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Booth B5918, March 4-7 2019
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Robinson Customer Service Soars

ON THE COVER: Dan Sweet, HAI’s director of public relations and communications, set out to discover how the Robinson Helicopter Company captured top marks in customer service in a recent industry survey. While conducting interviews for the story that appears on p. 24, Dan shot Robinson’s test pilot Scot Woolums as he maneuvers a Robinson R66 through the skies above the Port of Long Beach in Southern California.
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CONTRIBUTORS

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Pay It Forward
Support our industry and recruit the next generation.

I DON’T KNOW ABOUT YOU, but I love my job. Do I love everything about it? Absolutely not. Is there anything else in this world that I would rather be doing? Absolutely not. As I tell people every day, “Flying a helicopter sure beats working for a living.”

Our industry is currently suffering from a shortfall of qualified pilots and maintenance technicians. Low oil prices and the resulting downturn in the offshore sector somewhat masked this scarcity, but that will change in the future.

Unfortunately, our industry is competing for these folks with the airlines and, for a variety of reasons, the airlines are winning. For one, that industry is heavily vertically integrated—compare the 17 major air carriers in the United States with the thousands of helicopter operators. Large companies have more resources to address recruitment, including rotorcraft transition programs and beefed-up salary and benefit packages. They can also spread the cost of their workforce over 50 to 500 paying customers per flight, compared with zero to maybe 24 for our industry.

One way we can compete with the airlines’ big pockets is by advocating for our industry with the younger generation. And when I say “we,” I mean each one of us. This means promoting helicopter aviation in your local community, whenever you can, at events like school career days or in scouting programs. If every person in our industry took the time to mentor at least one individual and encourage him or her to enter helicopter aviation, we could make an impact.

Become a regular at your local airport and flight and maintenance schools. Talk about your passion for the helicopter industry and explain the opportunities we present. Offer to help with rotorcraft curriculum or with job searches for graduates. Just expressing an interest in these students will go a long way to encouraging people to consider our industry.

I’m closer to retirement than many, so I won’t see the worst of the shortage. But I am active in outreach because I am grateful to the pioneers who built this industry that has provided for me and my family for the past 50 years. Risking everything, they invested in the future of helicopters and thus provided opportunities for me and thousands of others. I feel an obligation to repay some of the blood, sweat, and tears that has been poured into this industry.

Another way to strengthen our industry is to support Helicopter Foundation International (HFI). The foundation annually offers up to 22 scholarships for aspiring pilots and maintenance technicians and sponsors several events at HAI HELI-EXPO® each year, such as the Military to Civilian Transition Workshop and the Helicopter Industry Career and Mentoring Fair. In addition to an Equipment Donation Program that will expand rotorcraft education at A&P schools, the foundation is also working to increase the number of high schools and postsecondary schools that offer helicopter-specific courses or instruction.

You can participate in the foundation’s several fundraising events at HAI HELI-EXPO 2019, such as its Online Silent Auction (rotor.org/auction) or its Scholarship Golf Tournament (rotor.org/golf). You can also support HFI throughout the year by visiting rotor.org/donate.

I would say, “Pay it forward,” but for me and many others, our efforts on behalf of the industry are more about how we can pay it back. We stand on the shoulders of giants; let’s give the next generation a hand up.

Cheers,

Jim Wisecup is the current chairman of the HAI Board of Directors and assistant chief pilot for Air Methods Corporation. A Vietnam veteran, he has a lovely wife, Jessica, and is father to five grown children. He is a 16,000-hour pilot with ATP and CFII ratings for helicopters and fixed-wing aircraft. Jim is also a helicopter DPE.
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Your Mission, Our Mission: KEEP THE ROTORS TURNING
HELIQUPTER ASSOCIATION INTERNATIONAL (HAI) has been going strong for 70 years, representing the international helicopter community and its efforts to build a safe, sustainable industry. HAI remains focused on its primary mission: to support our members so they can “keep the rotors turning.” We do this by advocating against overburdensome regulations and legislation, and by supporting a safe, efficient operating environment that is economically sustainable.

Since HAI’s founding, our industry has proven its value to society time and again. The list of helicopter missions has expanded to include firefighting, helicopter air ambulance, search and rescue, electronic news gathering, building and maintaining the international power grid, disaster relief, and law enforcement, to name a few.

As our industry has matured, we have come to recognize that simple compliance with regulations, while essential, is not enough. Most regulations define the minimum expectations of safety and professionalism. HAI continues to advocate for the adoption of higher standards by our industry as an expression of our social and moral responsibility to the public, our customers and passengers, and our co-workers.

It is essential that we “do the right thing” when conducting our operations—always. Yes, safety is our No. 1 priority, but doing the right thing also includes mitigating our impact on the communities we fly over and operate within.

In the past decade, we have been lucky to be part of a major watershed moment for our industry: the advent of unmanned aircraft systems (UAS), or drones. HAI is focused on the safe integration of unmanned aircraft into an already-busy airspace.

Both industry and government are working to establish the appropriate technology, operating protocols, and safeguards for this new sector of aviation, and I believe we will be successful. UAS have already proven their utility in a variety of missions, and more innovations are on the horizon, such as eVTOL (electric vertical takeoff and landing) aircraft for urban air taxis.

I am, however, concerned about our ability to create the required infrastructure for these new ventures, such as takeoff and landing sites and access to airspace. Many ambitious proposals for air taxi operations have been unveiled, but it is unclear how the accompanying infrastructure will be developed.

The biggest obstacle facing the growth of the urban air mobility sector is the current regulatory and legislative climate, promoted by well-organized opponents of helicopter aviation, that pushes to restrict aircraft and heliport operations. If we ignore this reality and challenge, we do so at our own peril.

People who oppose helicopter operations mention noise and safety, but the issues are in fact complex, multifaceted, and beyond noise and safety. HAI is ready to sponsor and join in a robust discussion of these issues and to do our part to ensure a successful implementation of this new, exciting rotorcraft sector.

I would appreciate your thoughts regarding our current efforts. More importantly, if you have any additional issues or concerns that you would like HAI to address, please let me know.

That’s my story and I am sticking to it. Let me know what you think at tailrotor@aol.com.

As always, fly safe, fly neighborly—and keep those rotors turning! 🩵

Best Regards,

Matt Zuccaro

Matt Zuccaro is president and CEO of HAI. He holds ATP and CFII ratings for helicopters and airplanes. His 50-year career in aviation began as a US Army helicopter pilot in Vietnam. Matt’s priority is safety in both his executive and operational assignments. His wife, Doreen, has been his copilot for the past 50 years.
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ADVOCATING FOR YOU

By Cade Clark

Introducing Ourselves to a New Congress

Let’s build on our effective advocacy for the helicopter industry.

The 116th US Congress is now gaveling in and tackling our nation’s problems. Your government is hard at work on your behalf.

Did you just roll your eyes at the thought that Congress understands your daily struggles and what you go through to keep the lights on at home or for your business? Be honest.

Reading the headlines about shutdowns, it may be a bit of a herculean task to believe that anything good can come out of Washington. But it’s a new year, and I haven’t yet broken my resolutions (the brownie I had at lunch was small, so it didn’t count).

Considering the successes that we had with the 115th Congress, let’s approach the new year with optimism. Let’s quickly review why 2018 was such a good year for our industry on Capitol Hill.

HAI’s 2018 Legislative Wins

HAI was deeply involved in advocating for the helicopter industry while legislators were hammering out the details of the five-year FAA reauthorization bill that passed Congress in October. Our work produced substantive ROI for the helicopter industry in the many provisions in the bill with real-world impact on members’ businesses:

- HAI ensured that the legislation gave the industry opportunities to provide input on and participate in the creation of upcoming FAA regulations
- HAI secured specific language that included helipads as eligible projects in airport construction or improvement initiatives
- Important safety provisions for crash-resistant fuel systems were implemented to comply with recommendations from the FAA’s Rotorcraft Occupant Protection Working Group, which HAI staff members participated in
- HAI helped secure the inclusion of drone policies that would safely accelerate their integration into the National Airspace System, including requirements for remote identification
- HAI helped to include in the bill important aviation workforce development programs that will provide resources and grants to increase the number of pilots and mechanics in the industry
- HAI helped push through language to modernize Part 147 training programs, providing new business opportunities for HAI members.

In other 2018 advocacy wins, HAI stopped legislation that would have capped veterans’ flight benefits for helicopter training. And let’s not forget our largest victory of the 115th Congress, when general aviation stepped up and stopped the privatization of the US air traffic control system.

The Blueprint for Success

Looking back, our industry had a very successful year. Where will this success and optimism take us in the 116th Congress?

You may have been right to roll your eyes when I said Congress was solving your problems. However, if they don’t know about your problems, how can they help?

That is why HAI’s work on Capitol Hill is so important. Advocacy is the mechanism by which HAI and its members communicate with Congress. We share our stories on the legislative and regulatory pinchpoints that negatively impact our businesses and stand in the way of our success. We educate Congress on legislation that can help our industry grow. We help develop policies that will ensure a healthy, competitive, and level playing field.

I’ve made it a point to visit local HAI members whenever I get outside of the Beltway bubble to attend a conference or engage in state legislative work. In these invaluable meetings, members educate me on the legislative issues causing roadblocks for them and we strategize together on ways to address their concern.

One issue that I keep hearing about is that operators are having trouble finding qualified mechanics and pilots. As you may know, HAI’s charitable arm, Helicopter Foundation International (HFI), recently undertook a study with the University of North Dakota (UND) to validate the long-standing assertion that the United States is not producing pilots and mechanics in sufficient numbers. The 2018 HFI-UND study found that in just over 15 years, the industry will face a shortage of more than 7,400 helicopter pilots and over 40,000 mechanics.

In addition to documenting the projected shortage, the study gathered information on how it is already changing operations. For example, more than 50 percent of surveyed operators said that the shortage of pilots and mechanics would definitely or probably interfere with their operation’s ability to grow over the next five years.

This workforce shortage issue is real, and you may be already feeling its effects. HAI began to address this issue from a legislative perspective in the FAA reauthorization bill, which contains a grant program to fund workforce development programs for pilots and mechanics.

This grant program came about because we talked to Congress about the problem and offered a potential solution. They listened and included the program in the bill.

I admit, it was a bit more complicated
than that. There was a lot of work that had to be done educating Congress about the issue. But in fact, that is how the process is supposed to work. Our industry defines a problem, identifies a solution, and provides solid, realistic, actionable solutions to the problem. In this case, we presented a compelling argument that the United States needs a sustainable aviation workforce, and Congress agreed. Granted, this one program is not a silver bullet for the workforce development issue, but it is a start.

HAI is also working directly with the states to address the workforce shortage. HAI and its Utah-based members are working with that state’s governor, Gary Herbert, and his staff on setting up a rotorcraft pathways educational program that will bring new students into the industry. This exciting initiative is moving forward because HAI contacted the Utah governor’s office and met with Lt. Gov. Spencer Cox to discuss workforce issues. We jointly identified a potential solution and are now working together to find success.

Help Government Understand Your Needs

How can we accomplish this—working with Congress and state governments to solve our problems—on a regular basis?

For this to occur, we must educate our elected officials on the issues that are confronting us and then be willing to provide potential solutions that we can work on together. These folks are busy and have a lot on their plate (like running the state of Utah, for instance). Don’t assume that they know your pain points, let alone how to solve them.

Policy, legislative, or regulatory language may have unintended (and sometimes intended) negative consequences on our businesses. Grassroots advocacy is our tool to reach out to our elected officials and show them how they can make a difference and provide positive solutions.

The 116th Congress as well as most state legislative sessions are now in full swing. They have many issues confronting them, and constituents representing all different perspectives are clamoring for attention. Get to know your elected officials. Make sure your issues get on their radar.

You are business owners and operators; you provide economic solutions and benefits to the people they represent. Your perspective and insights matter. Make a goal this year to host your elected official at your business. Let them see all you do and what you provide to your local community.

Don’t know where to start? That’s why you have an association. Reach out to me at cade.clark@rotor.org, and I will gladly help you set up a visit.

To expand our advocacy outreach, we are building on the success of our campaign to prevent ATC privatization. If you haven’t done so previously, text ROTOR to 40649 to sign up and stay up-to-date on legislation affecting the helicopter industry.

As your association, HAI represents the helicopter industry to government officials. Together, let’s make 2019 another year of effective advocacy!

Text ROTOR to 40649 to sign up and stay up-to-date on legislation affecting the helicopter industry.

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ANNOUNCING CANDIDATES FOR ELECTION TO THE HAI BOARD OF DIRECTORS

The following candidates for the HAI Board of Directors were nominated in accordance with the HAI By-Laws. Candidates elected to the HAI Board of Directors will serve a three-year term, beginning July 1, 2019.

<table>
<thead>
<tr>
<th>Candidates for the TWO General Aviation Seats</th>
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<tbody>
<tr>
<td><strong>Jeffery Smith</strong></td>
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<tr>
<td>R.O.P. Aviation, Inc.</td>
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<tr>
<td>Teterboro, New Jersey, USA</td>
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<tr>
<td><strong>Marc Stanley</strong></td>
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<tr>
<td>MassMutual Financial Group</td>
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<tr>
<td>Springfield, Massachusetts, USA</td>
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<th>Candidates for the ONE Commercial Seat</th>
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<tr>
<td><strong>Gordy Cox</strong></td>
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<tr>
<td>Redding Air Service, Inc.</td>
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<tr>
<td>Redding, California, USA</td>
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<tr>
<td><strong>Stacy Sheard</strong></td>
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<tr>
<td>Executive Jet Management</td>
</tr>
<tr>
<td>New Castle, Delaware, USA</td>
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Visit rotor.org/election to learn more about the election, including a message from each candidate and their résumé or CV. Each candidate will also speak at the HAI Annual Membership Meeting & Breakfast at HAI HELI-EXPO 2019 in Atlanta.

**VOTING FOR THE HAI BOARD OF DIRECTORS**

<table>
<thead>
<tr>
<th>Who can vote?</th>
<th>The designated member representatives of HAI Regular – Operator members are eligible to vote in Board of Director elections.</th>
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<tbody>
<tr>
<td>Where can I vote?</td>
<td>Designated member representatives can vote:</td>
</tr>
<tr>
<td></td>
<td><strong>ONLINE:</strong> Check your email for an online ballot that was sent from <a href="mailto:roxanne.fox@rotor.org">roxanne.fox@rotor.org</a>. If you have not yet received any voting materials via email, please contact <a href="mailto:roxanne.fox@rotor.org">roxanne.fox@rotor.org</a>.</td>
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<td></td>
<td><strong>IN PERSON:</strong> Membership representatives may vote in person at the HAI Annual Membership Meeting &amp; Breakfast at HAI HELI-EXPO 2019: Tue., March 5, 8:00 AM – 10:00 AM Thomas Murphy Ballroom Georgia World Congress Center (GWCC) Voting will continue at the HAI Membership Counters in the Registration Areas of both Halls B and C of the GWCC from 11:00 AM until 3:00 PM, at which time voting will close.</td>
</tr>
</tbody>
</table>

Election results will be announced at the Salute to Excellence Awards luncheon, Wed., March 6.
Next HAI HELI-EXPO to Be Held in January 2020

HOLD ON ... HAI HELI-EXPO 2020 is WHEN?

Attendees and exhibitors should start planning and budgeting for HAI HELI-EXPO 2020 in Anaheim now, because it’s already less than a year away. HAI HELI-EXPO 2020 will take place a few weeks earlier than normal, January 27–30, 2020, with the exhibit floor open January 28–30.

As you probably know, HAI rotates the location of the show, moving each year between large convention centers in a select group of cities. This gives industry operators and other companies the chance to participate in an Expo “in their own backyard” every few years. For 2020, it’s time to visit the West Coast of the United States. HAI typically hosts its annual trade show in the southern tier of the United States, where the weather is more likely to cooperate for fly-ins and fly-outs. Surprisingly, Anaheim is the only convention center on the West Coast with the 1 million square feet of exhibit floor and meeting space required to put on HAI HELI-EXPO®, the world’s largest helicopter trade show and exposition.

Anaheim is historically one of the most popular destinations for HAI HELI-EXPO attendees. The combination of weather, world-class attractions, easy access, and unbeatable industry networking and education will make for a productive and memorable show.

So plan to come to HAI HELI-EXPO 2020 a bit earlier than usual. Start your year and decade strong in warm, sunny, fun Anaheim.

Although the US television series *Airwolf* has been off the air for decades, this Instagram post celebrating its 35th birthday touched a nerve with fans of Stringfellow Hawke and his cosmetically modified Bell 222.

HAI on SOCIAL

/ HelicopterAssoc
/ HelicopterAssoc
/ heliexpo HELIEXPO haiexpo19
/ HeliAssoc HeliAssoc
/ company/helicopter association-international
/ HelicopterAssoc haiexpo19
Within the helicopter industry, whom do you admire and why?

Capt. Rick Newson, head of Flight Ops Rotary at the UK Civil Aviation Authority, works with industry and supports big and small commercial operators and private helicopter pilots equally. He always listens to a well-thought-out argument supported by safety risk analysis, providing advice where necessary to make the case stronger and therefore more acceptable to the authorities. Without his positive and enthusiastic support, the UK helicopter sector would not be as well positioned to meet the current challenging market conditions.

Tim Fauchon
Chief Executive
British Helicopter Association

The people who take responsibility to train the future of the helicopter industry. In addition to professional trainers and flight instructors, these include career-path mentors, maintenance shops that hire interns, and companies that hire prior military or low-time pilots and then train to proficiency, despite the money required to train. With dedicated trainers, the helicopter industry will be able to meet the challenges of an evolving economy while keeping safe, happy, and loyal employees.

Evie Lynn
Commercial Pilot
Director of Safety
Aspen Helicopters

The helicopter industry is dynamic, and I have to declare my admiration for all the professionals involved in its wonderful, constant evolution. Pilots and mechanics contribute in a fundamental way, working each day to keep our machines flying and transporting safely. Their daily efforts contribute to job creation and the strengthening of the global helicopter industry.

Thales A.D. Pereira
President
Brazilian Helicopter Association

I admire each and every women pilot and mechanic in the helicopter industry because they have made their way in an industry that, at least in Latin America, did not have them in mind. I believe that women contribute not only through their rigorous, detailed work in their day-to-day jobs, but also through their innate sense of collective well-being, which can be a great support for safety.

Loreto Moraga
Chairman
Chilean Helicopter Association

HAI, AMOA, and AMES to Hold Air Medical Safety Conference

HAI WILL PARTNER WITH the Air Medical Operators Association (AMOA) and the Association for Air Medical Services (AAMS) to hold a Helicopter Air Medical Safety Conference in Arlington, Virginia, May 8–9, 2019.

The meeting will feature presentations for managers, operators, pilots, maintenance technicians, and industry leaders. Topics to be discussed will include legislative and regulatory issues, the integration of unmanned aircraft systems into the National Airspace System, accident reviews, and managing the high-risk environment of helicopter air ambulance (HAA) missions.

Interested members of the HAA community can find out more and register online at rotor.org/amsc.

2020 Brings Changes to HAI Annual Calendar

THE SCHEDULING OF HAI HELI-EXPO 2020 for the end of January 2020 has had a ripple effect, changing some of the submission dates for HAI and HFI contests or events. Read on to learn the new timelines for the Salute to Excellence Awards, the ROTOR Photo Contest, and the HFI Scholarship Program.
**Salute to Excellence Awards**
Nominations open May 31, 2019 – August 30, 2019
rotor.org/salute

Nearly every person in this industry knows an individual or organization worthy of nomination in one of the nine categories of the HAI Salute to Excellence Awards. It is never too early to begin considering who you would like to nominate. Gathering the necessary material now will make it easier to prepare your nomination package. Visit rotor.org/salute to learn more.

**ROTOR Photo Contest**
Submissions open July 1, 2019 – November 1, 2019
contest.rotor.org

Have you taken some great photos of helicopters or drones you would like to share? Don’t miss your chance to have your work featured in ROTOR magazine and at HAI HELI-EXPO 2020 in Anaheim. Visit contest.rotor.org beginning July 1 to enter the contest, manage your submissions, and view submitted photos.

**HFI Scholarship Program**
Applications open August 1, 2019 – October 30, 2019
rotor.org/scholarships

Helicopter Foundation International (HFI) annually awards up to 22 scholarships for aspiring pilots, maintenance technicians, and safety professionals. In an industry experiencing a shortage of pilots and maintenance technicians, the HFI Scholarship Program is helping to welcome new faces. Visit rotor.org/scholarships to review application requirements.

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**HAI Briefs**

**HAI Hosts Second Meeting on Industry Safety**

In 2018, several tragic helicopter crashes led HAI to form a Regulatory Safety Working Group to examine the applicability and appropriateness of existing regulations as they relate to certain helicopter mission profiles. Drawing its membership from helicopter operators, HAI staff members, and FAA representatives, this group held its second meeting at HAI headquarters in Alexandria, Virginia, at the end of January 2019.

In its second meeting, the group, which now includes representatives of the US Helicopter Safety Team, began to address the 16 specific issues identified during its initial meeting in June 2018. Attendees sought to distill and prioritize those issues, separating and elevating the regulatory and safety issues that would require FAA intervention.

“We formed the initial group, which includes working industry and other interested parties, to learn from the tragic results of recent helicopter accidents,” says HAI president and CEO Matt Zuccaro. “We strongly believe it is in the best interests"
of the industry and the general public to prevent similar accidents from occurring in the future.”

From the 16 issues identified during the first meeting, the working group identified six priority issues for further study. These include:

■ Further defining FAR/AIM Parts 91, 135, and 119, including identifying equal levels of safety for similar operations, clarifying the term “commercial,” Part 119 exemptions, and implementing safety management systems
■ Operating non-IFR-certificated aircraft in, or near, instrument meteorological conditions
■ Removing unnecessary and burdensome personal protective equipment requirements
■ Reviewing restraints for passengers and service animals, including the inadvertent release of seatbelts in doors-off operations, and restraint systems for lap children and comfort animals
■ Examining CFR Part 136, Appendix A for possible redundancy to existing Part 136 requirements
■ Determining equivalent levels of safety for drone operations.

Six smaller working groups were formed, with each focusing on one of the six priority issues. The groups will hold monthly teleconferences, eventually producing findings and recommendations that address their specific issue.

The larger working group will then meet to review and refine the conclusions. Ultimately, the Regulatory Safety Working Group will prepare and submit its report to the FAA for review and possible action.

“Based on the discussions around the table, it’s evident that the industry and the FAA believe the group can help to clarify and improve regulatory safety,” says Chris Martino, vice president of operations for HAI. “While only the FAA can change its regulations, its representatives have participated in both meetings in advisory capacities, and they appear as fully vested as the industry in addressing these issues.”

HAI ONLINE EDUCATION

We help busy helicopter professionals stand out in the crowd by providing the education and training employers need to move their businesses forward.

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• Garmin 430/530 Master Training
• How to Speak to the News Media Effectively
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• UAS Part 107 Test Prep

rotor.org/academy
In aviation, the consequences of distracted behavior range from annoying to tragic.

Avoiding Distraction

1. **DON’T be a slave to your cell phone.** Yes, the cell phone is a useful tool, connecting pilots and maintenance technicians to information and support resources. But many operations are banning personal cellphone use in the cockpit, on the flight line, and in the hangar. Doing your job safely demands 100 percent of your attention.

2. **DO be aware of your power to distract others.** Most guidance on avoiding distractions focuses on limiting interruptions to your work. Have you thought about how often you distract others? Support your colleagues in their attempts to focus on the job at hand.

3. **DO treat any interruption as a reminder to go back two steps.** When you are interrupted during a procedure or checklist, go back two steps before the interruption occurred before you resume the task. This will help you to get back in the groove and ensure that all steps are completed with your full attention.

4. **DON’T engage in chit chat during high-workload tasks.** The free-form, unplanned nature of social conversation means that it occupies a lot of your attention. Be aware of how this could negatively affect your performance when high concentration is required. Human beings are social animals—keeping conversations brief and to the point requires discipline.

5. **DO be assertive when others attempt to distract you.** When a friend, co-worker, or manager opens a conversation about a nonurgent topic while you are engaged in a task or procedure, be willing to say, “Can’t talk right now—I’m in the middle of something. I’ll come and find you when I’m done.”
“The Challenge We Have Across Aviation Is Dealing with Automation”

The FAA’s Earl Lawrence returns to his roots in aircraft certification.

A CHALLENGE FOR EARL LAWRENCE, WHO TOOK OVER AS THE FAA’S NEW EXECUTIVE DIRECTOR for Aircraft Certification in early December, is dealing with new technology—in both manned and unmanned aircraft, and especially in the National Airspace System, where the two will meet. Rotor asked Lawrence about those big challenges ahead.

How will your shop help the helicopter industry comply with the 18-month window for crash-resistant fuel systems equipage set by the 2018 FAA bill? 
Lawrence: It’s a tough deadline for us all. But I think that as long as both industry and the FAA keep focused on the safety missions we’re trying to achieve, we’ll do well. What we’re focused on here in our aircraft certification offices is really expediting, or putting to the top of the list, any of the projects that we have for certification or validation.

By not moving more quickly to approve IFR equipage in single-engine helicopters, have we missed an opportunity to improve safety? 
Yes, it is a missed opportunity. We are working hard to figure out a way we can take advantage of that opportunity now and improve safety in those aircraft. As with anything, it’s not easy. Some of those opportunities require rule changing, which takes time. Other things we can do with policy and procedure changes. We’re looking to use those where we can.

What are your takeaways from the FAA reauthorization bill as it pertains to certification reform? 
Congress, the FAA, and the industry are all on the same page. Congress is asking us not just to streamline our certification processes, but as much as possible, to allow the manufacturers enough latitude to certify their products faster. But at the same time, they’re telling the FAA we also must create a system of checks and balances, a system that is based on performance objectives and metrics.

What level of technology will the FAA require to allow UAS, or drones, to regularly operate beyond line of sight? 
There are beyond visual line-of-sight operations done every day in the United States already. But they are being done by professionals under a good set of procedures that we find acceptable in ensuring that there will not be a midair collision. Drone operators need the same level of training and rigor that other professional operators in the same airspace get.

When people in conventional aviation hear about the thousands of flying cars that will be operating “very soon,” they feel those reports underestimate the complexities involved. What will it take to make that happen? 
We’ve got to go back to the core issue: we don’t want to have midair collisions. So what are the things you can do to prevent that midair collision? For many missions you don’t need detect-and-avoid. At least we don’t need a box that does that. You do need detect-and-avoid in a broader system that will continue to include humans.

Aircraft certification is not looking around for some magical device because there is no magical device that solves it all. People are involved in this. And we have procedures and rules that that will always be part of it. It’s going to be a system.
HELIQUARTERS EVENTS

2019

MARCH 4–7/ EXHIBITS OPEN MARCH 5–7
HAI HELI-EXPO 2019
Helicopter Association International
Atlanta, Georgia, USA
heliexpo.rotor.org

MARCH 17–20
Aviation Technician Education Council (ATEC) Annual Conference
Wichita, Kansas, USA
atec-amt.org/annual-conference.html

APRIL 16–18
ABACE–Shanghai
NBAA and AsBAA
Shanghai, China
abace.aero/2019
Visit HAI at Booth #B719

APRIL 29–MAY 2
AUVSI Xponential
Association for Unmanned Vehicle Systems International
Chicago, Illinois, USA
xponential.org/xponential2019
Visit HAI at Booth #2402

MAY 8–9
Helicopter Air Medical Safety Conference
Cosponsored by HAI, AAMS, and AMOA
Arlington, Virginia, USA
rotor.org/amsc

MAY 13–16
Forum 75 (75th Annual Forum and Technology Display)
Vertical Flight Society
Philadelphia, Pennsylvania, USA
vtol.org/forum

JUNE 6
NBAA Regional Forum
National Business Aviation Association
White Plains, New York, USA
nbaa.org/events/2019-white-plains-regional-forum

JULY 15–20
APSCON 2019
Airborne Public Safety Association
Omaha, Nebraska, USA
publicsafetyaviation.org/events/apscon-2019-omaha-ne
Visit HAI at Booth #413

OCTOBER 22–24
NBAA-BACE
National Business Aviation Association
Las Vegas, Nevada, USA
nbaa.org/events/2019-business-aviation-convention-exhibition

NOVEMBER 4–6
Air Medical Transport Conference (AMTC)
Association of Air Medical Services
Atlanta, Georgia, USA
aams.org/events/amtc
Visit HAI at Booth #718

NOVEMBER 17–21
Dubai Airshow
Tarsus F&E LLC Middle East
Dubai, United Arab Emirates
dubaiairshow.aero

NOVEMBER 18–20
HAI Firefighting Safety Conference
Helicopter Association International
Boise, Idaho
rotor.org/events

2020

JANUARY 27–30/ EXHIBITS OPEN JANUARY 28–30
HAI HELI-EXPO 2020
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Anaheim, California, USA
heliexpo.rotor.org
It's easy to talk about but hard to do.
IT'S OFFICIAL: The Robinson Helicopter Company knows a thing or two about customer service. A company that produces only three models of helicopters, Robinson recently achieved a milestone by being recognized by Vertical magazine's 2018 Helicopter and Engine Manufacturers Survey as having the highest customer service satisfaction ratings within the helicopter manufacturing industry.

Listening and responding to Robinson operators is one of the primary factors in the company's high customer service marks. Its customer service team treats all owners and operators equally, regardless of whether they have one helicopter or a fleet.

“Sales is the just the beginning of a relationship,” offers Kurt Robinson, company president and chairman. “You put the trust in us to buy our helicopter, and so we will absolutely support it.”

Making Time Machines
After working for Bell Helicopter and Hughes Helicopters, Frank Robinson started his company in 1973 and rolled the first production helicopter—the R2—out of his plant in 1979.

Forty years later, Robinson has produced more than 12,000 helicopters, many sold to nontraditional customers like hobby flyers who have embraced the airframe and the company that produces it. Today, Robinson maintains a headquarters and manufacturing facility in the Los Angeles suburb of Torrance, California, employing approximately 1,100 men and women. Many of the employees are fiercely loyal, staying with the company for upwards of 30 years.

From the company's earliest days, the comparatively affordable helicopters have appealed to a broad range of operators. Flight training operations around the world use the piston-powered, two-seat Robinson R22 to teach new pilots, and its price point has made it popular with budget-conscious enthusiasts.

“From the get-go, Frank would say ‘We're a Henry Ford-type of company, and we're going to try and keep the costs low,’” recalls Kurt, who assumed leadership of Robinson in 2010, after the retirement of his father, Frank. “If we can figure out a way to cut our costs, we want to pass that on to the consumer. I would much rather build a lot of parts at a lower price and have low margins. We want to keep our prices low and earn an honest profit.”

The four-seat, piston-powered R44 was released in 1990 and became the best-selling helicopter in the world with more than 6,000 produced. The turbine-powered R66 followed in 2010 and is widely utilized in commercial operations.

“I love hearing what people do with our aircraft,” says Kurt. “People tell me things all the time, and I think, ‘I never knew people were doing that.’”

From some of the earliest days of the company's marketing, Robinson has promoted its aircraft as the product of quality engineering with an emphasis on pilot and passenger safety.

“I see aircraft that we built in the 1980s that are still flying today,” Kurt says. “I've heard the jokes: ‘Do you really buy a Robinson, or do they just let you use it?’ Some of these helicopters have had three or four different owners.”

“We sell a time machine, when you really think about it,” says Pat Cox, Robinson technical representative. “Very few people buy a helicopter because it's fun. People buy helicopters to save time. So if we can't keep them in the air, we don't deserve to be in business.”

Customer Is King
Robinson offers several avenues for customer service, which includes dedicated customer service representatives as well as licensed service centers around the world. Customer service representatives have generally been with the company for many years and have specific customers assigned to them who come to know them well.

“I know Frank highly valued customer service,” says Kurt. “And many times, he was interested in it from an engineering standpoint. He wanted to understand what led to the problem. Once he understood, he'd go back to engineering and say, ‘This isn't right. Pull out that drawing, let's take another look at that part.’”

Like his father, Kurt recognizes the importance of customer
service. “Every time we hire a new customer service representative, I personally sit down with them to explain how important customer service is to us. I want them to know that if they ever get to the point where they’re going to have to tell someone no, they need to run the situation past me or one of the more experienced representatives to see if we can come up with an alternative solution.”

Kurt takes pride in the detailed knowledge the customer service representatives have of the Robinson fleet. “Someone will call in with a problem [that] just vexes everybody, but we can look at the cause, not just the symptom, and get back to determining the solution. I know it always feels good when we can resolve something like that.”

Frank Nieto is the customer service lead at Robinson. “We make ourselves available to the customers and every department works as a team. At the end of the day, we just want to keep everyone flying safely, so we make ourselves available as the intermediary between the customer and [the Robinson team]. If you need something, raise your hand. If we think you need something, we’ll raise your hand… It’s actually very easy to get ahold of someone here when you need some support.”

“I’m here at the crack of dawn,” says LuCinda Montague, supervisor of customer service who has worked at Robinson for more than 30 years, “so my European customer can get ahold of me before they leave for the day. I have people in my department who take staggered lunches, so there’s always someone available should a customer call or show up in the lobby.”

“Our customer service and tech support areas are within a few feet of each other,” adds Nieto. “We are constantly at each other’s doors to meet the goals that have been established, not just by the Robinson family, but by the customers themselves. And we do our best to meet those goals as often as we can.”

**Speedy Service Across the Globe**

Robinson also takes pride in its global network of service centers and exchange centers of more than 400 dealers and service centers around the world.

“A lot of the time, the individual owner or the small operators don’t know the options that are available to them,” says Kurt. “They’ll call in, and one of our tech reps will offer, ‘Well, we don’t have that part in stock, but if you contact this other service center, I believe they have it.”

Rotorcorp in Atlanta, Georgia, and Heliflite in Sydney, Australia, are both large parts suppliers for Robinson, offering parts either regionally or globally. “People can go directly to a service center or they can come through us,” adds Montague. “We encourage our service centers to hold things in stock so that customers can purchase them quickly.”

“We try to get customers to stay regional if they can,” says repair station manager John Hernandez, one of the youngsters in Robinson’s Customer Service Department with “just”
13 years at the company. “If an international customer is reaching out to us directly, there might be some lag time. If they’re able to go to within their country or region, they can get parts faster.

“Obviously, at the end of the day, everything starts with Robinson Helicopter,” continues Hernandez. “We are the biggest distribution center. But we do have a lot of partnerships that we’ve made, and we hope those partnerships are equating to happy customers at the end of the day.”

At the heart of the network is the understanding that all customers, whether they own one Robbie or 20, are equal. “It doesn’t matter if you’re a service center or a dealer, or if you’re a private pilot,” says Montague. “You absolutely get the same service.”

While every operator is on equal footing, there are occasions when one service issue will rise above others. “We really understand the true meaning of AOG [aircraft on ground],” says Kurt. “I spent many years running customer support and talking to the actual operators. I have at times literally gone down and stopped the main production line, just so that we can get a part out to our customer so that they can get back
Depending on circumstances, Robinson will also try to prioritize customer requirements. "I might have a customer who tells us, 'Hey, I'm going to be flying in a month, and I'd like you to get this part to me.' And I'll have someone who is AOG or close to AOG, and I'll try to work with both parties to get the part to the operator who needs it most," says Kurt. "And we don't forget the other person, because they need to go too."

Response time is of vital importance to Robinson Helicopter Company. In a recent survey, 84 percent of respondents indicated Robinson handled their technical support issues within two days. The company accomplishes this goal through "old-fashioned" connections like phone calls and emails with the customer service representatives and through more modern systems where barcoded parts are ordered online with a credit card.

"This is an area we have developed and worked on for years, just to get parts out," says Kurt. "I can call up and order something online and have it shipped to me the next day. So why can't I do that with a helicopter part? I understand that there are bigger components, such as additional inspections to complete. Or if it's going to foreign sales, there's other paperwork and criteria that we need to meet," he says. "But those are some of the areas where we just keep saying, 'Why can't we do it? What is preventing it, and how can we streamline the process to get it out?'

"One of the huge things that has made life a lot easier for everyone is the cell phone camera," says Kurt. "It is so helpful now to get a picture quickly, rather than having someone try to describe a problem. It makes our response time a lot quicker."

The Secret: "Keep 'Em Flying"
Robinson continues to upgrade its aircraft as industry technology has advanced, including features like GPS, SAS [stability augmentation system], and autopilot. "All of those relate to safety and improvements in the aircraft to make it easier to fly," says Kurt. "Hopefully, they'll make it more fun to fly too.

"One of the things we do is to reach back and make certain [the older models] stay current," says Kurt. "It's clear to me that aircraft are getting easier to fly, but are they getting safer? … Safety is always there at the forefront of our mind.

"We want the owners and operators to stay safe," Kurt continues. "It may be a 1980s aircraft, but if they're doing an overhaul, we want to make certain the aircraft is as safe as it can be and that it's maintained properly."

At its core, customer service comes down to supporting the customer, regardless of the issue. "As Frank used to say, 'Keep 'em flying,'" finishes Nieto. "So we pull a lot of rabbits out of our hat. All of our departments work together. If there's an issue or priority, it's not unusual for me to reach out to Hernandez, tech support, or production, and we work together. We pull a lot of rabbits because people need rabbits pulled. We keep customers in the air."

Feedback from satisfied customers does make its way to the production line. "I'll get an email back saying, 'Thank God you guys were able to get this out to me.' And I'll let the teams on the floor know that their efforts were appreciated. Because it's a team effort," says Nieto.

"One of the things I guess I'm most proud of is that people love this industry," finishes Kurt. "I like to think people get started with Robinson because they can afford it, and then they get going and get involved in the industry. I know businesses that started as a one-person operation, and now I realize, 'Oh my God, they've got 20 helicopters!' I've had people who have gone on to other aircraft, and they've come back to Robinson."
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A BIRD IN HAND REALLY WORTH TWO in the bush? Sikorsky Helicopters and its parent, Lockheed Martin, certainly are betting that way.

They’re wagering heavily that their 2010 Collier Trophy–winning X2 rigid coaxial compound helicopter design, flying since May 2015 aboard their S-97 Raider technology demonstrator, will be worth more to the US Army than two (actually up to five) other unconventional but not-yet-flying aircraft that competitors may offer the army.

The Future of Attack Reconnaissance Aircraft

The US Army, by far the world’s biggest operator of helicopters, has set up a preliminary competition aimed at deciding sometime next summer which technological paths it will compare between now and 2023. That is when it expects to decide what company will build the army’s next-generation future attack reconnaissance aircraft, and what technology that aircraft will feature.
The future attack reconnaissance aircraft, or FARA in US Army acquisition parlance, is one of two, and perhaps eventually three, classes of vertical-lift vehicles the army wants to buy over the next 20 years to replace potentially all 4,000 aircraft in its current vertical-lift fleet.

In one form or another, army planners and procurement leaders have been working on the replacement for its rotary fleet since at least 2004, and really since the early 1990s. It has been a frustrating process that has seen the cancellation of at least three different programs amid concerns about costs, funding sources, competition with other large procurement programs, and indecision among army leaders over what their future missions and tactics, and thus, what their future equipment requirements will be.

Over most of the last five years, the biggest—and some of the smaller—US helicopter manufacturers have been working under the assumption that the army most wanted a longer range, faster, more fuel-efficient troop transport and utility helicopter to replace its workhorse fleet of more than 2,000 Sikorsky UH-60 Black Hawks. But within the last year the army has made it clear that, while the Black Hawk replacement aircraft remains the biggest and most important item on its aviation wish list, the smaller FARA aircraft has been moved to the top of that list because it is most urgently needed.

The Army has been without a true armed scout aircraft since the last of the Bell OH-58 Kiowa Warriors was retired in mid-2017. Some aspects of the armed scout mission were assumed by Boeing AH-64 Apache attack helicopters, and some by drones. But that shift always was meant to be temporary, in large part because the Apache is too large, too expensive to acquire, and hugely expensive to operate in the scout role, for which it is not optimized. The shift to that aircraft also adds significantly to the already heavy maintenance demands on the Apache fleet and on Apache pilots.

So now the army is moving with the kind of development speed not seen since World War II to determine what kind of vertical-lift vehicle it will need to fill the FARA role. In a tentative timeline laid out last summer, the army hopes to begin fielding that aircraft by the early 2030s, perhaps even a bit earlier.

Initial award of preliminary design contracts to as many as six manufacturers is expected in June 2019. Approximately nine months later, the army plans to award two of those competitors contracts to build and test prototypes. A fly-off is planned to commence in the fall of 2022 (the first quarter of the government’s fiscal 2023).

But the selection of a winner to actually build the FARA is not guaranteed to follow immediately after the fly-off. The plan leaves room for the army to delay that decision, either to allow for more technology advancement or, more politically, to allow Congress and the administration more time to wedge the program into the defense budget.

However, neither the army’s short-term rush to get to a FARA fly-off in just four years, nor the political and funding uncertainty surrounding its fast-track FARA development plan, detracts from how impressive the S-97 and its underlying technology already are.

**Sikorsky Pursues Two Big Wins**

Make no mistake, the Raider and the derivative aircraft that’ll be built to win that fly-off will have to be pretty darn impressive for Sikorsky to reach its ultimate goal with its X2 compound helicopter technology, and for Lockheed to get the maximum reward for its decision to buy Sikorsky from United Technologies for nearly $9 billion in 2015. Clearly, Sikorsky and Lockheed leaders are focused on grabbing two big brass rings in the army’s Future Vertical Lift (FVL) aircraft procurement extravaganza, not just one.

The first one, obviously, is defeating the FARA competition—probably Bell—in the relative short term and converting that technology into an enormous contract to build 400 to 500 units of this nation’s next light observation and attack aircraft. That aircraft can be expected to serve deep into the second half of the 21st century. The second brass ring for which Sikorsky is reaching would be to win the slower moving but already underway competition to build the long-range assault vertical-lift aircraft that eventually would replace the Black Hawk.

The S-97 Raider’s mere existence and the strong flight-test record it already is building clearly puts Sikorsky in the lead in the FARA competition. But the Raider’s big brother, the Sikorsky/Boeing SB>1 Defiant, is believed by analysts to be at least a year behind rival Bell’s V-280 Valor tilt-rotor entry in the Black Hawk replacement derby. Sikorsky leaders, however, obviously are hoping that an impressive showing in the FARA fly-off competition using the same X2 technology that will also be at the core of the SB>1 Defiant will go a long way toward Sikorsky closing the gap with Bell in the long-range assault aircraft competition.

To be sure, the Raider, as configured today, will not be Sikorsky’s entrant into the FARA sweepstakes. But that entrant won’t be much different: a little larger, perhaps a smidgen faster and, once armed with the weapons and all the high-tech electronic gear the Army wants its new scout attack helicopter to carry, a lot more effective in battle.

Those military upgrades from the current Raider demonstrator will be worth exploring in minute detail in the years ahead. But even now, as currently constituted without all the radars and communication equipment needed for the scout mission and without the guns and missiles it’ll also carry, the Raider is an impressive vehicle.
“The army has two capability gaps,” says Tim Malia, director of Future Vertical Lift Light at Sikorsky. “One is how will they do the attack/recon mission against future threats. The other is how will they do long-range assaults. They both come up in the Future Vertical Lift program, but I don’t see them competing against each other [for congressional funding]. They’re complementary.”

Accordingly, while Sikorsky officials downplay the connection or potential connection between the two FVL program competitions—the scout/attack (FARA) aircraft and the long-range assault/utility (Black Hawk replacement) aircraft—the company clearly views this as an opportunity to use one technology package, the X2 compound helicopter technology, to win two major procurement competitions.

Advancing Helicopter Technology
Sikorsky believes its experience, first with the X2 demonstrator and more recently with the Raider, gives it a huge head start. Each of the factors that the army has asked competitors in the FVL competitions to address with the aircraft they will enter already were being addressed by the S-97 Raider—before the army issued those requirements.

Speed, fuel efficiency, maneuverability, noise signature, and physical size are all key elements in the army’s decision criteria for its new scout/attack FARA vertical-lift aircraft, along with, of course, purchase price and operating costs. Commonality, or the lack thereof, with other army aircraft also eventually could factor into the FARA decision. Hence Sikorsky leaders’ quiet eagerness to win that fly-off as a means of boosting the SB>1 Defiant’s chances of winning the Black Hawk replacement aircraft competition later on.

“Speed is increasingly important in the modern battlefield,” Malia says. “The enemy’s ability to keep us based further away from the fight by their use of regular weapons—think mortars—means our warfighters have to transit farther distances to get to the fight. So the aircraft has to have the range to go that far. And its speed becomes more relevant in order to make up the time lost by having to cover more ground to reach the fight.

“The second element of speed is when your guys get into a rapid-response situation and ground troops are being threatened by the enemy. You’ve got that ‘golden hour’—or less, usually a lot less—to get there and protect those troops.

“And the third element of speed is survivability. It’s just harder to hit something that’s moving fast,” he says. “And our X2 technology meets the speed requirement very well, whether we’re talking about the scout/attack mission or the long-range assault mission.”

Chris Van Buiten, vice president of innovations at Sikorsky, says the company long has recognized that speed and range, the helicopter’s natural limiting factors, eventually would have to be addressed by manufacturers.
“Something like 10 years back, maybe more, Sikorsky realized that some of our customers’ requirements, both commercial and military, were going to start calling for greater range and speed. And we’ve always had an internal interest in improving the noise level issue and maneuverability,” Van Buiten says. In attempting to address these issues, he says, “We looked at a lot of concepts and just gravitated toward this concept.”

Forty years ago, Sikorsky studied an advancing blade concept, which relies on two sets of rigid rotor blades mounted coaxially, one on top of the other, to counteract the inherent helicopter problem of the retreating blade, which moves in the opposite direction of the vehicle’s flight path, losing lift and speed. In flight tests in the late 1970s and early 1980s, Sikorsky’s XH-59A test vehicle—an advancing blade demonstrator augmented by two jet engines mounted on its sides—hit speeds of more than 300 mph in shallow dives. In straight and level flight, it topped out above 250 mph. Those are speeds no conventional helicopter can hope to achieve because of the retreating blade effect.

“Because it had a rotor, it could do everything a helicopter could do, but [the XH] doubled the speed,” Van Buiten explains.

However, the XH-59A was too heavy, too fuel inefficient, and too expensive to operate back in those days. It also was more than a handful for two pilots to fly, in part because of significant vibrations, an inherent characteristic of coaxial helicopter designs. Beyond that, no one in the military at that time seemed to have an appetite for taking on such a difficult and risky new technology.

In the mid-2000s, Sikorsky returned to the concept again with the development of the X2, this time pairing the advancing blade technology with an advanced pusher propeller called a propulsar. The X2 demonstrator also featured fly-by-wire flight control technology, lighter composite materials and a lot less steel and aluminum, and more advanced vibration control systems that took advantage of computer processors and software that had not been invented back in the XH-59A’s days. The propulsar installed in the tail—which also was not present in the XH-59A—proved capable of pushing the aircraft forward for prolonged periods at speeds approaching 300 mph, roughly twice the top speed of a conventional helicopter.

In 2013, two years after the X2’s retirement, the first S-97 Raider began its test-flight regime. While its speed performance and many other characteristics were excellent, it too
initially proved to be a high-workload aircraft for its pilots. But over the next two years Sikorsky engineers worked on solving those and other technical issues and made it possible for the Raider to return to its flight-testing program early in 2018. Since then, the aircraft has pushed through the 200-knot (230 mph) barrier in route to its eventual goal of more than 220 knots, or about 255 mph.

“One of the neat things about the Raider or X2 is that when you walk around it, you realize that’s really a set of recognizable technologies, just combined in a new way,” Van Buiten says.

Clearly the army took notice of the X2’s speed achievements, along with the successes that the US Marines were having with the large, fast, and long-range Bell Boeing V-22 Osprey tilt-rotor troop transport. Sensing that the technology had advanced far enough to consider using in army aircraft and recognizing that its fleet of more than 4,000 conventional helicopters will need to be replaced over the next two decades, the army launched its FVL technology development and procurement program.

Malia’s emphasis on the need for speed in the army’s FVL aircraft is understandable. Speed long has been the biggest limiting factor on rotary flight, especially in a military context. The retreating blade issue limits conventional military helicopters to flight speeds of around only 130 knots, or about 150 mph. Vertical-lift aircraft built in a X2 compound helicopter configuration with a pusher prop like the Raider can exceed that barrier with ease because once they are airborne and out of ground effect, they can redirect as much as 90 percent of their engines’ power to the propulsar. That can push the aircraft through the air at well over 200 knots.

That’s impressive, but still slower than the speed rival Bell can achieve with its tilt-rotor aircraft like the V-22 Osprey and the V-280 that it plans to field in competition with the SB>1 Defiant in the long-range attack vertical-lift aircraft competition.

Malia concedes that tilt-rotor technology has a top-end speed advantage over X2-style compound helicopters and may be slightly more fuel efficient as well. But he discounts that speed and fuel disadvantage because X2 technology will make the Sikorsky entrant plenty fast enough and with sufficient fuel efficiency to meet the army’s speed and operating costs requirements for a new scout/attack vertical-lift aircraft. Those disadvantages, he says, will be minimal because they only show up when the vehicles are flown at high speeds over long distances, something scout/attack helicopters won’t be asked to do very much.

**Changing the Game**

And there’s more to the FVL program than the Army’s need for more speed.

Though it’s not ready yet, S-97 project leaders are hyping the ease with which they think the Raider’s eventual scout/attack derivative will be able to shift from being flown by two pilots in a complex battlefield environment where human redundancy is critical to mission success, to being flown by just one pilot or autonomously, based on mission requirements.

“We call it ‘optimally piloted, not ‘optionally piloted.’ That’s the army’s term,” Malia explains. “The idea is to use the most appropriate piloting approach for each mission.”

The concept involves using highly trained human pilots to fly missions that require not only their piloting expertise but also their observation and critical mission decision-making experience and skills. More mundane, less risky missions then could be handled by a single pilot supported by onboard automation or eventually flown fully autonomously. The “optimally piloted” capability also would give commanders the option of using autonomous flight technology to perform a scout/attack mission that otherwise would not be undertaken because it would be, in effect, assigning human pilots to a suicide mission.

Meanwhile, Sikorsky leaders insist that its X2-style entry in the FARA fly-off will be much quieter, have a much smaller “physical footprint,” be more easily and cheaply maintained, and be more maneuverable than tilt-rotors, which sport two huge, side-by-side prop/blade arrangements at the end of their short, conventional fixed wings. Sikorsky leaders believe that only the slightly larger derivative of the
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Raider that the company likely will enter into the scout/attack fly-off will be able to operate freely, or perhaps even at all within the battle environment in major cities that the army calls “urban canyons.” That’s where military planners expect future scout and attack helicopters will be obliged to operate more and more in future conflicts.

Van Buiten says combining new or recently advanced technologies to create a new, more capable war-fighting machine that represents a major leap forward in fighting capability simply was not possible until now. “It’s an opportunity to give the warfighter a new configuration and a new capability that probably only comes around every 40 or 50 years. That’s why we had to build the Raider,” he says.

To a degree, the noise reduction, physical footprint, maneuverability, maintainability, speed, and range performance improvements that are inherent in X2/Raider-type aircraft could make commercial versions of such aircraft big hits with some corporate and medical vertical-lift operators and, in some cases, with police and other safety agencies that currently operate conventional helicopters.

Malia jokes that during a few flight demonstrations the noise from the Raider’s swirling props and engines was drowned out by a neighbor mowing his lawn near the flight observation area.

“The X2’s acoustic benefits will allow it to easily achieve the most stringent regulatory requirements,” when they eventually make their way into commercial vertical-lift aircraft, says Bill Fell, Sikorsky’s chief Raider test pilot. “This is great news if you are flying into the Wall Street Heliport, any hospital roof, or anywhere you want to make the locals happy.

“The use of the prop on any approach will allow the pilot to decelerate nose down via negative thrust on the prop. This has huge safety benefits by providing the pilot to see out in front of them throughout the approach and landing compared to the typical nose-up helicopter deceleration,” says Fell. “Think of the EMS operator landing somewhere they have never landed that is surrounded by wires; that nose-down attitude is huge.”

The X2 could change how and when we use helicopters, says Fell. “The lift/drag benefit of X2 over standard rotorcraft combined with the speed capability significantly expands the range where it makes time and economic sense to take an X2.”

The Raider is based on the award-winning Sikorsky X-2 platform, which used a rigid coaxial rotor design and a pusher propeller to achieve speeds of 250 knots in level flight.
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**What’s New**

at HAI HELI-EXPO 2019 in Atlanta

This year’s show features a new city, new education, and new events.

HAI HELI-EXPO® HAS BECOME A MUST-ATTEND EVENT IN THE HELICOPTER INDUSTRY. The show annually brings the helicopter industry together for four days of meetings, education, and networking. And of course, there’s always lots of excitement on a show floor packed with more than 700 exhibitors displaying the latest aircraft, engines, avionics, and everything an aviation business needs.

This year, HAI has added some new content to help keep you updated on the latest trends in the industry. From new Professional Education courses and Rotor Safety Challenge sessions to helicopter trendsetters at HAI Connect and a fresh take on the Salute to Excellence Awards—Atlanta will not disappoint.

Welcome to Atlanta!

HAI HELI-EXPO visits the Gateway to the South for the first time, and there’s plenty of reason for visitors to get excited. Having just hosted Super Bowl LIII in the Mercedes-Benz Stadium, the city is big enough for HAI HELI-EXPO, with attractions, museums, and history for everyone. The College Football Hall of Fame, the site of the HAI HELI-EXPO 2019 Welcome Reception, is on the east side of the Georgia World Congress Center complex. A few blocks away are the Coca-Cola museum and the Georgia Aquarium, the largest in the Western Hemisphere. A visit to the Martin Luther King National Historical Park is one option, as is a visit to the Jimmy Carter Presidential Library and Museum. Visit www.Atlanta.net for more suggestions or information.
Salute to Excellence Luncheon
Wednesday, March 6, 12:00 PM – 1:00 PM
For more than 50 years, HAI has recognized the outstanding achievements and exceptional merit of individuals and organizations in the international helicopter community. This annual awards event has been moved to the lunch hour, just steps from the show floor so it’s easy to attend this premier event of HAI HELI-EXPO. Tickets can be purchased online when you register for HAI HELI-EXPO or on-site at Attendee Registration.

New Convention Center
HAI HELI-EXPO 2020 will be held in Halls B and C of the Georgia World Congress Center, the fourth-largest convention center in the United States. There will be a connector between the two halls so attendees can travel between the halls in comfort. And the connector isn’t just a way to get from B to C—there will also be food options, seating areas, and music. Take advantage of the photo booth in Hall B, located between meeting rooms B209 and B210, where you can capture—and easily share—your memories from HAI HELI-EXPO 2019.

Welcome Reception at College Football Hall of Fame
Monday, March 4, 6:30 PM – 9:00 PM
The HAI HELI-EXPO Welcome Reception is always a good time, but this year will be special for all attendees who are fans of college football. Sponsored by Bell, the reception will take place at the College Football Hall of Fame, across the street from the Georgia World Congress Center. Have fun with your colleagues as you debate the greatest college football program of all time. There is also an indoor playing field where you can demonstrate your skills.

New HAI Professional Education Courses
HAI Professional Education courses are scheduled before or after the show. The courses are taught by industry experts and designed specifically for helicopter professionals; tracks include safety, pilot skills, operations, maintenance, inspection authorization renewal, and career development. Professional Education courses require a separate registration, in addition to your HAI HELI-EXPO registration. You can view the complete Professional Education schedule at rotor.org/takeacourse. Read on to learn about our most exciting new courses.

Part 107 UAS Ground School
Sunday, March 3, 8:00 AM - 5:00 PM
There’s no denying that unmanned aircraft systems (UAS) have become a growing part of the industry. For the first time, HAI is offering a Part 107 ground school that prepares attendees to take and pass an FAA Part 107 knowledge test, which enables them to operate small UAS. Previous aeronautical knowledge certainly helps, but this course does not require experience.

Underwater Egress Procedures and EBD Familiarization
Monday, March 4, 8:00 AM - 5:00 PM
If your aircraft crashed in water, would you know how to escape? This course—held at the Georgia World Congress Center for half the day, and at the Atlanta Marriott Marquis Hotel pool for the other half—provides all personnel working or traveling on or over water with the basic knowledge and skills necessary to egress aircraft in a ditching emergency while deploying an emergency breathing device (EBD).

But Wait … There’s More
Don’t miss these other great new courses:
- Aviation Safety Programs and Emergency Preparedness
  Saturday, March 2, 8:00 AM – 5:00 PM
- The Emotionally Effective Leader
  Saturday, March 2, 8:00 AM – 5:00 PM
- Introduction to Vertical Reference
  Sunday, March 3, 8:00 AM – 5:00 PM
- Helicopter Flight Instructor Refresher Course
  Sunday, March 3, 8:00 AM – 5:00 PM
- Introduction to the Dirty Dozen Contributing Factors
  Sunday, March 3, 8:00 AM – 5:00 PM
- Integrating UAS into Your Current Operation
  Monday, March 4, 1:00 PM – 5:00 PM
- Integrating UAS into Your Current Operation
  Monday, March 4, 1:00 PM – 5:00 PM
- Integrating UAS into Your Current Operation
  Monday, March 4, 1:00 PM – 5:00 PM
- Integrating UAS into Your Current Operation
  Monday, March 4, 1:00 PM – 5:00 PM

New HFI Rotor Safety Challenge Sessions
The HFI Rotor Safety Challenge offers a slate of safety education sessions, free to registered HAI HELI-EXPO attendees and exhibitors. This year’s Challenge is sponsored by MD Helicopters. Many Rotor Safety Challenge events are eligible for FAA WINGS and AMT

HAI HELI-EXPO 2019 will feature more than 100 educational opportunities for helicopter professionals.
program credits. Plan your day now with the full schedule at rotor.org/takethechallenge.

The 2019 Rotor Safety Challenge features some new sessions, including:

**John and Martha King: Avoiding Unwanted Helicopter Adventures**
Tuesday, March 5, 2:30 PM - 4:00 PM
After an aircraft accident and discovering their own sense of vulnerability, John and Martha say they have become “born-again pilots.” The Kings use humor and stories from real-world cross-country experience to vividly illustrate principles of risk management and pass along practical and insightful tools you will use forever.

**Other New Safety Sessions**
Be sure to attend these other exciting new sessions:
- **Increase Focus to Increase Safety**
  Tuesday, March 5, 10:30 AM – 11:30 AM
- **Special Instrument Procedures and Increased Risk Management**
  Wednesday, March 6, 9:15 AM – 10:15 AM
- **Safety: Neither a Goal Nor a Priority**
  Tuesday, March 5, 1:15 PM – 2:15 PM
- **Helicopter Ditching and Egress: Evaluate, Prepare, Perform**
  Tuesday, March 5, 9:15 AM – 10:15 AM
  Wednesday, March 6, 8:00 AM – 9:00 AM
- **Safely Managing Helipads**
  Wednesday, March 6, 8:00 AM – 9:00 AM

**New Events at HAI Connect**
HAI Connect (#B5014) is a space that hosts special events, meetups, interviews, and networking opportunities on a range of subjects relevant to you. This event space is right on the show floor, so be sure to check the schedule often on the monitors at HAI Connect and in the show app.

**Chuck Aaron: Get Inspired – a Career in the Helicopter Industry**
Tuesday, March 5, 2:00 PM – 2:30 PM
A living legend in the helicopter industry, Chuck Aaron knows his stuff. Join him in HAI Connect for an overview of careers and opportunities in the helicopter industry.
The world’s first Super Versatile Jet takes off! The PC-24’s generous pressurized cabin offers sufficient space for up to three patients plus medical systems. The large cargo door with lift ensures easy patient loading and unloading. And the cabin can be reconfigured in line with any mission profile for maximum flexibility. Provide the best possible care and fly PC-24 – contact us now!

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Visit us at HAI
Booth # C2223
For many years, the helicopter industry has seen simulator training as something the big operations do. Yes, the top-of-the-line Level D simulators do provide a great training environment. But it also costs a great deal to rent these devices, if one is even available for your aircraft.

Many in our industry prefer to conduct all training in an aircraft. “I want my training to be as realistic as possible,” said one pilot I spoke with, “and what could be more realistic than training in an actual helicopter?”

Actually, training in a simulated environment offers a host of benefits for pilots and operators, including enhanced realism. And the good news is that you don’t necessarily have to spend a fortune to reap those benefits.

The Goal: Proficiency
The goal of all training for helicopter pilots is proficiency, which is defined as “thorough competence acquired through training or practice.” Note the emphasis on practical skills—proficiency is about knowing how to do something well or to use a tool appropriately.

A pilot is managing risk throughout the flight, assessing multiple inputs in an environment where a favorable outcome sometimes demands the correct input in seconds. In this context, proficiency means being able to recall and carry out procedures and maneuvers quickly, efficiently, and confidently, especially under the stress of an emergency situation.

Just because you have a rating or a license does not mean that you are proficient. Instead, just like the musician who asked how to get to Carnegie Hall, I have one answer for pilots who want to become more
proficient: practice.

Yet, in many ways, our industry has unrealistic expectations for pilot training. Training at flight schools is performed to a set training schedule that was approved by regulators and has not changed much over the years. The student is financially motivated to move through the training as quickly as possible. Meanwhile, there is no incentive to take advantage of simulation technology as both the student and instructor want to build their flight hours, as that metric commonly stands in for a pilot’s proficiency.

New-hire training is little better. In many operations, these pilots go through a training program that covers company operations, policies, and procedures. Then they immediately move into a ground school on the aircraft-specific model. On average, the ground school is completed over two to four days. At that point, the pilot is trained in either a simulated environment or the actual aircraft. The flight hours for this training average eight to 12 hours, depending on the complexity of the aircraft. IFR training averages a bit longer.

Recurrent training has similar challenges. Most operators have not reviewed their recurrent training programs for many years. It has become a box to be checked as opposed to an opportunity to review and strengthen a pilot’s skills.

The Technology Learning Curve

These decades-old training schedules have not kept up with the increasingly complicated aircraft and avionics of modern aviation. Technology is the problem (and as we’ll see later, it’s also the solution).

Don’t get me wrong. I love glass cockpits, navigation displays, and all the cool things in an electronic flight bag. But as a pilot, you are responsible for the safe conduct of the flight. You have to know the details of how to use the aircraft’s systems and equipment properly, how to maintain its airworthiness, and how to recognize and deal with failure modes. And you have to know them to the point of proficiency.

We are now accustomed to being surrounded by technology, and often we don’t take the time to properly learn every function of that technology. Some people might only use their phones for daily tasks such as calls,
texts, and web browsing. When they need to figure out how to use a more complicated function, such as a three-way conference call, they google it or dig into the owner’s guide.

That’s fine for a phone but completely unacceptable when you are training to pilot a more complicated system such as an aircraft. Pilots need a complete understanding of the aircraft in order to make real-time decisions when problems may arise.

Pilots use simulator training to learn aircraft-specific systems and procedures. They can also learn multifunction displays, digital cockpits, and enhanced visual systems. They can develop the ability to accurately operate the technology, fly the aircraft, and make the decisions necessary for a safe mission.

But many pilots pass check rides without being completely comfortable with all the functions in the digital cockpit equipment. In other words, they are not proficient.

There are several factors at work here. One is the firehose training model, which pours a huge amount of information onto the pilot in a short time—one of the least effective, yet all-too-common training methods.

Secondly, it is difficult to become proficient in technology without hands-on practice. Studying from a book or PowerPoint presentation does not provide the muscle memory required to become proficient with the equipment.

The challenge that we are facing is that there is so much more to learn and no additional time to do it. This has put a greater burden on both the pilot and the instructor, who both feel pressured to complete the training in less time than is necessary to create true proficiency.

Investing in Simulation Training
Today we need more training to get and stay proficient. This practice to proficiency is much more cost-effective in a simulated environment than in the aircraft itself, especially if it can be done in realistic scenarios that visually depict the uses and effects of the equipment. Simulation training should be a tool used by every operator, flight school, or private pilot.

Note: technically only simulation environments that offer motion are called simulators. However, outside of the training industry, most of us call any training device that seeks to duplicate the cockpit environment a simulator. Please see Simulator 101 on p. 44 to learn about the different types of simulators.

Simulation training offers substantial benefits for operators, trainers, and trainees:

- **24/7 availability.** All weather or environments
SUPERIOR PERFORMANCE. FOR A HIGHER PURPOSE.

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are available, around the clock.

- **No risk to aircraft.** Trainees can safely practice emergency procedures that would result in damage to an aircraft.
- **No risk to personnel.** According to the FAA, training flights accounted for 25 accidents in 2017.
- **More realistic.** Trainees can practice procedures and maneuvers to failure, past the point where an instructor in an aircraft would take control for safety, and trainers can introduce additional complications, such as weather or equipment malfunctions, as needed.
- **More cost-effective.** Simulator training does not increase your maintenance costs, burns no fuel, and aircraft are not diverted from generating revenue. Because any scenario is instantly available and instantly replayable, no time is wasted on repositioning aircraft or waiting for appropriate conditions.

- **Immediate feedback.** Simulator training provides trainees with immediate feedback; training can be paused at any time for immediate correction, repetition, or instruction.

A common question is “how much training do I need?” The regulators, aircraft manufacturers, or a company training manual might provide guidance for a specific aircraft or procedure. However, I encourage operators and pilots to really see these numbers as the minimum. Remember, proficiency is the goal.

The next question I get asked is “what should I train for?” The answer: train for the challenges in your specific operational environment. The National Transportation Safety Board specifically recommends simulator training for:

- Emergency procedures, including autorotations and recovery from unusual attitudes
- Scenario-based training tailored to the mission, including site-specific training on obstacles and terrain or flying in low-light conditions with night-vision goggles
- Degraded visual conditions, sound aeronautical decision-making, and inadvertent IMC encounters.

**Training for Highly Complex Aircraft**

Training in a Level D simulator is most useful when the aircraft is highly complex, with integrated technology. It is also a vital resource for training in aircraft requiring an FAA type rating, such as the S-92 or AW139, as well as a valuable training option for complex twin-engine aircraft in many of the complex mission profiles. Full-flight scenarios in both IFR and VFR are possible in Level D simulators.

In the Level D helicopter simulator arena, the leaders have been FlightSafety, CAE, TRU, and Thales. Their simulators have been installed in training centers around the world and are certified by many regulatory authorities.

Level D simulators provide an incredibly realistic training environment for those flying complex aircraft or high-risk missions, but training time in these devices can be equivalent in cost to training in an actual aircraft. However, there is a range of devices that deliver the substantial benefits of simulator training at a lower cost.

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17th Annual HFI Helicopter Industry Career and Mentoring Fair at HAI HELI-EXPO®

Georgia World Congress Center
FREE ADMISSION FOR JOB SEEKERS

If you’re looking for a new career or job opportunity in the international helicopter industry, plan to attend the career fair at HAI HELI-EXPO 2019.

Exhibitors span all segments of the industry.

A list of exhibitors is online at rotor.org/careerfair. Admission to the career fair is free for job seekers.

Questions? Email careerfair@rotor.org.
Simulation Training Resource Guide

Below is a list of some of training centers and flight schools that offer simulation training. Simulator manufacturers are also listed.

### TRAINING CENTERS

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Training for Single-Engine Aircraft

The advanced avionics and flight procedures available in Level 6 and 7 FTDs are very useful for single-engine aircraft training. This level of simulation costs significantly less and is an affordable option for many operators. Quite often, the visual effects on these FTDs rival that of their larger Level D cousins. FTDs are often used as training for inadvertent entry into instrument meteorological conditions (IIMC) and basic IFR instrument procedures.

When looking at Level 6 and 7 FTDs with or without a motion base, Frasca has been the industry leader. Frasca’s FTDs are used around the world and provide all the functionality required for certification by regulators.

Ab Initio Training

Advanced aircraft training devices (AATDs) are very useful at the flight-school level for teaching procedures and for practicing flight maneuvers, start procedures, and checklists. They not only prepare the pilot for flight in the aircraft but provide a safe and cost-effective alternative for much-needed practice.

Basic desktop training models are also very useful for training on different types of avionics and checklist procedures. Sometimes desktop simulation is used to teach “differences training” that demonstrate the variations among the simulator and models with different technology or equipment installed. These devices can also be used by pilots with only analog experience to become familiar with digital cockpits.

As the flight schools prepare pilots for careers in aviation, desktop trainers are an affordable resource for practice time on advanced technology and digital cockpits. A digital technology transition course could prepare new pilots for careers in many industry sectors and might also draw some experienced pilots that have been limited to analog cockpits. The ideal situation is to have a combination of hands-on training, practice equipment, and the time to practice to proficiency.

In some training situations, simply providing the aircraft on the ground for technology practice is very helpful. There are some large training providers and aircraft manufacturers that have added technology as a separate training segment. However, this has been mostly limited to some full-service training on the larger aircraft and a few factory courses.

Simulation Training Costs

Costs for simulator training vary, based on the type and function of the device and the customer’s requirements. Rates may be higher for more complex simulation scenarios; operators who buy a bulk training package of a large number of hours in a year may pay less. The cost for full courses depends on the type of aircraft and the complexity of the course.

The cost to rent or lease simulators also varies, depending on the type of simulator, its location, level of demand, and whether an instructor will be provided. Full-service training providers such as FlightSafety, Airbus, Bell, and Coptersafety offer either a full-course price or hourly rate for simulator training. This can range from $600 per hour for a Level 6 or Level 7 FTD to $2,000 per hour for a Level D simulator.
Delta Air Lines is offering opportunities for travel discounts for HAI HELI-EXPO 2019. Use Meeting Event Code NMRS6 for discounts on round-trip flights to and from Atlanta, February 24 – March 18, 2019.

**BOOK NOW!**

To find out if your Expo trip is eligible for discounts:
- Book your flight on delta.com and use meeting event code NMRS6 **OR**
- Call the Delta Meeting Network at 1.800.328.1111 Mon.–Fri., 7:30 AM–7:30 PM (CT) and refer to meeting event code NMRS6 (no service fee will be added to reservations booked and ticketed using the network)

Please note:
- Not all fares are eligible for a discount
- Discounts apply to round-trip travel only
- Not valid with other discounts, certificates, coupons, or promotional offers
- Fare rules determine eligibility

**It’s Worth More than the Credit**

Originally operators looked for simulators to replace only the training required by the regulators. Therefore, much attention was paid to the amount of training credit offered by the different levels of simulation. Generally, only training in Level D simulators offers flight-hour credit. Operators, flight schools, and pilots are now realizing that the true value of training with simulation is not in the amount of credit issued by a regulator but rather in the resulting gains in proficiency.

A decade ago, only a small group of helicopter pilots trained in simulators. Aircraft manufacturers now have realized that providing this training is now a fundamental part of maintaining their customer base. There are new training centers opening worldwide, and a wide range of helicopter simulator options available.

Whether choosing a new helicopter or training for a rating, one of the challenges is to locate the appropriate simulators or training centers. The key is to know what type of simulator and training program fits your goals, operational requirements, and your budget. The aircraft manufacturer is usually a good resource for this information; you can also check out the Simulation Training Resource Guide on p. 47.

There is no one-size-fits-all answer to simulator training. But there is an answer that will fit most operations and budgets—and, as the NTSB has stated, “Consistent, standardized simulator training will help prepare pilots for the unexpected and will decrease the risk of an accident.”

To get the most out of your investment in simulator training, develop specific goals for the training that match your operational challenges. Then research the most cost-effective means to meet those goals. There are many resources to help you get started in building an effective simulator training program—and eventually a safer flight operation.
2019 ROTOR Photo and Video Contest

This year’s winners showcase the best in helicopter media.

WHAT MAKES A GREAT HELICOPTER PHOTO? Take a look: we have five examples for you in our showcase of the photo winners of the 2019 ROTOR Photo and Video Contest. You can view our video winner at contest.rotor.org.

Thank you to all of the contest entrants—we appreciate each one of the photos and videos you shared with us. We received hundreds of entries this year, and these stood out above the rest.

Even if your photo doesn’t appear in this issue, you may see your entry in future issues of ROTOR or as the pick for Today’s Photo in ROTOR Daily, our e-newsletter (if you aren’t already receiving ROTOR Daily, you can subscribe free of charge at rotor.org/subscribe).

Whether you’re here to see some compelling photography or you wanted to check out the competition, we hope you will participate in next year’s ROTOR Photo Contest—the contest opens July 1, 2019, at contest.rotor.org.

– Jenna Scafuri
Assistant Editor, ROTOR Magazine

PS: The rules for the 2020 ROTOR Photo Contest are simple: every shot has to show all or part of a helicopter, and you have to own the photo. That’s it. Anyone can enter: HAI members, nonmembers, professional photographers, and amateurs.

Start submitting your favorite shots at contest.rotor.org beginning July 1, 2019!
Grand Prize

Tom Houquet
Limburg, Belgium

In the Photographer’s Words

The crew of a Portuguese Air Force Merlin EH-101 visited the Belgian Air Force Days air show at Kleine-Brogel Air Base, where it was one of the highlights at the static show. Normally based at Montijo, Portugal, the helicopter flies with the 751 Squadron where it performs search-and-rescue operations. The photograph was taken during an air-to-air photoshoot from the open ramp of a Short SC.7 Skyvan with a Canon 7D Mark II camera with a 24-105 mm lens.
Digitally Enhanced

Jim Gallop and Life Link III

Minneapolis, Minnesota, USA

In the Photographer’s Words

Life Link III’s mission is to provide safe and effective air medical transport. Taken at Anoka County–Blaine Airport with a Sony RX10 Mk IV, this photo features one of the 10 Leonardo AW119Kx helicopters in the company’s fleet.
People and Their Helicopters/Drones

Desiree Tyler Horton  
Irving Lake, California, USA

In the Photographer’s Words

My CAL FIRE Bell UH-1H Super Huey crew routinely flies into mountainous locations for wildland fire training. The crew keeps up their firefighting skills with hover stepping to hike from the helicopter into locations where the helicopter cannot always land. This photo was taken while we caught our breath after a training hike near Irvine Lake. The CAL FIRE Prado Helitack Crew consists of myself (the pilot), two captains, and five firefighters who are inserted into fires where I support them with water drops. The helicopter pictured is one of 12 UH-1H Super Hueys that CAL FIRE operates throughout California.
Helicopters at Work

Diana Rusli

East Java, Indonesia

In the Photographer’s Words

Shown shut down in the middle of the ocean while performing a mission for Husky Oil, this Bell 412EP belongs to PT National Utility Helicopters. The helicopter’s mission is for crew transport and medevac between their base and the rig, a distance of about 50 to 60 nautical miles. This photo was taken by a crewmember in another PT National Utility Helicopter flying above the rig.
For more than 40 years, defense forces have trusted Robertson for helicopter fuel systems with uncompromising safety performance. Today we are applying these same principles to the commercial helicopter market with the STC FAA & EASA approved Crash-Resistant Fuel Tank in partnership with StandardAero (formerly Vector Aerospace). FLY SAFER NOW.
Helicopters in the Military

Paolo Rollino
Bern, Switzerland

In the Photographer’s Words
At an altitude of 7,300 feet above sea level, spectators of the Swiss Air Force live-fire event at the Axalp Ebenfluh shooting range have a unique vantage point to view the air displays. In this photo, a Eurocopter AS 532 UL Cougar pilot executes a tight turn at maximum speed in front of the mountains, with some flares released to show a helicopter defense maneuver in tactical flying.

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Sergei Sikorsky: Born to Aviation

By Steve Hirsch

Equipped with the most famous name in helicopters, Sergei Sikorsky carved his own path in the industry.

With a background in aviation going back to his birth, Sergei Sikorsky’s career traces the development of helicopters and the global aviation industry, despite his almost being sidetracked into medicine.

Sergei, now 94, discussed his life and career in an interview with Martin J. Pociask, retired curator of Helicopter Foundation International. You can watch the entire interview online at rotor.org/trailblazers.

Family Footsteps
Sergei is the son of aviation and helicopter pioneer Igor Sikorsky, who designed the first viable helicopter in 1939, the Vought-Sikorsky VS-300. A talented aeronautical engineer, the Russian-born Igor also designed the world’s first successful four-engine airplane in 1913. Before the 1917 Russian Revolution, Igor had a company Sergei says “would today be the equivalent of combining maybe Boeing and Douglas.”

With Europe recovering from four years of war and Russia in turmoil, Igor fled to the United States in 1919, living “in a $12-a-month flophouse in Manhattan” and supporting himself by lecturing on mathematics and physics. But by 1923 he managed to form an aircraft company bearing his name.

Sergei was born in 1925 and, in his words, “fell in
love with aviation at a very early age.” He started building model planes around age six, and he recounts an early memory of the rollout of the legendary Pan Am clipper.

Sergei recalls flying in his father’s lap in the co-pilot seat of a Sikorsky S-38 Amphibian. Visits from some of the greats of early aviation were common in his childhood, including Charles Lindbergh (Sergei recalls playing with his children), Pan Am founder Juan Tripp, Pan Am’s first head of flight operations André Priester, aviation pioneer Roscoe Turner, World War I fighter ace Eddie Rickenbacker, and Jimmy Doolittle, the American aviator who led the development of instrument flight.

Learning the Ropes
In 1909, recognizing the limitations of the technology at the time, Igor abandoned his research on helicopters, concentrating instead on fixed-wing aircraft. Fortunately, he later revisited his research in vertical flight. Sergei recalls one afternoon in 1938 “when my father returned home from a critical meeting with the board of directors of United Aircraft and told us that his helicopter project had been approved.”

Visiting the United Aircraft factory in the late 1930s, Sergei became intrigued “by a small little helicopter that was taking shape in the corner of the seaplane hangar.” Sergei worked with Igor, including making small balsa helicopter models and sketches of future helicopters conducting various missions, for his father to show to engineers.

Sergei handled a number of jobs as the pioneering Sikorsky VS-300 came into service around 1940, including greasing the main rotor and tail rotor fittings. Bearings in main rotor hubs would shoot grease out, which did not bode well for the parade of visitors to the factory.

As Sergei remembers, “When we didn’t like somebody, we would always say, ‘You don’t have to go back too far. You could stand up pretty close—very moderate rotor downwash.’ And sometimes that person believed it, stood up fairly close when the helicopters took off, and got himself a grease bath. It was not very polite, but at that time we weren’t very polite.”

The Sikorskys warned those they liked to stand back at least 50 feet, he says.

Sergei stresses that his father was adamant about not being named the inventor of the helicopter.

“Whenever he was told that he was the father of the helicopter, my father would insist, ‘No, the father of the helicopter is Professor Henrich Focke who built the very first practical machine capable of flying 250 miles, capable of climbing to 11,000 and 12,000 feet of altitude and endurances of 2 ½ and 3½ hours.’” Igor, he says, “would grudgingly admit to the fact that he solved the challenge over the single main lifting rotor and a small anti-torque rotor, which he made with the VS-300.”

A Detour in Italy
Drafted in 1943, Sergei went into the Coast Guard Helicopter Development Unit, a joint US-British unit that trained the first US and British helicopter pilots and mechanics and developed the first helicopter rescue hoists, litters, baskets, and related piloting techniques. His unit was also involved in some early search-and-rescue missions. Such a rich background in the early development of helicopter operations gave Sergei a promising future in aviation.

But first, fate had a detour in store. Sergei wanted to go to college on the GI Bill after the war, but with colleges crowded with his fellow ex-US servicemen, the wait to matriculate was two or three years.

“Unexpectedly,” he says, “I received a letter from a squadron mate who was studying in Italy on the GI Bill. The schools were hungry for students paying in dollars;
the $72 subsistence monthly was adequate to live reasonably well in postwar Italy.”

He decided to “kill one or two years” in Italy where he studied art, art history, and architecture, ending up in an anatomy class being taught by the local hospital’s chief surgeon.

“I darn near changed professions and ... was seriously considering taking up surgery, becoming a surgeon in the academy and going through the training,” Sergei says. “I decided later on that it was not quite what I wanted to do.” He returned to the United States, having graduated from the University of Florence “with a smattering of German and French, and very fluent in Italian.”

“I have lots of wonderful memories of my time in Italy,” Sergei says, “such as flying surplus US Army Piper Cubs liberated by Italian flying clubs, the first generation of post-war Italian sport aircraft ... the Macchi, the Fiat, and the Piaggio designs. And last, but not least, the beautiful Italian models in art class.”

Aviation in a Postwar World
In 1952, Sergei returned to the United States and took a job with United Aircraft Export Corp., which sent him to post-war West Germany to support Pratt & Whitney/Hamilton Standard in Europe and establish links with the recovering German aviation and manufacturing industries. Because of the war, West Germany was barred from aviation at that time.

However, because of tensions with the Soviet Union, United Aircraft executives predicted—correctly, as it turns out—that West Germany would be allowed to join NATO and restart its aircraft industry. During this period, Sergei established links with Germans who went on to high positions in Lufthansa and the West German Defense Ministry.

His work also took him to Asia. With political issues threatening the new Mitsubishi license for the S-55/H-19 Chickasaw, he was reassigned to Japan, an assignment that grew to include Taiwan, Hong Kong, Macau, and the Philippines.

Sergei later returned to West Germany after France agreed to German rearmament and as Lufthansa was permitted to buy Convair 440 prop-driven airliners. Meanwhile, the West German army was creating an aviation branch, historic aircraft companies reemerged, and the country began to bring in US, French, and British aircraft.

“I was an office manager. My job was to monitor the well-being of a company of 21 H-34 helicopters being tested against an equal number of then Piasecki H-21 helicopters,” Sergei says. His reassignment to West Germany was lengthened “as the Sikorsky H-34 won against the H-21 and an additional 140 H-34s were procured.”

During his time in Germany, the West German government began funding a new type of helicopter, the Sikorsky S-64 Skycrane. “Not too many people know that the Skycrane program actually was funded by the German government and not by the US government,” Sergei says.

He eventually became involved in numerous marketing campaigns in Europe. “These included the NATO-wide heavy-lifter, which resulted in the S-64 Skycrane program, the German coproduction program of 112 CH-53 cargo helicopters to replace the H-34s, and smaller numbers of various CH-53 versions for Israel, Iran, and Austria,” Sergei says.

The world was changing, though, and in the late 1960s he began to visit the Soviet Union, where, he says, his father’s name
opened a lot of doors. “At the time, the Soviet Union began to show its aeronautical hardware at the Paris Air Show and Farnborough. I became in demand as an unofficial facilitator-translator,” Sergei says.

He recounts meeting the first man in space, Soviet cosmonaut Yuri Gagarin, who showed Sergei his space capsule and “gave me some of the scary stuff about reentry when he was looking at the window, and suddenly, whop, the outmost layer of glass just disappears in a flash and then the second layer disappears about 10 seconds later.

“And he was lucky the last three layers of glass held but were badly, badly heated in the process. He got down all right, but it was a very interesting interview on how you land a space capsule,” Sergei says.

He had no illusions about Russia, though.

“The day that I landed in Moscow, I knew that I was being followed. When I was in the hotel room, I knew that the phone was bugged and that probably there was a little camera somewhere photographing every single move that I made.”

After 24 years traveling “from Iceland to Iran, selling a few helicopters along the way,” Sergei returned to the United States in 1975, around the time the US Army announced that United Aircraft had won the Utility Tactical Transport Aircraft System contract for what would become the Sikorsky UH-60 Black Hawk helicopter.

Sergei recounts speculating with friends from the company at the time that they might get to build roughly 1,400 US Army Black Hawks and that the US Navy might pick the company for its next antisubmarine helicopter, with “a couple of hundred” orders from Europe and Asia. “So we were actually speculating that possibly, with a great deal of luck, we would build 1,800, maybe 2,000 Black Hawks,” he says.

Sergei says no one in that group could have predicted that more than 4,000 Black Hawks would have been built by now, operating in about 29 countries. He would not be surprised to see the company building the helicopter for at least another 25 years, for a total production of around 6,000.

“It’s a unique machine right now. And the interesting thing is that, of course, people are using the Black Hawk in missions that we—and certainly Dad—never expected or never thought about,” he says.
The Legacy Continues

By then the vice president for special projects, Sergei retired in 1992 from United Technologies Corporation (UTC; United Aircraft changed its name in 1975), but he is still a consultant with the company. UTC is now owned by Lockheed Martin, but the Sikorsky name is still on cutting-edge aircraft (see the story on the Sikorsky Defiant on p. 30).

Sergei has many souvenirs and experiences from his lifetime in aviation. “Believe it or not, I have a membership card from the American Helicopter Society dating to 1945, the first year when it was organized,” Sergei says. He is also an honorary lifetime member of HAI. Sergei has held US, Italian, Swiss, German, and French pilot’s licenses and has checked out on around 40 US and European aircraft.

Sergei was awarded the Enoch Thulin Bronze Medal from the Swedish Society for Aeronautics in 1963, the Institute of Navigation Medal from the Italian Institute of Navigation in 1965, and an honorary doctorate in aviation management from Embry-Riddle Aeronautical University in 1983. He was also named an honorary fellow of the American Helicopter Society in 1991 and received the Gruppo Agusta Fellowship Award in 1993, the Ukrainian Yaroslav the Wise medal in 2005, the Helicopter Association Medal from the Russian Helicopter Industry Association in 2012, the John J. Schneider Historical Award from the American Helicopter Society in 2012, and the Corporate Leadership Award from the Navy Helicopter Association in 2017.

Frequently asked about the best way to become a helicopter pilot or mechanic, Sergei recommends starting with military service: “With a bit of luck, you can be trained in a light single-engine helicopter, progress through your instrument rating, and eventually wind up as a highly qualified multi-engine, instrument-rated helicopter pilot. As a mechanic, you will be trained to service and overhaul some of the biggest, heaviest, and meanest helicopters in the business.”

Given his military record, it is not surprising that Sergei has a favorite service to recommend. “At the risk of being called prejudiced,” he says, “I would suggest you take a good look at the aviation career, either as pilot or aircrewman/mechanic, potentially available in the US Coast Guard…. Choose the career path you like, and work like hell!”

Sergei used his drawing skills to illustrate a variety of helicopter missions for his father’s engineers.
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GROWING UP IN WESTFIELD CENTER, Ohio, HFI scholar-ship winner Derek Galla was fortunate enough to live next door to a pilot for Continental Express. They forged a friendship playing flight simulator games together.

"My advice to others is to look into and experience the different career paths. See where you will be the happiest. ... You want to wake up every day excited to go to work."

Galla even had the opportunity to tour the training facility where his neighbor worked and to fly a full-motion Embraer ERJ145 flight simulator. This really sparked his interest in aviation and is ultimately what led Galla to pursue his private pilot license.

Once he obtained his pilot rating, Galla realized that although he was passionate about aviation, maintaining aircraft was his true calling: “I enjoy working with my hands and the challenge of troubleshooting.” He looked forward to seeing a helicopter that he worked on all day take off, knowing that his work helped make that happen.

Galla enrolled in the Aviation Maintenance Technology program at MIAT College of Technology in Canton, Michigan. To offset the expense of his training, he applied for and won an HFI Maintenance Technician Certificate Scholarship. He completed his training in October 2018.

With demand for aviation maintenance professionals at an all-time high, Galla is glad he pursued his A&P license. "My advice to others is to look into and experience the different career paths (pilot, mechanic, air traffic controller, airport management). See where you will be the happiest. Don’t just go with a high-paying career that you will be miserable in. You want to wake up every day excited to go to work."

Galla looks forward to continuing his training and obtaining his inspection authorization (IA) and nondestructive testing (NDT) certifications and training, as well as a bachelor’s degree. His ultimate goal is to attain a leadership role by becoming a director of maintenance.
Your current position?
I am a CFI at California Aviation Services in Riverside, California. I teach international and domestic students the majority of the time.

How did you decide helicopter aviation was the career for you?
From the moment I realized what a helicopter was capable of doing compared to a plane, I was hooked. I was fascinated by people who could fly with such effortless finesse. After my private pilot checkride, I knew I wanted to become a professional pilot.

What excites you about helicopter aviation?
I just love learning new skills and meeting new people. I especially love the times I get to fly with experienced pilots who have seen a few summers. I try and take in all the real-world advice they offer.

How did you get to where you are now?
A lot of hard work, humility, and inner motivation. You have to surround yourself with like-minded people who are going after their goals full force, even if their goals don’t involve aviation.

What are your career goals?
Right now I want to become the very best instructor possible. I really enjoy helping people learn and seeing the joy someone has when they master a new skill. I have a few huge career goals such as becoming a Robinson pilot, working for the fire department, and one day flying for Red Bull like Chuck Aaron.

What advice would you give to someone pursuing your career path?
I would say keep a humble attitude and be prepared to work hard. You have to look ahead into the future at the person you’re trying to become, and say to yourself, “What do I have to change now to become that version of myself?” Like Thomas Jefferson said, “If you want something you’ve never had, you must be willing to do something you’ve never done.”

What do you think is the biggest threat to the helicopter industry?
I think a lot of flight instructors are so focused on getting to the next level and building time that they lose empathy for their students and the quality of their instruction suffers.

Complete this sentence: I know I picked the right career when …
… I leave work with a sense of pride and satisfaction that can’t be found in anything else I’ve accomplished.
Rex Bishopp
Alaska Aviation Pioneer

Alaska Helicopter Pioneer Rex Bishopp, age 96, passed away at his home in Anchorage, Alaska, on November 1, 2018.

Born in Farson, Wyoming, on June 6, 1922, Rex lived on the family ranch until moving to California for college. He later worked for a cousin, helicopter pioneer Jim Ricklefs, who owned and operated Rick Helicopters of San Francisco. Every summer, Rex and Ricklefs would drive to Alaska with a truck carrying two helicopters for the summer flying season.

Rex moved to Alaska in 1967, when he and his wife, Ruth, purchased Alaska Helicopters from Ricklefs. The two had many exciting adventures as they ran the company as a team. In 1978, they merged Alaska Helicopters with Columbia Helicopters of Portland, Oregon, and sold the company when they retired in 1995.

Throughout his career, Rex actively promoted safety within the aviation industry. He was instrumental in creating the Alaska Air Carriers Association and served on its board for more than a decade. Rex received numerous honors for his leadership in aviation safety. He was inducted into the Alaska Aviation Pioneer Hall of Fame in 2013.

Rex was preceded in death by his beloved wife and partner, Ruth, in 1995. He is survived by his children, Laurie, Renee, Lynn, and Clint, as well as grandchildren and great-grandchildren.

In Rex’s memory, the family suggests donations to the Alaska Aviation Museum (www.alaskaairmuseum.org) or the Alaskan Aviation Safety Foundation (www.aasfonline.org).

Loran “Pat” Patterson
Past HAI Chairman and 25,000-Hour Pilot

Loran “Pat” Edward Patterson, longtime HAI member and past chairman, died at his home in Lucerne Valley, California, on December 4, 2018.

Pat was born on September 24, 1933, in Rome, Georgia. At age 16, he enlisted in the US Army, where he received many commendations for bravery, leadership, and acts of heroism during the Korean War.

Upon returning to the United States in 1955, he was accepted into the army’s helicopter pilot school. He earned his wings, was nicknamed “Pat the Pilot,” and discovered a passion for flying that launched his future career.

In 1968, Pat became one of the first helicopter pilots hired by the Los Angeles County Fire Department. During his time there, he completed search-and-rescue assignments, emergency response calls, and firefighting flights, among other missions.

Pat’s flying career spanned more than four decades, with more than 25,000 logged flight hours. During that period, he also worked for Vought Helicopters, Air Logistics, and Rocky Mountain Helicopters before starting his own company, Continental Helicopters. He was serving as chairman of the board of Helicopter Association of America when the organization became HAI in 1981.

Pat retired as general manager of Heavy Lift Helicopters in Apple Valley, California, in 2007. He is survived by his son, Scott; daughter, Alita Patterson Irigoyen; son-in-law, Ramon Irigoyen; seven grandchildren; and three great-grandchildren.
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IT’S TIME FOR A BETTER APPROACH.
The rotorcraft accidents and incidents listed below occurred between October 1, 2018, and December 31, 2018. All details were obtained through the official websites listed below, where you can learn more information about each mishap.

Australia – Australian Transport Safety Bureau (ATSB): bit.ly/ATSBpub

Britain – Air Accident Investigation Branch (AAIB): bit.ly/AAIBUK

Canada – Transportation Safety Board of Canada (TSBC): bit.ly/TSBCanada


United States – National Transportation Safety Board (NTSB): bit.ly/NTSBrep

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<td>AugustaWestland AW139</td>
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<td>No fatalities</td>
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<td>Robinson R22</td>
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<td>Enstrom F-28</td>
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<td>Robinson R22</td>
<td>Fulton, MO, USA</td>
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<td>NTSB CEN19FA009</td>
<td>1 fatality</td>
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<tr>
<td>Hughes 369D</td>
<td>Wanaka, OTA, New Zealand</td>
<td>10-18-2018</td>
<td>TAIC AO-2018-009</td>
<td>3 fatalities</td>
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<tr>
<td>Robinson R44</td>
<td>Salinas, CA, USA</td>
<td>10-06-2018</td>
<td>NTSB WPR19LA002</td>
<td>No injuries</td>
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<td>Robinson R44</td>
<td>Kaneohe, HI, USA</td>
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<td>Amateur-Built Aircraft</td>
<td>Hidden Valley, NT, Australia</td>
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<td>Augustawestland AW169</td>
<td>Leicester, LCE, United Kingdom</td>
<td>10-27-2018</td>
<td>AAIB Special Bulletin S1/2018 on Agusta AW169, G-VSKP</td>
<td>5 fatalities</td>
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<td>Bell OH-58A</td>
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<td>NTSB GAA19CA039</td>
<td>No fatalities</td>
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<td>Bell UH-1H</td>
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<td>NTSB WPR19WA015</td>
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<td>Rotorway Exec 162F</td>
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<td>10-27-2018</td>
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<td>Aerospatiale AS350</td>
<td>Odanah, WI, USA</td>
<td>10-29-2018</td>
<td>NTSB CEN19FA018</td>
<td>1 fatality</td>
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<td>Aerospatiale AS355 F2</td>
<td>Beekmantown, NY, USA</td>
<td>10-30-2018</td>
<td>NTSB ERA19FA035</td>
<td>2 injuries</td>
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### NOVEMBER 2018

**Bell 47G**  
Wichita Falls, TX, USA  
11-02-2018 | NTSB WPR19LA019  
2 injuries | Training flight  
After five autorotations in traffic pattern, the helicopter experienced loss of engine power during hydraulics-off autorotation. During attempted emergency landing, the aircraft impacted nearby power lines before colliding with terrain.

**Hughes 369**  
McDougal, AR, USA  
11-02-2018 | NTSB CEN19FA020  
2 injuries, 1 fatality | External load flight  
Helicopter impacted utility pole and collided with terrain during utility line operation.

**Robinson R44 Raven II**  
Buckinghamshire, BKM, United Kingdom  
11-02-2018 | AAIB investigation to Robinson R44 Raven II, G-FLYX  
2 injuries | Training flight  
Helicopter tilted to the right and rolled over during training flight.

**Bell 206**  
Uvalde, TX, USA  
11-04-2018 | NTSB CEN19FA024  
3 fatalities | Personal flight  
The helicopter collided with the side of a 1,450-ft hill during a late-night flight, 5 miles east of departure point.

**Bell 412**  
West Rockhampton, QLD, Australia  
11-05-2018 | ATSB 201808484  
No injuries | Air medical flight  
Helicopter drifting resulted in equipment on the strop colliding with fence.

**Eurocopter EC130**  
Batman Park Heliport, VIC, Australia  
11-10-2018 | ATSB 201808058  
No injuries | Air charter flight  
The helicopter struck a pigeon while landing.

**Robinson R44**  
Lihue, HI, USA  
11-10-2018 | NTSB GAA19CA066  
Injuries unknown, fatalities unknown | Type of flight unknown  
No summary provided.

**Guimbal Cabri**  
Newberg, OR, USA  
11-13-18 | NTSB GAA19CA056  
No fatalities | Type of flight unknown  
No summary provided.

**Bell OH-58C**  
Clanton, AL, USA  
11-16-18 | NTSB ERA19FA047  
2 fatalities | Positioning flight  
Helicopter flying low over a river struck power lines and subsequently collided with water.

**Robinson R44**  
Knox City, TX, USA  
11-18-2018 | NTSB GAA19CA063  
No fatalities | Type of flight unknown  
No summary provided.

**No helicopter model provided**  
Townsville, QLD, Australia  
11-20-2018 | ATSB 201808304  
No injuries | Military flight  
The helicopter struck a flying fox during hover.

**No helicopter model provided**  
Townsville, QLD, Australia  
11-20-2018 | ATSB 201808476  
No injuries | Military flight  
The helicopter struck a bat during hover.
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<td>Eurocopter EC120</td>
<td>La Romana, DO-12, Dominican Republic</td>
<td>11-22-2018</td>
<td>NTSB ERA19WA054</td>
<td>Helicopter collided with terrain 130 km ENE of Alice Springs Airport. The pilot was fatally injured, the passenger seriously injured, and the helicopter was destroyed.</td>
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<td>Robinson R22 Beta</td>
<td>North of Ruby Gap Nature Park, NT, Australia</td>
<td>11-24-2018</td>
<td>ATSB AO-2018-077</td>
<td>Helicopter collided with terrain 130 km ENE of Alice Springs Airport. The pilot was fatally injured, the passenger seriously injured, and the helicopter was destroyed.</td>
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<tr>
<td>Bell 407GX</td>
<td>West Bangkala, SN, Indonesia</td>
<td>11-28-2018</td>
<td>NTSB WPR19WA038</td>
<td>Helicopter sustained substantial damage while executing a precautionary landing.</td>
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<td>Unknown Sikorsky Model</td>
<td>Broome, WA, Australia</td>
<td>12-06-2018</td>
<td>ATSB 201808786</td>
<td>Evidence of bird-strike detected during post-flight inspection.</td>
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<td>Robinson R44</td>
<td>Wollongong, NSW, Australia</td>
<td>12-15-2018</td>
<td>ATSB 201808974</td>
<td>Engine lost partial power during initial climb. The helicopter steadily descended and landed at a helipad. Engineering inspection revealed #4 cylinder exhaust push rod was bent, and #1 and #4 exhaust valves were tight.</td>
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<td>Robinson R44</td>
<td>Millaroo, QLD, Australia</td>
<td>12-19-2018</td>
<td>ATSB 201809026</td>
<td>During aerial agricultural operations, the helicopter collided with terrain, resulting in substantial damage.</td>
</tr>
<tr>
<td>Robinson R22</td>
<td>Delamere Air Range, NT, Australia</td>
<td>12-31-2018</td>
<td>ATSB 201809132</td>
<td>Helicopter encountered strong gust of wind and collided with terrain.</td>
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Identifying Risks in Real Time

Don’t mistake bad vibrations for business as usual.

The distinction lies in whether the time frame for responding affords the luxury of, say, consulting a checklist.

In helicopters, many incidents fall into the second class: the pilot’s reaction must be both immediate and exactly correct to avoid bailing up the machine. Losses of main rotor rpm (especially in low-inertia systems) or tail rotor control can escalate beyond hope of recovery if those relatively brief sequences of memory items aren’t executed in order and without delay.

Ground resonance is another example. If a fully articulated rotor system becomes unbalanced, the resulting vibration can excite a sympathetic vibration in the airframe. If its frequency is close to the airframe’s natural harmonic frequency, the two vibrations amplify one another until the helicopter shakes itself to pieces. In one famous case in Utah's Grand Staircase–Escalante National Monument, the aircraft was essentially destroyed within four seconds of the vibration’s onset. The most common cause is a rough touchdown that knocks one blade out of phase with the others, but significant vibration from any cause can have the same effect.

The required response depends on the helicopter’s energy state. If the rotor is still at flying rpm, an immediate lift-off—adding power as necessary—allows the fuselage’s vibrations to dissipate while any out-of-phase blades realign themselves automatically. At low rpm, lowering collective and reducing power to idle may succeed in saving the aircraft. Between those extremes, catastrophic damage is likely, whatever the pilot does—one reason they’re trained to maintain full rotor speed until the helicopter is fully down, settled, and secure.

The Flight

Shortly before 10:00 a.m. on February 15, 2018, an Airbus AS350 B2 landed on the timber pad of a telecommunications tower at Bear Rock, three miles west-northwest of Tulita in Canada’s Northwest Territories. On board were the pilot and one passenger. Photographs taken shortly after the accident show that the pad was mostly clear, with patches of ice covering perhaps 20 percent of its surface.

The weather was seasonably cold at -27°C (-17°F). With no preheat available on site, the pilot initiated an engine run about 30 minutes after landing in accordance with the AS350 flight manual supplement, Instructions for Operations in Cold Weather. The pilot later acknowledged having noticed some vibration, which he described as “consistent with those felt over the previous three days, both on the ground and during flight.”

At 11:08 a.m. he began a second engine run. Start-up was normal, and the engine accelerated smoothly to 70 percent Ng (gas generator speed). However, when the pilot increased fuel flow to the flight position, the helicopter began to buck fore and aft on its skids.

The pilot reduced fuel flow in response,
only to have the bucking intensify, leading him to suspect ground resonance. He increased fuel flow but did not advance it fully or lock it into its flight gate before raising collective, and neither the engine nor main rotor rpm reached their flight-governing ranges before the helicopter lifted from the pad.

The helicopter yawed and drifted to its left as engine rpm spooled up while the main rotor rpm decayed. Two minutes after engine start, the ship descended into the hillside and tumbled down the slope. The pilot—who was wearing his four-point harness but no helmet—managed to extricate himself from the wreckage after the engine shut down. He walked back to the tower’s service building where his passenger administered first aid.

After the pilot reported the accident, a company helicopter dispatched from Fort Simpson arrived about 3:00 p.m. Both men were initially flown to Yellowknife. The pilot was wearing his four-point harness but no helmet—managed to extricate himself from the wreckage after the engine shut down. He walked back to the tower’s service building where his passenger administered first aid.

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The duress, however, makes it seem unlikely that inadequate damping was a factor.

Four days before the accident, in order to hangar the aircraft overnight, all three main rotor blades had been removed by a technician with the assistance of the same pilot. After they were reinstalled the following morning, the pilot did a ground run and noticed increased vibration.

Although vibration analysis equipment was available at the site, vibration levels were not measured, nor were blade tracking and balance assessed as required by the aircraft’s maintenance manual. Furthermore, the removal and reinstallation of the main rotor blades weren’t recorded in the journey log, contrary to Canadian Aviation Regulations. Investigators learned that the maintenance shop routinely removed and remounted blades without making the required logbook entries.

The vibrations continued throughout the six hours the pilot flew the helicopter during the intervening three days. “During this time,” according to the Transportation Safety Board of Canada’s (TSB) report, “no action was taken to verify or rectify the vibration and no aircraft journey log entries were made.” With no measurements having been recorded, the preaccident tracking and balance status of the rotor could not be determined.

Professional pilots—particularly those operating in remote locations and extreme environments—can develop a tolerance for apparently benign aircraft anomalies. But discrepancies as seemingly trivial as a burned-out indicator lamp can become the kind of emergency that requires quick recourse to memory items if the wrong thing happens at the wrong time.
systematically track those events. Recurrent training for company pilots also stressed the need to record any sudden changes in vibration levels. While the TSB’s report doesn’t state this explicitly, it’s hoped this training also reinforced the importance of investigating and resolving any sudden increases in vibrations before further intensification.

The Takeaway
Professional pilots—particularly those operating in remote locations and extreme environments—can develop a tolerance for apparently benign aircraft anomalies. But discrepancies as seemingly trivial as a burned-out indicator lamp can become the kind of emergency that requires quick recourse to memory items if the wrong thing happens at the wrong time. It’s up to the certificate holder to establish operating procedures, backstopped by applicable national regulations, that remove those decisions and the accompanying temptations from its pilots’ hands. But written procedures count for little if company culture doesn’t identify and call out violations.

Students and low-time pilots might be taken aback by the notion of flying a helicopter that’s had its main rotor blades remounted without first checking blade track and balance. The rotational momentum of all that mass spinning hundreds of times per minute would seem to raise the prospect that any imbalance would quickly build toward catastrophe. But in the field, the need to shelter aircraft from a bitter climate in limited hangar space made this an unremarkable practice—in part, no doubt, due to the lack of adverse consequences up to that time.

In this case, a highly experienced pilot noticed increased levels of vibration without apparently finding them alarming. Over the course of six hours flight in the harsh conditions of a Northwest Territories winter, they presumably did not worsen enough for his survival instincts to command a return to the maintenance hangar. But while pilot-in-command authority should always admit grounding an aircraft in the interest of safety, it’s the operator’s responsibility to identify risks that can’t be left to pilot discretion.

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Questioning Single-Engine Helicopter Performance

Let’s focus on what causes most accidents (hint: it’s not engine failures).

While the US helicopter industry enjoys relatively nonrestrictive single-engine regulations, the rest of the world is experiencing increasingly prescriptive standards and recommended practices issued by the International Civil Aviation Organization (ICAO) that are aimed directly at limiting the operation of single-engine helicopters.

ICAO’s reasoning: if an engine failure occurs at any time during the flight, a single-engine aircraft will be forced to land. Governments that participate in ICAO are offered two choices. Either (1) restrict the operation of single-engine aircraft over congested areas (ICAO defines these as any used for residential, commercial, or recreational purposes, which ends up eliminating a lot of land, particularly in densely populated countries) or (2) implement their own performance standards for helicopter operations (which the United States, among others, has done). The result is that single-engine aircraft are being regulated out of the civil fleet in many of the 192 nations that are ICAO members.

In fact, there is no justifiable reason to portray single-engine helicopters as being inherently more dangerous. Companies that work regularly in mountainous and high-terrain areas often use single-engine helicopters because of their superior performance under those conditions. And just like single-engine helicopters, those with twin engines have only one tail rotor, one main rotor gear box, one tail rotor gearbox, and one tail rotor drive shaft. The failure of any one of these critical components means that aircraft is going down—regardless of the number of engines.

The sad truth is that the majority of helicopter mishaps result from pilots making judgment errors, losing control of the aircraft, and flying perfectly good machines into terrain. According to the US Helicopter Safety Team, the top three types of helicopter mishaps (loss of control, unintended flight in instrument meteorological conditions, and low-altitude operations) accounted for more than 50 percent of the helicopter fatalities (104), more than the remaining 15 types combined (96).

Accident data from other ICAO-participating states support the safety of single-engine helicopters. The Australian Transportation Safety Board classified accidents over a five-year period as either mechanical or operational. Of the 749 accidents recorded during the period, just over a quarter (197) were attributed to mechanical problems. In other words, close to 75 percent of those accidents were not mechanical (that is, pilot error).

Japan, a country with a relatively small land mass and numerous mountains, is an ICAO-participating state that employs over 300 single-engine helicopters. According to Japanese aviation records, there are presently 814 registered helicopters operating in the country, with a ratio of 42.1 percent single-engine and 57.9 percent twin. Over the last 20 years, the numbers of single-engine helicopters have decreased, but the country still has many single-engine helicopters that regularly fly over Japanese airspace.

According to statistics obtained from its Transport Safety Board, Japan has not experienced a single accident or incident caused by an engine failure in the last 10 years. Once again, pilot error is the leading cause of accidents or incidents—in singles and twins. Although mechanical issues did contribute to mishaps, they were caused by detachment of the tail rotor (immune from the number of engines) and a fire in the cargo compartment.

These mishap statistics tell the same story as those from the United States: the clear majority of helicopter accidents are caused by pilot error, not by system malfunction. Wouldn’t our attention, time, and money be better spent on training pilots instead of banning single-engine helicopters?

Instead of focusing an inordinate amount of time, energy, and resources to paint single-engine helicopters as potential high-risk operations, ICAO and its member states should instead invest in improved pilot training, risk assessment and mitigation, and crew resource management.
EARLIER THIS YEAR, I WAS HAVING MAINTENANCE challenges with an aircraft. Sometimes everything was perfect and nothing amiss, but other times, something wasn’t right. The plane would be hard to start but then would run perfectly. Other times, it wouldn’t start at all.

I read maintenance manuals, troubleshooting charts, and online blogs. I spoke to tech support people. I checked p-leads, spark plugs, fuel delivery, and the electrical system. I changed the ignition switch and installed a new carburetor. But I didn’t get to the root of the problem until the last maneuver of a biennial flight review, when the engine quit and the proverbial light came on.

What I had been experiencing all along was an intermittent magneto problem—a dual magneto problem at that!

A dual magneto failure. What are the chances? I hadn’t thought it possible. Our machines are redundant in so many ways. The electrical system is designed to make a dual mag failure very unlikely.

Here are some clues as to how this happened: Both magnetos were installed new at the same time during an engine overhaul. Both had 950 hours on them. Although both magnetos should have had 500-hour inspections, that never happened. At each annual inspection, the timing was checked, along with all items spelled out in FAR Part 43, Appendix D. Ops normal.

For Part 91 operations, the FAA allows us to continue to fly our aircraft if they pass the Part 43 annual inspection. We do not have to abide by the criteria for manufacturers’ recommended inspection or recommended time before overhaul.

This usually works out because much has been done in the past five decades to improve the equipment we fly. The machining process is better. The lubricants we use are a lot better. Parts are precision machined and last longer than components of yesteryear.

Many owners and pilots continue to fly beyond the recommended time limits. Is that a problem? It could be. You must ask yourself: If I do not use the manufacturer’s limit, then what is the limit? How far beyond the inspection criteria is too far?

When you fly that component to failure, you will know exactly how far is too far. But when you reach that point, where will you be? On the ground at your local airport or helipad? Or in the air, perhaps far from a hospitable forced-landing site?

A few days ago, I was in a different aircraft, out of town on a short flight of about 35 minutes each way. On the way back, I experienced an alternator failure. Not as big of a deal as the dual magneto failure, but still I had to do some higher-level math to determine how soon I needed to get the electric landing gear down with available battery power. I was certainly grateful to have an engine monitor, an electrical system monitor, and a navigation system with time-to-go displayed.

With a little brain power, I calculated I could get back to base with no problem. I chose to slow down and lower the landing gear at 11.7 volts to allow some juice to spare for radios. It worked out nicely. The gear went down, and the radios, autopilot, and transponder continued to work with the battery power I had.

Upon landing, I went through the logbooks. The alternator had been in service for 20 years and one month, or 1,756 hours. Kudos to the company who assembled such a robust alternator, but it should have been replaced or overhauled well before that day.

We have the right and authority to fly our machines beyond manufacturers’ recommended limits if we do not fly for compensation or hire. But we need to be smart about it and not put ourselves in a position where we fly them to failure. If you fly a component beyond the manufacturers’ recommendations, fine. But then whose recommendations will you follow?

Fugere tutum!
DON’T LOOK NOW, BUT HAI HELI-EXPO 2019 is here. It’s hard to believe the year has gone by so fast.

As you make your plans for attending the show in Atlanta, think about attending some of the great sessions available in the 2019 Helicopter Foundation International (HFI) Rotor Safety Challenge (RSC), sponsored by MD Helicopters. These 60-plus education sessions cover everything from improving pilot proficiency to developing a safety management system to managing aircraft vibration. And they are free to all HAI HELI-EXPO® attendees and exhibitors.

Expressing honest opinions or thoughts, even if—especially if—they expose potentially hazardous conditions, is encouraged.

There are tracks for safety, pilots, operations, maintenance, and career development (you can see the complete schedule at rotor.org/takethechallenge). Which sessions will you attend? Well, what were some of the hot-button topics in your shop or office this past year? Is there an issue that created a lot of discussion? Use the 2019 RSC to get on top of some of these subjects.

The HFI Rotor Safety Challenge is an outstanding opportunity to network with folks who face the same operational issues that you do. Is keeping track of all the inspection and repair paperwork for your operation a pain? Of course it is! So why not attend the session on best practices in in maintenance recordkeeping (Tuesday, March 5, 9:15 a.m.) and learn how others are coping with it. Get a fresh perspective from the RSC presenter or other attendees. Follow up with the presenter to discuss a particular point.

At a RSC session, you may learn new techniques or operational advances for dealing with common issues. But whether you are an owner/operator, manager, line pilot, or maintenance technician, to really make a difference, you need to share what you’ve learned with your colleagues.

Consider organizing a lunch-and-learn at work around your takeaways from the 2019 Rotor Safety Challenge. A lunch-and-learn is an informal learning opportunity organized around lunch time. Some people “brown-bag” it; some offices order pizza for the group. Meanwhile, everybody gets together to learn something new.

Bringing together different groups to discuss current topics in aviation is one of the best features of lunch-and-leaves. Breaking down the silos that divide pilots, maintainers, managers, dispatchers, and office staff and learning more about each other’s challenges can go a long way to improving team functioning and operational efficiency.

Some people structure their lunch-and-leaves as a lecture. And if you are only concerned with providing everyone with the same information, such as when announcing a policy change, this is a good format. However, consider using more of an open forum format for your lunch-and-learn. Encourage discussion. Be open to hearing different opinions and interpretations of certain regulations. While compliance with aviation regulations is a must, our work in the cockpit, hangar, and flight line has a way of exposing the gray areas between regulatory certainties. A spirited discussion of these issues is a good sign—it means your folks are thinking about their work and are not complacent.

Listen carefully to what is being said at the lunch-and-learn. The beliefs and attitudes expressed can alert management to confusion about company policies and procedures as they relate to safety, pilot operations, or maintenance. Remember, in a just culture, the focus is on improving safety. Expressing honest opinions or thoughts, even if—especially if—they expose potentially hazardous conditions, is encouraged.

As a service to HAI members, most of the 2019 RSC sessions will be available online beginning in May. Login to rotor.org/academy, and you’ll have access to the slide presentation synced to an audio recording of the presentation. These online learning tools can be used to address a particular issue or as content for your next safety meeting.

The HFI Rotor Safety Challenge can be a resource for ongoing safety education throughout the year—even for those who don’t make it to HAI HELI-EXPO.
Take the HFI Rotor Safety Challenge!

Attend at least six Rotor Safety Challenge events and receive a certificate of recognition. FAA WINGS and AMT program credits are also available.
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Are We Training Pilots Right?

When what you’re doing isn’t working, change is required.

It is no secret that the helicopter industry is experiencing a shortage of qualified pilots. Pilot recruitment has become a “let’s make a deal” scenario, pitting employers against potential pilot employees.

How did the pilot employment market shift so strongly toward the job applicant? There are many factors driving this change.

Facing a similar pilot shortage, the airline industry has found helicopter pilots to be the low-hanging fruit they desperately need to fill their recruiting quotas. While bad news for helicopter operators, this opportunity was welcomed by many helicopter pilots, as the long-term benefits of an airline pilot career often outweigh those of a similarly experienced and tenured helicopter pilot. Predictable scheduling and the ability of a somewhat normal lifestyle with family and friends is often more attainable as a career airline pilot.

This leaves the helicopter industry in an extremely difficult position. We must change how we recruit, train, employ, and engage newly minted helicopter pilots.

Yes, change is hard. But we have no choice if we want different results. A popular definition of insanity is doing the same thing over and over but expecting different results, something we as an industry are guilty of.

The financial debt a civilian-trained individual will incur in pursuit of a helicopter pilot career is staggering. In many cases, helicopter pilot training programs cost in excess of $85,000 to $125,000, with the only litmus test to being qualified to receive training is your personal credit score. Do we want to attract the best and the brightest to the cockpit or the folks with the biggest wallets?

Helicopter operators must become more involved in shaping early pilot training. According to Federal Aviation Regulations, helicopter pilots with 500 hours total, 100 hours cross-country, and 25 of those flight hours at night can be pilot-in-command of a VFR helicopter operating under Part 135. However, this scenario is very rarely exercised. In fact, there’s no reason why that number of flight hours couldn’t be reduced from 500 to a more reasonable 300, based on the proficiency of the applicant and mission requirements.

Spoiler alert: it’s not the insurance industry imposing these limitations. It is often an operator’s clients who determine pilot flight-hour requirements. As an industry, we need to step in and create meaningful, relevant criteria for evaluating pilot experience and ability.

The FAA should reexamine its policies on simulation training and remove hour limitations that blindly favor actual aircraft flight hours versus simulated flight hours. Simulation, even on relatively inexpensive flight training devices, delivers excellent training opportunities that cannot be safely duplicated in an actual aircraft.

Operators need to evaluate pilot applicants based on their proficiency in flight and their ability to exercise positive aeronautical decision-making. Instead, we’re still using the same antiquated flight-hour metrics. These don’t tell the real story of a pilot’s qualifications and worse, they drive training costs to a level that many desirable pilot applicants just can’t afford.

Folks, a lot of the reasons limiting the pool of qualified helicopter pilots are coming from inside the house! It’s not the airlines, technology, or even those often-blamed millennials. Our inability to change—or disinterest in changing—the way we train and mentor our pilots is the single most detrimental issue standing in the way of a helicopter industry that will be viable for years to come.
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