HOSTED PAYLOAD ALLIANCE

Working Session I
Assessing Commercial Space Alternatives in Early Stages of the Government Acquisition Process

National Space Symposium

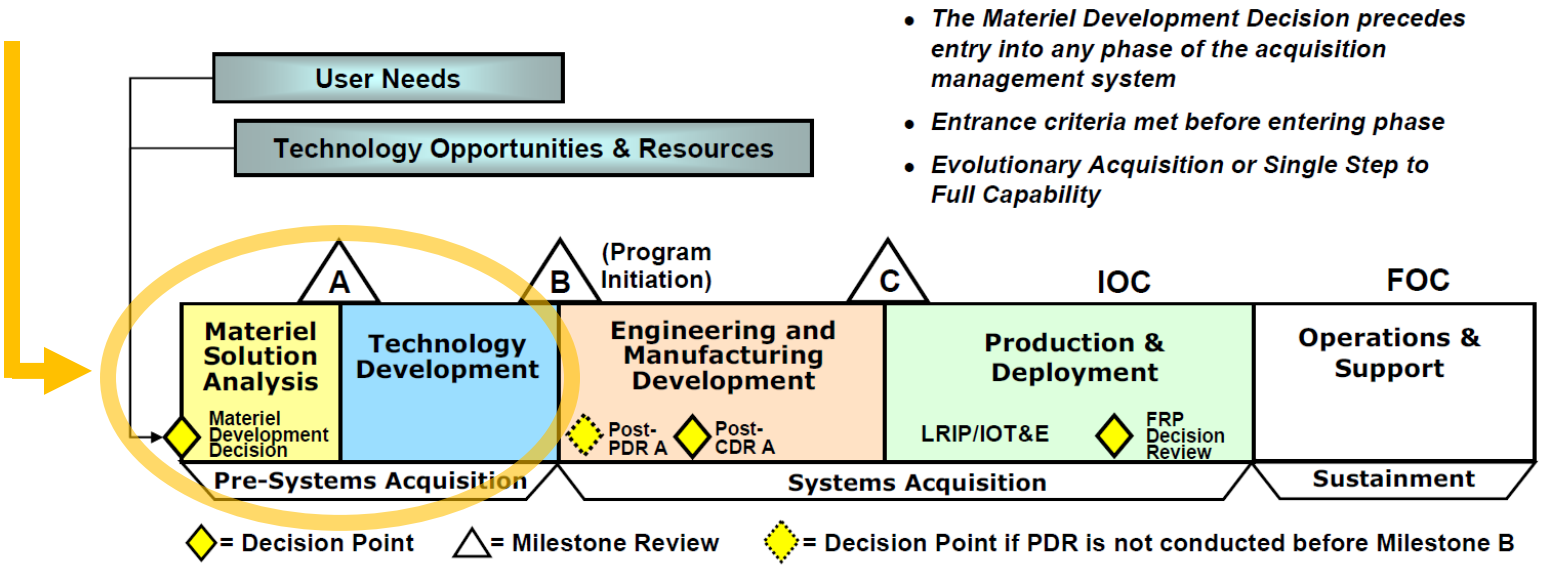
8 April 2013

www.hostedpayloadalliance.org

Seminar with Non-Attribution Policy

- "Participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed."
  - Chatham House Rule is invoked at meetings to encourage openness and the sharing of information.
- Seminar format with open dialogue among participants
- Output will identify:
  - Issues where there is already wide consensus
  - Issues meriting further dialog to advance understanding
  - New issues requiring more thought

Early Stage Assessment of Commercial Space Alternatives



- *The Materiel Development Decision precedes entry into any phase of the acquisition management system*
- *Entrance criteria met before entering phase*
- *Evolutionary Acquisition or Single Step to Full Capability*

Material Solution Analysis:

- Assess Potential Materiel Solutions
- Preliminary CONOPS
- Operational Risk
- Trade Space Characterization
- Architecture Characterization
- Cost/Effectiveness/Risk Analysis
- Analysis of Alternatives

Technology Development

- Technology Development Strategy
- Cost Analysis and Program Evaluation (CAPE) Independent Cost Assessment
- Evolutionary Strategy or Single-Step-to-Full Capability Strategy?
- Competitive Prototyping

Topics of Discussion

- Architectural Integration of Hosted Payloads
- Ground System Consideration for Hosted Payloads
- Business Case Considerations in Pursuing Hosted Payloads
- Information Assurance
- Schedule Alignment of Government Payloads and Commercial Host Platforms
- Risk management between multiple parties
- Operational concepts during crisis management
- International Launch Providers and the U.S. Space Transportation Policy

Space and Missile Systems Center

Architectural Integration of Hosted Payloads

Col Kent Nickle
Chief, Space Projects Division
Development Planning Directorate

Why Commercially Hosted Payloads?

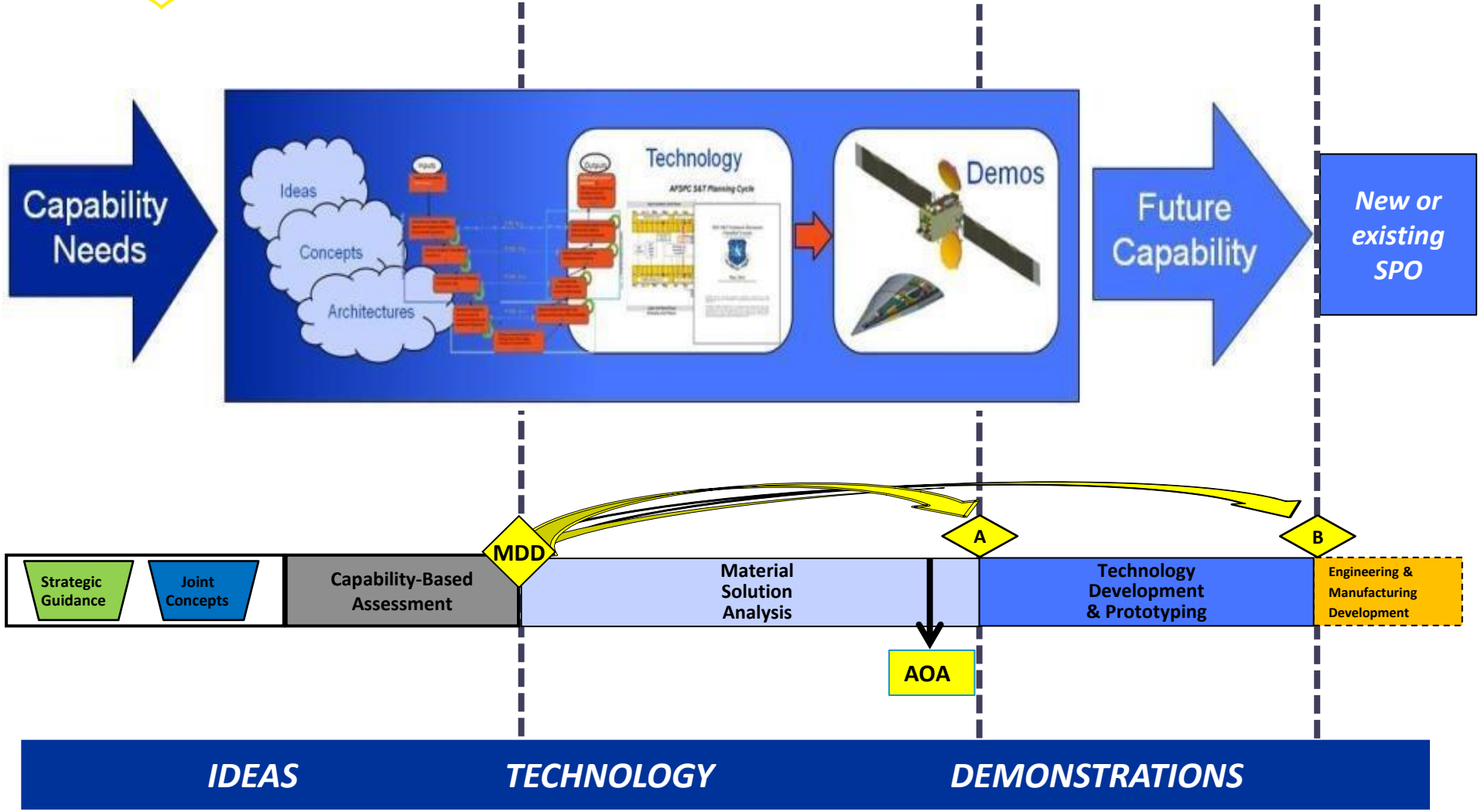
- Current Environment → Increasing Threats, Declining Budgets
- Solution → Resiliency, Flexibility, Responsiveness...
  …Disaggregated Architectures

- Disaggregation Advantages
  - More, smaller, less complex satellites/payloads
  - Increased technology refresh, risk tolerance, requirements stability
  - Increased industry participation

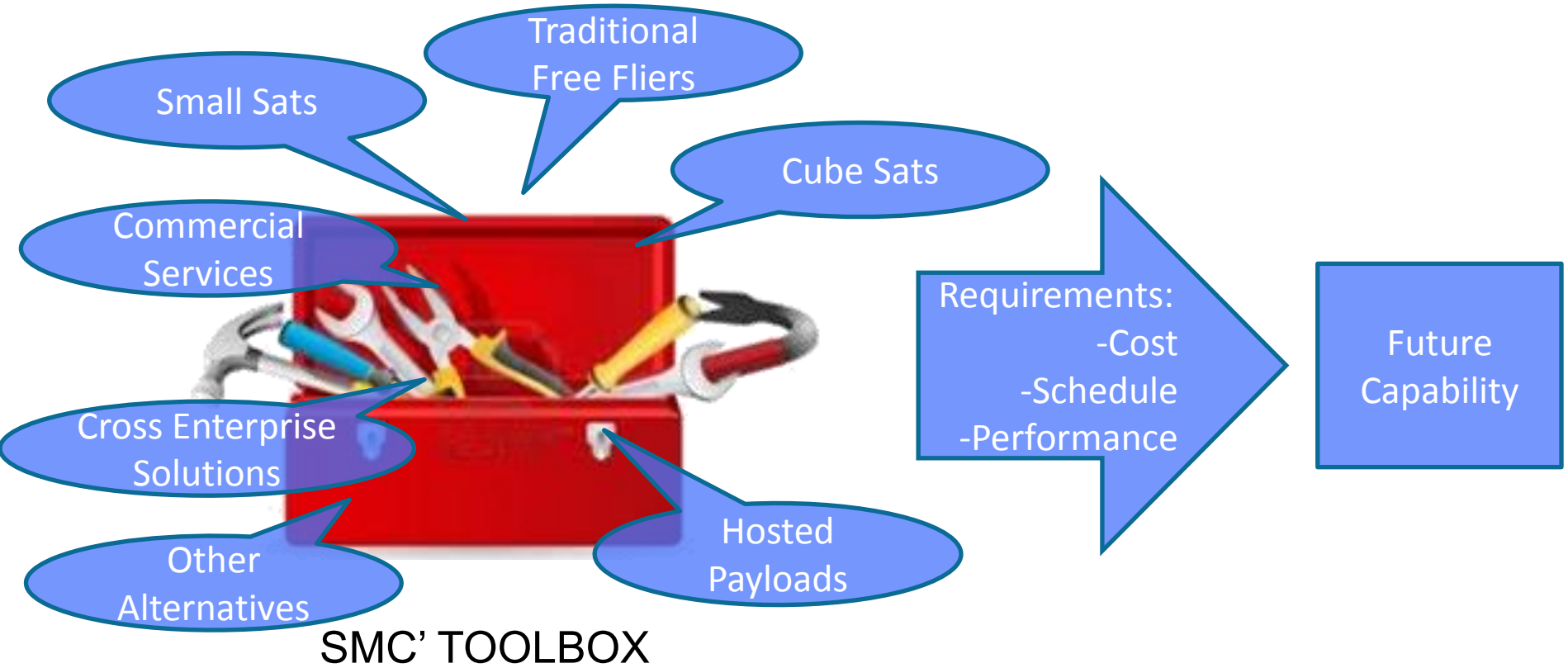
- Disaggregation Concerns
  - Increased costs
  - Increased ground processing and complexity

- Commercially Hosted Payloads Benefits
  - Additional, cheap, reliable access to space
  - Robust ground/connectivity infrastructure

SMC Capability Development



SMC Capability Toolbox

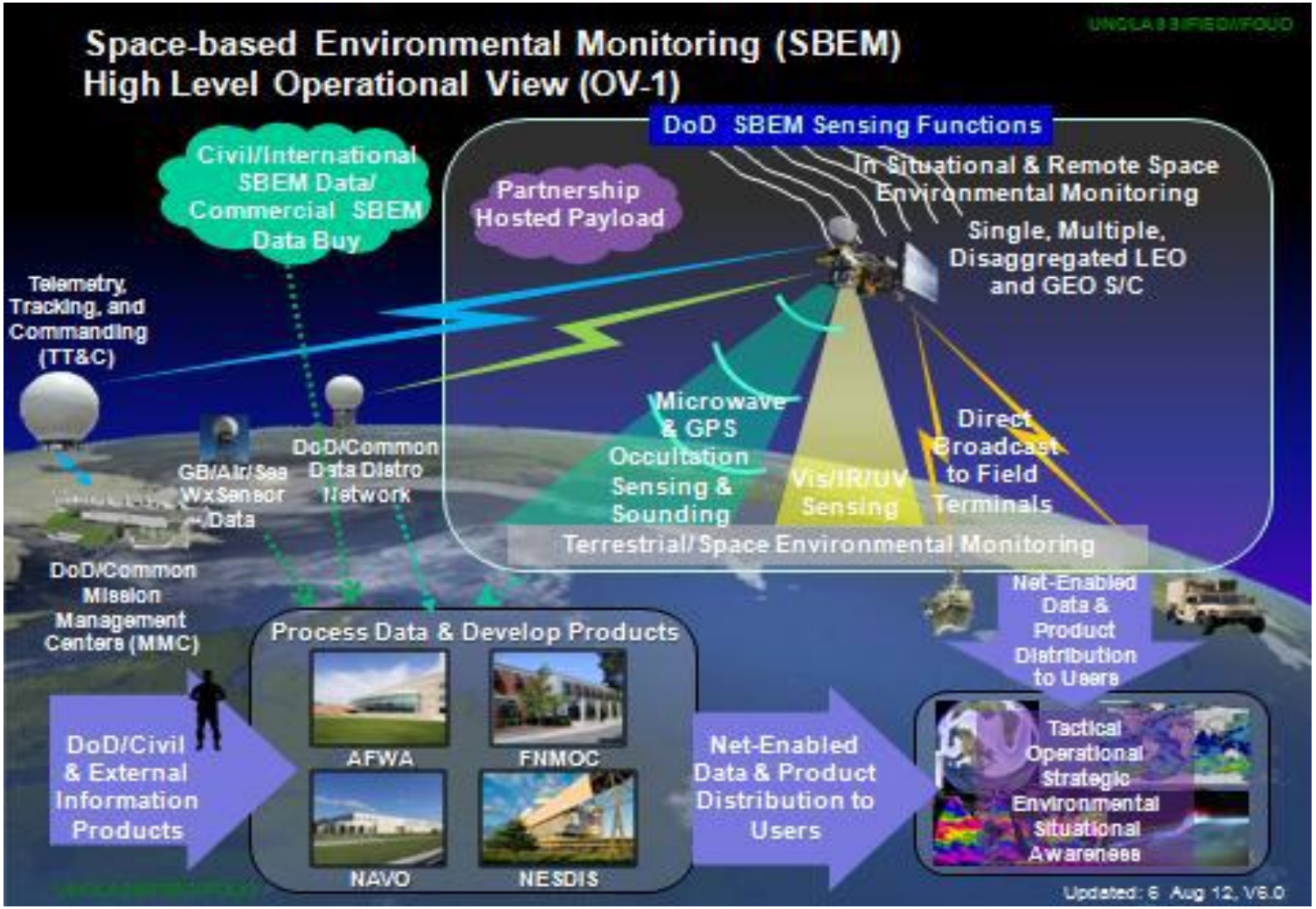


Hosted Payloads is one tool in SMC's Toolbox

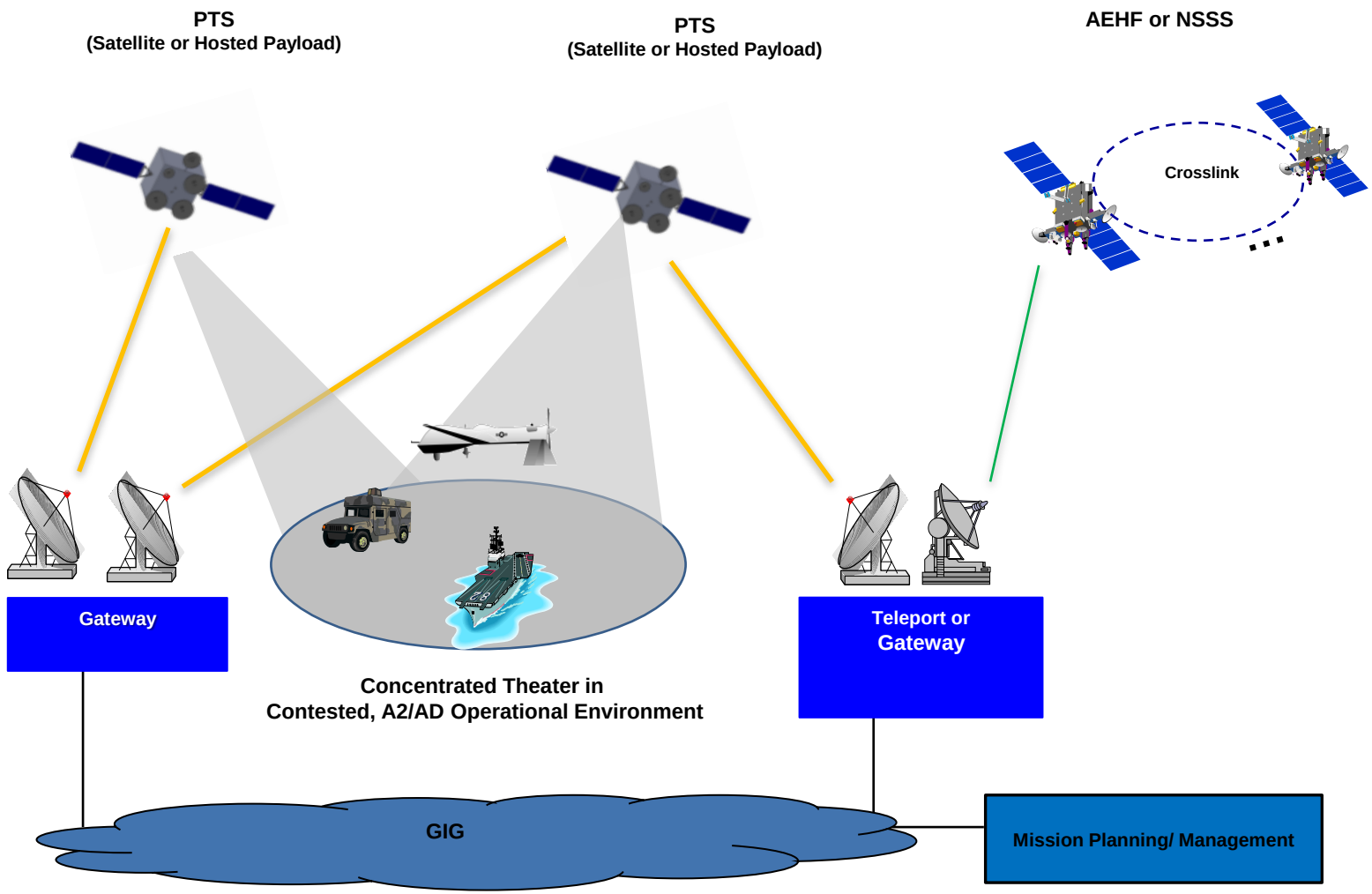
OPIR Architectures
Hosted Payload Option

Architecture	Constellation Size	Sensor	Spacecraft Bus	Launch Vehicle
Disaggregated	4 GEO	Simplified Scanner[1]	Small, Purpose-Built, Rad Hard	Atlas 401
	2 GEO WFOV Hosted	9° WFOV[2]	N/A	N/A
	3 GEO WFOV Free Flyer	6° WFOV[3]	Small commercial	Falcon 9

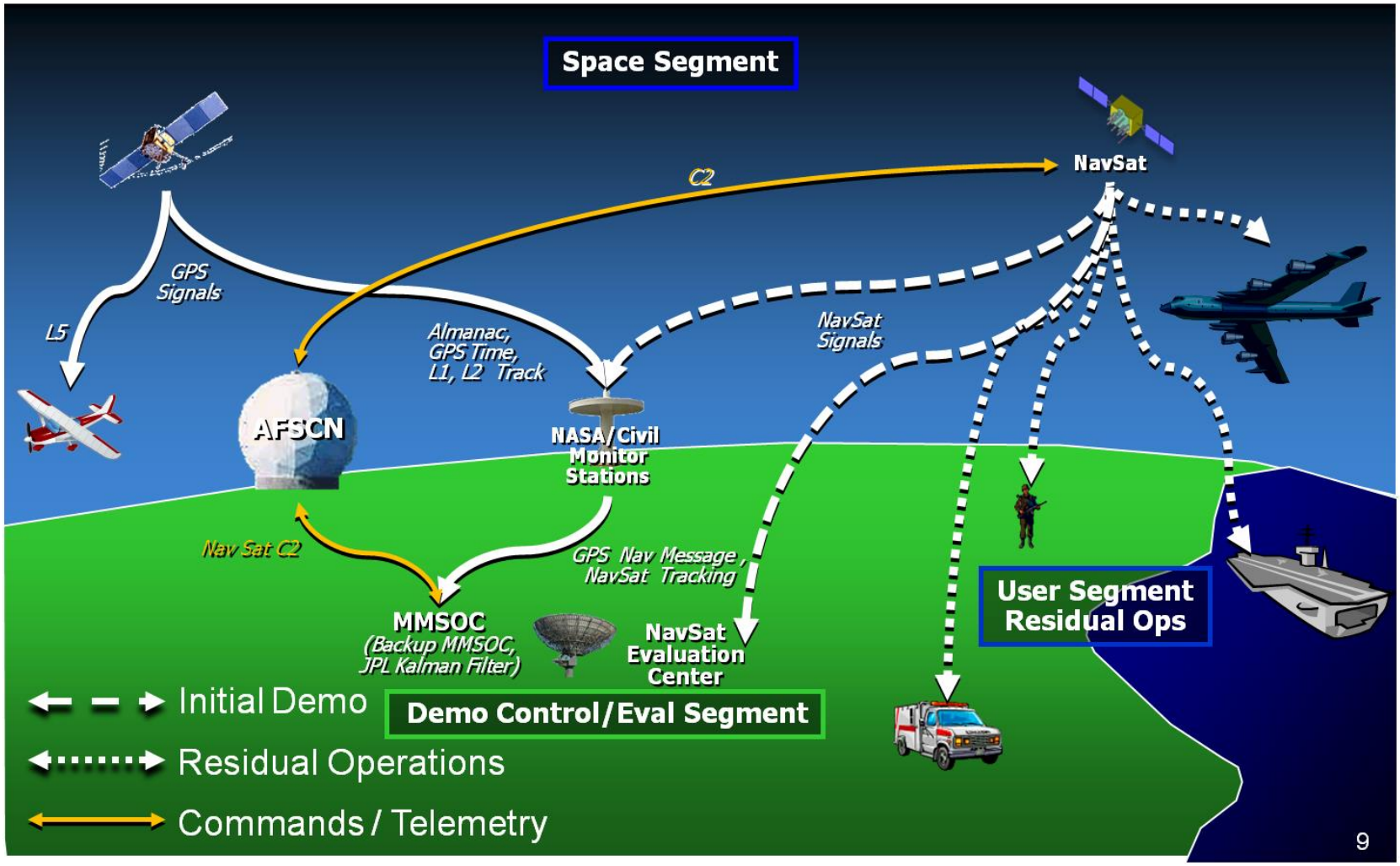
Space-Based Environmental Monitoring Hosted Payload Consideration



MilSatCom Architecture
Hosted Payload Consideration



NAVSAT Architecture



Potential Near Term Hosted Payloads

Capability Areas

Missile Warning/Def	9 Degree Wide Field of View (WFOV)
Prompt Global Strike	
Launch & Range	
Space Based Env. Monitoring	Tropospheric Emissions: Monitoring of Pollution (TEMPO); Hosted Environmental Assessment for LEo Radiation (HEALER); Weather Analysis of Alternatives
MILSATCOM	W/V Band Payload
ORS	Responsive Hosted Alternatives
Global Positioning	Atomic Clock
S&T M&S	

Summary

- Current environment drives need for resiliency and flexibility through disaggregation
- Commercially Hosted Payloads are a promising enabler
- Commercially Hosted Payloads are already being “baked in” to SMC’s future demos and operational system architectures

Perspectives from a Headquarters Action Officer

- Bigger picture: Innovative Business Models
  - Sometimes the innovation isn't a widget
  - Mission Services, Commercial SatCom models, Commercial hosting

- Why commercial hosting? Potential to achieve
  - Decreased costs
  - Increased resilience through disaggregation
  - Increased technology refresh through decreased timelines

Barriers to Hosting

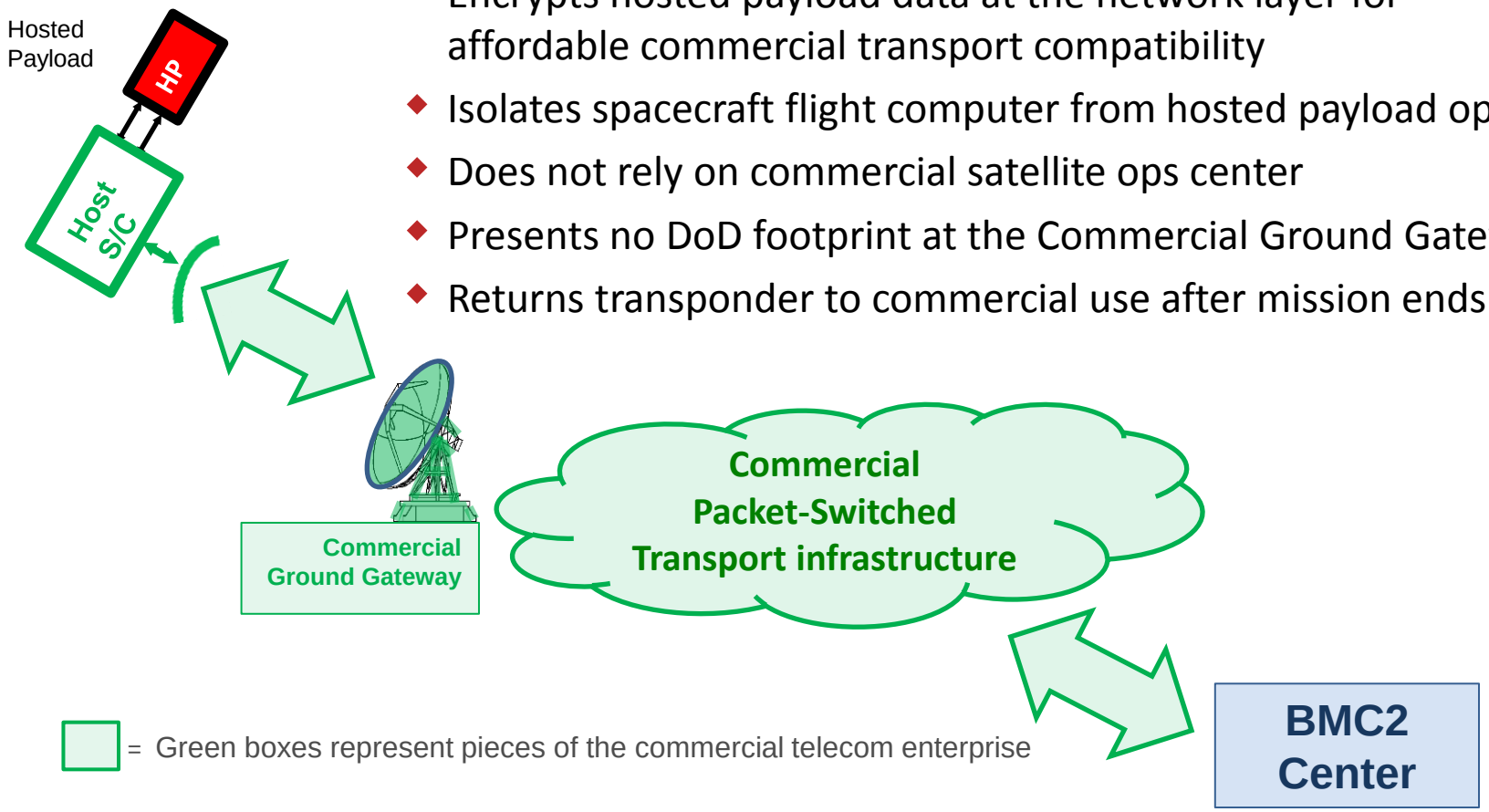
- How do we protect the information?
- How do we estimate the total life cycle costs?
  - How do we capture ground segment costs?
  - How well do we understand costs to sustain/extend service?
  - How will the data enter our existing networks and is there a cost to modify legacy systems?
- What if the satellite is to be launched on a foreign booster? (policy)
- How do we establish programming for emergent capabilities-of-opportunity?
  - Is our programming affected by service acquisition vs system acquisition

Business Case Considerations

- Source of uncertainty for US Government cost estimation in evaluating prospective hosted solutions
  - Non-traditional approach
  - Lack of insight into variables at play
- Discussion topics: hosting price relevance and dependence
  - Opportunity cost: displacement of transponders, or extra fuel or power use over course of payload mission life
  - Complexity and risk to primary commercial mission
  - Liability and insurance
  - Assessed value to US Government
  - Costs of “doing business”: planning, concept, and design phases
  - Competition among hosts for US Government business

Information Assurance Problem to Solve

- Provide secure, two-way interface to the hosted military payload that:
  - Uses ordinary commercial transponder(s)
  - Encrypts hosted payload data at the network layer for affordable commercial transport compatibility
  - Isolates spacecraft flight computer from hosted payload ops
  - Does not rely on commercial satellite ops center
  - Presents no DoD footprint at the Commercial Ground Gateway
  - Returns transponder to commercial use after mission ends



Characterization of Issues

- Issues where there is already wide consensus
- Issues meriting further dialog to advance understanding
- New issues requiring more thought

Issues Enjoying Wide Consensus

- Issue 1
- Issue 2
- Issue 3

Issues Meriting Further Dialog

- Item 1
- Item 2
- Item 3

New Issues Requiring More Thought

- Item 1
- Item 2
- Item 3