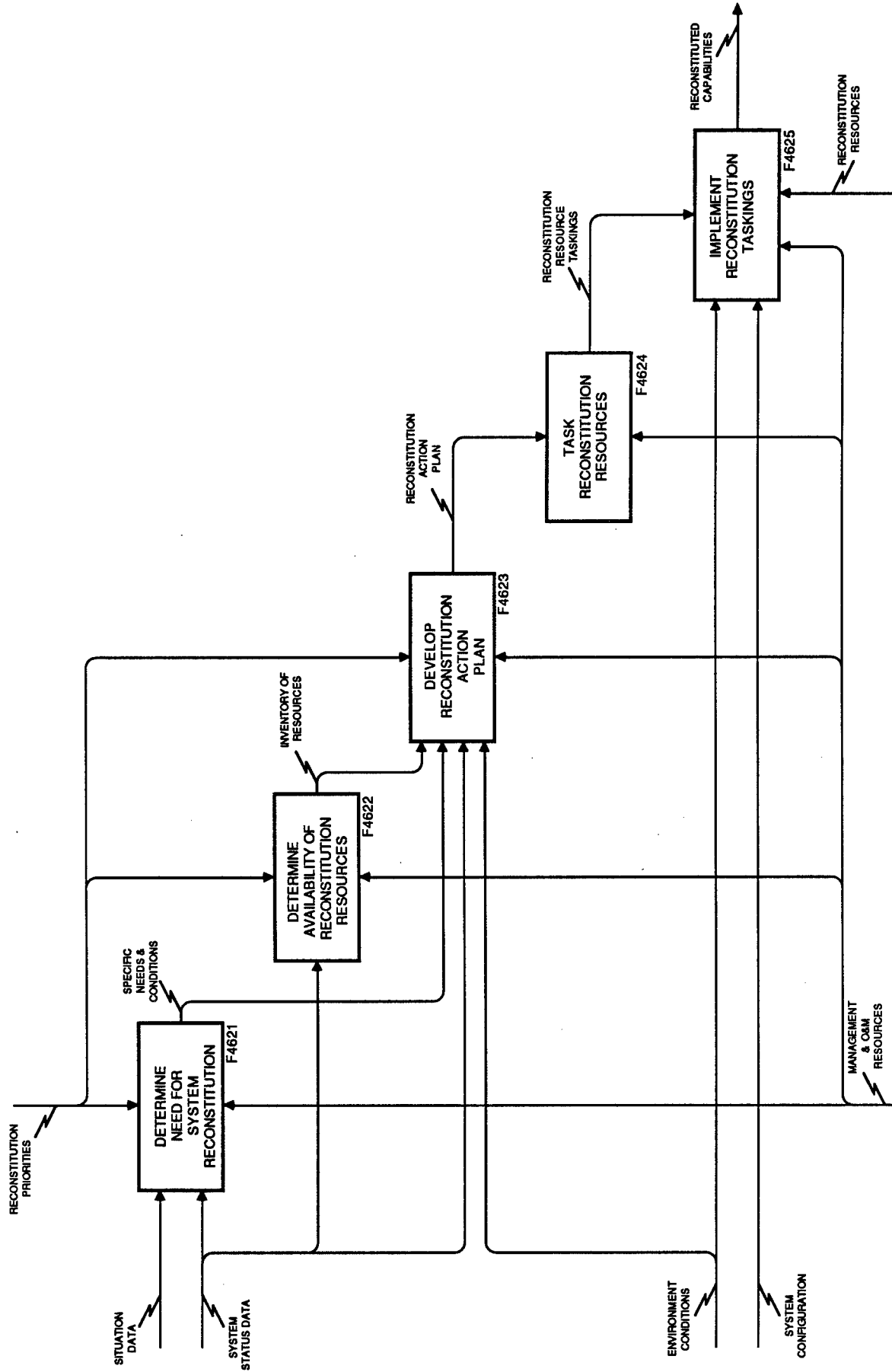
NODE: F46133
TITLE: PERFORM DATA TRANSPORT



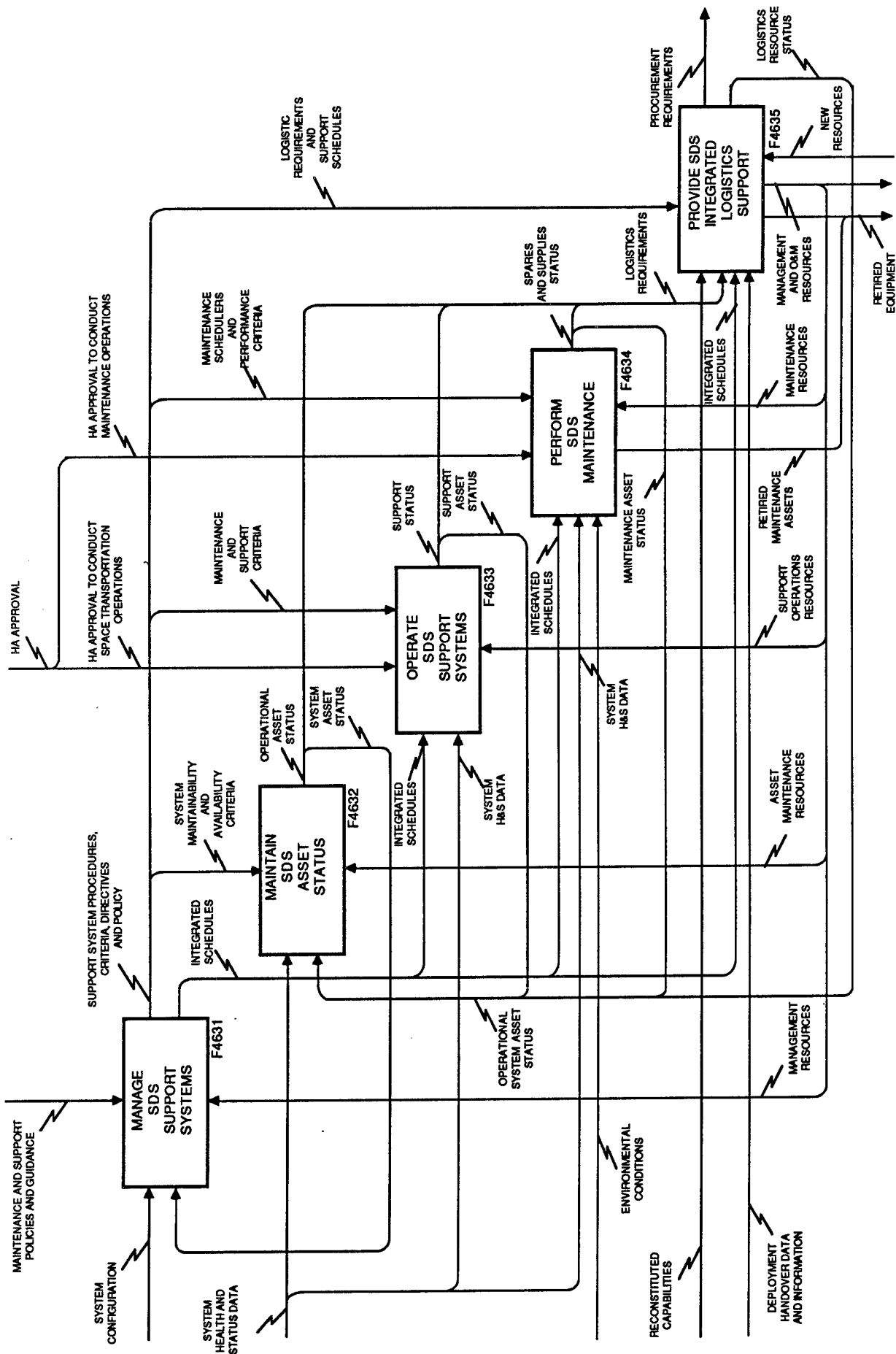
NODE: F46134
TITLE: PROVIDE ROUTING AND CONGESTION CONTROL



NODE: F46135
TITLE: PROVIDE COMMUNICATION SECURITY

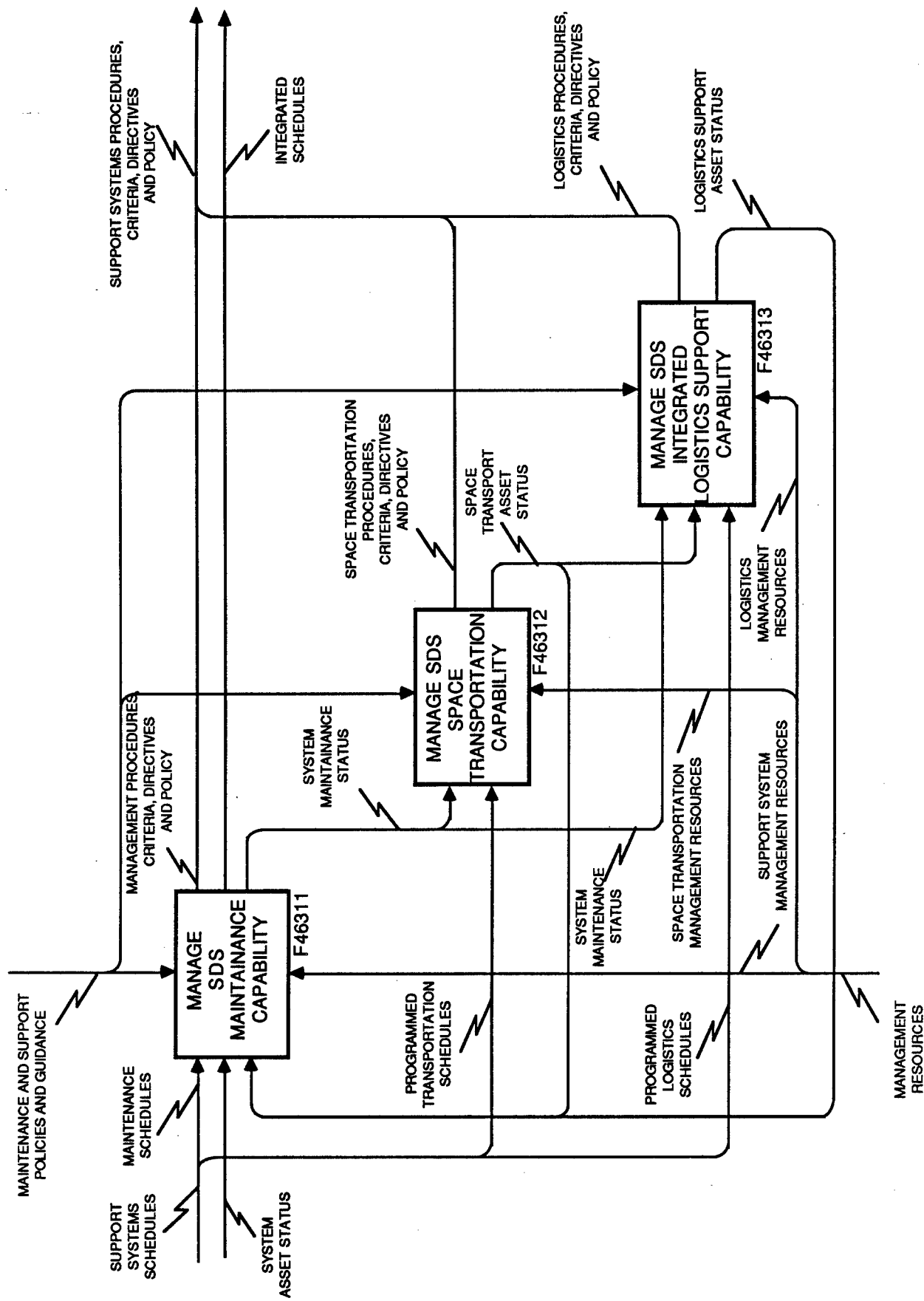


NODE: F462
TITLE: RECONSTITUTE SYSTEM

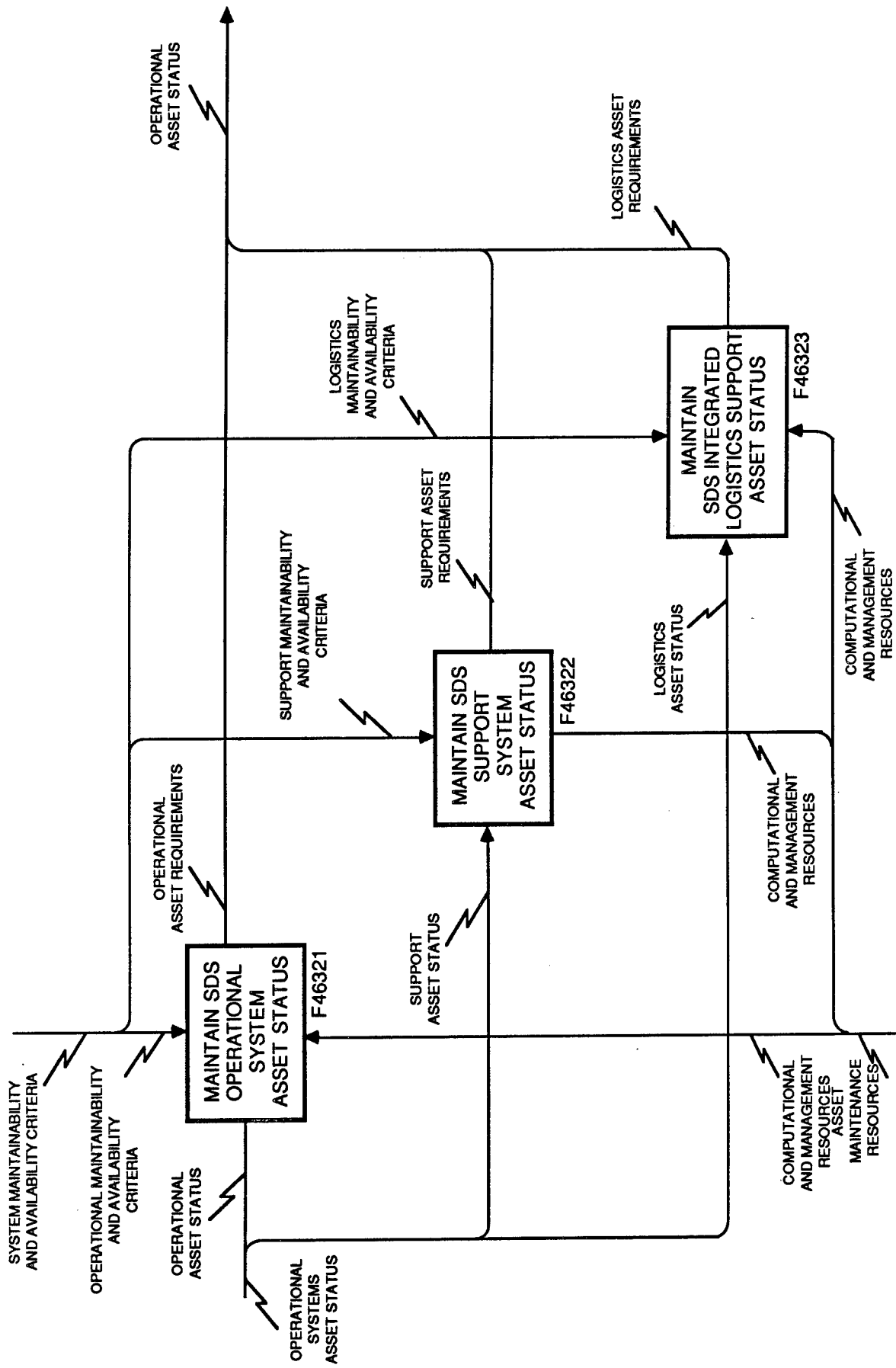


NODE: F463

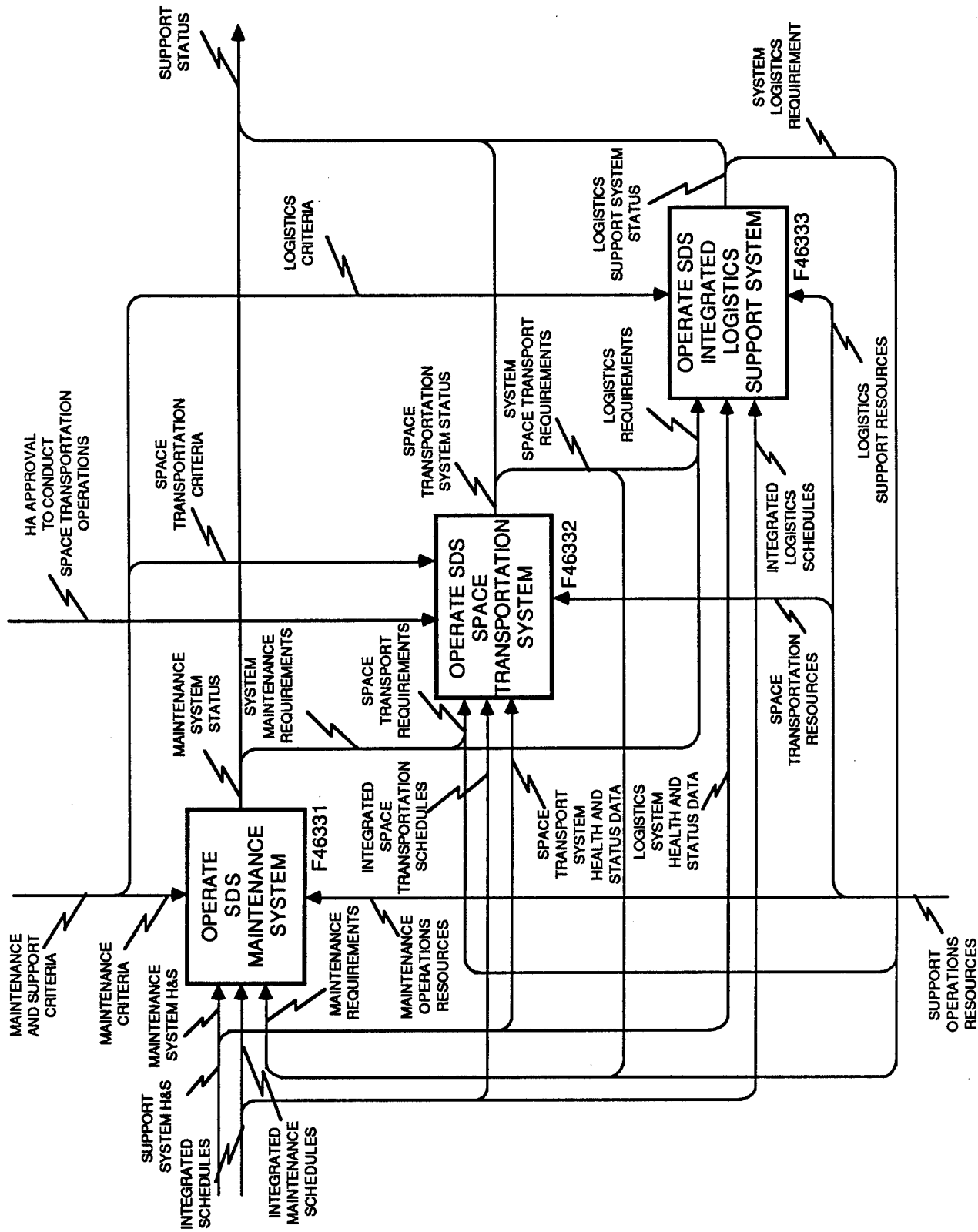
TITLE: SDS MAINTAIN AND SUPPORT THE SYSTEM



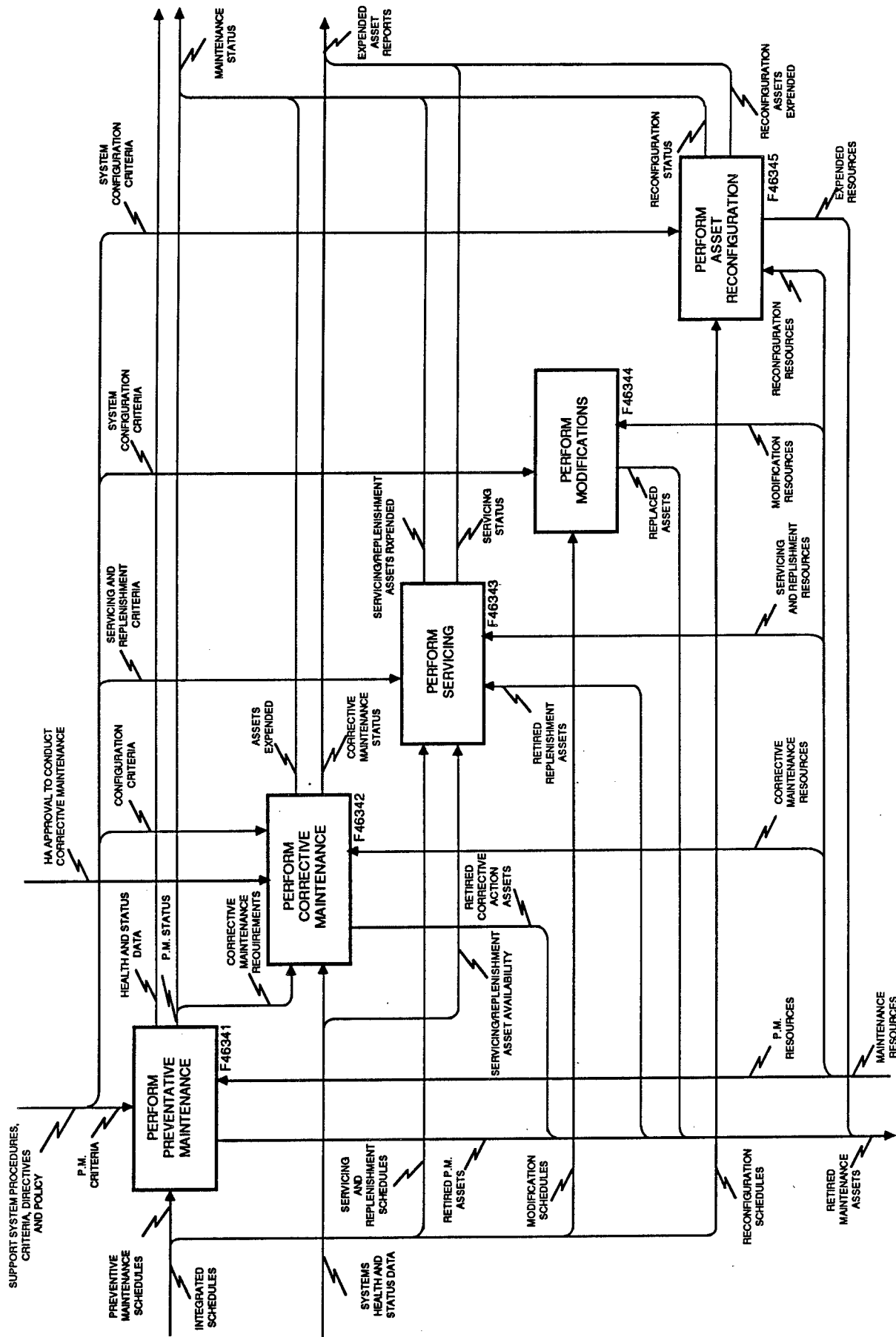
NODE: F4631
TITLE: MANAGE SDS SUPPORT SYSTEMS



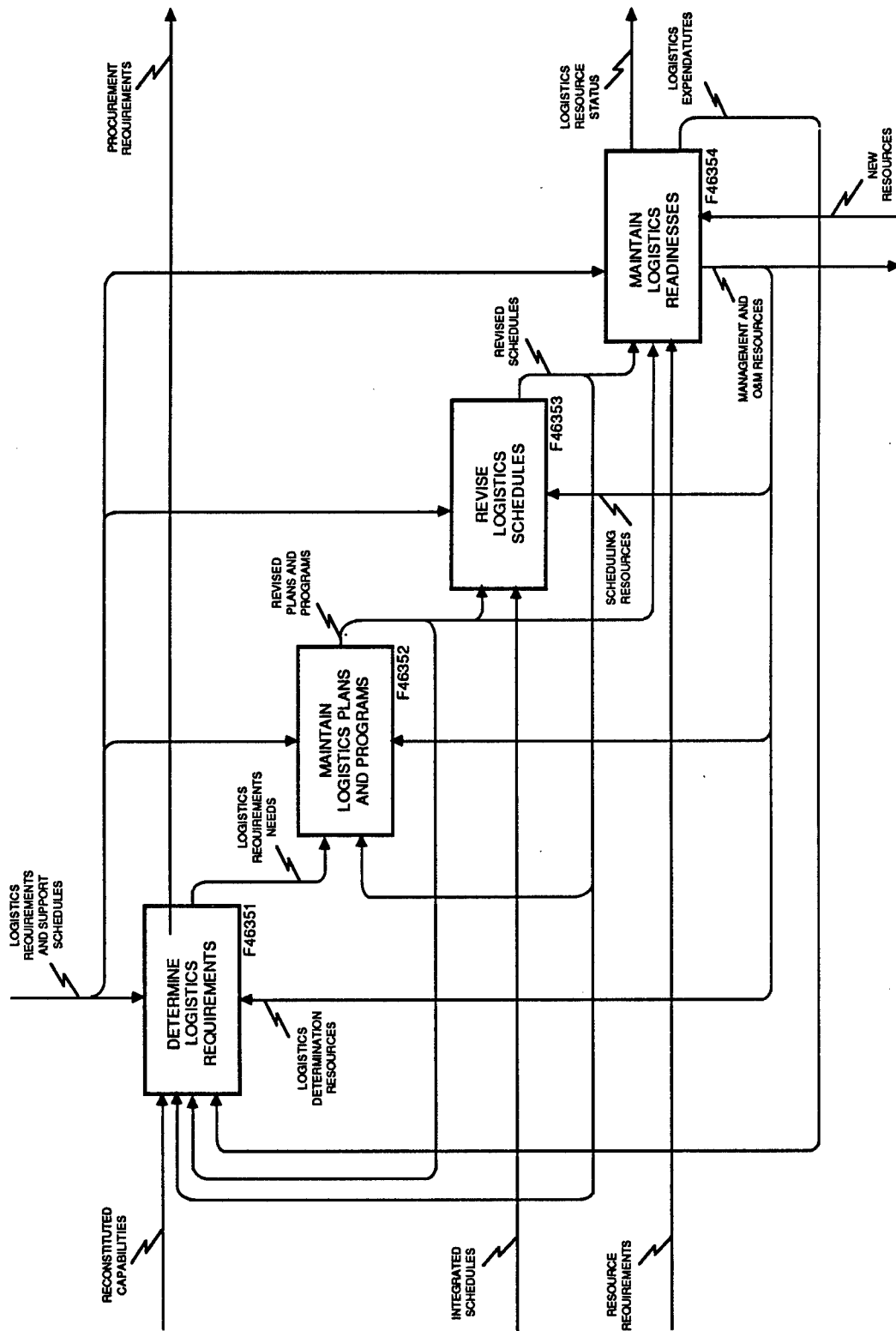
NODE: F4632
TITLE: MAINTAIN SDS ASSET STATUS



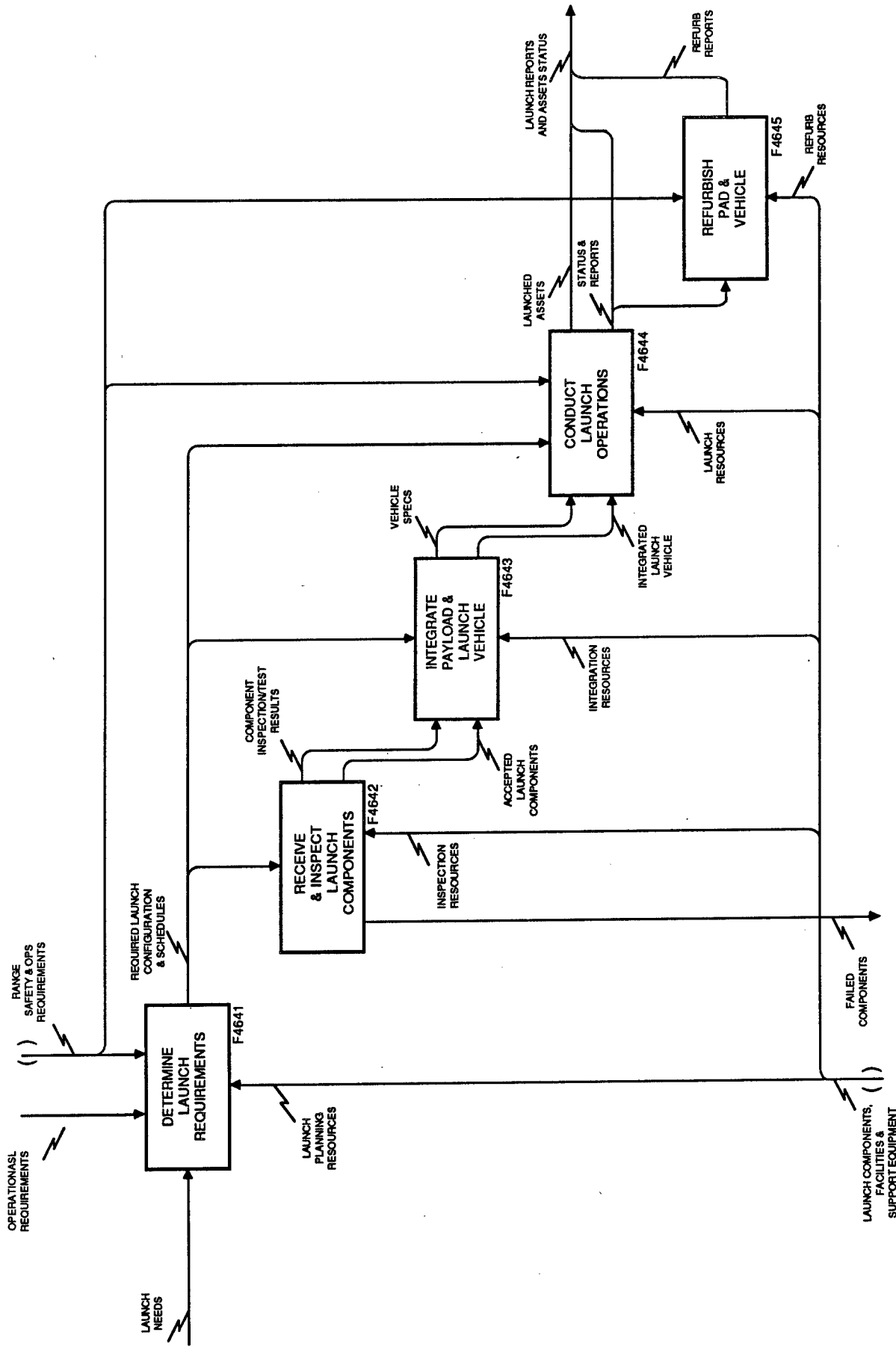
NODE: F4633
TITLE: OPERATE SDS SUPPORT SYSTEMS



NODE: F4634
TITLE: PERFORM SDS MAINTENANCE



NODE: F4635
TITLE: PROVIDE INTEGRATED LOGISTIC SUPPORT



NODE: F464
TITLE: PROVIDE LAUNCH ASSETS

SECTION II
FUNCTIONAL DESCRIPTIONS,
REQUIREMENTS AND IN/OUTPUT

INTRODUCTION TO SECTION II

This section is provides a generic description of each of the Strategic Defense System functions. Rockwell chose to use the structured functional model numbering system specified in the Integrated Computer Aided Manufacturing (ICAM) Program. This particular number sequence has provided Rockwell the vehicle to: (1) show the relationship among functions and requirements, (2) group functions into general categories i.e. Command and Control, Battle Management, etc., (3) show relationships of functions to requirements, and (4) provide the means to trace a requirement back to its governing function. A description of the format used in this document is provided below.

INPUT (A listing of Inputs, Controls and Mechanisms operating on this function)	(Function Number- Function Title) F41 - CONTROL THE SYSTEM Description: (A general description of the purpose of the function) Number F41-1 Requirement Description (A description of a requirement derived from this function) (The first requirement derived from this function)	OUTPUT (A listing of Outputs Controls and Mechanisms resulting from the operations of this function)

Note: The traceability of inputs/outputs to functions is not specified in this document. This traceability was not accomplished during this effort, but a suggested numbering traceability sequence is provided below.

- Data/Information Input F41- DI 2 - First Data Input to function F41 • Control Output F41-CO3 - Second Control Output from F42
- Control Input F41- CI 3 - Third Control Input to F41 • Data/Information Output F41-DO5 - Fifth Data Output from F41
- Mechanism Input F41- MI 3 - Third Mechanism Input to F41 • Mechanism Output F41-MO1 - First Mechanism Output from F41

STRATEGIC DEFENSE SYSTEM
FUNCTIONAL DESCRIPTIONS
REQUIREMENTS AND INPUT/OUT
(THE STRATEGIC DEFENSE SYSTEM)

INPUT

- 1) National Security Policy
- 2) Military Strategy
- 3) SDS Missions
- 4) Direction And Guidance From Higher Authority
- 5) Decisions To Develop And Deploy The SDS
- 6) Decision To Decommission The SDS
- 7) Intelligence Information
- 8) Friendly Force Information
- 9) Ballistic Missile And Defense Suppression Threats
- 10) Environment

FO - PROVIDE STRATEGIC BALLISTIC MISSILE DEFENSE

Description: This highest level function encompasses all activities, processes, and means to provide active strategic ballistic missile defense of the United States and its Allies. It includes the high level functions of developing the Strategic Defense System (SDS), producing the SDS, deploying the SDS, employing the SDS, and, when appropriate, decommissioning the SDS.

Requirement Description

F0-1	SDS Development Resources
F0-2	SDS Production Resources
F0-3	SDS Deployment Resources
F0-4	SDS Employment Resource
F0-5	SDS Decommissioning Resources

OUTPUT

- 1) Satisfaction Of National Security Policy And Military Strategy Requirements In The Strategic Ballistic Missile Defense Mission Area
- 2) Support Of Collateral And External Mission Areas

**STRATEGIC DEFENSE SYSTEM
FUNCTIONAL DESCRIPTIONS
REQUIREMENTS AND INPUT/OUTPUT
(DEPLOYMENT)**

INPUT

- 1) Declaration Of SDS Milestone III
- 2) Policy, Missions, And Direction From HA
- 3) Plans & Schedules
- 4) Threat Objects And Events
- 5) Facilities and Technical Designs
- 6) SDS Deployment Resources
- 7) Intel/Friendly Force Reports
- 8) Environments

F3 - DEPLOY SDS

Description: This function encompasses all the activities of the deployment phase of the SDS to include the acceptance and evaluation of resources from manufactures/vendors; the testing of systems and components prior to integration into larger sections of the SDS; the integration of systems into elements and the integration of elements into the overall SDS. This function encompasses the maintenance of SDS configuration plans, changes to these plans, the evaluation of and testing of sds standards, concepts, policies, etc. which will eventually be integrated into the SDS and the training of personnel which will be responsible for operating, maintaining and supporting the SDS.

#	Requirement Description
F3-1	Deployment Assets
F3-2	Deployment Self Defense Policy
F3-3	Deployment Facilities
F3-4	Training Facilities and Standards
F3-5	Deployment Standards and Policies
F3-6	System Configuration Controls
F3-7	Self Defense Assets
F3-8	Manufacturing Schedules

OUTPUT

- 1) Recommendations To HA
- 2) Changes & Reports
- 3) Impact Assessment Data
- 4) Operational Readiness Status
- 5) Warning & Assessment Reports
- 6) Battle Losses & Expenditures
- 7) System Handover To SDS
- 8) Self Defense System Status
- 9) Residual Threat

INPUT

- 1) Policy Mission Rules & Direction From HA
- 2) OPlans & Procedures
- 3) External Environment Including The Enemy Defense Suppression Threat (Postulated For Planning And Actual For Operations)
- 4) Resources Required To Perform The Protection - Initially Including SPACETRACK, SPADOR, ALASAT, INTEL, And Other External Applicable Assets.
- 5) Schedules & Revisions
- 6) Intelligence & Warning Information To Include Satus Of Friendly Forces
- 7) Declaration Of MS III
- 8) Threat Object & Events

F31 - PROVIDE SDS DEPLOYMENT PROTECTION

Description: This function encompasses the planning and operation of the command and control, surveillance, situation assessment, defensive response selection, and defensive response execution activities required for the protection of the SDS beginning with deployment of the initial SDS asset and concluding with the final validation of SDS Initial Operational Capability (IOC). For those SDS protection activities required which must be performed externally to the SDS, this function will provide the planning, command and control, situation assessment, and operational tasking for those external activities.

#	Requirement Description
F31-1	Command And Control The Defense
F31-2	Conduct Surveillance And Discrimination
F31-3	Monitor And Asses The Situation
F31-4	Select The Defensive Response
F31-5	Execute The Defensive Response
F31-6	Maintain System Capability

OUTPUT

- 1) Recommended Actions To Higher Authority (Depending On Roes For Applicable IOC)
- 2) Warning And Assessment Reports To Higher Authority
- 3) Battle Losses And Protection Resource Expenditures
- 4) Self Defense System Status
- 5) Residual Threats

INPUT

- 1) Mission Requirements From The JCS And Real-Time Direction From Higher Authority (NCA)
- 2) Approved OPlans And Procedures
- 3) Situation Data Including The Defense Suppression Threat
- 4) C2 Resources; Including Defense Commander, Command Center Personnel & Facilities, And C2 Planning Personnel And Facilities
- 5) Declaration Of MS III
- 6) Strategy Selection
- 7) SDS Deployment Schedules & Revisions

F311 - COMMAND AND CONTROL THE DEFENSE

Description: This function includes the activities required for command and control of the SDS deployment protection which are principally those activities of guidance and direction which require centralized and positive control, or those activities which must interface with applicable external functions. This function does not include those activities required for battle management, detailed tasking, and fire control which have been delegated to other F31 functions. Initially some efforts required for this function may be delegated to the space defense operations center (SPADOC) until sufficient SDS assets are deployed to perform this function within the SDS.

Requirement Description

- F311-1 Exercise Command (I.E. Exercise Executive Command Over The Other C2 Functions; eg Establish C2 Procedures And Choose Battle Operation)
- F311-2 Preplan And Test Command And Control
- F311-3 Provide Positive Control (I.E. Activities Of Defense Command Center Personnel; eg To Assess Situation And Develop Alternatives)
- F311-4 Provide Management Control (eg Generate Weapons Release, Surveillance Criteria, Develop Integrated Battle Timeline, And Delegate Defensive Response Authority To Other F31x Functions)

OUTPUT

- 1) Recommendations To HA
 - NCA (Eg. Real-Time Chosen Battle Option)
 - CINC (Eg. Non-Real-Time Changes To OPlans And ROEs)
- 2) Defense Command & management Guidance
 - S&D Criteria
 - Decision Aids & Procedures
 - ROEs & Defense Preferences
 - Strategy Selection Overrides
 - System Mode Selection
 - System Management Guidance

INPUT	F312 - CONDUCT SURVEILLANCE AND DISCRIMINATION (S&D)	OUTPUT										
1) Situation Data - Information From External Contributing Surveillance Assets (SPACETRACK, ITW & KA System, INTEL) - Information From External Contributing Object/Event Identification And Classification Assets (SPADPC And INTEL) 2) Environment Background 3) Surveillance And Discrimination (S&D) Criteria 4) Object/Event Observables 5) Surveillance And Discrimination Resources (SDS Sensors, Personnel And Facilities As They Are Deployed)	Description: This function includes those activities required to manage S&D asset tasking, collect and process surveillance and discrimination data, initiate and maintain potential defense suppression threat data files, and classify and identify objects and events. Initially some efforts required for this function may be delegated to the spacetrack system (for cold body surveillance), the integrated tactical warning and attack assessment (ITW&AA) system (for space launch detection) and the space defense operations center (SPADOC) (for object and event identification and classification). <table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F312-1</td><td>Manage Surveillance And Discrimination Asset Tasking</td></tr><tr><td>F312-2</td><td>Collect And Process Surveillance And Discrimination Data</td></tr><tr><td>F312-3</td><td>Initiate And Maintain Potential Defense Suppression Threat Data Files</td></tr><tr><td>F312-4</td><td>Classify And Identify Objects And Events</td></tr></table>	#	Requirement Description	F312-1	Manage Surveillance And Discrimination Asset Tasking	F312-2	Collect And Process Surveillance And Discrimination Data	F312-3	Initiate And Maintain Potential Defense Suppression Threat Data Files	F312-4	Classify And Identify Objects And Events	1) Object And Event Data To Target Track Files 2) Surveillance And Discrimination (S&D) Activities To Include S&D Expenditures
#	Requirement Description											
F312-1	Manage Surveillance And Discrimination Asset Tasking											
F312-2	Collect And Process Surveillance And Discrimination Data											
F312-3	Initiate And Maintain Potential Defense Suppression Threat Data Files											
F312-4	Classify And Identify Objects And Events											

INPUT

- 1) External Intelligence Reports
 - Information From Cooperating External Monitor And Assessment Assets (SPADOC)
 - Monitor And Assessment Resources (Personnel And Facilities)
- 2) Decision Aids & procedures
- 3) Battle Data
 - S&D Activities
 - Defense Activities
 - OPlans
- 4) Environmental Reports
- 5) Object/Event Data
- 6) Assessment Resources

OUTPUT

- 1) Battle Situation Assessment Data
 - Situation Data
 - Warning & Assessment Report

F313 - MONITOR AND ASSESS SITUATION

Description: This function includes those activities required to assess the defense suppression threat force status, determine attack initiation, determine the SDS assets at risk, evaluate the battle situation, and determine the defended SDS assets status. Initially, some efforts required for this function may be delegated to SPADOC (for attacks against SDS space assets) until sufficient SDS assets are deployed to perform this function within the SDS. some other efforts are required for this function may be delegated to external security assets responsible for the security maintenance for the ground locations where SDS assets are deployed.

#	Requirement Description
F313-1	Assess Threat Force Status
F313-2	Determine Attack Initiation
F313-3	Determine SDS Assets At Risk
F313-4	Evaluate Battle Situation
F313-5	Determine Defended SDS Asset Status

INPUT

- 1) Roe's & Defense Preferences; Strategy Selection Override (And Battle Option Selection In Some Circumstances)
- 2) Situation Data
- 3) Target Track File Data
- 4) Response Selection Resources (Personnel And Facilities)

F314 - SELECT DEFENSIVE RESPONSE

Description: This function includes the activities required to identify roe imposed constraints, selected the defensive tactics and countermeasures, and specify response parameters. Initially, some efforts required for this function may be delegated to SPADOC (for attacks against SDS space assets until sufficient sds assets are deployed to perform this function within the SDS.

Requirement Description

- F314-1 Identify ROE Imposed Constraints
- F314-2 Select Defensive Tactics And Countermeasures
- F314-3 Specify Response Parameters

OUTPUT

- 1) Strategy & Tactics Selection
 - Response Parameters To Function F315
 - Strategy Selection
- 2) Response Parameters

INPUT

- 1) Response Parameters
- 2) Situation Data
- 3) Track File
- 4) Threat Object/Event Data
- 5) Defense Resources (Personnel And Facilities)
- 6) System Mode Selection

F315 - EXECUTE DEFENSIVE RESPONSE

Description: This function includes the activities required to assign threat target values and allocate threat targets for engagement (for large attacks), assign assets for engagement against the threat targets, engage the threats, and employ defensive countermeasures. Initially, some of these activities may be delegated to external cooperating assets until sufficient SDS assets are deployed to perform this function within the SDS.

Requirement Description

- F315-1 Assign Threat Target Values
- F315-2 Allocate Threat Targets For Engagement
- F315-3 Assign Assets For Engagement
- F315-4 Engage Threats
- F315-5 Employ Defensive Countermeasures

OUTPUT

- 1) Defense Activities
 - Losses & Expenditures
- 2) Residual Threat
 - Hostile Threats

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INPUT

- 1) Original Plans & Schedules
- 2) Element/Asset Status
- 3) Integrated Test Status
- 4) HA Policy & Guidance
 - Deficiency Reports
 - Incident Reports
 - Program Management Directive
 - Advance Study Notice
 - Operations Planning Guidance
 - Change Status
 - Higher Authority Feedback/Approval
 - Mission Requirements
- 5) Declaration Of MS III
- 6) I & D Report

F32 - REVISE & MAINTAIN PROGRAM MASTER PLAN

Description: This function encompasses those activities to maintain and revise the Program Master Plan and supporting plan that guide deployment activities. These activities include the identification and assessment of changes, development and evaluation of options, review and approval of changes, and direction and implementation of approved changes.

#	Requirement Description
F32-1	Management Information System
F32-2	SDS Operations Planning Support System
F32-3	Analytical Tools
F32-4	National Test Bed

OUTPUT

- 1) Oplan Revisions
- 2) PMP TEMP & Changes
- 3) Recommended Changes & Reports
- 4) Impact Assessment
- 5) Schedules & Revisions

INPUT

- 1) Change Resources
- 2) Original OPlans & Schedules
 - PMP TEMP & Changes
 - Transition/Turnover Plan (T/TI)
 - Program Management Directive
 - Program Status Reports
 - Integrated Logistics Support Plan
 - Advance Study Notice
 - Draft Operations Plans
 - Operations Planning Guidance
- 3) Plan Change Status
- 4) I & D Reports
- 5) HA Policy & Guidance
- 6) Changes To OPlans & Procedures
- 7) Element/Asset Status
- 8) Integrated Test Status
- 9) Milestone III

F321 - IDENTIFY CHANGES

Description: This Function Encompasses Activities To Identify Changes To The Program Master Plan And Supporting Plans. These Activities Include Monitoring Status, Program Decision Memoranda And Program Change Directives To Detect Items That May Conflict With Current Plan.

Requirement Description

- F321-1 Management Information System
- Word Processing/Report Generation
 - Scheduling
 - Budgeting
 - Configuration Management
 - Requirements Traceability

OUTPUT

- 1) Conflict Reports
- 2) PMP TEMP & Changes

INPUT

- 1) Conflict Reports
- 2) Feasible Objective Options
- 3) Impact Resources

F322 - EVALUATE/ASSESS IMPACT

Description: This function encompasses those activities to determine the impact of any detected deviations from the approved plans. These activities include determining the impact and extent upon schedules, budgets, responsibilities, requirements.

#	Requirement Description
F322-1	M/S
F322-2	SDS Operations Planning Support System
F322-3	Analytical Tools -Modeling -Simulation -War Gaming
F3422-4	National Test Bed

OUTPUT

- 1) Impact Assessments
- 2) Impacts

INPUT

- 1) Impact Assessment
- 2) Mission Requirements
- 3) PMP TEMP & Changes
- 4) Eval/Sel Options Resources

F323 - SELECT OPTIONS

Description: This function encompasses those activities involved in developing and evaluating options and selecting a preferred option for implementing an identified change. These activities include identifying, defining, evaluating, ranking and recommending alternatives.

#	Requirement Description

F323-1	M/S

F323-2	SDS Operational Planning Support System

F323-3	Analytical Tools

F323-4	National Test Bed

OUTPUT

- 1) Recommended Option
- 2) Feasible Objective Options

INPUT

- 1) Recommended Option
- 2) Higher Authority Comment/Feedback
- 3) Ha Approval
- 4) Gain Approval Resources

F324 - GAIN APPROVAL

Description: This function encompasses those activities involved in obtaining approval required for implementation of a change. these activities include the distribution, coordination and approval of change documentation.

#	Requirement Description
F324-1	None

OUTPUT

- 1) Recommendation Changes & Reports To HA
- 2) Program Change Directive

INPUT

- 1) Program Change Directive
- 2) Change Resources

F325 - IMPLEMENT CHANGE

Description: This function encompasses those activities involved in implementation of approved changes to the Program Master Plan. Activities in this function involve the preparation and distribution of approved program change directives and their incorporation in the PMP and ancillary/subordinate plans.

#	Requirement Description

F3425-1	M/S

OUTPUT

- 1) Oplan Revision
- 2) Plan Change Status
- 3) PMP TEMP & Changes
- 4) Schedules & Revisions

INPUT

- 1) PMP TEMP & Changes
- 2) Facilities Design Technical Data
- 3) Asset Technical Data
- 4) Delivery System Technical Data
- 5) Schedules
- 6) Deployment Assets

F33 - DEPLOY ASSETS

Description: This function encompasses those activities involved in the delivery of assets to their operational location. These activities include preparation of launch and/or assembly and checkout of SDS assets, delivery to the operational location (i.e. orbit or ground site), and performing asset acceptance tests.

Requirement Description

F33-1	M/S
F33-2	A & E Plans & Specs
F33-3	Real Estate & Facilities
F33-4	Environmental Impact Statement Approval
F33-5	Construction Resources
F33-6	Facility Activation Plan
F33-7	Facility Activation Task Force
F33-8	Facility Acceptance Criteria
F33-9	Quality Assurance Program
F33-10	Special Tools & Test Equipment
F33-11	Trained Personnel
F33-12	Training Program & Equipment
F33-13	Assembly Procedures & Acceptance Criteria
F33-14	Safety Program
F33-15	Inventory Management System
F33-16	Delivery Systems (Surface, Air, Space)
F33-17	Materials Handling Equipment
F33-18	Delivery Procedures (Pack, Ship, Etc)
F33-19	Prepared Operating Locations
F33-20	Transportation Complexes
F33-21	Asset Acceptance Criteria
F33-22	Satellite Control Facilities

OUTPUT

- 1) Acceptance Status & Data
- 2) Asset Status
- 3) I & D Reports

INPUT

- 1) Schedules
- 2) Facilities Design Technical Data
- 3) Facilities & Resources

F331 - PREPARE FACILITIES

Description: This function encompasses those activities to prepare and deliver facilities to be used to assemble, checkout and deliver SDS element assets to their operational locations. These activities include the construction, activation, checkout and acceptance of the facilities.

#	Requirement Description
F331-1	M/S
F331-2	A&E Plans & Specifications
F331-3	Real Estate & Facilities
F331-4	Environmental Impact Statement Approval
F331-5	Construction Resources
F331-6	Facility Activation Plan
F331-7	Facility Activation Task Force
F331-8	Facility Acceptance Criteria

OUTPUT

- 1) Facility Status
- 2) Facility As-Built Technical Data

INPUT

- 1) Facility Status
- 2) Facility As-Built Technical Data
- 3) PMP TEMP & Changes
- 4) Asset Technical Data
- 5) Assets & Checkout Resources

F332 - ASSEMBLE & CHECKOUT ASSETS

Description: This function encompasses those activities to assemble checkout and prepare SDS element assets for delivery to their operational locations. These activities include the receipt and inventory management of all necessary subsystems and piece parts, receipt and maintenance of engineering data and records, scheduling, assembly, inspection test and verification and status reporting of completed configuration items.

Requirement Description

- F332-1 Quality & Assurance Program
- F332-2 Special Tools & Test Equipment
- F332-3 Facilities
- F332-4 Trained Personnel
- F332-5 Training Program & Equipment
- F332-6 Assembly Procedures
- F332-7 Acceptance Criteria
- F332-8 Safety Program
- F332-9 M/S
- F332-10 Inventory Management System

OUTPUT

- 1) Assembly Status
- 2) Assembly Assets Status

INPUT

- 1) PMP TEMP & Changes
- 2) Deliverly System Technical Data
- 3) Deliverly Assets

F333 - PROVIDE DELIVERY SYSTEMS

Description: This function encompasses those activities that provide the systems to be used to deliver SDS element assets to their operational locations. These activities include scheduling, positioning, preparation of the delivery system prior to loading of the deliverable asset.

#	Requirement Description
F333-1	M/S
F333-2	Quality Assurance Program
F333-3	Acceptance Criteria
F333-4	Surface Delivery Systems
F333-5	Airborne Delivery Systems
F333-6	Space Delivery Systems

OUTPUT

- 1) Deliverly System Status
- 2) Deliverly System as-Built Technical Data

INPUT

- 1) Assembly Status
- 2) Delivery System Status
- 3) Facility Status
- 4) Delivery System As-Built Technical Data
To Include Configuration Records
- 5) PMP TEMP & Changes
- 6) Delivery Resources

F334 - DELIVER ASSETS

Description: This function encompasses those activities involved in the transportation of SDS element assets to their operational location. These activities include the packing, loading, moving, unloading and unpacking of the asset. Also included are activities of scheduling, quality assurance and status reporting.

Requirement Description

- F334-1 M/S
- F334-2 Materials Handling Equipment
- F334-3 Packing/Shipping Procedures & Standards
- F334-4 Quality Assurance Program
- F334-5 Prepared Operating Location
- F334-6 Transportation Complex
 - Surface
 - Space
 - Air
- F334-7 Trained Transportation Personnel

OUTPUT

- 1) Delivery System Status
- 2) Assets & Resources

INPUT

- 1) Delivery System Status And Configuration Records
- 2) PMP TEMP & Changes
- 3) Assets and Resources
- 4) Performance Assets

F335 - PERFORM ASSET ACCEPTANCE TEST

Description: This function encompasses those activities to conduct tests to determine acceptability of delivered SDS element assets. These activities include maintenance of test procedures, performing tests, collection and evaluation of acceptance data, and reporting of test results and status.

#	Required Description
F335-1	Acceptance Criteria
F335-2	Test Procedures Equipment
F335-3	M/S
F335-4	Element Control
F335-5	Test Personnel
F335-6	Quality Assurance

OUTPUT

- 1) Acceptance Status And Data
- 2) I & D Reports

INPUT

- 1) PMP TEMP & Changes
- 2) Acceptance Data & Status
- 3) Asset Data
- 4) Connection Resources
- 5) Schedules

F34 - CONNECT SDS ELEMENT ASSETS

Description: This function encompasses those activities to incrementally integrate new assets into accepted SDS element configurations (e. g. constellations). These activities include the planning, coordination and reconfiguration of the element baseline, interconnecting the assets, and verifying element functional capability subsequent to insertion of the new asset.

#	Requirement Description
F34-1	Management Information System
F34-2	Deployment Planning
F34-3	Procedures & Test Equipment
F34-4	Quality Assurance Program
F34-5	Trained Personnel
F34-6	Element Control Facilities
F34-7	Interface Simulators
F34-8	Analytical Tools
F34-9	Comm Tech Control Facilities
F34-10	Acceptance Criteria

OUTPUT

- 1) Element Status & Data
- 2) Element Test Results & Configuration
- 3) I & D Reports

INPUT

- 1) PMP TEMP & Changes
- 2) Acceptance Data & Status
- 3) Schedules
- 4) Configuration Change Resources

F341 - COORDINATE ELEMENT CONFIGURATION CHANGE

Description: This function encompasses those activities to coordinate a change in an SDS element configuration covered by the introduction of an additional operating asses into the configuration. These activities include scheduling, configuration management and tasking of affected system and agencies

#	Requirement Description

F341-1	M/S

F341-2	Deployment Plan

OUTPUT

- 1) Reconfiguration Timeline
- 2) Element Re-Configuration Plan

INPUT

- 1) Reconfiguration Timeline
- 2) Reconfiguration Plan
- 3) Element Test Results & Configuration
- 4) Reconfigure Resources

F342 - RECONFIGURE ELEMENT BASELINE

Description: This function encompasses those activities to modify the configuration of a baseline SDS element to incorporate additional assets. These activities may include: velocities of already deployed assets, configuration of proper function and location, subsequent to relocation & retask in conjunction with relocation.

Requirement Description

- F342-1 Procedures & Test Equipment
- F342-2 Element Control Facilities
- F342-3 Trained Personnel
- F342-4 M/S
- F342-5 Quality Assurance
- F342-6 Comm Tech Control Facility

OUTPUT

- 1) Reconfiguration Status
- 2) Configuration Data

INPUT

- 1) Reconfiguration Status
- 2) Configuration Data
- 3) Asset Data
- 4) Acceptance Data/Status
- 5) Interconnect Asset Resources

F343 - INTERCONNECT ASSETS

Description: This function encompasses those activities to establish and verify connectivity among SDS element assets coincident with insertion of new assets into the baseline. The activities involve establishing communications links, verifying link function, tasking new asset and transferring operational control.

#	Requirement Description
F343-1	Element Control Facilities
F343-2	Procedures & Test Equipment
F343-3	Quality Assurance
F343-4	Comm Tech Control Facilities
F343-5	Trained Personnel (Element Level)

OUTPUT

- 1) Interconnect Status
- 2) Connection Data

INPUT

- 1) PMP TEMP & Changes
- 2) Interconnect Status
- 3) Connection Data
- 4) Configuration Data
- 5) Acceptance Data & Status
- 6) Verification Resources

F344 - VERIFY ELEMENT FUNCTIONAL CAPABILITY

Description: This function encompasses those activities to verify the integral functional of capability of the SDS element. these activities involve maintenance of procedures, performance of functional verification tests, collection and verification of data and report of test results and status.

Requirement Description

F344-1	Procedures & Test Equipment
F344-2	Quality Assurance
F344-3	M/S
F344-4	Acceptance Criteria
F344-5	Travel Personnel (Element Level)
F344-6	Element Control Facilities
F344-7	Interface Simulators
F344-8	Analytical Tools (Element Level)
	- Model
	- Simulators

OUTPUT

- 1) Element Status & Data
- 2) Element Test Results & Configuration
- 3) I & D Reports

INPUT

- 1) Element Status & Data
- 2) Element Test Results & Configuration
- 3) PMP TEMP & Changes
- 4) Schedules
- 5) Test & Evaluation Resources

F35 - CONDUCT SYSTEM TEST AND EVALUATION

Description: This function encompasses those activities to enivertally integrate new elements into the accepted SDS system configuration. These activities include the planning, coordination and reconfiguration of the system baseline, interconnecting the elements, and verifying system functional capability subsequent to integration of the new element.

#	Requirement Description
F35-1	Management Information System
F35-2	Integration Plans & Procedures
F35-3	Element Control Facilities
F35-4	Trained Personnel
F35-5	Quality Assurance Program
F35-6	System Control Facilities
F35-7	Analytical Tools
F35-8	Procedures & Test Equipment
F35-9	Acceptance Criteria

OUTPUT

- 1) System Test Results & Configuration
- 2) Integration Test Status & Results
- 3) I & D Reports
- 4) Validated Planning Factors

INPUT

- 1) Element Test Results & Configuration
- 2) Element Status & Data
- 3) PMP TEMP & Changes
- 4) Schedules
- 5) Coordination Resources

F351 - COORDINATE SYSTEM CONFIGURATION

Description: This function encompasses those activities to coordinate a change on the SDS system configuration caused by the introduction of an additional element into the baseline configuration. These activities include scheduling, configuration management and tasking of affected systems/agencies.

#	Requirement Description
F351-1	M/S
F351-2	Coordinate System Configuration

OUTPUT

- 1) System Reconfiguration Timeline
- 2) System Configuration Plan

INPUT

- 1) System Reconfiguration Timeline
- 2) System Configuration Plan
- 3) System Test Results & Configuration
- 4) Reconfigure Resources

F352 - RECONFIGURE SYSTEM BASELINE

Description: This function encompasses those activities to modify the configuration of the baseline SDS system to incorporate additional elements. These activities may involve: Installation and checkout of software releases, removal of test drivers/interface simulators, update of databases.

Requirement Description

F352-1	Procedures
F352-2	Element Control Facilities
F352-3	Trained Personnel
F352-4	M/S
F352-5	Quality Assurance
F352-6	Comm Network Control Facilities

OUTPUT

- 1) Reconfiguration Status
- 2) Configuration Data

INPUT

- 1) Reconfiguration Status
- 2) Configuration Data
- 3) Element Test Results & Configuration
- 4) Interconnect Resources

F353 - INTERCONNECT SYSTEM ELEMENTS

Description: This function encompasses those activities to establish and verify connectivity among SDS elements associated with the insertion of a new element into the baseline. The activities involve establishing communications links, verifying link functions, tasking new elements and transferring operational control.

#	Requirement Descriptions
F353-1	Element Control Facilities
F353-2	Procedures & Test Equipment
F353-3	Quality Assurance
F353-4	Comm Network Control Facilities
F353-5	Trained Personnel (System Level)

OUTPUT

- 1) Interconnect Status
- 2) Connection Data

INPUT

- 1) PMP TEMP & Changes
- 2) Interconnect Status
- 3) Connection Data
- 4) Configuration Data
- 5) Element Test Results & Configuration
- 6) System T & E Resources

F354 - CONDUCT INTEGRATED SYSTEM TEST & EVALUATION

Description: This function encompasses those activities to verify the overall functional and performance capability of the SDS system. These activities involve maintenance of procedures, performance of functional tests, collection and evaluation of test data, and reporting of test results and status. Evaluation of test results may include special analysis and simulation. Also the preceeded are validated planning factors to be used for operational planning.

#	Requirement Description
F354-1	Procedures & Test Equipment
F354-2	Quality Assurance
F354-3	M/S
F354-4	Acceptance Criteria
F354-5	Trained Personnel (System Level)
F354-6	Element Control Facilities
F354-7	Analytical Tools (System Level) - Modeling - Simulation

OUTPUT

- 1) Integrated Systemtest Status
- 2) System Test Results & Configuration
- 3) Validated Planning Factors
- 4) I & D Report

INPUT

- 1) PMP TEMP & Changes
- 2) HA Approval & Standards
- 3) OPlans & Procedures
- 4) Records
 - Security Records
 - Training Records
 - HRP Records
- 5) Transition Resources
- 6) System Test Results & Configuration
- 7) Schedules

F36 - TRANSITION TO IOC

Description: This function encompasses those activities to formally transfer operational and support responsibility from the developing agency to the using agency. These activities include validating procedures, review and approval of operation plans, certification of operations and maintenance crew personnel, operational readiness demonstration/inspection, and declaration of operational capability.

Requirement Description

F36-1	Management Information System
F36-2	SDS Operations Planning Support System
F36-3	Analytical Tools
F36-4	National Test Bed
F36-5	Trained & Certified Operations Staff
F36-6	Trained Operations Planning Staff
F36-7	Operations Planning Guidance
F36-8	Transition Criteria
F36-9	Quality Assurance Program
F36-10	Exercise Drivers
F36-11	Trained Inspection Team
F36-12	Test Targets & Training Range

OUTPUT

- 1) Declaration Of Operational Readiness
- 2) System Handover To SDS

INPUT

- 1) OPlans & Procedures
- 2) PMP TEMP & Changes
- 3) HA Approval & Standards
- 4) Schedules
- 5) Update/Approval Resources

F361 - UPDATE/APPROVE OPERATIONS PLANS

Description: This function encompasses those activities to review, update and approve operations and supporting plans. these activities include: review and revision of operations and supporting plans based on revisions in planning factors and system capabilities resulting from the evaluation of integrated system operational test results; coordination of plan charges with the JCS*, and services; and forward approval of the plans by the appropriate authority. The review and approval process may include modeling, simulation, war gaming etc.

#	Requirement Description
F361-1	M/S
F361-2	SDS Operations Planning Support System
F361-3	Analytical Tools (Simulation, War Gaming)
F361-4	MTB
F361-5	Trained Operations Planning Staff
F361-6	Plan Preparation Policy Guidelines

* Other U&S Commands

OUTPUT

- 1) Approved OPlans

INPUT

- 1) Approved OPlans
- 2) System Test Results & Configuration
- 3) Draft Procedures
- 4) Validation Resources

F362 - VALIDATE OPERATIONAL PROCEDURES

Description: This function involves CINC SDS review and validation of operational procedures (SOPS), task menus, COOPS, etc., developed internally by SDS and SDS components to guide the range of human and automatic procedures and processes to be followed according to prevailing circumstances. the function includes both BMC2 and technical procedures involved in employing sds.

#	Requirement Description
F362-1	Validation Criteria
F362-2	Trained Personnel
F362-3	Quality Assurance
F362-4	National Test Bed

OUTPUT

- 1) Validated Procedures

INPUT

- 1) Validated Procedures
- 2) Transition/Turnover Plan (T/TP)
- 3) PMP TEMP & Changes
- 4) HA Approval & Standards
- 5) Security Records
- 6) Training Records
- 7) HRP Records
- 8) Personnel & Resources

F363 - CERTIFY SDS PERSONNEL

Description: This function encompasses the formal certification by responsible certification authorities for the qualification of each member of the SDS operational and technical cadre charged with responsibilities critical to the safe and effective maintenance, preparation and operation of the SDS system. The function involves verification of successful completion of formal and out initial training and successful demonstration of in-depth knowledge/understanding of applicable plans, procedures and techniques for employing the SDS in peacetime, crisis and conflict situations.

#	Requirement Description
F363-1	Qualification Standards
F363-2	Certifiable Personnel
F363-3	Operational Simulators & NTB
F363-4	Procedures
F363-5	M/S
F363-6	Quality Assurance

OUTPUT

- 1) Certification Status
- 2) Certified Personnel

INPUT

- 1) Validated Procedures
- 2) PMP TEMP & Changes
- 3) Transition/Turnover Plan
- 4) Personnel Certification Status
- 5) Certified Personnel
- 6) SDS Ready Assets & Facilities
- 7) Approved OPlans

F364 - PERFORM OPERATIONAL DEMONSTRATION

Description: This function involves a comprehensive demonstration and evaluation of the capability of all organizational, operational and system elements of the SDS to perform the bdm mission. The demonstration, conducted and evaluated by a competent and objective agency external to the SDS mission performance in a simulated conflict environment.

#	Requirement Description
F364-1	Demonstration Plan
F364-2	Exercise Driver/NTB
F364-3	Trained Inspection Team
F364-4	Test Targets & Training Range

OUTPUT

- 1) Demonstration Evaluation Results

INPUT

- 1) Approved Operations Plan
- 2) Personnel Certification Status
- 3) Demonstration Evaluation Results
- 4) Certification Resources

F365 - CERTIFY SDS OPERATIONALLY READY

Description: Based on an accepted demonstration and evaluation of SDS mission performance capability, competent authority will certify the SDS operationally ready.

#	Requirement Description
F365-1	Evaluation Criteria
F365-2	Designated Certifying Authority

OUTPUT

- 1) Declaration Of Operational Readiness
- 2) System Handover To SDS

STRATEGIC DEFENSE SYSTEM

FUNCTIONAL DESCRIPTIONS
REQUIREMENTS AND INPUT/OUTPUT
(EMPLOYMENT)

INPUT

- 1) Declaration Of Initial Operational Capability (IOC)
- 2) Policy, Missions, And Directions From HA
- 3) External C2, Intelligence, And Friendly Force Reports
- 4) Threat Objects And Events
- 5) Environment
- 6) Deployment Handover Data And Information

F4 - EMPLOY SDS

description: This high level function encompasses all the activities, processes, and means to utilize the deployed SDS to provide defense of the United States and its Allies against strategic ballistic missiles, as well as to provide SDS self defense and to support collateral and external missions, in accordance with national policy, mission requirements, and guidance and direction from Higher Authority (HA). The function involves controlling the SDS, conducting surveillance and discrimination, monitoring and assessing the situation, selecting a defensive response, executing the selected response, and maintaining and supporting the SDS system.

Requirement Description

- F41-1 Command And Control Elements And Resources
- F41-2 Surveillance And Discrimination Elements And Resources
- F41-3 Situation Monitoring And Assessment Resources
- F41-4 Response Selection Resources
- F41-5 Engagement Elements And Resources
- F41-6 System Operations And Maintenance Resources
- F41-7 New And Reconstitution Resources

OUTPUT

- 1) Coordination With And Recommendations To HA
- 2) Warning And Assessment Reports
- 3) Object And Event Data
- 4) Destroyed And Residual Threats
- 5) System Status Data
- 6) Retired Equipment
- 7) Battle Losses And Expenditures

INPUT	F41 - CONTROL THE SYSTEM	OUTPUT																								
1) Declaration Of IOC 2) Policy, Mission, And Direction From HA 3) Situation Data 4) Engagement Strategy Nomination 5) External C2 Reports And Plans	Description: This High Level Function Encompasses The Processes And Means To Provide High Level Human Control Of The Sds And Its Operations In Accordance With National Policy, Sds Mission Objectives, And Guidance And Direction From Ha. The Function Includes Issuing Command Policy And Guidance, Preparing And Revising Plans And Procedures, Providing Positive Control Of The Sds, And Providing High Level System Management Control. <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F41-1</td><td>SDS Commander, Alternates, And Command Staff</td></tr><tr><td>F41-2</td><td>Planning Staff</td></tr><tr><td>F41-3</td><td>Positive Control Teams</td></tr><tr><td>F41-4</td><td>System Management Control Teams</td></tr><tr><td>F41-5</td><td>Primary And Alternate Command Facilities</td></tr><tr><td>F41-6</td><td>Planning And Simulation Facilities</td></tr><tr><td>F41-7</td><td>Primary And Alternate Positive Control Cell Facilities</td></tr><tr><td>F41-8</td><td>Primary And Alternate System Management Control Facilities</td></tr><tr><td>F41-9</td><td>Communications With HA</td></tr><tr><td>F41-10</td><td>Communications And Interfaces With All Other Functions Of The Employ SDS Function</td></tr><tr><td>F41-11</td><td>Means To Receive External C2 Reports And Plans</td></tr></tbody></table>	#	Requirement Description	F41-1	SDS Commander, Alternates, And Command Staff	F41-2	Planning Staff	F41-3	Positive Control Teams	F41-4	System Management Control Teams	F41-5	Primary And Alternate Command Facilities	F41-6	Planning And Simulation Facilities	F41-7	Primary And Alternate Positive Control Cell Facilities	F41-8	Primary And Alternate System Management Control Facilities	F41-9	Communications With HA	F41-10	Communications And Interfaces With All Other Functions Of The Employ SDS Function	F41-11	Means To Receive External C2 Reports And Plans	1) Coordination With And Recommendations To HA 2) Validate Operational Concepts 3) Approved Decision Aids And Validated Procedures 4) Current Rules Of Engagement 5) Current Defense Preferences 6) System Mode Selections 7) Engagement Strategy Overrides 8) Surveillance And Discrimination Criteria 9) System Configuration Criteria 10) Recovery And Reconstitution Priorities
#	Requirement Description																									
F41-1	SDS Commander, Alternates, And Command Staff																									
F41-2	Planning Staff																									
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F41-4	System Management Control Teams																									
F41-5	Primary And Alternate Command Facilities																									
F41-6	Planning And Simulation Facilities																									
F41-7	Primary And Alternate Positive Control Cell Facilities																									
F41-8	Primary And Alternate System Management Control Facilities																									
F41-9	Communications With HA																									
F41-10	Communications And Interfaces With All Other Functions Of The Employ SDS Function																									
F41-11	Means To Receive External C2 Reports And Plans																									

INPUT

- 1) Declaration of IOC
- 2) Policy, missions, and direction from HA

F411 - ISSUE COMMAND POLICY AND GUIDANCE

Description: This function encompasses the high level command responsibilities and activities of interpreting and assessing policy and missions for the SDS, establishing command policy and guidance, delegating decision authority to subordinates, and maintaining continuity of command. The function involves coordination with HA, other Unified and Specified (U&S) Commands, and the Component Commands and Services on matters of policy and mission.

Requirement Description

F411-1	SDS Commander And Alternates
F411-2	Command Staff
F411-3	Primary And Alternate Command Facilities
F411-4	Communications With HA
F411-5	Communications With U&S Commands, Component Commands, And Services

OUTPUT

- 1) Coordination with HA
- 2) Coordination with U&S Commands, Component Commands, and Services
- 3) Command policy/guidance
- 4) Delegated authority for planning, positive control, and system management control

INPUT 1) Declaration Of IOC 2) Mission, Policy, And Approvals From HA 3) Inputs From Coordination With U&S Commands, Component Commands, And Services	F4111 - INTERPRET/ASSESS POLICY AND MISSIONS Description: This command function involves interpretation, assessment, and coordination of existing and proposed policy and SDS missions to update and promulgate the command mission description for the SDS. The function involves assessment of the feasibility and impact of proposed policy and mission changes and includes coordination with HA, other U&S Commands, Component Commands, and Services. <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4111-1</td><td>SDS Commander</td></tr><tr><td>F4111-2</td><td>Command Staff</td></tr><tr><td>F4111-3</td><td>Peacetime Command And Staff Facilities</td></tr><tr><td>F4111-4</td><td>Communications With HA, U&S Commands, Component Commands, And Services</td></tr><tr><td>F4111-5</td><td>Analytical Tools For Feasibility And Impact Assessment</td></tr><tr><td>F4111-6</td><td>Document Production Capabilities</td></tr></tbody></table>	#	Requirement Description	F4111-1	SDS Commander	F4111-2	Command Staff	F4111-3	Peacetime Command And Staff Facilities	F4111-4	Communications With HA, U&S Commands, Component Commands, And Services	F4111-5	Analytical Tools For Feasibility And Impact Assessment	F4111-6	Document Production Capabilities	OUTPUT 1) Coordination With HA 2) Outputs Of Coordination With U&S Commands, Component Commands, And Services 3) Promulgation Of Revised/Updated Command Mission Description
#	Requirement Description															
F4111-1	SDS Commander															
F4111-2	Command Staff															
F4111-3	Peacetime Command And Staff Facilities															
F4111-4	Communications With HA, U&S Commands, Component Commands, And Services															
F4111-5	Analytical Tools For Feasibility And Impact Assessment															
F4111-6	Document Production Capabilities															

INPUT 1) Policy From HA 2) Command Mission Description	F4112 - ESTABLISH COMMAND POLICY/GUIDANCE Description: This command function involves developing and providing the command-level policy and guidance for planning, positive control of the SDS, and system management control of subordinate SDS management functions and activities. Inherent in the policy for these is guidance for delegation of authority and for continuity of command. # Requirement Description F4112-1 SDS Commander F4112-2 Communications Between Commander And Staff	OUTPUT 1) Policy/Guidance For Planning 2) Policy/Guidance For Positive Control Of SDS 3) Policy/Guidance For System Management Control 4) Guidance For Delegation Of Authority 5) Guidance For Continuity Of Command

INPUT 1) Command Policy And Guidance For Delegation Of Authority	F4113 - DELEGATE DECISION AUTHORITY Description: This command function involves the formalized delegation of decision authority to subordinates in accordance with command policy and guidance. The function provides for delegation of decision authority for planning, positive control, and system management control. It also provides authority for acting commanders and successors to the SDS Commander. <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4113-1</td><td>SDS Commander</td></tr><tr><td>F4113-2</td><td>Communications Between Commander And Subordinates</td></tr></tbody></table>	#	Requirement Description	F4113-1	SDS Commander	F4113-2	Communications Between Commander And Subordinates	OUTPUT 1) Authority For Planning 2) Authority For Positive Control 3) Authority For System Management Control 4) Authority For Acting Commanders And Successors To The SDS Commander
#	Requirement Description							
F4113-1	SDS Commander							
F4113-2	Communications Between Commander And Subordinates							

INPUT

- 1) Command Mission Description
- 2) Guidance For Continuity Of Command
- 3) Authority For Acting Commander And Successors To Commander
- 4) Evaluation Of Threat

F4114 - MAINTAIN CONTINUITY OF COMMAND

Description: This function encompasses all provisions and activities to ensure there is at all times one valid SDS Commander and that he is recognized as such by the structure, including HA, other U&S Commands, and subordinate personnel within the SDS. It includes establishment of a continuity of command plan and implementation of day-to-day continuity of command, change of location of command, and devolution of command.

Requirement Description

F4114-1	SDS Commander And Alternates
F4114-2	Continuity Of Command Planning Staff
F4114-3	Primary And Alternate Command Facilities (Including Personnel Transportation)
F4114-4	Communications Between Commander And Staff
F4114-5	Communications Among Primary And Alternate Facilities
F4114-6	Communications With HA, U&S Commands, And Subordinate Commands

OUTPUT

- 1) One Valid And Recognized SDS Commander At All Times

INPUT 1) Approvals From HA 2) Command Policy/Guidance For Planning 3) Authority For Planning 4) Threat Evaluation 5) External C2 Plans	F412 - PREPARE/REVISE PLANS AND PROCEDURES Description: This function encompasses deliberate planning and associated activities to define system and force requirements, formulate operational concepts and plans, develop baseline rules of engagement, refine decision aids and procedures, and conduct operational exercises. The function involves coordination with HA, other U&S Commands, Component Commands, and Services. <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F412-1</td><td>Planning Staff</td></tr><tr><td>F412-2</td><td>Planning Facilities</td></tr><tr><td>F412-3</td><td>Simulation Capabilities</td></tr><tr><td>F412-4</td><td>Facilities For Operational Exercises And Data Collection</td></tr><tr><td>F412-5</td><td>Data Analysis Tools</td></tr></tbody></table>	#	Requirement Description	F412-1	Planning Staff	F412-2	Planning Facilities	F412-3	Simulation Capabilities	F412-4	Facilities For Operational Exercises And Data Collection	F412-5	Data Analysis Tools	OUTPUT 1) Coordination With And Recommendations To Ha 2) Exercise Plans And Results 3) Validated System/Force Requirements 4) Validated Operational Concepts 5) Baseline Rules Of Engagement 6) Approved Decision Aids And Procedures
#	Requirement Description													
F412-1	Planning Staff													
F412-2	Planning Facilities													
F412-3	Simulation Capabilities													
F412-4	Facilities For Operational Exercises And Data Collection													
F412-5	Data Analysis Tools													

INPUT

- 1) Command Policy/Guidance For Requirements Planning
- 2) Authority For Requirements Planning
- 3) Approval Of Recommendations By HA
- 4) Threat Evaluation

F4121 - CONDUCT REQUIREMENTS PLANNING

Description: This staff function involves analysis of system and force requirements and potential solutions leading to definition and validation of statements of required operational capabilities for the strategic ballistic missile defense mission area. The function is conducted in accordance with command policy/guidance and delegated authorities for system and force planning.

#	Requirement Description

F4121-1	Planning Staff

F4121-2	Planning Facilities

F4121-3	Channels To Obtain Validation From HA

OUTPUT

- 1) Statements Of Required Operational Capabilities

INPUT 1) Command Policy/Guidance For Operational Planning 2) Authority To Conduct Operational Planning 3) Approvals From HA 4) Threat Evaluation 5) External Command And Control Reports And Plans 6) Operational Exercise Results	F4122 - CONDUCT OPERATIONAL PLANNING Description: This staff function involves the formulation, evaluation, and coordination of concepts of operation, and the development and promulgation of formal operational plans for validated concepts of operation. The function encompasses concepts and plans for peacetime operations, crisis/alert operations, engagement operations, continuity of operations, and recovery and reconstitution. # Requirement Description F4122-1 Planning Staff F4122-2 Planning Facilities F4122-3 Simulation Facilities F4122-4 Means To Obtain Validation Of Concepts Of Operation	OUTPUT 1) Validated Concepts Of Operation 2) Peacetime Operational Plans 3) Crisis/Alert Operational Plans 4) Engagement Operational Concepts And Plans 5) Continuity Of Operational Plans 6) Recovery/Reconstitution Concept And Plans

INPUT

- 1) Command Policy/Guidance For ROE Planning
- 2) Authority For ROE Planning
- 3) Approvals From HA
- 4) Validated Operational Concepts
- 5) Threat Evaluation
- 6) Operational Exercise Results

F4123 - DEVELOP BASELINE ROES

Description: This function encompasses deliberate activities and processes leading to the dissemination of formal baseline rules of engagement (ROEs) in the format in which they will be used by personnel and/or machines of the SDS. ROEs set forth the conditions under which engagements can be initiated and continued. The function involves identification for new or revised ROEs, formulation and evaluation of ROE constructs, coordination to obtain validation from HA, and input and dissemination of validated ROEs to positive control and battle management functions.

Requirement Description

F4123-1	Planning Staff
F4123-2	Planning Facilities
F4123-3	Simulation Facilities
F4123-4	Process To Obtain Validation Of ROEs From HA
F4123-5	Interface And High Assurance Communications For Dissemination Of Roe Constructs To Battle Managers

OUTPUT

- 1) Baseline ROE Recommendations
- 2) Validated Baseline ROEs

INPUT

- 1) Validated Operational Concepts
- 2) Validated Baseline ROEs
- 3) Approvals From HA
- 4) Threat Evaluation
- 5) Operational Exercise Results

F4124 - DEVELOP/REFINE DECISION AIDS AND PROCEDURES

Description: This function encompasses activities and processes to develop and refine decision aids and procedures for conduct of exercises, positive control, system management control, and situation monitoring and assessment. It involves identification of needs and opportunities for enhancements, formulation and evaluation of new and revised decision aids and procedures, coordination to obtain approval or validation, and installation of decision aids and promulgation of procedures.

Requirement Description

F4124-1	Planning Staff
F4124-2	Planning Facilities
F4124-3	Simulation Facilities
F4124-4	Process To Obtain Approval Or Validation
F4124-5	Hardware And Interface To Install Approved Decision Aids
F4124-6	Format And Means To Promulgate Validated Procedures

OUTPUT

- 1) Recommended Procedures
- 2) Approved Decision Aids
- 3) Validated Procedures

INPUT

- 1) Validated Operational Concepts
- 2) Validated Baseline ROEs
- 3) Approved Decision Aids
- 4) Validated Procedures
- 5) HA Approval Of Exercise Plans
- 6) Threat Evaluation

F4125 - CONDUCT OPERATIONAL EXERCISES

Description: This function encompasses activities associated with preparing for, conducting, and developing findings from operational exercises of personnel, plans, procedures, software, and/or equipment of the SDS. The function involves formulation of exercise objectives, development and coordination of exercise plans, as-needed configuration of systems and facilities to support exercises, exercise conduct and data collection, and analysis and reporting of findings.

Requirement Description

F4125-1	Planning Staff
F4125-2	Planning Facilities
F4125-3	Process And Means For Coordination Of Exercise Plans
F4125-4	Simulation Facilities For Exercise Support
F4125-5	Capability To Configure SDS Systems And Facilities For Support Of Exercises
F4125-6	Operational Personnel To Participate In Exercises
F4125-7	Capability To Collect And Reduce Exercise Data
F4125-8	Tools For Analysis Of Exercise Data
F4125-9	Means To Report Exercise Results

OUTPUT

- 1) Coordination Of Exercise Plans
- 2) Final Approved Exercise Plans
- 3) Reports Of Exercise Results

INPUT	F413 - PROVIDE POSITIVE CONTROL	OUTPUT
1) National Policy 2) SDS Mission 3) Baseline Defense Preferences 4) Command Policy/Guidance For Positive Control 5) Delegated Decision Authority 6) Validated Operational Concepts 7) Baseline ROEs 8) Approved Decision Aids 9) Validated Procedures 10) Approval/Direction From HA 11) Situation Data 12) Attack Warning And Assessment 13) External C2 Reports And Plans 14) Engagement Strategy Nomination	Description: This function encompasses the processes and means to maintain continuous human positive control of the SDS and its operation in accordance with national policy, baseline defense preferences, applicable command policy/guidance, delegated decision authority, validated operational concepts, ROEs, validated procedures, and approvals and direction from HA. The function includes revision of baseline ROEs, adjustment of baseline defense preferences, adjustment of system mode, approval or override of engagement strategy nominations, and continuity of positive control. # <u>Requirement Description</u> F413-1 Qualified Positive Control Teams F413-2 Primary And Alternate Positive Control Cells F413-3 Man-machine Interfaces To SDS Battle Management F413-4 Communications With HA F413-5 Communications With Other U&S Commands F413-6 Communications Among Positive Control Cells F413-7 Interface With Situation Monitoring And Assessment	1) Real-time ROE Recommendations To HA 2) ROE Revisions 3) Adjustments To Defense Preferences 4) System Mode Selections 5) Engagement Strategy Overrides

INPUT

- 1) Command Policy/Guidance For Positive Control
- 2) Delegated Authority For Positive Control
- 3) Validated Procedures For Positive Control
- 4) Baseline ROEs
- 5) Approvals And Direction From HA
- 6) Situation Assessment
- 7) External C2 Reports, Requests, And Plans

F4131 - REVISE RULES OF ENGAGEMENT (ROEs)

Description: This positive control function encompasses processes and means to recommend expeditious changes in baseline ROEs and to implement changes as directed by HA. It involves monitoring the situation, including reports and requests from other U&S Commanders, identifying potential problems with baseline ROEs, and recommending expeditious changes for HA consideration. It also involves implementation of expeditious ROE changes as approved or otherwise directed by HA, including revision of parameters in ROE constructs, masking or unmasking of ROE constructs, dissemination of changes to alternate positive control cells and automated battle managers, and reporting completion of ROE change implementations.

Requirement Description

- F4131-1 Qualified Positive Control Teams
- F4131-2 Positive Control Cell Facilities
- F4131-3 Communications With HA
- F4131-4 Means To Obtain Situation Assessment
- F4131-5 Means To Receive Reports And Requests From Other U&S Commands
- F4131-6 Quick-look ROE Assessment Capabilities
- F4131-7 Communications With Alternate Positive Control Cells
- F4131-8 Man-machine Interface To SDS Battle Management
- F4131-9 High Assurance Communications For ROE Change Dissemination

OUTPUT

- 1) ROE Change Recommendations To HA
- 2) Approved Or Directed ROE Construct Changes To Alternate Positive Control Cells And To SDS Battle Managers
- 3) ROE Change Implementation Completion Reports

INPUT	F4132 - ADJUST DEFENSE PREFERENCES	OUTPUT																		
1) Command Policy/Guidance For Positive Control 2) Delegated Authority For Positive Control 3) Validated Procedures For Positive Control 4) Baseline Defense Preferences 5) Guidance/Direction From HA 6) Situation Assessment 7) External Reports And Plans For Defended Assets	Description: This positive control function encompasses processes and means for implementation and dissemination of defense preference weight changes as directed by HA and, to the extent allowed, in response to situation dynamics. It involves receipt of defense preference guidance from HA, establishing/entering baseline land area and asset category preferences, adjusting preference weights in response to situation dynamics (e.g., force generation activities, missile launches, asset destruction), dissemination of preference weight changes to alternate positive control cells and to SDS battle managers, and reporting of defense preference change implementations. <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4132-1</td><td>Qualified Positive Control Teams</td></tr><tr><td>F4132-2</td><td>Positive Control Cell Facilities</td></tr><tr><td>F4132-3</td><td>Communications With HA</td></tr><tr><td>F4132-4</td><td>Means To Flowdown Higher Level Defense Preference Guidance To Specific Land Area And Asset Preference Weights</td></tr><tr><td>F4132-5</td><td>Means To Obtain Real-time Defended Asset Situation/Status Data And To Adjust Preference Weights Accordingly</td></tr><tr><td>F4132-6</td><td>Communications With Alternate Positive Control Cells</td></tr><tr><td>F4132-7</td><td>Man-machine Interface To Automated Battle Management</td></tr><tr><td>F4132-8</td><td>High Assurance Communications For Dissemination Of Defense Preference Weight Changes To Battle Managers</td></tr></tbody></table>	#	Requirement Description	F4132-1	Qualified Positive Control Teams	F4132-2	Positive Control Cell Facilities	F4132-3	Communications With HA	F4132-4	Means To Flowdown Higher Level Defense Preference Guidance To Specific Land Area And Asset Preference Weights	F4132-5	Means To Obtain Real-time Defended Asset Situation/Status Data And To Adjust Preference Weights Accordingly	F4132-6	Communications With Alternate Positive Control Cells	F4132-7	Man-machine Interface To Automated Battle Management	F4132-8	High Assurance Communications For Dissemination Of Defense Preference Weight Changes To Battle Managers	1) Defense Preference Weight Changes To Alternate Positive Control Cells And SDS Battle Managers 2) Defense Preference Change Implementation Completion Reports
#	Requirement Description																			
F4132-1	Qualified Positive Control Teams																			
F4132-2	Positive Control Cell Facilities																			
F4132-3	Communications With HA																			
F4132-4	Means To Flowdown Higher Level Defense Preference Guidance To Specific Land Area And Asset Preference Weights																			
F4132-5	Means To Obtain Real-time Defended Asset Situation/Status Data And To Adjust Preference Weights Accordingly																			
F4132-6	Communications With Alternate Positive Control Cells																			
F4132-7	Man-machine Interface To Automated Battle Management																			
F4132-8	High Assurance Communications For Dissemination Of Defense Preference Weight Changes To Battle Managers																			

INPUT

- 1) Command Policy/Guidance For Positive Control
- 2) Delegated Authority For Positive Control
- 3) Validated Procedures For Positive Control
- 4) Baseline And Revised ROEs
- 5) Baseline And Revised Defense Preferences
- 6) Approval/Direction From HA
- 7) Situation Summaries
- 8) Warning And Assessment Of Attack

F4133 - ADJUST SYSTEM MODE

Description: This positive control function encompasses processes and means to select and change the SDS mode, including changes in system alert levels and enablement/termination of countermeasure and engagement actions. The function involves monitoring of the situation with respect to system mode selection criteria, recommending mode changes to HA as time allows, verifying conditional authority to change system mode in emergency conditions, adjusting the mode in accordance with criteria or as directed by HA, entering and disseminating mode selection changes to alternate positive control cells and SDS battle managers, and reporting implementation of system mode changes.

Requirement Description

F4133-1	Qualified Positive Control Teams
F4133-2	Positive Control Cell Facilities
F4133-3	Communications With HA
F4133-4	Means To Obtain Situation Summaries And Warning And Assessment Of Attack
F4133-5	Communication With Alternate Positive Control Cells
F4133-6	Man-machine Interface To Automated Battle Management
F4133-7	High Assurance Communication To Disseminate System Mode Changes To Battle Managers

OUTPUT

- 1) System Mode Change Recommendations To HA
- 2) Mode Changes To Alternate Positive Control Cells And SDS Battle Managers
- 3) Mode Change Implementation Completion Reports

INPUT	F4134 - APPROVE/OVERRIDE ENGAGEMENT STRATEGY SELECTION	OUTPUT																		
1) Command Policy/Guidance For Positive Control 2) Delegated Authority For Positive Control 3) Validated Procedures For Positive Control 4) Baseline And Revised ROEs 5) Baseline And Revised Defense Preferences 6) System Mode Selection 7) Situation Assessment 8) Engagement Strategy Nomination	Description: This positive control function encompasses processes and means to ensure engagement strategy selections by SDS battle management are valid and, if not, to override such selections with alternate strategy selections. The function is triggered by receipt of an engagement strategy nomination from SDS battle management and includes quick-look assessment of the validity and optimality of that selection, implicit approval if the nominated selection is satisfactory or override if not, and reporting of the current engagement strategy selection. In the case where an override is warranted, the function also involves quick-look review of alternate strategy options for validity and optimality, selection and entry of an alternate strategy selection, and dissemination of the override strategy to SDS battle managers. <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4134-1</td><td>Qualified Positive Control Teams</td></tr><tr><td>F4134-2</td><td>Positive Control Cell Facilities</td></tr><tr><td>F4134-3</td><td>Means To Receive Situation Assessments</td></tr><tr><td>F4134-4</td><td>Decision Aids And/Or Procedures For Quick-look Evaluation Of Engagement Strategy Selections And Options</td></tr><tr><td>F4134-5</td><td>Communications With Alternate Positive Control Cells</td></tr><tr><td>F4134-6</td><td>Man-machine Interface To Automated Battle Management</td></tr><tr><td>F4134-7</td><td>High Assurance Communications With SDS Battle Managers</td></tr><tr><td>F4134-8</td><td>Communications With HA (And Possibly U&S Commands)</td></tr></tbody></table>	#	Requirement Description	F4134-1	Qualified Positive Control Teams	F4134-2	Positive Control Cell Facilities	F4134-3	Means To Receive Situation Assessments	F4134-4	Decision Aids And/Or Procedures For Quick-look Evaluation Of Engagement Strategy Selections And Options	F4134-5	Communications With Alternate Positive Control Cells	F4134-6	Man-machine Interface To Automated Battle Management	F4134-7	High Assurance Communications With SDS Battle Managers	F4134-8	Communications With HA (And Possibly U&S Commands)	1) Strategy Selection Override And Alternate Selection 2) Report Of Current Engagement Strategy Selection
#	Requirement Description																			
F4134-1	Qualified Positive Control Teams																			
F4134-2	Positive Control Cell Facilities																			
F4134-3	Means To Receive Situation Assessments																			
F4134-4	Decision Aids And/Or Procedures For Quick-look Evaluation Of Engagement Strategy Selections And Options																			
F4134-5	Communications With Alternate Positive Control Cells																			
F4134-6	Man-machine Interface To Automated Battle Management																			
F4134-7	High Assurance Communications With SDS Battle Managers																			
F4134-8	Communications With HA (And Possibly U&S Commands)																			

INPUT

- 1) Command Policy/Guidance For Positive Control
- 2) Delegated Authority For Positive Control
- 3) Validated Procedures For Positive Control
- 4) Continuity Of Operations Plan
- 5) Baseline And Revised ROEs
- 6) Baseline And Revised Defense Preferences
- 7) Current System Mode Selection
- 8) Current Engagement Strategy Selection
- 9) Situation Assessments Relevant To Relocation And Devolution Of Positive Control

F4135 - MAINTAIN CONTINUITY OF POSITIVE CONTROL

Description: This function encompasses the processes and means to ensure that there is at all times one valid team and cell exercising positive control over the SDS, and that the acting cell is recognized as such by the system and external interfaces. The function includes implementation of day-to-day continuity of positive control, relocation of positive control, and devolution of positive control in accordance with continuity of operations plans and validated procedures.

Requirement Description

F4135-1	Primary And Alternate Positive Control Teams
F4135-2	Primary And Alternate Positive Control Cell Facilities (Including Personnel Transportation)
F4135-3	Communications With SDS Commander
F4135-4	Communications Among Primary And Alternate Positive Control Cells
F4135-5	Communications With HA, U&S Commands, And Subordinate Commands
F4135-6	Interfaces To Situation Assessment And Battle Management Functions Of The SDS

OUTPUT

- 1) One Valid And Recognized Team And Cell Exercising Positive Control Over The Sds

INPUT	F414 - PROVIDE SYSTEM MANAGEMENT CONTROL	OUTPUT										
1) Command Policy/Guidance For System Management Control 2) Delegated Authority For System Management Control 3) Validated Procedures For System Management Control 4) System Mode Selection 5) Situation Data 6) External C2 Reports And Plans	Description: This command and control function encompasses the processes and means for high level human control of the subordinate SDS system management activities, both the fully automated management activities and those involving humans. The functions includes establishment of surveillance and discrimination (S&D) criteria, establishment of system configuration criteria, definition of recovery and reconstitution priorities, and continuity of system management control. <table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F414-1</td><td>System Management Control Teams</td></tr><tr><td>F414-2</td><td>Primary And Alternate System Management Control Facilities</td></tr><tr><td>F414-3</td><td>Interfaces To System Mode Selection And Situation Assessment Functions Of The SDS</td></tr><tr><td>F414-4</td><td>Means To Receive External C2 Reports And Plans</td></tr></table>	#	Requirement Description	F414-1	System Management Control Teams	F414-2	Primary And Alternate System Management Control Facilities	F414-3	Interfaces To System Mode Selection And Situation Assessment Functions Of The SDS	F414-4	Means To Receive External C2 Reports And Plans	1) S&D Criteria 2) System Configuration Criteria 3) Recovery And Reconstitution Priorities
#	Requirement Description											
F414-1	System Management Control Teams											
F414-2	Primary And Alternate System Management Control Facilities											
F414-3	Interfaces To System Mode Selection And Situation Assessment Functions Of The SDS											
F414-4	Means To Receive External C2 Reports And Plans											

INPUT

- 1) Command Policy/Guidance For System Management Control
- 2) Delegated Authority For System Management Control
- 3) Validated Procedures For System Management Control
- 4) System Mode Selection
- 5) Situation Data

F4141 - ESTABLISH SURVEILLANCE AND DISCRIMINATION CRITERIA

Description: This command and control function encompasses the processes and means to establish and disseminate high level criteria to be followed by surveillance and discrimination human and automated managers. S&D criteria to be established include but are not limited to S&D management reporting requirements, S&D resource allocation criteria, sensor detection and false alarm rate objectives, and criteria for use of expendable S&D assets. The function involves assessment of the need for revised S&D criteria, establishing/setting the new criteria, and disseminating the criteria changes to system management nodes.

Requirement Description

F4141-1	System Management Control Teams
F4141-2	System Management Control Facilities
F4141-3	Interfaces To System Mode Selection And Situation Assessment Functions Of The SDS
F4141-4	Decision Aids And Analytical Tools For Assessing Alternative S&D Criteria

OUTPUT

- 1) S&D Management Reporting Requirements
- 2) S&D Resource Allocation Criteria
- 3) Detection And False Alarm Rate Objectives
- 4) Criteria For Use Of Expendable S&D Assets
- 5) Other S&D Management Criteria As Needed

INPUT	F4142 - ESTABLISH SYSTEM CONFIGURATION CRITERIA	OUTPUT												
1) Command Policy/Guidance For System Management Control 2) Delegated Authority For System Management Control 3) Validated Procedures For System Management Control 4) Situation Data 5) System Mode Selection	Description: This command and control function encompasses the processes and means to establish and disseminate criteria to be followed in the management of the operational and support configuration of the SDS. System configuration criteria include but are not limited to space/time coverage criteria, communications management criteria, criteria for use of reserve and spare assets, and system status reporting requirements. The function involves assessment of the need for revised system configuration criteria, establishment of the new criteria, and dissemination of the criteria changes to operational configuration management and system support functions of the SDS. <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4142-1</td><td>System Management Control Teams</td></tr><tr><td>F4142-2</td><td>Primary And Alternate System Management Control Facilities</td></tr><tr><td>F4142-3</td><td>Interfaces With System Mode Selection And Situation Assessment Functions Of The SDS</td></tr><tr><td>F4142-4</td><td>Decision Aids And Analytical Tools For Assessment Of Alternative System Configuration Criteria</td></tr><tr><td>F4142-5</td><td>Communications And Interfaces For Dissemination Of Criteria Changes To Operational Configuration Management And System Support Nodes Of The SDS</td></tr></tbody></table>	#	Requirement Description	F4142-1	System Management Control Teams	F4142-2	Primary And Alternate System Management Control Facilities	F4142-3	Interfaces With System Mode Selection And Situation Assessment Functions Of The SDS	F4142-4	Decision Aids And Analytical Tools For Assessment Of Alternative System Configuration Criteria	F4142-5	Communications And Interfaces For Dissemination Of Criteria Changes To Operational Configuration Management And System Support Nodes Of The SDS	1) Space/Time Coverage Criteria 2) Communications Management Criteria 3) Criteria For Use Of Reserve And Spare Assets 4) System Status Reporting Requirements 5) Other System Configuration Criteria As Applicable
#	Requirement Description													
F4142-1	System Management Control Teams													
F4142-2	Primary And Alternate System Management Control Facilities													
F4142-3	Interfaces With System Mode Selection And Situation Assessment Functions Of The SDS													
F4142-4	Decision Aids And Analytical Tools For Assessment Of Alternative System Configuration Criteria													
F4142-5	Communications And Interfaces For Dissemination Of Criteria Changes To Operational Configuration Management And System Support Nodes Of The SDS													

INPUT

- 1) Command Policy/Guidance For System Management Control
- 2) Delegated Authority For System Management Control
- 3) Validated Procedures For System Management Control
- 4) Situation Data
- 5) External C2 Reports And Plans

F4143 - DEFINE SYSTEM RECOVERY AND RECONSTITUTION PRIORITIES

Description: This command and control function encompasses processes and means to set recovery and reconstitution priorities to be followed, respectively, by the operational configuration management and reconstitution functions of the SDS. The function involves monitoring the situation with respect to recovery and reconstitution, establishing priorities, and disseminating the priorities to operational configuration management and reconstitution nodes of the SDS.

Requirement Description

F4143-1	System Management Control Teams
F4143-2	Primary And Alternate System Management Control Facilities
F4143-3	Interfaces With The System Mode Selection And Situation Assessment Functions Of The SDS
F4143-4	Means To Receive External C2 Reports And Plans
F4143-5	Decision Aids And Analytical Tools For Assessment Of Alternative Recovery And Reconstitution Priorities
F4143-6	Communications And Interfaces With Operational Configuration Management And Reconstitution Nodes Of The SDS

OUTPUT

- 1) System Recovery Priorities
- 2) System Reconstitution Priorities

INPUT	F4144 - MAINTAIN CONTINUITY OF SYSTEM MANAGEMENT CONTROL	OUTPUT														
1) Command Policy/Guidance For System Management Control 2) Delegated Authority For System Management Control 3) Validated Procedures For System Management Control 4) Continuity Of Operations Plan 5) Baseline And Revised S&D Criteria 6) Baseline And Revised System Configuration Criteria 7) Current Recovery And Reconstitution Priorities 8) Situation Data	Description: The function encompasses the processes and means to ensure there exists a valid and recognized set of nodes executing system management control of the SDS. The function includes implementation of day-to-day continuity of system management control, relocation of system management control, and devolution of system management control. <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4144-1</td><td>Primary And Alternate System Management Control Teams</td></tr><tr><td>F4144-2</td><td>Primary And Alternate System Management Control Facilities (Including Personnel Transportation)</td></tr><tr><td>F4144-3</td><td>Procedures For Day-to-day Continuity Of System Management Control</td></tr><tr><td>F4144-4</td><td>Procedures For Relocation Of System Management Control</td></tr><tr><td>F4144-5</td><td>Procedures For Devolution Of System Management Control</td></tr><tr><td>F4144-6</td><td>Interface To The Situation Assessment Function</td></tr></tbody></table>	#	Requirement Description	F4144-1	Primary And Alternate System Management Control Teams	F4144-2	Primary And Alternate System Management Control Facilities (Including Personnel Transportation)	F4144-3	Procedures For Day-to-day Continuity Of System Management Control	F4144-4	Procedures For Relocation Of System Management Control	F4144-5	Procedures For Devolution Of System Management Control	F4144-6	Interface To The Situation Assessment Function	1) One Valid, Recognized Set Of System Management Control Nodes
#	Requirement Description															
F4144-1	Primary And Alternate System Management Control Teams															
F4144-2	Primary And Alternate System Management Control Facilities (Including Personnel Transportation)															
F4144-3	Procedures For Day-to-day Continuity Of System Management Control															
F4144-4	Procedures For Relocation Of System Management Control															
F4144-5	Procedures For Devolution Of System Management Control															
F4144-6	Interface To The Situation Assessment Function															

INPUT

- 1) System Mode Selection
- 2) S&D Criteria
- 3) Situation Data
- 4) System Status Data
- 5) Kill Assessment Observables
Collection Requests
- 6) Object And Event Observables
- 7) Background Environment

F42 - CONDUCT SURVEILLANCE AND DISCRIMINATION

Description: This high level function encompasses processes and organic means to obtain, and process into useful form, real time data on objects and events relevant to the SDS mission in accordance with the selected system mode and the surveillance and discrimination (S&D) criteria from the system management control function. The function includes managing S&D, obtaining and bulk processing observables, initiating and maintaining track files, classifying and identifying objects and events, and employing expendable S&D assets. Requirement Description

Requirement Description

F42-1	S&D Management Capabilities And Resources
F42-2	S&D Observables Collection Elements And Resources
F42-3	Computational Resources
F42-4	Communications And Interfaces With All Other Functions Of The Employ SDS Function

OUTPUT

- 1) S&D Activity Reports
- 2) Object/Event Data
- 3) S&D Expenditures

INPUT 1) System Mode Selection 2) S&D Criteria 3) Situation Data 4) S&D Expenditure Reports 5) Track File 6) System Status Data 7) Kill Assessment Observables Collection Requests	F421 - MANAGE SURVEILLANCE AND DISCRIMINATION Description: This function encompasses the processes and means to to manage surveillance and discrimination to meet SDS requirements in accordance with the system mode selection, S&D criteria, kill assessment observables collection requests, and situation and other data. The function includes determining S&D requirements, assigning and tasking S&D resources, assigning and tasking object/event data reporting, authorizing use of expendable S&D assets, and maintaining continuity of S&D management. # Requirement Description F421-1 S&D Management Resources (Personnel And Computational Resources) F421-2 Host Facilities And/Or Platforms	OUTPUT 1) S&D Activity Reports 2) S&D Control And Tasking

INPUT 1) S&D Management Reporting Requirements 2) System Mode Selection 3) Track File 4) Situation Data 5) S&D Expenditure Reports 6) S&D Activity Reports	F4211 - DETERMINE SURVEILLANCE AND DISCRIMINATION REQUIREMENTS Description: This function encompasses the processes and means to determine the S&D operational requirements so that S&D resources can be efficiently assigned and tasked. The function involves determining search volume coverage requirements, observables collection and processing requirements, and object/event data distribution requirements. The requirements are established at a system level and provide the guidelines for the subsequent assignment and tasking of S&D resources. <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4211-1</td><td>S&D Management Resources</td></tr><tr><td>F4211-2</td><td>Host Facilities And/Or Platforms</td></tr></tbody></table>	#	Requirement Description	F4211-1	S&D Management Resources	F4211-2	Host Facilities And/Or Platforms	OUTPUT 1) S&D Requirements 2) S&D Reporting Requirements
#	Requirement Description							
F4211-1	S&D Management Resources							
F4211-2	Host Facilities And/Or Platforms							

INPUT 1) S&D Resource Allocation Criteria 2) S&D Requirements 3) Track File 4) Situation Data 5) System Status Data 6) Kill Assessment Observables Collection Requests	F4212 - ASSIGN AND TASK S&D RESOURCES Description: This function encompasses the processes and means to assign and task search volume coverage and object-specific collection requirements among the S&D resources in order to conduct surveillance and discrimination of the inflight threat objects. This function involves partitioning the search volume coverages among the S&D resources in order to obtain favorable viewing angles of the threat objects and to avoid saturation of the S&D resources during peak processing times. This may require the function to determine the status and capability of the S&D resources and the space/time distribution of inflight threat objects. Object-specific collection requirements include such parameters as detection thresholds, filtering algorithms, and coordinate conversions. It is also necessary to provide S&D activity reports to other SDS functions. # Requirement Description F4212-1S&D Management Resources F4212-1 2Host Facilities And/Or Platforms	OUTPUT 1) S&D Resource Taskings 2) S&D Activity Reports

INPUT

- 1) S&D Reporting Requirements
- 2) S&D Resource Taskings
- 3) Track File
- 4) Situation Data
- 5) System Status Data

F4213 - ASSIGN AND TASK OBJECT/EVENT DATA REPORTING

Description: This function encompasses the processes and means to assign and task the reporting of object and event data among the functions and elements of the SDS system in accordance with the S&D reporting requirements, S&D resource taskings, and situation and other data. This function involves partitioning the object/event data reporting tasks in order to avoid saturation of the SDS system resources during peak processing times. This may require the function to determine the availability and capability of communication and processing resources in the SDS system, as well as determine the required update rates and communication paths over which object and event data should be reported. It may also be necessary to provide alternate reporting paths in the event of damage or loss to communication and processing resources.

Requirement Description

F4213-1 S&D Management Resources

F4213-2 Host Facilities And/Or Platforms

OUTPUT

- 1) S&D Object/Event Data Reporting Taskings

INPUT 1) Criteria For Use Of Expendable S&D Assets 2) S&D Resource Taskings 3) S&D Activity Reports 4) Situation Data 5) Track File	F4214 - AUTHORIZE USE OF EXPENDABLE S&D ASSETS Description: This function encompasses the processes and means to provide authorization for use of expendable S&D assets based on the S&D resource taskings and in accordance with the criteria for use of expendable S&D assets and situation assessment. The function involves identifying expendable S&D resource taskings, verifying satisfaction of utilization criteria, and providing authority to release the assets if the criteria are satisfied. The expendable S&D asset release authority is not a specific S&D asset tasking or launch directive; rather, it is a form of positive control for use of the expendable S&D assets. <table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F4214-1</td><td>S&D Management Personnel Computational Resources</td></tr><tr><td>F4214-2</td><td>Host Facilities And/Or Platforms</td></tr></table>	#	Requirement Description	F4214-1	S&D Management Personnel Computational Resources	F4214-2	Host Facilities And/Or Platforms	OUTPUT 1) Expendable S&D Asset Use Authorizations
#	Requirement Description							
F4214-1	S&D Management Personnel Computational Resources							
F4214-2	Host Facilities And/Or Platforms							

INPUT	F4215 - MAINTAIN CONTINUITY OF S&D MANAGEMENT	OUTPUT						
1) System Mode Selection 2) S&D Requirements 3) S&D Reporting Requirements 4) S&D Resource Taskings 5) S&D Data Reporting Taskings 6) Expendable S&D Asset Use Authorizations 7) Situation Data 8) Track File	Description: This function encompasses the processes and means to maintain continuity of the S&D management function in order to provide reliable control and tasking to the S&D resources based on the S&D control and taskings and in accordance with the system mode selection and situation and other data. The function involves monitoring the status of S&D management nodes, identifying the need for transfer of S&D management functions, transferring functions to successor nodes, and advising the SDS structure of the new S&D management relationships. <table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F4215-1</td><td>Nodes With The Capability To Assume The Critical Functions Of Primary S&D Management Nodes (Including Personnel And/Or Computational Resources As Applicable To The Functions Subject To Transfer)</td></tr><tr><td>F4215-2</td><td>Communications For Status Monitoring Among Primary And Alternate S&D Management Nodes</td></tr></table>	#	Requirement Description	F4215-1	Nodes With The Capability To Assume The Critical Functions Of Primary S&D Management Nodes (Including Personnel And/Or Computational Resources As Applicable To The Functions Subject To Transfer)	F4215-2	Communications For Status Monitoring Among Primary And Alternate S&D Management Nodes	1) S&D Management Function Transfers
#	Requirement Description							
F4215-1	Nodes With The Capability To Assume The Critical Functions Of Primary S&D Management Nodes (Including Personnel And/Or Computational Resources As Applicable To The Functions Subject To Transfer)							
F4215-2	Communications For Status Monitoring Among Primary And Alternate S&D Management Nodes							

INPUT 1) S&D Control And Tasking 2) Background Environment 3) Object/Event Observables 4) System Status Data	F422 - OBTAIN AND PROCESS OBSERVABLES Description: This function encompasses the processes and means to operate the S&D collection assets in order to obtain and process observables into time-tagged sensor measurement reports. The function includes activities such as aligning the S&D platform, pointing and activating interactive discrimination subsystems, collecting the radiometric observables, and bulk filtering extraneous observables required to generate the sensor measurement reports on objects and events. The sensor measurement reports, as generated by this function, are not associated with an object in the track file. However, they are platform dependent reports and require time tags and either platform location information or platform identification from which the platform location can be computed by user functions. # Requirement Description F422-1 S&D Collection Assets (Including At Least Sensors Subsystems, But Also Possible Interactive Discrimination Subsystems) F422-2 Signal Processing/Bulk Filtering Components F422-3 Host Facilities And/Or Platforms	OUTPUT 1) Time-tagged Sensor Measurements Reports (Of Objects And NUDET Events)

INPUT

- 1) Coverage taskings
- 2) System status data
- 3) Background environment
- 4) Time-tagged sensor measurements (of objects and NUDET events)

F4221 - OPERATE S&D COLLECTION ASSETS

Description: This function deals with those activities covering the operation of deployed S&D assets. It covers the tasking of search volumes and locations, the instructions to collect observable in a specific color band or frequency, the tasking of new sensor thresholds, the tasking of sensors to support specific events, i.e. NUDET observations, and the updating of on-board status and repair instructions.

#	Requirement Description
F4221-1	Communications
F4221-2	Processing Resources
F4221-3	Sensor Controls
F4221-4	Maintenance

OUTPUT

- 1) Sensor positions and viewing angles

INPUT 1) Collection taskings 2) Sensor position and viewing angles 3) Object/event observables 4) Background environment	F4222 - COLLECT AND FILTER OBSERVABLES Description: This function deals with the bulk filtering of a single sensor data cluster from a single target and a single scan to determine whether the observable falls into a specific group of categories such as stars, thrusting boosters, new or old space debris, clusters of objects, RVs or replicas, etc. <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4222-1</td><td>Active Sensor</td></tr><tr><td>F4222-2</td><td>NUDET Sensor</td></tr><tr><td>F4222-3</td><td>Data Storage</td></tr><tr><td>F4222-4</td><td>Computational Resources</td></tr><tr><td>F4222-5</td><td>Algorithms</td></tr></tbody></table>	#	Requirement Description	F4222-1	Active Sensor	F4222-2	NUDET Sensor	F4222-3	Data Storage	F4222-4	Computational Resources	F4222-5	Algorithms	OUTPUT 1) Filtered observables data
#	Requirement Description													
F4222-1	Active Sensor													
F4222-2	NUDET Sensor													
F4222-3	Data Storage													
F4222-4	Computational Resources													
F4222-5	Algorithms													

INPUT

- 1) S&D data reporting taskings
- 2) Sensor position and viewing angles
- 3) Filtered observables data

F4223 - PROVIDE TIME-TAGGED SENSOR MEASUREMENTS

Description: This function deals with the activities of the sensor to provide event time, azimuth, elevation (in either inertial or geocentric coordinates), signal amplitudes in each of the sensor's spectral bands, and target class of observables.

#	Requirement Description
F4222-1	Data Storage
F4222-2	Computational Resources
F4222-3	Clock
F4222-4	Positioning Sensor
F4222-5	Algorithms

OUTPUT

- 1) Time-tagged sensor measurements (objects and NUDET events)

INPUT 1) S&D Resource And Track Reporting Taskings 2) Time-tagged Sensor Measurements 3) Object Type And Status Estimates 4) System Status Data 5) Situation Data	F423 - INITIATE AND MAINTAIN TRACK FILES Description: This function encompasses the processes and means to correlate, filter, and possibly fuse sensor measurements in order to develop state vector estimates and improve their accuracy and confidence. The function includes association and correlation of the sensor measurements, initiation and updates of the state vector estimates, and fusing of independently developed state vector estimates. It may also require removing redundant and extraneous sensor measurement reports and providing a consistent and timely means by which to update the fields of the track file in order that other SDS functions can be supplied with the necessary data. Data fields of the track file may include time tags, state vector estimates, launch point or parent track estimates, radiometric signature data, and other information as required by elements and functions of the SDS. # <u>Requirement Description</u> F423-1 Computational Resources F423-2 Host Facilities And/Or Platforms	OUTPUT 1) Object/Cluster Track File

INPUT 1) S&D Resource Taskings 2) System Status Data 3) Time-tagged Sensor Measurements 4) State Vector Estimates 5) Type And Status Estimates	F4231 - ASSOCIATE AND CORRELATE SENSOR MEASUREMENTS Description: This function encompasses the processes and means to perform data correlation of the time-tagged sensor measurements. This function includes frame-to-frame mono correlation, stereo correlation, resolving of unassociated sensor measurements, and filtering of extraneous observables, such as space debris. This requires associating single detection reports to an existing object/cluster track file and may require generating three-dimensional reports from the correlation of two or more measurements (e.g., for angle-only measurements). The function also accounts for the uncertainty in the origin of the measurements by forming gate regions around the extrapolated state estimate and assigning probabilities that a sensor measurement within the gate is correctly associated to the state estimate. # Requirement Description F4231-1 Computational Resources F4231-2 Host Facilities And/Or Platforms	OUTPUT 1) Correlated Measurements

INPUT 1) S&D Resource And Track Reporting Taskings 2) Correlated Measurements 3) Type And Status Estimates	F4232 - ESTIMATE CLUSTER/OBJECT STATE VECTOR Description: This function encompasses the processes and means to provide object/cluster state vector and confidence interval estimates in order to facilitate the execution of other SDS functions. This function includes determining the appropriate state estimation algorithm, determining the state estimation parameters such as the transition matrix and model noise, and computing the updated state vector and confidence interval estimates. Potential state estimation algorithms include the Kalman filter and the iterative least squares parameters estimation. A cluster, as opposed to an object, is a synthetic location which represents the centroid of a group of observables in three space, such as an RV and its associated decoys. # <u>Requirement Description</u> F4232-1 Computational Resources F4232-2 Host Facilities And/Or Platforms	OUTPUT 1) Object/Cluster State Vector (And Confidence Interval) Estimates

INPUT

- 1) S&D Resource And Track Reporting Taskings
- 2) Object Track File
- 3) Object State Vector Estimates

F4233 - FUSE STATE VECTOR ESTIMATES

Description: This function encompasses the processes and means to merge state vector and confidence interval estimates when it is desired to improve the accuracy and confidence of the state vector estimates as compared to those developed by any single S&D element. This function includes determining the appropriate fusing algorithm, determining the fusing parameters, and computing the fused state vector and confidence interval estimates. Applicable fusion algorithms include filter algorithms which weight the state vector estimates according to their confidence levels and association algorithms which augment the correlation level of the state vector estimates.

Requirement Description

F4233-1 Computational Resources

F4233-2 Host Facilities And/Or Platforms

OUTPUT

- 1) Fused State Estimates

INPUT 1) S&D Track Reporting And Resources Taskings 2) State Vector Estimates Or Fused State Vector Estimates 3) Type And Status Estimates 4) Time-tagged Sensor Measurements 5) Situation Data	F4234 - APPEND RELEVANT DATA TO TRACK FILE Description: This function encompasses the processes and means to initiate and maintain the entry of data into the cluster/object track file in order that the SDS functions can be supplied with the necessary and timely data. The track file can be defined as containing all the necessary cluster/object data that a set of SDS functions require to perform their objectives. By this definition the data fields of the track file can be permitted to vary among the SDS elements, as long as the data among the different track files is kept consistent. The objective of this function is to provide a consistent means with which to update the fields of the track file and to provide the SDS functions with the necessary cluster/object data required. # Requirement Description F4234-1 Computational Resources F4234-2 Host Facilities And/Or Platforms	OUTPUT 1) Updated Cluster/Object Track File

INPUT

- 1) S&D Control And Tasking
- 2) S&D Resource Tasking
- 3) Discrimination, Kill Assessment, And NUDET Event Reporting Tasking
- 4) Object Track File
- 5) NUDET Sensor Measurements
- 6) Situation Data (Threat Order Of Battle)

F424 - CLASSIFY AND IDENTIFY OBJECTS/EVENTS

Description: This function encompasses the processes and means to provide object type/status estimates and NUDET event data. This function includes providing object launch point and parent track estimates, comparing radiometric signature data, comparing object trajectory data, estimating object type and status, and estimating NUDET burst locations and yields. This function also provides a means by which the threat technical and threat order of battle data can be updated and/or revised as new information and observations of the threat become available.

Requirement Description

F424-1 Computational Resources

F424-2 Host Facilities And/Or Platforms

OUTPUT

- 1) Object Type And Status Estimates
- 2) NUDET Event Data

INPUT 1) S&D Resource Taskings 2) Object Track File 3) Situation Data (Threat Order Of Battle)	F4241 - ESTIMATE LAUNCH POINT OR PARENT TRACK Description: This function encompasses the processes and means to provide launch point estimates for boost threat objects and parent track estimates for other inflight threat objects. This function includes determining the relevant estimation methods, computing the launch point and parent track estimates, and assessing the plausibility of launch point estimates. Launch point and parent track estimates are computed as soon as the relevant estimation methods have the required number of data points. The estimates are not continually updated since the estimates cannot be expected to improve as the threat objects travel further along their trajectory. The function also provides information required to update the threat order of battle data. <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4241-1</td><td>Computational Resources</td></tr><tr><td>F4241-2</td><td>Host Facilities And/Or Platforms</td></tr></tbody></table>	#	Requirement Description	F4241-1	Computational Resources	F4241-2	Host Facilities And/Or Platforms	OUTPUT 1) Launch Point And Parent Track Estimates
#	Requirement Description							
F4241-1	Computational Resources							
F4241-2	Host Facilities And/Or Platforms							

INPUT

- 1) S&D Control And Tasking
- 2) Object Track File

F4242 - COMPARE RADIOMETRIC DATA TO COLLATERAL DATA

Description: This function encompasses the processes and means to provide object type and status estimates based on comparisons between radiometric data from sensor measurements and collateral signature data files. This function involves determining the relevant collateral data signature files and correlating the radiometric data to those data files in order to identify object type/status estimates or candidates. It also involves converting the radiometric data into formats that are appropriate for data correlation. This may require filtering of the estimates in order to avoid the accumulation of a large set of radiometric data on each object. In some instances, signature data files may not exist for particular combinations of threat objects and radiometric data. In these cases, the function may need to provide information for updates to the signature data file.

Requirement Description

F4242-1 Computational Resources

F4242-2 Host Facilities And/Or Platforms

OUTPUT

- 1) Object Type/Status Candidates

INPUT 1) S&D Control And Tasking 2) Object Track File 3) Launch Point Or Parent Track Estimate	F4243 - COMPARE OBJECT TRAJECTORY TO COLLATERAL DATA Description: This function encompasses the processes and means to provide object type and status estimates based on comparisons of object trajectory data and collateral trajectory data files. This function involves determining the relevant collateral trajectory data files and correlating the object data to the trajectory data files. The trajectory correlations include position and velocity discriminants, as well as acceleration discriminants, such as the ballistic coefficient and maneuvering forces. In some instances, collateral trajectory data may not exist for particular threat objects flying depressed, maneuvering, fast-burn or other unfamiliar trajectories. In these cases the function may need to provide information for updates to the collateral trajectory data file. # <u>Requirement Description</u> F4243-1 Computational Resources F4243-2 Host Facilities And/Or Platforms	OUTPUT 1) Object Type/Status Candidates

INPUT

- 1) S&D Control And Tasking
- 2) Discrimination And Kill Assessment Reporting Taskings
- 3) S&D Resource Taskings
- 4) Object Type And Status Candidates
- 5) Launch Point Or Parent Track Estimates
- 6) Situation Data (Threat O.B.)

F4244 - ESTIMATE OBJECT TYPE AND STATUS

Description: This function encompasses the processes and means to provide other SDS functions with a consistent cumulative set of object type/status estimates based on an accumulation of the launch point or parent track estimates and previously developed object type and status candidates. This function involves merging and fusing all relevant object type and status estimates, as well as estimating the time at which the object transitioned to its current status.

Requirement Description

F4244-1 Computational Resources

F4244-2 Host Facilities And/Or Platforms

OUTPUT

- 1) Object Type And Status Estimates

INPUT 1) S&D Control And Tasking 2) NUDET Event Reporting Taskings 3) NUDET Sensor Measurements 4) Situation Data	F4245 - ESTIMATE NUDET PARAMETERS Description: This function encompasses the processes and means to provide nuclear detonation (NUDET) event data based on NUDET sensor measurements and in accordance with S&D resource and reporting taskings. This function involves correlating the sensor measurement reports to estimate the position and time of the NUDETs, as well as use of the radiometric data to estimate the yield of the NUDET bursts. It is also necessary to associate NUDET detections to potential threat objects in the object track file in order to provide birth-to-death tracking of threat objects, and to provide further information with which to estimate yield of burst. # Requirement Description F4245-1 Computational Resources F4245-2 Host Facilities And/Or Platforms	OUTPUT 1) NUDET Event Data

INPUT 1) Expendable S&D Taskings 2) Expendable S&D Asset Use Authorization 3) Object Track File 4) Situation Data	F425 - EMPLOY EXPENDABLE SURVEILLANCE AND DISCRIMINATION ASSETS Description: This function encompasses the processes and means to employ expendable S&D assets of the SDS in order to provide primary or augmentation means to obtain, filter, and/or process observables of interest into time-tagged sensor measurement reports. The function includes preparation of the S&D asset, delivery of the S&D asset to the desired location/volume for operation, and activation of the expendable S&D asset and its reporting. It does not include the actual collection, processing, and delivery of time-tagged sensor measurements, since these processes are part of function F422, Obtain and Process Observables. <table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F425-1</td><td>Expendable S&D Assets</td></tr><tr><td>F425-2</td><td>Asset Delivery Subsystems</td></tr><tr><td>F425-3</td><td>Asset And Delivery Subsystem Storage And Support Facilities And/Or Platforms</td></tr><tr><td>F425-4</td><td>Asset And Delivery Subsystem Preparation Means</td></tr><tr><td>F425-5</td><td>Asset Activation Means</td></tr></table>	#	Requirement Description	F425-1	Expendable S&D Assets	F425-2	Asset Delivery Subsystems	F425-3	Asset And Delivery Subsystem Storage And Support Facilities And/Or Platforms	F425-4	Asset And Delivery Subsystem Preparation Means	F425-5	Asset Activation Means	OUTPUT 1) S&D Expenditure Reports 2) Expendable S&D Asset Activations
#	Requirement Description													
F425-1	Expendable S&D Assets													
F425-2	Asset Delivery Subsystems													
F425-3	Asset And Delivery Subsystem Storage And Support Facilities And/Or Platforms													
F425-4	Asset And Delivery Subsystem Preparation Means													
F425-5	Asset Activation Means													

INPUT

- 1) Expendable S&D asset tasking
- 2) Track file
- 3) Situation data

F4251 - PREPARE S&D ASSETS FOR EMPLOYMENT

Description: This function encompasses all the activities leading up to the launch of expendable S&D assets. This function includes the loading of instructions and taskings through the loading of expendable items, i.e. coolants, fuels, etc. This function also deals with the process of acquiring a launch vehicle, the mating of payloads, the prelaunch testing, and the orientation of the launch vehicle prior to launch.

<u>#</u>	<u>Requirement Description</u>
F4251-1	Launch Facilities
F4251-2	S&D Assets
F4251-3	Expendables
F4251-4	Maintenance and Testing
F4251-5	Storage

OUTPUT

- 1) Prepared expendable S&D assets

INPUT

- 1) Prepared expendable S&D asset
- 2) Expendable S&D asset use authorization
- 3) Situation data

F4252 - DELIVER S&D ASSET TO LOCATION/ VOLUME FOR OPERATION

Description: This function encompasses all the activities commencing with the launch of the S&D asset through the command guidance of the sensor to its assigned location ormspace surveillance volume

<u>#</u>	<u>Requirement Description</u>

F5252-1	Tracking Facility

F4252-1	Communications

OUTPUT

- 1) S&D expenditure reports
- 2) On station expendable S&D assets

INPUT

- 1) On station expendable S&D assets
- 2) Situation data

F4253 - ACTIVATE S&D ASSET AND REPORTING

Description: This function encompasses all the activities commencing with the arrival of the S&D asset to its assigned location or space surveillance volume. This function deals with the activation of the sensor subsystems and the monitoring of data received from the activated sensor and future sensor taskings and instructions.

<u>#</u>	<u>Requirement Description</u>
F4253-1	Tracking Facility
F4253-2	Communications
F4253-3	Sensor Analysis
F4253-4	Battle Management

OUTPUT

- 1) Expendable S&D asset activations

INPUT 1) Approved Decision Aids And Validated Procedures 2) Intelligence And Friendly Force Reports 3) System Status Data 4) Object/Event Data 5) Battle Data (S&D And Engagement Activity Reports)	F43 - MONITOR AND ASSESS SITUATION Description: This high level function encompasses processes and means to provide situation data, warnings, and assessments in support of other SDS functions and external users, including release of object and event data to external users. The function includes assessing the threat force status, determining the existence of an attack, determining the assets and land areas at risk, evaluating the battle situation, and determining the status of defended assets which includes SDS assets. <table> <tr> <th>#</th> <th>Requirement Description</th> </tr> <tr> <td>F43-1</td> <td>Threat Assessment Analysts</td> </tr> <tr> <td>F43-2</td> <td>Computational Resources</td> </tr> <tr> <td>F43-3</td> <td>Host Facilities And Platforms</td> </tr> <tr> <td>F43-4</td> <td>Communications And Interfaces To Other Functions Of The Employ SDS Function</td> </tr> </table>	#	Requirement Description	F43-1	Threat Assessment Analysts	F43-2	Computational Resources	F43-3	Host Facilities And Platforms	F43-4	Communications And Interfaces To Other Functions Of The Employ SDS Function	OUTPUT 1) Warning And Assessment Reports 2) Situation Data 3) Object/Event Data Released To External Users
#	Requirement Description											
F43-1	Threat Assessment Analysts											
F43-2	Computational Resources											
F43-3	Host Facilities And Platforms											
F43-4	Communications And Interfaces To Other Functions Of The Employ SDS Function											

INPUT 1) Decision Aids And Procedures 2) Intelligence Reports 3) Object/Event Data	F431 - ASSESS THREAT FORCE STATUS Description: This function encompasses the processes and means to accumulate, assess, and revise associated collateral databases of information on threat force status. The function includes assessing threat performance characteristics, updating threat order of battle data (O.B.), assessing indications and warning (I&W) information, and assessing overall risk measures. <table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F431-1</td><td>Threat Analysts</td></tr><tr><td>F431-2</td><td>Computational Resources</td></tr><tr><td>F431-3</td><td>Host Facilities And Platforms</td></tr></table>	#	Requirement Description	F431-1	Threat Analysts	F431-2	Computational Resources	F431-3	Host Facilities And Platforms	OUTPUT 1) Threat Evaluation 2) Threat Performance Data 3) Threat O.B. Data 4) Assessed Risk Of Attack
#	Requirement Description									
F431-1	Threat Analysts									
F431-2	Computational Resources									
F431-3	Host Facilities And Platforms									

INPUT 1) Decision Aids And Procedures 2) Intelligence Reports 3) Object/Event Data	F4311 - ASSESS THREAT PERFORMANCE CHARACTERISTICS Description: This function encompasses the processes and means to revise/update collateral information and databases of threat performance characteristics. The function involves obtaining threat technical data from the intelligence community, obtaining threat data from SDS sensor observations, assessing threat performance characteristics bases on the data obtained, and revising/updating threat performance databases. <table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F4311-1</td><td>Threat Scientific And Technical (S&T) Analysts</td></tr><tr><td>F4311-2</td><td>Analytical Tools And Simulation Capabilities</td></tr><tr><td>F4311-3</td><td>Real-time Computational Resources (Optional)</td></tr><tr><td>F4311-4</td><td>Host Facilities (And Optional Platforms)</td></tr></table>	#	Requirement Description	F4311-1	Threat Scientific And Technical (S&T) Analysts	F4311-2	Analytical Tools And Simulation Capabilities	F4311-3	Real-time Computational Resources (Optional)	F4311-4	Host Facilities (And Optional Platforms)	OUTPUT 1) Threat Performance Data (And Associated Portions Of Threat Evaluations)
#	Requirement Description											
F4311-1	Threat Scientific And Technical (S&T) Analysts											
F4311-2	Analytical Tools And Simulation Capabilities											
F4311-3	Real-time Computational Resources (Optional)											
F4311-4	Host Facilities (And Optional Platforms)											

INPUT 1) Decision Aids And Procedures 2) Intelligence Reports 3) Object/Event Data	F4312 - UPDATE THREAT ORDER OF BATTLE Description: This function encompasses the processes and means to revise/update information and databases of the threat missile, space, and defense suppression system orders of battle, including quantities by type, positions, operational statuses, command and control relationships, and other relevant O.B. type data. The function involves obtaining threat O.B. data from the intelligence community, receiving launch point estimates and associations from other SDS functions, extracting threat space O.B. from the track file, optionally assessing damage expectancies of threat ground installations from friendly force retaliatory strikes, and revising/updating the threat O.B. information held by the SDS. <table> <tr> <th>#</th><th>Requirement Description</th></tr> <tr> <td>F4312-1</td><td>Threat O.B. Analysts</td></tr> <tr> <td>F4312-2</td><td>Real-time Computational Resources</td></tr> <tr> <td>F4312-3</td><td>Host Facilities And/Or Platforms</td></tr> </table>	#	Requirement Description	F4312-1	Threat O.B. Analysts	F4312-2	Real-time Computational Resources	F4312-3	Host Facilities And/Or Platforms
#	Requirement Description								
F4312-1	Threat O.B. Analysts								
F4312-2	Real-time Computational Resources								
F4312-3	Host Facilities And/Or Platforms								
	OUTPUT 1) Threat O.B. Data (And The Associated Portions Of Threat Evaluations)								

INPUT

- 1) Decision Aids And Procedures
- 2) Threat O.B. Data
- 3) Intelligence Reports
- 4) Object/Event Data

F4313 - ASSESS I&W INFORMATION

Description: This function encompasses the processes and means to obtain and fuse indications and warning information to support assessment of risk measures. The function involves obtaining I&W information from the intelligence community, obtaining space object I&W information directly from the object/event data, and fusing the information to increase confidence levels as compared to the confidence inherent in any single indication.

#	Requirement Description
F4313-1	I&W Analysts
F4313-2	I&W Cell And Associated Host Facilities
F4313-3	Computational Resources

OUTPUT

- 1) Fused I&W Data

INPUT 1) Decision Aids And Procedures 2) Fused I&W Data 3) Threat O.B. Data 4) Threat Performance Data	F4314 - ASSESS RISK MEASURES Description: This function encompasses the processes and means to determine the likelihood of conflict or conflict escalation and to provide associated risk assessments to support decisions to elevate the SDS alert status and/or to provide another basis for corroboration of real-time indications of an attack. The function involves determining the likelihood of imminent attack, determining the likelihood of conflict escalation, estimating the consequences of an attack or escalation, and providing associated risk assessment reports. <table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F4314-1</td><td>Situation Assessment Analysts</td></tr><tr><td>F4314-2</td><td>Host Facilities</td></tr></table>	#	Requirement Description	F4314-1	Situation Assessment Analysts	F4314-2	Host Facilities	OUTPUT 1) Assessed Risk Of Attack (Or Conflict Escalation)
#	Requirement Description							
F4314-1	Situation Assessment Analysts							
F4314-2	Host Facilities							

INPUT

- 1) Decision Aids And Procedures
- 2) System Status Data
- 3) Object/Event Data
- 4) Assessed Risk Of Attack
- 5) Reported Hostilities (Friendly Force Reports)

F432 - DETERMINE EXISTENCE OF ATTACK

Description: This function encompasses the processes and means to identify and confirm the existence of a defense suppression and/or ballistic missile attack in order to support decisions to enable countermeasure and/or engagement actions and to provide warning of attack to external users. The function includes determining the existence of a covert suppression attack, determining the existence of an overt suppression attack, determining the existence of a ballistic missile attack, and confirming NUDET sightings.

Requirement Description

F432-1	Attack Assessment Analysts
F432-2	Man-machine Interfaces For Information Display
F432-3	Computational Resources
F432-4	Host Facilities

OUTPUT

- 1) Warning Of Attack (To Include Nature And Scope)

INPUT 1) Decision Aids And Procedures 2) System Status Data 3) Object/Event Data 4) Reported Hostilities	F4321 - DETERMINE EXISTENCE OF COVERT SUPPRESSION ATTACK Description: This function encompasses the processes and means to determine if there is or has been a covert attack on the SDS or portions thereof. The function involves monitoring system status data reporting, isolating suspicious system outages and malfunctions, formulating hypotheses as to causes, obtaining available corroborative information, assessing or testing the validity of the hypotheses, and rendering a determination as to the existence of a covert suppression attack. <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4321-1</td><td>SDS System/Operation Analysts</td></tr><tr><td>F4321-2</td><td>System Diagnosis Means</td></tr><tr><td>F4321-3</td><td>Hypothesis Assessment/Testing Tools</td></tr><tr><td>F4321-4</td><td>Host Facilities And Platforms</td></tr></tbody></table>	#	Requirement Description	F4321-1	SDS System/Operation Analysts	F4321-2	System Diagnosis Means	F4321-3	Hypothesis Assessment/Testing Tools	F4321-4	Host Facilities And Platforms	OUTPUT 1) Identified Covert Suppression Attack(S)
#	Requirement Description											
F4321-1	SDS System/Operation Analysts											
F4321-2	System Diagnosis Means											
F4321-3	Hypothesis Assessment/Testing Tools											
F4321-4	Host Facilities And Platforms											

INPUT

- 1) Decision Aids And Procedures
- 2) Object/Event Data
- 3) System Status Data
- 4) Assessed Risk Of Attack
- 5) Reported Hostilities
- 6) Identified Covert Suppression Attack
- 7) Identified Ballistic Missile Attack
- 8) Confirmation Of NUDET Sightings

F4322 - DETERMINE EXISTENCE OF OVERT SUPPRESSION ATTACK

Description: This function encompasses the processes and means to identify and confirm the existence of an overt suppression attack against the SDS. The function involves monitoring initial indicators of an overt suppression attack, identifying indications of hostile suppression actions, weighing available supporting evidence when needed, rendering a determination of an overt suppression attack, and characterizing the nature/scope of the suppression attack.

#	Requirement Description
F4322-1	Attack Assessment Analysts
F4322-2	Man-machine Interfaces For Displaying Information
F4322-3	Computational Resources
F4322-4	Host Facilities

OUTPUT

- 1) Identified Overt Suppression Attack

INPUT 1) Decision Aids And Procedures 2) Object/Event Data 3) Assessed Risk Of Attack 4) Reported Hostilities 5) Identified Covert Suppression Attack 6) Identified Overt Suppression Attack 7) Confirmation Of NUDET Sightings	F4323 - DETERMINE EXISTENCE OF BALLISTIC MISSILE ATTACK Description: This function encompasses the processes and means to identify the existence and characterize the size of a ballistic missile attack. The function involves monitoring object/event data reporting, identifying launch (or boost) of nuclear-capable foreign missile(s), weighing available supporting evidence, rendering a determination of a ballistic missile attack, and characterizing the size of the attack. The function is performed regardless of whether or not the United States is the target of the attack, i.e., the function is only concerned with determining the existence of a ballistic missile attack. <table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F4323-1</td><td>Attack Assessment Analysts</td></tr><tr><td>F4323-2</td><td>Man-machine Interface For Information Display</td></tr><tr><td>F4323-3</td><td>Computational Resources</td></tr><tr><td>F4323-4</td><td>Host Facilities</td></tr></table>	#	Requirement Description	F4323-1	Attack Assessment Analysts	F4323-2	Man-machine Interface For Information Display	F4323-3	Computational Resources	F4323-4	Host Facilities	OUTPUT 1) Identified Ballistic Missile Attack
#	Requirement Description											
F4323-1	Attack Assessment Analysts											
F4323-2	Man-machine Interface For Information Display											
F4323-3	Computational Resources											
F4323-4	Host Facilities											

INPUT

- 1) Decision Aids And Procedures
- 2) Object/Event Data
- 3) Reported Hostilities
- 4) Identified Overt Suppression Attack
- 5) Identified Ballistic Missile Attack

F4324 - CONFIRM NUDET SIGHTINGS

Description: This function encompasses the processes and means to confirm and characterize the numbers and timing of nuclear detonations in order to indicate or corroborate the existence of a defense suppression and/or ballistic missile attack. The function involves monitoring NUDET event data reporting in the SDS system, corroborating system NUDET reports when needed, rendering a confirmation of NUDET event(s), and characterizing the numbers and timing of NUDETs.

Requirement Description

F4324-1 Situation Analysts

F4324-2 Computational Resources

F4324-3 Host Facilities

OUTPUT

- 1) Confirmation Of NUDET Sightings

INPUT	F433 - DETERMINE ASSETS/AREAS AT RISK	OUTPUT						
1) Decision Aids And Procedures 2) Defended Asset Status 3) Threat O.B. And Performance Data 4) Warning Of Attack 5) Object/Event Data (Track File)	Description: This function encompasses the processes and means to identify by threat object the asset(s) or area(s) it is placing at risk. Assets include SDS platforms and installations, as well as other defended assets in the United States and Allied countries, and in space. The function includes projecting friendly asset positions, projecting threat object envelopes, computing closest approach distances, and comparing those distances to vulnerable radii of the assets. The function is performed before launch or commit of the threat objects to identify the full range of assets/areas which it could attack (i.e., SDS space platforms or other friendly satellites in the case of ASAT threat systems, and land areas in the case of ballistic missiles), as well as in each phase of the object's flight after launch, in order to support assignment of values to objects for engagement (or weapons withhold) and to support attack assessment. Since the envelope of the threat object will narrow after commit, and the SDS system's accuracy in predicting the trajectory of the threat object will improve with phase of flight and number of position measurements obtained, the function should result in successively better resolution in the asset/area at risk prediction. <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F433-1</td><td>Computational Resources</td></tr><tr><td>F433-2</td><td>Host Facilities And/Or Platforms</td></tr></tbody></table>	#	Requirement Description	F433-1	Computational Resources	F433-2	Host Facilities And/Or Platforms	1) Threat Versus Assets/Areas
#	Requirement Description							
F433-1	Computational Resources							
F433-2	Host Facilities And/Or Platforms							

INPUT 1) Decision Aids And Procedures 2) Asset Positions/Motions	F4331 - PROJECT FRIENDLY ASSET POSITIONS Description: This function encompasses the processes and means to project the positions of friendly assets into the future in order to support determination of potential closest approach distances to threat objects. The function involves identifying state estimates for friendly assets, determining the state extrapolation method, and actual extrapolating of the friendly asset locations over time out to some appropriate planning window. Note that even "fixed" assets will have motion in an inertial reference frame, and therefore must have their positions projected in that reference frame. In this context, the word "assets" includes land areas. # <u>Requirement Description</u> F4331-1 Computational Resources F4331-2 Host Facilities And/Or Platforms	OUTPUT 1) Projected Friendly Asset Positions

INPUT

- 1) Decision aids and procedures
- 2) Threat O.B. data
- 3) Warning of attack
- 4) Object/event data (track file)
- 5) Threat performance data

F4332 - PROJECT THREAT OBJECT ENVELOPES

Description: This function encompasses the processes and means to estimate/project threat object envelopes in order to support determination of closest approach distances to assets/areas. The function involves identifying the threat object state estimate (from the threat O.B. database or from the track file), determining the appropriate state extrapolation method, and extrapolating of the threat object trajectory/envelope. For uncommitted threat objects, this will be the threat system's precommit envelope associated with its launch site or platform location (though this could be refined if there were reliable a priori information about the specific targets against which it is assigned). For inflight threat objects, this will be the expected trajectory and some confidence bound around that expected trajectory, i.e., the threat tube.

#	Requirement Description

F4332-1	Computational resources

F4332-2	Host facilities and/or platforms

OUTPUT

- 1) Areas at risk
- 2) Threat trajectories/envelopes

INPUT

- 1) Decision Aids And Procedures
- 2) Projected Friendly Asset Positions
- 3) Threat Trajectories/Envelopes

F4333 - COMPUTE CLOSEST APPROACH DISTANCES

Description: This function encompasses the processes and means to determine closest approach distances between friendly assets and threat objects based on the projected positions and trajectories/envelopes of each, respectively. The function involves comparing threat trajectories/envelopes to friendly asset projected positions, computing distances over time, and determining the minimum distances between a threat object's expected trajectory and all the assets within (or which enter) its envelope.

Requirement Description

F4333-1 Computational Resources

F4333-2 Host Facilities And/Or Platforms

OUTPUT

- 1) Closest Approach Distances

INPUT 1) Decision Aids And Procedures 2) Asset Vulnerability Data 3) Threat Performance Data 4) Closest Approach Distances	F4334 - COMPARE DISTANCES TO VULNERABLE RADII Description: This function encompasses the processes and means to determine the specific asset(s) at risk from a threat object based on closest approach distance(s) and radii of vulnerability of the asset(s) to the threat object. The function involves assessing friendly asset vulnerable radii (e.g., sure-safe and sure-kill radii) to the estimated destructive power/performance of the threat object, comparing the vulnerable radii to the closest approach distance, determining the expected degree of risk to the friendly asset, and disseminating friendly asset risk reports. <table><tr><td>#</td><td>Requirement Description</td></tr><tr><td>F4334-1</td><td>Computational Resources</td></tr><tr><td>F4334-2</td><td>Host Facilities And/Or Platforms</td></tr></table>	#	Requirement Description	F4334-1	Computational Resources	F4334-2	Host Facilities And/Or Platforms	OUTPUT 1) Assets At Risk (Including Degree Of Risk And Threat Object Or Objects Causing The Risk)
#	Requirement Description							
F4334-1	Computational Resources							
F4334-2	Host Facilities And/Or Platforms							

INPUT

- 1) Decision Aids And Procedures
- 2) Threats Versus Assets/Areas
- 3) Battle Data (S&D And Engagement Activity Reports)
- 4) Object/Event Data (Track File)
- 5) Threat O.B. And Performance
- 6) System Status Data

F434 - EVALUATE BATTLE SITUATION

Description: This function encompasses the processes and means to perform real-time monitoring, assessment, and evaluation of the battle situation to support both decisionmaking and automated battle management. The function includes inferring the attack objectives, monitoring battle activities, performing target kill assessment, estimating aggregate system performance, characterizing the remaining threat, and characterizing the current system capability. As a part of these activities, the function provides information to enhance attack assessment reporting and serves as the control for release of object/event data to external users.

Requirement Description

F434-1	Battle Situation Analysts
F434-2	Man-machine Interfaces For Information Display
F434-3	Computational Resources
F434-4	Host Facilities And Platforms

OUTPUT

- 1) Inferred Attack Objectives (Becomes A Part Of The Attack Assessment)
- 2) Object/Event Data (To Track File And To External Users)
- 3) System And Threat Effectiveness And Capability Assessments (I.E., Aggregate System Performance, Remaining Threat Capability, And Current System Capability)

INPUT 1) Decision Aids And Procedures 2) Threats Versus Assets/Areas 3) Remaining Threat Capability	F4341 - INFER ATTACK OBJECTIVES Description: This function encompasses the processes and means to arrive at a best estimate of the objectives the attacker is attempting to achieve in the unfolding attack, in order to support HA decision making relative to employment of other forces and to provide a basis (with other factors) for revisions of defense preferences. The function involves summarizing the nature and scope of the attack, including threat numbers and timing , as well as assets and functions under attack; summarizing the threat force not yet committed, including defense suppression assets, ballistic missiles, and associated O.B.; assessing possible intentions (unauthorized launch, suppression-only attack, third party attack only, counterforce versus countervalue, etc.), and rendering a best estimate as to the attack objectives. <table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F4341-1</td><td>Situation Assessment Analysts</td></tr><tr><td>F4341-2</td><td>Man-machine Interface For Information Display</td></tr><tr><td>F4341-3</td><td>Computational Resources</td></tr><tr><td>F4341-4</td><td>Host Facilities</td></tr></table>	#	Requirement Description	F4341-1	Situation Assessment Analysts	F4341-2	Man-machine Interface For Information Display	F4341-3	Computational Resources	F4341-4	Host Facilities	OUTPUT 1) Attack Objectives
#	Requirement Description											
F4341-1	Situation Assessment Analysts											
F4341-2	Man-machine Interface For Information Display											
F4341-3	Computational Resources											
F4341-4	Host Facilities											

INPUT

- 1) Decision Aids And Procedures
- 2) System Status Data
- 3) Battle Data (S&D And Engagement Activities)

F4342 - MONITOR BATTLE ACTIVITIES

Description: This function encompasses the processes and means to monitor and summarize the real-time battle activities in order to provide requisite data to support kill assessment, estimation of aggregate system performance, and characterization of the current system capability. The function involves monitoring system status reporting, monitoring S&D activities, monitoring engagement activities, and summarizing the system asset activities as needed to support other SDS functions.

#	Requirement Description

F4342-1	Computational Resources

F4342-2	Situation Analysts And Displays (Optional)

F4342-3	Host Facilities And/Or Platforms

OUTPUT

- 1) System Asset Activity Information And Summaries

INPUT 1) Decision Aids And Procedures 2) System Asset Activity 3) Object/Event Data (Track File)	F4343 - PERFORM TARGET KILL ASSESSMENT Description: This function encompasses the processes and means to develop best estimates of target kill probabilities based on both system asset activity data and object/event data. For each credible threat object, the function involves identifying the S&D threat status estimate, determining if the system responded to the threat, comparing the S&D estimate of the system response information, and fusing the a priori and S&D kill probability estimates to form a best estimate. (Note that it is possible that the S&D estimate of object status might indicate that the threat has been destroyed, but the system has not engaged it, in which case the threat may have failed on its own or the S&D estimate may be false.) Since the assessments performed by this function validate and improve upon the object/event data reporting of the S&D elements, the function serves as a control for release of object/event data to external users and for update of the object status data contained in the track file. <table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F4343-1</td><td>Computational Resources</td></tr><tr><td>F4343-2</td><td>Host Facilities And/Or Platforms</td></tr></table>	#	Requirement Description	F4343-1	Computational Resources	F4343-2	Host Facilities And/Or Platforms	OUTPUT 1) Assessed Killed And Live Threat Objects
#	Requirement Description							
F4343-1	Computational Resources							
F4343-2	Host Facilities And/Or Platforms							

INPUT

- 1) Decision Aids And Procedures
- 2) System Asset Activity
- 3) Assessed Killed And Live
- 4) Threat Objects
- 5) Object/Event Data (Track File)
System Status Data

F4344 - ESTIMATE AGGREGATE PERFORMANCE

Description: This function encompasses the processes and means to estimate aggregate performance measures relevant for decision making and the higher level battle management functions. The function involves determining intercept rates by weapon and target types, leakage rates by engagement phase, unexploited engagement opportunity rates, and attrition rates by system asset type, as needed by the served decision making and battle management functions.

#	Requirement Description

F4344-1	Computational Resources

F4344-2	Situation Analysts And Displays (Optional)

F4344-3	Host Facilities And/Or Platforms

OUTPUT

- 1) Aggregate System
Performance Estimates

INPUT 1) Decision Aids And Procedures 2) Assessed Killed And Live Threat Objects 3) Threats Versus Assets/Areas 4) Threat O.B. And Performance	F4345 - CHARACTERIZE REMAINING THREAT Description: This function encompasses the processes and means to characterize the remaining threat to support the process of inferring the attack objectives, as well as high level battle management functions, such as selection/reselection of engagement strategy and tactics options. The function involves summarizing inflight threat objects, assets still at immediate risk, the uncommitted threat arsenal, and the damage capability of the uncommitted threat, all in a forms appropriate to the using SDS functions. <table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F4345-1</td><td>Computational Resources</td></tr><tr><td>F4345-2</td><td>Situation Analysts And Displays (Optional)</td></tr><tr><td>F4345-3</td><td>Host Facilities And/Or Platforms</td></tr></table>	#	Requirement Description	F4345-1	Computational Resources	F4345-2	Situation Analysts And Displays (Optional)	F4345-3	Host Facilities And/Or Platforms	OUTPUT 1) Remaining Threat Capability
#	Requirement Description									
F4345-1	Computational Resources									
F4345-2	Situation Analysts And Displays (Optional)									
F4345-3	Host Facilities And/Or Platforms									

INPUT

- 1) Decision Aids And Procedures
- 2) System Status Data
- 3) System Asset Activities
- 4) Aggregate System Performance
- 5) Inferred Attack Objectives

F4346 - CHARACTERIZE CURRENT SYSTEM CAPABILITY

Description: This function encompasses the processes and means to characterize the current capability of the SDS to achieve its mission requirements and to deny the attack objectives, in order to support decision making and higher level battle management functions. The function involves determining the status and availability of system resources, determining the battle losses and expenditures, predicting future system performance, and estimating the capability to deny the inferred attack objectives.

Requirement Description

F4346-1	Situation Analysts And Displays (Optional)
F4346-2	Computational Resources
F4346-3	Host Facilities And/Or Platforms

OUTPUT

- 1) Current System Capability

INPUT 1) Decision Aids And Procedures 2) Friendly Force Reports 3) System Status Data 4) Battle Data (S&D And Engagement Activity Reports) 5) Threats Versus Assets/Areas 6) Object/Event Data (Track File And NUDETs)	F435 - DETERMINE DEFENDED ASSET STATUS Description: This function encompasses the processes and means to determine the current activities, vulnerabilities, and survival of defended assets, including SDS assets, in order to support implementation of various forms of engagement strategies and tactics, particularly preferential defense and self defense strategies/tactics. The function includes monitoring defended asset status data reporting, computing or inferring damage expectancies, and updating the defended asset data. # Requirement Description F435-1 Computational Resources F435-2 Host Facilities And/Or Platforms	OUTPUT 1) Defended Asset Status

INPUT

- 1) Decision aids and procedures
- 2) Friendly force reports
- 3) System status data
- 4) Battle data (S&D and engagement activity reports)
- 5) Previous update of defended asset status

F4351 - MONITOR DEFENDED ASSET STATUS

Description: This function encompasses the processes and means to characterize the current criticality and vulnerability of defended asset, including SDS assets, on the basis of reported status and plans. The function involves monitoring system asset status and activities, monitoring other defended asset status and plans reporting, and characterizing the current criticality and vulnerability of the defended assets based on that data.

#	<u>Requirement Description</u>
F4351-1	Computational resources
F4351-2	Host facilities and/or platforms

OUTPUT

- 1) Defended Asset Activity
- 2) Defended Asset Vulnerability

INPUT 1) Decision Aids And Procedures 2) Defended Asset Vulnerability 3) Threats Versus Assets/Areas 4) Object/Event Data (Track File And NUDETs) 5) Friendly Force Reports 6) System Status Data	F4352 - COMPUTE AND INFER DAMAGE EXPECTANCIES Description: This function encompasses the processes and means to determine or estimate the survival of defended assets based on their current vulnerabilities, NUDET event data, and continuation or cessation of reporting from assets. The function involves computing damage expectancies from NUDET event data, inferring damage from cessation of reporting, and aggregating the computed and inferred damage estimates to provide best estimates. # Requirement Description F4352-1 Computational Resources F4352-2 Host Facilities And/Or Platforms	OUTPUT 1) Defended Asset Damage Expectancies

INPUT

- 1) Decision Aids And Procedures
- 2) Defended Asset Activity
- 3) Defended Asset Vulnerability
- 4) Defended Asset Damage Expectancy

F4353 - UPDATE DEFENDED ASSET DATA

Description: This function encompasses the processes and means to update the real-time databases of defended asset status. The function involves updating asset criticality indices, asset vulnerability parameters, and asset damage expectancy.

#	<u>Requirement Description</u>
F4353-1	Computational Resources
F4353-2	Host Facilities And/Or Platforms

OUTPUT

- 1) Current Defended Asset Data
(In A Form Needed By
Supported Functions)

INPUT 1) Current ROEs 2) Current Defense Preferences 3) Strategy Selection Overrides 4) Situation Data 5) System Status Data 6) Object/Event Data	F44 - SELECT DEFENSIVE RESPONSE Description: This high level function encompasses the processes and means for selecting the desired response of the SDS to the existence of threat objects and events relevant to the system. The function includes identifying ROE-imposed constraints on SDS actions, selecting a preferred engagement strategy, selecting preferred engagement tactics, and selecting preferred countermeasure tactics. # <u>Requirement Description</u> F44-1 Response Selection Computational Resources F44-2 Host Facilities And/Or Platforms F44-3 Communications Or Interfaces With Other Functions Of The Employ SDS Function	OUTPUT 1) Engagement Strategy Nominations 2) Response Parameters

INPUT

- 1) Current ROEs
- 2) Situation Data
- 3) Object/Event Data
- 4) System Status Data

F441 - IDENTIFY ROE-IMPOSED CONSTRAINTS

Description: This function encompasses the processes and means to determine in real time the constraints on allowable SDS actions which are imposed due to the current set of ROEs and the situation dynamics. The function includes determining satisfaction of ROE conditions (and hence the specific ROE constructs invoked) based on situation and other data, determining which if any of the ROEs are superseded by other invoked ROEs, and determining the union of constraints from the remaining invoked ROEs.

Requirement Description

F441-1 Computational Resources

OUTPUT

- 1) ROE Constraints

INPUT 1) Current ROEs 2) Situation Data 3) Object/Event Data 4) System Status Data	F4411 - DETERMINE SATISFACTION OF ROE CONDITIONS Description: This function encompasses the processes and means to identify in real time the specific ROEs which are invoked by satisfaction of the conditional part of the ROE construct. The function involves identifying the data needed to determine ROE conditions, extracting the data from system reporting and databases, converting the data as needed for ROE evaluation, determining which ROEs are invoked, and identifying those ROEs. # Requirement Description F4411-1 Computational Resources	OUTPUT 1) ROEs With Satisfied Conditions

INPUT

- 1) Current ROEs
- 2) ROEs With Satisfied Conditions

F4412 - DETERMINE SUPERSEDED ROES

Description: This function encompasses the processes and means to identify and disinvoke ROEs which are superseded by other invoked ROEs. The function involves identifying invoked ROEs which override other ROEs, identifying which if any of the invoked ROEs are thereby overridden, and disinvoking those

Requirement Description

F4412-1 Computational Resources

OUTPUT

- 1) Remaining Invoked ROEs

INPUT 1) Current ROEs 2) Remaining Invoked ROEs	F4413 - DETERMINE UNION OF ROE CONSTRAINTS Description: This function encompasses the processes and means to identify and disseminate as required the constraints associated with the remaining invoked ROEs. The function involves extracting the constraints from the remaining invoked ROEs, determining the disallowed (or allowed) engagement and countermeasure actions associated with those ROE constraints, and disseminating the ROE-imposed constraints to other SDS functions. <table><thead><tr><th>#</th><th><u>Requirement Description</u></th></tr></thead><tbody><tr><td>F4413-1</td><td>Computational Resources</td></tr></tbody></table>	#	<u>Requirement Description</u>	F4413-1	Computational Resources	OUTPUT 1) ROE Constraints
#	<u>Requirement Description</u>					
F4413-1	Computational Resources					

INPUT

- 1) ROE Constraints
- 2) Defense Preferences
- 3) Strategy Overrides
- 4) Situation Data
- 5) Object/Event Data

F442 - SELECT STRATEGY OPTION

Description: This function encompasses the processes and means to select, nominate, and specify a preferred, allowable engagement strategy in accordance with defense preferences and situation and other data, as well as to implement a strategy override from the positive control function of the SDS. The select strategy function includes determining allowable strategy options in relation to ROE constraints, computing strategy selection metrics, nominating a preferred strategy option, implementing strategy selection overrides as required, and specifying the governing strategy.

Requirement Description

F442-1 Strategy Selection Resources (Computational Resources And/Or Personnel)

F442-2 Host Facilities And/Or Platforms

OUTPUT

- 1) Engagement Strategy Nomination
- 2) Strategy Selection (And Specification)

INPUT 1) ROE Constraints	F4421 - DETERMINE ALLOWABLE STRATEGY OPTIONS Description: This function encompasses the processes and means to identify which of the potential strategy options are allowable under the current ROE-imposed constraints. The function involves identifying actions involved in each strategy option, comparing those actions against ROE-imposed constraints to determine precluded strategy options, and identifying remaining allowed strategy options. <table> <tr> <th>#</th><th><u>Requirement</u></th><th><u>Description</u></th></tr> <tr> <td>F4421-1</td><td>Strategy Selection</td><td>Resources</td></tr> <tr> <td>F4421-2</td><td>Host Facilities And/Or</td><td>Platforms</td></tr> </table>	#	<u>Requirement</u>	<u>Description</u>	F4421-1	Strategy Selection	Resources	F4421-2	Host Facilities And/Or	Platforms	OUTPUT 1) Set Of Allowed Strategy Options
#	<u>Requirement</u>	<u>Description</u>									
F4421-1	Strategy Selection	Resources									
F4421-2	Host Facilities And/Or	Platforms									

INPUT

- 1) Defense Preferences
- 2) Set Of Allowed Strategy Options
- 3) Situation Data
- 4) Object/Event Data
- 5) Previous Strategy Selection (# Applicable)

F4422 - COMPUTE STRATEGY SELECTION METRICS

Description: This function encompasses the processes and means to assess goodness metrics for allowed strategy options in relation to defense preferences, situation and other data, and the previous strategy selection (if applicable). The function involves determining the particular method(s) to assess goodness metrics, determining data needed to assess the metrics, extracting required data from system reporting and databases, converting the data as needed to calculate goodness metrics, and actual calculating of the metrics for the set of allowed strategy options.

Requirement Description

F4422-1 Strategy Selection Resources

F4422-2 Host Facilities And/Or Platforms

OUTPUT

- 1) Assessed Goodness Metrics For Allowed Strategy Options

INPUT 1) Set Of Allowed Strategy Options 2) Assessed Goodness Metrics	F4423 - NOMINATE PREFERRED STRATEGY OPTION Description: This function encompasses the processes and means to identify and nominate a preferred, allowable strategy option based on the assessed goodness metrics. The function involves rank ordering of allowed strategy options in accordance with each of the (possibly many) goodness metrics, identifying and eliminating dominated strategy options (i.e., those which rank lower than at least one other strategy option with respect to all the metrics), weighting the relative importance of the selection metrics, and identifying and nominating the strategy option which is preferred relative to the complete set of weighted metrics. <table><tr><th>#</th><th><u>Requirement Description</u></th></tr><tr><td>F4423-1</td><td>Strategy Selection Resources</td></tr><tr><td>F4423-2</td><td>Host Facilities And/Or Platforms</td></tr></table>	#	<u>Requirement Description</u>	F4423-1	Strategy Selection Resources	F4423-2	Host Facilities And/Or Platforms	OUTPUT 1) Engagement Strategy Nomination
#	<u>Requirement Description</u>							
F4423-1	Strategy Selection Resources							
F4423-2	Host Facilities And/Or Platforms							

INPUT

- 1) Strategy Override Message
- 2) Engagement Strategy Nomination

F4424- IMPLEMENT STRATEGY SELECTION OVERRIDE (AS REQUIRED)

Description: This function encompasses the processes and means to implement strategy selection overrides whenever they are commanded from the positive control function of the SDS. The function involves monitoring and receiving a strategy selection override message from the positive control cell, authenticating the override command, and providing the associated alternative strategy for specification in lieu of the nominated strategy.

Requirement Description

F4424-1	Strategy Selection Resources
F4424-2	Host Facilities And/Or Platforms

OUTPUT

- 1) Alternative Strategy For Specification

INPUT 1) Nominated Or Alternative (Override) Strategy Selection 2) Defense Preferences 3) Situation Data 4) Object/Event Data	F4425 - SPECIFY GOVERNING STRATEGY Description: This function encompasses the processes and means to specify the governing strategy (i.e., the nominated strategy or the alternative strategy associated with a strategy selection override, as applicable) in terms of response parameters needed as inputs by other SDS functions. The function involves specifying the strategy option identification, the associated target/threat value computation method, the weapons withhold requirements, and other strategy specific constraints as applicable. <table> <thead> <tr> <th>#</th><th>Requirement Description</th></tr> </thead> <tbody> <tr> <td>F4425-1</td><td>Strategy Selection Resources</td></tr> <tr> <td>F4425-2</td><td>Host Facilities And/Or Platforms</td></tr> </tbody> </table>	#	Requirement Description	F4425-1	Strategy Selection Resources	F4425-2	Host Facilities And/Or Platforms
#	Requirement Description						
F4425-1	Strategy Selection Resources						
F4425-2	Host Facilities And/Or Platforms						
	OUTPUT 1) Specified Engagement Strategy Selection						

INPUT

- 1) Roe Constraints
- 2) Engagement Strategy Selection
- 3) Defense Preferences
- 4) System Status Data
- 5) Situation Data
- 6) Object/Event Data

F443 - SELECT ENGAGEMENT TACTICS

Description: This function encompasses the processes and means to select and specify preferred, allowed engagement tactics in relation to ROE constraints, the engagement strategy selection, defense preferences, and situation and other data. The function includes determining allowed engagement actions, determining compatible engagement action sets, computing engagement tactics selection metrics, and selecting and specifying governing engagement tactics.

#	<u>Requirement Description</u>

F443-1	Computational Resources

F443-2	Host Facilities And/Or Platforms

OUTPUT

- 1) Engagement Tactics Selection (And Specification)

INPUT 1) ROE Constraints 2) Selected Engagement Strategy	F4431 - DETERMINE ALLOWABLE ENGAGEMENT ACTIONS Description: This function encompasses the processes and means to identify the potential engagement actions which are allowed by the ROE-imposed constraints and the strategy selection. The function involves comparing engagement actions against ROE constraints, comparing engagement actions against the specified engagement strategy, determining precluded actions, and identifying remaining allowed engagement actions. <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4431-1</td><td>Computational Resources</td></tr><tr><td>F4431-2</td><td>Host Facilities And/Or Platforms</td></tr></tbody></table>	#	Requirement Description	F4431-1	Computational Resources	F4431-2	Host Facilities And/Or Platforms	OUTPUT 1) Allowed Engagement Actions
#	Requirement Description							
F4431-1	Computational Resources							
F4431-2	Host Facilities And/Or Platforms							

INPUT

- 1) Allowed Engagement Actions
- 2) System Status Data

F4432 - DETERMINE COMPATIBLE ENGAGEMENT ACTION SETS

Description: This function encompasses the processes and means to identify and sequence compatible sets of allowed engagement actions. The function involves determining mutually exclusive and mutually compatible engagement actions, formulating sets of mutually compatible engagement actions, and sequencing the actions in each compatible set.

#	<u>Requirement Description</u>

F4432-1	Computational Resources

F4432-2	Host Facilities And/Or Platforms

OUTPUT

- 1) Logically Compatible, Sequenced Sets Of Allowable Engagement Actions

INPUT 1) Compatible Sets Of Allowed Engagement Actions 2) Defense Preferences 3) System Status Data 4) Situation Data 5) Object/Event Data 6) Previously Selected Engagement Tactics	F4433 - COMPUTE ENGAGEMENT TACTICS SELECTION METRICS Description: This function encompasses the processes and means to assess goodness metrics for the compatible sets of allowed engagement actions in relation to defense preferences, situation and other data, and previously selected engagement tactics. The function involves determining the method(s) to assess goodness of action sets, determining the data needed to assess the goodness metrics, extracting the required data from system reporting and databases, converting the data as needed to calculate the metrics, and actual calculating of the goodness metrics. <table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F4433-1</td><td>Computational Resources</td></tr><tr><td>F4433-2</td><td>Host Facilities And/Or Platforms</td></tr></table>	#	Requirement Description	F4433-1	Computational Resources	F4433-2	Host Facilities And/Or Platforms	OUTPUT 1) Assessed Goodness Metrics For Compatible Sets Of Allowed Engagement Actions
#	Requirement Description							
F4433-1	Computational Resources							
F4433-2	Host Facilities And/Or Platforms							

INPUT

- 1) Compatible Sets Of Allowed Engagement Actions
- 2) Defense Preferences
- 3) Assessed Goodness Metrics
- 4) Situation Data
- 5) Object/Event Data
- 6) System Status Data

F4434 - SELECT/SPECIFY GOVERNING ENGAGEMENT TACTICS

Description: This function encompasses the processes and means to select and specify the governing engagement tactics based on the assessed goodness metrics and data needed to specify the tactics. The function involves rank ordering of the compatible engagement action sets in accordance with each of the goodness metrics, eliminating dominated action sets, weighting the relative importance of the selection metrics based on defense preferences and other data, selecting engagement action set(s) which is (are) preferred based on all the weighted goodness metrics, and specifying the selected engagement action set(s). The specification includes the specific engagement actions and sequence(s), battle space partitioning criteria, platform preference parameters, weapons commit thresholds, required confidence of kill, and other engagement tactics parameters as applicable.

#	Requirement Description

F4434-1	Computational Resources

F4434-2	Host Facilities And/Or Platforms

OUTPUT

- 1) Engagement Tactics Selection (And Specification)

INPUT 1) ROE Constraints 2) Selected Engagement Strategy 3) Defense Preferences 4) Selected Engagement Tactics 5) System Status Data 6) Situation Data 7) Object/Event Data	F444 - SELECT COUNTERMEASURES TACTICS Description: This function encompasses the processes and means to select and specify allowable countermeasures tactics in accordance with ROE-imposed constraints, the selected engagement strategy, defense preferences, the selected engagement tactics, and situation and other data. The function includes determining allowable countermeasure actions, determining compatible countermeasure action sets, computing countermeasure tactics selection metrics, and selecting and specifying the governing countermeasure tactics. # Requirement Description F444-1 Computational Resources F444-2 Host Facilities And/Or Platforms	OUTPUT 1) Countermeasure Tactics Selection (And Specification)

INPUT

- 1) ROE Constraints
- 2) Selected Engagement Strategy
- 3) Selected Engagement Tactics

F4441 - DETERMINE ALLOWABLE COUNTER-MEASURE ACTIONS

Description: This function encompasses the processes and means to identify the potential countermeasure (CM) actions which are allowed under the current ROE-imposed constraints and the selected engagement strategy and which are compatible with the selected engagement tactics. The function involves comparing potential CM actions against ROE constraints, the specified strategy, and the specified engagement tactics to determine precluded CM actions and to identify remaining allowed CM actions.

#	<u>Requirement Description</u>

F4441-1	Computational Resources

F4441-2	Host Facilities And/Or Platforms

OUTPUT

- 1) Allowable Countermeasure Actions

INPUT 1) Allowable Countermeasure Actions 2) System Status Data	F4442 - DETERMINE COMPATIBLE COUNTER-MEASURE ACTION SETS Description: This function encompasses the processes and means to identify and sequence compatible sets of allowed CM actions. The function involves determining mutually exclusive and mutually compatible CM actions, formulating sets of mutually compatible CM actions, and sequencing the actions in each set. <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4442-1</td><td>Computational Resources</td></tr><tr><td>F4442-2</td><td>Host Facilities And/Or Platforms</td></tr></tbody></table>	#	Requirement Description	F4442-1	Computational Resources	F4442-2	Host Facilities And/Or Platforms	OUTPUT 1) Logically Compatible And Sequenced Sets Of Allowable Countermeasure Actions
#	Requirement Description							
F4442-1	Computational Resources							
F4442-2	Host Facilities And/Or Platforms							

INPUT

- 1) Compatible Sets Of Allowed Countermeasure Actions
- 2) Defense Preferences
- 3) Selected Engagement Tactics
- 4) System Status Data
- 5) Situation Data
- 6) Object/Event Data
- 7) Previously Selected Countermeasure Tactics

F4443 - COMPUTE COUNTERMEASURE TACTICS SELECTION METRICS

Description: This function encompasses the processes and means to assess goodness metrics for compatible sets of allowed CM actions in relation to defense preferences, situation and other data, and previously selected countermeasure tactics as applicable. The function involves determining the method(s) to assess goodness of CM action sets, determining the associated data needed to assess the goodness metrics, extracting the data from system reporting and databases, converting the data as needed to calculate the metrics, and actual calculating of the goodness metrics for the compatible CM action sets.

Requirement Description

F4443-1 Computational Resources

F4443-2 Host Facilities And/Or Platforms

OUTPUT

- 1) Assessed Goodness Metrics For Compatible Countermeasure Action Sets

INPUT 1) Compatible Sets Of Allowed Countermeasure Actions 2) Defense Preferences 3) Assessed Goodness Metrics For Sets Of Countermeasure Actions 4) Selected Engagement Tactics 5) System Status Data 6) Situation Data 7) Object/Event Data	F4444 - SELECT/SPECIFY GOVERNING COUNTERMEASURE TACTICS Description: This function encompasses the processes and means to select and specify the countermeasure tactics in relation to the assessed goodness metrics, defense preferences, and situation and other data. The function involves rank ordering the sets of compatible CM actions in accordance with each goodness metric, eliminating dominated CM action sets, weighting the relative importance of the goodness metrics, selecting a preferred CM action set(s) with respect to all the goodness metrics, and specifying the selected countermeasure tactics. The specification includes the specific CM actions and sequence(s), survival goals by system function, asset/platform level survival goals, thresholds for use of expendable CM resources, engagement-versus-CM deconfliction criteria, and other countermeasure tactics parameters as applicable. # Requirement Description F4444-1 Computational Resources F4444-2 Host Facilities And/Or Platforms	OUTPUT 1) Countermeasure Tactics Selection (And Specification)

INPUT

- 1) Defensive Response Selection Parameters
- 2) System Mode Selection
- 3) Situation Data
- 4) System Status Data
- 5) Object/Event Data (Track File)
- 6) Threat Objects

F45 - EXECUTE DEFENSIVE RESPONSE

Description: This high level function encompasses the processes and means to execute the preferred defensive response as allowed by the system mode selection in effect. The function includes assignment of values to targets/threats, allocation of targets/threats for engagement, assignment of system resources for engagement, actual engagement of targets/threats as authorized, and employment of countermeasures as authorized.

Requirement Description

F45-1	Battle Management Computational Resources
F45-2	Engagement Weapons And Fire Control
F45-3	Countermeasures Capabilities

OUTPUT

- 1) Engagement Activity Reports
- 2) Kill Assessment Observables Collection Requests
- 3) Destroyed And Residual Threats
- 4) Engagement Losses And Expenditures

INPUT 1) Target Value Computation Method (Part Of Response Parameters) 2) Situation Data 3) Track File	F451 - ASSIGN VALUES TO TARGETS/THREATS Description: This function encompasses the processes and means to assign engagement value scores to target or threat objects in support of engagement allocation. The function includes obtaining or inferring threat value parameters, computing current threat value, and extrapolating the value into the future. <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F451-1</td><td>Computational Resources</td></tr><tr><td>F451-2</td><td>Host Facilities And/Or Platforms</td></tr></tbody></table>	#	Requirement Description	F451-1	Computational Resources	F451-2	Host Facilities And/Or Platforms	OUTPUT 1) Target/Threat Values (Over Time)
#	Requirement Description							
F451-1	Computational Resources							
F451-2	Host Facilities And/Or Platforms							

INPUT

- 1) Target value computation method
- 2) Situation data
- 3) Track file

F4511 - OBTAIN OR INFER TARGET/THREAT VALUE PARAMETERS

Description: This function encompasses the processes and means to obtain or infer the parameters needed to compute target/threat value. The function involves identifying the data needed to compute target/threat value in accordance with the selected target value computation method, extracting available data from system reporting and databases, identifying missing data, and determining and executing the method(s) to estimate or infer the missing data.

Requirement Description

F4511-1 Computational resources

F4511-2 Host facilities and/or platforms

OUTPUT

- 1) Value parameters for computation of target/threat value

INPUT 1) Target Value Computation Method 2) Value Parameters	F4512 - COMPUTE CURRENT TARGET/THREAT VALUE Description: This function encompasses the processes and means to compute the current target/threat value in accordance with the selected method and the value parameters. The function involves, as applicable to the selected method, computing the land area/asset at risk component, the destructive power/asset kill probability component, the current accumulated probability of kill for the object due to weapons already committed against it, the remaining engagement time component, any special engagement strategy or tactics components, and the aggregation of the value computation components. <table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F4512-1</td><td>Computational Resources</td></tr><tr><td>F4512-2</td><td>Host Facilities And/Or Platforms</td></tr></table>	#	Requirement Description	F4512-1	Computational Resources	F4512-2	Host Facilities And/Or Platforms	OUTPUT 1) Current Target/Threat Value
#	Requirement Description							
F4512-1	Computational Resources							
F4512-2	Host Facilities And/Or Platforms							

INPUT

- 1) Target Value Computation Method
- 2) Value Parameters
- 3) Current Target/Threat Value
- 4) Track File

F4513 - EXTRAPOLATE TARGET/THREAT VALUES INTO FUTURE

Description: This function encompasses the processes and means to extrapolate target/threat values into the future in accordance with the selected target value computation method and the value parameters. Depending on the selected value computation method, the function involves estimating future times of object type and status changes, estimating future last engagement opportunity times, and computing the aggregate threat value extrapolation.

#	<u>Requirement Description</u>
F4513-1	Computational Resources
F4513-2	Host Facilities And/Or Platforms

OUTPUT

- 1) Target/Threat Values (Over Time)

INPUT 1) Strategy And Tactics Selections 2) Target/Threat Values 3) Platform Preference Parameters 4) Weapon Commit Thresholds 5) System Status Data	F452 - ALLOCATE TARGETS/THREATS FOR ENGAGEMENT Description: This function encompasses the processes and means to allocate targets/threats for engagement by the SDS based on parameters from the defensive response selection. The function includes partitioning the battle space, identifying feasible weapon/target pairings, computing the weapon/target payoffs and where they are optimized in time, and selecting a preferred allocation with associated objective firing times. <table><tr><th>#</th><th><u>Requirement Description</u></th></tr><tr><td>F452-1</td><td>Computational Resources</td></tr><tr><td>F452-2</td><td>Host Facilities And/Or Platforms</td></tr></table>	#	<u>Requirement Description</u>	F452-1	Computational Resources	F452-2	Host Facilities And/Or Platforms	OUTPUT 1) Target/Threat Allocation
#	<u>Requirement Description</u>							
F452-1	Computational Resources							
F452-2	Host Facilities And/Or Platforms							

INPUT

- 1) Strategy And Tactics Selection
- 2) System Status Data
- 3) Track File

F4521 - PARTITION BATTLE SPACE IAW ENGAGEMENT STRATEGY/TACTICS

Description: This function encompasses the processes and means to partition the battle space in order to avoid span of control problems and to reduce and level the data distribution and processing loads associated with battle management. The function includes identifying the relevant type of battle space partitioning, identifying the preferred size and scope of the partitions, mapping the targets/threats into the partitions, and mapping the SDS engagement and engagement support resources into the partitions.

#	Requirement Description

F4521-1	Computational Resources

F4521-2	Host Facilities And/Or Platforms

OUTPUT

- 1) Battle Space Partitions

INPUT 1) Battle Space Partitions 2) System Status Data 3) Track File	F4522 - IDENTIFY FEASIBLE WEAPON ASSET/ TARGET PAIRINGS AND TIMES Description: This function encompasses the processes and means to identify feasible weapon/target pairings and times within the battle space partitions based on the trajectories of the targets/threats, the positions and motions of weapon platforms, and the weapon engagement envelopes. The function involves determining the appropriate extrapolation methods, extrapolating the threat object and weapon platform positions and the weapon envelopes into the future, and estimating the engagement opportunity windows, as defined by the earliest and latest engagement times. # Requirement Description F4522-1 Computational Resources F4522-2 Host Facilities And/Or Platforms	OUTPUT 1) Feasible Weapon Asset/Target Pairings Over Time

INPUT 1) Target/Threat Values 2) Platform Preference Parameters 3) Feasible Weapon Asset/Target Pairing Over Time 4) Track File 5) System Status Data 6) Situation Data 7) Last Target/Threat Allocation	F4523 - ASSESS PAYOFF OF FEASIBLE PAIRINGS AND TIMES Description: This function encompasses the processes and means to estimate the engagement payoffs over time for each of the feasible weapon asset/target pairings. The function involves receiving the time-dependent target/threat values, estimating the single-shot probabilities of kill over time, estimating the platform preferences over time, computing aggregate expected payoffs over time, determining the times when the weapon/target pairing payoffs are maximized, and determining the sensitivities of the optimum firing times, as applicable to the particular engagement phase allocation algorithms. # Requirement Description F4523-1 Computational Resources F4523-2 Host Facilities And/Or Platforms	OUTPUT 1) Weapon/Target Pairing Payoffs Over Time

INPUT 1) Strategy And Tactics Selection 2) Weapon Commit Thresholds 3) Weapon/Target Pairing Payoffs Over Time	F4524 - SELECT PREFERRED ALLOCATION AND FIRING TIMES Description: This function encompasses the processes and means to select a set of preferred target/threat allocations and engagement times based on the selected engagement strategy/tactics, weapon/target pairing payoffs, and weapon commit thresholds. The function involves determining the time budget for solving the allocation problem, identifying primary and fallback allocation algorithms, loading and executing the allocation algorithms, determining satisfactory algorithm completion at the end of the time budget, identifying the allocation from the primary or backup algorithm (depending upon satisfactory completion), and appending associated payoff and objective firing time data to the allocation for use in assigning weapons firing sequences. <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4524-1</td><td>Computational Resources</td></tr><tr><td>F4524-2</td><td>Host Facilities And/Or Platforms</td></tr></tbody></table>	#	Requirement Description	F4524-1	Computational Resources	F4524-2	Host Facilities And/Or Platforms	OUTPUT 1) Target/Threat Allocation
#	Requirement Description							
F4524-1	Computational Resources							
F4524-2	Host Facilities And/Or Platforms							

INPUT

- 1) Target/Threat Allocation
- 2) Specified Engagement Actions
- 3) System Status Data
- 4) Track File

F453 - ASSIGN RESOURCES FOR ENGAGEMENT

Description: This function encompasses the processes and means to assign and task SDS resources in order to engage the allocated targets and threats. This function includes assigning weapon firing sequences, assigning fire control requirements, requesting or assigning target designation requirements, and requesting kill assessment observables collection. The resources are tasked based on their availability and constraints, the selected engagement tactics, and the preferred set of target/threat allocations.

#	Requirement Description
F453-1	Computational Resources
F453-2	Host Facilities And/Or Platforms

OUTPUT

- 1) Engagement Asset Taskings
- 2) Kill Assessment Collection Requests

INPUT 1) Target/Threat Allocation 2) Specified Engagement Actions 3) System Status Data 4) Track File	F4531 - ASSIGN WEAPON FIRING SEQUENCE Description: This function encompasses the processes and means to assign and task the weapon firing sequence for weapon platforms/sites. The function involves receiving the target/threat allocation and associated data, determining the weapon platform/site firing rate constraints, determining a firing sequence to optimize the net defense payoff, assigning specific weapons for the selected sequence, and tasking the weapon assets. <table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F4531-1</td><td>Computational Resources</td></tr><tr><td>F4531-2</td><td>Host Facilities And/Or Platforms</td></tr></table>	#	Requirement Description	F4531-1	Computational Resources	F4531-2	Host Facilities And/Or Platforms	OUTPUT 1) Weapon Firing Taskings
#	Requirement Description							
F4531-1	Computational Resources							
F4531-2	Host Facilities And/Or Platforms							

INPUT

- 1) Specified Engagement Actions
- 2) Weapon Firing Taskings
- 3) System Status Data
- 4) Track File

F4532 - ASSIGN FIRE CONTROL REQUIREMENTS

Description: This function encompasses the processes and means to assign fire control requirements based on the specified engagement actions and weapon firing sequence taskings (and the particular weapon fire control requirements). This function involves monitoring specific weapon firing taskings, determining fire control requirements in accordance with the selected engagement tactics, determining available fire control assets, and assigning and tasking the fire control assets.

Requirement Description

F4532-1 Computational Resources

F4532-2 Host Facilities And/Or Platforms

OUTPUT

- 1) Fire Control Taskings

INPUT 1) Specified Engagement Actions 2) Weapon Firing Taskings 3) Track File 4) System Status Data	F4533 - REQUEST/ASSIGN TARGET DESIGNATION REQUIREMENTS Description: This function encompasses the processes and means to request or assign target designation requirements based on the weapon firing sequence taskings and the specified engagements actions. This function involves monitoring the specific weapon firing taskings, determining target designation requirements in accordance with the selected engagement tactics, determining available target designation assets, requesting or assigning the target designation responsibilities, and ultimately tasking target designation assets. <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4533-1</td><td>Computational Resources</td></tr><tr><td>F4533-2</td><td>Host Facilities And/Or Platforms</td></tr></tbody></table>	#	Requirement Description	F4533-1	Computational Resources	F4533-2	Host Facilities And/Or Platforms	OUTPUT 1) Target Designation Taskings
#	Requirement Description							
F4533-1	Computational Resources							
F4533-2	Host Facilities And/Or Platforms							

INPUT

- 1) Specified Engagement Actions
- 2) Weapon Firing Taskings
- 3) Track File
- 4) System Status Data

F4534 - REQUEST KILL ASSESSMENT OBSERVABLES COLLECTION

Description: This function encompasses the processes and means to request kill assessment observables collection based on the specific weapon firing sequence taskings and the specified engagement actions. The function involves monitoring the weapon firing taskings, determining kill assessment observables collection requirements in accordance with the selected engagement tactics, and requesting S&D kill assessment observables collection.

#	Requirement Description

F4534-1	Computational Resources

F4534-2	Host Facilities And/Or Platforms

OUTPUT

- 1) Kill Assessment Collection Requests

INPUT

- 1) Alert Level
- 2) Weapon Firing Taskings
- 3) Engagement Enablement
- 4) Fire Control Tasking
- 5) Target Designation Tasking
- 6) Track Files
- 7) Threat Object

F454 - ENGAGE TARGETS/THREATS

Description: This function encompasses the processes and means to engage the threats and targets based on the weapon firing taskings and in accordance with the alert levels and engagement enablements. This function includes preparing and orienting the weapon, firing the weapon, providing needed guidance or aiming corrections, designating the target, and completing the target intercept. This function requires specific release authority from the positive control cell in order to engage the targets and threats.

#	Requirement Description
F454-1	Message Authentication Means
F454-2	Weapon Subsystem
F454-3	Fire Control Subsystem
F454-4	Host Facilities And/Or Platforms

OUTPUT

- 1) Weapon And Fire Control Activities Reports
- 2) Destroyed Or Residual Threat
- 3) Weapon Expenditure

INPUT

- 1) Alert Level
- 2) Weapon Firing Tasking
- 3) Track File

F4541 - PREPARE AND ORIENT WEAPON

Description: This function encompasses the processes and means to complete preparation of weapons platforms/sites and weapons for firing, based on the SDS alert level and weapon firing taskings. The function involves authenticating the alert level and firing tasking commands, computing required weapon orientation, and, if authorized, loading data into the weapon, loading weapon energy production components (e.g., for directed energy weapons), loading other weapon components as needed (e.g., cryogenics for infrared seekers), and completing weapon preparation and orientation (e.g., disconnect cables and hoses on interceptors).

#	<u>Requirement Description</u>
F4541-1	Message Authentication Means
F4541-2	Weapon Subsystem
F4541-3	Host Platform Or Site

OUTPUT

- 1) Prepared Weapon

INPUT 1) Engagement Enablement 2) Weapon Firing Taskings 3) Prepared Weapons	F4542 - FIRE WEAPON Description: This function encompasses the processes and means to fire an SDS weapon. The function involves authenticating weapon firing enablement, starting the energy or mass delivery component if authorized, and controlling the output of that component. The function requires release authority from the positive control cell. <table><tr><th>#</th><th><u>Requirement Description</u></th></tr><tr><td>F4542-1</td><td>Message Authentication Means</td></tr><tr><td>F4542-2</td><td>Weapon Subsystem</td></tr></table>	#	<u>Requirement Description</u>	F4542-1	Message Authentication Means	F4542-2	Weapon Subsystem	OUTPUT 1) Fired Weapon 2) Weapon Expenditure
#	<u>Requirement Description</u>							
F4542-1	Message Authentication Means							
F4542-2	Weapon Subsystem							

INPUT

- 1) Engagement Enablement
- 2) Fire Control Tasking
- 3) Fired Weapon
- 4) Track Files

F4543 - PROVIDE NEEDED GUIDANCE OR AIMING CORRECTIONS

Description: This function encompasses the processes and means to provide the weapon with needed guidance or aiming corrections based on the fire control taskings, engagement enablement, and track file data. This requires an extrapolation of the target state vector (from the track file or fire control subsystem) and the weapon state vector (from the track file, the weapon's own navigation means, or a separate fire control subsystem) in order to predict a new intercept point. This function may also include providing the weapon with antenna steering commands to control the weapon from the primary or secondary platforms. In general, the function requires authentication of guidance/aiming enablement before updates are allowed to be provided to the weapon. The weapon must also be able to execute the guidance or aiming correction.

#	Requirement Description
F4543-1	Message Authentication Means
F4543-2	Fire Control Subsystem
F4543-3	Weapon Subsystem

OUTPUT

- 1) Corrected Weapons

INPUT 1) Engagement Enablement 2) Target Designation Tasking 3) Corrected Weapon 4) Track Files 5) Threat Object	F4544 - DESIGNATE TARGET FOR INTERCEPT Description: This function encompasses the processes and means to provide the weapon with a designation of the target before the lethal energy delivery time is reached in order for the weapon to complete its intercept. The function involves authenticating target designation enablement, extrapolating positions of the target and other objects, optionally associating signature data with the target and other objects, and execution of the designation if authorized. Target designation may be by a target object map or similar means, by semi-active designation, or by fully active designation. <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4544-1</td><td>Message Authentication Means</td></tr><tr><td>F4544-2</td><td>Fire Control/Target Designation Subsystem</td></tr><tr><td>F4544-3</td><td>Weapon Subsystem</td></tr></tbody></table>	#	Requirement Description	F4544-1	Message Authentication Means	F4544-2	Fire Control/Target Designation Subsystem	F4544-3	Weapon Subsystem	OUTPUT 1) Designated Target
#	Requirement Description									
F4544-1	Message Authentication Means									
F4544-2	Fire Control/Target Designation Subsystem									
F4544-3	Weapon Subsystem									

INPUT

- 1) Designated Target
- 2) Corrected Weapons
- 3) Threat Object

F4545 - COMPLETE THE INTERCEPT

Description: This function encompasses the processes and means to complete the weapon intercept in order to destroy or negate the target. This function involves acquiring and identifying the target with a weapon sensor(s), determining relative positions and velocities, computing final corrections for intercept, executing final maneuvers or aiming corrections, and delivering lethal energy to the target. It can also include employing lethality enhancers as in the case of a kinetic energy weapon.

#	Requirement Description
F4545-1	Weapon Sensor Subsystem
F4545-2	Weapon Subsystem

OUTPUT

- 1) Destroyed Or Residual Threat

INPUT 1) Specified countermeasure actions 2) Alert level 3) Countermeasure enablements 4) Engagement asset taskings 5) Track file 6) Residual threats	F455 - EMPLOY COUNTERMEASURES Description: This function encompasses the processes and means to assign and employ the countermeasure resources in order to mitigate attempted suppression of the SDS. The function includes resolving conflicts between engagement and countermeasure actions, assigning a preferred countermeasure action sequence, and employing the selected countermeasures. In general, the employment of countermeasures requires enablement from the positive control cell order to minimize the possibility of actions being perceived as provocations, to conserve SDS asset life or capabilities, and/or to prevent disclosure of classified capabilities. # Requirement Description F455-1 Message authentication means F455-2 Computational resources F455-3 Countermeasure capabilities and resources	OUTPUT 1) Countermeasure activity reports 2) Countermeasure actions 3) Countermeasure expenditures 4) Battle losses

INPUT

- 1) Specified Countermeasure Actions
- 2) Engagement Asset Taskings

F4551 - DECONFLICT ENGAGEMENT AND COUNTERMEASURE ACTIONS

Description: This function encompasses the processes and means to resolve conflicts among the assigning and tasking of resources for engagement and countermeasure actions. The function includes receiving specified countermeasure actions, monitoring engagement asset taskings, identifying countermeasure actions in conflict with engagement taskings, and identifying nonconflicting time windows for employing countermeasure actions. This requires the function to determine the implications of executing a countermeasure action on assigned or tasked engagement actions, such as the effect of executing an avoidance maneuver at a weapon platform on the ability to fire the weapon, to continue to provide guidance or aiming corrections, or to provide target designation.

Requirement Description

F4551-1 Computational Resources

F4551-2 Host Facilities And/Or Platforms

OUTPUT

- 1) Countermeasure Time Windows And Constraints

INPUT 1) Specified Countermeasure Actions 2) Countermeasure Time Windows And Constraints 3) Track File	F4552 - ASSIGN COUNTERMEASURE ACTION SEQUENCE Description: This function encompasses the processes and means to select a preferred countermeasure sequence for the specified countermeasure actions which conforms to the available time windows and constraints. This function involves determining feasible bounds for employing the countermeasures, selecting a feasible and preferred countermeasure sequence and timing, and assigning actions and timing to countermeasure resources. It also involves reporting the assigned countermeasure action sequences as situation information for other SDS functions. # Requirement Description F4552-1 Computational Resources F4552-2 Host Facilities And/Or Platforms	OUTPUT 1) Preferred Countermeasure Action Sequence

INPUT

- 1) Alert Level
- 2) Countermeasure Enablement
- 3) Preferred Countermeasure Action Sequence
- 4) Residual Threats

F4553 - EMPLOY SELECTED COUNTERMEASURES

Description: This function encompasses the processes and means to employ the selected countermeasures in accordance with the preferred countermeasure action sequence and countermeasures enablement commands. This function involves authenticating the countermeasure enablement, activating the countermeasure resources at the assigned times, controlling or adjusting the countermeasure execution, and ceasing execution of the countermeasures as assigned or as directed (e.g., by a disablement command). Potential countermeasures include, but are not limited to, electronic countermeasures (ECM), decoys and deception, and avoidance maneuvers.

Requirement Description

F4553-1 Message Authentication Means

F4553-2 Countermeasure Capabilities And Resources

OUTPUT

- 1) Countermeasure Actions
- 2) Countermeasure Expenditures
- 3) Battle Losses

INPUT 1) System configuration criteria 2) Recovery and reconstitution priorities 3) Operational requirements 4) Range safety requirements 5) Situation data 6) Environment conditions 7) Deployment handover data and information	F46 - MAINTAIN SYSTEM CAPABILITY Description: This high level function encompasses the processes and means to maintain the capability of the SDS to meet its mission requirements. The function includes managing the system operational configuration, reconstituting the system, maintaining and supporting the system, and providing launch assets. <table><tr><th>#</th><th><u>Requirement Description</u></th></tr><tr><td>F46-1</td><td>New and reconstitution resources</td></tr><tr><td>F46-2</td><td>Management and operation and maintenance resources</td></tr><tr><td>F46-3</td><td>Launch resources</td></tr></table>	#	<u>Requirement Description</u>	F46-1	New and reconstitution resources	F46-2	Management and operation and maintenance resources	F46-3	Launch resources	OUTPUT 1) System configuration (including the resources to support other functions) 2) System status data
#	<u>Requirement Description</u>									
F46-1	New and reconstitution resources									
F46-2	Management and operation and maintenance resources									
F46-3	Launch resources									

INPUT

- 1) System Configuration Criteria
- 2) Recovery Priorities
- 3) Situation Data
- 4) Reconstituted Capabilities
- 5) Launch Reports And Launched Assets
- 6) Environment Conditions

F461 - MANAGE SYSTEM OPERATIONAL CONFIGURATION

Description: This function encompasses the processes and means to maintain a preferred configuration of operational SDS assets in accordance with system configuration criteria and recovery priorities. The function includes managing the space/time distribution of system assets, activating and deactivating reserve assets, providing communication connectivity and service, and obtaining and dissemination system operational status data.

Requirement Description

F461-1	Management And Operation Resources
F461-2	Host Facilities And/Or Platforms

OUTPUT

- 1) System Configuration
- 2) System Status Data

INPUT 1) System Configuration Criteria 2) Recovery Priorities 3) Situation Data 4) System Status Data 5) Activated And Deactivated Reserve Assets 6) Reconstituted Capabilities 7) Launch Reports And Launched Assets	F4611 - MANAGE SPACE/TIME DISTRIBUTION OF SYSTEM ASSETS Description: This function encompasses the processes and means to maintain a preferred space/time distribution of operational system assets in accordance with system configuration criteria and system recovery priorities. The function involves implementing normal configuration changes, identifying deficiencies of current asset distributions, defining options to improve the distribution, selecting and planning redistributions of assets, tasking specific redistribution actions, and executing the redistribution taskings. # <u>Requirement Description</u> F4611-1 Management And Operations Resources F4611-2 Host Facilities And/Or Platforms	OUTPUT 1) Preferred Distribution Of Operational System Assets

INPUT

- 1) System Configuration Criteria
- 2) Recovery Priorities
- 3) Preferred Distribution Of System Assets
- 4) System Status Data

F4612 - ACTIVATE AND DEACTIVATE RESERVE ASSETS

Description: This function encompasses the processes and means to activate and deactivate reserve system assets to enhance the pool of operational assets or to preserve the pool of reserve assets, as the distribution of assets, the system configuration criteria, and the recovery priorities dictate. The function involves determining or receiving requirements for activation/deactivation of reserve assets, identifying the applicable procedure, executing the asset activation or deactivation, and handing over activated assets to the space/time distribution management function.

Requirement Description

F4612-1 Management And Operation Resources

F4612-2 Host Facilities

OUTPUT

- 1) Activated Reserve Assets
- 2) Deactivated Reserve Assets

INPUT

- 1) Environmental Conditions
- 2) Activated/Deactivated Assets
- 3) Preferred Asset Distribution
- 4) Systems Status Data
- 5) User Messages
- 6) Communication Resources
- 7) System Configuration Criteria

F4613 - PROVIDE COMMUNICATIONS CONNECTIVITY & SERVICES

Description: This function provides the capability to install, test and maintain communications links between SDS elements. The communication system continuously monitors its links and equipment and will maintain realtime system connectivity. Congestion control is provided through alternate routing schemes and the security functions such as encryption/decryption and message authentication will be implemented. The basic function is to deliver error-free messages in a timely manner to other elements.

Requirement Description

- F4613-1 System And Environment Monitoring
- F4613-2 Network Control
- F4613-3 Data Transport
- F4613-4 Message Routing And Link Congestion Control
- F4613-5 System Security

OUTPUT

- 1) Communications Service And Status
- 2) Messages

INPUT 1) Environmental Conditions 2) Communications Monitoring And Environment Resources 3) Communications System Configuration	F46131 - PERFORM SYSTEM AND ENVIRONMENT MONITORING Description: This process collects data on node locations, link performance, threat activities and the communications environment. The data is analyzed to determine link and channel effectiveness and to determine potential threats. Additional processing provides measures of link degradation as well as location, type and priority of threats to the communications system. # Requirement Description F46131-1 Status Information Communication Resource F46131-2 Communication Link And Channel Performance F46131-3 Communications Threat Situation	OUTPUT 1) Congested Links 2) Unnegated Threat 3) Degraded Links/Channels 4) Communication Status Requests

INPUT

- 1) Environmental Conditions
- 2) Communication Status
- 3) Communications Monitoring And Environment Resources
- 4) Communications System Configuration

F461311 - COLLECT INFORMATION

Description: This process collects communication resource status information in order to develop and update a communications status File (to include link status and node status) and a Configuration File (including node locations). This status is fused with reports from external systems in order to discern threats to communication functions and resources.

Requirements Description

F461311-1	Link Event Counts
F461311-2	Node Location Lists
F461311-3	NUDET And Jamming Interference
F461311-4	Link Statistics
F461311-5	Threat Summary Report

OUTPUT

- 1) Communications Status Requests
- 2) Questionable Link Status
- 3) Potential Communication Threats

INPUT

- 1) Communications Monitoring And Environment Resources
- 2) Questionable Link Status
- 3) Communication System Configuration

F461312 - EVALUATE COMMUNICATION PERFORMANCE

Description: This function analyzes traffic statistics from the current and previous control and monitor cycles to produce performance summaries by link and by channel (data interface).

#	<u>Requirement Description</u>

F461312-1	Link Throughput
F461312-2	Link Integrity
F461312-3	Link Effectiveness
F461312-4	Channel Effectiveness

OUTPUT

- 1) Link And Channel Degradation
- 2) Communication Status

INPUT 1) Potential Communication Threats 2) Communications Monitoring And Environment Resources 3) Link And Channel Degradation 4) Communication System Configuration	F461313 - ASSESS COMMUNICATION SITUATION Description: This process fuses information from various other C&M communication processes in order to discern the most disruptive threats to communication functions and resources. <table> <thead> <tr> <th>#</th><th>Requirement</th><th>Description</th></tr> </thead> <tbody> <tr> <td>F461313-1</td><td>Link Degradations</td><td></td></tr> <tr> <td>F461313-2</td><td>Active Threat Identification</td><td></td></tr> <tr> <td>F461313-3</td><td>Threat Prioritization</td><td></td></tr> </tbody> </table>	#	Requirement	Description	F461313-1	Link Degradations		F461313-2	Active Threat Identification		F461313-3	Threat Prioritization		OUTPUT 1) Congested Links 2) Degraded Links/Channels 3) Unnegated Threats
#	Requirement	Description												
F461313-1	Link Degradations													
F461313-2	Active Threat Identification													
F461313-3	Threat Prioritization													

INPUT

- 1) Preferred Asset Distribution
- 2) Activated/Deactivated Assets
- 3) Control Network Resources
- 4) H/W And S/W Change Requests
- 5) System Status Data
- 6) Degraded Links/Channels
- 7) Routing Tables
- 8) System Reconfiguration Criteria
- 9) Recovery Priorities

F46132 - CONTROL NETWORK

Description: This function provides physical control of the communications system. Configuration/reconfiguration and reconstitution of physical resources will be accomplished. System, subsystem, link and component test and evaluation will be accomplished in this function. Media control for radio, laser and landline links is directed by this function. The process maintains the hardware and software configuration and will control the implementation of new communications functions into the system.

Requirement Description

F46132-1 Network Configuration And Reconstitution

F46132-2 H/W And S/W Configuration

F46132-3 Media Control

F46132-4 Technical Control

OUTPUT

- 1) Communication System Configuration
- 2) Status Reports And Maintenance Requests
- 3) Test Messages

INPUT 1) Degraded Links/Channels 2) Routing Tables 3) System Reconfiguration Criteria 4) Recovery Priorities 5) Reconfiguration Recommendation 6) Preferred Asset Distribution 7) Activated/Deactivated Assets 8) Configuration And Reconstitution Resources	F461321 - DETERMINE CONFIGURATION/RECONFIGURATION & RECONSTITUTION REQUIREMENTS Description: Reconfigures subnetworks periodically to accommodate space-based platform motions or when triggered by F46131. Determines actions to take to restore SDS communications after attack or another event causing loss of assets. <table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F461321-1</td><td>Acquire And Release Links</td></tr><tr><td>F461321-2</td><td>Network Optimization</td></tr><tr><td>F461321-3</td><td>Network Routing Map And Configuration Distribution</td></tr><tr><td>F461321-4</td><td>Link Event History</td></tr><tr><td>F461321-5</td><td>Network Reconstitution</td></tr></table>	#	Requirement Description	F461321-1	Acquire And Release Links	F461321-2	Network Optimization	F461321-3	Network Routing Map And Configuration Distribution	F461321-4	Link Event History	F461321-5	Network Reconstitution	OUTPUT 1) Communication System Configuration
#	Requirement Description													
F461321-1	Acquire And Release Links													
F461321-2	Network Optimization													
F461321-3	Network Routing Map And Configuration Distribution													
F461321-4	Link Event History													
F461321-5	Network Reconstitution													

INPUT 1) Routing Tables 2) H/W And S/W Change Requests 3) Maintenance Actions 4) H/W And S/W Configuration Resources	F461322 - MANAGE H/W & S/W CONFIGURATION Description: Maintain H/W and S/W configuration database and control the addition of new/modified components. <table><thead><tr><th>#</th><th><u>Requirement Description</u></th></tr></thead><tbody><tr><td>F461322-1</td><td>Network Configuration Change Requirements</td></tr><tr><td>F461322-1</td><td>System Parameters And Database Updates</td></tr><tr><td>F461322-3</td><td>System Software Updates</td></tr><tr><td>F461322-4</td><td>New/Additional System Components</td></tr></tbody></table>	#	<u>Requirement Description</u>	F461322-1	Network Configuration Change Requirements	F461322-1	System Parameters And Database Updates	F461322-3	System Software Updates	F461322-4	New/Additional System Components	OUTPUT 1) Status Reports And Maintenance Requests
#	<u>Requirement Description</u>											
F461322-1	Network Configuration Change Requirements											
F461322-1	System Parameters And Database Updates											
F461322-3	System Software Updates											
F461322-4	New/Additional System Components											

INPUT 1) Routing Tables 2) Communication System Configuration 3) Media Control Resources	F461323 - PROVIDE MEDIA CONTROL Description: Control various types of communications media including radios, lasercom and terrestrial networks including fiber-optic transmission system. <table><thead><tr><th>#</th><th><u>Requirement Description</u></th></tr></thead><tbody><tr><td>F461323-1</td><td>Radio Link Control</td></tr><tr><td>F461323-2</td><td>Laser Link Control</td></tr><tr><td>F461323-3</td><td>Ground Network Control</td></tr></tbody></table>	#	<u>Requirement Description</u>	F461323-1	Radio Link Control	F461323-2	Laser Link Control	F461323-3	Ground Network Control	OUTPUT 1) Revised Media Control
#	<u>Requirement Description</u>									
F461323-1	Radio Link Control									
F461323-2	Laser Link Control									
F461323-3	Ground Network Control									

INPUT

- 1) System Reconfiguration Criteria
- 2) Routing Tables
- 3) Revised Media Control
- 4) Communication System Configuration
- 5) System Status Data
- 6) Technical Control Resources

F461324 - CONDUCT TECHNICAL CONTROL

Description: Provides system level tests on channels and links in addition to detailed fault detection, isolation and repair/replacement at the component level.

Requirement Description

F461324-1	System Tests
F461324-2	Fault Detection
F461324-3	Fault Correction
F461324-4	Patch Around Or Repair Components

OUTPUT

- 1) Reconfiguration Recommendation
- 2) Test Messages
- 3) Maintenance Actions

INPUT 1) User Messages 2) Test Messages 3) Messages From Security 4) Data Transport Resources 5) System Configuration Criteria	F46133 - PERFORM DATA TRANSPORT Description: This function implements the transmission and receipt of messages with all their associated OSI protocols. Receipt of and delivery of messages to the communications system and external users is controlled by the function. <table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F46133-1</td><td>User Messages</td></tr><tr><td>F46133-2</td><td>Communication System Messages</td></tr><tr><td>F46133-3</td><td>Message Creation And Transmission</td></tr><tr><td>F46133-4</td><td>Message Receipt And Breakdown</td></tr></table>	#	Requirement Description	F46133-1	User Messages	F46133-2	Communication System Messages	F46133-3	Message Creation And Transmission	F46133-4	Message Receipt And Breakdown	OUTPUT 1) Messages 2) Messages For Security
#	Requirement Description											
F46133-1	User Messages											
F46133-2	Communication System Messages											
F46133-3	Message Creation And Transmission											
F46133-4	Message Receipt And Breakdown											

INPUT

- 1) Clear Messages
- 2) Messages With Authorization Added
- 3) Message Authentication
- 4) Decrypt Received Messages
- 5) User Message Resources
- 6) System Configuration Criteria

F461331 - PROCESS USER MESSAGES

Description: Validate user connectivity and provide initial message processing before/after protocol operations.

#	<u>Requirement Description</u>
F461331-1	Protocol Service For Transmissions
F461331-2	Outgoing Message Validation
F461331-3	Protocol Service For Received Messages
F461331-4	Received Message Validation

OUTPUT

- 1) Messages
- 2) Transmitted User Messages

INPUT 1) Test Messages 2) System Message Resources 3) System Configuration Criteria	F461332 - PROCESS COMMUNICATION SYSTEM MESSAGES Description: This function generates messages and responses to maintain the status of the communications system. <table><tr><td>#</td><td><u>Requirement Description</u></td></tr><tr><td>F461332-1</td><td>Network Control Orders</td></tr><tr><td>F461332-2</td><td>Communication Function Information</td></tr></table>	#	<u>Requirement Description</u>	F461332-1	Network Control Orders	F461332-2	Communication Function Information	OUTPUT 1) Transmitted Communication Messages
#	<u>Requirement Description</u>							
F461332-1	Network Control Orders							
F461332-2	Communication Function Information							

INPUT 1) Transmitted Communication Messages 2) Transmitted User Messages 3) Transmitted Encrypted Message 4) Build Message Resources 5) System Configuration Criteria	F461333 - BUILD/TRANSMIT MESSAGE Description: Perform the transmit functions for the IOS/OSI Reference model level protocols. # Requirement Description F461333-1 Protocol Applications F461333-2 Internet Protocol F461333-3 Network Protocol And Message Transmission	OUTPUT 1) Messages 2) Cleared Messages For Encryption 3) Messages For Authentication

INPUT 1) Received Encrypted Messages 2) Unbuild Message Resources 3) System Configuration Criteria	F461334 - RECEIVE/UNBUILD MESSAGE Description: Perform the received functions for the ISO/OSI Reference Model level protocols. <table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F461334-1</td><td>Message Reception And Network Protocol</td></tr><tr><td>F461334-2</td><td>Internet Protocol</td></tr><tr><td>F461334-3</td><td>Application Protocol</td></tr></table>	#	Requirement Description	F461334-1	Message Reception And Network Protocol	F461334-2	Internet Protocol	F461334-3	Application Protocol	OUTPUT 1) Received Encrypted Message 2) Messages Received With Authentication
#	Requirement Description									
F461334-1	Message Reception And Network Protocol									
F461334-2	Internet Protocol									
F461334-3	Application Protocol									

INPUT

- 1) System Configuration Criteria
- 2) System Status Reports
- 3) Routing And Congestion Control Resources
- 4) Congested Links
- 5) Communication System Configuration

F46134 - PROVIDE ROUTING & CONGESTION CONTROL

Description: This function provides the logical control to partition data, monitor data flow, control congestion, assign channels and provide alternate routing schemes.

#	Requirement Description
F46134-1	Communication System Partitioning Requirements
F46134-2	Traffic Flow Control
F46134-3	Traffic Congestion Control
F46134-4	Channel Assignments
F46134-5	Routing Table Updates

OUTPUT

- 1) Routing Tables

INPUT 1) System Configuration Criteria 2) System Status Reports 3) Communication Partitioning Resources	F461341 - DETERMINE PARTITIONING REQUIREMENTS Description: Determine how to partition the system so sensor data may be routed to the appropriate platforms. <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F461341-1</td><td>Network Configuration</td></tr><tr><td>F461341-2</td><td>Sensor Data Destinations</td></tr><tr><td>F461341-3</td><td>Network Connectivity</td></tr></tbody></table>	#	Requirement Description	F461341-1	Network Configuration	F461341-2	Sensor Data Destinations	F461341-3	Network Connectivity	OUTPUT 1) Valid Routes
#	Requirement Description									
F461341-1	Network Configuration									
F461341-2	Sensor Data Destinations									
F461341-3	Network Connectivity									

INPUT

- 1) Congested Links
- 2) System Status Reports
- 3) Routing And Congestion Control Resources

F461342 - MONITOR FLOW CONTROL

Description: Continuously monitor the status of traffic flow throughout the system and determine whether it is within predefined bounds.

#	<u>Requirement Description</u>

F461342-1	Network Traffic

F461342-2	Network Configuration

F461342-3	Flow Control Monitoring

OUTPUT

- 1) Affected Channels/Links

INPUT 1) System Configuration Criteria 2) Channel Changes 3) Channel Resources	F461344 - ASSIGN CHANNELS Description: Assigns channels on a platform basis. May change assignments based on either fault detection or to relieve congestion. # Requirement Description F461344-1 Valid Routes F461344-2 Jamming And Nuclear Environment Threat F461344-3 Message Priority	OUTPUT 1) New Routes

INPUT

- 1) New Routes
- 2) Updating Resources

F461345 - UPDATE ROUTING TABLES

Description: Updates the routing tables used to translate from logical addresses to physical links. Routing considers traffic capacity of each link, whether it is a primary or secondary link, geometries of space elements and fault conditions.

Requirement Description

F461345-1 Network Configuration

F461345-2 Link/Node Status

F461345-3 Jamming And Nuclear Threat Environments

OUTPUT

- 1) Routing Tables

INPUT 1) Messages For Security 2) OPSEC Guidance 3) Security Resources 4) System Configuration Criteria	F46135 - PROVIDE COMMUNICATIONSSECURITY Description: This function provides the communications security features. Specific functions include cryptographic key storage and distribution, encryption/decryption, OPSEC procedures and authentication techniques for message validation. <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F46135-1</td><td>Message Information Collection</td></tr><tr><td>F46135-2</td><td>Communications OPSEC Guidelines</td></tr><tr><td>F46135-3</td><td>Message Authentication</td></tr></tbody></table>	#	Requirement Description	F46135-1	Message Information Collection	F46135-2	Communications OPSEC Guidelines	F46135-3	Message Authentication	OUTPUT 1) Communication Status Requests 2) Communications OPSEC Policies And Procedures
#	Requirement Description									
F46135-1	Message Information Collection									
F46135-2	Communications OPSEC Guidelines									
F46135-3	Message Authentication									

INPUT

- 1) Clear Messages For Encryption
- 2) Encrypted Messages Received
- 3) Cryptography Resources
- 4) System Configuration Criteria

F461351 - PROVIDE CRYPTOGRAPHY

Description: Performs end-to-end encryption/decryption and the key distribution functions

#	<u>Requirement Description</u>
F461351-1	Crypto Key Storage
F461351-2	Remote Crypto Key Change

OUTPUT

- 1) Decrypted Received Messages
- 2) Transmitted Encrypted Messages

INPUT 1) OPSEC Guidance 2) OPSEC Resources 3) System Configuration Criteria	F461352 - PROVIDE COMMUNICATION OPSEC GUIDELINES Description: This function provides the OPSEC guidelines for conducting SDS operations. <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F461352-1</td><td>OPSEC Guidelines Document</td></tr><tr><td>F461352-2</td><td>OPSEC Procedures</td></tr></tbody></table>	#	Requirement Description	F461352-1	OPSEC Guidelines Document	F461352-2	OPSEC Procedures	OUTPUT 1) Communications OPSEC Policies And Procedures
#	Requirement Description							
F461352-1	OPSEC Guidelines Document							
F461352-2	OPSEC Procedures							

INPUT

- 1) Messages With Authentication
- 2) Messages For Authentication
- 3) Authentication Resources
- 4) System Configuration Criteria

F461353 - AUTHENTICATE MESSAGES

Description: This function deals with all activities associated with the authentication of incoming and outgoing messages.

#	Requirement Description
F461353-1	Authentication Scheme For Message Encoding
F461353-2	Authentication Scheme For Message Decoding
F461353-3	Link Spoofing Threat

OUTPUT

- 1) Messages With Authentication Added
- 2) Authenticated Messages

INPUT 1) System configuration criteria 2) Distribution of assets 3) Activation and deactivation of reserve assets 4) Communications status	F4614 - OBTAIN AND DISSEMINATE SYSTEM OPERATIONAL STATUS DATA Description: This function encompasses the processes and means to obtain operational status data on SDS assets and to disseminate it to other SDS functions and to external parties. The function involves implementing routine asset status reporting, requesting and providing special asset status reports, providing event-triggered asset status reports, maintaining local and master system status databases, and providing tailored status reports for SDS functions. <table><tr><th><u>#</u></th><th><u>Requirement Description</u></th></tr><tr><td></td><td>F4614-1 Management and operation resources</td></tr><tr><td></td><td>F4614-2 Host facilities and/or platforms</td></tr></table>	<u>#</u>	<u>Requirement Description</u>		F4614-1 Management and operation resources		F4614-2 Host facilities and/or platforms	OUTPUT 1) System status data
<u>#</u>	<u>Requirement Description</u>							
	F4614-1 Management and operation resources							
	F4614-2 Host facilities and/or platforms							

INPUT

- 1) Reconstitution priorities
- 2) Situation data
- 3) System configuration
- 4) System status data
- 5) Environment conditions

F462 - RECONSTITUTE SYSTEM

Description: This function encompasses the processes and means to reconstitute the SDS system following losses or exhaustion of assets. Reconstitution refers to the replacement of lost or exhausted assets (including human assets), as opposed to the reallocation of functions or responsibilities among remaining assets. The function includes determining the need for system reconstitution (versus just recovery), determining the availability of reconstitution resources, developing a reconstitution action plan, tasking reconstitution resources, and implementation of the taskings by those resources.

#	Requirement Description
F462-1	Management and operation resources
F462-2	Host facilities
F462-3	Reconstitution resources (personnel, equipment, and delivery capabilities)

OUTPUT

- 1) Reconstituted capabilities

INPUT 1) Reconstitution priorities 2) Situation data 3) System status data	F4621 - DETERMINE NEED FOR SYSTEM RECONSTITUTION Description: This function encompasses the processes and means to determine the need to reconstitute system assets. It involves review of situation and system status data, evaluation of continuing SDS mission demands, assessment of shortfalls expected to remain after system recovery operations, determination that reconstitution is necessary, and definition of specific needs and conditions in accordance with priorities for reconstitution. # Requirement Description F4621-1 Management operation resources F4621-2 Host facilities	OUTPUT 1) Specific reconstitution needs and conditions

INPUT 1) Reconstitution priorities 2) Situation data	F4622 - DETERMINE AVAILABILITY OF RECONSTITUTION RESOURCES Description: This function encompasses the processes and means to ascertain the existence, status, and other commitments against resources which could be used for or in support of SDS system reconstitution. The function involves monitoring system status data (to the extent that the system includes caches of reconstitution resources), conducting inquiries into the availability of external resources which could support SDS reconstitution, and compiling an inventory of relevant available resources <u>#</u> <u>Requirement Description</u> F4622-1 Management resources F4622-2 Host facilities	OUTPUT 1) Inventory of resources available for or in support of SDS reconstitution

INPUT 1) Reconstitution priorities 2) System status data 3) Specific reconstitution needs and conditions 4) Inventory of available reconstitution resources	F4623 - DEVELOP RECONSTITUTION ACTION PLAN Description: This function encompasses the processes and means to formulate and refine a specific plan of action for meeting SDS reconstitution needs with available resources and in accordance with reconstitution priorities. The function involves formulation of the overall reconstitution approach, allocation of available resources to prioritized requirements, definition of tasks and their desired sequences, and detailed allocation of resources to tasks over time <u>#</u> <u>Requirement Description</u> F4623-1 Management resources F4623-2 Planning and allocation tools F4623-3 Host facilities	OUTPUT 1) Reconstitution action plan

INPUT

- 1) Reconstitution action plan

F4624 - TASK RECONSTITUTION RESOURCES

Description: This function encompasses the processes and means to task reconstitution resources to implement the reconstitution action plan. The function involves coordination with the parent organizations of the identified reconstitution resources to establish tasking channels or to transfer their operational control to the SDS, detailed assignment of resources to tasks of the reconstitution plan, and formal communication and acknowledgment of those taskings

<u>#</u>	<u>Requirement Description</u>

F4624-1	Management resources

F4624-2	Host facilities

F4624-3	Communications with reconstitution resource parent organizations

OUTPUT

- 1) Specific taskings to reconstitution resources

INPUT 1) Taskings of reconstitution resources	F4625 - IMPLEMENT RECONSTITUTION TASKINGS Description: This function encompasses the processes and means employed by reconstitution resources to implement their respective reconstitution taskings. These include but are not limited to organization of work teams, requisition of tools and equipment, delivery and activation of reconstitution assets, and handover of assets to the SDS operational configuration management function. <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4625-1</td><td>Skilled reconstitution personnel</td></tr><tr><td>F4625-2</td><td>Caches or other sources of tools and equipment</td></tr><tr><td>F4625-3</td><td>Reconstitution asset delivery means</td></tr><tr><td>F4625-4</td><td>Reconstitution asset activation means</td></tr></tbody></table>	#	Requirement Description	F4625-1	Skilled reconstitution personnel	F4625-2	Caches or other sources of tools and equipment	F4625-3	Reconstitution asset delivery means	F4625-4	Reconstitution asset activation means	OUTPUT 1) Reconstituted capabilities
#	Requirement Description											
F4625-1	Skilled reconstitution personnel											
F4625-2	Caches or other sources of tools and equipment											
F4625-3	Reconstitution asset delivery means											
F4625-4	Reconstitution asset activation means											

INPUT

- 1) Maintenance Support and Guidance
- 2) System Configuration
- 3) SSystem Health and Status
- 4) Reconstituted capabilities
- 5) Environment conditions
- 6) Deployment and handover data and information
- 7) Higher Headquarters Approval
- 8) New and Reconstitution Resources

F463 - MAINTAIN AND SUPPORT SYSTEM

Description: This function encompasses the processes and means to maintain and support the SDS system, including equipment and personnel, in accordance with system configuration criteria and special system and equipment requirements. The function includes determining the system availability, performing maintenance, performing modifications, and supporting the system.

Requirement Description

F463-1 Manage SDS Support Systems

F463-2 Maintain SDS Asset Status

F463-3 Operate SDS Support Systems

F463-4 Perform SDS Maintenance

F463-5 Provide SDS Integrated Logistics Support

OUTPUT

- 1) Management and O&M resources
- 2) Retired equipment
- 3) Procurement Requirements

INPUT 1) Maintenance and Support Policies and guidance 2) Support System Schedules 3) Syatem Asset Status 4) Management Resources	F4631 - MANAGE SDS SUPPORT SYSTEMS Description: This function deals with the management of SDS support systems. It includes the management of the overall SDS maintenance capability, the management of space transportation resources, to include scheduling of launches, and the management of logistics support. <table><tr><th>#</th><th><u>Requirement Description</u></th></tr><tr><td>F4631-1</td><td>Maintenance Capability Management</td></tr><tr><td>F4631-2</td><td>Space transportation Management</td></tr><tr><td>F4631-3</td><td>Logicstic Management</td></tr></table>	#	<u>Requirement Description</u>	F4631-1	Maintenance Capability Management	F4631-2	Space transportation Management	F4631-3	Logicstic Management	OUTPUT 1) Support Systems Procedures, Criteria, Directives, and Policy 2) Integrated Schedules
#	<u>Requirement Description</u>									
F4631-1	Maintenance Capability Management									
F4631-2	Space transportation Management									
F4631-3	Logicstic Management									

INPUT 1) Maintenance and Support Policies and guidance 2) Support System Schedules 3) System Asset Status 4) Management Resources	F4631 - MANAGE SDS SUPPORT SYSTEMS Description: This function deals with the management of SDS support systems. It includes the management of the overall SDS maintenance capability, the management of space transportation resources, to include scheduling of launches, and the management of logistics support. <table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F4631-1</td><td>Maintenance Capability Management</td></tr><tr><td>F4631-2</td><td>Space transportation Management</td></tr><tr><td>F4631-3</td><td>Logistic Management</td></tr></table>	#	Requirement Description	F4631-1	Maintenance Capability Management	F4631-2	Space transportation Management	F4631-3	Logistic Management	OUTPUT 1) Support Systems Procedures, Criteria, Directives, and Policy 2) Integrated Schedules
#	Requirement Description									
F4631-1	Maintenance Capability Management									
F4631-2	Space transportation Management									
F4631-3	Logistic Management									

INPUT 1) System Maintainability and Availability Criteria 2) Operational System Asset Status 3) Maintenance Resources	F4632 - MAINTAIN SDS ASSET STATUS Description: This function deals with the maintenance of SDS assets and the determination of system operational status. It includes the task to maintain the system at a specified operational readiness level, the maintenance of a support system to provide personnel and material requirements needed to operate the system, and the logistic and planning capability to insure the system logistics support needs are planned, programmed and acquired. # Requirement Description F4632-1 Maintain Operational Readiness F4632-2 Support SDS Systems F4632-3 Provide Logistics Planning	OUTPUT 1) Operational Asset Status

INPUT

- 1) Maintenance and Support Criteria
- 2) Integrated Schedules
- 3) H/A Approval to Conduct Space Transportation Operations
- 4) Support Operations Resources
- 5) Support System Health and Status

F4633 - OPERATE SDS SUPPORT SYSTEMS

Description: This function deals with the operations of the maintenance, Support andspace transportation activities. It includes all those activities associated with the operation of a maintenance support function, those dealing with the acquisition and launch of space transportation systems, and the operation of an integrated logistic support function.

#	Requirement Description

F4633-1	Maintenance support

F4633-2	Space transportation Support

F4633-3	Integrated Logistic Support

OUTPUT

- 1) System Status

INPUT 1) Support System Procedures, criteria, Directives, and Policy Integrated Schedules 2) System Health and Status Data Maintenance Resources 3) Higher Headquarters Approval to Conduct Corrective Maintenance	F4634 - PERFORM SDS MAINTENANCE Description: This function encompasses those activities dealing with the performance of maintenance, corrective actions, system upgrades P3I and deferred enhancements and the performance of routine services and maintenance of the system. This function also includes the reconfiguration of SDS assets. # Requirement Description F4634-1 Preventative Maintenance F4634-2 Corrective Maintenance F4634-3 System Servicing F4634-4 System Modifications F4634-2 Asset Reconfiguration	OUTPUT 1) Maintenance Status 2) Health and Status Data 3) Expended Asset Reports 4) Retired Maintenance Assets

INPUT

- 1) Logistics requirements and support schedules
- 2) Reconstituted capabilities
- 3) Deployment handover data and information
- 4) Logistics requirements
- 5) Integrated schedules
- 6) New resources

F4635 - PROVIDE INTEGRATED LOGISTIC SUPPORT

Description: This function encompasses those activities dealing with the performance of integrated logistics support, planning and resource acquisitions. It includes the development and maintenance of the plans and programs dealing with the logistic support and planning for the SDS. i.e. SEMP, ILSP, PMP, etc.

Requirement Description

F4635-1 Plans and Programs

F4635-2 Policies and Directives

F4635-3 Reviews and Schedules

F4635-4 Requests

OUTPUT

- 1) Procurement requirements
- 2) Logistics resource status
- 3) O&M maintenance resources
- 4) Retired equipment

INPUT 1) Operational requirements 2) Range safety requirements 3) Launch needs 4) Launch components, facilities & support equipment	F464 - PROVIDE LAUNCH ASSETS Description: This function encompasses all those activities associated with the launch of SDS space resources. It covers support as well as operational launches of SDS assets. This function deals with the determination of launch requirements, the requisition of assets, the arrangement for ground and space transportation vehicles and other activities associated with space launches. <table><tr><th>#</th><th><u>Requirement Description</u></th></tr><tr><td>F464-1</td><td>Launch Requirements</td></tr><tr><td>F464-2</td><td>Inspection and Receiving</td></tr><tr><td>F464-3</td><td>Integration</td></tr><tr><td>F464-4</td><td>Launch</td></tr><tr><td>F464-5</td><td>Refurbishment</td></tr></table>	#	<u>Requirement Description</u>	F464-1	Launch Requirements	F464-2	Inspection and Receiving	F464-3	Integration	F464-4	Launch	F464-5	Refurbishment	OUTPUT 1) Launch reports and asset status 2) Failed components
#	<u>Requirement Description</u>													
F464-1	Launch Requirements													
F464-2	Inspection and Receiving													
F464-3	Integration													
F464-4	Launch													
F464-5	Refurbishment													

INPUT

- 1) Special launch directives
- 2) Standard policy and procedures
- 3) Launch needs
- 4) Operational requirements
- 5) Launch planning resources

F4641 - DETERMINE LAUNCH REQUIREMENTS

Description: This function covers those activities dealing with the determination of launch requirements and those actions to implement those requirements. It covers planning, scheduling and the monitoring of all launch activities both operational and support.

#	<u>Requirement Description</u>
F4641-1	Requirements Planning
F4641-2	Scheduling
F4641-3	Resource Planning

OUTPUT

- 1) Required launch configuration and schedules

INPUT

- 1) Required launch configuration and Launch schedules
- 2) Launch components and equipment

F4642 - RECEIVE AND INSPECT LAUNCH COMPONENTS

Description: This function deals with the arrangement for transportation of assets from supply points or from depots to the launch facility complex, the receipt for and the inspection of received components, and the determination if these components meet system specifications prior to delivery to the integration facility.

#	<u>Requirement Description</u>
F4642-1	Transportation
F4642-2	Inspection
F4642-3	Repair
F4642-4	Security
F4642-5	Test and Evaluation

OUTPUT

- 1) Component inspection/test results
- 2) Accepted launch components
- 3) Failed components

INPUT

- 1) Required launch configuration and schedules
- 2) Component inspection/test results
- 3) Accepted launch components
- 4) Integration resources

F4643 - INTEGRATE PAYLOAD AND LAUNCH VEHICLE

Description: This function encompasses those activities dealing with the acceptance of the space asset and launch vehicle from the receive and inspection facility, to the test and evaluation of the individual components, through the integration of the different components into a single payload, to their final step of integrating the payload into the launch vehicle.

#	Requirement Description
F4643-1	Integration of assets and components
F4643-2	Test and Evaluation
F4643-3	Support facilities and equipment
F4643-4	Transportation

OUTPUT

- 1) Vehicle specifications
- 2) Integrated launch vehicle

INPUT

- 1) Range safety requirements and operational requirements
- 2) Required launch configuration and schedules
- 3) Vehicle specifications
- 4) Integrated launch vehicle
- 5) Launch resources

F4644 - CONDUCT LAUNCH OPERATIONS

Description: This function deals with those activities commencing with the completion of the payload and launch vehicle mating through the final on-orbit checkout of the launched asset to the turn over of the asset to the SDS-OC.

#	<u>Requirement Description</u>
F4644-1	Launch Facilities
F4644-2	Launch Control
F4644-3	Ground Control
F4644-4	Ground Support Equipment

OUTPUT

- 1) Status and reports
- 2) Launched assets

INPUT

- 1) Range safety requirements and operational requirements
- 2) Status and reports
- 3) Refurbishment resources

F4645 - REFURBISH PAD AND VEHICLE

Description: This function encompasses those activities dealing with the refurbishment of the launch pad and facilities prior to the next scheduled launch to include the integration of the next launch vehicle onto the launch pad/complex.

#	<u>Requirement Description</u>
F4645-1	Repair and Replacement
F4645-2	Launch Vehicle Integration
F4645-3	Test and Evaluation

OUTPUT

- 1) Refurbishment reports