Keynote Address

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Fixed Wing and Rotary Wing FSTDs:
On the Road to Harmonization

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Global training and pilot qualification harmonization: Continuing to raise the bar for efficiency and safety

By

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Thank you very much and good morning, everyone. It is a sincere pleasure for me to be here today.

CAE has been a longstanding participant of the Royal Aeronautical Society. And we are certainly committed to the important work that is accomplished under its auspices.

We have been privileged to participate in the two phases of the Society's International Working Group -- the first focus on flight simulation training devices (FSTDs) for fixed-wing aircraft that led to Volume 1 of the new ICAO 9625 document. And now the IWG focus on helicopter simulation.

This group's deliberations have been referred to – and rightly so -- as "the largest harmonization effort ever attempted in the history of the flight simulation industry."

That's not to say there hasn't been harmonization up to now. In fact, airlines, OEMs, regulators, and training providers should be commended for pushing for improvements and efficiencies in the interest of our number one priority – safety. Around the world, there are examples of how the simulation and training industry have come together with airlines and other stakeholders to demonstrate various forms of harmonization – things like Level D simulators, brief and debrief facilities, and instructor expertise can all be linked to the topic of harmonization. But certainly more can and will be done.

I would also like to commend the Society's new International Committee for Aviation Training at the Edge of the Envelope -- which met for the first time this week.

As a Company, CAE applauds the Society's significant contributions to advancing pilot proficiency and aviation safety. We would also like to thank all the IWG contributors.

The need for flight standards and harmony in the skies has been obvious since the Wright Brothers and Glenn Curtiss started putting more than one aircraft in the air at the same time a century ago.

I'm sure someone on the ground that day probably looked up and remarked how terribly congested the airspace was becoming!

By 1926 … the year before Lindbergh stimulated global public interest in aviation … the U.S. passed the Air Commerce Act to regulate air traffic, pilot licensing, and safety standards. That eventually led to formation of the FAA in 1958.

By the 1970s – around the time the UK CAA was conceived … and flight simulators were becoming quite sophisticated – the need for a common international baseline was evident.

In the late 70s, soon after visual technology had transitioned from model-boards to computer-generated night scene images, the Society challenged our industry to keep pushing for even more realism … and that led to daylight IG systems.

The Society also played a key role in every decade since … helping to establish and update standards that enable aircraft operators to conduct all of their initial and recurrent training in high-technology full-flight simulators.

We've come a very, very long way from early-generation methods of simulating flight to the current advanced technology of synthetic training systems.

We've come so far that it's somewhat puzzling to me when I hear a vocal minority in our industry basically suggest that technology advancement is somehow a bad thing. The entire aviation industry has been built on a foundation of pioneering developments that consistently push the envelope of conventional wisdom. Our industry is all about the pursuit of "what is possible," not "let's keep the status quo." If that were the case, we wouldn't have GPS approaches or TCAS in the cockpit. Continuing to develop advanced technologies and applying those technologies in ways that enhance safety and efficiency is our duty and privilege.

Thanks to the Society's leadership and credibility, training standards and fidelity are now largely in synch with the prolific advances we have seen in both aircraft design and simulation technologies.

Everyone here today must continue to look forward – and we all need to be committed to developing new ways to enhance pilot Knowledge, Skills, and Attitudes.

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So let's talk about pilot training, safety, cost, and harmonization.

Harmonization is an interesting word. It tends to mean slightly different things to different people.

To me, harmonization in pilot training is not mandating the exact same prescribed method for everyone. Harmonization is about outcomes, not about how we each get there.

Harmonization is about eliminating major differences … creating agreed-upon standards and requirements among organizations and people who operate in a

shared sphere. In the case of aviation, that shared sphere, remarkably enough, is the entire planet.

Today I'd like to address 3 areas of harmonization in global aviation that I think we can all agree on:

*** First, the need for harmonization of standards for high-technology training devices – the very purpose of the Society's Working Group,**

*** Second, the need to continue delivering more and more training capability for less cost,**

*** And third, the importance of training pilots to proficiency or competency.**

Harmonization of flight simulation training device qualification represents an area in which this group *has made* and *is* making a significant contribution to the airline industry – both potentially reducing unnecessary costs and continuing to raise the bar of safety.

Let me give you an example on the cost side from our own experience.

At CAE's training centre in Dubai, we get up to 11 visits a year from different Authorities for a single simulator. Addressing each of these Authorities involves different QTG tests, engineering support, technical services, and so forth. This seems like unnecessary duplication and inefficiency. It costs as much as 40 thousand dollars for *just one* of these regulators to check out the simulator. And who ends up paying for that? You guessed it: our airline customers and their passengers.

On the safety side, the overall fatal accident rate for scheduled airlines has declined since the early 1990's to about half or less in recent years. One of the reasons for the improvement and stability in safety metrics over the past two decades is high-end simulators. Of course, safety is not exclusively the domain of simulation – but I believe the ever-increasing realism and fidelity of simulation-based training is a significant contributor.

At the same time, there's still room for improving safety of flight worldwide.

Bill Voss of the Flight Safety Foundation makes the point that -- if you have 190 countries being their own regulator, then you have 190 potential points of failure. But conversely, if you have those same 190 watching each other's back, sharing standards and best practices, you've gone from 190 points of failure to 190 layers of redundancy.

Our airline customers are looking to us for leadership in addressing safety and cost challenges that impact their current situation as well as their future – *and our future too*.

Airlines continue to experience the fallout of difficult global economic conditions, along with increased competition. IATA forecasts the airline industry will lose 11 Billion dollars in 2009.

We are all feeling our customers' pain. We are reducing costs in every feasible area.

Aside from the escalating cost of OEM data rights, the price of advanced-technology simulators has continued to come down in recent years. COTS components such as graphics cards and electric motion … PC-based architectures … more efficient manufacturing … and extended equipment lifecycles have significantly reduced the long-term cost of ownership.

At CAE, we believe we have done our part to continue to lower acquisition and operating costs for our customers. And we call on everyone in the industry to do their fair share as well.

Harmonized global standards are a critical factor if we are to alleviate some of the financial burdens and achieve the global levels of safety we seek. Every one of us has a stake -- international and national civil aviation authorities … aircraft and avionics manufacturers … training products and services providers … pilots … our airline customers … and, of course, their customers – the flying public.

The International Working Group has done yeoman's work in crafting the recommendations for flight simulators. We need to continue to push this initiative forward. Now it's up to the National Aviation Authorities to implement a new level of global harmony and efficiency by quickly adopting these recommendations. The Society's efforts may be for naught if the ICAO member states do not follow through on bilateral agreements to recognize device qualification by authorities from other nations.

So that's one essential harmonization step that can create efficiencies, reduce customer cost, and enhance safety – implement Volume 1 of ICAO 9625 soon.

The second harmonization fundamental I think we can agree on is the need to deliver more training for less.

The military training community has adopted a phrase in recent years -- "Train Like You Fight." It means, quite simply, that they want their training scenarios to be as close as possible to real-world conditions as technically feasible.

In civil aviation training, the parallel phrase might be, “Train Like You Fly.” The more realistic the training environment -- with zero negative training disparities -- the better our pilots will perform in day-to-day operations … and in life-threatening conditions where quick-thinking and sound judgment are required.

I find it ironic that -- in a community which has always driven for higher levels of fidelity and realism -- there are some who advocate for less capability primarily for the sake of cost.

“Dumbing down” training and *less-for-less* does not seem – to me – like a prudent solution. I think we should all be concerned about the pervasive impacts of quick-fixes and cost-cutting that could potentially jeopardize safety.

One example is the motion system. Some argue that it can be eliminated with little or no training impact. Yet there is research that indicates motion cues influence pilot behaviours. And the cost savings of removing motion are modest at best in the overall context of the cost drivers for training.

On the other hand, a few people resisted the concept of incorporating robust air traffic control into the simulator. I am pleased that the working group saw the value of realistic ATC simulation and included it in their FSTD recommendations.

Before we remove … or add … any capability, we should be certain we clearly understand the benefits and risks to training and safety.

Ideally, we should always seek to offer *more for less, not less for less*. More fidelity at lower cost rather than less fidelity primarily for the sake of less cost … and potentially less safety… *If you buy a half a can of Coke for half the price, will your thirst be fully satisfied?*

Our customers are also facing an unprecedented change in the demographic profile of new pilots. Large numbers of veteran airline pilots are rapidly approaching retirement. Traditional military sources have nearly dried up. And with greater use of unmanned drones, there will be even fewer military pilots in the future commercial pipeline.

We are training these new pilots to fly increasingly sophisticated and complex aircraft … and for increasingly congested airspace and airport environments.

We need to adjust our curriculum to younger pilots who do not yet have the benefit of experience-tempered judgment – and still maintain and improve the industry’s high levels of safety.

But here’s an important consideration: *the new generation of pilots can handle all the fidelity we can give them.* In fact, they expect it. Today’s 20-somethings grew

up using the very video game graphics technology that provides the unprecedented levels of realism we now enjoy in simulation.

Today's career pilot candidates have an ingrained appetite for fidelity. The idea of *reduced fidelity and limited capability is counter-intuitive* to their nature … and they will be frustrated by anything less than the highest levels of realism we can deliver to them. If they're turned off by training deficiencies, they will not learn as quickly or to the proficiency levels our customers need.

Obviously, the fidelity in a device must be appropriate to the training task and human factors at hand. For example, using a desktop device to teach a pilot how to enter data into a flight management computer is totally appropriate. But if you want to evaluate a pilot's potential performance for managing a stimulus-rich environment, it is inappropriate to do so without giving them all of the stimuli and potential distractions present in the real world.

What we as training providers must promote is the use of the appropriate training tool for a given training, testing or checking task -- based on validated research and instructional systems design methodology, not purely on cost considerations.

The third area of harmonization where the Society and other aviation experts can weigh in is pilot and instructor certification based on the end result of competency … rather than the process of racking up hours.

As you know, for many years the regulations governing full-flight simulators and flight training devices lagged the available technology. And they probably always will to some degree.

Nonetheless, many airlines and independent training organizations have regularly kept pace with simulation technology advancements – continuing to upgrade capabilities in the interests of better training, more operational efficiency, and safer pilots. Those organizations are to be commended for going beyond the minimums.

But not everyone embraces this conscientious operating philosophy. If the regulation bar is set low, some will barely clear the minimum. They will follow the letter of the law, rather than the spirit. And in today's complex aviation environment, if the bar is set too low – or if the requirements use the wrong criteria -- we may all suffer the consequences.

For many years, the pilot licensing regulations have seemed fixated on the number of hours logged. In the United States, for example, a commercial pilot license can be obtained with 250 hours of flight time. Again, most airlines have raised the bar much higher in their own hiring requirements.

In the wake of recent accidents, in the United States there's a reactive proposal to change the legal minimum to 1500 hours in order to be hired as an airline pilot. But the real question is: Are hours the right criteria? Does time in the seat necessarily lead to pilot proficiency?

The military uses pilots with fewer than 300 hours to fly transport, combat and other high-stress missions. Some of them land on *very* challenging airstrips – including the deck of an aircraft carrier. With the proposed 1500 hours requirement, otherwise capable ex-military pilots will not even be eligible to be considered for airline employment.

As we have seen, it can sometimes be difficult to determine the accuracy or relevance of a civilian pilot's "logged" flight time. Was the pilot flying charters into mountain approaches … or towing banners along the beach? In addition, an airline may not be fully aware of the quality of a pilot's training … nor how often they failed critical tests or checkrides.

FAA Administrator Randy Babbitt stated that "simply raising the total amount of time … is not really a good benchmark for how good the quality of the pilot is. The *quality of training* is far more important than the *quantity of training* or total time."

Instead of an hours-based system, shouldn't the industry and the regulators instead harmonize around a validated level of pilot proficiency? Isn't that what's most important – the pilot's airmanship ability? Is this not the underlying principle of the MPL (Multi-crew Pilot Licence) initiative? And also one of the goals of the IATA Training and Qualification Initiative (ITQI)?

The technology exists, I believe, to effectively test for competency in the essential skills of airmanship – including decision-making and judgment. What is needed … and this is an area where the Society can once again provide leadership -- along with IATA and ICAO -- is to advocate for and support development of a global standard for competency-based testing and pilot licensing. … For prospective airline pilots. … For business aircraft pilots. … For commercial helicopter pilots … And for instructors.

If the 1500 hours lobby prevails, the aviation industry could well face a severe pilot shortage right about the time the industry is starting to recover and resume a growth trajectory. Why? Because all of those 500- to 1500-hour regional airline pilots will no longer be eligible to fly.

And many students enrolled in colleges and flight schools – facing more flight hours over more years and with a greater student loan burden … *well*, they'll just abandon the dream and find a career outside of aviation.

How will the airline industry grow if there are not enough competent pilots to fly the planes?

What is needed, in my opinion, is an outcomes-based training benchmark -- like the ITQI is addressing -- defined by a consensus of industry experts, issued by ICAO as a standard for adoption by its member nations.

A *common global standard* and a *common, global, competency-based test* – set at a high enough level – will yield a consistently higher quality of pilot. And I believe it will reduce costs for our customers.

A harmonized, competency-based standard should reduce costs of curriculum development for all training organizations because the topics, skills, and outcomes will be well defined. We have already seen this benefit in CAE's own network of training centres and academies by following common best practices around the world.

Harmony around competency will also lower airline new-hire costs. The pool of pilot candidates will be coming to our customers with a standardized high level of proficiency … instead of the inconsistencies we now see between low-bar minimalists and above-the-bar training organizations. And there should be fewer wash-outs and marginal performers after hire.

It is the vision of CAE and others involved in pilot provisioning that -- one day -- harmonized pilot licensing will effectively allow for true global mobility … with licensed pilots able to fly for any carrier anywhere in the world.

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These are certainly challenging and exciting times.

Between now and the year 2020, Boeing and Airbus have projected that we need to train about 18,000 new pilots annually. The numbers have not changed substantially with current economics; they've simply shifted to the right until expected growth trends resume.

According to the FAA, air traffic will double in the next decade. Aircraft movements will triple. Add to the mix personal jets … and possibly thousands of UAVs in civil airspace … and you get the picture of what it will be like.

Use of secondary, less-equipped airports will increase. Pilots will be operating sophisticated aircraft in environments where they will need to interpret more data on their own and use more judgment.

Our task as a training industry is to assist airlines with their growth and budget objectives – and always within the greater context of safety.

We need to constantly improve the science and art of delivering effective instruction and an efficient path to the cockpit. We need to impart reasoning skills that will keep low-time pilots and their passengers safe. That means developing good judgment in every phase of flight training … presenting real-world learning scenarios in which judgment must be appropriately exercised.

We have the tools at our disposal. Synthetic environment technology continues to progress rapidly. But we need to implement harmonized criteria for flight simulation training devices … as well as competency-based certification for pilots and instructors … ultimately in every corner of the globe.

We are going through a tough economic period where the focus on costs is exerting pressure to compromise. If we are not vigilant and vocal, compromise and reactive quick-fixes such as the hours-based requirement … and *less-for-less* equipment options … could wipe out years of progress -- and jeopardize the quality of pilot training and the safety of the flying public.

In many ways, we find ourselves on the cusp of a transformational moment. Now is not the time to lower the bar. Rather, we need to deliver more effective training … more efficiently … for less. Through global harmonization of training criteria and outcomes, we *can* do better for less … and we *can* continue to improve safety.

I am convinced that the Royal Aeronautical Society is uniquely positioned to help bring about continued global training standardization. Its history of successfully shepherding the acceptance of safety and training best practices qualifies the Society to play a key role in this endeavour -- working with industry stakeholders to achieve the benefits of global harmonization we all seek.

When you cut to the chase of harmonization issues, we are not acting as aircraft operators and OEMs, simulator manufacturers and training providers, regulators and pilots. We are *aviation safety advocates*. If we don't advocate for the highest level of safety training standards, who will?

I thank you for your attention. I also wish you all a very productive conference. Thank you.