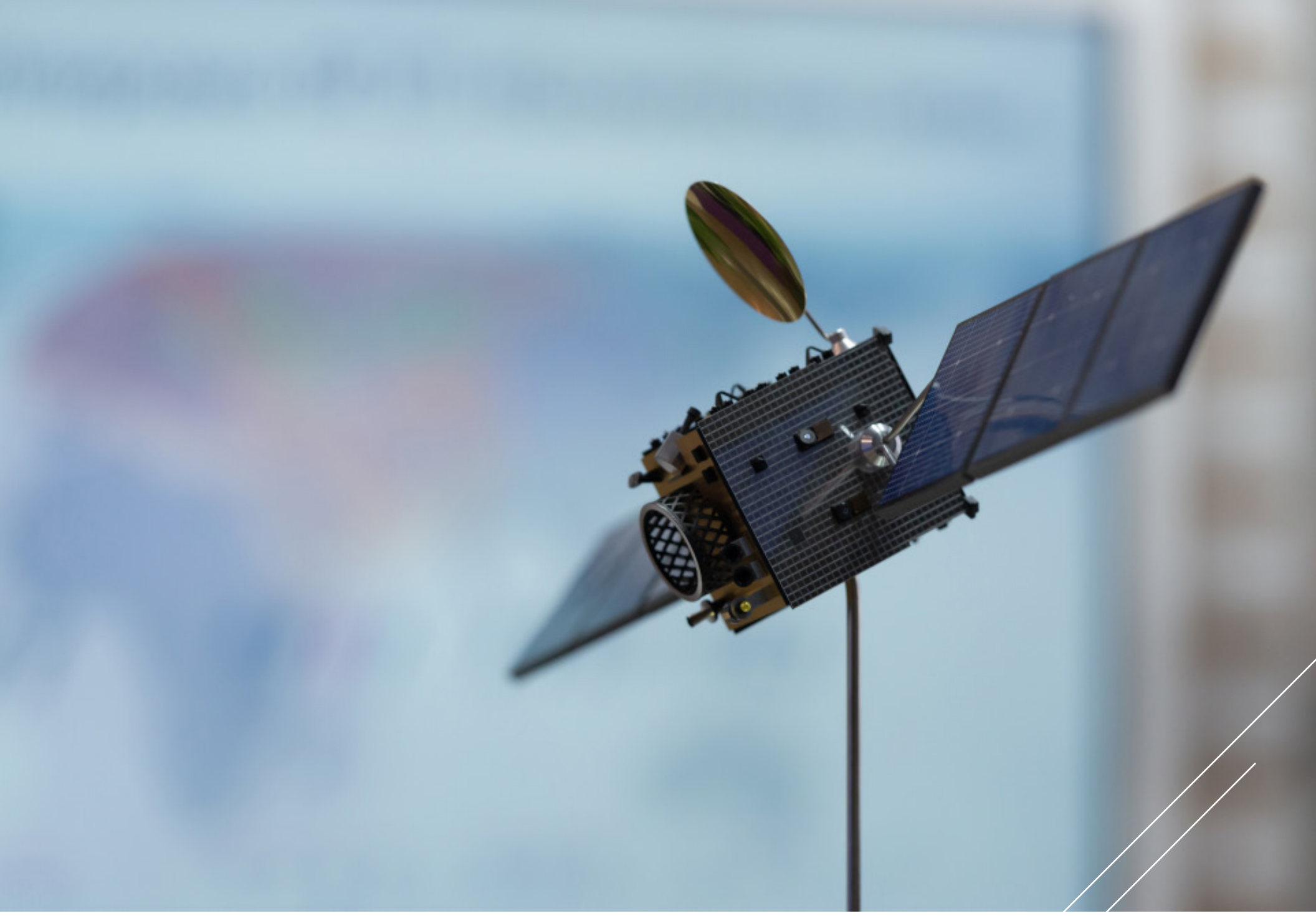


OVERALL DEMAND FOR APPLICATIONS AND DATA TRANSMISSION THROUGH SATELLITES IS GROWING, AND THERE IS A METEORIC RISE IN COMMERCIAL SATELLITES PROVIDING SUCH APPLICATIONS AND SPACE-BASED INTERNET SERVICES DIRECTLY TO CONSUMERS

OMNETICS
CONNECTOR CORPORATION

Small SATs Conferences take off after Pandemic Hiatus

BY SALEEM KHAWAJA

Costs for sending a satellite into orbit in a shared-payload vehicle are dropping, enabling direct-to-consumer applications providers to offer their space-based services competitively.

Space vehicle exhibitions are back, and they're picking up speed after the massive slowdown during the Covid-19 pandemic. New technology and new designs for CubeSats, microsats, nanosats, and more are bringing new life to this burgeoning sector.

With the ever-increasing demand for space-based technology services, more and more companies are entering the near-space space race.

The advantages and uses of space-based technology are countless. For instance, satellites are becoming important

for everything from border protection and precision agriculture to internet connectivity and archaeological research.

At the moment, there are close to 6,000 satellites orbiting the Earth, and according to the 2021 report "Satellites to be Built and Launched by 2028" by market intelligence firm Euroconsult, 990 new satellites will be launched every year, meaning there may be 15,000 satellites in orbit by 2028.

Commericial Satellites Join the Race to Space

In July 2020, the FCC granted approval for Amazon to launch and operate an internet constellation of 3,236 satellites, and so with the tech giant's proposed entry into the satellite lofting business, the space race is continuing to widen and speed up at the same time.

Sailors have long been using the stars for navigation, but now satellites have taken this and other tasks over by carrying technologies like Global Positioning System (GPS), several navigation systems, and other communications and monitoring applications.

Commercial communications satellites support everything from satellite TV and Internet of Things (IoT) connectivity to the global internet and Earth Observation (EO) purposes, which include environmental monitoring and border security.

The United States, China, and Russia top the list of countries with operational satellites, as the original space race was a nationalistic competition between Cold War rivals.

The new space race, however, is collaborative and commercialised. National, international, and supra-national cooperation underpins and supports satellite deployments and research into a variety of space-based sciences.

The first satellite in space, Russia's Sputnik 1, launched in 1957, was an aluminium ball nearly 6 metres across, and in the following year USA lofted Explorer 1, which was nearly 4 metres long. Satellites today, however, need to be small, dense with technical capability and lightweight (comparatively), to reduce costs.

The price of launching a kilogramme into orbit averaged US$18,500 between 1970 and 2000, remaining largely constant. When the space shuttle was in use, it cost $1.5 billion, or $54,500 per kilogramme, to launch a cargo weighing 27,500 kilos. The price per kilogramme for a SpaceX Falcon 9, the rocket utilised to reach the ISS, was only $2,720.

Omnetics Return to Satellite Conferences

In addition to satellite conferences that have already taken place this year, Omnetics will be at the upcoming Space Tech Expo|Europe on 15-17 November in Bremen Germany. Omnetics will be exhibiting at stand F-11 available for answering questions and demonstrating the latest products.

Scott Unzen, Director, Marketing & Market Development at Omnetics, told us, "The Small Satellite Conference, an international gathering of the small satellite community from the military, commercial, scientific, and academic sectors, has been taking place at Utah State University in Logan, UT, for more than 30 years.

"This year, there were more than 3,000 guests from 40 different countries, 240 exhibitors, and 1,000 companies. Emerging applications are discussed and innovations in many fields of space technology are introduced to cross-pollinate ideas across the entire sector.

"One area of discussion was more of a "what's old is new again": specifically, radiation hardening of the components. This was a key requirement for satellites in the past, and still is an important consideration for larger satellites. As the capabilities and the useful life of small satellites have increased, there is more attention and discussion on using components that will be able to function and survive the effects of radiation.

"There were several new propulsion technologies on display that created vector-changing thrust by liquifying metal or nylon to move or reposition the satellites. These technologies need high voltage, low amperage connectors, and small, high-reliability connector designers can meet these requirements by understanding the voltage demands and creating the proper spacing between the contacts.

"New magnetic-based position technology was on show, displaying small magnetic sensors for space measurements of the magnetic field or magnetic gradient, and also for attitude control systems. The magnetic field in orbit can be measured for geomagnetic measurement purposes or, conversely, to establish the relative orientation of a spacecraft in the geomagnetic field.

"Hybrid connector configurations continue to grow, allowing designers to reduce the number of connectors while meeting the system requirements for signal and power along with addressing the specifications for power derating of the connectors.

"As radio frequency (RF) is not capable of supporting continued market growth, there has been increasing investment by major constellation operators in developing optical communication since 2021. Optical communication supports high data throughput with low latency communication and provides 50% less mass and 25% less power over RF."

Mr. Unzen also told us about another conference he attended. "The Space-Comm Expo, held at Farnborough, UK provided an opportunity to showcase Omnetics products and capabilities to the growing number of space-based companies and decision-makers in the UK market. The UK is working to support the growth and development of local companies that will supply the global space market."

Future Flights

Satellites will continue to play a vital role as the world's mobility patterns change from driver-operated to autonomous-drive vehicles, and there is an additional focus on gleaning oceanic data, and monitoring and analysing changes to the Earth's atmosphere.

The overall demand for applications and data transmission through satellites is growing exponentially, with a meteoric rise in commercial satellites providing such applications and space-based internet services directly to consumers who may be in remote areas, or those without a wired or cabled infrastructure.

Plans for tens of thousands of satellites in low-, mid-, and high-earth orbits, could provide the economic momentum to rapidly transform the Earth-moon system and near-earth asteroids into a rapidly developing economy. Satellites are capable of providing exabytes of data transmission to and from terrestrial receiving stations already, and this number will only go up.