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Acquisition reform: Real solutions

Shifting fortunes for commercial X-band
A conversation with Eddy Pieniazek

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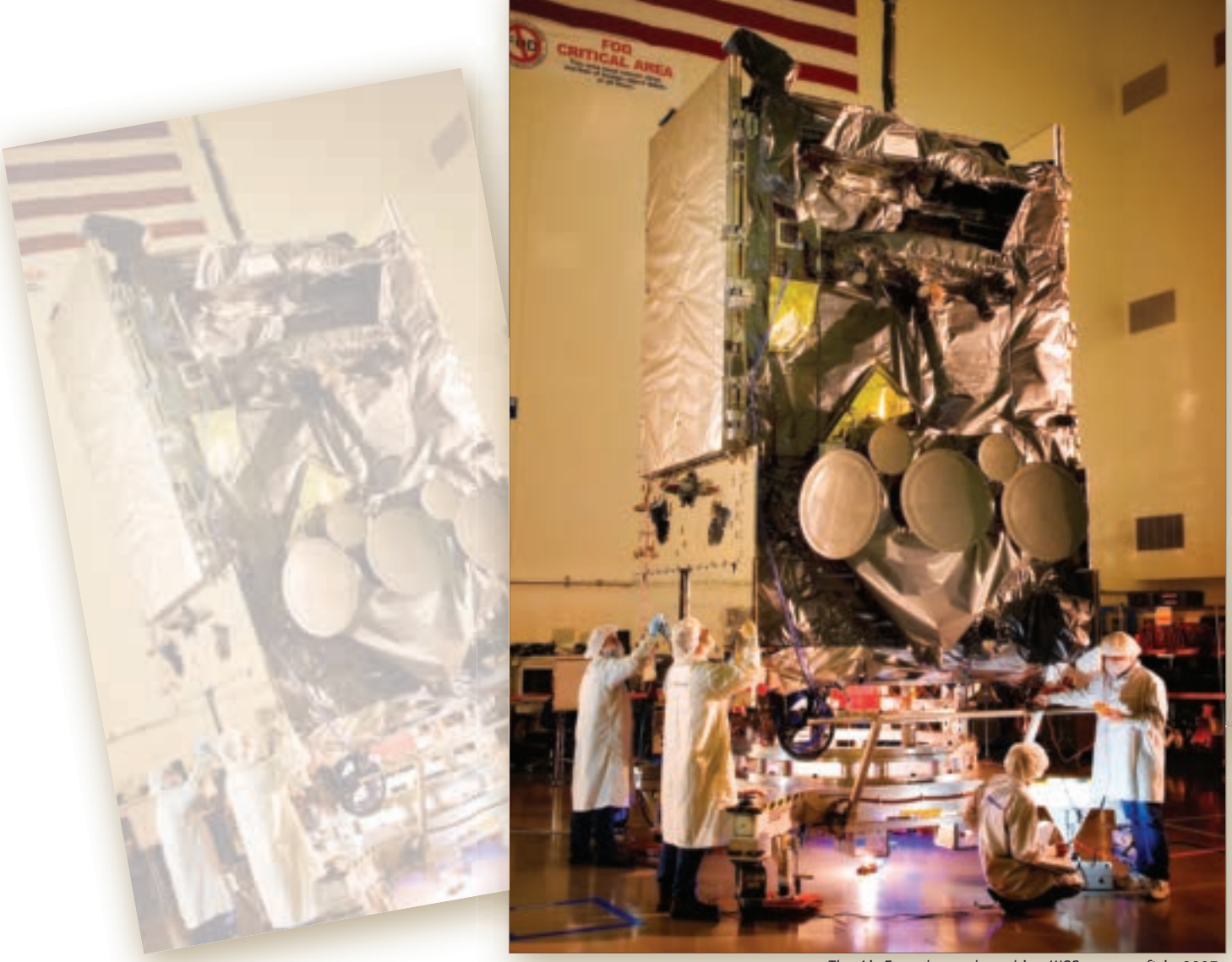


The Air Force began launching WGS spacecraft in 2007.

Shifting fortunes for

The war in Afghanistan sparked a booming market for commercially provided satellite communications in the X-band range of 8-12 GHz. This frequency band is reserved exclusively for government use by the U.N.'s International Telecommunication Union. Commanders, troops, and intelligence analysts needed to share maps, detailed satellite images, and electrooptical and infrared videos of villages and roads. The U.S. government's satellites could not cover all of the demand.

But now the U.S. and its allies are planning to bring most troops home from Afghanistan by the end of 2014, and the U.S. is trying to shift more of its diplomatic and military partnership resources toward the Pacific region to meet a rising China. That pivot could spell business trouble for commercial X-band providers, because it is a region largely uncovered by them.

Those providers know they must adjust their plans if they are to sustain or grow their businesses, and there are signs that this is happening.

"We're very aware of the pivot to Asia that's talked about by the U.S. government," says Andrew Ruszkowski, vice president for global sales and marketing at XTAR in Herndon, Virginia. Founded in 2001, the company provides communications for the Spanish government, the U.S., NATO, and their allies.

by Ben Iannotta
Contributing writer

COMMERCIAL X-BAND

In this corner, weighing 13,000 lb…

As they seek to adapt, XTAR and other X-band providers will be facing a familiar competitor: the Boeing-built Wideband Global Satcom (WGS) satellites. The Air Force began launching these in 2007 in the midst of the commercial X-band boom. A WGS spacecraft weighs 13,000 lb, almost twice as much as some X-band-equipped commercial satellites. Each operates in both X- and Ka-band, and can even convert signals arriving in one band to the other, so that recipients with different terminals can exchange information.

The Air Force has started launching upgraded Block II versions that are even more powerful. They have frequency bypass electronics that transmit Ka-band reconnaissance imagery at three times the data rate of the original satellites. By the service's calculation, a single WGS satellite provides more capacity than the entire Defense Satellite Communications System they are gradually replacing.

The U.N.'s International Telecommunication Union reserves the X-band frequency exclusively for government communications. During the war in Afghanistan, the need for sharing battlefield information was so great that U.S. government satellites could not keep up with it. As that war ends and the U.S. shifts its attention to other regions, commercial satellite companies face some significant challenges—including competition from U.S. government spacecraft.

XTAR-EUR and the XTAR-LANT payload coverage leave out most of the Pacific region.

The commercial providers nevertheless pushed back hard on the U.S. government's plans to buy more and more WGS satellites, arguing that shifting to commercial capacity would be cheaper at a time when governments need to spend less. In an April 2012 commentary in *Space News*, XTAR president and COO Philip Harlow said the U.S government was now a "front-line competitor" in the market: "Not only does the [WGS] program appear focused on replacing as much commercial capacity as possible, the government is becoming the de facto service provider to a host of high-value customers," he wrote.

Since then, XTAR has cooled its rhetoric about WGS. Only when pushed would Ruszkowski attribute XTAR's slow growth to the emergence of the WGS. "There was a lot of promise [for XTAR's profitability] early on, and then I guess I would say that maybe some policy issues particularly with the U.S. government slowed down the demand for XTAR capacity," he says.

These days, XTAR is adjusting its plans, rather than trying to get the U.S. government to adjust WGS. The U.S. shows no signs of backing off from WGS in the face of the industry's criticism. There are now four of these satellites in orbit; a fifth was scheduled for launch by the start of this month, and more are under construction. In fact, Boeing is now on contract to build a tenth, ensuring there will be satellites to sustain the constellation for years to come.

Fresh approaches

The commercial X-band satellites and hosted payloads have been produced mainly by Space Systems/Loral of Palo Alto, California, and its European rival, Astrium Satellites, based in Stevenage, U.K.

XTAR's reliance on SSL was not surprising. Loral helped form XTAR in 2001 and remains the majority owner. The minority partner is Madrid-based Hisdesat, the government services arm of the Hispasat telecommunications company.

If XTAR was once locked into SSL, it is not now. Last year, Loral sold its SSL unit to MacDonald, Dettwiler and Associates of Richmond, British Columbia, meaning Loral and by extension XTAR no longer have a stake in SSL's manufacturing.

"We enjoy a very good relationship with Space Systems/Loral," says Ruszkowski. "But we also have good relationships with other manufacturers, and we will do what's right with the XTAR business and by our customers and our users," he says.

XTAR was founded partly on the concept of the hosted payload—separate transponders installed on a satellite owned by another company or agency. XTAR operates an eight-transponder X-band payload called XTAR-LANT, which rides on Spainsat, a 7,500-lb Spanish military satellite. Spainsat was launched in March 2006 to a position high over the Atlantic at 30° W longitude, with an X-band communications footprint spanning west to Denver, south to Latin America, and east across Africa and into the Middle East.

SSL also built XTAR-EUR, an 8,000-lb satellite launched in February 2005. It is located at 29° East (over the Horn of Africa).

Taken together, XTAR-EUR and the XTAR-LANT payload provide coverage from Denver to Singapore, which of course leaves out most of the Pacific region.

XTAR wants to change that, and sees particular need for expanding coverage to Southeast Asia. The firm has not announced details of its strategy, but Ruszkowski hints that the solution could be a surprising one.

"We are XTAR, and today we are X-band, but if you recall, our mandate…is to support the government user with satellite communications. That, in our view, doesn't necessarily limit us to X-band. So while we might grow by offering more X-band capacity, we might also grow in other frequency bands, whether they be military Ka, commercial Ka, Ku," he says.

As for applications, Ruszkowski predicts the U.S. will need to tap commercial X-band services to move information off its large fleets of traditionally piloted intelligence, surveillance, and reconnaissance planes. The primary unmanned aircraft—Air

Force Predators and Reapers—are equipped to communicate in other frequencies and thus are not candidates for X-band. "There are some new UAV systems, including the Navy's BAMS system, which are going to come out with an X-band-capable antenna. But if we're talking the Predators and the Global Hawks that are out there today, those are typically Ka-band systems," Ruszkowski adds.

None of this is to say that XTAR is giving up on X-band. The company's strategists remain convinced that the U.S. and allied militaries are going to need additional capacity, and that XTAR can fill that role in many cases. Military X-band satellites "often have special features on them that make them maybe more survivable in the case of a nuclear attack or a little bit more resistant to offensive pursuit by an adversary," explains Ruszkowski.

XTAR's payloads are simpler and less costly because of that. "XTAR is kind of in this nexus between the technical features of a milsat resource—X-band specific—and the features that make for a value proposition by a commercial operator," he says. "We enjoy that position because we think we offer to the government user, to the military user, a unique value proposition that they don't get elsewhere in the commercial or government market of resources."

On top of that, Ruszkowski says XTAR knows the importance of adaptability to changing demand and customer requirements. In fact, such capability is engineered into XTAR-LANT and EUR through the advent of steerable spot beams.

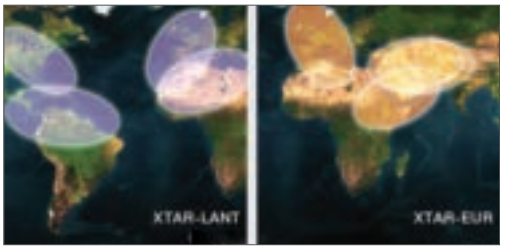
"It's not a Game Boy, but you do literally put in new coordinates to the ground-based system that flies the satellites and controls the payload," he says. "The antennas are actually moved, repositioned on the satellite to provide different pointing and different coverage of the Earth."

XTAR has done a lot of that in the past 18-24 months in reaction to changing geopolitical conditions. "Notably, we've moved a beam on the LANT payload to provide coverage of Latin America and the Caribbean," Ruszkowski points out. On XTAR-EUR, "we also repointed a beam from Europe…to the Horn of Africa to address obvious demand for military and diplomatic" communications, he adds.

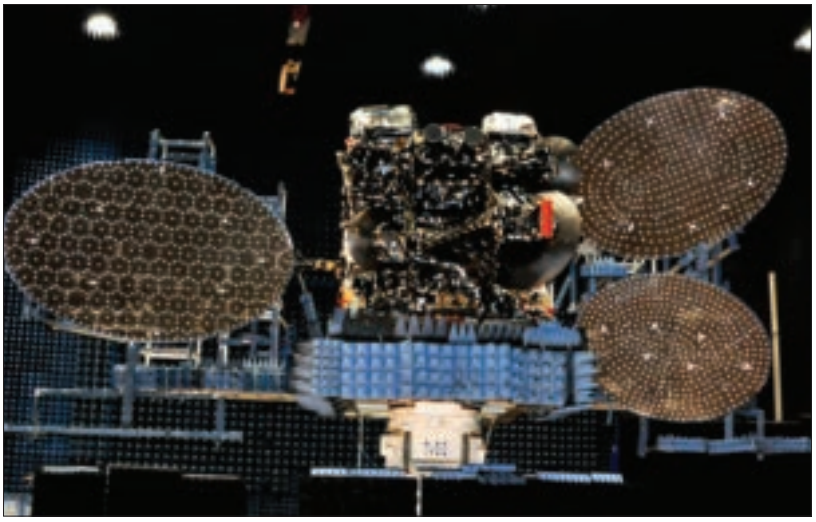
Pacific specific

There is another X-band-capable satellite on the way, a commercial spacecraft called Anik G1. Built by SSL for Canada's Telesat, it will be positioned over the Pacific Ocean west of Ecuador (107.3° West) in an orbit that will maximize coverage of the western Pacific. The satellite's main job will be to broadcast Ku-band television signals for Shaw Direct, a Canadian direct-to-home television service. If all goes as planned, it will simultaneously route X-band military and diplomatic communications in the Pacific region.

Air Force officials launch a ULAe Delta IV-Medium rocket carrying the fourth WGS satellite January 19, 2012, from Cape Canaveral AFS. (USAF photo/Patrick Corkery.)



Adaptability to changing demand and customer requirements is engineered into XTAR-LANT and EUR through the advent of steerable spot beams.



Anik G1 arrived at the Baikonur Cosmodrome on March 18 for launch on a Proton Breeze M.

Telesat is not the only X-band provider that is counting on Anik G1 to expand coverage in the Pacific region. U.K.-based Astrium Services Government Communications (formerly known as Paradigm) has leased X-band capacity on the satellite. Astrium wants to use the capacity to fill its coverage gap in the western Pacific.

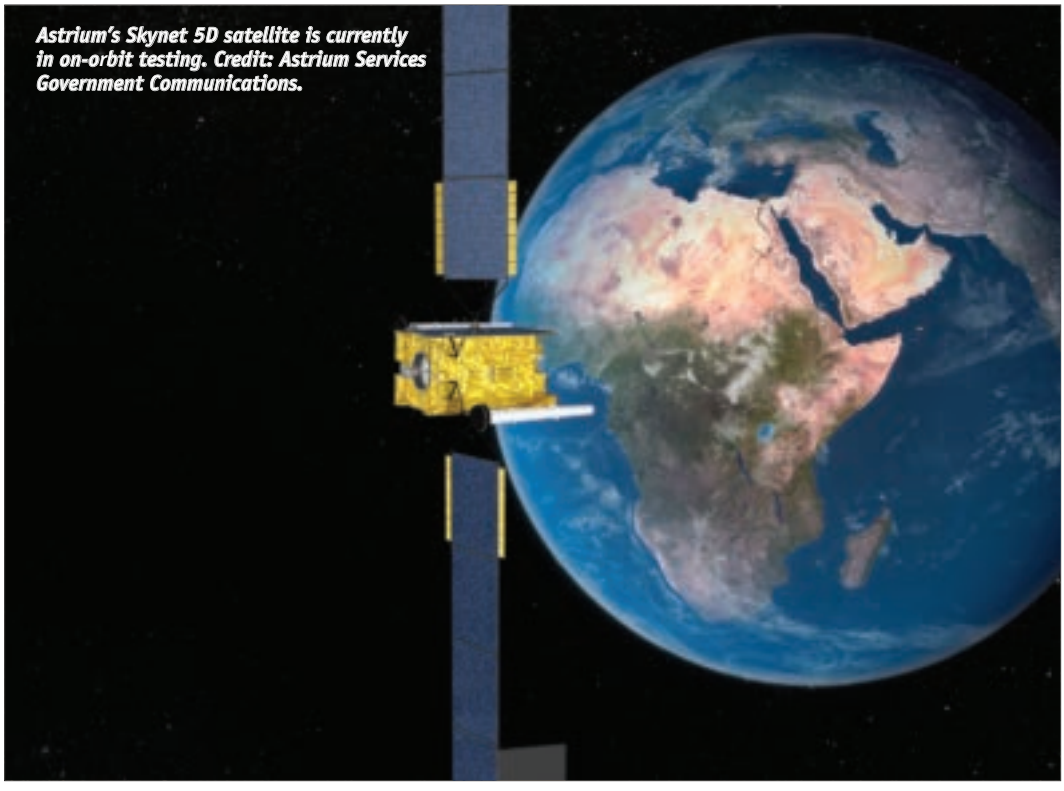
It is an unusual step for Astrium, whose role has been as operator of the U.K. military's Skynet fleet. The U.K. encourages Astrium to lease excess Skynet capacity to other governments, including the U.S., as a way to defray satellite costs.

Astrium has no choice but to look beyond Skynet if it wants to expand its Pacific reach. Skynet satellites are positioned over the equator from the Atlantic Ocean to Africa and the western Indian Ocean. The best they can do from those perches is reach eastward halfway across Australia. The newest of the satellites, the 11,000-lb Skynet 5D, will not change that. It was launched in December to a position over Africa (25° East) and is in on-orbit testing. It was built at facilities in the U.K. and assembled in Toulouse under supervision by the U.K. Ministry of Defence. "When the satellite was being constructed, it was obviously effectively part of the U.K. MOD with U.K. staff guarding it 24/7 to make sure nobody gets a close look at what's on it," says Astrium U.K. spokesman Jeremy Close.

For Astrium Services Government Communications, Anik G1 is a compromise that will fill geographic gap for the MOD. Ken Hadfield, the defense and security advisor at Astrium Services, says Anik G1 will give the company capability "virtually around the globe, except for a tiny portion."

Anik G1 is not a perfect solution when compared with Skynet 5 series, which was built to exacting U.K. military specifications. Skynet 5D, for example, is "antijam, antilaser, anti all sorts of other things," he says.

Anik G1 is more of a consumer satellite



Astrium's Skynet 5D satellite is currently in on-orbit testing. Credit: Astrium Services Government Communications.

than a military spacecraft, so it has less protection. Hadfield says that is also true for other services, such as XTAR's.

If Anik G1 shows the U.K.'s willingness to compromise, the Skynet 5 series shows its willingness to innovate. These satellites were born of a stark choice: "If you're doing warfighting operations against a sophisticated enemy, that means protected comms with survivability, resilience, and redundancy. That drives you toward a military-grade satellite that is nuclear hardened, antijam, capable of doing shaped beams, which is what a Skynet 5 is," Hadfield says.

But how to pay for all that?

"You either put a huge amount of money into research and development and a huge bow wave of expenditure up front, or what you do is partner with industry to smooth out that financial profile, and that's exactly what the United Kingdom has done with the Skynet 5, private-finance deal," Hadfield says.

The ministry put in some 'seed corn' during the concept definition phase of the Skynet 5 series, says Hadfield, then hired Astrium to build the satellites using loans. After that initial funding, Skynet 5D was built without any MOD funds at all, he says.

Bank loans will be repaid as Astrium leases the spare capacity that the U.K. MOD does not need. This capacity is leased as a service to include billing and troubleshooting. "The United Kingdom Ministry of Defence takes the view that it should help us to generate extra revenue, and we have commercial contracts with a number of nations, including the U.S. DOD," he says.

The agreement between Astrium and the U.K. runs through 2022; after that, satellites and ground equipment revert to the MOD. An extension would not be unprecedented, however. The agreement was extended once from 2018 to 2020, and then to 2022. Skynet 5D was added to the plan when a study by the MOD warned that the Skynet constellation would be out of capacity by 2016.

Hadfield, a retired officer who served in the British Army's Royal Corps of Signals, is anxious to see how a new communications study now under way comes out. The result could be one indicator of whether commercial X-band is here to stay.