HYBRID SPACE ARCHITECTURE

Statement of Principles

US Government and commercial space capabilities are vital to our national and economic security. They are increasingly threatened militarily by potential adversaries and commercially by foreign government-backed competition. To meet these challenges and retain US primacy in space, the US Government should partner with the US space industry to rapidly transition to a Hybrid Space Architecture.

The Hybrid Space Architecture is the integration of emergent "new space" smallsat capabilities with traditional US Government space systems.

This evolving resilient architecture will use a "variable trust" network framework for rapid and secure data exchange among proliferated satellite systems and services that are large and small; government and commercial; US and Allied; in various, diverse, and layered orbits. The architecture shifts from a platform-centric to an information-centric paradigm.

The Hybrid Space Architecture will dramatically improve deterrence and resilience in space while providing substantial new information advantage for science, commerce, and security.

Distribute Risk - provides strength in numbers and diversity, mitigating the inherent vulnerability associated with small numbers of high value assets in the current architecture.

Operate and Innovate Faster – allows for more rapid collection and dissemination of vital information, as well as rapid insertion of new technologies as they mature. For the military, allows some missions currently performed by aircraft to be hosted in space.

Improve Interoperability – improves decentralized interoperability among US and Allied military services; the intelligence community; civil and commercial space.

Lead the New Space Economy - strengthens the US commercial space economy, further boosting US space leadership.

The Hybrid Space Architecture will leverage:

- Multi-path, adaptative, secure communications; open mission systems; common standards
- Edge processing; autonomous command and control/tip and cue; artificial intelligence; distributed ledgers (e.g. blockchain)
- Terrestrial and space-based cloud infrastructure and analytics
- Commercial space manufacturing efficiencies (e.g. additive manufacturing and scale), systems, and data; digital modeling, design, and engineering; standards for cyber protection and secure supply chains; Agile/DevOps software and hardware approaches
- Low cost commercial bulk launch; responsive and resilient small launch
- New rapid government acquisition mechanisms to move quickly to the new architecture