TAKING PRODUCTIVITY TO THE NEXT LEVEL

Transforming Aviation through Higher Productivity

Honeywell

ACHIEVING PRODUCTIVITY IN THE AVIATION INDUSTRY

Aviation has the opportunity to transform itself through increasing productivity. That's because being more productive doesn't just mean producing more of something, it can also mean reducing costs; increasing profits; and improving safety, user satisfaction and worker satisfaction.

Productivity's range of outcomes can be seen across the organization. When employees have more visibility into the value of their role, they feel more control over their work. As a result, they feel empowered to make a difference, and their overall job satisfaction improves. This also leads to more collaboration and improvements for the organization at large.

One powerful tool for improving productivity is the application of efficiency frameworks. Lean manufacturing, agile software

> "Our low costs aren't achieved by paying lower wages. The key to our low costs, really, is high productivity." - Tammy Romo, Treasurer, Southwest Airlines[1]

development and Lean Six Sigma are all examples of efficiency frameworks or programs. Each has its own terminology and focus, but largely covers the same themes:

- Eliminate tasks.

- Sort and organize for better access to tools and information.

- Standardize work processes.

- Control variables and create transparency to reduce mistakes.

- Determine the appropriate solutions by scenario.

In this e-book, we align current aviation practices with these themes to see how aviation organizations can maximize their productivity. First, though, let's look at why productivity matters.

1. Associated Press, "Airlines Begin to Focus on Productivity, Not Pay," TribLIVE, Jan. 7, 2005, https://archive.triblive.com/news/airlines-begin-to-focus-on-productivity-not-pay/.

WHY
PRODUCTIVITY
MATTERS

WHAT IS PRODUCTIVITY?

Productivity is the measurement of how much output (be it cotton, automobiles or aircraft) an entity can produce with a given input.

The term "productivity" was used mostly by economists until the industrial revolution brought it into the corporate world. New tools, from the cotton gin to Henry Ford's automobile assembly lines, boosted productivity and imparted a hunger for measuring it. As these tools saved time and replaced workers, the term "productivity" became firmly aligned with cost savings and profits.

Today the term productivity is used everywhere, to discuss personal effectiveness as well as organizational goals. The idea of people changing habits to capture additional productivity in their personal lives is broadly accepted. In organizations like the military, the idea of training for bigger and more accurate outcomes is a close corollary to productivity, and has become a cornerstone value.

The concept has moved beyond mechanical and industrial tools. Digital tools have had an enormous effect on productivity. With the advent of big data, productivity tools made leaps forward to predict, prescribe, automate and respond.

Today, mechanical, individual, digital and data tools intersect through data analysis, the Internet of Things (IoT) and connected machines. This new world of productivity tools offers the potential for giant gains.

ELIMINATING TASKS THROUGH QUALITY FUNDAMENTALS

While it's easy to demonstrate the productivity benefits of software that optimizes decision making and action, there are considerable productivity gains to be made in hardware as well. Reliable components, coatings, fuels and lubricants can boost overall productivity.

Most operators spend a significant amount of time refueling, repainting, and otherwise maintaining the fundamental components of an aircraft. Even time spent searching, locating and purchasing aircraft parts can take office staff and maintenance crews away from their core responsibilities of keeping aircraft in the air. E-commerce platforms built for the aerospace industry finally exist to streamline these tasks.

To be more productive, aircraft need components that are more reliable, are longer lasting and have longer intervals between refilling or adjustment. These more reliable components can provide:

- Less maintenance

- Fewer change-outs or refueling stops

- Less time in installation or upkeep

- Less ordering and stocking of replacement parts

| HOW TO CAPTURE TIME REDUCTIONS		
REFUELING OR RELUBRICATING INTERVALS	**REPLACEMENT OR MAINTENANCE INTERVALS**	**GENERAL UPKEEP**
Better-quality fuel and lubricants can reduce the number of times crews need to perform these tasks.	Longer-lasting components like engines, actuators, auxiliary power units (APUs), tires and brakes can reduce maintenance and installation time.	Lighting, paint and other non–mission-critical items that last longer can save crews time on every turnaround.

ELIMINATING TASKS THROUGH TECHNOLOGY

Aircraft maintenance, ground activities, communications and data logging are all jobs composed of many small tasks, each of which takes time. Eliminating just a few of these can lead to much higher productivity.

Efficient communication through the use of flight planning or flight management apps can eliminate time spent on the wrong tasks before, during or after flight. Better communication also reduces pilot and crew workloads. In addition, communication efficiency requires current data. The ability to quickly load data makes it possible to have information where it's needed, when it's needed.

Voice recognition is one example of a tool that can accelerate tasks, if not eliminate them altogether. Voice recognition systems enable maintenance crews to record serial numbers and parts lists without putting down their tools. These systems can also reduce data entry errors, and fewer mistakes means fewer operational disruptions.

Regardless of the overall area of operations, clearly tracking tasks can help crews stay on task and help management foresee bottlenecks (such as supply or staffing levels) and give crews the chance to find solutions before issues arise.
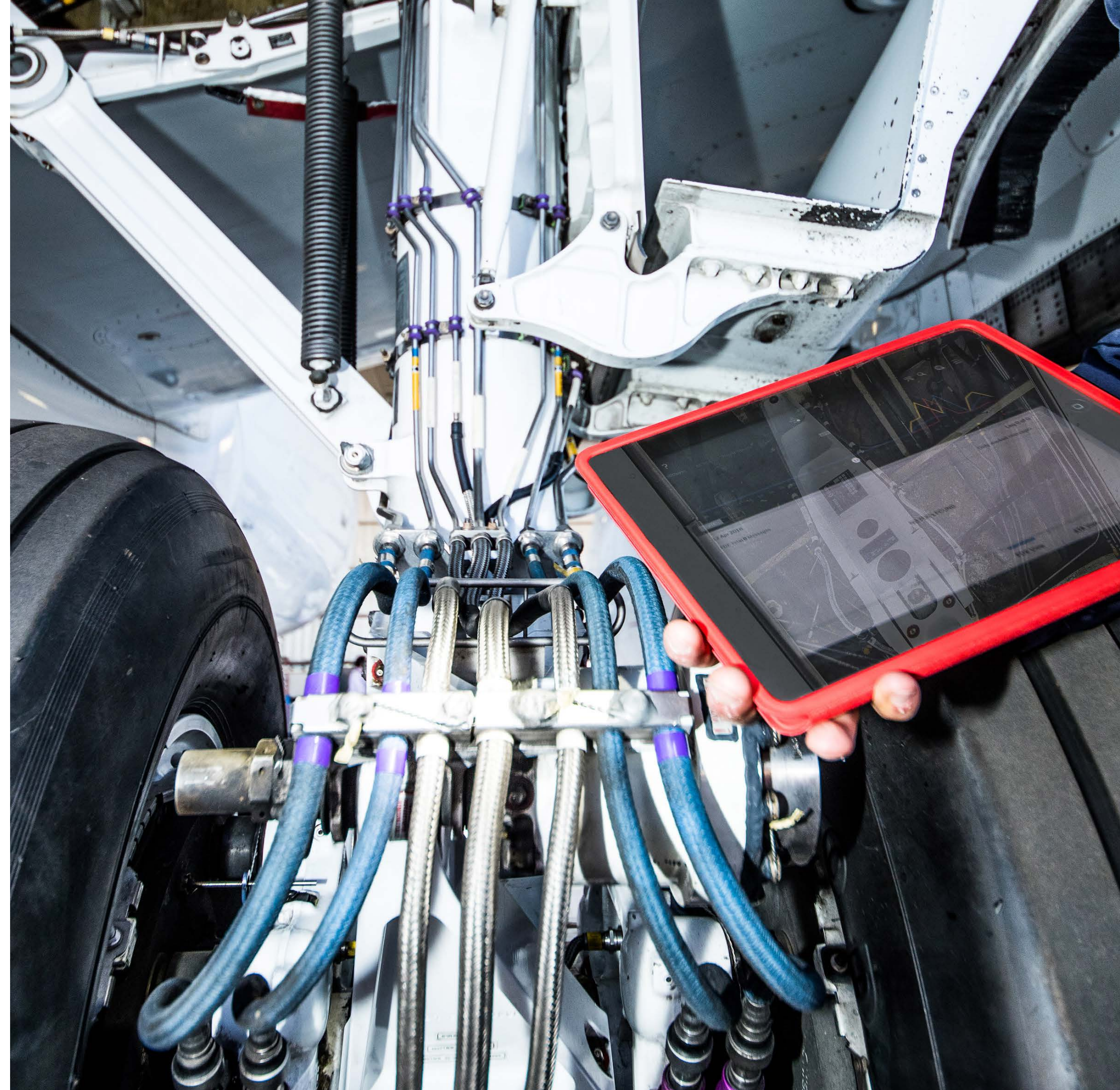
SORTING AND ORGANIZING WORK AND ACCESSING INFORMATION

"Workload" is the demand placed on an operator's mental resources used for attention, perception, decision making and action.

Aviation researchers have extensively studied the dangers of fatigue on pilots, air crews and air traffic controllers. As the focus on, and understanding of, mental taxation has increased, the industry has begun to acknowledge how increasing workloads and the associated mental demands impact capabilities and safety.

A psychophysiological approach (called "psychophysiological engineering") examines the human-machine interaction to understand what can be done to lessen that load.

The aviation industry has already responded with many different solutions to organize work and lessen the mental taxation of important tasks. As additional research has revealed, humans have a more productive response when they are prepared. This has resulted in an emphasis on preparatory information so that action can take place more quickly.

COCKPIT TASKS	NAVIGATION TASKS	GROUND TASKS	COMMUNICATION TASKS
Cockpit designs have evolved dramatically over the past 30 years, increasing automation and providing easier-to-see and easier-to-use instrumentation.	While some pilots still carry paper navigation maps and manuals, the industry has evolved and is moving information onto apps that have much greater search capabilities and are easier to use.	Enhanced sensors on aircraft equipment and better communication with ground crews has enabled them to be better prepared for the aircraft's needs immediately upon landing.	Secure satellite communications enable aircraft to transmit valuable information to the ground, and in turn enable the ground crew to provide analyzed data and perspectives up to the cockpit.

STANDARDIZING WORK

Aviation has long been a believer in, and user of, standardized processes. Standardized work improves productivity for pilots, ground crews and customer service staff so they in turn can further improve the flight experience. However, standardization of work is not pervasive across all roles and processes in the aviation experience.

Most roles in aviation can benefit from standardization or further standardization of work. Those benefits include:

- Documenting and sharing best practices

- Easier training

- A reduction in variables (and thus in surprises and opportunities for issues)

- Creating a baseline for future improvement

As an industry, greater dependence on digital checklists and computer-guided standardized processes have been adopted to make work easier. Continuing this adoption will bring continued productivity gains in the future.
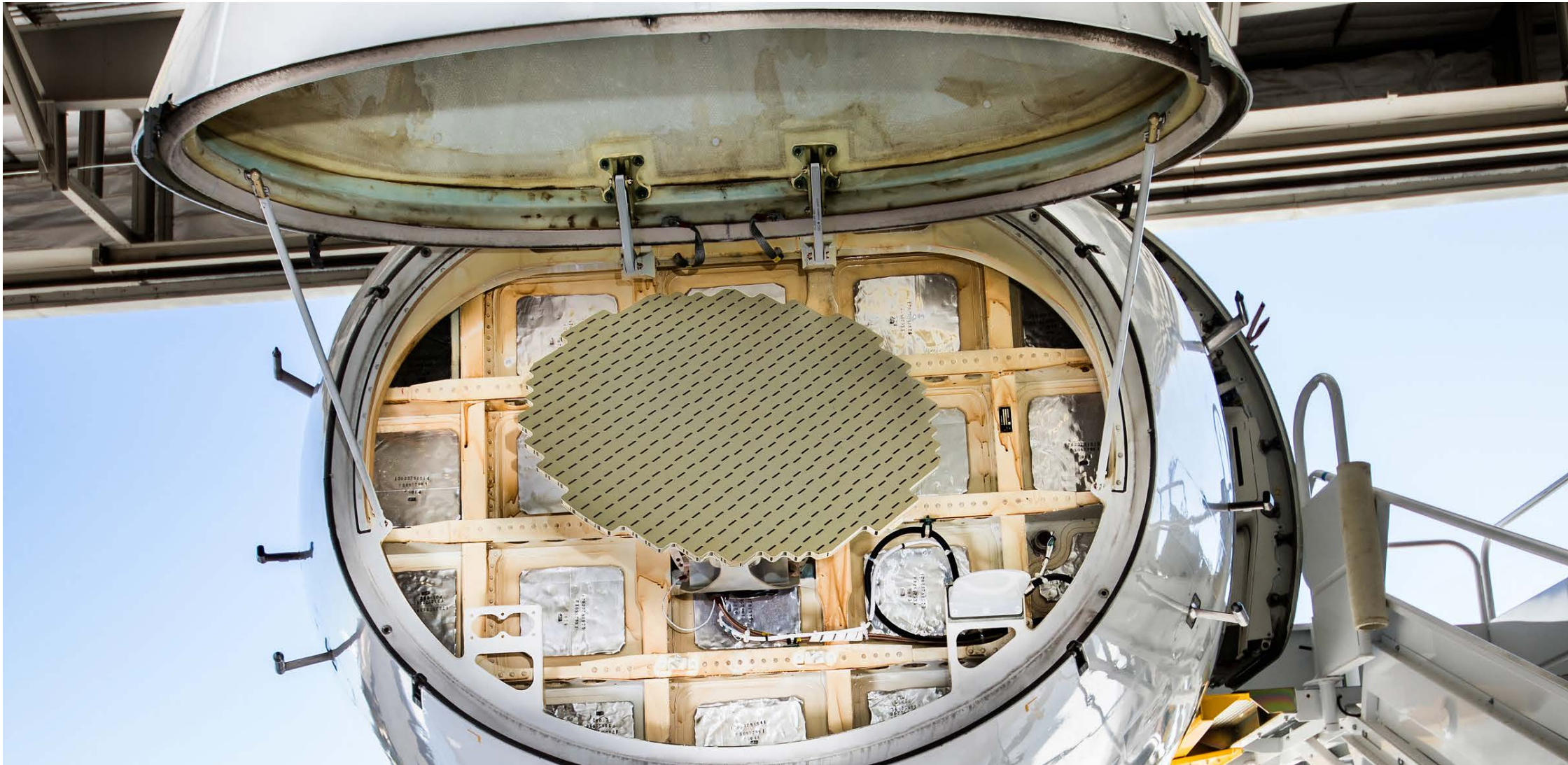
CONTROLLING
FOR VARIABLES

Probably the greatest advances in productivity have been made through technology and the advent of big data – the use of sensors to collect data, advances in bandwidth to transmit data, and new analytics to draw insight from that data. The calculation power and analytics ecosystems that are available today make it possible to control for certain variables with great precision.

The use of existing data on weather systems, terrain and physical structures coupled with radar advances has led to the ability to make predictions of upcoming hazards. Additionally, Connected Aircraft solutions use on-aircraft components to analyze real-time information and transmit data about likely or urgent maintenance needs.

Use of outsourced flight-planning and weather-tracking services is also helpful in providing input on variables while offloading the mental strain and instead making pilots and crew more productive in their decision making.

SOLUTIONS FOR GREATER CONTROL		
WEATHER VARIABLES	**TERRAIN/STRUCTURE VARIABLES**	**EQUIPMENT VARIABLES**
Advances in big data, predictive insights, connected systems and support services	Advances in big data, predictive insights and connected systems	Advances in sensors, transmission of data, connected systems and predictive insights

DETERMINE APPROPRIATE SOLUTIONS BY SCENARIO

In aviation emergencies, helicopter operations or military missions, high-stakes decision making is involved, and therefore productivity is critical.

- Minimum input/effort must result in output of the greatest importance.

- Decisions must be made quickly.

- Decisions must include the greatest amount of information possible.

- Pilots and operators must determine the course of action necessary to prevent serious issues.

By combining massive data sets with advanced analytics, Connected Aircraft solutions can deliver predictive insights. Prescriptive insights can help identify appropriate responses and options by pinpointing issues and then prescribing actions to take to:

- Prevent a part failure from occurring

- Choose a safer flight path

- Avoid an in-air collision or hazard

- Fix a mechanical problem

Outside of emergencies, predictive insights can provide real-time information about shortcut routes, climb speeds and cruise altitudes to save fuel, as well as enhanced awareness to more easily avoid issues on the runway.

These predictive insights arm pilots and operators with current information and options. That enables them to make the best decisions. It also takes some of the mental burden off of operators or commanders, allowing them to better maintain focus. Predictive insights thus boost productivity by limiting the options that decision makers have to assess and giving them the information they need to choose between those options.

PRODUCTIVITY SOLUTIONS AND SERVICES FOR PILOTS AND OPERATORS

At Honeywell, we build our solutions and services with the many benefits of productivity in mind. We merge our knowledge from across industries to identify what's needed to improve costs, safety, end-user satisfaction and worker satisfaction for the aviation industry. With solutions on nearly every aircraft in the world and at more than 500 airports, we're perfectly suited to help you achieve higher productivity for pilots and operators.

COCKPIT IMPROVEMENTS	NAVIGATION	FLIGHT EFFICIENCY AND PLANNING TOOLS	COMMUNICATION
- Primus Epic integrated avionics system	- GoDirect Flight Bag Pro - IntuVue RDR-4000 3D Weather Radar System - CAS67A Traffic Alert and Collision Avoidance System (TCAS) II - Mark IV Enhanced Ground Proximity Warning System (EGPWS)	- GoDirect Flight Efficiency - GoDirect Flight Planning - SmartRunway software - SmartLanding software - SmartView synthetic vision system	- Aspire satellite communications system - JetWave satellite communications system

PILOT SERVICES	OPERATOR SERVICES
- 24/7 aircraft on ground support - Flight operations support - GoDirect Flight Sentinel - GoDirect Flight Services, GoDirect Flight apps and NavDataBase Services - Weather Information Service	- Entry into service and service management support - Business operations and contract management - Customized asset management

PRODUCTIVITY
SOLUTIONS AND SERVICES FOR MAINTENANCE

While our heritage in aerospace gives us the perspective to craft services and solutions that keep maintenance operations running smoothly, our experience with the fundamental hardware of flight enables us to understand the needs of maintenance crews.

REPLACEMENT OR UPKEEP INTERVALS	GROUND CREW TASKS	MAINTENANCE PLANNING AND SCHEDULING	SERVICES AND SUPPORT
– Engines and APUs – Wheels and brakes – Coatings and paints	– GoDirect Ground Handling	– GoDirect Connected Maintenance – Health Usage and Monitoring Systems (HUMS)	– 24/7 aircraft on ground and global technical support – GoDirect maintenance and protection programs – MyAerospace portal – Technical solutions and on-site remote training

PRODUCTIVITY
SOLUTIONS AND SERVICES FOR PURCHASERS

Our focus on every aspect of aviation led us to realize the challenge facing purchasers. We've made it easier for purchasers to find and buy products through our e-commerce platform: https://www. godirecttrade.com/.

Additional services for purchasers include:

- 24/7 aircraft on ground and MyAerospace portal order support

- Price quote support

- Warranty and material returns

- Exchange and rental support

THE FUTURE IS WHAT WE MAKE IT.

Honeywell