Product Lifecycle Management in the Aerospace Arena

Abstract

The years 2014 and the first half of 2015 have witnessed new records being set in the Aerospace industry, as revenues and profit margins literally soar through the sky and beyond. This is primarily driven by the great year that commercial Aviation has been having, coupled with the changes that have occurred both structurally and strategically in the production, in the value chain, in the engineering processes, in the penetration of new technologies, etc. to name a few factors. Of course, the fact remains that several of the players, big and small, have had to rethink their positioning in the arena in order to account for the onslaught of new players, new technologies, and also several macroeconomic factors including GDP, fluctuation in oil and commodity prices. The average profitability of the top cross section of players crossed 10% on the EBIT Margin. Out of this, the Airlines industry saw about 5% in 2014, which is expected to cross 6% by end of 2015. The Defense players increased their profitability to 11.2% in 2014 from a 10.1% in 2011 and the global expenditure on Defense saw a downward trend at USD1.78 billion in 2014. The tailwinds that hampered the growth in 2013 are turning around and the civil aviation industry across the globe increased at a rate of 35% from USD53 billion in 2013 to USD77 billion in 2014 and is only expected to grow further this year. This growth has panned out across all the players in the value chain, including the aircraft suppliers, the OEMs, lessors, MRO and aviation-services players.

1. EBIT Margin- ratio of Earnings before Interest and Taxes to net revenue earned. Indicator of company's earning ability
2. Original Equipment Manufacturer
3. Maintenance, Repair and Operations
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Introduction

Aerospace is a high technology industry that produces not only aircrafts and their engines, but also space vehicles, guided missiles, propulsion units, etc. The global Aerospace market primarily includes the following applications—Defense, Commercial Aerospace, General Aviation, Helicopter, and Regional Jet. The major players in the United States are Department of Defense and NASA and in India the important names are HAL, ISRO and NAL (Aerospace).

The primary regions that contribute significantly to these applications both in terms of the number of players in the industry, the number of end users, OEMs, suppliers and other players along the value chain, as well as revenue are North America, Europe, APAC and ROW. It is estimated that the overall global Aerospace market will boom to USD352.2 billion by the year 2033 and the main factors that will propel this growth world-wide would be the change in technologies, the high replacement rate, changes in the size of the aircraft and the increase in high net-worth population (Global Aerospace Market Trends and Forecasts: 2014-2033, 2015). Given this ever changing scenario as well as the evolving dynamics of a fast growing industry, all the players along the Aerospace value chain are having to restructure, rethink, redesign, and strategize their position in the market to stay ahead of the competition. With constant innovation being the name of the game, digitization not only of their technologies but of the entire product lifecycle becomes an urgent ask.

Challenges in the Aerospace Industry - Embracing PLM

The Aerospace industry has always been way ahead of the other industries in terms of adoption of the latest technologies. They were the first adopters of the CAD when it came into being in the 1960s. It has become critical for them to adopt the latest technologies in order to avoid getting into complexities of the aircrafts, various governmental and spatial regulatory requirements, long service life, exacting operational demands and of course the safety regulations and demands. The use of advanced technologies for design, engineering, production, planning, simulation and all the other aspects of the supply chain, including all the players involved becomes a question of survival for the Aerospace industry players. With so many players permeating the air space, it also is a question of the survival of the fittest.

4. National Aeronautics and Space Administration
5. Hindustan Aeronautics Limited
6. Indian Space Research Organization
7. National Aerospace Laboratories
8. Asia Pacific
9. Rest Of the World
10. Computer Aided Design
However, despite the advanced technologies being used, the amount of data and information that is required for every single aspect of the huge network that goes into creating an Aerospace supply chain, is limitless. This means that working with them in individual silos is an impossibility and given the fact that it takes a minimum of ten years to develop and three decades for product service, maintaining the integrity of the data also comes under scrutiny (Grasson, 2012). Also, given the fact that there are several OEMs and external networks that need to be managed and legacy applications to be optimised, the Aerospace market is not only huge, it is also extremely complex to say the least and these in turn have led to the adoption of PLM solutions. This helps them in better time to market, lower costs and increased revenues.

Advantages of PLM in Aerospace Arena

Those Aerospace players who have already adopted several digital trends like Big Data, Analytics, Social, Media, and Cloud are already seeing the ROI. Those who have embraced PLM as a part of their development processes have already seen an acceleration of 20% to 50% in the development time, along with the associated cost savings. Many companies have already made the move to other technologies like Additive manufacturing, Lightweighting, Modular Information systems, Cloud solutions, etc. The main advantages and industry-wide implications though are (Aerospace):

- Improved quality of supply
- Reduced design to manufacture time
- Improved responsiveness to service and maintenance

On a broader scale though, the repercussions that PLM can have on the Aerospace arena are tremendous:

1. **One unified system** – The lack of a PLM system will indicate information on ERPs, CRMs, Excel, databases, disparate file servers, emails, etc. PLM acts in unifying all requisite data on one single source that can be accessed through one single application

2. **Security and Compliance** – Aerospace industry has a long development cycle and an even longer product life, which means that the adherence to stringent regulations depends on how secure and reliable the stored data is and how easily it can be accessed and retrieved. These companies have the added burden of addressing export control regulations on data, multi-nationality and air space regulations, etc., which can be addressed from one single point now

3. **Networking** – The OEMs and the other teams are mostly third party vendors. Having a need for huge amounts of simulation data, tools, infrastructure, and software to be shared with multiple teams, internal and external, across continents sometimes can be almost impossible without PLM

11. Product Lifecycle Management
4. **Define business processes** – Bill of Materials (BOMs), changes, workflows, parts, phase-gate, etc. can easily be stored with the right accessibility permissions as well as with in-built reports access when required.

5. **Robust documentation management** – With so much of documentation to manage, PLM gives the industry a robust solution that ties both the engineering data as well as all the documentation together.

6. **Comprehensive solution** – PLM enables digital simulation and mock-up, process and data management, configuration management, better quality control that extends even to suppliers base, change management, field testing solutions, and much more on an open, modular and easily scalable platform.

7. **MRO solutions** – PLM maintains the required data to address maintenance, repair and operational roadblocks.

8. **RFLP** – PLM solutions, when integrated early on, can help from Requirements to Features to Logical to Physical stages of the product lifecycle. This means that Aerospace companies can work from start to finish using one comprehensive platform that allows a multi-directional flow of information with minimum manual intervention and low room for errors. This also negates the need for mid-stream reconfiguration and shows the path to realization of the benefits.

PLM solutions provided by solutions providers typically include, but are not limited to:

- Application development, PLM Scan and 4D Process Consulting, Data Migration services, Implementation services, Data Validation services, Product Data Management etc.
Conclusion

Aerospace companies have the constant need to provide faster-better-cheaper and more innovative solutions that come under all the security and compliance regulatory umbrellas. They need to continuously innovate the way they design, create, and produce their products and PLM gives them the support of one comprehensive platform that allows them to do so. They are beginning to use new initiatives to transition their design technologies and existing systems into a comprehensive PLM solution and most are aiming to embrace the 3D PLM environment where all the players in the supply chain can virtually interact with the product as if it is a physical object. The latest component in the PLM space, Digital manufacturing, lets them do just that. It is well known fact that the Boeing-787 was designed in a 3D PLM environment from start to finish.
References


About PROLIM:

PROLIM is a leading provider of PLM Software Services to industries like Automotive, Aerospace, Manufacturing Supplier and Life Sciences. Providing these services has helped the clients to enhance efficiency and top-line growth. As one of the fastest growing private companies in America recognized by Inc 500, PROLIM being customer focused rather than product focused, the company envisions harnessing customer requisites by adding more satellite offices over the next few years in major metropolitan centers. PROLIM envisions reaching customers beyond borders to deliver effective services in the west and east coasts of the US, Canada, and Europe and Asia.

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