Tracking government launch trends

Traditionally, government-funded space launches have accounted for more than three-quarters of the launches attempted each year. Most of these missions have been for the Ministry of Defense (MOD) in Russia, DOD and NASA in the U.S., ESA, and a range of other national space and military agencies.

By the mid-1990s, however, the distribution between government and commercial launches started to change noticeably. In 1995, commercial launches made up slightly less than one-third of all the launches attempted that year. In 1996, the figure rose to 35%.

By 1998 and 1999, there was a much more even balance between government and commercial launches. In both years, 52% of the launches attempted were primarily for government agencies, and 48% were for commercial customers.

The mobile satellite factor

The main reason for this growth toward parity was the advent of the LEO commercial mobile communications satellite constellations. More than a third of all the commercial launches attempted during 1998-1999 were for three customers—Globalstar LP, Iridium, and Orbital Communications (Orbcomm).

Launches for Iridium and Orbcomm had actually begun in earnest in 1997, but the bulk of the LEO commercial mobile missions took place during the following two years.


AEHF

After 1999, launches of LEO commercial mobile satellites practically came to a halt. On February 8, 2000, four Globalstars were launched aboard a Boeing Delta II/7420 rocket. On February 11, 2002, five Iridiums went up on a Delta II/7920. On June 20, 2002, two more Iridiums were boosted by a Eurockot Launch Services Rockot. No additional Orbcomms or other LEO commercial mobiles have been launched.

It is no mere coincidence that the period in which we were launching roughly equal numbers of government and commercial missions overlapped with the first wave of LEO commercial mobile satellite launches.

Now that the LEO commercial mobile wave has subsided and no other segment of the commercial satellite sector has emerged to energize the market, it should not surprise anyone to learn that government launches are once again dominant. In 2003 and 2001, government launches accounted for 75% of all the launches attempted in each of those years. Before 2001, you would have to go back to 1994 to find such a high preponderance of government launches.

We have come full circle in less than a decade. Many in the launch services industry are now asking, “Is that it? Are we back to relying almost entirely on government business?” If you take the past four years together, it looks as if we are falling in line with tradition, in which government launches make up more than three-quarters of the launches attempted annually.

Customer diversity on the rise

What does seem to be changing is the number of different government customers. In 1994, 94% of all government launches were conducted for the Russian MOD (26 launches), Rosaviakosmos (16 launches), DOD (13 launches), and NASA (10 launches).

In 2003, these four government customers accounted for only 67% of the government launches—DOD (11 launches), NASA (seven), Russian MOD (seven), and Rosaviakosmos (six).

Last year was notable for the growing diversity of government customers that launched satellites. Besides the Americans and the Russians, there was Brazil's National Institute for Space Research, the Canadian Space Agency, the Chinese National Space Agency (CNSA), ESA, the Indian Space Research Organization (ISRO), the Japan Aerospace Exploration Agency (JAXA), the Japanese Defense Agency, and the Japanese Ministry of Economy, Trade, and Development.

Most of these government customers have launched satellites before. But 2003 marked the first time that non-U.S., non-Russian government customers accounted for at least one-third of the government launches, or slightly less than 25% of the total launches for the year.

The trend toward more non-U.S., non-Russian government customers has been growing since the 1990s. Dozens of government customers have launched their first satellites during the past decade and a half, including the Algerian National Center for Space Technology, the Argentine National Space Activities Commission, the Brazilian Space Agency, the Chilean Air Force Space Div., the Danish Space Research Institute, the Korean Advanced Institute of Science and Technology, the Moroccan Royal Center for Remote Sensing, the Pakistani Space and Upper Atmosphere Research Commission, and the Riyadh Space Research Institute.

The presence of these organizations in the market is now starting to become more evident, though, given the steady decline in the number of Russian government launches and the drastic drop in the number of commercial launches during the past few years.

We expect that U.S. and Russian government customers will probably continue to fund more than half the civil and


Soyuz

military launches annually for the foreseeable future. Russian government launches should total no more than about a dozen per year, including three or four Progress and Soyuz resupply and crew capsules for the International Space Station, a few Glonass and Parus navigation satellites, plus a handful of Cosmos communications and reconnaissance satellites. The money for returning to the days when the Russian government was regularly launching more than 50 missions per year just is not in their budget.

U.S. government launches, on the other hand, should rise gradually during the remainder of the decade, as DOD replenishes a half dozen of its satellite constellations or introduces new ones. These include systems such as the Advanced Extremely High Frequency satellites, GPS III, Future Imagery Architecture, Mobile Users Objective System, National Polar-orbiting Operational Environmental Satellite System, Space-Based Infrared System, Space-Based Radar, Space Tracking and Surveillance System, and Wideband Gapfiller System. All of these satellites would be launched by Delta II, Delta IV, or Lockheed Martin Atlas V rockets.

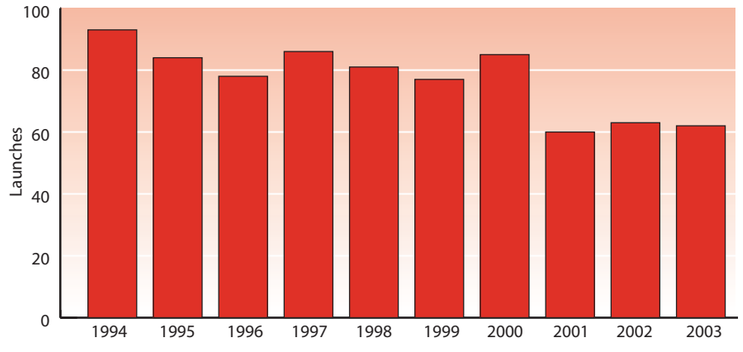
NASA has ambitious plans to launch dozens of scientific research and exploration satellites over the next few years. This year alone, the agency has scheduled launches for at least seven satellites. These include Aura on a Delta II/7920, Deep Impact on a Delta II/7925, the Swift Gamma-Ray Burst Explorer on a Delta II/7320, the Gravity Probe-B on a Delta II/7920, Messenger on a Delta II-H, and the GOES-N and NOAA-N meteorological satellites, aboard a Delta IV and Delta II/7320, respectively, for the U.S. National Oceanic and Atmospheric Administration. NASA also hopes to resume space shuttle flight operations by the end of this year.

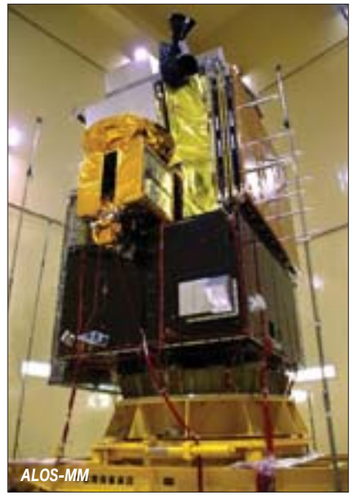
Rising players: Japan…

The real opportunities for significant growth in the world launch market lie with non-U.S., non-Russian government agencies and institutes that want to become more active in space. The three organizations at the top of our list are the Japanese, Chinese, and Indian space agencies—JAXA, CNSA, and ISRO.

JAXA, formed last year by the merging of the National Space Development Agency of Japan and the Institute of Space and Astronautical Sciences, has less than 15% of NASA's annual budget, but it has a minimum of a dozen launch missions planned over the next three years.

WORLDWIDE SPACE LAUNCHES ATTEMPTED




ALOS-MM

JAXA has been trying for years to escape its cycle of three or fewer launches per year and to start launching its H-2A and small vehicles such as the M-5 and proposed Galaxy Express five or six times annually. The agency has no shortage of satellites in the pipeline. Astro-E2, Astro-F, the Advanced Land Observation Satellite, ETS-8, Global Change Observation Mission, the Optical Inter-Satellite Communications Experiment Satellite, Selene, Quasi-Zenith, the Venus Climate Orbiter, and Yohkoh-B have all received development funding and are scheduled for launch before the end of the decade.

The problem for the Japanese is simply that they cannot come up with a reliable version of their H-2 rocket. Following two consecutive failures of the original H-2 in 1998 and 1999, JAXA introduced the upgraded H-2A. That model flew successfully on five occasions before suffering a booster separation malfunction that forced ground controllers to destroy it shortly after liftoff last November.

Ever since the H-2 first entered the market in 1994, the main problem with the rocket was its high cost. By the end of the 1990s, the Japanese had succeeded in reducing the permission price of the H-2 from $200 million to less than $120 million, making the vehicle competitive with other heavy-lift space launchers such as Arianespace's Ariane 5 and Lockheed Martin's Atlas IIAS.

With the current overcapacity in the launch services market, it is likely that the H-2A could be offered for closer to $100 million per mission. Price is no longer an impediment to the H-2A's competitive position or increased use; reliability (or lack thereof) is. We anticipate that JAXA will fix the H-2A and that the program will eventually develop a good track record. When that happens, the Japanese government will be among the most active launch customers in the world.

Note that JAXA does indeed appear to have every intention of remaining in the launch business. Several uprated versions of the H-2A are in the planning stages. We understand that a more powerful model, designated the H-2A2, is scheduled to be launched by 2007. It would be followed by the H-2A3.

China…

Perhaps the greatest potential contributor to an expanded government launch market is the CNSA. For many years now, we have heard the Chinese government propose plans for building and launching more than two dozen satellites over a five-year period. We have seen the government invest heavily in the development of the Long March family of expendable launch vehicles. Consistently, though, the Chinese government has managed to launch an average of only about three missions a year.

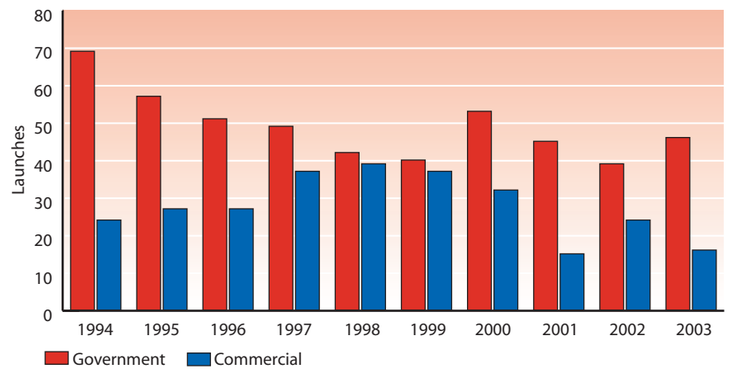
Launch rates for the Chinese began to change soon after the launch of the Shenzhou 1 unmanned test capsule on November 20, 1999. In 2000, China posted four Long March launches, followed by one in 2001, and four in 2002. Among the missions in 2001 and 2002 were three additional unmanned Shenzhous.

Last year is what you might refer to as a "breakthrough" year for China and Long March. In all there were seven Long March flights, and all but one were government launches. Even the one that we designated as a commercial launch, the Ziyuan 4 imaging satellite, could be considered a government mission. Ziyuan 4 is part of a commercial joint venture between the governments of Brazil and China.

The milestone for China, however, occurred on October 15, 2003, when CNSA successfully launched its first manned space capsule, the Shenzhou 5. That mission has clearly jump-started China's national space program, giving the government's plans for expanded space activities credibility that they did not previously have. The Shenzhou 5 launch was followed very quickly by four successful Long March launches on October 21, November 3, November 15, and December 30.

The idea that the Chinese government might develop a manned space station, a spaceplane, and microsatellites, or send an unmanned spacecraft to the Moon, no longer seems a distant possibility.

WORLDWIDE SPACE LAUNCHES ATTEMPTED: GOVERNMENT VS. COMMERCIAL



…and India

India's ISRO is not that far behind CNSA in capability. While the agency's two rockets, the PSLV and GSLV, have not launched nearly as often as Long March, the Indian government has a more robust satellite manufacturing program. ISRO operates the world's largest fleet of Earth imaging satellites as part of the Indian Remote Sensing (IRS) system.


Shenzhou

The agency's program proposes to launch more than a dozen IRS, Insat, and GSAT communications and imaging satellites through 2010 using a mix of PSLVs, GSLVs, and Ariane 5s.

ISRO is reportedly also working on a reusable spaceplane called Avatar and has approved funding for the development of a lunar imaging probe. Chandrayan-1 would be launched to the Moon in 2008.

(((

In short, there are clear signs that launch rates may soon begin to rise and pull the industry out of the stagnation it has had to endure for the past three consecutive years. The catch is that much of the new launch activity will be fueled by government customers that will be largely inaccessible to Western launch companies.

Marco Cáceres
Teal Group
mcaceres@tealgroup.com

Clarification: In the January column, we listed the Chandra X-Ray Observatory in a list of satellites that failed or malfunctioned in 2003. The spacecraft experienced a build-up of grease on an optical filter in front of its advanced charge-coupled device imaging spectrometer. According to a Chandra project scientist, this grease was not unexpected and did not cause any blurring of the images. The spacecraft is performing as expected.