At PTC, we see 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 airframe business lower risk while connecting the present to the future.

Learn more about prominent business challenges in the airframes field:

**Accelerating fuel-efficient airframe development with additive manufacturing**

In the additive realm for the airframe 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%. That is a transformational breakaway advantage, and the stretch goal on the horizon is to additively manufacture electronics and structures fully integrated in one metal print.

- **To lower risk and shorten product development/certification times for new fuel-efficient platforms, how can our program managers have full confidence that what they’re printing reflects the finalized design, its proper version, orientation, and inspection history?**
- **How will capabilities like topology optimization and real-time simulation inside CAD fundamentally change our pivot speed to embrace additive?**
- **Have I tapped into my supply chain to utilize existing CAPEX in additive versus capitalizing it alone?**
- **How will additive manufacturing help achieve greater effectiveness and versatility of airframe assembly and production operations?**

**Innovation in airframe product development**

Given the constant requirements for safety and fuel efficiency in airframe product development, emerging capabilities in the CAD domain for real-time simulation, topology optimization, and FEA integration will aid in the transition to new structures and composites. PLM offers a means to improve development processes across mechanical, structural, and electrical systems as well as environmental testing. The Internet of Things and augmented reality are already ushering in major changes in smart manufacturing and the maintenance of aircraft. Each one of these areas can be a fundamental platform for innovation.

- **Is my team designing this airframe with modularity in mind to accommodate evolving customer requirements across both civil and military portfolios?**
Will that modularity enable us to repurpose engineering artifacts from our current focus to broader marketplace needs?

What is the optimal variation of composites that will enable customer and mission success?

**Extended airframe service life**

Today's aircraft designs will have much longer expected service lives than those of just a few years ago. A longer product lifecycle will naturally mean modularity to pivot to rapidly changing market conditions.

- Do we have a clear understanding and a practical CONOPS for how historical flight loads are impacting structural integrity?
- For current programs, how can we manage component upgrades in the most efficient way?
- How can we increase mission readiness by implementing a comprehensive service parts forecasting strategy at the program level?

**Aircraft mergers and acquisitions**

As new jet orders, airline utilization rates, and US defense spending have all increased, M&A activity in the FA&D sector was up by 80% YOY from 2016 to 2017. Recent transactions related to airframe, aircraft equipment, and aircraft interiors have been Rockwell Collins and B/E Aerospace, Safran and Zodiac, and ultimately UTC and Rockwell Collins. 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?
- As we grow through acquisitions, how can we create a single collaborative environment to integrate design, build, and support functions across multiple aircraft programs?
- 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?
- How are we tapping into the innovation best practices of newly acquired firms who have expertise in key sub sectors of the aircraft business?

**Digital engineering policy**

In June of 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. What will that mean for DoD aircraft acquisition and sustainment?

- 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 an airframe failure based on intuitive, model-based views into key component data and processes?
- How are we truly enabling MBE for air vehicle design collaboration across geographically dispersed teams?

**Innovation versus accountability**

With greater military aircraft program funding comes more accountability across the board—both inside government as well as with the OEMs directly. Along with a slew of service-specific variants for F-35, in FY 2018 the DoD has acquired 24x F/A 18s, 3x P-8As, 2x CH-53Ks, 17x AH-64s, 8x Chinooks, 11x UH-72s. 8 MH-60s,8x V-22s, 4 KC-130Js, and so on.

- While delivering on contractual requirements, how can we break the mold of the traditional financial model for a military aircraft program and put investment dollars to work in anticipation of new
How can we demonstrate the impact that real-time aerodynamic modeling will have on our ability to quickly roll out new product features; both now and in the coming decades of the program’s life?

Should we stand up a PLM capability on a program specific basis to enable a quick pivot to whatever system the end customer uses? Could this itself be a win theme?

Leading innovators like you need airframe systems that organize and distribute data for maximum advantage.

Win programs

As airline utilization rates and US defense spending have both increased, many programs that have been in limbo for years are suddenly in play. Successful bidders will need to not only develop a compelling capability but also communicate that in a meaningful way to the customer—which requires an excellent command of product data.

How can we quickly repurpose the same airframe and associated artifacts to other emerging civil or military programs that are on the horizon?