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# AEROSPACE

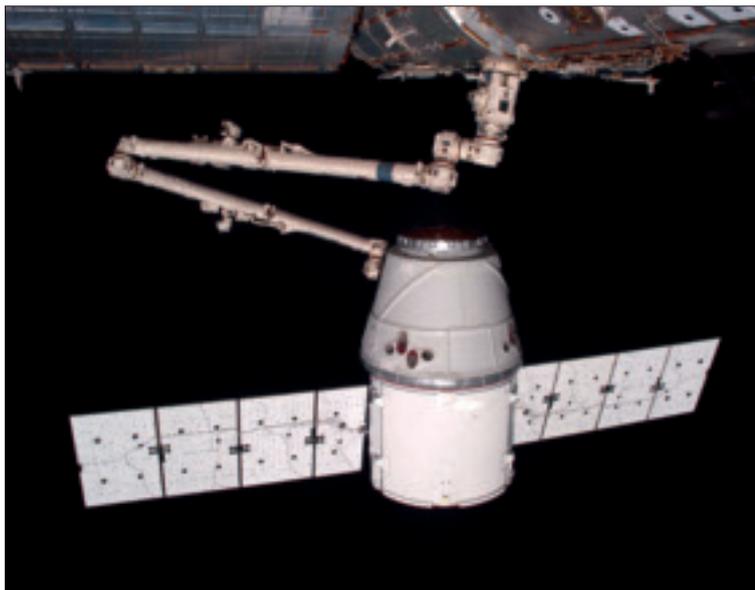
A M E R I C A

# 2012

*Year in review*

## Space operations and support

This year three new countries joined the the list of satellite operators, with the first successful Hungarian and Romanian Cubesat launches and the successful BelKA 2 launch for the Belarussians after BelKA-1 was lost on launch in 2006. China also continued its record set in 2011, when it overtook the U.S. for the first time, with an equally impressive 2012 launch schedule.



*SpaceX made history in May when its Dragon capsule successfully berthed with the ISS.*

In addition to a number of ongoing Beidou (Compass) satellite launches adding to its navigation constellation, China continues to develop its human spaceflight capabilities, delivering the first Chinese woman to space on Shenzhou-9 in June.

The HTV and the third ATV missions continued to show European and Japanese heavy-lift capabilities. Japan and Europe also saw launch firsts—Japan's first commercial launch and the first Vega launch for Europe. The Vega launch also highlighted the continuing growth of Cubesat mission opportunities, launching seven Cubesats on its maiden flight.

In space science, the successful launches of the two radiation belt storm probe satellites in August joined the successful departure of Dawn from its orbit around Vesta to head to the companion asteroid Ceres. And the successful execution of the incredibly complex entry sequence for the Curiosity lander on Mars clearly marks a highlight in space operations activity.

History was made in May when SpaceX became the first in the private sector to visit the international space station, during a nine-day mission that combined demo flights 2 and 3 of NASA's Commercial Orbital Transportation Services Space Act Agreement (SAA). The company's Dragon spacecraft, carrying supplies for the ISS and riding atop a Falcon 9 rocket, departed Cape Canaveral Air Force Station on May 22 and arrived at the ISS on May 25, when it was captured by station's remote manipulator arm and was mated to the Harmony module. The mission met all its milestones and made it possible for SpaceX to begin regular resupply flights under a \$1.6-billion resupply contract with NASA. The first flight took place in October.

U.S. human spaceflight moved forward in August when NASA announced the selection of SpaceX, Sierra Nevada, and Boeing as the winners of the third round of the Commercial Crew Development (CCDev3) SAA. SpaceX now moves ahead with further development of Dragon, which the company had designed from the start with crew in mind, and is demonstrating a lead in the push to field a commercial space transportation system that will replace the shuttle. Crew vehicles designed and built by all three CCDev3 winners are crucial if the U.S. is to regain its ability to fly astronauts to orbit and do so more safely and cost effectively than in the past.



*ESA's third ATV continued to demonstrate its prowess at delivering cargo to the ISS.*

Capitalism and the introduction of competition into space transportation services have already changed the paradigm for human spaceflight and brought to bear an array of technologies—two capsules and one lifting body—to dramatically lower the cost of access to space and place the U.S. once again at the head of the pack. ▲