

Outlook 2007

Waypoint 2025: Maintaining Aviation in the Year 2025

By Jack Demeis



Jack Demeis is founder and president of Continuum Applied Technology. In 1996, Demeis founded Continuum to develop software applications targeting improvements in cost of ownership, compliance and increased customer service levels.

I invite you to take a journey into our industry's future, experience how the developments of today will impact the aircraft maintenance community of tomorrow and examine what will emerge from this impact. Let's take a glimpse at aircraft maintenance in the year 2025.

Setting the Stage

There are exciting developments occurring today that will have far reaching effects on the maintenance environment 18 years from now. As the opportunities and challenges of a globalized planet continue to expand and unfold, there is a growing demand from the global marketplace for more reliable and convenient air travel, not only for

business but also for leisure travel.

This groundswell of demand has resulted in the accelerated development of new and different types of aircraft, and also in their corresponding design and engineering breakthroughs, including powerplants and avionics. In addition, the aviation community is being asked to provide these more reliable and convenient flight services to the business community at lower acquisition and operating costs than ever before. All of this adds up to supporting a record number of flights, safely and efficiently, for a record number of existing and emerging aircraft. Sounds simple, right? Surely we can continue on as we have in the past, with supply fulfilling demand and after-market services staying steady in its support role.

Included in this bucket of new aircraft are UAVs (Unmanned Aerial Vehicles), Orbital and Sub-Orbital Spacecraft, and the most visible new aircraft today, the VLJs (Very Light Jets). Today UAVs are being deployed primarily by the military for delivering ordinance, reconnaissance and surveillance. Civilian applications, however, are also on the rise in industries such as weather watch and research, air quality measurement, fire fighting and law enforcement. The UAV market is projected to hit 9,000 aircraft within seven years and be worth \$19 billion.

A little further off in the horizon,

but increasing as well, are the Orbital and Sub-Orbital Spacecraft such as SpaceShipOne and Space Adventures' C-21. Today, there are approximately six operating space ports, four of which are in the United States. Interest in sub-orbital space flight has been bolstered by Bigelow Aerospace's Americas Prize of \$50 million. The prize will go the first private aircraft and crew of at least five to journey two orbits, return safely and repeat the feat within 60 days.

A little closer to home, and certainly more directly impactful, is the surge in emerging VLJs with their single pilot flight decks, short runway requirements, and much lower acquisition and operating costs.

Evaluating the Impact

With more aircraft, operators and airports in play, competition will escalate to levels we have never before experienced. This larger market space will demand high performance and a reliable maintenance infrastructure. High performance and reliability will be expected in areas such as communications, downtime, cost, efficiency, quality and safety. While none of these are new or profound, the level of performance expected in these areas will be unprecedented, and could not easily be met today. So let's explore the opportunities that will emerge in order for us to be successful.

Instead of looking at the myriad of forecasts available in the aviation industry to determine where we are headed for this outlook, I asked several industry visionaries to give their take on the future of aviation maintenance. As amazing and futuristic as these predictions are, they will be realities in the blink of an eye. Are you ready to meet the future? — Editor

Exploring Emergent Opportunities

First and foremost, the maintenance community will need to join together in order to meet this challenge, and create standards in training, processes, information and interpretation of regulations. Additionally, the industry must consociate much further to create effective and efficient communications. A good start would be development of a shared knowledge base.

Maintenance requirements will emerge not only for traditional aircraft, but also for the influx of UAVs and Orbital/Sub-Orbital spacecraft, requiring tools and skills not readily available now. With the significant increase in the number of aircraft flying due primarily to the VLJs, many more municipal airports will receive traffic, unmanned automated air traffic control will be utilized, and smaller FBOs and repair stations will emerge.

These smaller operations will be required to provide service and maintenance to a deeper level than they do today. The distinctions between the specialized skill sets of avionics and aircraft technicians will become blurred; there will be more crossover of technical skills and less specialization.

Realizing the Future

Let's take a look at where we've arrived — Waypoint 2025 — and get a glimpse of aircraft operation and maintenance in the year 2025.

- An air taxi operator flying his

regular three or four hops per day lands at home base at the end of the day. After taxiing and shutting down, a button is pressed, the aircraft's systems connect to the Internet and the aircraft's data is electronically uploaded to a central location. The updated aircraft status is then transmitted back where the information can be reviewed as desired.

- The operator's DOM or management company is notified the aircraft has maintenance coming due. While accessing the centralized aircraft records, an RFQ is created for the maintenance and is sent to selected Repair Stations (RS) via the Internet.

- The RSs receive the RFQ automatically into their quoting system and begin to create a response. In creating the response, each RS accesses, in real-time, a shared industry Knowledge Database & Flat Rate resources, parts suppliers, and outside service providers (repair orders, NDT, overhauls, etc.) via the Internet. The responses are completed and sent back to the operator for comparison and RS selection. The selected RS will be notified and with a button press its quotation turns into a work order.

- The maintenance date arrives and the operator takes off for the RS for service. Enroute, the operator gets a DC bus failure indication and the aircraft notifies the RS of the indication. A technician at the RS, while logged into the operator's work order will begin interrogating the aircraft, running onboard diagnostics and troubleshoot the problem. Should the source of the problem be found, the RS will begin preparing for the corrective action which includes ensuring the appropriate parts and resources are available.

- Upon arrival at the RS



Shop operations can be performed through the use of wireless technologies, like accessing reference documents from a handheld device.

hangar; with a button push, the aircraft records are automatically updated. Technicians begin to work on the aircraft by connecting it to a computer and running onboard diagnostics.

- Shop floor operations are completely paperless and the technicians are equipped with a small wireless headset and a handheld device. The wireless headset is used in conjunction with voice recognition software providing hands-free entry of data such as squawks, corrective actions, log book entries, etc. The wireless handheld is used for referencing documents, communications and also for entering information. As the technician works the work order is being updated automatically, and any activity affecting the aircraft records are being held in queue for QA review and sign-off.

- The customer, who can quite literally be almost anywhere, is reviewing the work order in real-time, approving squawks and statusing all aspects of progress on the aircraft.

- As work is completed, squawks are being reviewed and completed for billing and QA is finalizing aircraft records and logbook entries.

- On the last day of work, the work order is finalized and billed, the maintenance release is issued and the operator departs.

As the next two decades fill with growth and opportunities for the aircraft services market that we haven't seen in a long time, I look forward to us joining together to meet these opportunities head-on.

Technology is increasingly vital to efficient maintenance operations.

