

Tech focus

This month's focus is on the avionics activities of an industry supplier.

Honeywell sees sunny skies on horizon

With projections for solid growth in aircraft production globally, avionics supplier **Honeywell** is optimistic about its own growth.

"I can't imagine a Honeywell without a strong and growing avionics business," said Bob Smith, the company's Vice President of Advanced Technology, in

an interview with *Aerospace Engineering* magazine. What we're really talking about is information security—how securely we can transfer information, how efficiently we can work within what I'll call a Net-enabled environment, and then also what's the tighter integration of all these systems such that we can get better efficiency and, of course, better safety."

Smith noted that avionics have played a key role in an improving aviation safety record. "It used to be, even 10 years ago, that controlled flight into terrain [CFIT] was the dominant cause of fatalities and hull loss," he said. "Through GPWS [ground proximity warning systems] we've been able to eliminate it—not just reduce it, but eliminate it. Anything that has had an enhanced GPWS [EGPWS] has not had a CFIT accident. It's a remarkable accomplishment for the industry as a whole."

Honeywell, Smith said, is busy enhancing EGPWS technology. "If you look at what a ground proximity warning system is, and talk about the underlying technologies, it is very sophisticated but not all that complex," he said.

"Effectively, you're dealing with a terrain database and also a navigation state, but what you find is it's a very powerful tool, and you can take it far beyond where it's currently deployed. Right now, it's mostly used for alerting a crew for CFIT issues, or wind-shear issues. That was the first change. Wind shear was a problem, so we added that capability into the EGPWS."

The modification for wind shear was simple, according to Smith. "And we're going to continue to expand on the theme of how we use enhanced ground proximity warning system capability to provide other safety features," he said.

Runway situational awareness is one such feature, and as its name implies, it helps pilots choose the correct taxiways and runways. "It's a software-only change," Smith said.

"We have more than 45,000 en-



Honeywell's primary large-format flight display for business jets is one of the many products leveraging the company's experience in avionics.

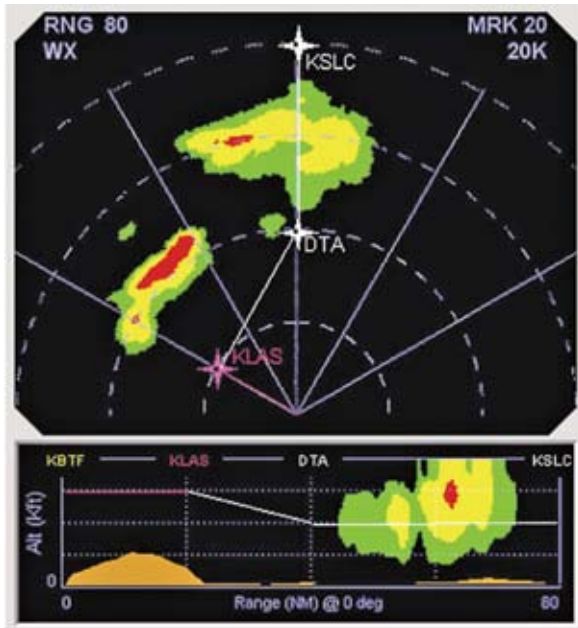


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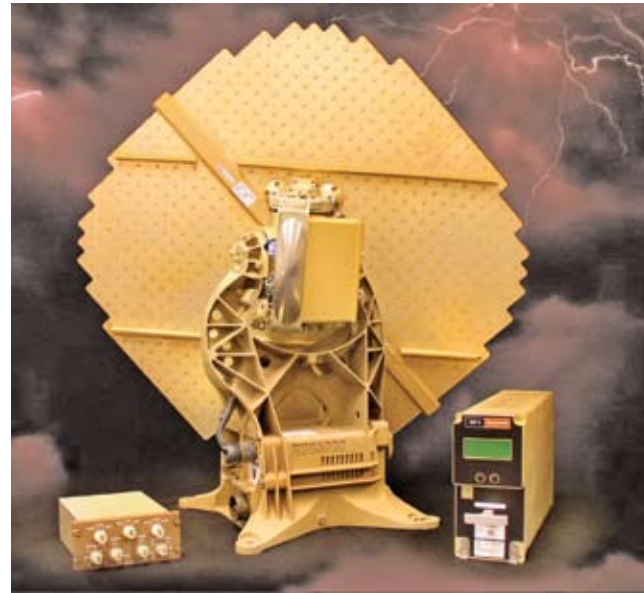
an interview with *Aerospace Engineering* magazine.

Asked which aspect of avionics will provide for the most growth at Honeywell, Smith answered, "I think the avionics business is following the models of some other industries that deal in processing, data buses, memory, and display information—and that is that we are now getting more and more capability by using more information and transferring information on and off the vehicle." He continued, "So I see us going along the same growth path that we're currently on, which is giving the pilot more information about his or her current situational awareness, being able to give the operator information about the state of the aircraft, and being able to operate better and more efficiently within the air traffic manage-

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Honeywell's RDR-400 weather radar system features predictive wind-shear detection. The 3-ft-tall radar unit is affixed inside a plane's radome.



hanced ground proximity warning system boxes out there, and you can continue along this theme," he continued. "We can monitor the approach—whether the plane is coming in too high, or too fast, or too low, *etc.* Similarly, we can talk about whether they're in the right airspace.

"There are all kinds of ways in which we can take those safety features and not only build off existing boxes, but also combine those with ADS-B [automatic dependent surveillance - broadcast] systems, and we can also integrate that with terrain collision avoidance systems so that we can make sure we give the kind of resolution advisories and traffic advisories that are appropriate."

Integration with flight-management and radar systems would allow for recommendation to the pilot for routes around bad weather.

"Some of those are fairly sophisticated integration tasks; others, I think, are low-hanging fruit," Smith said.

Transmitting information on and off an aircraft, in a secure way, is something Honeywell and the industry at large is hard at work on. The company is developing a system called Secure ACARS (Aircraft Communications Addressing and Reporting System) that provides data compression as well as integrity. "You actually pay for that system by the bit, so you pay for it by how much you're using that datalink," Smith noted.

The system was developed for military application, but Honeywell is exploring other markets.

Telematics and aircraft information systems allow for improvements in many areas, including safety and air traffic deconfliction, according to Smith. Also, if the aircraft's in-flight status can be communicated, preparations such as pre-positioning of spares can be made on the ground for whatever repairs might be necessary. With aircraft having long "logistics trains" that impact aircraft availability, such data communication capability has large ramifications, Smith said.

Asked how the job of avionics engineers has changed in recent years, Smith said Honeywell's customers are demanding that it take a larger systems-engineering role—not just in avionics, but in all areas. "They're asking us to engage with them earlier in the design process and take on more and more responsibility," he said.

Avionics systems have become much more complex, Smith added. "Developing tools and techniques for handling that complexity is something that we spend a good amount of time on, and I think we are pretty good at it. Engineers in this environment have to learn how to structure systems in a systems-engineering way, and then also go off and be able to develop the tools, techniques, and processes that will al-

low them to validate that all the complexity they just system-engineered will actually work."

That is a daunting challenge for any engineer, but especially for a new one, according to Smith. And with the nation facing a shortage in engineering graduates, the challenge for Honeywell as a company to fill its ranks with quality personnel is also daunting. "We have more work than we do engineers to get it done," he said.

Smith noted that at 690,000, the number of engineers employed in the aerospace field is at a near record low. It was "well over 1 million a decade ago," he said. "Some of that is healthy contraction, meaning we've increased productivity. But some of that means we as a nation are not producing enough scientists and engineers.

"We're on the constant lookout for great talent because, quite frankly, the aerospace industry has a history of making great-engineered products. I mean that's how we compete as an industry. So unless we have that great engineering talent, we'll have ourselves a problem."

Honeywell employs about 8000 engineers overall, with less than half of them working in avionics or an avionics-related area, according to Smith. "Recruiting is very aggressive at this point," he said.

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