Impact of e-technologies on MRO supply chain

Analysis by David Stewart, *VP and Global Managing Director - Aerospace and MRO, ICF International*

The aviation industry is about to go through an unprecedented period of time in which the air transport fleet will undergo rapid technological change, providing significant opportunity and challenge for airlines and suppliers alike.

Today, depending on your definition, there are few "connected" aircraft in operation. Some would define it as "aircraft that are continuously connected to the ground during flight" (circa 3,000), others might call it next generation IP (internet protocol) –enabled (less than 500) [1].

Taking the latter definition, over the next ten years, the next generation fleet will grow to 11,300 aircraft at 45% per annum (see Chart One). But why is the change in the next decade unprecedented? There are two main reasons. First, over the next ten years, the airlines will be introducing five new aircraft types with, in the main, a rapid ramp up of production. The importance of this rate of ramp-up and fleet rollover is because this switch of aircraft technology gives airlines the opportunity to change the way they manage their aircraft. A frequent theme heard from aircraft operators is that the 787 and A380 can, are and will be operated and managed differently. It provides airlines the opportunity to change the way they do their maintenance, an activity that for many is no longer a core business. So, for example, we now see airlines such as ANA, Qantas, Singapore Airlines, British Airways and JAL outsourcing their 787, A380 or A350 component maintenance to companies like LH Technik, SR Technics, Air France Industries/KLM E&M and now (another change happening in the MRO supply chain) Airbus.

The second reason why the change is so unusual is the "accelerator" effect of the incoming technologies (see Chart Two) and the resulting tsunami of available data and information that airlines and OEMs will have available to them. The 767 can offer up to 10,000 parameters for aircraft health monitoring. The same number for the 787 is 100,000. Combine this huge (per aircraft) increase with the 45% per annum growth rate of the next generation fleet, and the supply chain will see a 1,100% increase in available data being generated. And put bluntly, there are many airlines with legacy IT and maintenance systems that can't handle or leverage the information available from today's fleet.

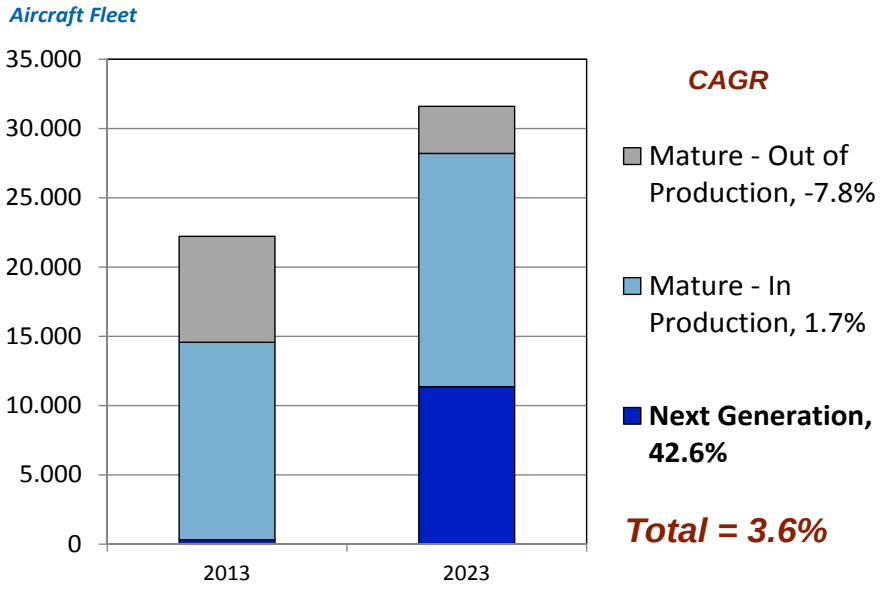
And the data generation potential of the new fleet is not the only e-related technologies that are impacting aircraft operations and support today. To name but a few, there's the Cloud, "Big Data" analytics, ETL/EFB, xml, and greater EDI/automation.

What does all this mean for airlines and suppliers? First, these new technologies will drive greater operational efficiency and facilitate better schedule reliability and services for the passenger. The inter-operability of systems, EFB, connectivity and data analytics will impact air traffic management,

[1] *Next Generation aircraft: 787, A380, 747-8, A350X-WB, A320NEO, 737MAX, 777X*

Over the next decade, the fleet will grow to 31,000 with over 11,300 new generation IP-enabled aircraft

Air Transport Jet Fleet Development By Maturity Grouping 2013 vs 2023



Excludes Turboprops
Source: ICF SH&E
New: A380, 747-8, 787, 777X, A350, A320neo, 737MAX, EJets E2, CSeries, C919, ARJ21, MRJ, MS-21, Superjet

CHART ONE

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fuel management and day-to-day operations control (on the ground and in the air), providing utilisation, cost and service benefits.

Second, e-enabled related technologies in the maintenance supply chain will also reduce costs. Combined with new technologies such as portable maintenance devices, xml, data analytics and prognostics, these next generation aircraft offer the opportunity to reduce MRO supply chain costs by hundreds of millions of dollars. The day will come where aircraft and maintenance records are not stored in rooms full of paper, but rather in the cloud accessible to those who need them – the airlines, the MRO, the owner, the lessor, and the OEM.

Third, these next generation aircraft will provide many opportunities to enhance the passenger experience. Airlines and airports can seek to provide seamless experience from ticketing to arrival. On-board entertainment and cabin systems need to be easy to use and consistent with the passenger's experience elsewhere. Personal tablets will likely become the on-board media and communications interface for the passenger. Airlines will no longer be hardware and embedded IFE providers, rather connectivity providers. As passengers seek to shop, converse (VOIP) or watch personalised content, reliable, capable and affordable IP connectivity in the cabin and to the ground throughout flight will be critical. The challenge for suppliers is to keep up with passenger expectations of being constantly engaged and connected, of faster and more reliable connection speeds, and of the "latest and greatest". And the greatest challenge of all is that for adoption of all this to really happen, these services will need to be affordable.

The arrival of these 1000s of next generation aircraft over the coming decades and the "perfect storm" created by the growth or maturing e-related technologies creates significant challenge.

In particular, the decisions on how the infrastructure will be established to support this are being made today. Without protocols, standards, and industry approaches, there's the risk of embedding additional cost and inefficiencies, and wasting some of the opportunity available. Airlines and OEM/MRO suppliers need to make the right decisions now to ensure that the capability and opportunity represented by the advent of these new generation aircraft are fully harnessed in the future.

The competitive landscape is also going to change and the balance of power will evolve. The MRO supply chain will become more OEM-centric as the OEMs will be better able to manage and protect IP and data. Those who have the strength and capability (financially and technically) to implement Big Data and systems inter-operability will likely benefit the most. Smaller and less sophisticated players will need to focus their strategies on markets where they can win and/or find new ways to access the opportunities available in this more e-enabled aircraft support environment.

All this change and opportunity may facilitate disruptive change in aircraft support. "May" is the operative word, because for this to happen requires supply chain participants to embrace, invest in and manage the transition.

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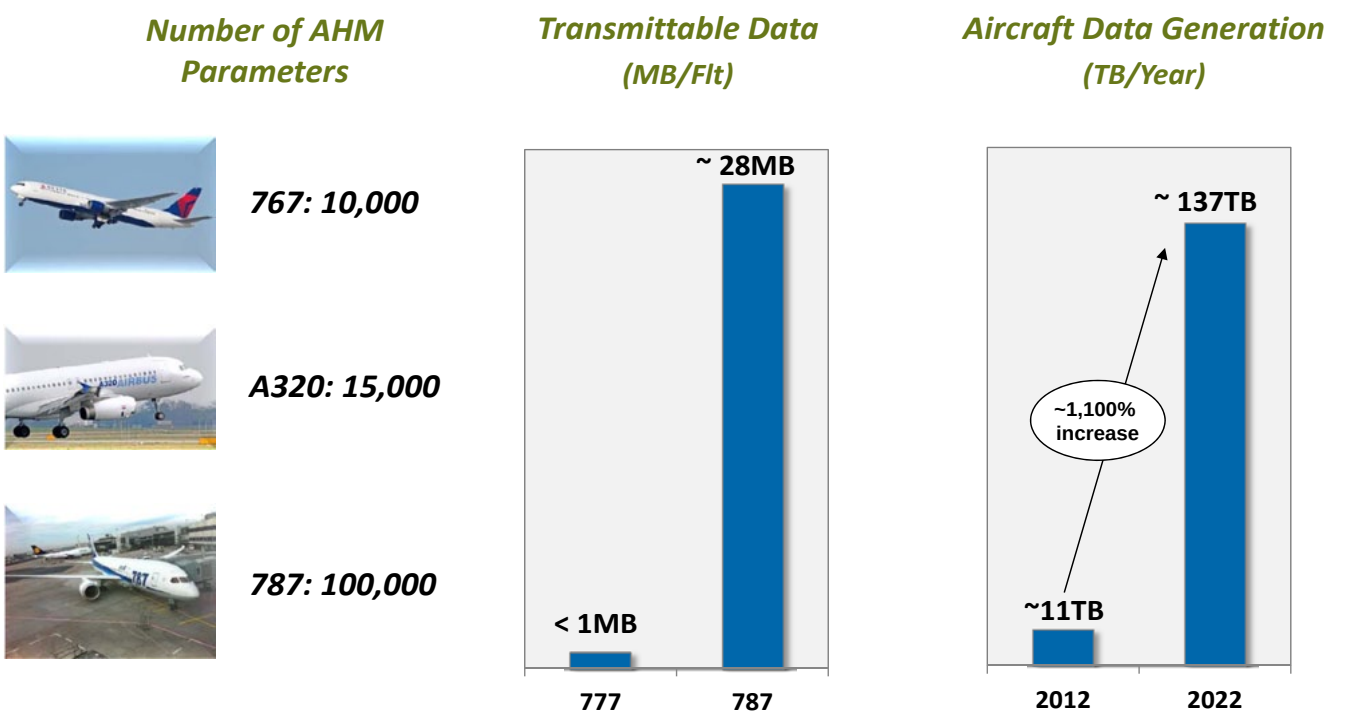
Tsunami effect of aircraft technology

CHART TWO



Source: ICF