

Determining atmospheric composition

Commemorating Kitty Hawk

A good precedent for debris mitigation

AEROSPACE

★ ★ ★ AMERICA ★ ★ ★

2023

YEAR-IN-REVIEW



Space logistics: A burgeoning commercial market

BY HAO CHEN AND KOKI HO

The **Space Logistics Technical Committee** fosters development of integrated space logistics capabilities that enable safe, affordable and routine spacefaring operations.



Technology development of **in-space servicing, assembly and manufacturing, or ISAM**, increasing concern about space debris and the global enthusiasm for space exploration are fostering a new commercial market for space logistics. This year, multiple market research companies, such as **Brainy Insights** in India, **Allied Market Research** of Delaware and **Report Ocean** in India, estimated the space logistics market size will reach \$20 billion in the 2030s.

Government investment in space technology development propelled the growth. In April, **NASA** formulated and funded the **Consortium for Space Mobility and ISAM Capabilities, COSMIC**, to foster nationwide collaboration across government, industry, nonprofits and academia. The **Aerospace Corp.** was selected to operate the group. In March, NASA awarded **Redwire** of Florida a \$5.9 million contract to complete the design of **FabLab**, a new in-space manufacturing system. In June, NASA entered into a Space Act Agreement with **Sierra Space** of Colorado for the development of the company's commercial low-Earth orbit ecosystem, including new space station architectures and in-space logistics and servicing. NASA will provide access to facilities and support for environmental and crew systems testing, tools and software.

In the commercial market, **Intelsat** purchased two **Mission Extension Pods** from **SpaceLogistics**, a satellite-servicing company owned by **Northrop Grumman**, in April and in June. These propulsion pods are scheduled to be attached to Intelsat communication satellites in geosynchronous orbit in early 2025.

▲ Intelsat this year purchased two SpaceLogistics Mission Extension Pods, an example of which is shown at the center of this illustration. The Mission Robotic Vehicle (at left) would attach this pod to a client satellite. The pod would remain docked for a number of years, providing propulsion and pointing control.

Northrop Grumman

The same market growth trend appeared in Europe. In February, French space services company **Exotrail** announced that it raised \$58 million in a Series B funding round to expand its in-space transportation services. In April, the **Italian Space Agency** awarded a 235-million-euro contract to a **Thales Alenia Space-led consortium** to design, develop and build an in-orbit servicing demonstration mission. The contract was funded through the in-orbit economy component of the Italian national covid-19 recovery scheme, which is part of the European Union's Next Generation EU economic package.

In February, the **U.S. Space Force** awarded Colorado-based **CisLunar Industries, Astroscale U.S. and Colorado State University** a \$1.7 million **Direct-to-Phase II Small Business Innovation Research** contract to recycle space debris into metal propulsion. In March, the Space Force awarded a \$1.6 million SBIR contract to a team led by Southern California startup **Arkisys** to demonstrate satellite assembly capability in orbit. In July, the Space Force awarded a \$1.7 million Direct-to-Phase-II contract to California-based **Orbital Composites**, partnering with **Axiom Space, Northrop Grumman and Southwest Research Institute**, to build and launch the first space factory for kilometer-scale antennas within the next three to five years.

In the realm of moon and Mars transportation, **NASA** in May selected **Blue Origin** of Washington as the second lunar lander provider for the **Artemis** program, awarding a \$3.4 billion firm-fixed price contract. In July, **DARPA** contracted Lockheed Martin to design and build a nuclear-powered rocket, with an in-space flight demonstration scheduled for 2027. The Space Force will provide launch and launch site support for the test.

In academia, **NASA's Office of Technology, Policy and Strategy** awarded two teams funds to examine policy opportunities and perform space logistics analysis for commercialization of debris remediation. The lead institutions are **Princeton University** and the **Stevens Institute of Technology**, both in New Jersey. Also, as part of the **Space University Research Initiative** program, the **Air Force Office of Scientific Research** awarded three new teams contracts for space logistics research and development. Each will receive up to \$5 million (\$3 million base plus a \$2 million option). The lead institutes are **Georgia Tech**, the **University of California, Santa Cruz** and **Cornell University** in New York. ★