

The Growth of Orbital Sciences and the Market for Small GEO Satellites

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Orbital Sciences was founded over 25 years ago with the following mission: “making space technology more affordable, accessible and useful to millions of people on Earth”. At the time of the company founding, the Aerospace industry was dominated by large, bureaucratic and expensive Defense conglomerates. Orbital’s founder and CEO, David W. Thompson, believed that reliable, simpler systems could be made with a core team of dedicated and experienced engineers. From this simple idea, one of the world’s premiere satellite designs was created.

The Birth of the Orbital STAR-2 Satellite

Orbital’s initial success started from launch vehicles and small low Earth orbit satellites. This allowed the company to grow through the mid-90’s, but David Thompson understood the importance of targeting the exclusive domain of Geosynchronous (GEO) Communication Satellites. Orbital Sciences realized that dream with the purchase of CTA in 1997, and the subsequent launch of Indostar-1 for Indovision of Indonesia. Indostar-1 was developed as a STAR-1 satellite, and this design was carried forward for the BSAT-2 series of satellites. But even as BSAT-2 satellites were being built, Orbital committed to a future in the GEO satellite business, with the development of the STAR-2 product line.

The design of the STAR-2 satellite started with the quality engineers that flocked to Orbital as the companies success grew. By the late 90s, many of the large US Satellite Manufacturers were pulling back from the commercial satellite market. Many of their top engineers migrated to Orbital, drawn by the entrepreneurial spirit that Orbital fostered. This has always been a hallmark of Orbital’s success: the ability to draw the best talent in the industry.

Armed with the best engineering talent and design tools available, Orbital started the task of designing a new GEO Commercial platform. The requirements were: simple design, parallel testing, and off-the-shelf components. But instead of developing a large complex satellite, Orbital made the decision to focus on the small GEO satellite size, with a sub-5 kW Payload power. It was recognized that the market was overcrowded with manufacturers producing large GEO satellites starting at 6 kW of Payload power.

The planners at Orbital had a vision that they needed to serve the small regional market that was being abandoned by the Hughes HS376 satellite. Orbital saw this as a good market opportunity, and development of the STAR-2 was born.

Initial Success of the STAR-2 Satellite Started in Japan

The success of the BSAT-2 series of satellites allowed Orbital to market their first STAR-2 satellite, N-STAR c, to NTT DoCoMo. It is no coincidence that the first three satellites that Orbital sold were in Japan. Orbital’s small GEO STAR-1 and STAR-2 platform was an ideal fit for the Japanese market and Orbital quickly realized the importance of the Japanese market to its long-term success.

The STAR-2 was optimally designed for this 2 to 5 kW payload range and that made it the platform of choice for operators looking for this size range.. The success of N-STAR c in 2000 was followed by PanAmSat in 2001 (Galaxy 12, Galaxy 14, and Galaxy 15), Telkom in 2002 (TELKOM-2) and Optus in 2003 (Optus D1 and Optus D2). Again, it was not surprising that the STAR-2’s initial success was with regional satellite operators throughout Asia. The STAR-2 satellite size is perfect for operators looking for affordable and reliable satellites on a quick delivery schedule.

Success came slowly, as the affordable STAR-2 proved its flight heritage and reliability within the industry. Since those early days, there are now ten STAR-2 satellites in-orbit:

Program	Customer	Launch Date
N-STAR c	NTT DoCoMo	7/5/2002
Galaxy 12	PanAmSat (now Intelsat)	4/9/2003
Galaxy 14	PanAmSat (now Intelsat)	8/13/2005
Galaxy 15	PanAmSat (now Intelsat)	10/13/2005
TELKOM-2	PT Telkom	11/16/2005
OPTUS-D1	Optus	10/13/2006
IS-11	Intelsat	10/5/2007
Horizons-2	Intelsat and JSAT	12/5/2007
OPTUS-D2	Optus	10/5/2007
THOR-V	Telenor	2/10/2008



Fig-1: STAR-2 Satellite Fleet launched in orbit

Orbital recognizes the importance of quality and has a rigorous program to incorporate lessons learned throughout the communication satellite community, as well as our customer's experiences. Customer participation is encouraged. As a result, all of the STAR-2 satellites are performing very well for our customers and the satellite community recognized the quality of the STAR-2 satellite. The high quality and in-orbit success has helped spur further business expansion.

Initially, the STAR-2 size was developed to support regional operators, particularly in Asia, looking for a small GEO replacement. However, as industry dynamics were evolving, global operators like Intelsat and SES began to make the STAR-2 platform a key part of their fleets. They quickly realized that the STAR-2 is a reliable and affordable way to provide flexible fleet management capabilities. Intelsat currently has two more satellites on order from Orbital (in addition to the five already in-orbit). SES has five satellites in production with Orbital (AMC-21, NSS-9, AMC-5R, AMC-FM1, AMC-FM2).

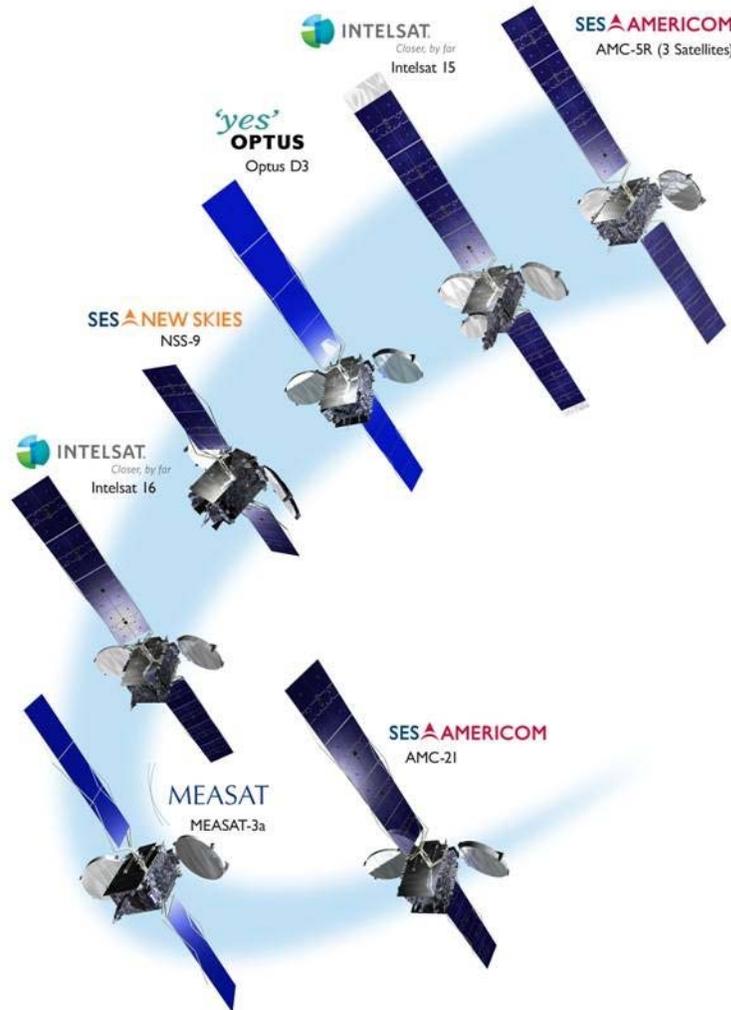


Fig-2: STAR-2 Satellite in progress

The success of the STAR-2 satellite has been a major driver in the overall growth of Orbital Sciences. Seven STAR-2 satellites were sold and built between 2000 and 2004. In the three years since, twelve STAR-2 satellites have been sold. This positive trend continues as Orbital now holds a dominant share of the small-to-medium commercial GEO market. This has led to a further expansion of Orbital's manufacturing and testing facilities coupled with corresponding human resources growth. But Orbital's driving philosophy remains, led by the Orbital founder and CEO David W. Thompson.

The Future of the STAR-2 Satellite and the Small Satellite Market

As we look ahead to the future, it is important to consider several key driving forces:

- Consolidation within the Satellite Industry – many operators and manufacturers, such as Intelsat/PanAmSat and Telesat/Loral, have merged.
- General Satellite industry growth – the natural growth of certain markets, such as HDTV broadcasting, mobile video, and general cellular and data bandwidth growth are spurring better transponder prices and the need for additional capacity, especially in emerging markets
- US Government activities around the world – The increased demand for Government missions have led many US Satellite manufacturers to focus on the US Government satellite market almost exclusively.
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Orbital views all of these trends as favorable to the future success of the STAR-2 satellite. Orbital remains committed to improving the STAR-2 satellite in incremental steps. Every launched STAR-2 program provides valuable information for enhancing the product line. Orbital’s management style has always emphasized small, efficient, tight knit programs with a strong Systems Engineering core. Because of this, improvements to the STAR-2 product are easily disseminated.

The future looks bright for the STAR-2 satellite. The STAR-2 satellite was designed with the Japan market in mind. The success of the STAR-2 has allowed it to be used in ways above and beyond the original plans. Orbital remains stronger and more committed than ever to our customers in Japan.

References

1. Gary Dorsey, “Silicon Skies: How One Small Start-up went over the Top to Beat the Big Boys into Satellite Heaven” *Perseus Publishing*, March 1999
2. Orbital Sciences website, <http://www.orbital.com/About/>

Christopher Richmond



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Christopher Richmond leads all geosynchronous communication programs at Orbital. His duties include developing standard products and vendors for both bus and payload hardware suppliers, and leading internal research and development efforts for Orbital’s STAR bus product. Prior to being named Vice President, Mr. Richmond served as Senior Director of the PanAmSat C-Band Satellite Program for Orbital, successfully leading the program through the development and production of three C-band communication satellites. He also served as Director of Advanced Programs, where he led business development and marketing efforts for Orbital’s Star bus satellite systems, including BSAT-2a/b, Orbital’s first geosynchronous satellite program, N-STAR c, and Galaxy-12, -14, and -15. Mr. Richmond began his career with Lockheed Martin Astro Space as an Engineering Program Manager for the ChinaStar-1 and A2100 Ax programs. He holds Bachelor and Master of Science in Mechanical Engineering degrees from Rutgers University.