

YEAR IN REVIEW: Space Systems/Loral (SS/L)

by Arnold Friedman, Senior Vice President, Marketing and Sales

What successes did SS/L enjoy over the past year?

This has been a positive year for SS/L with six satellites launched as of early November and several currently waiting for launch vehicles with launches scheduled before the end of the year. We have won contracts totaling approximately \$1B, and have added two new customers: Star One and NBN Co.

We continued our well-established broadband leadership with the successful launch in July of **EchoStar XVII**, a high-throughput satellite built for **Hughes Network Systems, LLC.**, that will deliver broadband satellite services to consumers, businesses, and government customers across North America. In addition, we were awarded a contract for the space segment of Australia's **National Broadband Network**, and are designing and building the two satellites, **NBN Co 1A** and **1B**. This initiative will ensure all Australians have equal access to high-speed broadband, even in the remotest sections of the country.

During 2012, we saw the U.S. Government begin to take action to leverage the value of the commercial sector and we were pleased to be awarded contracts from several different agencies. Our high-production capabilities and technical expertise will help bring affordability to U.S. Government programs.

Hosted payloads have been an important topic of discussion during the year. In April, we were awarded a contract from **NASA Goddard Space Flight Center** to host a **Laser Communications Relay Demonstration (LCRD)** on a commercial satellite. SS/L was also selected by the **Defense Advanced Research Projects Agency (DARPA)** to develop a hosted payload concept for its **Phoenix Project**, which is focused on developing and demonstrating technologies to cooperatively harvest and re-use valuable components from retired, non-working satellites in GEO.

Our company's third U.S. Government contract award for the year came from the **U.S. Air Force Space and Missile Systems Center's (SMC)**. The company was selected to develop affordable design concepts for the next generation *Protected Military Satellite Communications (MILSATCOM)*.

What challenges did SS/L need to overcome over the past year?

Worldwide, evolving infrastructure means more competition in the telecommunications industry. In countries that have mature, well-established telecommunications networks, satellite growth may be limited. Therefore, the challenge for satellite manufacturers, especially those in the commercial sector, is to identify the markets with the largest growth potential.

In regions where terrestrial services don't meet the needs of the user or are not economically, or logistically feasible, demand for satellite service is increasing. These geographical locations are becoming favorable markets with areas of opportunity for satellite operators. For example, parts of Latin America, such as Brazil, are showing high demand for satellite services.

However, there remain numerous applications that continue to drive market growth and the sheer amount of digital data that proliferates each year continues to expand.

What upcoming projects are in the works and what may we expect to see from SS/L over the next three to four quarters?

We have three key initiatives for the next year.

First, SS/L is focused on *increasing on-orbit capacity*, for television—especially HD and ultra HD—and for broadband. Our SS/L **1300** satellite platform has the power to maximize the amount of HDTV channels that can be broadcast from a single satellite, and has also been shown to support the complexity of the world's highest capacity broadband satellites. Our advanced use of spot beam designs and frequency

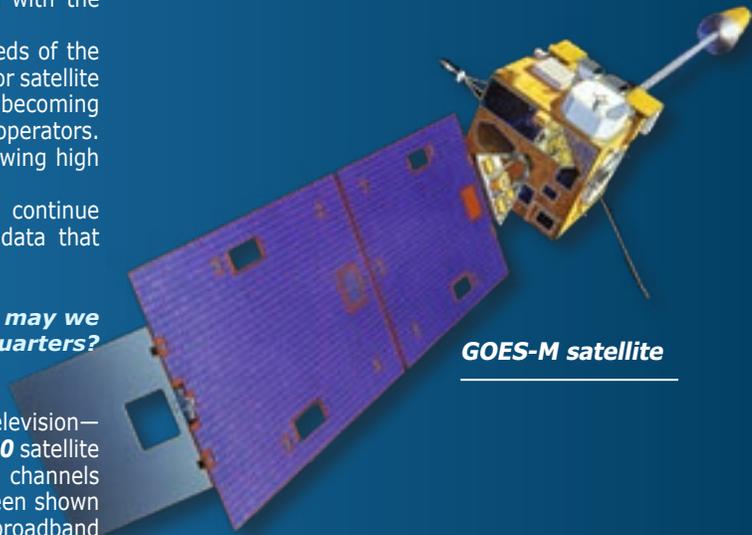
reuse is enabling unprecedented capability and we now have more commercial capacity on orbit than any other manufacturer.

Second, SS/L has continued its work with *electric propulsion* throughout 2012. We have an outstanding track record with the technology. Our electric propulsion system, which we refer to as *Stationary Plasma Thrusters (SPTs)*, was first used on satellites launched in 2004 and 2005 and has had more than 20,000 hours of on-orbit operation without a single failure. Currently, 12 SS/L-built satellites on orbit have electric thrusters, with 10 more in backlog. We expect that number to continue to grow as demand for the technology increases.

Our next-generation electric thruster, which we have continued to develop, is based on the same design and is available for orbit raising today. Depending on the mass of the satellite, it can deliver a GEO to orbit in as little as 30 days and enables a 30 to 40 percent increase in dry mass per launch. We can also provide hybrid electric propulsion and bipropellant systems for orbit raising, which have the benefit of reducing mass but also getting to orbit faster than the all-electric solution.

Finally, we continue to leverage our experience with *hosted payloads*, to help bring disaggregation and affordability to U.S. government programs. As founding members of the **Hosted Payload Alliance**, Space Systems/Loral is working with others in the industry to expand the opportunities for government payloads on commercial satellites. Our experience with hosted payloads began more than a dozen years ago with solar x-ray imagers for NASA on the **GOES 11** and **12** spacecraft. Additional SS/L-flown hosted payloads include the **Cisco Internet Router In Space (IRIS)**, which flew on SS/L-built **Intelsat 14**; CCD cameras on **EchoStar XI** and **DBSD (ICO G1)**; and the **European GPS Navigation Overlay System (EGNOS)** on **SES-5**.

Going forward, we hope to continue to apply our experience to help government agencies identify programs that are appropriate for hosted payload missions, and to work with satellite operators to find commercial missions that are appropriate hosts. In doing this, we can help bring economic benefit to both the government and the commercial customer.



GOES-M satellite