SAFETY
IN THE MODERN AIRSPACE

Honeywell

A GUIDE TO TODAY'S RISKS AND THEIR SOLUTIONS

Safety has always been a priority for aviation, and the industry's focus is paying off. But that doesn't mean it's time to sit back and rest. Further improvements can boost safety, enhance operations and improve mission readiness and flight efficiency. Modern airspaces are changing – the skies are more crowded, and air traffic is coming closer to home with Urban Air Mobility. Maintaining safety and reducing risk even further will only be possible with new technologies.

This guide will help you understand 14 of the most common safety issues in flight and what the industry is doing about them.

Maintaining safety in modern airspaces will require advances in unmanned flight and improvements in communication, navigation accuracy, sensors, situational awareness and cybersecurity. With the help of technologies such as those mentioned here, you can be a part of the aviation industry's continuing history of safety.

ACCESS TO INFORMATION

Staying connected is critical to flight safety and efficiency. Without a reliable connection, pilots may not be able to obtain important information, such as:

- Current or potential weather events

- Ground conditions

- The location of other aircraft sharing the airspace

Access to information can be the crucial difference in navigating through difficult flight routes and accomplishing missions. This becomes increasingly critical as the airspace becomes more crowded.

To solve this challenge, the industry is turning to higher-bandwidth connections. In addition, through mandated improvements, the industry is requiring communication technology improvements.

The Future Air Navigation System 1/A (FANS 1/A) is one of those sets of mandates, and calls for the use of Controller Pilot Data Link Communications (CPDLC) in various forms. CPDLC is essentially a secure, high-speed version of text messaging for pilots, and allows pilots and air traffic control to send preset data messages between the ground and the aircraft.

Another mandated communication technology is Automatic Dependent Surveillance-Broadcast Out (ADS-B Out), which uses GPS technology to determine an aircraft's location, airspeed and other data. It enhances safety by making an aircraft visible, in real time, to air traffic control and to other appropriately equipped ADS-B aircraft.

AUTONOMOUS FLIGHT
AND URBAN
AIR MOBILITY

Unmanned or autonomous technology is already in use for space exploration, commercial monitoring, equipment inspection and more, but it is poised to take on an even greater role in commerce and society in general. Some Unmanned Aerial Vehicles (UAVs) will operate in city environments, and will be part of a larger movement known as Urban Air Mobility (UAM).

As with driverless automobiles and unmanned flight, UAM brings a host of safety concerns that will need to be solved. Those concerns include:

- Navigation precision

- Air traffic control (ATC) systems must be modernized to address these new environments and ATC operators must be trained

- Controlling noise, vibration, turbulence and other effects from urban air vehicles

- Radar limitations. The radar used for current aircraft - with its long range and slow refresh - is not well suited to urban flight, where short-range obstacles will be many. New solutions will be needed

- Take-off and landing zones. New UAM pads, similar to helipads, must be developed that can sit within cities themselves but are separated enough from the general population to operate safely

The industry is currently working on what a safe and functional take-off and landing zone for unmanned vehicles means. In the meantime, advances in autonomous equipment like those used in space exploration, are making their way into unmanned vehicle technology

CYBERSECURITY

Cybersecurity is a basic requirement in the digital age. Cyber threats today are every bit as serious as threats from terrain or other hazards. And unlike other hazards, cyber threats can affect every aspect of business or mission success, including customer data, back-office systems, system integrity, personnel and the flight itself.

To maintain security, all nodes within your ecosystem must be resilient. That means your staff must be trained to identify suspicious emails and not click on suspect links, your communications equipment should use encryption, your networks should be secured and your systems should be accessible only through multifactor authentication.

Unfortunately, that's not an exhaustive list of the tasks required to secure your organization today. The variety and speed of attackers and the time most attackers have once they break in reveals the current complexity of cybersecurity, and suggests that most organizations will want to work with outside experts to secure their operations.
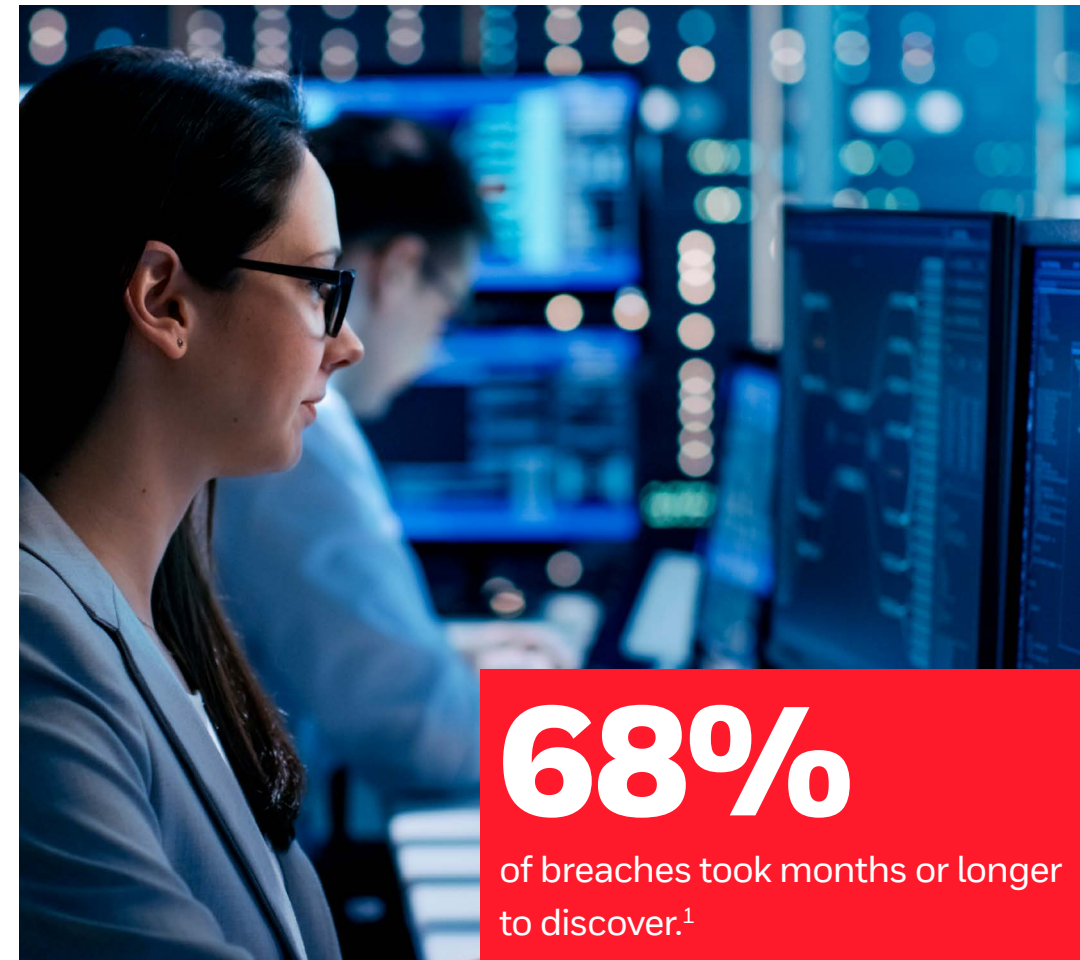
68%
of breaches took months or longer to discover.[1]

1. 2018 Verizon Data Breach Investigations Report

EQUIPMENT AND SENSOR SAFETY

The safety and reliability of your equipment is the foundation for all flight safety. Selecting quality equipment, using sensors to detect issues and performing regular maintenance checks can together keep aircraft functioning at peak performance and uptime. But sometimes even these safeguards can go wrong.

At times, aircraft operators who receive a sensor reading cannot be sure if they have a system issue they need to address or if the sensor itself is malfunctioning. Thus, the reliability of sensors is critical on your aircraft.

While equipment can fail for several reasons, two of the primary causes are common and within operators' ability to control:

FAILURE TO UPGRADE

As equipment ages, the chance that it will fail also increases. Proper management of upgrades (both hardware and software) is critical to maintain uptime and avoid accidents.

FAILURE TO PREDICT MAINTENANCE ISSUES

It's no longer necessary to wait until equipment breaks. Modern predictive maintenance solutions enable you to understand the wear on various parts and repair them before they become issues. Predictive solutions can help keep maintenance crews prepared, which not only improves safety, but can potentially reduce costs and aircraft downtime.

Smarter sensors are helping to alleviate the issue of sensor trustworthiness. Data analysis solutions, which look for anomalies, can also help predict issues or determine if the results from a sensor are likely to be reliable.

FUEL
ISSUES

No one expects or intends to run out of fuel in flight, and yet fuel exhaustion, starvation or contamination issues occasionally endanger flights for operators of all kinds. Fuel contamination issues are often due to accidents by the ground crew and other support personnel. Better training and procedures can reduce the likelihood of such issues. Fuel exhaustion and starvation issues are different.

Flight planners and dispatchers often decide how much fuel is needed for an aircraft's trip, but sometimes give the pilot the option to load between 5 to 10% of contingency before take-off. This 5 to 10% number usually involves little formal calculation and could result in flights burning fuel unnecessarily, all at additional financial and environmental cost.

Data analytics tools can help operators calculate more exact fuel requirements. Using these tools can help avoid unnecessary costs while providing safety against fuel exhaustion or starvation issues.

IN-AIR
COLLISIONS

Possibly nothing is as frightening to aerospace operators as the possibility of an in-air collision. With the increase in air traffic and the coming rise in Urban Air Mobility (UAM), new technologies will be needed to maintain safety and prevent the risk of in-air accidents.

Traffic Alert Collision Avoidance Systems (TCAS) have existed for decades and can help alleviate these risks for conventional commercial and military aviation. In addition, Automatic Dependent Surveillance Broadcast (ADS-B) seeks to add to the situational awareness of all pilots and operators. It is a precise satellite-based surveillance system. ADS-B uses GPS to determine an aircraft's location, airspeed and other data. ADS-B Out systems enhance safety by making an aircraft visible, with position and velocity data transmitted every second, to air traffic control and to aircraft with ADS-B In systems.

The demands of UAM call for a completely different kind of solution, however. UAM is envisioned as a version of on-demand mobility focused on air traffic operations in metropolitan areas.

The on-demand nature of UAM means that a system of air traffic control as used in conventional flight will not suffice. NASA and other organizations are currently studying how to make air traffic control work, and how UAM will impact the National Airspace System. Unmanned flight, such as drones used for delivery, will further complicate this new area. In this new and fast-changing area of flight, the industry is working closely with regulatory agencies and other groups to ensure safety for all.

LANDING AND GROUND SAFETY

As airspaces expand and grow more crowded, so do airports and runways. Coordinating movements on the ground is vital to ensuring safety for all aircraft – including helicopters and military craft – and the ground crew that service them.

Runway safety is a particularly important category of ground safety, as a large majority of flight accidents occur during take-off, taxi or landing. Incursions are common and could grow increasingly so as airports become more crowded.

In addition, more-crowded airports are likely to lead to further issues with wake vortices, where the disturbance created by large airliners creates unpredictable issues for following aircraft.

Ground safety must also consider the environment outside the airplane. That includes support vehicles and the lane markings, speed limits and zones they must adhere to, and equipment such as ramps and stairs.

Some of the visibility and awareness tools developed to help pilots now include aid for dealing with runway issues and wake vortices. Large advances have come by providing pilots with 3-D and 360-degree views for better situational awareness. Meanwhile, ground handling solutions can help coordinate efforts on the ground, so that crews remain safe while accomplishing their tasks efficiently.

"EUROPE EXPERIENCES A MINIMUM OF TWO RUNWAY INCURSIONS EVERY DAY, ACCORDING TO EUROCONTROL."

LIFE SUPPORT SYSTEMS

The lack of oxygen at high altitudes means that true high-altitude passenger flight wasn't practicable until cabin pressurization was introduced during World War II. Aviation initially relied on gaseous compressed oxygen, then moved to liquid oxygen and today can use onboard oxygen generation systems. These onboard systems free up space, simplify oxygen infrastructure and can enable extended flight or mission durations.

In addition to temperature control systems on aircraft, pressurization has largely made up the extent of life support. But as some commercial operations begin to push out to the limits of our atmosphere, they are encountering a whole new world of life support requirements. For those in the space industry, life support is an entire field of extreme complexity and challenge.
In orbit, life support systems must cope with:

- Radiation

- Extreme temperatures

- A complete lack of oxygen, water and gravity

Life support for the space industry (and to some extent the defense industry) is thus an enormous challenge and an enormous area of innovation. Advancing technology will help meet some of this challenge.

For those in the commercial sector, many of the advances made by NASA and other space agencies in the past decades are already available or are influencing what is available to commercial endeavors.

PILOT
FATIGUE

Too often, flight crews or operators don't recognize the risks posed by long flights, extended duty days and sleep loss. Fatigue degrades every aspect of human performance, including reaction time, memory, judgment and the ability to communicate, making it one of the leading safety hazards today.

Pilots often accumulate sleep deficits that result in impaired alertness and performance. Critically important, however, is the kind of fatigue that goes beyond sleep patterns. Even with adequate sleep, excessive exposure to mental stimulation produces the same measurable results as extensive manual labor and leads to a decrease in the ability to carry out tasks.

This makes reducing pilot workload and stress one of the most important ways to improve safety in modern aviation, so pilots are alert and able to carry out the essential tasks needed for safety assurance. Solving the issue involves a mix of solutions, from better scheduling of pilots to technology that is easier to use, to tools that can help pilots focus on what's important.

RUNWAY SAFETY

A runway excursion occurs every day worldwide, and more crowded airspaces will mean more crowded runways too.

Both incursions and excursions create serious safety issues for airports, pilots and passengers. Incursions cost the aviation industry roughly $100 million a year, are one of the National Transportation Safety Board's top 10 safety concerns and are often very dangerous. Between 1995 and 2010, 55% of runway incursion incidents resulted in fatalities.

Excursions are potentially even more dangerous. They cost U.S. operators approximately $900 million every year and account for 80% of runway-related fatal accidents.

Runway safety is of particular concern as air travel spreads further around the world. As more and more travelers take to the skies, more and more pilots will be landing at new or unfamiliar airports.

Improved situational awareness tools for pilots are under development or are now available, but ensuring the industry improves its safety records on the runway will require a mix of smart technologies. Previews of destination airports, 3-D visualization tools and better aircraft-traffic control communications are all available and can help alleviate these hazards.

SAFETY DATA RETENTION AND ACCESS

The aviation industry has long understood the value of learning from crashes, which is why the first modern flight recorders were created as early as the 1940s. Today, maintaining safety in a growing and changing industry still requires an ongoing understanding of aircraft issues. The difference is in the sophistication of the technology. The industry now requires flight data recorders (FDRs) and cockpit voice recorders (CVRs) that have advanced far beyond their beginnings.

In fact, the European Aviation Safety Agency (EASA) has issued a series of mandates on upgraded CVRs and underwater locating devices (ULDs). Future CVRs will require a 24-hour recording capability and must record onto solid-state material.

With more and more data flowing through modern aircraft, the industry can expect these recorders to only become more valuable in addressing incidents and maintaining safety. The industry is already taking advantage of real-time connectivity to develop recorders that capture this data and allow much easier access to it.

TERRAIN
AWARENESS

Controlled Flight into Terrain (CFIT) is one of the leading causes of general aviation fatalities. When a pilot in complete control accidentally flies an airworthy aircraft into terrain, water or an obstacle, they were unaware of danger until it was too late.

Helicopters, which often operate at low altitudes, and military craft, which often operate in novel, changing or chaotic environments, are at particular risk for CFIT. Most CFIT accidents occur during approach or landing. CFIT is often caused by pilot lack of familiarity with an approach or misreading of the approach.

Terrain awareness tools can alert pilots of the danger of CFIT and drastically reduce the likelihood of one of these incidents. Some are bundled together with other situational awareness tools into combined solutions to help pilots maintain the proper location of the aircraft in regards to its environment. Advanced systems integrate various databases and references systems to provide extremely accurate visuals of forward terrain.

WEATHER HAZARDS

Waiting for the weather to change is rarely an option for airlines, business aviation and the military. To operate safely in all possible weather conditions, aircraft must rely on technology to avoid and manage weather hazards. Those hazards are many, and include:

- Wind shear - most dangerous at low altitudes and during take-off and landing, wind shear can slow planes drastically, creating dangerous situations. Wind shear and high winds in general can be particularly challenging for helicopters.

- Icing - presents itself differently on the ground and in the air, but is a threat to safety in both areas. Icing affects runway surfaces on the ground, but can also endanger the ground crew as they navigate around support vehicles and equipment. In the air, icing often occurs in bands. Modern technology can often detect and help pilots avoid these areas.

- Thunderstorms - while large winter storms often get more press for the flight cancellations they cause the airline industry, thunderstorms can cause just as much disruption. They present a mix of dangerous conditions and issues such as high winds, microbursts and turbulence.

- Instrument meteorological conditions (IMC) - fog and heavy cloud cover can create conditions that require flying by instrument alone, which can greatly increase risk.

Turbulence costs the global airline industry more than $100 million each year, according to the National Transportation Safety Board.

Technology has greatly reduced some of these threats. Modern communication and connectivity tools help pilots today be far more informed about the weather than in the past. Advanced weather radars can often see hazards, such as ice bands, and alert pilots in time to plan alternate routes. There are even tools that collect pilot-reported weather, creating a crowd-sourced view of current conditions.

NOTES ON
HELICOPTER
SAFETY

Helicopters face a number of unique safety challenges. This is partially due to their nature, in which **weather hazards** can cause issues that fixed-wing aircraft do not face, such as:

- Loss of tail-rotor effectiveness

- Mast bumping

- Mechanical turbulence

Another reason that helicopters face unique safety challenges is that they can operate in conditions and locations where fixed-wing aircraft cannot, such as in search-and-rescue missions. This makes **terrain awareness** particularly crucial for safe helicopter operations.

Finally, helicopter operators should consult the section on **pilot fatigue and workload**, as this serious hazard affects pilots of all aircraft.

Safety Solutions for Helicopters

Honeywell® technology addresses over 80% of helicopter accident causes. We provide safety, tracking and power for helicopter operators performing a variety of missions using a number of civilian and military platforms.

NOTES ON SAFETY
FOR THE DEFENSE INDUSTRY

Safety Solutions for Defense

Honeywell Defense solutions are available to help defense industry customers reduce the risk of the many hazards they face. We offer solutions on a number of platforms, including:

- AH-64 Apache

- C-130 Hercules

- CH-47 Chinook

- F-16 Fighting Falcon

- UH-60 Blackhawk

Few industries are as conscious of the safety hazards they face as the defense industry. Of particular interest to defense aviation organizations would be the sections on:

– **Terrain awareness**

– **Weather hazards**

– **Landing and ground safety**

– **Life support systems**

The chaotic and fast-changing nature of any warzone or area of deployment means that **access to information** is of enormous importance to anyone in the defense industry.

Finally, we hope you'll consult the section on **cybersecurity**, as the nature of modern cyber warfare means organizations in the defense industry are surely being investigated, if not actively attacked, by advanced persistent threats and hostile nation-states.

NOTES ON BUSINESS JETS

Business aviation operators largely face the same safety hazards as other aviation operators, but it remains worthwhile to call out certain issues.

The high frequency of runway excursions in business aviation makes **runway safety** particularly valuable. **Landing and ground safety** is a related important topic.

Because pilots may fly alone or have a less predictable schedule than those working for an airline, **pilot fatigue** and workload is another hazard worth addressing.

Honeywell offers a wide array of solutions for business jets, including safety solutions for platforms such as:

- Bombardier

- Dassault

- Embraer

- Gulfstream

- Pilatus

- Textron Aviation

HONEYWELL AEROSPACE HAS PRODUCTS TO MEET THE SAFETY CHALLENGES OF TODAY.

As the industry works together to address the future of aviation, Honeywell technologies are playing a big role in shaping this future. We developed the world's first ground proximity warning system and were the first to offer an FAA-approved traffic alert and collision avoidance system. Today, our core technologies and data-driven solutions are paving the way for safer, smarter skies in all environments through reliability and prevention and prediction of accidents or issues.

INFORMATION ACCESS SOLUTIONS

Honeywell offers ADS-B Out, FANS 1/A and CPDLC solutions for multiple aircraft platforms, and satellite communication systems such as:

Aspire™

Our Aspire 350 satellite communication system enables pilots to stay connected with data and voice services throughout their flight path, anywhere in the world.

JetWave™

Improve the passenger experience while helping make the crew more productive with hardware that enables fast, consistent, reliable, global connectivity.

AUTONOMOUS FLIGHT AND URBAN AIR MOBILITY SOLUTIONS

Our **UAV inspection service** provides autonomous, end-to-end, drone-based inspections and data analytics for industrial companies all around the world.

We're uniquely positioned for unmanned flight with next-gen navigation systems for accurate navigation, high reliability and long life. Further developments with Sense and Avoid (SAS) systems and secure remote connectivity provide the innovation needed to ensure safe communications and safer, cleaner skies.

With our extensive background in situational awareness and collision avoidance technologies, Honeywell is well suited to advance the development UAV capabilities for safety, and partnering with various aviation authorities to develop certification standards needed in some of these areas.

We are ready to support the new manned and unmanned vehicles of UAM with our **Urban Air Mobility solutions.**

CYBERSECURITY SOLUTIONS

Honeywell's cybersecurity experience goes far beyond aerospace: We are a trusted cybersecurity service and system integrator for government and civilian customers, bringing together best-in-class partners to offer customized solution sets.

Our **Cybersecurity Assurance Center** is a key element of the cybersecurity protection we provide. The center specializes in data collection, penetration testing and predictive analytics that enable operators to stay a step ahead of the threat and take preventative action rather than waiting to respond after a cyberattack occurs. We also offer tailored Aerospace Cybersecurity Solutions.

EQUIPMENT AND SENSOR SAFETY SOLUTIONS

Honeywell's engines, landing gear, cockpit and other components throughout the aircraft offer the highest quality and reliability designed for uptime, performance and reliability.

We also offer Connected Aircraft solutions designed to give you predictive insights about maintenance. **GoDirect® Connected Maintenance** monitors aircraft technology in real time and post-flight to ensure your teams catch potential issues early.

Our **Integral Health Monitoring (IHM)** proximity sensors are self-diagnosing and can detect whether a sensor reading is correct or the result of damage or some other problem with the sensor itself.

FUEL SOLUTIONS

Honeywell's **GoDirect Flight Efficiency** software analyzes data and provides reports that empower operators to optimize fuel efficiency across flight operations, ground operations and maintenance. It can help you reduce fuel costs and emissions by up to 5% per year.

COLLISION AVOIDANCE SOLUTIONS

We pioneered TCAS for military and commercial aircraft more than a half-century ago and have delivered more collision avoidance systems than anyone else. Today, our **SmartTraffic® collision avoidance system (CAS) 100** system offers three models of commercial TCAS, all of which have sufficient processing capacity to incorporate future ADS-B In functionality.

Our latest system for military aircraft – the **MILACAS-XR** – represents a generational improvement over most of the military collision avoidance systems flying today. It enables safer flight formations and identifies all aircraft within 100 nautical miles.

LAND AND GROUND SAFETY SOLUTIONS

GoDirect Ground can deliver a 10 to 45% reduction in the cost of damage due to improved safety adherence (such as by reducing speeding), location awareness, vehicle status (whether stairs are locked in place for instance) and so on.

Our **Surface Indications and Alert System (SURF IA)** is the first system to visually show pilots whether their aircraft will come into contact with dangerous wake turbulence from other aircraft.

SmartRunway and SmartLanding improve flight safety and help reduce the risk of a runway excursion by alerting crew members if the aircraft is going too fast or too high, or is going to incur a long landing.

SmartView® synthetic vision synthesizes flight information from multiple onboard databases, GPS and inertial reference systems into a complete, easy-to-understand 3-D rendering of the forward terrain.

Integrated Airfield Lighting mitigates runway and taxiway errors. Dramatic improvements in searchlight technology are also on the horizon, promising to deliver better performance, enhanced safety and lower cost of ownership for commercial helicopter operators. Honeywell Aerospace is on the leading edge of the evolution of exterior **aircraft lighting solutions**.

LIFE SUPPORT SOLUTIONS

More than 20,000 **Honeywell cabin pressure systems** are flying on aircraft today, reflecting innovation that dates back to 1942. Our cabin pressure systems deliver unparalleled passenger comfort while lowering costs, improving fuel efficiency, economizing on weight and easing the path to aircraft certification.

Our **On-Board Oxygen Generation Systems** create enhanced physiology protection that goes beyond commercial flight to aircrew of high altitude military aircraft and space missions.

We offer multiple **advanced life support products for space travel**, including carbon dioxide removal, environmental control valves and pressure control panels. Along with Paragon Space Development Corporation, we are designing, building, testing and applying environmental control and life support systems for future human NASA and commercial programs.

SOLUTIONS TO DECREASE PILOT FATIGUE

Honeywell offers a complete line of airline cockpit technologies, from integrated flight systems to radars and transponders that are intuitive and easy to use, lowering training costs and reducing pilot attention and fatigue.

GoDirect Flight Services and **GoDirect Flight Sentinel** provide a dedicated team available 24/7 to ensure your flights operate as safely as possible. Using route management techniques, flight control specialists proactively help reduce delays by filing you on routes currently being used by air traffic control to avoid traffic congestion and weather conditions.

GoDirect Flight Preview, with its unique 3-D animated view, can help pilots prepare visually and mentally for approaches.

RUNWAY SAFETY SOLUTIONS

SmartRunway and SmartLanding represent the next generation of runway awareness and advisory systems. These systems give pilots timely information to help ensure they are accurately navigating and landing on the correct runways and taxiways.

Integrated Multi-Mode Receiver combines satellite-based and ground-based navigation systems into one receiver. The receiver helps pinpoint precise airplane locations for efficient landings, especially during difficult and new runway approaches.

GoDirect Flight Preview shows a preview of runways and surroundings, helping to prevent incidents from occurring by providing pilots with the information they need to make avoidance decisions quicker.

Our **Surface Indications and Alert System (SURF IA)** is the first system to visually show pilots whether their aircraft will come into contact with dangerous wake turbulence from other aircraft.

SmartView synthetic vision synthesizes flight information from multiple onboard databases, GPS and inertial reference systems into a complete, easy-to-understand 3-D rendering of the forward terrain.

DATA RETENTION SOLUTIONS

Honeywell's cockpit voice recorders and flight data recorders are capable of withstanding great impact and pressure to contribute to making future air travel safer. We offer **multiple CVR options** that use a modular, crash-survivable memory unit (CSMU) to protect the solid-state voice recording memory. Our CVRs are FAA-compliant with new mandates for data link recording.

Honeywell's **RESCU 406®** automatic fixed navigation delivers the next generation of emergency locator transmitter with a smaller, lighter and easy-to-use interface.

TERRAIN AWARENESS SOLUTIONS

Honeywell developed the first Ground Proximity Warning System (GPWS) in the 1970s and introduced the Enhanced Ground Proximity Warning System (EGPWS) in 1996. We now offers multiple EGPWS versions:

– The **Mark V EGPWS** exceeds Class A terrain awareness and warning system (TAWS) requirements and provides protection against Controlled Flight into Terrain (CFIT) and windshear.

– The **BendixKing KGP 560 EGPWS** incorporates much of the same terrain database technology found in our air transport EGPWS, while specifically protecting light turbine and piston aircraft from the threat of Controlled Flight into Terrain (CFIT).

SmartView synthetic vision synthesizes flight information from multiple onboard databases, GPS and inertial reference systems into a complete, easy-to-understand x3-D rendering of the forward terrain.

Our **Aircraft Environmental Surveillance System** combines our weather, terrain and traffic awareness solutions to create holistic understanding of the environment and improve flight safety.

WEATHER HAZARD SOLUTIONS

IntuVue® RDR-4000 uses 3-D volumetric scanning and pulse compression technologies to provide a complete view of the weather from 0 to 60,000 feet across a 320 nm detection range. IntuVue has demonstrated a 26% improvement in weather hazard detection over conventional radar systems.

GoDirect Flight uses in-air pilot-sourced weather information to provide real-time weather data and a more robust view of weather than ever before.

Weather Information Service provides an electronic flight-bag app to assist the flight crew in making strategic, in-flight decisions with respect to weather information by providing up-to-date weather data.

Our **Aircraft Environmental Surveillance System** combines our weather, terrain and traffic awareness solutions to create holistic understanding of the environment and improve flight safety.

THE FUTURE IS WHAT WE MAKE IT.

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