Space Systems: Business Challenges and Key Questions

At PTC, we view industry and government stakeholders in federal aerospace and defense as being in the same boat. The near-term challenges may be different, but longer term, they're identical: mission success within budget. Since 1985, the most powerful firms in global aerospace and defense have partnered with PTC to establish and maintain a winning advantage.

The US government also works closely with PTC on priorities that range from managing acquisition programs and tracking how fleets are configured to synchronizing maintenance with technology insertion and strategic planning—all within the supply-chain operations reference, or “SCOR,” framework. PTC has the system-wide insight, proven technology, and best practices to help the space sector lower risk while connecting the present to the future.

Lowering cost of launch with additive manufacturing

In the additive realm for the space business, the focus isn't just on lowering cost through fewer component parts and reduced weight. Smart players are cutting product development times by up to 40% and manufacturing times by 80%. Whether your competition is another company or an entire nation state, that is a transformational breakaway advantage. The stretch goal on the horizon is to additively manufacture electronics and structures fully integrated in one metal print. Beyond that, just think: How will additive manufacturing impact deep space exploration on the moon or asteroids?

• How will capabilities like topology optimization and real-time simulation inside CAD fundamentally change our pivot speed to embracing additive?
• Have I tapped into my supply chain to utilize existing CAPEX in additive versus capitalizing it alone?

Spending wins in space

In the FY 2018 US Defense Appropriations Bill, overall defense spending saw the largest YOY increase in the last 15 years. Space systems spending was increased by 8%, and a good portion of R&D spending focuses on space with RDT&E up by $16 billion YOY. The budget for NASA was $1.6 billion higher than the agency had requested, with the SLS and Orion programs benefitting the most. Ground systems for NASA received nearly double their original request.

• As the DoD and NASA maintain existing programs and get new programs off the ground, how is it possible to ensure a single source of truth for product data across the lifecycle?
• Based on new spending increases, the customer requirements have now changed. Are our
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**spacecraft designs bidirectionally reflecting these changes in requirements?**
- How can our technology platforms enable us to quickly scale up deliverables in programs that received unexpected funding increases?

**Mergers and acquisitions**

As the US defense spending outlook has increased and tax reform has injected liquidity back onto corporate balance sheets, merger, and acquisition activity in the FA&D sector was up by 80% YOY from 2016 to 2017. One major space-related transaction recently has been Northrop Grumman acquiring Orbital ATK. Total transaction volume in M&A recently spiked to $72 billion and equity market performance of the A&D sector is now outpacing the S&P by 40%. The market is betting that discounted future cash flows from these transactions will be compelling enough to justify present valuations. How can A&D players reduce the risk of delivering on these promises?
- How are we tapping into the innovation best practices of newly acquired firms who have expertise in key sub sectors of the space business?
- After we pay dividends on repatriated profits, how can we put retained earnings to work to integrate product data from sub-contractors of newly acquired firms? Could we classify that OPEX under an M&A cost center?
- As we grow through acquisitions, how can we create a single collaborative environment to integrate design, build, and support functions across multiple programs?

**Digital engineering policy**

In June 2018, the Office of the US Secretary of Defense issued a policy regarding digital engineering strategy. It will require the use of digital models to inform program decision-making as well as a single authoritative source of truth to sync documents and engineering artifacts to digital models for improved collaboration across government and industry. Product lifecycle management will be the centerpiece of this strategy and will have a profound impact on the way space systems data is organized.
- In the lead up to SSR, PDR, and CDR, could our digital engineering collaboration processes with other services on joint programs be optimized?
- Could an MBE approach to product data quicken the process for RCAs after a launch failure based on intuitive, model-based views into key component data and processes?
- How are we truly enabling MBE for space vehicle/launch vehicle design collaboration across geographically dispersed teams? In the lead up to SSR, PDR, and CDR, could our digital engineering collaboration processes with other services on joint programs be optimized?
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Innovation in space systems product development

Having a commitment to excellence for safety and reliability in space systems is not optional. This really is rocket science. PLM offers a means to improve development processes across mechanical, structural, and electrical systems as well as environmental testing.

- Is my team designing this launch vehicle with modularity in mind to accommodate evolving customer requirements?
- Do we have a clear understanding and a practical CONOPS for how flight loads are impacting structural integrity on our reusable launch vehicles?
- What is the optimal variation of composites and propellants that will enable mission success?

Knowledge retention

In NASA alone, as early as five years ago, people of retirement age outnumbered those aged 35 and under by 3:1. A similar problem is happening in the IT functions of the DoD. This creates a major knowledge retention issue for space systems development and operation in the US and globally.

- How can we leverage PLM and CAD technology platforms to accelerate knowledge management (KM) plans?

Innovation versus accountability

With greater funding comes more accountability across the board—both inside government itself and in the industrial contractor base.

- While delivering on contractual requirements, how can we break the mold of the traditional financial model and put investment dollars to work in anticipation of new capabilities the government will clearly need?
- With IoT and AR, how can we smartly build out multiple, simultaneous pilot programs securely, fail the non-performing ones quickly, and scale what is working across multiple OODA loops?

What’s your vision? Connect with a PTC space systems expert today.