News Release

Defense Advanced Research Projects Agency

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DARPA AWARDS CONTRACTS FOR FRACTIONATED SPACECRAFT PROGRAM

The Defense Advanced Research Projects Agency (DARPA) has awarded funding to four contractor teams for the first phase of the Future, Fast, Flexible, Fractionated, Free-Flying Spacecraft United by Information Exchange (System F6) space technology and demonstration program.

Contracts are being awarded to:

- The Boeing Co., Huntington Beach, Calif., teamed with L3 Communications, Millennium Space Systems, Octant Technologies, and Science Applications International Corp. ($12,891,049);
- Lockheed Martin Space Systems Co., Palo Alto, Calif., teamed with Aurora Flight Sciences, Colbaugh & Heinsheimer Consulting, Vanderbilt University, and Lockheed Martin Integrated and Global Systems ($5,762,781);
- Northrop Grumman Space & Mission Systems Corp., Redondo Beach, Calif., teamed with Alliant Tech Systems Inc., Aurora Flight Sciences, Juniper Networks, L3 Communications, BAE Systems, Cornell University, Jet Propulsion Laboratory, Massachusetts Institute of Technology, University of Southern California, and University of Virginia ($6,159,866); and
- Orbital Sciences Corp., Dulles, Va., teamed with IBM, Jet Propulsion Laboratory, Georgia Institute of Technology, SpaceDev, and Aurora Flight Sciences ($13,648,758).

The DARPA System F6 program intends to demonstrate that a traditional, large, monolithic satellite can be replaced by a group of smaller, individually launched, wirelessly networked and cluster-flown spacecraft modules. Each "fractionated" module can contribute a unique capability to the rest of the network, such as computing, ground communications, or payload functionality. The ultimate goal of the program is to launch a fractionated spacecraft system and demonstrate it in orbit in approximately four years.

DARPA F6 Program Manager Dr. Owen Brown explains, "We see many benefits to fractionation. Fractionation provides the flexibility to launch individual payloads when they are ready so that an otherwise complex, multi-payload program isn't delayed. It diversifies risk during launch by not putting all of our eggs into one basket, greatly improves robustness to attack, and provides the capability to rapidly replace a failed component without needing complex in-orbit servicing. And we have the potential to take advantage of Moore's law by frequently upgrading on-orbit computing resources using relatively small modules, as opposed to waiting decades until we replace the entire spacecraft. The F6 architecture will demonstrate an

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approach that will enable us to do these types of crucial space activities in the future, and maybe even some incredible things we haven't even begun to consider."

During the first phase, contractors will:

- Develop key technologies to enable the fractionated approach, including robust networking, reliable wireless communications, fault-tolerant distributed computing, wireless power transfer, and autonomous cluster navigation;
- Select a space system mission of value to a national security space stakeholder and develop a system design to accomplish that mission;
- Develop an innovative analytical approach using econometric tools that determine the risk-adjusted cost and value of a both a fractionated space system and a monolithic program of record with equivalent capability; and
- Develop an evolved hardware-in-the-loop test-bed to emulate the designed fractionated spacecraft using a cluster of networked computers.

"This is an incredibly exciting program that could radically change the way we do business in space," continues Brown. "The world of tomorrow will be one of uncertainty. To address this uncertainty, F6 will develop an approach that provides flexibility and reduced risk for a space system's entire lifecycle."

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