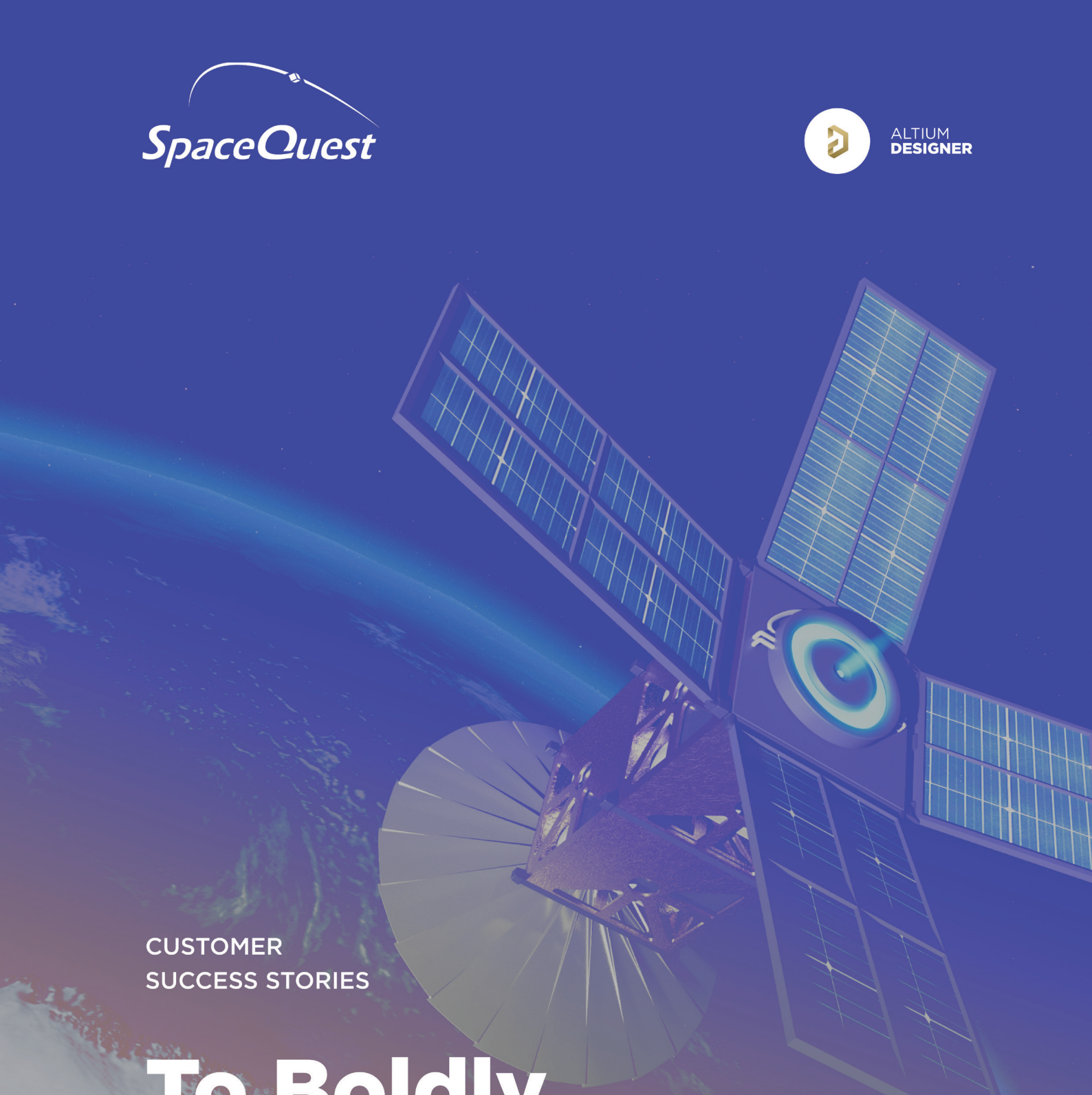
SpaceQuest

ALTIUM DESIGNER



CUSTOMER
SUCCESS STORIES

To Boldly Go with SpaceQuest and Altium

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Mark Kanawati

Vice President, SpaceQuest

Find out how SpaceQuest used Altium Designer to develop an experimental automatic identification system from concept to flight hardware in just six weeks.

SpaceQuest, Ltd. is a satellite technology company headquartered in Fairfax, VA. They develop advanced satellite technology for government, university, and commercial use for over two decades.

SpaceQuest is a recognized leader for development and rapid turnaround of advanced microsatellites and space systems and a pioneer in the satellite automatic identification system (AIS) market. The company has delivered microsatellites and been involved in over multiple space development projects, including avionics for the world's first private space station, Genesis I and Genesis II, for Bigelow Aerospace.

AIS is a navigation communications system for maritime collision avoidance. International treaty requires most large cargo and passenger vessels to be equipped with AIS transponders. Over 100,000 vessels are tracked by competent maritime authorities using coastal stations every year.

SpaceQuest relied on a variety of tools to address PCB layout on their complex designs, and frequently outsourced projects. With a major microsatellites program looming large, they needed something more than what they had at their immediate disposal.

One of their engineers suggested trying Altium Designer as a possible way to get ahead of schedule—and that's when SpaceQuest boldly went into the future of PCB design.

The capabilities offered by Altium Designer was one of the factors that enabled us to integrate an experimental payload at a late stage in the launch campaign and validate our technology on-orbit for a promising new service.

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Simplifying Designing Challenges with Quantifiable Results

SpaceQuest was the first company to demonstrate collection of AIS signals from space using an experimental receiver hosted on a customer satellite. Over the ensuing years, they analyzed the payload data and developed AIS signal processing software.

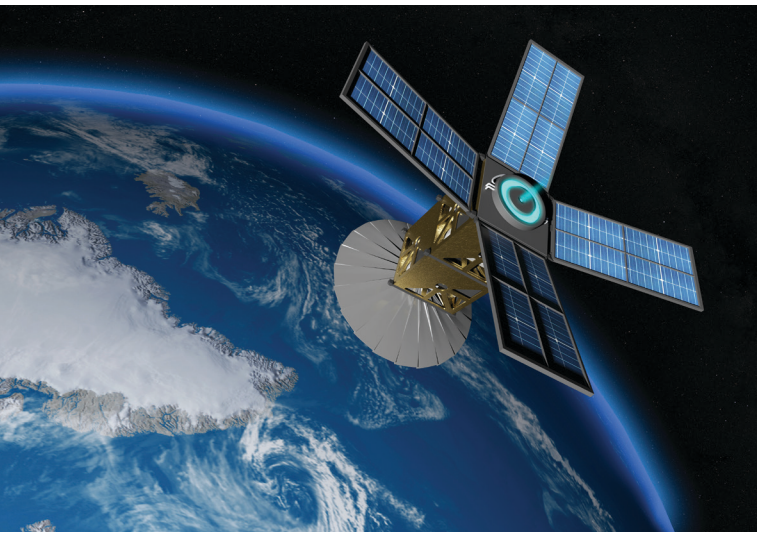
When SpaceQuest first adopted Altium Designer, they were just starting to develop microsatellites for asset tracking and management services from low earth orbit. Recognizing the limitations of coastal AIS tracking networks, they were also exploring how to collect AIS signals from space.

Mark Kanawati, Vice President of SpaceQuest recalls, "We had a preliminary design of a payload to collect AIS signals, but that design was a prototype and our development processes were still evolving."

Integrating a brand new payload relatively late in a satellite development project is unheard of in the space industry. SpaceQuest was in the late stage delivery of two satellites when the decision was made to integrate an updated prototype AIS collection payload on one of them. And only six weeks remained before the design was scheduled to ship for launch.

"Delivering a completely new electronic board, on such a compressed schedule using our previous myriad of tools and processes would have been daunting," recalls Kanawati. "Altium Designer has helped us accelerate our time to market not only from the design perspective, but also the management/ creation of the design/library data and associated documentation."

The turnaround time Kanawati and his team experienced with Altium Designer was unprecedented. Altium Designer enabled SpaceQuest to develop an experimental AIS collection payload from concept to flight hardware in just six weeks.



SpaceQuest continues to expand its constellation of AIS satellites with the development of more microsatellites. Altium Designer is now used in-house throughout the entire development process for microsatellites and other space systems.

Making Easy Work of Even the Tightest Timelines

The intuitive workflow of Altium Designer enabled SpaceQuest to consolidate all the board schematics into one environment, conduct electrical integrity, routing and mechanical fit checks and spin a flight prototype board in just over one week.

The time saved was crucial as it allowed focus on populating the board with electronic components, testing of the AIS decoder software and final thermal and vacuum chamber testing. Missing the integration deadline would have resulted in a two-year wait before another launch opportunity opened up.

SpaceQuest was able to complete testing of the flight prototype AIS collection board and integrate the payload enclosure in time for delivery. The satellites were successfully launched into a low-earth orbit; the experimental AIS collection payload performed flawlessly.

Recalls Kanawati, “The capabilities offered by Altium Designer was one of the factors that enabled us to integrate an experimental payload at a late stage in the launch campaign and validate our technology on-orbit for a promising new service.”

The AIS flight experiment was a game changer for SpaceQuest, which established itself as an early pioneer in AIS data services that ultimately became its primary business.

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Smooth Sailing from Project to Project

Since the successful launch, SpaceQuest has fully adopted Altium Designer in its electronic board development pipeline from design, to layout, to assembly. PCB directives are maintained automatically from design to layout stage saving time and eliminating errors. Altium Designer's differential pair routing and integrated pin swapping have empowered SpaceQuest engineers exponentially.

Leveraging the software's 3D PCB visualization capability allows engineers to achieve reduced tolerances for smaller and lighter payload enclosures, which translates to less mass and volume, critical issues in the space industry. That same capability allows a high degree of confidence for mechanical compatibility prior to committing to board fabrication.

SpaceQuest's engineers used to generate PCB assembly drawings using a separate CAD tool but now generate drawings directly from Altium Designer. The company also has seen efficiency benefits for its product documentation and inventory control.

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