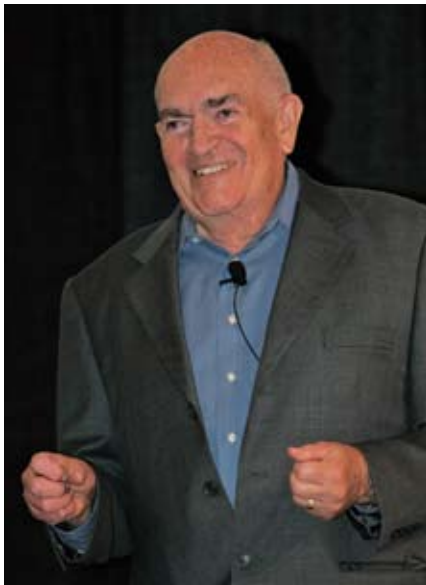


Tech focus

Professionals with accomplishment-filled careers offered their insights to engineers and other professionals at September's SAE AeroTech conference in Los Angeles.

Urie gets last laugh in speech about pursuing dreams

For a guy who said he did not have the obligatory joke to go with his speech, engineer extraordinaire David Urie managed to coax quite a few laughs out of his AeroTech audience.



David Urie says there is a great need for new ideas from engineers in today's dangerous world.

It was not ha-has he was after, though. The 1997 **American Institute of Aeronautics and Astronautics** Engineer of the Year was more interested in pumping up the engineers in the room (and the engineering profession in general) while encouraging them to be creative and to pursue their dreams. With a delivery as deadpan as any, he deftly weaved humor into his nuggets of wisdom and caution—to great effect.

And he did it without using visual aids. In today's world, "we're awash in visuals of all types and size," Urie said at the outset of his speech. "This morning, we're going to use another form of technology, and this is the visual system inside your head. All you have to do is switch that on and make the pictures that you need as we go along, if you feel

you need pictures. It's up to you. Now, this is a technology that was very highly developed back in the days when people watched a lot of radio.

"Also, I don't have a joke," he said, further drawing in his audience. "I don't even bother to remember jokes. However, I do keep up with research, and I recently read in a psychology publication that old people don't get jokes. In my case, my empty look at a joke is not because I don't get it, but because I'm trying to remember whether I heard it in the fifth or sixth grade."

With his joke about not having a joke behind him, Urie segued nicely from jokes to dreams—the main topic of his speech.

"Now, a joke is only a story," he said. "Our minds work in terms of stories. We make sense of the world by making up stories. The world presents us with empirical data in the form of experiences, which we have to organize in some way to make sense of them. So memory is the story we make up about the past, and dreams are the stories we make up about the future.

"Speaking with engineers, I'm talking about a special kind of dreams. I'm talking about the kind of dreams that drew us into this line of work. Most of us are attracted to this industry because we share dreams that this industry could fulfill. So we're all dreamers. And we're informed dreamers. Engineers know stuff. So when an engineer forms a dream, it's well informed by solid information. And so engineers' dreams deserve to be listened to. One of the things I want to encourage you to do is make trouble for your management by coming up with ideas, some of which may become the dreams of the future."

The history of aviation is filled with dreamers, Urie said. Among the more significant dreamers, in his eyes, was Robert E Gross, who with his brother

purchased Lockheed in 1932 during the Great Depression. (Urie, currently Senior Consultant at **Colbaugh & Heinsheimer Consulting**, once worked for Lockheed Martin.) "Look ahead, where the horizons are absolutely unlimited," Gross said in a speech to his employees early on.

"Those are the words of a dreamer," Urie said. "And out of that was built a company. And other companies were founded in the same way, and they struggled."

Despite the Great Depression, engineers' dreams thrived—not always with sufficient payback and not always with the approval of Lockheed engineer spouses, according to Urie, who created the following fanciful dialogue to illustrate the conflict between an engineer's dreams and his income level at that tension-filled time in U.S. history. The dialogue begins when the engineer returns home from work.

Wife: "What did you do today?"

Engineer: "Oh, nothing. Was just hanging out."

Wife: "You're not down there hanging out with those Lockheed guys, are you? You're not getting involved in that aeronautics stuff?"

Engineer: "Oh no, I just drink and gamble."

Wife: "Oh, well that's a relief."

The dreams of those engineers finally came to life in World War II. Technologies such as the all-metal semi-monocoque airframe and the air-cooled radial engine already had been developed, and were put to use for the war effort, according to Urie.

In such a crisis as WWI, and the Cold War that followed, dreams became realized easily because there was a willingness to "do anything that might work," Urie said. "Nowadays, we're in an era where you don't do anything that might not work, which is probably not healthy.

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When he was with Rocketplane Kistler, David Urie was responsible for technical excellence in engineering, testing, and manufacturing of the K-1 reusable launch vehicle.

We need to get back a little bit towards the try-anything period."

In the most recent 50 years of aviation's roughly 100-year history, Urie noted, engineers have established a backlog of technology—a "technology harvest," he called it, "which needs to be reviewed and examined for things that can be applied now." The U.S. facing asymmetric threats in a vastly changed, multipolar world, now is not the time to be wasting potentially useful ideas just because they are old. "It's an entirely new picture," Urie said, "and the picture's getting muddier because we don't have the distance of time to make up our story. So my suggestion is, we need the dreamers."

Being a dreamer is not necessarily easy, he said. One of the problems

plaguing big companies is their reliance on "designated thinkers" to the exclusion of engineers. Big mistake, said Urie. "Every engineer I've ever met had something to contribute," he said. "Engineers as a group, rank and file, are a tremendous resource that tends to get wasted."

Be persistent in pursuing your ideas, Urie exhorted the engineers in the room. Dreams are contagious, he noted, so a good idea will draw the help of colleagues if the originator is passionate and reaches out. But because not every idea will be a good one (a good way to tell is to run it by some colleagues before going on a mission), engineers must be willing to sign on to someone else's better idea—at least for the moment.

Patrick Ponticel

Too much emphasis on specialization at universities, panelists say

Participants in the opening panel at AeroTech are distinguished engineers/scientists all, not educators, but they had a thing or two to say about university education and career development.

David Urie, Senior Consultant at **Colbaugh & Heinsheimer Consulting**, encouraged engineers to cultivate some degree of "unspecialization." He said specialization, taken too far, creates an envi-

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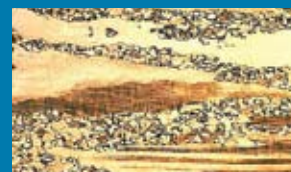


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Participating on the AeroTech plenary panel were (left to right) William Scott, David Urie, Jay Davis, Terry "Houston" Hawkins, and Peter Cochrane.

ronment in which new ideas that do not fit squarely into a particular field might "whistle right between the specialties" in the same way that fly balls to Lucy in the 'Peanuts' comic strip drop right beside her because she pays no attention to anything outside her precise position. He suggested to engineers in the room that taking in an AeroTech technical session outside his or her specialty would be a good exercise in unspecialization.

And a way for America as a nation to further unspecialization is to have its universities begin awarding degrees in the broad areas of science and engineering vs. specialized degrees, Urie said. He described a science or engineering degree as a "ticket to go out and commit science or commit engineering."

Said Peter Cochrane, a self-described futurist with his own firm, **Cochrane Associates**: "What we've created in our education system are silos of ignorance where we say, 'You do physics, you do chemistry, you do biology.' Well, there is no physics, there is no chemistry, there is no biology; there is only science. And in a world that is becoming more complex, we've got to become much more multidisciplinary to understand some of this [future technology]."

U.S. Air Force retired general Houston "Terry" Hawkins thinks that "what we've done in science is build artificial boxes so we can have titles. But I think fundamentally we have to be scientists who are currently working in biology, or scientists who are currently

working in chemistry. We need to never lose sight of the fact that we're, foremost, scientists ... If you stay in one area too long, you'll tend to atrophy."

Strategic and scientific consultant Jay Davis, a physicist, said the country's universities are lagging behind the national laboratories and industrial research companies, "who understand the future is multidisciplinary stuff."

Most people end up working in a field other than their specialty anyway, said panel moderator William Scott, President of **Scott Systems**. "For the longest time, I just thought I couldn't hold a job," he said in explanation of having a career that has spanned electrical engineering and journalism.

Patrick Pontice

Gulfstream sees bright future for supersonic flight, but no time soon

With the need for speed greater than ever, **Gulfstream** continues to pursue supersonic flight despite the U.S. government's current prohibition on it.

"When we talk about the market in the business aircraft context, it's all about saving time," said Preston Henne, the company's Senior Vice President of



When extended to its full 24 ft length, the 470-lb Quiet Spike produces a sine-wave sound shape that generates ground noise quieter than the Concorde's by a factor of 10,000, according to NASA's Dryden Flight Research Center, which worked with Gulfstream on the Quiet Spike.

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Programs, Engineering, and Test. He spoke about Gulfstream innovations during the AeroTech William Littlewood Memorial Lecture.

Henne acknowledged that supersonic flight is at least 10 years away. To make it a reality, two things must happen, he said: The government must relax its rules on sonic boom, and Gulfstream and/or another company must demonstrate a technology that passes muster with "a rational" sonic boom regulation.

Gulfstream is busy on its part, Henne said. "We've had a technology program in place for several years looking at ingredients to a design that can be made quiet enough to fly supersonic over land—a lot of simulation on sonic boom and how quiet is quiet enough."

One of the flavors Gulfstream has developed is the Quiet Spike, a three-segment composite structure that telescopes out from an initial length of 14 ft to a fully deployed 24 ft. Each of the three segments is designed to set up a very weak shock. Flight testing for the spike on an F-15B ended earlier this year, and it behaved structurally just as Gulfstream engineers predicted, according to Henne. The testing was not designed to produce a sound signature on the ground because, he noted, "the F-15 is a flying brick, and it consumes anything that is set up in front of it" in terms of noise. Near-field signatures were captured by tankers flying below the F-15, and results aligned tightly with Gulfstream engineering predictions.

"There are some next-generation activities that we are contemplating," he said of the Quiet Spike. "And there is regulatory effort under way to a rational sonic boom rule, as opposed to a prohibition."

Once Gulfstream or some other company develops technology that allows for quieter supersonic flight, the government likely will adopt rules to accommodate it. Henne said he is confident that, at that point, the market for supersonic business aircraft will develop.

Supersonic flight is envisioned by Gulfstream in the form of an eight-passenger aircraft with maximum mass of 100,000 lb, takeoff field length of 6000 ft, range of 4800 nm, and cruise speed of 1.8 M. By comparison, Henne noted, Gulfstream's eight-passenger, 91,000-lb top-of-the-line G550 has a cruise speed of 0.80 M and a range of 6750 nm. A key to success in



For "significant contributions to the field of air transport engineering," Gulfstream's Preston Henne was invited to give the William Littlewood Memorial Lecture.



Gulfstream's PlaneView cockpit configuration with four 14-in LCD displays is based on modular avionics architecture from either Honeywell (shown) or Rockwell Collins.

supersonic flight is the ability to take off and land the plane at the same fields that accommodate current Gulfstream planes, he added.

Patrick Ponticel

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