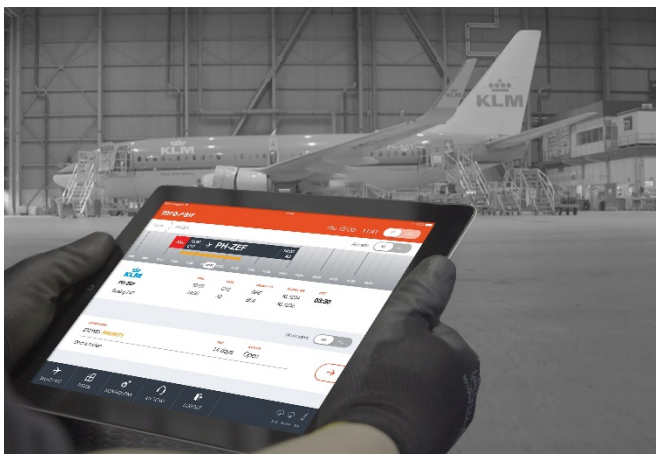
ADVANCEMENTS IN AVIONICS

Avionics is a field not many of us might think about, but it is quite an important field in current times. Simply put avionics refers to electronic systems applied to aviation. It has applications in all manner of aviation, ranging from drones to aircraft, even artificial satellites and spacecraft. Systems used for communication, navigation, flight control, etc. fall under its purview.

While research and development in this field may be slower compared to others, it is has managed to come up with some pretty impressive innovations. So let's take a look at a few advancements made in recent times.

1) Internet of Things

Internet of Things is a connected system of objects (electronic devices) that have been assigned an IP address and have the ability to collect and transfer data over a network without any manual assistance or intervention.



Airlines were already gathering a lot of data using sensors built into the interior and exterior of the plane. Today maintenance, repair and overhaul professionals (MROs) can connect to these sensors using tablets and use them to scan the plane for any components in need of maintenance or replacement. The sensors can also be used in the supply chain, allowing suppliers to identify parts that are nearing the end of their lifespan and arrange for spares beforehand, improving efficiency.

2) Prescriptive Maintenance Looms

Most MROs use a form of predictive analytics to identify possible outcomes of a given situation, allowing them to determine the best course of action. For example, instead of replacing parts every three months, they pinpoint when the part will complete its lifespan and if repair or replacement is best. Now, with the vast amount of data collected through IoT, MROs may be able to push this further into the realm of prescriptive maintenance.

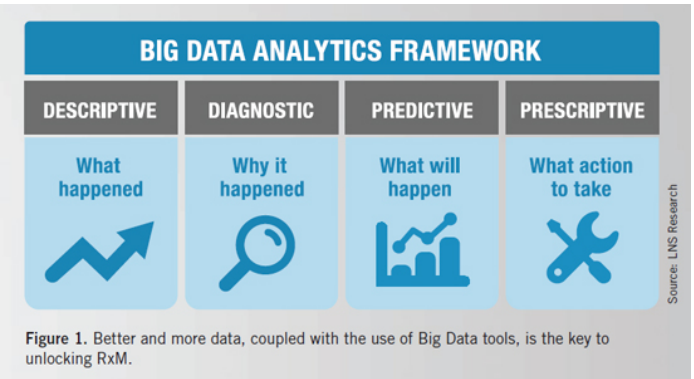


Figure 1. Better and more data, coupled with the use of Big Data tools, is the key to unlocking RxM.

Prescriptive maintenance is a method that decides all possible avenues and is capable of choosing the best plan of action on the basis of the desired outcome. The model essentially "thinks" for itself. It is similar to the method used by self-driving cars on how to reach their desired end point. This removes the guesswork for professionals in an industry reliant on speed.

3) Drones

Most of us know drones (or quadcopters) as small, lightweight aircraft that we fly around for fun. Amazon uses them for deliveries in the US. The aviation industry has also started to look into their viability in aircraft maintenance. Thanks to IoT and the accompanying sensors, MROs can identify faulty components or systems. Drone technology allows technicians to visually identify areas in need of service without physically inspecting the aircraft. Drones can also be used to determine the health of some aircraft components.

During the Farnborough Airshow around 2 years ago, Airbus demonstrated the use of drones in inspection of an A330. In addition, easyJet began limited use of drones for inspecting A320s and inspecting lightning damage to incoming planes.

4) Augmented reality

While not explicitly related to avionics, this felt like an interesting and worthy inclusion to the list. Augmented Reality refers to the use of technology to superimpose virtual elements into the real world. A popular example is Pokémon Go.

In recent years, the aviation industry has seen a shortage in personnel in terms of trained MROs. This is due to many factors, including the lack of training centres in countries where expansion is happening, and the difficulty of getting certification in a highly regulated industry. With the introduction of augmented reality, MROs would be able to train anywhere in the world without the need for open training spots, allowing them to receive certification as trained professionals.

These are a few of the recent advancements that have been seen in avionics and in the aviation industry as whole. Besides this, separate research being carried out on concepts like supersonic avionics, neural sensing, robot co-pilots, Open Mission System (OMS) Software as well as multiple businesses foraying into airborne taxis for city commute show that we can expect more of such ground-breaking developments in the coming years.