



# SERVITIZATION IN AVIATION INDUSTRY: DIGITAL OFFERINGS

## Abstract

Servitization is a paradigm shift of the Original Equipment Manufacturers (OEM) from just selling the products to delivering supporting services or solutions that can generate additional business values for their customers. Industry 4.0 fuels the servitization business model by paving the way for variety of aftermarket services and solutions that can maximize the potential of the product.

In aviation industry, the primary component of digital offerings in servitization business model is the data generated from the aircraft. New generation aircraft use latest technologies that can generate huge amount of operation and performance data. The OEM collects and processes this data which can then be used to monitor, analyze and predict the reliability of the fleet. Such offering from OEM's is well received by the airline operators and leveraged to mitigate the risk of unplanned downtime and to avoid high cost maintenance activities. The above described is one of the infinite servitization digital offerings in aviation industry. This article walks you through such existing and potential offerings using the latest technological innovations.

## Servitization Market in Aviation Industry

Rolls Royce, the engine manufacturer has stepped into servitization business model a few decades back. The TotalCare® program launched by Rolls Royce removes the burden of engine maintenance from their customers. Rolls Royce takes care of the engine maintenance requirements and charge their customer for the use of

engine on an hourly basis. i.e. the airlines don't own the engine, instead they pay RR for every hour of engine usage. As the OEM itself is involved with all its expertise in maintaining the serviceability of the engine, the airlines can elude the expensive engine maintenance cost. Such service offering enables to achieve

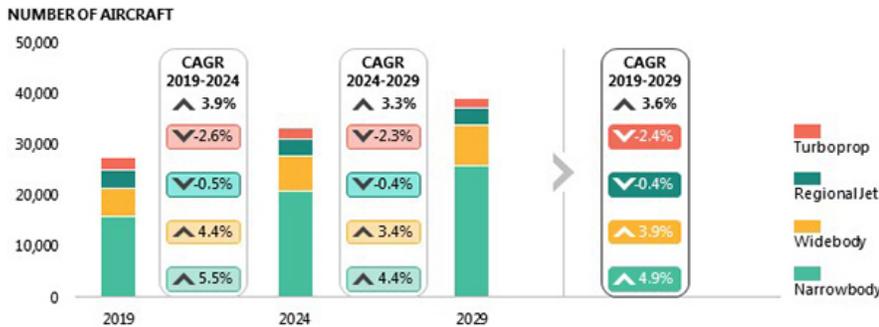
maximum flying availability of the engines.

Airbus and Boeing also have their own aftermarket service programs such as Total Support Package (TSP) and Golden Care program respectively. Although servitization is not new in aviation industry, it has started to gain more traction with on-going technological innovations. Now, every OEM is in the pursuit to come up with solutions that they can offer their customer as a service along with their aircraft. A driving factor that push the OEM's to explore the servitization offerings is the depleting revenue streams. The existing revenue streams are no longer as rich as they used to be few decades back. The operating margins have shrunk as low as 1% for the repair and overhaul organizations. Adding to this is the new business models (like LCC, code sharing etc.) which aims at cutting corners for any extra expenditure that occurs. This is forcing the big players to think of innovative ways to build new revenue streams. Another correlated factor for the OEM's to capitalize on the servitization offerings is the forecasted aviation market growth.

The increase in global feet size and MRO spend in the coming decade will interest the OEM to capitalize on it to generate additional revenue. The total number of aircraft in 2019 is 27,500 which is forecasted to increase ~42%, rising the global fleet size to 39,175 in 2029. MRO spend which is calculated to be \$81.8bn in 2019 is expected to raise ~41% in next 10 years and forecasted to reach \$116bn in 2029. (Source: Oliverwyman GLOBAL FLEET & MRO MARKET FORECAST COMMENTARY 2019-2029). The Global IT spending market in aviation industry is also expected to grow steadily till 2020 with 4% CAGR.

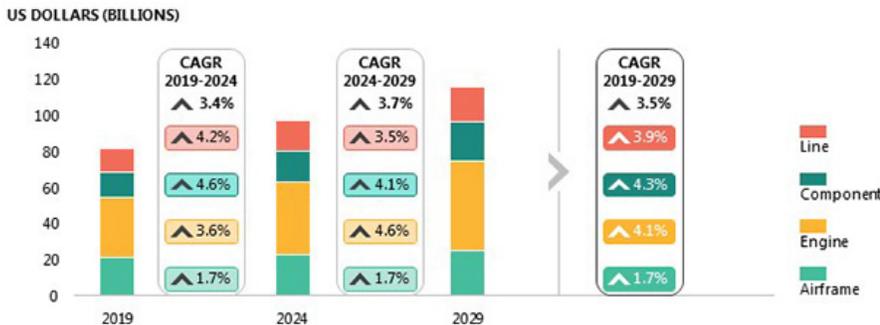
However, these figures are expected to vary significantly due to the impact of ongoing COVID 19 pandemic.

### Global Fleet Forecast By Aircraft Class, 2019-2029



Source: Oliver Wyman

### Growth of MRO Spend, 2019-2029



Source: Oliver Wyman



## Digital Offerings in Servitization

For the past few years, the digitalization is happening in rapid pace across the aviation industry. Valuable and innovative solutions are offered by the OEM's to its airline customers on subscription basis.

IoT is one of the disruptive technologies that is driving every industry towards technological advancement. Latest forecast from International data corporation estimates that there will be 41.6 billion connected devices generating 80 zettabytes of data in 2025. Let's explore few IoT driven technological solutions and its case studies that OEM's focus to deliver in their servitization business model.

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## Health Monitoring Solution

On-time departure is a primary key performance indicator for the commercial airline industry. Though there are various factors involved in causing delays and cancellations which are beyond the control of airlines, the technical faults are also one of the primary factors involved in causing AOG scenarios. DHL cites that the highest possible cost per day, for an Airbus A380 to be grounded due to technical reason is €925,000, referring to a source information from Airbus China. Multiple sources state that the AOG scenario can cost up to \$150,000 per hour. Even though all the aircraft are equipped with systems to record technical parameters during the flight, it can only be retrieved once the aircraft is on ground. Monitoring the health of the aircraft in real time to predict any possible failures can help to avoid such expensive groundings.

The Aircraft Health Monitoring (AHM) system is used to receive data from the aircraft to get real time alerts on the faults, warnings and cautions recorded on the aircraft during the flight. This system connects with ACMS/ECAM in the aircraft and with ACARS to receive operational and performance data. By monitoring these events, the airlines can pre plan their maintenance activities and perform suitable trouble shooting procedure to confirm or ignore any recorded failures. This helps to reduce the unplanned maintenance downtime and avoid AOG scenarios.

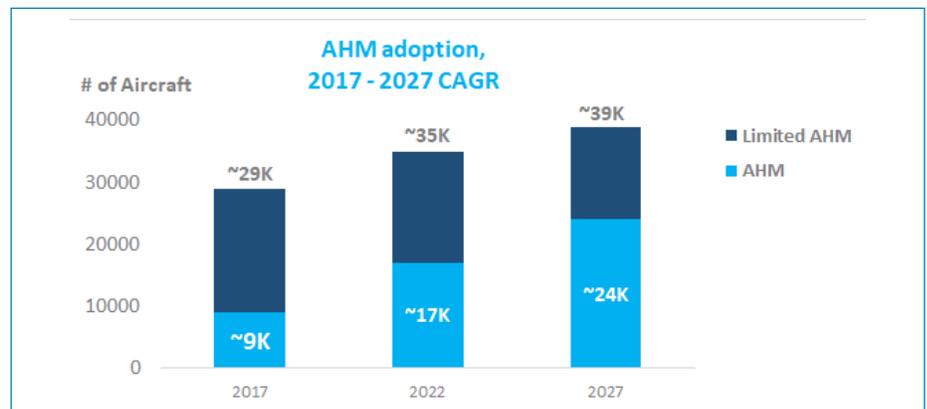
Boeing's AHM solution provides this capability to its customers. The AHM solution collects the airplane data that can be analyzed to determine the serviceability and performance of the aircraft. It also notifies the anomalies recorded during the flight, for which the maintenance can be planned in advance to avoid the

additional ground time of the aircraft. The outcome from this analysis can be used to make decisions on the maintenance requirements, designs and operational strategies to improve the overall fleet performance.

Boeing has also integrated this with their technical documentation solution to quickly access the troubleshooting and maintenance repair procedures. Other Manufacturer's like GE, Rolls Royce and Bombardier also provide customer services using their own health monitoring systems.

ICF forecasts that, by 2027 approximately 24,000 aircraft would be equipped with health monitoring solutions.

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**Source:** "ICF - Big data; the race is on, but what is the end goal?" Presented by Joost Groenenboom – IATA 14th Maintenance Cost Conference



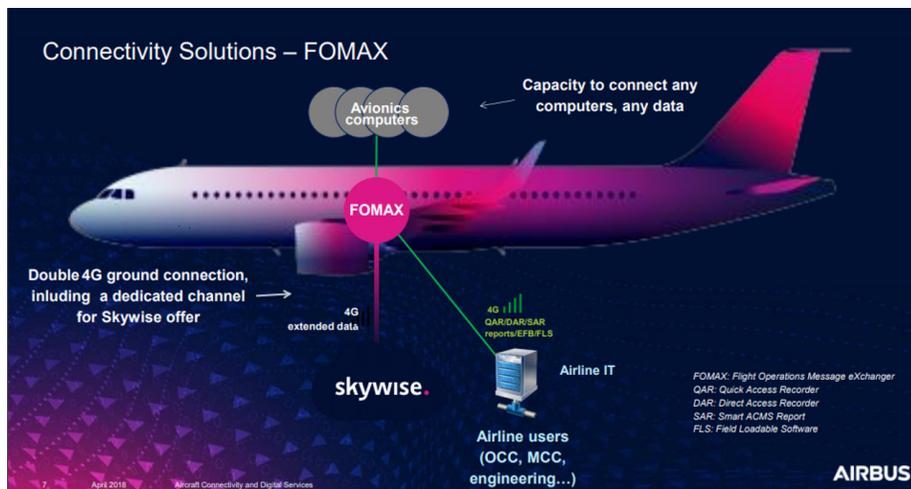
## Data platform and advanced analytics

Data platform that provides the airlines access to a data lake containing different scopes of data related to the aircraft coupled with advanced analytics will enable them to monitor their fleet's performance, trends, alerts and build their own health monitoring KPI's to perform predictive maintenance activities.

The Maintenance Operations Control (MOC) center monitors the data continuously to predict the maintenance requirements thus eliminating the unplanned downtime and achieving maximum serviceable life of the component.

Airbus has introduced their open data platform "Skywise". Skywise provides its subscribers access to the sensor data, manufacturing data, operational and maintenance data of the aircraft. Using its analytical and report generation tools, the airlines can monitor and predict the maintenance requirements before any unplanned failure occurs. Airbus has collaborated with Rockwell Collins to build a router system called FOMAX (Flight Operations and Maintenance Exchanger) that will be retrofitted in all airbus aircraft. FOMAX is capable to record and transmit up to 24000 parameters (30GB information per flight) from A320 aircraft. More data received and analyzed from the aircraft will improve the accuracy of predictions. Air Asia, Asiana Airlines and Etihad Airways are some of the airlines to use the Skywise platform.

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Source: Aircraft Connectivity and Digital Services, Airbus



## Digital Twins

A survey by Gartner reveals that 75 percentage of organizations that use IoT, use Digital Twins or plan to do it in near future. Digital Twins is a digital replica of the physical assets. The digital assets along with the real time performance data collected from the sensors placed in the aircraft and its components can be used to simulate, predict and optimize the outcome or productivity of the physical asset or a process undergoing any kind of scenario.

GE collects and uses the data from its aircraft engines to create a unique model of specific asset, system, or process. Analytics are then applied to these models to detect anomalies in the system. The twin determines a set of actions that can maximize the performance of the asset. These modeling and analytics are embedded in GE's Predix platform that allows to rapidly create or modify business services for customers. Boeing, Airbus and few more aviation manufacturers have implemented the Digital twin technology.

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*Benefits of using Digital twin technology*

**Source:** GE Digital, Boeing



## Conclusion

Infosys joins hands with manufacturers in their pursuit to attract customers by providing servitization digital offerings that could be placed as a competitive differentiator. Infosys helps the OEM to define the servitization strategy, identify the opportunities based on scope of operations and customer demography provides a 16-point readiness framework to identify their pain points and rollout programs that can add business value.

The servitization digital offerings discussed above are only a few and there are others that OEM's provide related to supply chain management, training and re-skilling etc. Over a long period of time the goal for the airline operators have always been to reduce the maintenance and operational cost, avoid unplanned maintenance and AOG scenarios. As long the manufacturer's service offerings cater to these objectives of the airlines, the mutual benefits will improve the growth of aviation industry.



## About the Author



### Rajesh Kanna Dhamotharan

Rajesh is an aviation consultant as part of Infosys Manufacturing Domain Consulting Group. He has rich experience working in several IT transformation projects for OEM, Airlines and MRO's across the globe. He has expertise in the areas of solution advisory, conceptualization, business process optimization and ERP implementations. He has profound insight into aviation value chain especially focused on CAMO, aircraft maintenance, flight operations and MRO services management. Rajesh's passion towards aviation industry drives him to be conversant with technological innovations and latest industry trends.

## References

1. <https://www.iata.org/contentassets/a4bf2b3cda374ee29141304b6530e4ec/1100-1130-mro-forecast-market-trend-icf.pdf>
2. <https://www.som.cranfield.ac.uk/som/dinamic-content/media/Executive%20Briefing%206%20-%20RR%20Totalcare%20-%20Mtg%20the%20Needs%20of%20Key%20Customers%20-%208%20Mar%2010%20v9.pdf>
3. [https://www.dhl.com/en/logistics/industry\\_sector\\_solutions/aerospace\\_logistics/aircraft\\_on\\_ground.html#.XnRLdIgzbiW](https://www.dhl.com/en/logistics/industry_sector_solutions/aerospace_logistics/aircraft_on_ground.html#.XnRLdIgzbiW)
4. <https://www.oliverwyman.com/our-expertise/insights/2019/jan/global-fleet-mro-market-forecast-commentary-2019-2029.html>
5. <https://www.sae-itc.com/sites/default/files/Airbus.pdf>
6. <https://www.gartner.com/en/newsroom/press-releases/2019-02-20-gartner-survey-reveals-digital-twins-are-entering-maintenance>
7. <https://www.ge.com/digital/applications/digital-twin>
8. <https://www.idc.com/getdoc.jsp?containerId=prUS45213219>
9. <https://www.boeing.com/maintenance-engineering/airplane-health-management-ahm/>
10. [https://www.boeing.com/commercial/aeromagazine/articles/qtr\\_03\\_09/article\\_07\\_1.html](https://www.boeing.com/commercial/aeromagazine/articles/qtr_03_09/article_07_1.html)



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