

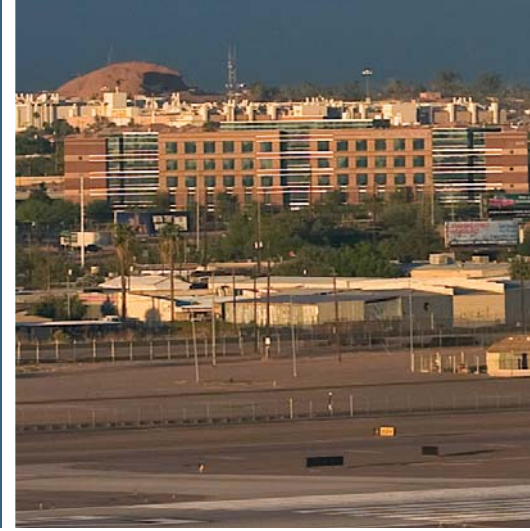
SmartRunway™ and SmartLanding™

Honeywell



Leading safety solutions that reduce the risk of runway incursions and excursions

Honeywell's SmartRunway and SmartLanding are designed to break the chain of events that lead to runway incidents — a \$1 billion annual global safety concern.



Improving runway safety on approach, landing



Runway safety is a key concern for the airline industry. Managing it is a dynamic process that involves measuring runway incursions and excursions and understanding those factors that lead to such incidents. Runway incursions and excursions have a variety of causes and are often the result of a combination of factors. When there is limited visibility, poor lighting, bad weather, inadequate paint lines, confusing signs or any combination of these factors, there is a greater risk of an accident. This is compounded as air traffic increases and airports become more congested.

This key safety issue is also costly, accounting for U.S. \$1 Billion per year for inspections, repairs and passenger injuries. There is approximately one runway incursion per day worldwide, and while runway excursions are less frequent, they are far more costly, accounting for approximately 90% of the expenses associated with runway incidents.

Designed to break the chain of events leading to either a runway incursion or a runway excursion, Honeywell's new line of SmartRunway and SmartLanding products increase flight safety by improving situational awareness for pilots and crew members during approach, landing, taxi and take-off. These next-generation solutions build upon existing Honeywell technologies to deliver enhanced performance with smarter alerts and added visual messaging to support both 'heads-up' and 'quiet' cockpits.

Both products are software upgrades to existing EGPWS MK V and MK VII systems and capitalizes on Honeywell's worldwide terrain and runway

database, which has proven itself for over 600 million flight hours. Both SmartRunway and SmartLanding were meant to be used simultaneously for maximum safety during approach, landing, roll-out, taxi and take-off, but can be purchased separately.

SmartRunway

Honeywell's SmartRunway addresses one of the National Transportation Safety Board's (NTSB) top 10 global safety concerns — runway incursions. The Federal Aviation Administration (FAA) has identified three major factors contributing to runway incursions: communication, airport familiarization and cockpit procedures for maintaining orientation. Additionally, they attribute the loss of positional awareness as a causal factor in 44% of runway incursions. The industry requested a cost effective safety system that helped maintain situational awareness during taxiing, take-off and landing; and Honeywell's Runway Awareness and Advisory System (RAAS) answered that need.

SmartRunway is the next generation of RAAS, and now includes new advisories and visual messaging. Complements electronic flight bag (EFB) solutions, through heads-up advisories and supports quiet cockpits with graphical alerts. It is positioned for future growth and will include ADS-B functionality as the technology becomes available and used throughout the industry. SmartRunway is a proven global solution for reducing runway incursions.



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SmartLanding

Runway excursions are caused when an aircraft is approaching the runway too high or too fast* — common components of an unstable approach — or not properly configured for landing; therefore causing a hard or long landing. There are approximately 29 global runway excursions each year, primarily caused by lack of situational awareness and human error. Runway excursions represent 96% of the total runway related accidents, and 80% of those runway excursions have resulted in fatalities.

Honeywell's new SmartLanding improves flight safety and helps reduce the risk of a runway excursion by alerting crew members if the aircraft is going too fast, too high or going to incur a long landing. SmartLanding complements Standard Operating Procedures (SOPs) and Flight Operation Quality Assurance (FOQA) programs to improve safety by encouraging compliance with stabilized approach criteria, such as:

- Aircraft should be stable at 1000 feet above the field
- Aircraft MUST be stable at 500 feet above the field
- Aircraft is properly configured to land
- Aircraft is on the correct vertical path
- Aircraft is at the correct speed*

Under normal conditions, no advisory would be heard or displayed. When the aircraft is approaching the runway too fast or too high, a callout and visual advisory will be issued. Another callout and graphical advisory is available for long landing, which occurs when the aircraft extends beyond a customer-defined touchdown zone, followed by distance remaining on the runway. Also included is a check for inadvertent barometric altimeter correction setting errors, which have been a contributing factor for incidents and accidents during approach and landing in the past.

System configuration

SmartRunway and SmartLanding are available today. They are customizable to best suit individual operating environments, including volume control and optional inhibit switches for both systems. And installation is simple as a low-cost software upgrade to Honeywell's Mark V or Mark VII EGPWS, which requires minimal aircraft downtime and minimal pilot training.

Key Benefits

- Decreases the risk of runway incursions and excursions
- Increases runway situational awareness and the likelihood of stabilized approaches
- Supports 'heads-up' operations with aural advisories
- Supports 'quiet' cockpits with visual advisories
- Configurable to fit operating environment requirements
- Inhibit switches are optional
- Positioned for future growth and ADS-B implementation

Why Honeywell?

Honeywell is a pioneer and industry leader in aircraft safety systems:

- 30 years of avionics system experience
- Advanced safety system integration expertise
- Broad range of avionics products and services
- Innovative technologies with proven reliability
- Global service and support network (24/7/365)

Capability/Feature	SmartRunway	SmartLanding
Approaching Runway (on Ground)	X	
On Runway	X	
Approaching Runway (in Air)	X	X
Distance Remaining (Landing & Rollout)	X	X
Runway End	X	
Extended Holding	X	
Taxiway Takeoff	X	
Taxiway Landing	X	X
Short Runway Takeoff	X	
Short Runway Landing	X	X
Distance Remaining (Rejected Takeoff)	X	
Takeoff Flaps	X	
Flaps during Approach		X
Too Fast during Approach*		X
Too High during Approach		X
Unstable during Approach		X
Long Landing (Deep Landing)		X
Distance Remaining (Long Landing)		X
Check Altimeter Setting		X

Honeywell runway safety solutions:

- Increase cockpit efficiency with reduced pilot workload
- Support global operations with worldwide airport runway databases
- Minimize aircraft downtime through simple EGPWS software upgrades

SmartLanding increases flight safety through stabilized approaches:

- Decreases the risk of runway excursions
- Integrates directly into SOP and FOQA programs

SmartRunway enhances situational awareness to reduce the risk of runway incursions or collisions:

- Reduces delays caused by crew disorientation
- Provides smarter alerts with added visual messaging to support both 'heads-up' and 'quiet cockpits'

Find out more

For further information on Honeywell's SmartRunway and SmartLanding, visit us online at www.honeywell.com/runwaysafety.

Honeywell Aerospace

1944 E. Sky Harbor Circle
Phoenix, AZ 85034
Toll Free: 1-800-601-3099
International: 602-365-3099
www.honeywell.com

C61-0919-000-000
June 2009
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Meeting customer needs

As the airline industry continues to evolve, Honeywell remains at the forefront of avionics and electrical system, subsystem and component innovation. Dedicated to increasing efficiencies with reduced operating costs for today's aircraft, our development teams are working with a focus on the future to create new product platforms that can be easily upgraded and modified to meet emerging technologies, operational requirements and industry standards for commercial airlines. Our innovative solutions are proven to deliver lower costs and improved efficiencies for your aircraft and operations.

Global network of support services

Honeywell's resources span the Americas, Europe, Middle East, Africa, Asia and the South Pacific to deliver dedicated 24/7 service support. As a world leader in aviation aftermarket services, our global repair centers, logistics network and field services engineering teams are able to quickly repair, supply and warrant equipment whenever and wherever it is needed.

Honeywell Aerospace

Honeywell is a leading global provider of integrated avionics, engines, wheels and brakes systems and service solutions for aircraft manufacturers, airlines, business and general aviation, military, space and airport operations. For more information on Honeywell Aerospace, visit us online at www.honeywell.com/aero.

*Future enhancement for business aircraft