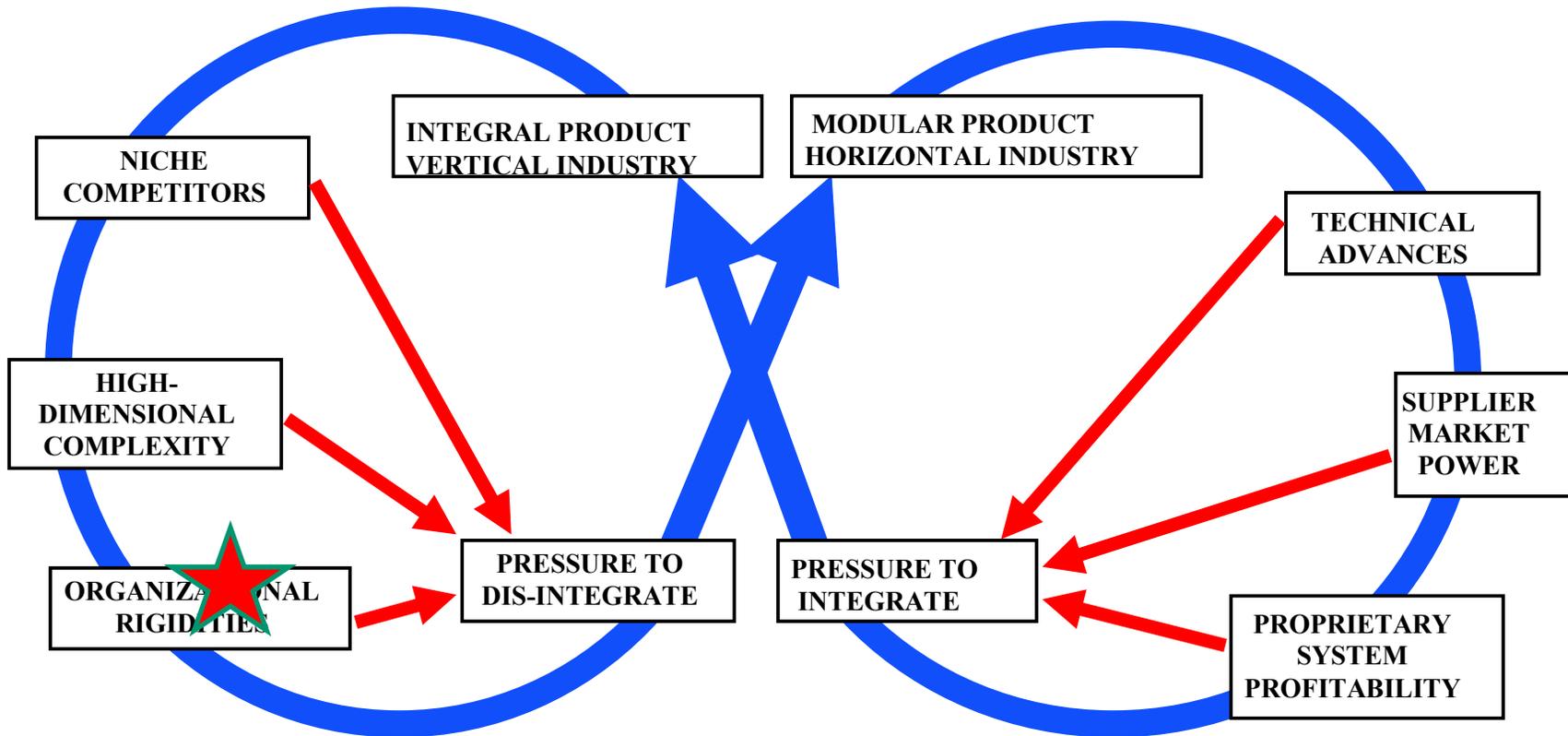




Enabling Radical Innovation through Joint Capability Technology Demonstrations (JCTD): The Case of the Internet Routing in Space (IRIS) JCTD

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AIAA Space 2009

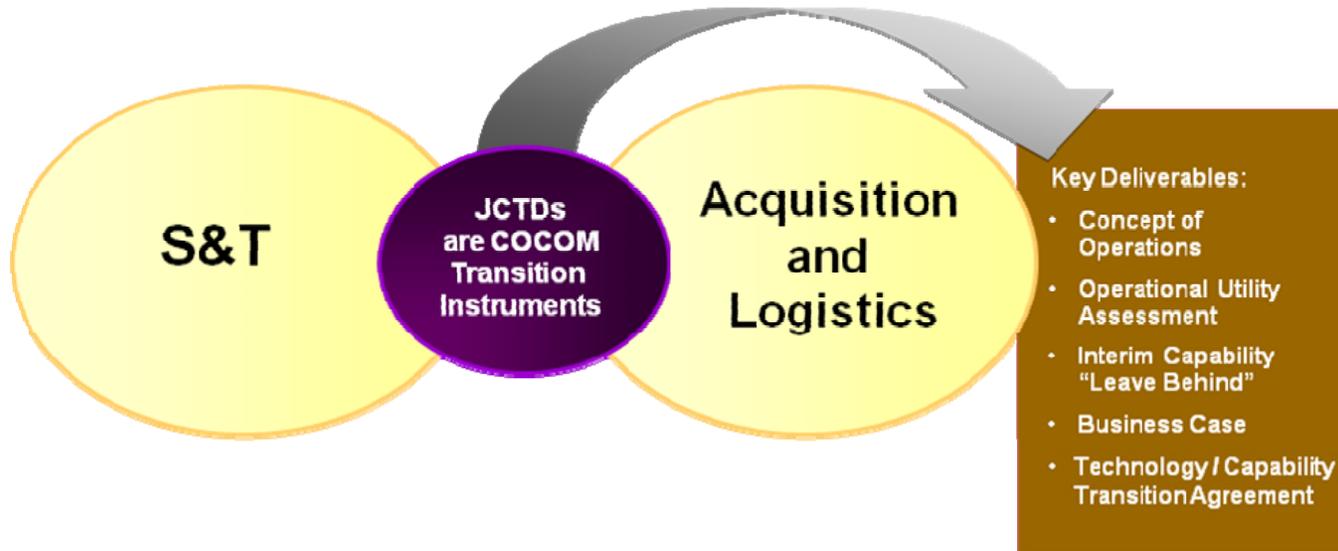
Disruptive change typically comes from outside of the “establishment”
 (Schumpeter 1934; Utterback 1994; Christensen 1997)



Unique market structure of space industry lacks pressure to “dis-integrate”, upsetting natural process of “creative destruction”

- One “corrective” mechanism is the Joint Capabilities Technology Demonstration (JCTD) program

- **Fill Gaps Between S&T and Acquisition for COCOMs**
- **Demonstrate Multi-Service, Joint, Interagency and Coalition Capabilities**

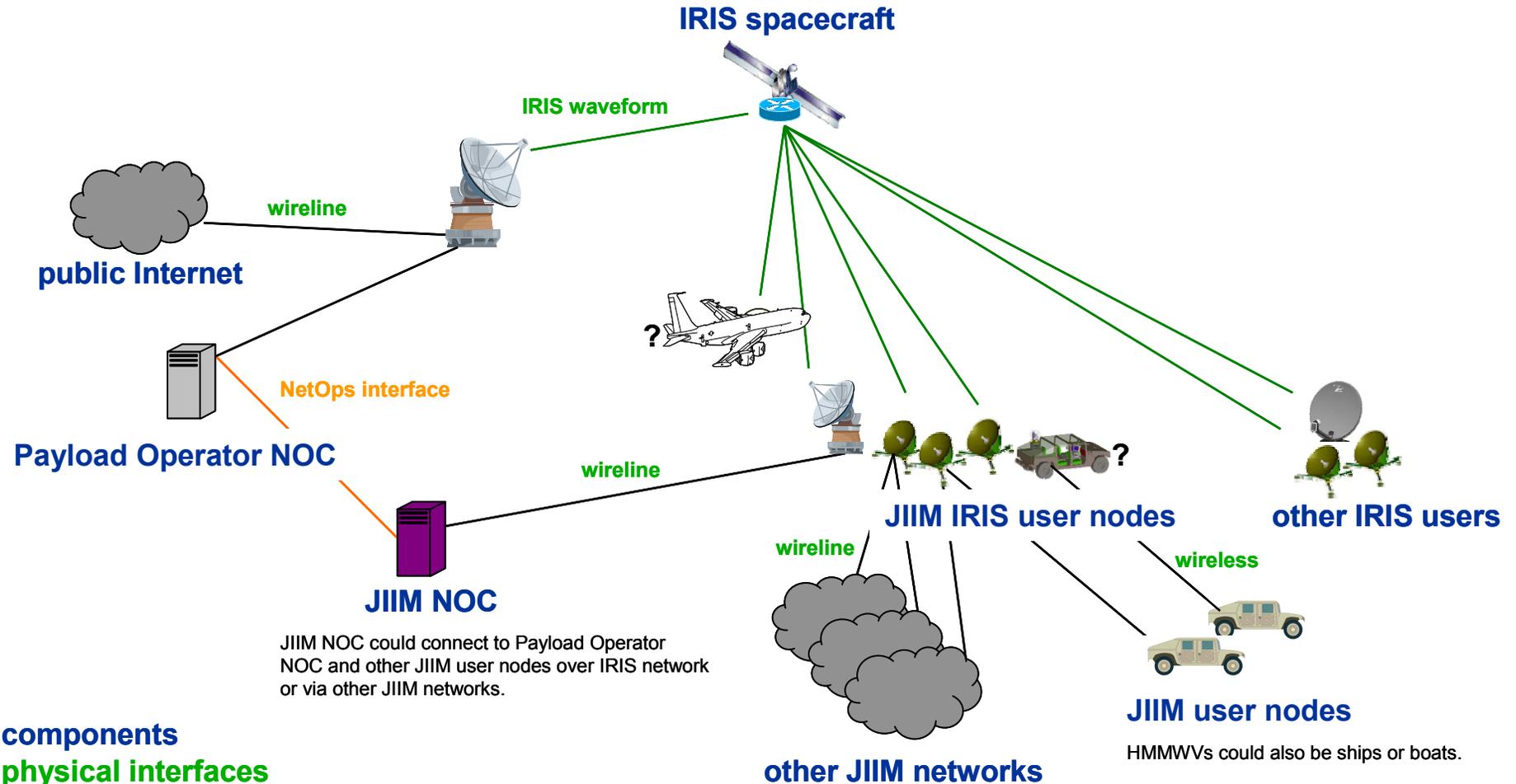


JCTDs are not acquisition programs; they transition solutions to COCOMs

(JCTD POG Narrative)

- Key Question:
 - How effective is the JCTD program as a mechanism for encouraging disruptive technological innovation – both within the DoD and leveraging the creativity of “outside” contributors?
- Approach:
 - Conduct case study of the Internet Routing in Space (IRIS) JCTD (the only space JCTD to date).
 - Analyze case through the lens of market disruption and innovation theory.

IRIS Case Study



components

physical interfaces

logical interfaces

NOC: Network Operations Center

JIIM: Joint, Inter-Agency, Inter-Governmental, and Multi-National

The IRIS innovation

Old way: “Bent-pipe” strategy (the on-orbit asset merely amplifies the signal and bounces it back to a compatible source, effectively unchanged)

Vs.

New way: IRIS equipped satellites will perform both regeneration and processing on-orbit (allowing the use of smaller ground stations and cross-beam, cross-frequency communication among any node in the network)

Payload Operator NOC



Nature of the Disruption

- Places high technology in orbit (contrary to conventional wisdom)
- Changes value proposition in market (potentially displacing powerful incumbents)
- Benefits accrue at system level

com
phys
logic

NOC: N

JIIM: Joint, Inter-Agency, Inter-Governmental, and Multi-National

oats.

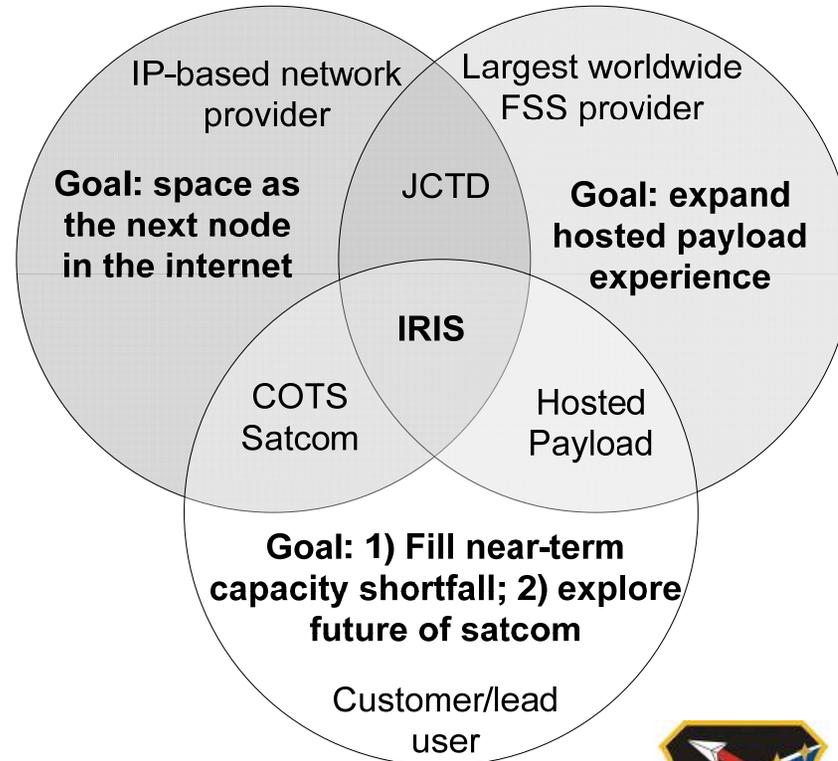


The IRIS Team: Overlapping Interests



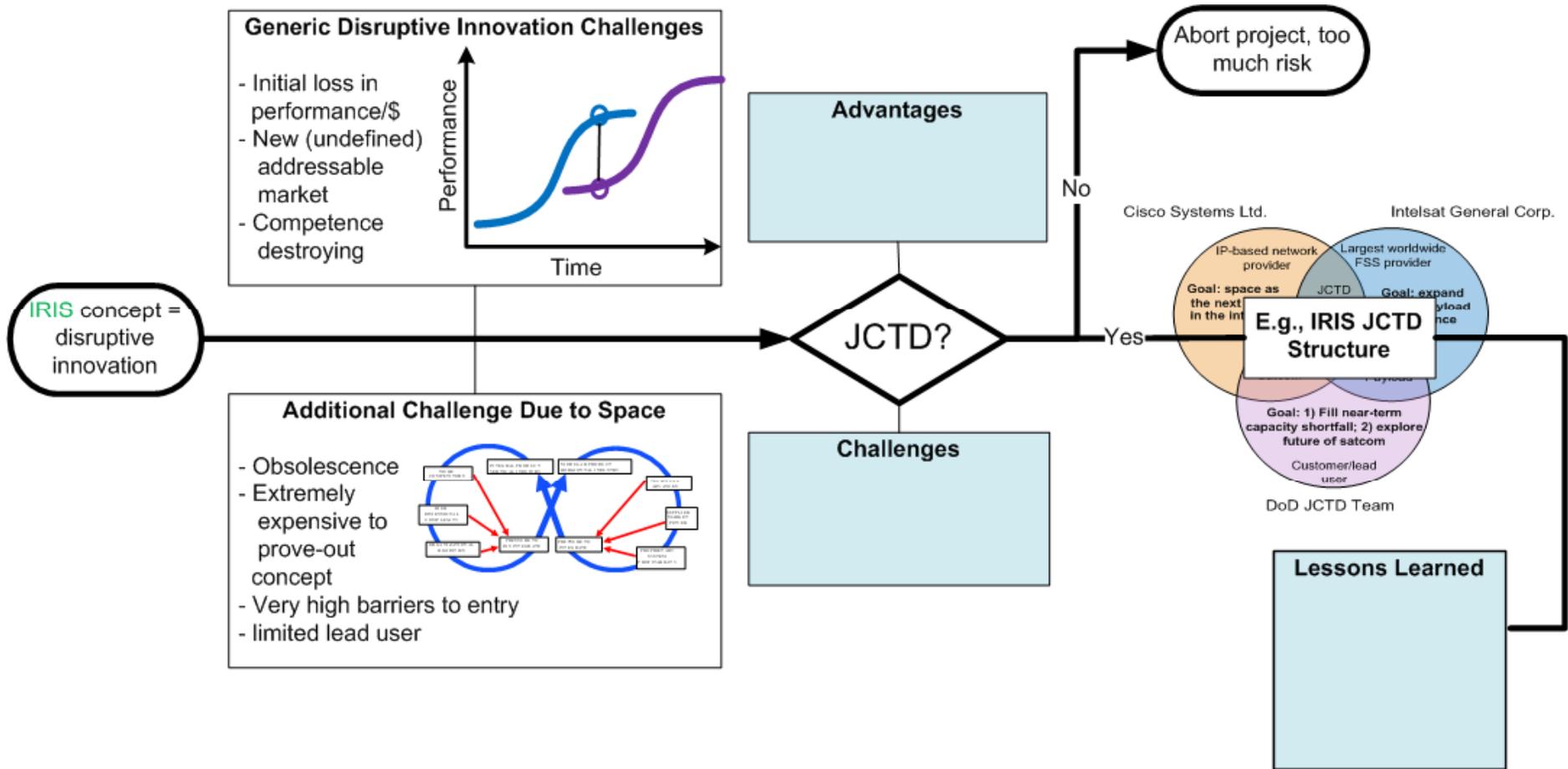
Cisco Systems Ltd.

Intelsat General Corp.



DoD JCTD Team



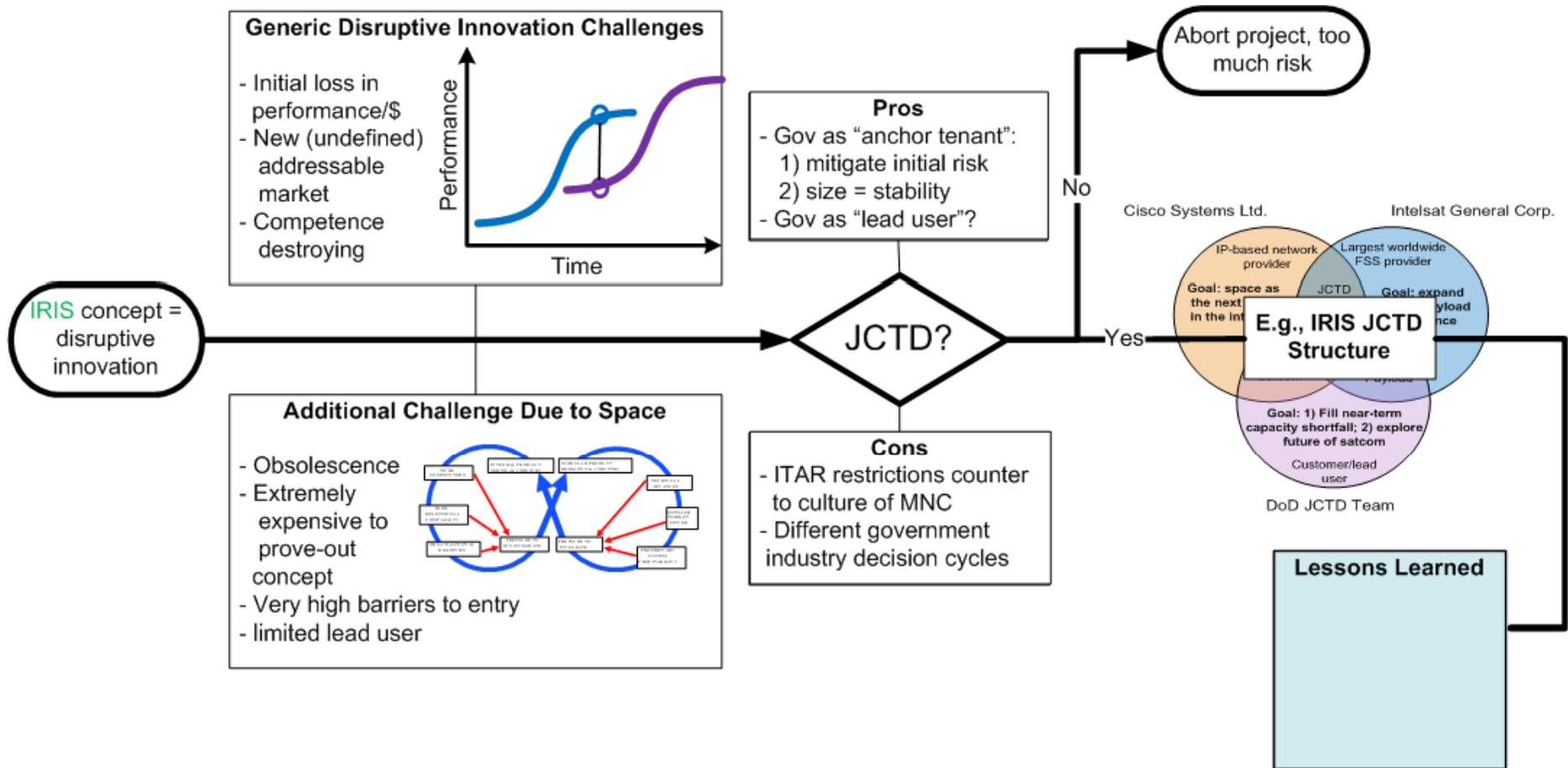


- Advantages

- Commercial P.O.V.
 - “Anchor tenant”
 - Opportunity to prove out utility prior to wide deployment
- Government P.O.V.
 - leverage the paper-to-orbit efficiency of commercial service providers
 - Influence innovation pathway with minimal investment

- Challenges

- Mismatched “clock-cycles”
 - E.g., waveform decision
- Cost of Regulatory compliance
 - Financial
 - Cultural
 - E.g. ITAR impact on innovative culture of MNC



- **Great idea not sufficient to change the fundamentals of an industry**
- **Government buy-in early is sufficiently important to merit weathering the challenges that government partnerships entail.**
- **JCTD joint venture model not sustainable in current form**
- **Currently functioning because:**
 - overlapping objectives built into the program – and sheer persistence of many of the key stakeholders – rather than a sustainable long-term alignment of interests.
- **In general:**
 - Most entrants will neither have the economic stability to fund, nor the commitment to pursue, an IRIS-like innovation to the extent that Cisco has.
- **Given that most radical changes come from outside, it is in the government's interest to make the infusion task more manageable.**