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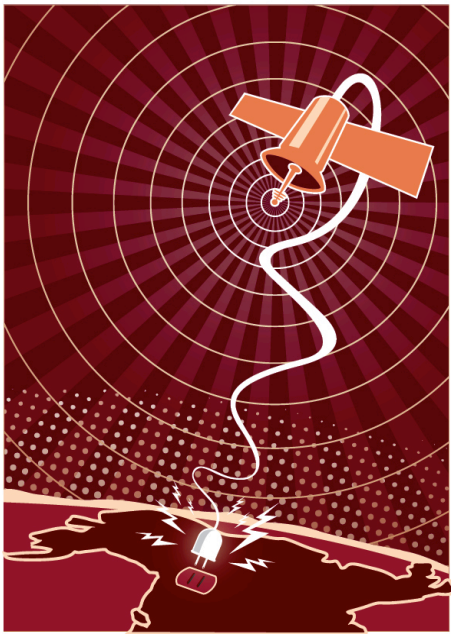
Satellite Builders Enjoy Strong Market Conditions



By Sam Silverstein

Once a highly visible symbol of human progress and competitiveness, satellite technology long ago settled into a peaceful existence as an essential but little-noticed component of the world's telecommunications infrastructure. But while communications spacecraft may no longer command the same level of public excitement that defined their early years, the companies that build these complex machines are pleased with the quiet role they play in the global economy.

"I'd love to say that this is a high-tech and sexy industry, but the truth is it's a production environment where customers desire a reliable product to generate revenues," says Christopher Richmond, senior vice president of communications satellite programs at Orbital Sciences Corp. "The industry has matured. It used to be more about technology. Today it's a business."

That business is in remarkably good condition despite the rocky global economy, according to industry officials. Interest in new satellites is strong, spurred by heavy demand for connectivity stemming from the proliferation of mobile communications devices, the rising number of high-definition television channels and other factors.

In fact, although the satellite-manufacturing industry has passed its most recent replenishment cycle — a period when orders for satellites spike as operators move to replace aging spacecraft — interest in satellite procurements from established and newer operators is high enough that if the market experiences a long-term decline in orders, the downturn will

probably be less pronounced than it has been during similar periods in the past, says Joe Rickers, president of Lockheed Martin Commercial Space Systems.

"Satellite communications not only survived the financial crisis, you might even say it has thrived as many other industries are being pressured," Rickers says. "We have a healthy satellite-manufacturing marketplace."

Rickers expects the number of orders for commercial geostationary satellites placed to remain at about 20 per year for the next five years. Richmond offered a more conservative estimate of 18.

"To forecast any 12-month period can be a little difficult, but I would tell you, seeing what is out there in terms of [requests for information and requests for proposals], I have not seen any significant downturn" in the market for new satellites, says Steve O'Neill, president of Boeing Satellite Systems International.

Financially Sound

A key reason for the robust market is that investors and bankers believe the satellite industry is financially sound, says Jeremy Rose, senior consultant with Comsys. "It seems that the market is very buoyant. People realize that satellite is a good investment," he says. "They can see the dollars coming in, and new projects are having less of a problem getting financed than they did before."

Evert Dudok, CEO of Astrium Satellites, the satellite-manufacturing unit of European Aeronautics and Space Company (EADS), says he is satisfied that his company has been able to book at least four new satellite orders during each of the past few years, and is targeting a similar number of annual sales during the next several years. The company will be marketing satellites built on the new AlphaBus platform, which it developed in partnership with Europe's Thales Alenia Space. AlphaBus is designed to house large, high-power communications payloads.

Dudok adds he is optimistic that Astrium will be able to land increased business outside Europe, its traditional stronghold. "We are showing that we have the right product and the right price," and hope to generate business in regions where growth potential for the satellite industry is particularly high, such as the Middle East and Asia, he adds.

Some manufacturers offset the cyclical demand for commercial satellites with sales to government customers. O'Neill says that Boeing's satellite manufacturing operation has been bumping up the amount of revenue it generates from commercial buyers and expects that in 2012 about 25 percent of its revenue will come from the private sector, up from 10 percent two years ago. By contrast, the company was heavily dependent on commercial customers prior to its October 2000 sale to Boeing by the former Hughes Electronics Corp.

Space Systems/Loral (SS/L), meanwhile, is mostly dependent on commercial sales, says Arnold Friedman, the Palo Alto, Calif.-based company's senior vice president of worldwide sales.

In late June, Canada's MacDonald, Dettwiler and Associates Ltd. (MDA) announced it would acquire Space Systems/Loral in a move designed to give MDA a place in markets "fueled by some of today's most compelling consumer communications needs." The $875 million transaction will result in two-thirds of MDA's revenue coming from the commercial sector, according to an MDA statement announcing the deal. MDA, of Richmond, British Columbia, was owned by Orbital Sciences from 1995 until 2001.

Having commercial and government operations can allow manufacturers to leverage technology developed for one type of customer when producing products for another. Historically, space companies have found commercial applications for systems originally developed for government projects. But with government budgets under pressure in recent

years, the number of commercial advances finding their way into products built for government buyers has increased, says Rickers.

Among the trends that define the satellite-manufacturing business, the march toward ever-larger satellites with growing numbers of transponders and higher power levels is one of the most pronounced. During the past 25 years, the average satellite has gone from the five-to-nine kilowatt range to offering 15 kilowatts or more of power, according to Friedman. Some satellites have more than 20 kilowatts of power.

"The bottom, top and average [power levels] keep on rising," Friedman says. Power levels "are tending to move up across classes. People want more bits today than before...I think we're getting used to an increased expectation for more. I don't see that changing."

Different Approaches

Not all satellite manufacturers run their businesses around packing as much transponder capacity as possible on their satellites. Orbital Sciences, for example, believes that operators are better off adding capacity to orbital slots conservatively, a practice that can save money and reduce the risk of having too much capacity in a particular orbital slot than the market requires, says Richmond. The company builds commercial satellites using a platform known as STAR Bus.

Richmond adds that buyers recognize that lowering the cost per transponder is of little value if those transponders go unused. "It's not necessarily the cost per transponder, but the cost per saleable transponder," he says. "If you have infinite cash available, the answer is to build a bigger satellite. If you're capital-constrained, it's better to build smaller satellites and fill in [capacity] over time," just as an airline might elect to use smaller planes instead of jumbo jets on a route with uncertain demand.

Orbital also tries to set itself apart by delivering satellites faster than the competition — something Richmond says it can do by focusing on smaller spacecraft that take less time to construct. Orbital typically builds a satellite in two years, compared with three years for bigger satellites from other manufacturers, he says.

Other satellite manufacturers also see potential in smaller satellites. Boeing recently introduced a variant of its 702 satellite platform designed for smaller payloads, known as the 702SP. The original 702 bus was unveiled by Hughes Electronics in the 1990s as the company's largest satellite frame.

Friedman says he is less concerned with offering the lowest price for its satellites and focuses instead on its reputation for delivering satellites on time and being open with customers to attract buyers. "Satellites are pretty sophisticated products, but [even though] they are commodity-like, a commodity is an overstatement of what a satellite is. You don't always go for the lowest bid."

Ka-Band

The demand for bandwidth is fueling buyer interest in transponders that operate in Ka-band, a portion of the radio spectrum long seen as a way to efficiently move data via satellite, industry officials said. Although Ka-band transponders have been available for decades, operators have deployed them in relatively few numbers compared with the widely used C- and Ku-band transponders. This is due to a variety of factors, including the susceptibility of Ka-band transmissions, which use higher frequencies than C- and Ku-band signals, to atmospheric interference known as rain fade.

Improved technology has made Ka-band a more viable solution for satellites, and the number of spacecraft equipped with transponders in this band is rising, Rose says. He notes, however, that the rain fade issue means Ka-band is unlikely to be used for mission-critical applications that cannot tolerate transmission disruptions.

"My take on Ka-band is it's here to stay," says Rickers. "It's a new frontier for Ka, and it has some real legs underneath it now."

In addition to embracing Ka-band as a way to increase the ability of satellites to transmit data, the satellite-manufacturing industry is making progress with other technologies that were considered somewhat futuristic 15 years ago but are now seen as more mainstream, officials said.

These technologies, which include on-board signal processing, advanced antennas and reconfigurable payloads, can help increase a satellite's utility after launch. "You have to be flexible in terms of your payloads to be able to match service to where it is needed," says Dudok.

Astrium, like other satellite manufacturers, is also seeing interest from customers in spacecraft that carry transponders for more than one organization. Dudok says such "hosted payload" arrangements can benefit operators by spreading the costs associated with building and launching satellites.

In addition, spacecraft manufacturers are making progress toward replacing, or at least augmenting, the venerable traveling wave tube amplifier (TWTA), long the heart of satellite transponders, with solid state technology, according to Friedman. "The holdback is that solid state's efficiency is not yet up to the efficiency of tubes, but it's being worked on."

Another area where satellite manufacturers report progress both in terms of sales and capability is electric propulsion, a technique that can open up more space on a satellite for transponders by reducing or eliminating the need for conventional chemical-propulsion systems. A satellite uses its propulsion capabilities to move to its intended orbital slot after being released by a rocket and maintain its position once in orbit.

Electric Propulsion

Earlier this year, Satelites Mexicanos and Asia Broadcast Satellite announced a joint deal with Boeing Satellite Systems International to buy the first satellites with all-electric propulsion systems. The satellites are based on Boeing's new 702SP platform.

Using an all-electric propulsion system comes at a cost, however, as satellites with this type of system can take months longer to move to their final orbital positions than spacecraft that rely on chemical propulsion, delaying their ability to generate revenue. Buyers must "understand the implications of the disruptive cost of providing that lower cost per transponder to orbit, [but] this will definitely change the industry," says O'Neill.

The tradeoffs introduced by electric propulsion systems are significant and require careful consideration, Dudok adds. "It's not a straightforward question. Every customer has its own ideas and constraints, and our goal is to have a flexible solution for each of those customers' needs."

Rickers says Lockheed Martin has supplied spacecraft to government buyers with all-electric propulsion systems. But he says the firm, which bases its satellites on several variations of its A2100 bus, has not yet sold a commercial satellite with completely electric propulsion.

SS/L offers propulsion systems that are partially electric, but the company has yet to sell a satellite with a fully electric mechanism to propel itself in space, says Friedman. About half of the satellites the company has sold during the past eight years have hybrid electric-chemical propulsion systems, and the company is looking at how best to implement fully electric systems, he says. "If we see enough demand for [all-electric propulsion], we will offer it." SS/L builds satellites using a platform known as the 1300.

Satellite buyers are generally very cautious when it comes to embracing anything that strays

from what has been done in the past, says Jay Gullish, director of the space and telecommunications division at Futron Corp. Operators "focus a lot on heritage, so technological advancements will be incremental," he says.

Rose also notes that the satellite industry tends to be risk-averse despite gains in reliability in recent years.

"Satellites continue to be a very reliable business proposition with minor exceptions," he says. "Banks are interested and want to look at good projects. But there are still reminders that something can go very wrong in the process."