



MMSOC GSA Mission Integration Suite (MI-S)

SDSG/RS C2

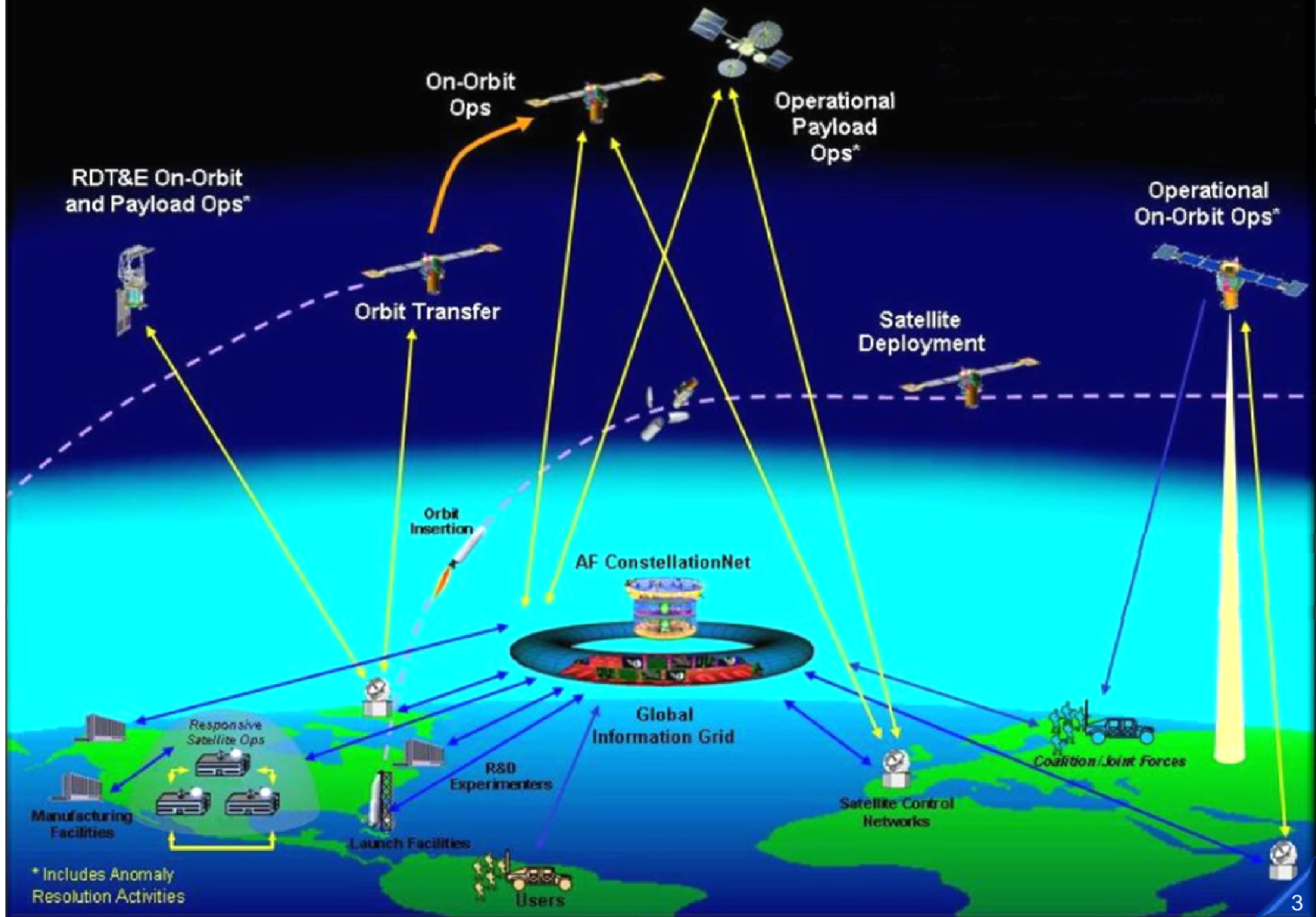
2 Mar 10

***Presented by
Charles Warrender***

Research & Development Space & Missile Operations (RDSMO)

- **Seamlessly develop and rapidly field new capabilities**
- **Standardize SATOPS and exploit core competencies**
- **Provide flexible, agile and affordable SATOPS capabilities**

Responsive Satellite Operations High Level Operational Concept (OV-1)



Taking the Red Pill

- **Operational Viewpoint**
- **Project Viewpoint**

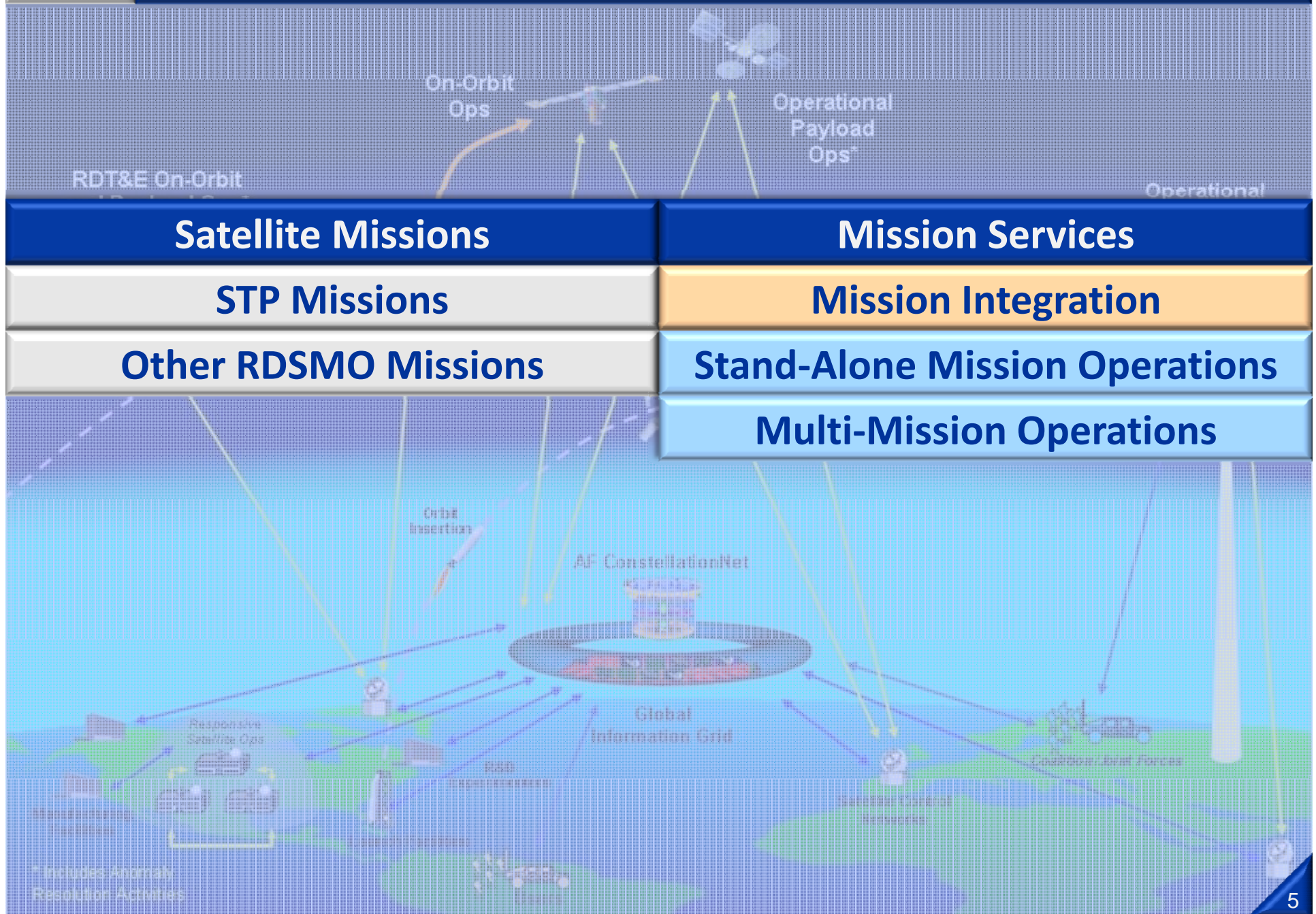
You take the blue pill - the story ends, you wake up in your bed and believe whatever you want to believe.

You take the red pill - you stay in Wonderland...



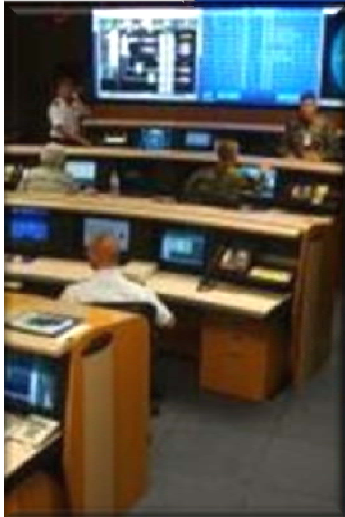


Project Portfolio





Mission Integration (MI) Models



GROUND SYSTEM (GS)

Used by the Mission
Operator



GROUND SUPPORT EQUIPMENT (GSE)

Used by the SV
Integrator

MI-1: GSA-Common Development

SV Integrator and GS Provider both use the same Ground System Architecture (GSA) CMD/TLM system

MI-3: Serial Development

GS Provider develops a GS CMD/TLM system after the SV development is complete

MI-2: Parallel Development

SV Integrator develops a CMD/TLM system and the GS Provider separately develops a CMD/TLM system

MI-4: GSE-Common Development

SV Integrator provides their GSE “as-is” to the GS Provider for use in on-orbit operations



MI-1 Concept: GSA-Common Development

MISSION INITIATION
SV Need Defined

CONCEPT EXPLORATION
SV & GS Requirements Defined

MISSION IMPLEMENTATION
SV & GS Developed

**MISSION
PARTNER**

SV INTEGRATOR

SV FACTORY

**GSA GUI &
CMD & TLM
DEVELOPMENT**



MI-S



CRYPTO



GSE



**SV ASSEMBLY
INTEGRATION
& TEST**

**GSA
EXTERNAL
ICD & GSA
SERVICES
GUIDE**

**MI-1
SELECTION
CUSTOMER
STATEMENT
OF NEED**

**MI-1 RFP
PROVISIONS
MISSION
PLAN**

**MISSION
SPECIFIC
REQUIRE-
MENTS**

**TRAINING &
MI-S TECH
SUPPORT
GS DESIGN &
INTEGRATION**

**SV DESIGN,
BUILD & TEST
GSA GUI &
CMD & TLM
FILES**

NEW MISSION IPT

MISSION MANAGER / GS LEAD / OPS LEAD

**SPACE DEVELOPMENT
& TEST WING**

GROUND SYSTEM IPT

OPERATIONS IPT

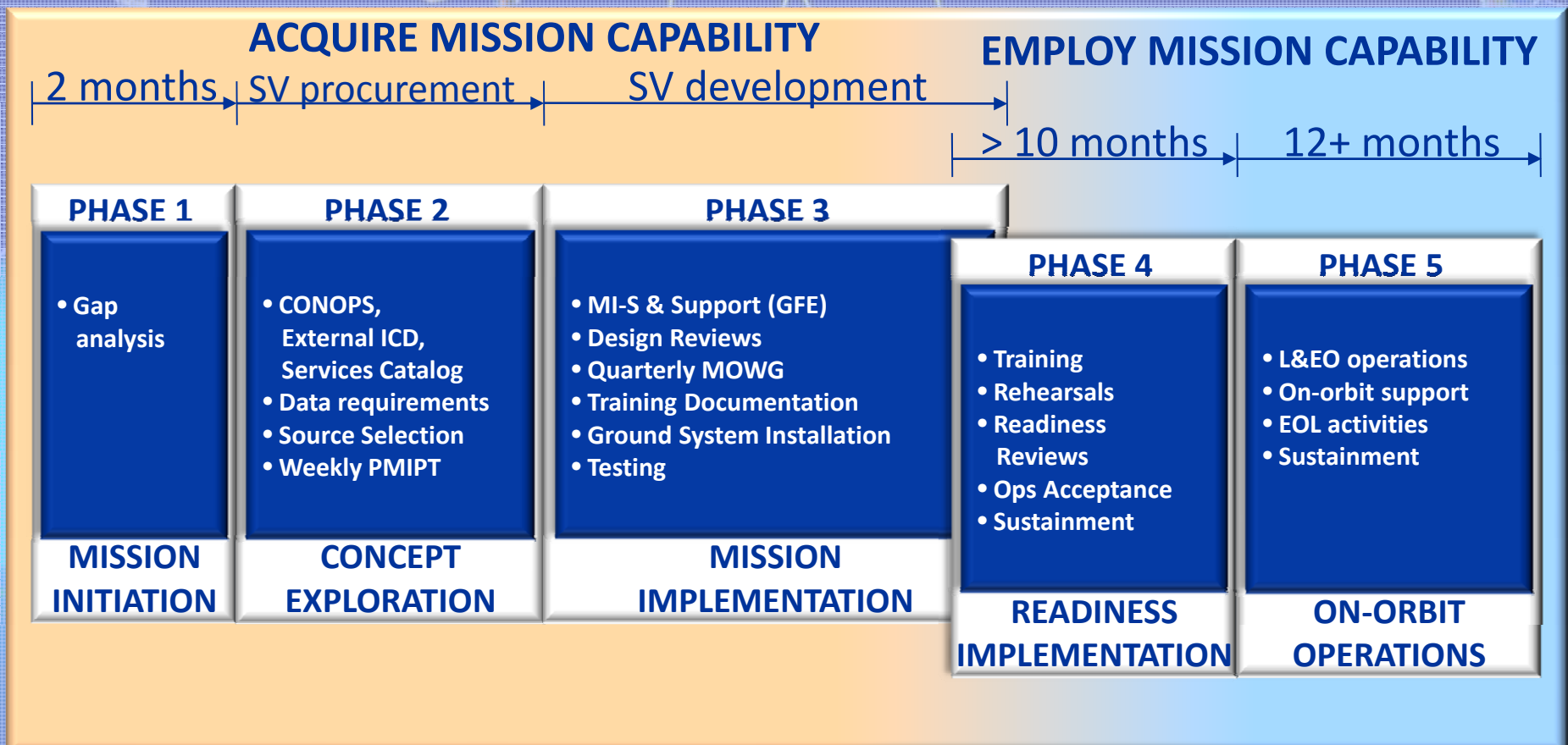
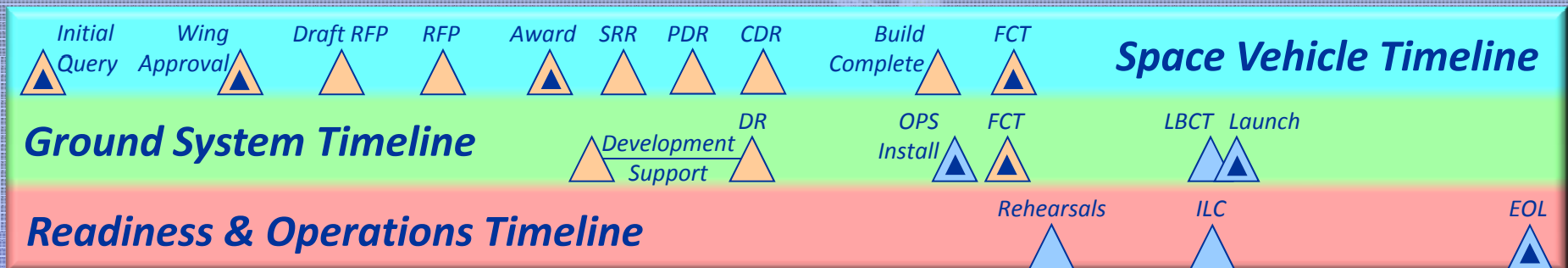
2 Months

SV Procurement Timeline

SV Development Timeline



MI-1 Mission Timeline







CRITICAL ON-ORBIT TECHNOLOGY ELEMENTS

The diagram illustrates four critical on-orbit technology elements, each represented by a satellite icon and a text label:

- RDT&E On-Orbit and Payload Ops[®]**: Represented by a satellite icon on the left.
- On-Orbit Ops[®]**: Represented by a satellite icon in the upper center.
- Operational Payload Ops[®]**: Represented by a satellite icon in the upper right.
- Operational On-Orbit Ops[®]**: Represented by a satellite icon on the right.

Arrows indicate the flow of data and operations between these elements, showing a complex network of interactions.

[illegible]



Mission Lifecycle

ACQUIRE MISSION CAPABILITIES

MISSION INITIATION	CONCEPT EXPLORATION	MISSION IMPLEMENTATION
<ul style="list-style-type: none">• Gap analysis	<ul style="list-style-type: none">• CONOPS, External ICD, Services Catalog• Data requirements• Source Selection• Weekly PMIPT	<ul style="list-style-type: none">• MI-S & Support (GFE)• Design Reviews• Quarterly MOWG• Training Documentation• Ground System Installation• Testing

EMPLOY MISSION CAPABILITIES

READINESS IMPLEMENTATION	MISSION OPERATIONS
<ul style="list-style-type: none">• Training• Rehearsals• Readiness Reviews• Ops Acceptance• Sustainment	<ul style="list-style-type: none">• L&EO operations• On-orbit support• EOL activities• Sustainment

Evolutionary Development

ACQUIRE MMSOC GSA CAPABILITIES

CAPABILITY NEED IDENTIFICATION	CONCEPT EXPLORATION	CAPABILITY IMPLEMENTATION
<ul style="list-style-type: none">• Weekly Working Group Meetings• Perform System Analysis<ul style="list-style-type: none">○ System Reliability○ System Costs○ System Loading○ Change Request• Define MMSOC GSA Capability Needs• Elements of Cost for Solution Concept Development	<ul style="list-style-type: none">• Collaborate with the Government to Develop Mature Solutions• Solution Concept includes:<ul style="list-style-type: none">○ Operations Concept○ Verification and Test Strategy○ Deployment Strategy○ Requirements and Traceability○ Risk Analysis○ Implementation Best Estimate○ Master Schedule	<ul style="list-style-type: none">• Fully Develop HW/SW architecture• Conduct a Technical Interchange Meeting• Procure and assemble HW/SW• Establish a revised baseline• Integrate HW/SW components• Create/update test plans/cases• Conduct System Testing• Deploy new capability• Perform Regression Testing• Update System Documentation• Provide Training for New Capabilities



MI-S Use Cases

Ground System Equipment

Deploy MI-S to a vehicle contractor facility for SV testing

Simulator Support

Host MI-S locally to simulate an SV for readiness and testing

Flight Support

Deploy MI-S as a flight asset

Ground System Evolution

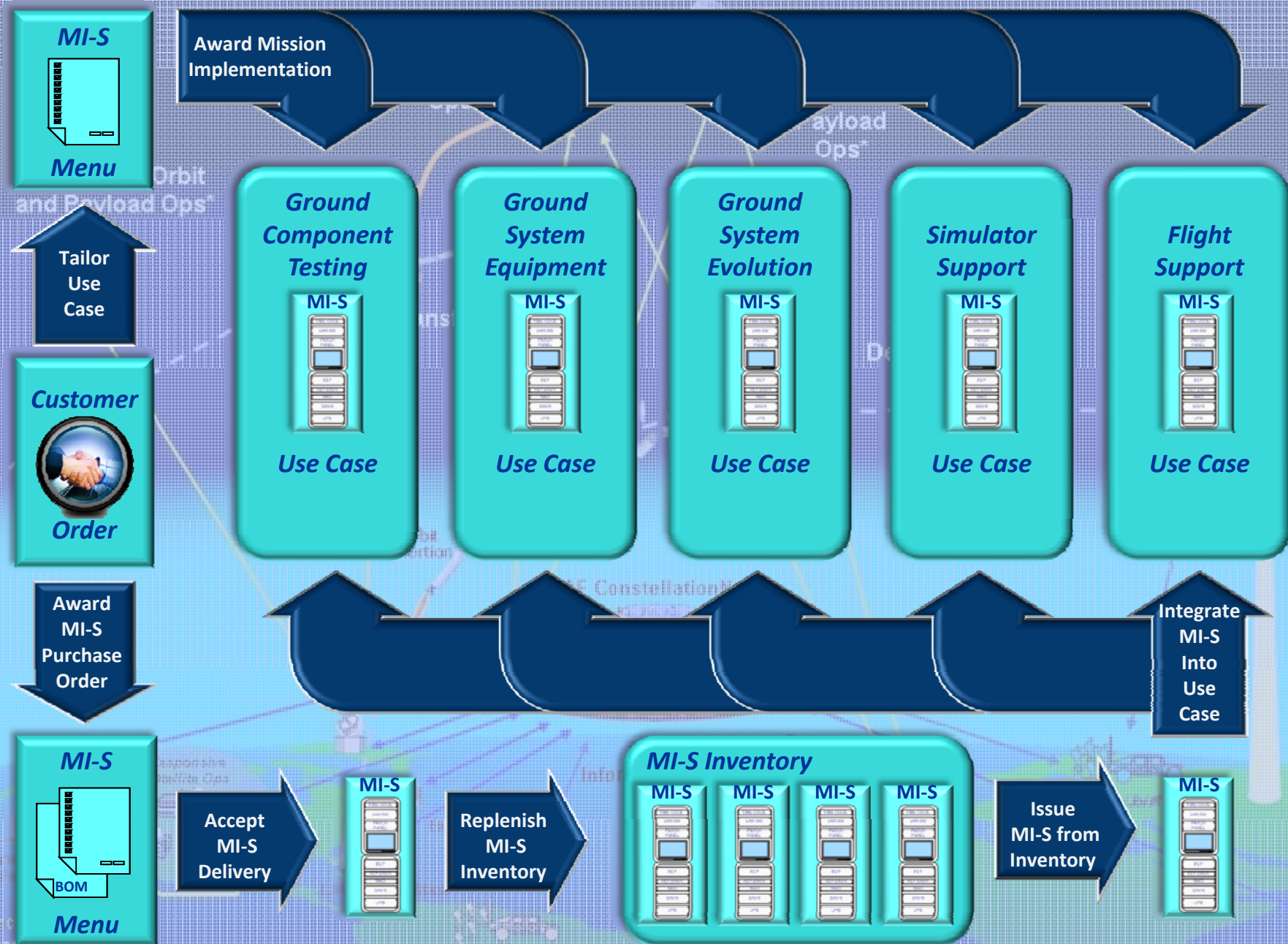
Integrate MI-S into a testbed for ground system experimentation

Ground Component Testing

Host MI-S locally to evaluate HW /SW components



MI-S Ordering Menu Business Model



Responsive Satellite Operations High Level Operational Concept (OV-1)

We took the red pill



Which one will you choose?

Questions?



* Includes Anomaly Resolution Activities