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MARCH 2023

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ON THE COVER: It's nearly here! Leonardo appears almost ready to complete its 20-year pursuit of FAA certification for the world's first certificated civil tiltrotor, the AW609. (Leonardo Helicopters US Photo)

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Got something to say to the international helicopter industry? We're listening. Email story ideas, manuscripts, or questions to letters@rotor.org. Visit rotor.org/write for more information.

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Jaasmin Foote joined HAI as the association's social media manager in March 2020, just a week before the COVID-19 pandemic lockdown. She holds a

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Aaron Karp has been an aviation journalist for more than 20 years. Based in Rockville, Maryland, he has served as editor in chief of *Aviation Daily* and managing

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David Jack Kenny is a fixed-wing ATP with commercial privileges for helicopter. He also holds degrees in statistics. From 2008 through 2017, he worked for

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Gina Kvitkovich joined HAI as director of publications and media in 2011 after decades of honing her skills in writing, editing, and publishing. As editor of ROTOR,

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An award-winning journalist, James T. McKenna has covered airlines, military aviation, spaceflight, and helicopters for *Aviation Week*. Twice editor in

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Jayne Wood joined HAI as assistant director of publications and media in November 2022, returning to the part of

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Chris is a broker with Pik West Insurance Agency and executive director of the Tour Operators Program of Safety (TOPS). He has 30 years of aviation and

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By Jeff Smith



Jeff Smith is the chief pilot for R.O.P. Aviation in Teterboro, New Jersey, and the 2022–23 chair of the HAI Board of Directors. A former US Army aviator, he is a dual-rated pilot with more than 11,500 flight hours. Jeff is an active industry volunteer and advocate who has worked on noise, safety, and airspace issues in the New York City area as a member of the Eastern Region Helicopter Council.

What You Can Expect in Atlanta

Take advantage of all Expo offers to connect and grow.

HELLO FROM ATLANTA, AND WELCOME TO HAI HELI-EXPO 2023!

As 2022–23 chair of the HAI Board of Directors, I've been fascinated to watch the world's largest vertical aviation conference and trade show come together. Charlotte Zilke, who as HAI senior director of membership and conventions leads Expo development and operations, and the HAI staff, exhibitors, vendors, and our host city of Atlanta, Georgia, have done a remarkable job of creating experiences and value for the vertical aviation industry.

I hope to see you at Monday night's welcome reception that will kick off HAI HELI-EXPO 2023. This year's event will be held at the impressive Georgia Aquarium, and the entire place will be exclusively ours. If you see me or any of my fellow board members, please stop and say hello. We would love to talk with you!

The Expo show floor is always a huge draw. Our industry runs on innovation, and like you, I can't wait to see all the cool stuff our 600-plus exhibitors will bring to Atlanta. And be sure to spend time in the Rotor Safety Zone (Booth #B3555). Chris Hill, HAI senior director of safety, keeps upping the ante each year to provide you with an array of safety resources, best practices, and tips you can use when you're back on the job. This year's Zone also offers you an opportunity to compete with other "heli-experts" in a trivia game to test your aviation and safety knowledge and win prizes. Set a personal goal to go home with at least one takeaway that will elevate your operational safety.

I also want to ask you to become more engaged with your industry by attending HAI working group meetings. Composed of HAI members just like you, our working groups volunteer their time to address our industry's challenges. Some working groups concentrate on sector issues, such as tours and air medicine. Others address activities common to all aviators, such as safety and flight operations.

This year, we'll see two new HAI working groups: one looking at how our industry attracts and retains our workforce, and the other examining the exploding costs of aviation insurance. Are these issues problems for you, as well? Then as an HAI member, you have the chance to help create their solutions! All working group meetings are listed in your HAI HELI-EXPO 2023 Program & Exhibit Guide, in the HAI Events app, and online at rotor.org/wg.

This year's Expo will begin the yearlong observation of the 75th anniversary of HAI's founding on Dec. 13, 1948, and the HAI Board of Directors and staff are committed to making 2023 a year to remember. The board's Strategic Industry Plan Committee, led by Treasurer Nicole Battjes, has been working tirelessly to enable HAI to expand its leadership of the vertical aviation industry. The committee has completed a three-year strategic plan (see "Defining the Future of Vertical Aviation," p. 38) and is now leading a rebrand of the association. I know you're busy, but we appreciate each one of you who responds to a survey or provides feedback. The HAI Board and staff take very seriously their responsibility to provide you with the finest in events and services, and your comments are extremely valuable.

Now, that's enough of the preflight briefing—let's buckle in and enjoy the ride! 🚁

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By James A. Viola

New Benefits for HAI Members

Providing value for members is essential to our mission.



James A. Viola is HAI's president and CEO. After a career as a US Army aviator, he joined the FAA, where he served as director of the Office of General Aviation Safety Assurance before joining HAI. A dual-rated pilot, James holds ATP ratings in both airplanes and helicopters and is a CFII. James can be contacted at president@rotor.org.

AS A MEMBERSHIP ASSOCIATION, HAI collects dues each year from the vertical aviation operators, manufacturers, vendors and suppliers, pilots, aviation mechanics/engineers, and industry professionals who have chosen to join the organization. Our members have the option to spend that money in many places, and HAI recognizes our responsibility to ensure that they see the value of their investment in us.

Since I assumed the leadership of HAI's professional staff in 2020, I have been working to grow the value of your membership. A key way to do that is our ongoing expansion of your HAI member benefits, seven of which we are introducing at HAI HELI-EXPO 2023. These programs are either new or significantly upgraded to better meet the needs of our members.

Flight Training and Checking Program. Created in partnership with Helicopter Institute, the HAI Flight Training and Checking Program keeps your rotors turning by managing any part or all of your aircrew's training, testing, qualification, certification, and compliance needs. Think of it as a fast pass through all things training and checking.

Legal Services. Even the best of us may find ourselves on the wrong side of an enforcement action. HAI's new Legal Services portal provides our members with articles, webinars, and downloadable guides. HAI is also assembling an easy-to-use, searchable directory of legal service providers with experience in aviation law.

Loss of License Insurance for Pilots. Losing your medical could mean losing your livelihood. Our partnership with Lockton Affinity gives HAI member pilots a way to protect themselves.


HAI Online Academy. Look for an exciting expansion of our education offerings. We are not only bringing in new courses from leading industry partners, but our new portal provides an easy-to-navigate environment for your professional development.

King Schools Discounts and Scholarship. John and Martha King are probably the best-known instructors in aviation, and they are strengthening their partnership with HAI. Our members will get a discount for their courses, AND one lucky member of our working groups will each year have the opportunity to win a lifetime scholarship to the Kings' courses.

Purdue University Online Education Discount. Through a partnership with HAI, Purdue University Global offers HAI members and their immediate families a tuition discount of up to 20% on more than 100 programs, including aviation, business, public safety, technology, legal studies, health sciences, and many others. For ultimate flexibility, all courses are 100% online.

SMS Coaching and Assessment. HAI has partnered with WYVERN to provide an easy-start process for members implementing safety management systems (SMSs). Check for potential costly threats in minutes, not months, and resolve them with help from your SMS coach.

No matter what your industry role is—business owner or employee, individual or family member—HAI has benefit programs that will help you grow and prosper. If you have not done so in a while, visit rotor.org/benefit, where you will always find an up-to-date list of HAI member benefits, including our health insurance solutions for individuals, families, and businesses.

Providing our members with value is our mission and my commitment to you. I would love to hear your thoughts on this or any aspect of being an HAI member; please email me at president@rotor.org. 

A handwritten signature in blue ink, appearing to read 'J. Viola', written over a light blue horizontal line.



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FAA Reauthorization Underway

Safety, maintaining US leadership in aviation are priorities as Congress works toward developing a final bill.

HAI HAS BEEN DISCUSSING THIS ISSUE since 2018 and now, it is finally here: the FAA reauthorization bill. This is the perfect year to advocate for vertical aviation to ensure that the policy written moves our industry forward. If you're a self-proclaimed policy geek and an aviation enthusiast, this topic is for you.

A Complex Process

The FAA reauthorization process is essentially what it sounds like: Congress providing the FAA the authority to function, which expires at the end of September. The process is relatively straightforward, with the House and Senate developing their own versions of the bill and resolving their differences, after which Congress takes a vote and the president signs the bill into law.

While it may sound simple, passage of the reauthorization bill is much more complex than it might appear.

House of Representatives Transportation and Infrastructure (T&I) Committee chair Sam Graves (R-Mo.-06) says his goal is to craft the reauthorization bill by Jul. 1. Meanwhile, Aviation Subcommittee chair Garret Graves (R-La.-06) is leading the subcommittee's work on the multiple hearings the com-

mittee is planning to hold to discuss a wide range of policy issues.

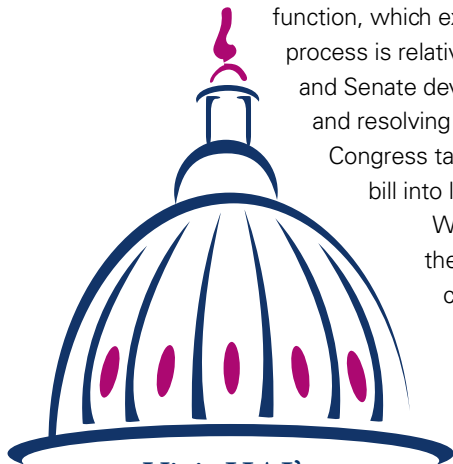
Now that the committee leadership has been established, the T&I Committee has formally commenced its work on the FAA's reauthorization bill by holding its first hearing. During the hearing's opening remarks, Chair Sam Graves emphasized that the committee continues to have a bipartisan commitment toward safety and that its members intend to maintain US leadership as the gold standard for aviation safety.

Graves also said during the hearing that general aviation is the safest it's ever been, crediting Congress and the FAA's partnership with industry, labor, and the traveling public with continuing efforts to make air travel safe and efficient. However, Graves referred to recent incidents that reemphasize why getting an FAA reauthorization done on time is critical, commenting that "these incidents show that even after the safest decade in our history, our aviation system clearly needs urgent attention. The FAA needs to mitigate risks before accidents happen. The committee will be reviewing all such recommendations while reauthorizing the NTSB [National Transportation Safety Board] as part of the FAA bill."

Rep. Garret Graves conveyed similar concerns, remarking that despite safety improvements, "alarm bells should be going off across the aviation industry." He noted that the nation's aviation system is stretched and stressed to capacity, and that demand is projected to increase. Therefore, Congress and the FAA need to be proactive about meeting growing demands, he noted, because there are fundamental transformations on the horizon for the National Airspace System (NAS), including more drones, electric aircraft (including eVTOL), the reintroduction of civil supersonic aircraft, and the expanded use of commercial space transportation vehicles. Thus, he added, the FAA must maintain the nation's outstanding record on aviation safety while also facilitating innovative technologies and entrants into the market.

Bipartisanship Approach

Ranking Member Rick Larsen (D-Wash.-02) of the full committee and Ranking Member Steve Cohen (D-Tenn.-09) of the subcommittee are working closely with the majority to ensure that the committee takes a bipartisan approach to the reauthorization process. Even the meetings HAI has had with congressional staff to discuss our priorities for the bill have been joint meetings, with both the majority and minority members. Furthermore, the committee has announced its intention



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Legislative Action Center
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to include a general aviation section in the bill.

On the Senate side, the Senate Committee on Commerce, Science, and Transportation has jurisdiction, and Chair Maria Cantwell (D-Wash.) has directed the committee full steam into FAA reauthorization hearings. Sen. Tammy Duckworth (D-Ill.) is the chair of the Senate Subcommittee on Aviation Safety, Operations, and Innovation, with Sen. Jerry Moran (R-Kans.) serving as ranking member.

The Senate Commerce Committee started its work with the hearing “Strengthening Airline Operations and Consumer Protections,” followed by another hearing titled “The Federal Aviation Administration’s NOTAM System Failure and Its Impacts on a Resilient National Airspace.” In the latter hearing, FAA Acting Administrator Billy Nolen detailed the failure of the agency’s computerized NOTAM system that led to a ground stop of flight departures in January 2023.

Chair Cantwell said the FAA “needs to get it right on modernizing its technology and infrastructure.” She added, “For the United States to be the leader in aviation, we must set the global standard for aviation safety.” Subcommittee Chair Duckworth submitted questions to the FAA inquiring how the agency and the Federal Communications Commission are cooperating to prevent a future problem with 5G.

For his part in the hearing, Ranking Member Ted Cruz (R-Texas) said the committee “is going to examine the FAA’s record on questions of safety [and] on the failure of the NOTAM system that resulted in thousands of flights being canceled, and I also expect it’s going to highlight the very real consequences for air travel and safety of being more than two years into an administration without a confirmed FAA administrator.”

HAI’s Work in Advocating for Members’ Interests


Clearly, safety and preserving the FAA as the gold standard are a priority for both the House and the Senate. HAI is working with the committees in both chambers to

advocate for our members’ priorities in the large reauthorization bill. HAI submitted written testimony for the initial House hearing, providing our stance on the most pressing safety issues facing the vertical aviation industry today, including leadership, FAA preemption authority, infrastructure, technology, UAS (uncrewed aircraft system) beyond-visual-line-of-sight (BVLOS) operations, performance-based requirements, and airspace access, as well as spectrum policy, workforce development, a commitment to safety, and the role of the National Parks Overflights Advisory Group in the development of air tour management plans (ATMPs).

Congress must pass the reauthorization bill by the end of September. In order to do so, the committees involved will hold multiple hearings to discuss a wide range of issues. The chairs of both committees will produce their separate versions of a base bill. As that base bill then moves forward through the committee process, other

members will submit amendments in an attempt to get their priority items attached to the overall bill.

Once the House and Senate have each settled on its version of the reauthorization bill, the chambers then need to work together to merge the two different versions into one. This is typically done through conference, where staff determine where agreement exists on priorities and generate one version of the bill that both the House and the Senate can approve. It’s an intensive process, requiring long staff hours to shepherd the bill to the finish line.

If Congress can’t submit a final reauthorization bill by the end of September, it will be forced to pass an extension, which puts the agency essentially on status quo until Congress can pass the bill. Both Senate committee chair Cantwell and House committee chair Graves have set aggressive schedules for the completion of the legislative work, and both leaders have publicly stated their commitment to wrapping up the bill this year. HAI will continue to work with the committees throughout this process to ensure that the voice of the vertical aviation industry is represented and heard. 

HAI Members

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HAI BRIEFS

Communications U Returns to HAI HELI-EXPO®

SMALL BUSINESSES ARE THE BACKBONE of aviation. Large, corporate manufacturers often receive the most media exposure, but it's the hundreds of small manufacturers and suppliers that often provide the parts or components allowing the big businesses to thrive.

HAI salutes our small-business members, and we want to help you be noticed or heard for your positive efforts—and protected in the case of adverse situations.

For the second consecutive year, at HAI HELI-EXPO 2023, we'll present four short courses, taught by HAI subject matter experts, to assist small businesses in their marketing

and communication efforts. The courses at HAI HELI-EXPO 2023 Communications University—or Comms U, for short—will



HAI's social media manager, Jaasmin Foote, shares her expertise with attendees at last year's Comms U. (HAI/f-stop Photography)

take place Thursday, Mar. 9, in the HAI News Conference Room (B207) at the Georgia World Congress Center in Atlanta, Georgia, site of this year's Expo. The 45-minute courses, free to registered HAI HELI-EXPO 2023 attendees, will start on the hour and run consecutively beginning at 8 am.

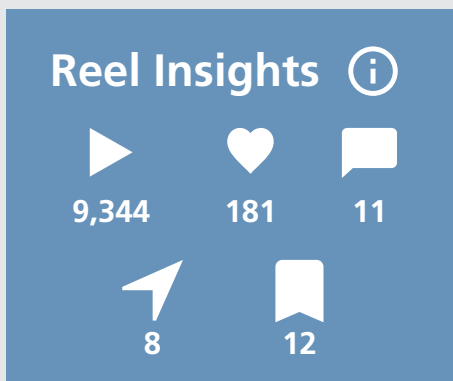
Advance registration for the courses is not required. Class size is limited to about 80 people, however, so attendance will be first come, first served.

This year's courses are:

■ Digital Marketing and Campaigns for Vertical Aviation

Instructor: Katerina Bedoya, HAI Director of Marketing

8:00 am – 8:45 am ➤



Do you like dad jokes? It seems our Instagram audience does, as this humorous video with HAI influencer, USCG rescue swimmer, and podcaster Jason Quinn racked up almost 9,400 views. Here, Jason playfully reminds HAI HELI-EXPO fans of the early-bird discount for show registration while telling his daughter Haleigh about the importance of saving money.

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- ■ **Social Media 101**
Instructor: Jaasmin Foote, HAI Social Media Manager
9:00 am – 9:45 am
- **Crisis Communications: What to Say (and Not Say) after the Accident**
Instructor: Dan Sweet, HAI Director of Public Relations and Communications
10:00 am – 10:45 am
- **Communicating Your Value to Elected Officials**
Instructor: John Shea, HAI Director of Government Affairs
11:00 am – 11:45 am
For more information on Comms U, visit heliexpo.com.



REVISIT
last year's
Expo Fly-In/
Fly-Out in
Dallas, Texas

HAI BRIEFS

HAI HELI-EXPO 2023 Fly-In/ Fly-Out: A Dream Event for Aviation Lovers

IT'S PROBABLY THE COOLEST annual air show to occur in a space just a bit smaller than a city block. And this year's event takes place during HAI HELI-EXPO 2023, Mar. 6–9 (exhibits open Mar. 7–9) at the Georgia World Congress Center (GWCC) in Atlanta, Georgia.

During the 2023 Fly-In/Fly-Out, dozens of helicopters will arrive at the GWCC immediately before the show opens and depart soon after it closes. The event is a dream for aviation photographers and helicopter aficionados who gather at a safe distance, and it's the exciting result of significant amounts of work.

Planning and coordination efforts for HAI HELI-EXPO flight operations begin months in advance, with the HAI staff working closely with representatives from the local Flight Standards District Office (FSDO), convention center staff, and even local emergency services agencies. The overarching goal is always to establish appropriate routes and procedures that ensure safe flight operations both into and out of the Expo convention center.

In most cases, the vertiport is a parking lot or truck staging area. Representatives from each organization and other stakeholders conduct inspections to ensure the vertiport is safe to land the smallest and largest rotorcraft. Lighting systems may require temporary modifications, and shrubs or trees may need pruning. The space is also cleaned of FOD (foreign object debris) and other trash. One of the final steps is applying the giant "H" to indicate the center of the landing area.

HAI also works with representatives from a fixed-base operator (FBO) at a nearby airport for the fly-in/ ➤

HAI's director of flight operations and maintenance, Zac Noble, provides landing directions using standard arm signals at the HAI HELI-EXPO 2022 Fly-In/Fly-Out in Dallas, Texas. (HAI/f-stop Photography)





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► fly-out. Since the landing area is comparatively small, aircraft arriving at and departing from the show usually stage from a local airport. The team from HAI also arranges for tow vehicles and cranes to assist in removing rotor blades from and replacing them on large aircraft that might not otherwise fit through convention-center doors. If required, HAI also secures the services of a portable control tower and flight manager.

Safety is always paramount during the fly-in/fly-out, so mandatory pilot briefings are held each arrival day. Only pilots who have attended the briefing are permitted to fly an aircraft to the site, and no passengers aside from essential crew are permitted on board.

As show floor-ready aircraft arrive, the pilot makes radio contact with the landing zone coordinator, HAI's director of flight operations and maintenance, Zac Noble. Zac provides updated wind and landing conditions, then provides final landing directions through standard arm signals.

Once an aircraft lands, crews quickly secure it, prepare it for towing, and move it out of the landing area. Depending on a

variety of conditions, aircraft land about every 10 to 15 minutes, providing a true air show experience.

HAI BRIEFS

HAI Rotor Safety Zone, HAI Connect Join Forces at Expo

COME MEET THE INDUSTRY'S most dedicated safety professionals in the HAI Rotor Safety Zone at HAI HELI-EXPO 2023, Mar. 6–9 (exhibits open Mar. 7–9) in Atlanta, Georgia, at the Georgia World Congress Center. This year, the HAI Rotor Safety Zone is sponsored by WYVERN Ltd., a provider of aviation safety services and one of the industry partners in HAI's SMS Software Support Program. The expanded Rotor Safety Zone and HAI Connect will join together to offer attendees a wealth of information, resources, and networking opportunities and even more space than previously to relax, network, and learn.

Here are just some of the things you can expect in the Zone this year:

- The US Coast Guard's Aviation Training Center will show off its newest variant,

the Airbus MH-65E Dolphin multimission helicopter. Learn how the USCG routinely trains and sustains peak mission and safety performance in some of the world's most demanding and high-risk environments.

- Back by popular demand, virtual-reality simulators are again ready and waiting to challenge your piloting and aeronautical decision-making skills in various environments.
- Win awesome prizes playing our inaugural HAI HELI-EXPO® Expert Trivia games. Come show off your vertical aviation knowledge! Prizes are valued from \$25 to \$50, with chances to win even more!
- This year, we have a full lineup of presentations and entertainment onstage at HAI Connect. Informative training, big announcements, lively debates, and happy hours!
- Want to elevate safety in your operation? Come chat with our safety-industry partners and exhibitors in and around the HAI Rotor Safety Zone. Each offers an array of proven safety resources, tools, and information that can help you take your safety and operational performance to the next level. Our safety stakeholders and partners in the Zone include:
 - Air Charter Safety Foundation
 - FAA Weather Cameras
 - FAA Rotorcraft Safety Research Program
 - FAA Wildlife Strike Database
 - HAI Safety Working Group
 - International Business Aviation Council
 - Precision Flight Controls Inc.
 - Truth Data Insights LLC
 - USCG Aviation Training Center
 - US Helicopter Safety Team (USHST)
 - Vertical Aviation Safety Team (VAST).
- Adjacent safety stakeholders and partners near the HAI Rotor Safety Zone:
 - AeroDirections LLC (Booth #B4460)
 - Baldwin Safety & Compliance (Booth #B4461)
 - WYVERN Ltd. (Booth #B4560). [🌐](#)



A would-be pilot tests his skills on a virtual-reality simulator in the Rotor Safety Zone at last year's Expo. The popular feature will be back by popular demand at HAI HELI-EXPO 2023 in Atlanta, Georgia. (HAI/f-stop Photography)

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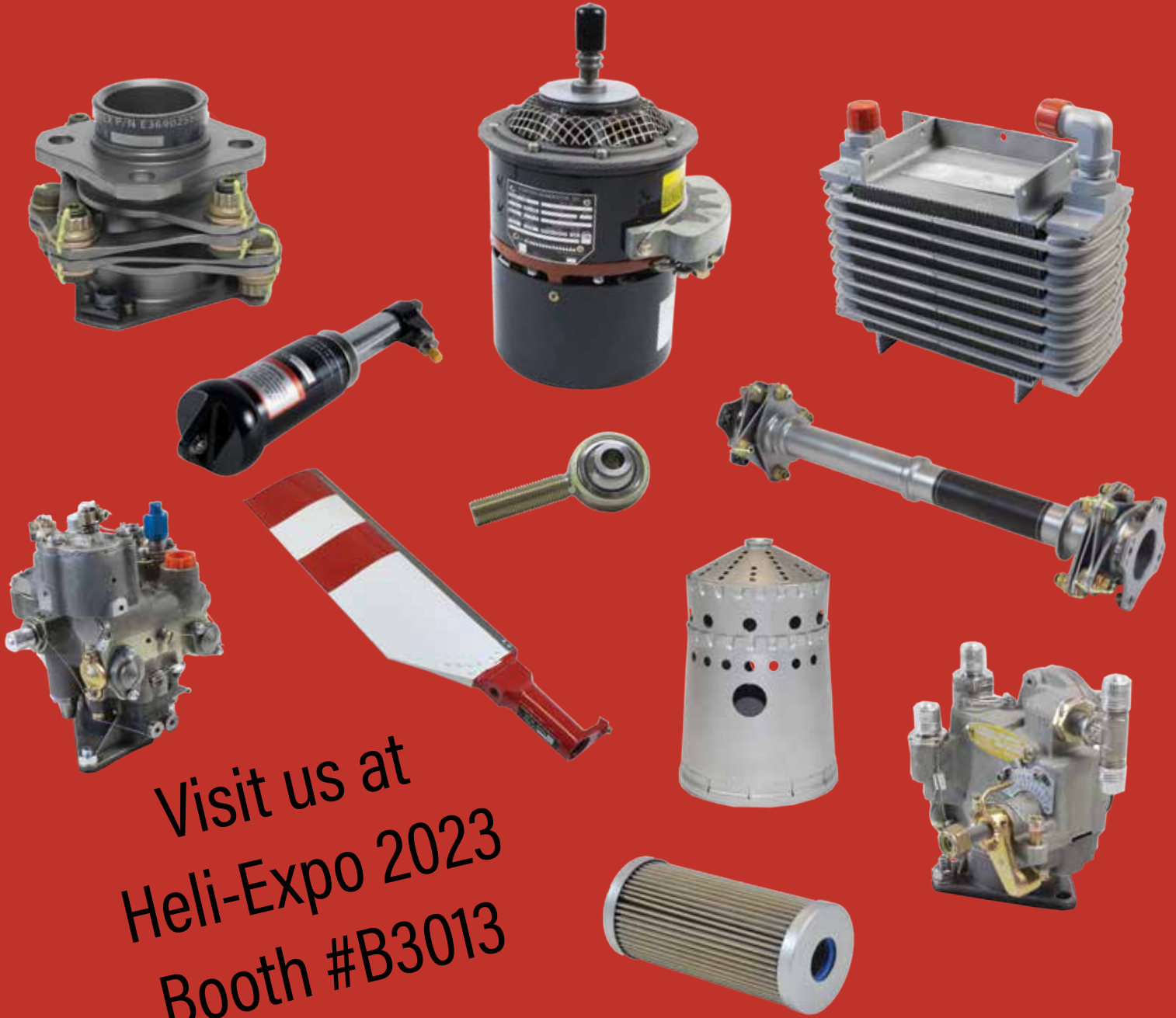
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By Christine A. DeJoy

How to Nail the Job Interview

Industry recruiters reveal their tips on what to do—and not do—when seeking employment.

READY FOR THAT BIG JOB INTERVIEW?

Looking to make contacts in your dream career? Before you meet with a potential future employer or begin to network in a field of interest, consider the advice of a few recruiting experts.

Several human resources professionals who've interviewed a multitude of aviation job applicants share the following pointers to help you become the best candidate you can be.

1 DO research the job and the company. Doing your homework about an organization you're interested in is a no-brainer. "Researching the company will help you come to an interview prepared to address [the company's] needs and ask informed questions," says Teresa Strangie, chief HR officer for Boston MedFlight. To find recent news about an organization, visit its website and social media pages, check out industry publications, or simply talk to friends or other contacts in your network, she adds.

2 DON'T ask just surface questions. In your first interview with a company, leave the questions with obvious answers for last. "Employers expect you to ask about compensation, paid time off, and health care," says Susan Kim, general manager at Rainbow Helicopters. "It's always a pleasant surprise when a candidate implements some critical thinking and asks an uncommon, albeit great, question." Kim cites the time an applicant asked, "What are the most challenging aspects of this position?" as an example of a solid, probing question that made the candidate memorable.



3 DO practice good etiquette. Manners matter! "Be confident, humble, and polite when answering questions or speaking," advises Jaclyn Roach, manager, staffing and compensation, for MD Helicopters. "Don't forget about nonverbal communication, too: Are you leaning in? Looking at your feet? Be aware." Silence your phone and don't put it on the table or look to see who's texting or calling during the interview, adds Felicia Naquin, senior HR business partner at Bristow Group.

4 DON'T appear arrogant. Avoid being boastful when speaking about your accomplishments. "It's one thing to share examples of the experiences you've had that were challenging. It's another to boast about how you flew in a difficult situation, when a team is part of the flight," says Laurie Church, HR generalist, aviation operations, with

Life Link III. "Teamwork is essential in [the air ambulance sector]. Collaborating to achieve the best outcome for the patient is No. 1." Indeed, adds Austin Roth, president of SkyBridge, "Everyone who will look at hiring you will want to know you can work as part of a team." On the other hand ...

5 ... DO talk positively about yourself. "Be proud of your accomplishments no matter how big or small they are," advises Miranda Colosimo, people operations manager at Erickson. Your achievements can set you apart.

If you're attending HAI HELI-EXPO 2023 in Atlanta, Mar. 6–9 (exhibits are open Mar. 7–9), don't miss the HAI Helicopter Industry Career Fair, Tuesday, Mar. 7, from 10:30 am to 5:00 pm, in the Thomas Murphy Ballroom, Georgia World Congress Center, Building B, Level 5. More than 25 recruiters from a variety of aviation organizations will be there, and admission is free!

Explore our rotorcraft solutions to support your missions at HAI Heli-Expo 2023

Booth #B-5504

Learn more about Bell's presence at HAI Heli-Expo at bell.co/HeliExpo



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By Jen Boyer

Tammy Duckworth, Helicopter Pilot, US Army Veteran, and US Senator

Her perseverance turned tragedy into powerful advocacy, paving the way for a successful career in public service.

US SEN. TAMMY DUCKWORTH (D-Ill.) was among the first handful of army women to fly combat missions during Operation Iraqi Freedom (2003–2011). In 2004, she was deployed as a Black Hawk helicopter pilot with the Illinois Army National Guard. Her aircraft was hit by a rocket-propelled grenade (RPG) on Nov. 12 of that year, causing her to lose her legs and partial use of her right arm. The experience led Duckworth to become an advocate for veterans.

After her yearlong recovery, Duckworth

served as director of the Illinois Department of Veterans' Affairs, as assistant secretary of the US Department of Veterans Affairs, and two terms in the US House of Representatives before being elected to the US Senate in 2016.

ROTOR: Please share with us your helicopter experience.

Duckworth: I'm an instrument-rated commercial rotorcraft pilot with an airplane private pilot license. I earned my commercial instrument rotorcraft ratings at the army



flight school in Fort Rucker, Alabama. I used regular flight schools for my private pilot airplane license. I flew Black Hawks throughout my military service.

What are some examples of how your helicopter flying experience has shaped who you are today?

Flying for the army was more than the best job I've ever had—it became my identity and is who I am today. But I wouldn't have even landed the job if it weren't for hard work and persistence, values I've carried with me throughout my career and life.

Determined to be a combat arms officer and fly Black Hawks, I wasn't going to let anything stand in my way on my path to flight school. I filed away every piece of advice from the commanders and officers of my reserve unit, completed the Army Aviation Branch's preflight course, and called the Army Aviation's flight school assignments manager at least once a week to see if there were any empty slots for flight school.

Once I finally landed an opening at Fort Rucker, I begged the sergeant major every chance I had to be assigned to one of the training slots with Black Hawks. One day, after he practically dared me to get 100% on my systems test and graduate at the top of my class in instruments to even consider me for the slot, I did exactly that.

In my flight school class of 40 commissioned officers, only 3 of us got Black Hawks. I attribute that to one simple fact about me: if there's something I really want



and you tell me what I have to do to get it, then I will do that thing.

It was a lot of work, but flying helicopters was worth it. Flying a helicopter is nowhere near as graceful as flying an airplane, but I loved the machinery, the technical challenges, powering through the sky—all of it. Contrary to what some might think, it's not necessarily the big macho guys who are good at it. Being a great helicopter pilot takes the ability to multitask and act quickly: you have to be able to work the controls while monitoring and responding to radio traffic, maintaining situational awareness, and more. And for a US senator, multitasking is everything. While I can't fly combat missions anymore, it's an honor to use my current role—serving no longer from the cockpit but in the Senate—to ensure that our armed forces are the strongest they can be.

How has what you learned in flight school, combat, and helicopter flying in general helped you in your career as a US senator?

Throughout my military service and to this day, I take the Soldier's Creed seriously: you don't leave a fallen comrade behind. That's why I work hard every day to find new ways to better support our service members, their families, and all Americans.

In the FY 2023 National Defense Authorization Act (NDAA), I'm proud that a modified version of my Improving Military Aviation Readiness Act of 2022 was included to authorize the Department of Defense (DOD) to include FAA-certified overhauled parts as part of its supply chain, improving both aircraft readiness, by increasing access to repair parts, and value to the taxpayer, by purchasing overhauled, used parts instead of new ones.


Given ongoing supply-chain delays and the increasing cost of new parts, utilizing used serviceable materials in DOD maintenance operations can contribute to decreased costs and increased readiness. In this NDAA, I also supported funding for modernizing fighter aviation technology for the US Navy and Marine Corps' F-35 programs. This funding will allow for updates to 24 aircraft, ensuring that war fighters are able to maintain the most advanced platforms needed to meet evolving threats.

What inspired you to pursue a career in politics after your service in the military?

After my helicopter was shot down and I woke up in Walter Reed [National Military Medical Center in

Bethesda, Maryland], I promised myself I'd do whatever it took to honor my buddies who saved my life on that dusty battlefield in Iraq and repay them for their sacrifice. I became an advocate for our nation's veterans, and I realized that the best thing I could do to continue to serve our country and help make it better was to run for office. Veterans should be in Congress to hold the government accountable for the promises we make to our military men and women, who go out and do an incredible job at our behest, and their families.

What advice would you give to those interested in pursuing a flying career, particularly young women, from your perspective as both a former pilot and a professional in a nonaviation career?

You can be anything and can do anything, but make sure you give yourself permission to struggle and be frustrated as you take on new responsibilities. There's no perfect work-life balance, and you're not going to be able to do everything you'd like to do. You may try something, and it may not work out. But as long as you keep your head down and work hard, that's when the victories come. That's how you can make a difference in people's lives. 



ROTORCRAFT EVENTS

2023

APR. 26–28
2023 Army Aviation Mission Solutions Summit
 Army Aviation Association of America
 Nashville, Tennessee, USA
 Learn more at quad-a.org

MAY 8–11
XPONENTIAL 2023
 Association for Uncrewed Vehicles International
 Denver, Colorado, USA
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JUN. 19–25
Paris Air Show
 Salon International de l'Aéronautique et de l'Espace
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Rotors 'n Ribs Fly-In
 Goshen Municipal Airport (KGSB)
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 Learn more at rotorsnribs.com

JUL. 17–22
APSCON / APSCON UNMANNED 2023
 Airborne Public Safety Association
 Orlando, Florida, USA
 Learn more at publicsafetyaviation.org
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JUL. 24–30
EAA AirVenture Oshkosh 2023
 Oshkosh, Wisconsin, USA
 Learn more at eaa.org
Visit HAI at Booth #363

OCT. 17–19
2023 NBAA Business Aviation Convention & Exhibition
 National Business Aviation Association
 Las Vegas, Nevada, USA
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OCT. 23–25
The AMTC23
 Association of Air Medical Services
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PILOT: AARON FITZGERALD

PHOTO BY MARK BENNETT







SEE
the maiden
flight of the
1st production
AW609

The AW609

Expanding the Vertical Aviation Fleet

The remarkable tiltrotor promises advantages conventional helicopters can't match.

AFTER MUCH ANTICIPATION, Leonardo Helicopters US appears on the verge of completing its 20-year pursuit of FAA certification for the world's first certificated civil tiltrotor and putting that aircraft, the AW609, into service with international air services giant Bristow Group.

The manufacturer in recent years stopped forecasting a certification date, but Bill Sunick, Philadelphia, Pennsylvania-based Leonardo's head of tiltrotor marketing, says "we can definitely see the light at the end of the tunnel."

For 16 years, the US Marine Corps and the US Air Force Special Operations Command have been flying the AW609's military predecessor, the Bell Boeing V-22 Osprey, around the globe. Its demonstrated

speed, range, and vertical takeoff and landing (VTOL) capabilities have converted tiltrotor skeptics and spurred American military, diplomatic, and humanitarian aid officials to change how they conduct their operations.

Osprey missions have evacuated troops at distances far beyond the reach of single helicopter flights and sped them to faraway hospitals, greatly expanding the Golden Hour's umbrella for patients. They've extended the range and shortened the time to get relief supplies to disaster victims. They've enabled the United States to swiftly protect and extract American citizens abroad from harm's way.

On Oct. 31, 2020, USAF CV-22 Ospreys, paired with Lockheed Martin MC-130Js and other aircraft, flew US Navy SEALs more than 1,500 nm to rescue an American kidnapped along the Niger-Nigeria



By James T. McKenna

border. The air force says it was the longest hostage rescue mission flown at night. The mission, requiring flying 11 hours nonstop, was completed within 48 hours. For it, the air force in January 2023 awarded the CV-22 crew members the Distinguished Flying Cross and Air Medals.

In December 2021, the navy made operational its CMV-22B, which is to replace the Northrop Grumman C-2A Greyhound in resupplying aircraft carriers at sea. Navy leaders had resisted employing tiltrotors for that purpose until the mid-2010s.

US Army leaders, likewise, long resisted adopting tiltrotor technology, instead pursuing faster, compound helicopters to speed up vertical lift operations.

Last December, the army awarded Bell \$232 million to develop a virtual prototype of its V-280 Valor tiltrotor under the multibillion-dollar Future Long-Range Assault Aircraft program to replace approximately 2,000 Sikorsky H-60s. (Sikorsky, a Lockheed Martin company, and Boeing, which partnered on the Defiant compound helicopter contender, have protested the award.)

Transforming Civil Vertical Lift

If the 9- to 12-seat AW609 achieves success similar to the V-22 in civil air ambulance, search-and-rescue, offshore support, corporate transport, and VIP operations, it may transform civil vertical lift operations everywhere.

The all-weather tiltrotor is designed to fly at 270 kt. and 25,000 ft. With an 18,000-lb. maximum takeoff weight, 6,000-plus-lb. useful load, and 750-nm range, the fly-by-wire AW609 “is poised to change the face of civil aviation” by giving operators “a huge speed and range advantage over a conventional helicopter,” says David King, Leonardo’s chief engineer for tiltrotor technologies.

The FAA could foster that transformation through its pending review of “powered lift” aircraft regulations. (The term “powered lift” refers to heavier-than-air aircraft that can take off or land like an airplane or a helicopter and transition between both those modes in flight.) In particular, the agency could streamline how pilots are approved to fly the AW609.

Leonardo two years ago opened its Northeast Philadelphia Airport (KPNE) academy to train pilots, among others, for AW609s entering service. The facility includes a Level D flight simulator. But under FAA rules, pilots can’t be cleared to fly a tiltrotor unless they log enough time in such aircraft. The only way to do that currently is to fly military V-22s.

“Training in the two-pilot AW609 requires at least a private powered lift license; no pilot holds one. Today’s ex-military powered lift pilots (roughly 350) hold FAA commercial licenses; high-paying airlines want them. Unless the FAA revises rules, the industry can’t produce nonmilitary commercial powered lift pilots,” says Bryan Willows, Bristow’s AAM program manager. “It’s a showstopper.”

Other hurdles remain. The AW609’s certification goal has been a moving target for years. Its order book has shrunk with those recurring delays, from up to 80 units in the 2000s to an unspecified number today from Bristow, an unnamed European operator, and perhaps the United Arab Emirates. The FAA has pushed back repeatedly on requests for exemptions from regulations that specify “airplanes” or “rotorcraft” with no mention of “powered lift,” a term developed to cover the AW609.



V-22 operational successes with the US Marine Corps and US Air Force Special Operations Command have converted many tiltrotor skeptics. Here, an AFSOC 8th Special Operations Squadron CV-22 trains in air-to-air evasive maneuvers and fighter escort tactics. (USAF Photo/Airman Bailey Wyman)

Challenges aside, “we’re looking forward to a big year,” Sunick says. “The AW609 has strong interest around the world in all five mission sets: VIP, corporate, offshore, EMS, and SAR.”

Leonardo has two prototypes flying at its Cascina Costa, Italy, headquarters and another flying in Philadelphia, along with its first production AW609 there. Three customer tiltrotors are on the Philadelphia production line, including Bristow’s first. The program is racking up flight test hours: 200 or so were logged in 2022’s second half, pushing the total to 1,900-plus, attesting to Sunick’s sentiment that “these are very, very exciting times.”

(In addition to its AW609 activities, the Philadelphia plant assembles the medium twin AW139 and FAA-certificated, multimission MH-139A Grey Wolf that Leonardo is providing, with Boeing, to the US Air Force. The facility also produces the single-engine AW119Kx and the IFR TH-73A navy trainer based on it.)

With COVID’s deadliness fading, the AW609 team has been back on the road. In 2021, Aircraft 4 (N609PH) self-deployed 2,550 nm from Cascina Costa to visit Expo Dubai and the Dubai Airshow. Last October, Aircraft 3 (N609PA) made the AW609’s National Business Aviation Association (NBAA) debut in Orlando, Florida, with a VIP interior mock-up on exhibit. The team then went to the Association

of Air Medical Services conference in Tampa, Florida, exhibiting an air ambulance interior mock-up and meeting with air ambulance operators.

And the team is headed to Atlanta, Georgia, for HAI HELI-EXPO 2023, Mar. 6–9 (exhibits are open Mar. 7–9). At Booth #B1005 at Expo, Leonardo will feature its AW139 and twin-engine AW169, as well as the single-engine AW09. (The company took over the latter aircraft in 2020 when it acquired Kopter AG.)

Regarding an AW609 certification date, Sunick says he “most certainly would scream it from the rooftops” if he could provide one. “We’re having the same challenges every other OEM is: certification throughput challenges with our partners at the FAA, supply chain, and things like that. With the FAA, it’s been a marriage; we’re walking hand in hand, being the first to go down the aisle with the FAA on powered lift.”

Regulatory Criteria in Process

FAA officials caused a stir last May, stating their intention to change how eVTOL (electric vertical takeoff and landing) aircraft would be certificated to carry passengers or freight for hire. eVTOL makers believed, based on earlier FAA guidance, that they could pursue type certificates under Part 23 of the Code of Federal Regulations (CFRs).

Part 23 covers small aircraft and was streamlined in 2017 to speed the incorporation of new technologies. Instead, the FAA said in May that eVTOL aircraft would be approved under CFR 21.17(b), which covers special aircraft classes and requires certificate applicants and the FAA to determine which elements of six different CFRs must be met. AW609 and FAA officials agreed early on in the tiltrotor's certification efforts that the 21.17(b) "special class" rules would apply.

In November, FAA officials further stirred things up, announcing plans to overhaul the CFRs' air carrier definition to cover powered lift operations and training. The agency said the proposed changes would be open for public comment and finalized before the first powered lift aircraft was certificated. The rules would be laid out in a Special Federal Aviation Regulation (SFAR), with its draft released mid-2023 and a final version in the second half of 2024.

As of the end of January 2023, however, the FAA hadn't released the AW609's final G-1

certification basis for public comment. The agency also hadn't signed off on the tiltrotor's type inspection authorization (TIA), a milestone marking the FAA's completed examination of technical data required for type certification. The TIA clears FAA officials to begin conformity and airworthiness inspections and ground and flight tests needed to fulfill type certificate requirements.

"The FAA will be conducting an early involvement, pre-TIA flight in the very near future," Sunick says.

Leonardo officials have said they believe "the 609 will be certified with its own certification basis in advance of the SFAR."

The AW609's proposed 21.17(b) certification basis draws on airworthiness standards from Parts 29 (Transport Category Rotorcraft), 25 (Transport Category Airplanes), and 23 (Normal Category Airplanes); draft airworthiness standards for powered lift transport aircraft (referred to as Part XX); and unique tiltrotor requirements (referred to as TR).

The Rich History of Tiltrotors

Tiltrotor history goes back at least 90 years, including George Lehberger's US patent in 1930, though no aircraft was built to that design. By the early 1950s, the US Army and US Air Force jointly researched an aircraft capable of helicopter-like takeoffs and landings but with airplane-fast flight. They used McDonnell Aircraft's XV-1 compound helicopter but also funded research on two Bell XV-3 tiltrotors through the 1950s. NASA continued that research into the mid-1960s.

NASA's research prompted its 1972 XV-15 program, under which Bell and Boeing Vertol won contracts for separate designs. Bell's used rotating engine/gearbox/rotor assemblies in wingtip pods. Boeing's used stationary engines with rotating rotor pods (like Bell's new V-280 Valor). NASA chose Bell's Model 301 tiltrotor for flight tests into the 1980s. Bell and Boeing later teamed up for the US Defense Department's Joint-Service Vertical Take-off/Landing Experimental (JVX) program, proposing in

TT Straps for Bell 206, OH-58, 204, 205, 212, UH-1, AH-1, 214, Enstrom 480, 280, F28 and Bell 407 main rotor elastomers

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An overhaul of the 609 followed. “We looked at where the aircraft was in its development,” Sunick says. “We talked to a lot of our customers and got a good feeling for what capabilities they were looking for.”

Pratt & Whitney Canada (P&WC) gained certification of a PT6C-67A engine capable of producing 2,000 shaft horsepower (2,500 at one-engine inoperative conditions) and doing so through the proprotor nacelles’ full 95-degree movement arc. The engines can operate continuously in the vertical position. Upgrades included an advanced-aerodynamics compressor and turbines made with state-of-the-art materials that increase power and reduce fuel consumption, P&WC says.

The extra power allowed a maximum takeoff-weight increase to 18,000 lb. from 16,799 lb. That, in turn, required landing-gear and structural changes. The smaller, side-hinged cabin door was replaced with a 35-in.-wide, 50-in.-high clamshell design, with segments hinged top and bottom. The 609’s changes also included a redesigned cockpit with Pro Line Fusion avionics from Collins

Aerospace, a new air data system, upgraded flight control computers, and a new environmental control system.

“We wound up with a whole other development program,” Sunick says. “There’s essentially nothing we didn’t change.”

Preparing for Takeoff

Flight test and certification work are progressing, Sunick notes, including completion of 30-minute run-dry testing of the tilt-axis and proprotor gearboxes.

Above, the Leonardo Helicopters Training Academy, opened in Philadelphia in 2021, includes a roll-on/roll-off, AW609 full-flight motion simulator developed by the OEM’s Rotorsim joint venture with CAE. Below, the tiltrotor’s mid-2010s redesign included a clamshell door, in part to facilitate air medical patient loading and search-and-rescue hoist operations. (Leonardo Helicopters US Photos)

1983 an enlarged XV-15, which became the V-22.

In 1994, Bell started the Model D-600 commercial tiltrotor program. Boeing joined it in 1996, launching the Bell Boeing 609. In 1997, Boeing bought McDonnell Douglas, focused on military helicopters, and ended its 609 work. Later that year, Bell brought Agusta into the renamed BA609 development; the latter would manufacture and assemble tiltrotors destined for Europe and elsewhere. Test pilots Roy Hopkins and Dwayne Williams flew the first prototype Mar. 7, 2003, near Bell’s Texas headquarters.

Bell was struggling to sustain its commercial and military helicopter lines, having lost civil ground to Eurocopter and military work to Sikorsky’s H-60s. Meanwhile, the V-22 program was plagued by scandal and problems, including two fatal crashes in 2000 that killed 27 Marines.

Bell sold its BA609 stake in 2011 to Agusta parent Finmeccanica, which set up an arm (now AgustaWestland Philadelphia Corp.) as program owner, technical lead, and type certificate applicant. (Bell is designing and certifying components that it will supply when the AW609 enters production.)



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Aircraft 1 (N609TR), which first flew in 2003, is on a run stand in Italy to verify inspection intervals, check mean time between overhauls, and test rotor- and drive-system endurance.

Aircraft 2 (N609AG) had been used for the development of new installations (such as a new pitot-static system), marketing flights, and collaborative development with Bristow of an offshore support configuration. It broke up in flight on Oct. 30, 2015, over northern Italy, killing test pilots Herb Moran and Pietro Venanzi. The two pilots had detected roll oscillations during a maximum dive-speed test at 293 kt. Italy's Agenzia Nazionale per la Sicurezza del Volo (National Agency for the Safety of Flight) found that, as designed, the flight control system generated yaw inputs to counteract the sideslip effects of the pilot flying's roll input. This led to divergent oscillations, likely causing the right proprotor blades to strike the right-wing leading edge.


Aircraft 3 is conducting engine-handling performance and load-level surveys in Philadelphia. It had been used for icing certification tests in Michigan.

Aircraft 4 is being used for mechanical-systems and avionics testing in Italy and will conduct customer demonstrations.

Aircraft 5 (N609LH), the first production AW609, has been used for ground-based high-intensity radiated field and indirect-effects-of-lightning tests. It will participate in mission capability assessments and customer demonstrations, support the transition from development to operations, and assist with FAA type and production certificate examinations.

The Philadelphia operation has registered a sixth AW609, whose tail number, N609LE, was issued by the FAA on Aug. 4, 2022.

At HAI HELI-EXPO 2023, Sunick says he'll be assessing customers' familiarity with the tiltrotor. "Like the V-22, getting folks in the airframe, flying it, showing it, demonstrating missions helps open their eyes to possibilities for their operation," he says.

That, adds Sunick, sparks in potential customers that eureka moment when the promise of this exciting aircraft becomes clear. 

Prototype No. 3, N609PA, crosses Pennsylvania countryside near the Philadelphia plant. This AW609 is being used for engine-handling and load-level survey tests. (Leonardo Helicopters US Photo)



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Defining



the Future of



Vertical Aviation



HAI's strategy to position the industry for growth.

By Daniel A. Varroney

COMPANIES TODAY ARE BANDING together with their supply chains, forming larger ecosystems, and utilizing these robust communities to shape the external environment, better navigate uncertainty, and position for industry growth. In response, owners, companies, trade associations, and government are joining forces to build durable strategic partnerships.

The aviation industry is no different. In fact, one of the most noteworthy efforts to build partnerships occurs in the vertical aviation industry. HAI, in particular, is brainstorming innovative solutions to shape the uncertain economic environment. It's a rising-tide-lifts-all-boats approach—and it's working.

Positioning the Industry for Growth

Nicole Battjes, founder and owner of Rainbow Helicopters and treasurer of HAI, and James A. Viola, president and CEO of HAI, have spearheaded the association's Strategic Industry Plan and Value Proposition to position the vertical aviation industry for growth.

The two formed HAI's Strategic Industry Plan Committee, comprising HAI Board of Directors members Stacy Sheard, Mark Schlaefli, and Robert Miller Stallings, and former board member Jack Matiasevich. The planning process launched with intensive qualitative and quantitative research to ascertain the industry's "what keeps you up at night" challenges and desired future direction. Through the research, actionable insights and key themes surrounding the industry emerged in several areas:

- Legislative and regulatory challenges on the global, federal, and local levels
- Public perception
- Collaboration and engagement
- Safety and training
- Innovation
- Positioning for the future
- International unity and growth.

The committee and HAI staff developed initial drafts of the Strategic Industry Plan and Value Proposition and sought feedback from the board and leaders from [HAI's 14 working groups](#). Their insights helped shape the plan's completion.

HAI's Strategic Industry Plan

The Strategic Industry Plan, which was unanimously approved at a special HAI Board of Directors meeting on Oct. 27, 2022, outlines a robust future vertical aviation ecosystem to help build the strongest base of allies to shape and define the industry's future.


The plan incorporates five strategic initiatives focused on positioning the industry for growth:

- **Strategic Initiative 1:** Unify the industry around a new vision of vertical aviation and continually promote **community compatibility**
- **Strategic Initiative 2:** Engage all stakeholders in the **global value chain** to help create a favorable environment that helps the entire industry thrive and prosper
- **Strategic Initiative 3:** Elevate **safety culture** throughout the value chain
- **Strategic Initiative 4:** Develop **business resources** that help companies elevate their operational performance
- **Strategic Initiative 5:** Develop a pathway that helps attract and maintain the best **workforce** in the world.

"This was a strategic and research-guided process, and the committee and I were thrilled to play an important role," Battjes says. "[We] are very proud of the plan because it [helps] the industry build a long-term vision that aligns our trade association with the future of vertical aviation."

Reflecting on his decision to recommend a broad-based industry strategy, Viola says he "wanted a meaningful strategic planning process to help us more closely align with the members and a rapidly changing landscape, and to help the trade association build even stronger strategic partnerships with vertical aviation."

The Strategic Industry Plan Committee, the HAI Board, and HAI staff set out to represent the industry so that everyone would benefit and prosper. Through this process, they've helped determine the future of vertical aviation and demonstrated that strategic partnerships between industries and their trade associations work.

The future of the vertical flight industry will continue its advance because the trade association and its leaders have invested considerable time and resources to envision the future of vertical aviation by reimagining the industry's growth. 



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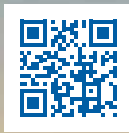
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On the following pages, HAI recognizes our 2023 honorees' remarkable achievements across the rotorcraft industry. We congratulate them and celebrate their extraordinary contributions to aviation and the example they set for the entire vertical flight community.

Nominations for the 2024 Salute to Excellence Awards, to be celebrated at HAI HELI-EXPO 2024 in Anaheim, California, will be accepted beginning in June 2023. Visit rotor.org/salute for more information.



COMMUNICATIONS AWARD

For creative distinction in disseminating information about the helicopter industry

Lawrence “Skip” Robinson

Photographer and Writer, Vertical Magazine, Los Angeles, California, USA

Lawrence “Skip” Robinson was a fixture in the helicopter industry, known for his fabulous photography, infectious passion for helicopters, and ability to capture jaw-dropping shots.

Robinson, who died unexpectedly in March 2022 of natural causes at the age of 56, loved helicopters from very early on, studying them and their missions and amassing an impressive collection of helicopter memorabilia. Having photographed rotorcraft since his teens, he spent countless hours chasing them with his camera. In 2005, he submitted one of those photos, of a Los Angeles (California) Fire Department Bell 412 working a fire, to *Vertical* magazine. It was published, forming a partnership with the magazine that continued for the next 17 years.



Lawrence “Skip” Robinson

With his first published image in hand, Robinson took his passion door-to-door. He had a particular interest in parapublic and military operations—not the easiest operators with which to secure permission to fly and photograph. Yet his tenacity, credentials, and charm opened doors. Robinson shared his published *Vertical* photo with other public agencies and offered to shoot their aircraft for publication as well.

Vertical publisher Mike Reyno says the phone never stopped ringing after the day that first photo was published. Robinson often called several times a day himself with story tips, and he was willing to go anywhere to produce breathtaking images of helicopters.

“Everyone has a calling in life, and Skip’s was as a photojournalist in the helicopter industry,” Reyno says. “At HELI-EXPO®, many people would tell us

how Skip’s photos or stories inspired them to enter the industry. They all wanted to thank him.”

One photo shoot led to another as more and more public agencies saw Robinson’s work and agreed to a photo shoot of their own. Word was out about Robinson’s skill, and it wasn’t long before his clientele went well beyond *Vertical*. Law enforcement agencies, air ambulance providers, flight schools, helicopter operators, and even manufacturers started calling him to photograph their helicopters and operations.

When not spending time with or shooting helicopters, Robinson loved to share his passion with others. He was like an uncle to a neighbor’s children, even taking one of them on photo shoots that eventually inspired the child to pursue flight training. Robinson was also an avid volunteer at the Classic Rotors museum in Ramona, California.

From the local Los Angeles helicopter community to operators across the globe, people know about Robinson, through contact with him or his beautiful photography. With his words and through his camera lens, he brought readers with him on countless visits with operators in the field. His photos have appeared in almost every issue of *Vertical* and *Valor* magazines and graced nearly 40 of the publications’ covers.

Robinson’s passing leaves a hole not only in the hearts of his friends and family, but also throughout his beloved industry.

“At HELI-EXPO®, many people would tell us how Skip’s photos or stories inspired them to enter the industry. They all wanted to thank him.”

—Mike Reyno, publisher, Vertical

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HUMANITARIAN SERVICE AWARD

For outstanding service in using rotorcraft to provide aid to those in need

Ananda "Andy" Thapa

Operations Director, Altitude Air, Kathmandu, Nepal

A hero to countless individuals, Ananda "Andy" Thapa is humble by nature. Born in the remote area of Dhading District in Nepal, Thapa grew up in extreme poverty. As a child, he averaged one meal a day and had no electricity, telephone, or even a nearby medical facility. He did, however, have a dream: he wanted to fly. So he worked hard in his studies, earning a spot in a Nepali Army education program in Kathmandu.

Because his family couldn't afford higher education, Thapa enlisted in the Nepali Army's officer program, hoping to be selected for pilot training despite it being exceptionally rare in the army. Timing was on Thapa's side, however. Civil war broke out in Nepal during his second year of cadet officer training, creating a need for helicopter and fighter pilots. Amid fierce competition, Thapa was chosen and learned to fly helicopters.

After eight years flying in the army, Thapa accepted a civilian helicopter pilot position where he could apply his experience and understanding of the small villages, remote regions, fast-changing weather, and terrain of Nepal to perform rescues and extractions.

Thapa has since been credited with hundreds of, if not well over 1,000, technical rescues throughout Nepal and surrounding regions. He is one of the elite skilled pilots who have extracted multiple climbers from Mount Everest, landing as high as Camp 2 above 21,000 ft. (6,401 m). He participated in the much-publicized search for Bulgarian mountaineer Boyan Petrov in 2018, which unfortunately ended with no sign of Petrov.

In 2022 alone, Thapa participated in three large rescues: he airlifted several

climbers from Mount Everest's Camp 1 and Camp 2, evacuated two people at 22,349 ft. (6,812 m) from Ama Dablam using a human longline technique, and, together with another company rescue pilot, rescued 72 Nepalese and foreign visitors stranded in a remote region of Nepal by extremely bad weather.

Thapa has also helped families achieve closure. In 2018, famed mountaineer Kim Chang-ho, the first Korean to summit the world's 14 tallest mountains without supplemental oxygen, died with eight others at the base camp of Gurja Himal in Nepal. After searchers discovered their bodies, Thapa transported them down the mountain via longline.

The one rescue that stands out the most in Thapa's mind took place on Jun. 18, 2021. Five days before, more than 100 people had trekked to areas bordering Tibet from the Nepalese town of Manang to collect Yarsagumba, a medicinal fungus, and hadn't returned. Thapa took the lead in the search, flying their route up the mountains. While most were feared dead, Thapa found them all alive between 14,000 ft. (4,267 m) and 17,200 ft. (5,243 m), stranded after heavy snowfall. He transported the most critical, about 70 in all, back to a lower-altitude safe zone within an incredible two hours and 20 minutes.

He also delivered a supply drop of food and other survival goods to the remaining 30 foragers as the weather deteriorated and fuel ran low. Thapa says this rescue was the most successful and also the fastest he has conducted in his career, but it is only one of countless rescues that have made the helicopter the real hero to the people of and visitors to Nepal.



Ananda "Andy" Thapa

Thapa has been credited with hundreds of, if not well over 1,000, technical rescues throughout Nepal and surrounding regions.

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W.A. "DUB" BLESSING FLIGHT INSTRUCTOR OF THE YEAR AWARD

For upholding high standards of excellence in flight instruction

Karl Cotton

Senior Flight Instructor, Helicopter Institute, Fort Worth, Texas, USA

Karl Cotton has a simple philosophy: if a student isn't successful, it's a reflection on the instructor.

"There's usually a way to get through to somebody if they're struggling," Cotton explains. "I'm a really big believer in bringing a kind of [excitement] to flight training. There's nothing about training that should cause the students to suffer. It should be challenging but should be an overall pleasant experience. That's really what I try to bring out, a challenging but fun experience."



Karl Cotton

Cotton's journey to flight instructor and mentor for countless students started on the ski slopes of Utah. He began heli-skiing in the late 1970s, quickly became hooked on helicopters, and soon started learning to fly.

Cotton began instructing as soon as he received his flight instructor rating and, a little over 700 hours later, landed his first turbine helicopter job as a tour pilot at Grand Canyon Helicopters. From there, he took a utility flying job performing seismic exploration throughout the Rocky Mountains during the 1980s oil boom before landing at the Arizona Department of Public Safety as an officer pilot and flight instructor.

Cotton's law enforcement experience in Arizona opened the door for a position with the Los Angeles County (California) Fire Department, where he taught various flight techniques, from swift- and blue-water rescue to aerial firefighting, high-rise fire rescue, and hoist training.

Since then, Cotton has worked as a short-haul pilot for three US national parks and has served as a chief instructor at flight schools, including Leading Edge Aviation in Bend, Oregon, where he runs the night-vision goggles (NVG)

program. He also holds a designated pilot examiner certification and has administered more than 1,000 pilot exams.

Today, Cotton is the senior instructor at Helicopter Institute, an OEM-level training facility that offers initial and advanced instruction in Bell aircraft to customers around the country. Cotton serves as the field pilot, traveling to customers and providing customized training in their aircraft. With his vast and varied background in mountain flying, law enforcement, NVG, fire-and-rescue, instrument instruction, and more, he provides just about any kind of training a customer needs.

Yet, while his impressive breadth of skills and experience speaks volumes, it's how Cotton approaches his work that really stands out to his customers. He's easygoing and puts his students at ease, even earning the impressive accolade of making checkrides fun.

"Karl comes to the table with thousands of hours having flown many different profiles and missions," says Deputy Josh Sweeney of Washington state's King County Sheriff's Office. "He's a great communicator and makes sure to constantly pass on his knowledge and experience to those he's instructing. What's even more amazing, Karl is never satisfied with the knowledge he's gained and always shows up with new and refined techniques to accomplish a task. Karl has inspired me to be a better pilot and a better instructor."

"There's nothing about training that should cause the students to suffer. It should be challenging but should be an overall pleasant experience."

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Penny Ritter

Criminalist, Alameda County Sheriff's Office, Oakland, California, USA

A 14-year criminalist at the Alameda County Sheriff's Office (ACSO), Penny Ritter helped turn the agency's fledgling small uncrewed aerial system (sUAS) program into an award-winning, nationally recognized initiative that supports not only the county's work but also that of agencies across California and around the nation.

Traditionally, as part of her crime-lab work, Ritter employed laser scanners to map scenes. Five years ago, the lab commander approached her with a challenge: the sUAS team of eight aircraft and five pilots had received a free trial license to Pix4D, a photogrammetry and drone mapping software. He asked if she'd be interested in learning how to register the Pix4D data the drones captured to provide scene mapping.

"I said, 'Sure. Not a problem,'" Ritter recalls with a laugh. "I had no idea how to use the software and didn't even know what a drone looked like. He gave me some of the data, and I went to YouTube to watch training videos and took a class. Then, I started modeling crime scenes and making 2D and 3D maps."

The maps proved extremely valuable and led to approvals to expand the team with more equipment and operators. Again, the commander tapped Ritter, this time to help lead the program. She learned to fly and maintain the county's drones and earned her FAA Part 107 certificate to operate them. She built spreadsheets to track equipment, maintenance, pilot licenses and training, operations, and more.

While ACSO is responsible for unincorporated areas of the county, its team often supports incorporated cities within Alameda County and beyond.



Penny Ritter

"Penny is an exceptional asset to ACSO because of her leadership and her willingness to assist public safety agencies around the nation."

—Paul Liskey, captain, ACSO

Starting with the Tubbs Fire in October 2017, ACSO began using its sUAS assets annually to assist with mapping disaster zones. Ritter's team also mapped the deadly Camp Fire. For that job, Ritter helped lead a task force of 16 agencies that conducted 518 sUAS flights to collect 70,000 images over 17,000 acres to map the town of Paradise after the tragedy.

ACSO credits Ritter with helping locate and arrest countless dangerous individuals and document many crime scenes. Ritter also assists with crime scene reconstruction, such as for the Hart family murders in Mendocino County in 2018. Ritter led the team that helped search for the victims of the murder-suicide, in which the family vehicle was driven off a 100-ft. cliff. The team produced an orthomosaic map and 3D model used in the coroner's inquest.

Today, the ACSO sUAS team includes 110 aircraft and 25 pilots. Ritter ensures that all aircraft are up and running, assisting with updates and repairs 24/7. She's also instrumental in helping several other agencies launch and expand their sUAS programs by offering her expertise and support.

"Penny is an exceptional asset to ACSO because of her leadership and her willingness to assist public safety agencies around the nation," says ACSO captain Paul Liskey. "She not only knows how to safely operate each aircraft ACSO deploys, but she continually offers her time and support to train other team members and local agencies."

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GOLDEN HOUR AWARD

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David Ellis

Executive Director, Haiti Air Ambulance, Port-au-Prince, Haiti

When charity air medical transport service Haiti Air Ambulance (HAA) was founded in 2014 as Haiti's only helicopter air ambulance provider, David Ellis was one of the first flight paramedics to volunteer. Volunteering for 10 to 14 days at a time, he supported the HAA team's tireless work with various hospitals and medical teams to improve both the quality of and access to lifesaving and life-changing care.



David Ellis

In 2020, Ellis took over the helm of the service as executive director, ushering in a significant change in the way HAA approaches which patients are transported by helicopter. He shifted away from the traditional US helicopter emergency medical services (HEMS) guidelines related to injury severity or threat to life. Instead, he focused on reasons specific to Haiti's land-transport challenges: a grossly underequipped and understaffed national ambulance service, gas shortages, impassable roads, and rampant gang violence and roadblocks.

"The US's stringent patient-carrying criteria just don't work here," Ellis says. "People can't [always] get to medical services, and their injuries can become life-threatening if not treated. Our service is for a funded charity, so we look at how we can affect as many lives as possible with that funding. Sometimes, it's bringing patients to medical services; sometimes, it's bringing vital medical supplies and professionals to the people."

Ellis's philosophy has led to two significant results: an exponential increase in the number of flights for the service and a monumental improvement in transport times. Since its inception, HAA has transported more than 1,500

patients, all during daylight VFR conditions. An impressive 53% of those were transported in the past two years since Ellis took the helm. HAA transported more than 500 patients in 2022 alone.

Ellis has also been instrumental in developing relationships with local doctors, hospitals, charities, and service providers. Most of HAA's staff are Haitian, including several doctors he hired who provide vital direction and insight to HAA for operations in the country, helping Ellis direct a service that meets the extended needs of Haiti's population.

For instance, many medical facilities in the country lack several basics. Some don't have a permanent roof, others have only a doctor or two with no nursing support, and virtually none have cafeterias or prepared food for patients. With the understanding that a patient will need a support person in the hospital to care for and feed them, Ellis arranged for HAA to transport a family member or friend with every patient.

Haiti is also experiencing a steep increase in gang activity and unrest. In addition to arranging for HAA to carry more patients to avoid the violence, Ellis has taken steps to protect his team, hiring armored cars and security services to ensure that vital airlift work isn't interrupted.

Under Ellis's leadership, HAA is growing. A second Bell 407 was scheduled to arrive in-country in early 2023, potentially doubling HAA's impact in the impoverished nation.

Ellis ushered in a significant change in the way HAA approaches patient transport, shifting the focus from injury severity to Haiti's land-transport challenges.

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**ROTOR
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For outstanding contributions to the promotion of rotorcraft safety and safety awareness

Eric Bechhoefer

CEO and Chief Engineer, GPMS International, Waterbury, Vermont, USA

Eric Bechhoefer changed the playing field for aircraft safety with the helicopter health and usage monitoring system (HUMS) for single-engine helicopters.

After retiring from his career as a naval flight officer, Bechhoefer pursued a doctorate in engineering with an interest in advancing aviation safety. He saw his dream come true at Goodrich Sensor Systems, where, in the 2000s, he helped pioneer the first-generation HUMS and condition-based maintenance systems, which the company designed for the UH-60 Black Hawk, CH-47 Chinook, and S-92.

“It was great work, but I really felt if anyone needs these systems, it’s the smaller operators with light aircraft and single engines,” he explains. “I wanted to design a lighter, much less expensive solution for smaller operators with those aircraft that don’t have the assets and finances for the current HUMS programs. I wanted to give them the same level of safety and protection the big guys get and be able to easily add functions as users identify their needs.”

Bechhoefer began to work through an idea, leaving Goodrich in 2010 to work at a wind turbine company to develop a sort of HUMS for wind turbines. After three years of development, he had a product design that could work with light helicopters. In 2012, he copublished and presented a white paper arguing for improving HUMS for the light-helicopter market and went to work on the application.

In 2013, Bechhoefer cofounded Green Power Monitoring Systems (GPMS) International to bring his vision to reality. In 2018, the company launched

its first product, a lightweight, affordable, next-gen HUMS solution applicable to all helicopters regardless of make, model, or mission. He has since overseen the design, certification, and sale of HUMSs for many helicopter models, including the Airbus AS350; Bell 212, 407, 412, and 429; Mil Mi-8, Mi-17, and Mi-171; and MD 530F.

An active industry champion for HUMS, Bechhoefer continues to promote the benefits of today’s advanced HUMS and condition-based monitoring and maintenance. He is a founder and fellow at the Prognostics and Health Management Society, a fellow of the Society for Machinery Failure Prevention Technology, and a senior member of the Institute of Electrical and Electronics Engineers. He also sits on the Vertical Flight Society’s HUMS Committee and the SAE Aerospace HM-1 Committee covering integrated vehicle health management.

“Dr. Bechhoefer’s contribution to rotorcraft operational and maintenance safety simply stands above all others,” says Garmin

International Senior Systems Engineer Brent Butterworth. “Through his research and development, he has taken a system only large helicopters and fleet operators could utilize to one where all sizes and budgets of Part 27 or 29 aircraft can reap the benefits of health monitoring. This has had a radical impact on the knowledge, awareness, and understanding of how the operation of an aircraft affects the health of the aircraft.”



Eric Bechhoefer

“[Dr. Bechhoefer’s work] has had a radical impact on the ... understanding of how the operation of an aircraft affects the health of the aircraft.”

—Brent Butterworth, senior systems engineer, Garmin International

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MAINTENANCE AWARD

For significant and distinct contributions to helicopter maintenance

Mike Iven

VP of Maintenance, Rainbow Helicopters, Honolulu, Hawaii, USA

As a young child in Germany, Mike Iven knew he wanted to be a pilot. But while flying was always his main goal, Iven also wanted to ensure he would be marketable and could control his own safety by obtaining his maintenance certificate.

"I've always been very mechanical, so it was a very easy education receiving my maintenance certificate," Iven recalls. "It really did increase my opportunities and my ability to ensure safety."



Mike Iven

In 1995, Iven began work toward his EASA (European Union Aviation Safety Agency) aircraft maintenance license in Germany while working as an early morning bread-truck delivery driver and a flea market manager. During breaks from maintenance training, he flew to the United States, where he earned his private pilot airplane and private pilot helicopter certificates.

Iven acquired a green card in 1998 through the US State Department's Diversity Visa Program, whereupon he flew to Helicopter Adventures in Concord, California, to complete his helicopter training. Recognizing Iven's potential, Helicopter Adventures founder and CEO Patrick Corr hired him as a shop hand, later promoting him to full-time aviation maintenance technician once Iven converted his German license to an FAA A&P.

Iven earned his helicopter ratings and added flight instructor to his duties at Helicopter Adventures before moving to Hawaii to take both director of maintenance and tour pilot positions for Rainbow Pacific Helicopters. While there, he earned his FAA inspection authorization certificate at the age of 28.

An exceptionally skilled, knowledgeable, generous professional with an unwavering dedication to safety, Iven opened his own general aviation

maintenance shop before joining Makani Kai Helicopter Tours as director of maintenance. There, he sought and obtained an FAA Part 145 repair station certificate for the company.

Throughout his career, Iven has continued to add to his skills and expertise. He returned to the mainland to gain customer service and project management experience in the manufacturing side of the helicopter industry at Safran and, later, Schweizer.

During the COVID-19 pandemic, Iven returned to Hawaii to accept his current position as VP of maintenance at Rainbow Helicopters. He has helped the company expand its turbine fleet and integrate into Rainbow's tour business its first Airbus AS350 helicopter.

When not working in the hangar, Iven helps mentor the next generation of maintenance technicians. He talks to students about the benefits and rewards of being an A&P, using his own rich career as an example of all that an aviation mechanic/engineer can achieve with passion and dedication.

"After a lifetime of extraordinary achievement, you can find Mike in a maintenance hangar in Hawaii putting people first," says Rainbow Helicopters founder Nicole Battjes. "He serves others, which is the highest compliment we can pay him, and through his example he is inspiring the next generation of great helicopter mechanics, making the industry a better place."

"After a lifetime of extraordinary achievement, you can find Mike in a maintenance hangar in Hawaii putting people first."

— Nicole Battjes, founder, Rainbow Helicopters

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LIFETIME ACHIEVEMENT AWARD

For long and significant service to the international rotorcraft community

João “John” Vinagre

Director and Founder, Capital Air, Johannesburg, South Africa

João “John” Vinagre moved to Mozambique from Portugal with his family when he was just 6 months old, fleeing the post–World War II damage and poverty in his homeland. A fourth-generation pilot, he earned his private license in airplanes at 19 years of age and soon added his helicopter ratings after joining the army.

Vinagre was on a course to take over the family helicopter business when the 1974 Carnation Revolution forced Portuguese citizens to leave Mozambique in 1975. The new ruling political party seized his family’s company, including 13 aircraft.

Vinagre and his family left Mozambique for South Africa with little more than \$10 in today’s currency, but he was eventually able to find a flying job with a local company in his new country. When the company’s owner passed away eight years later, Vinagre purchased its Bell 206 with a business partner. Not long after, he secured the name and license of a South African company in liquidation, Capital Air.

Operating out of a wooden-plank zozo hut at Rand Airport (FAGM) in Johannesburg, Vinagre rebuilt his family’s legacy with Capital Air, seeking new opportunities anywhere they could be found, from nature conservation, weddings, and television broadcasting to schools and trade shows. No job was too small, and his tenacity paid off. In the late 1980s, Capital Air obtained exclusive rights as the transportation operator for the Rand Show, the largest annual consumer exhibition in southern Africa. Drawing tens of thousands of visitors annually, the show helped put Capital Air on the map.



João “John” Vinagre

“Flying was in my bones. ... I am proud of the company we’ve built and hope to share it with many future generations.”

Vinagre was stabbed in the back for his effort, but all were saved by Good Samaritans on the scene.

Vinagre has come full circle in his career. He opened an affiliate operation in 1999, Helicopteros Capital, in Mozambique, returning the family business to the country more than two decades after it was lost. Now, more than 40 years since Vinagre took over the name, Capital Air has grown to 1,000 employees and 17 helicopters, the largest fleet in South Africa. It remains a family business, with three of Vinagre’s children helping run the company with a commitment to his philosophy of exceptional customer service.

“Flying was in my bones,” Vinagre says. “I was very lucky I found a flying job and could start over in South Africa. I am proud of the company we’ve built and hope to share it with many future generations.”

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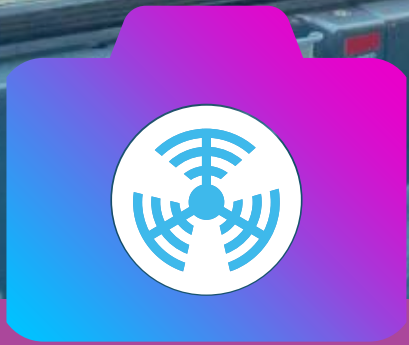
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In the following pages, we celebrate the winners of the 2023 ROTOR Magazine Photo Contest. Their photos will also be on display at HAI HELI-EXPO in Atlanta, Georgia, Mar. 6–9. Behind every mission is a story, and behind every great picture is an artist. This year, we received submissions from around the world telling amazing stories. And for the second time in the history of the annual contest, one photographer has won two categories.

As you enjoy these compelling photos, we encourage you to consider both the hard work displayed by their subjects and the level of craft required to capture them. These six images reflect the allure of our great industry and all it has to offer.

HAI/JIM CARLSON



Grand Prize

Dianne Bond

Pensacola, Florida, USA

The US Air Force enlisted Air Center Helicopters to conduct special ops training in elite offshore rescue operations using the Airbus H225. Here, a pararescueman, or “PJ,” deploys from the helicopter in a mission simulation. During search-and-rescue missions, such as responding to a stranded boat or downed aircraft, the PJ medically assesses injured persons and assists in hoist operations to get them safely to the cabin.

“Seventeen years ago, by chance, I entered the field of helicopter photography,” says Bond. “I strive for every photograph I take to be a beautiful piece of art, worthy of telling the stories of the incredible, selfless people that save lives and perform unfathomable missions using these incredible machines. As a photographer, I think I see the world a little differently than others. When I capture an image the way I see it in my mind, I get to share a little piece of my vision with the world.”





Helicopters/Drones at Work

Gabe Yancey

Burleson, Texas, USA

This photo shows an Air Center Helicopters Airbus H225 Super Puma beginning a vertical replenishment (VERTREP) mission between a US Military Sealift Command (MSC) T-AKE class ship and a US Navy aircraft carrier. Air Center Helicopters has eight H255s deployed on four MSC ships supporting the US Navy and coalition ships in the 5th and 7th Fleet AORs. Yancey, a retired US Navy pilot, has stayed active in the aviation industry through his employment at Air Center Helicopters as director of US Navy programs.





Helicopters/Drones in the Military

Brandon Roberson

Vacaville, California, USA

This photo of an MH-60S Knighthawk helicopter was captured by Mass Communication Specialist 3rd Class Brandon Roberson. In the photo, the Knighthawk assigned to Helicopter Sea Combat Squadron (HSC) 5 is directed to land aboard the aircraft carrier USS *George H.W. Bush* (CVN 77) during flight operations. GHWB is operating in the Atlantic Ocean in support of naval operations to maintain maritime stability and security to ensure access, deter aggression, and defend US, allied, and partner interests.



People and Their Helicopters/Drones

Eric Canning

San Diego, California, USA

This photo of a Bell 407 was taken after sling work to upgrade a US Coast Guard repeater site outside of Ketchikan, Alaska, during one of Alaska's 22:00 sunsets. At the end of a rare, beautiful day, Canning had to grab a photo and take in the moment.

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Helicopter/Drone Digitally Enhanced Photos

Sean Slebrich

Pittsburgh, Pennsylvania, USA

Allegheny Health Network's LifeFlight fleet has five Airbus EC145s, which were introduced in 2007. The EC145 is a light, twin-engine helicopter with a cruising speed of 130 kt. and maximum speed of 145 kt. The EC145's wide-open, rear-loading cabin allows maximum flexibility to accommodate medical equipment, up to three medical crew members, and a Ferno Powerflexx stretcher.

"No matter how many times I have an opportunity to photograph a helicopter during takeoff or landing, it always feels as exciting as if it was for the first time," says Slebrich. "The power and magnitude of these aircraft up close is, quite literally, breathtaking. By creating a trusting relationship with the pilots and crew, we're able to collaborate as teammates, enabling an environment that allows for a view seldom seen." For this shot, a LifeFlight EC145 takes off from Pittsburgh-Butler Regional Airport (KBTP).



Wrench Turners

Sean Slebrich

Pittsburgh, Pennsylvania, USA

In this photo, Chad Slovik, a Metro Aviation maintenance technician, completes routine maintenance on an Airbus EC145, one of five in Allegheny Health Network's LifeFlight fleet, at the fleet's Butler, Pennsylvania, hangar. Slovik and the rest of the Metro Aviation maintenance technician team are an unseen yet integral part of the LifeFlight program, allowing LifeFlight to serve its communities each and every day.

"For myself, this was an awesome opportunity to get a behind-the-scenes look into what helps to keep this critical business safe and mission ready 24/7," says Slebrich.



FLIGHT PATH

QUICK FACTS

Cmdr. Brian Wetzler, US Coast Guard, Ret.

Guest Lecturer and West Point
Alumni Association
Outreach Manager

CURRENT JOB

I'm a retired US Coast Guard officer and aviator. I served 24 years on active duty, including 14 years amassing 3,200-plus hours in the HH-65 Dolphin helicopter, mostly in search-and-rescue. My current involvement in the helicopter community is primarily as a guest lecturer. My other job is with the West Point Association of Graduates at the US Military Academy at West Point. I serve as an outreach manager for alumni and their families.

FIRST HELICOPTER AVIATION JOB

I was a junior officer and newly minted pilot in the HH-65 at Coast Guard Air Station Borinquen, Puerto Rico. Our job was mostly search-and-rescue, but we also did a lot of drug interdiction missions throughout the Caribbean.

FAVORITE HELICOPTER

Well, this one is easy! The HH-65 Dolphin, US Coast Guard variant.

Brian Wetzler and his wife, Elizabeth, in front of a Coast Guard HH-65 Dolphin.



VIEW
the Nov. 17, 2022,
HAI@Work webinar to
hear how Brian survived
a catastrophic crash

How did you decide helicopter aviation was the career for you?

The idea of hovering captured my imagination. Coming from a fixed-wing mindset, I gradually came to discover that although fixed-wing aircraft propel themselves through the air, they don't really "fly" in the spirit of nature's original pilots (birds). But helicopters? They may not have wings, but they fly!

My pursuit of a career in helicopters was a combination of pure fascination with the aircraft and a love of the Coast Guard mission.

experience gets older each year, the human factors I discuss in my training do not. As technology seems to take on more and more responsibility in the cockpit, I believe it's important to remember that flying remains primarily a human undertaking.

What advice would you give someone pursuing your career path?

If "pursuing my path" means flying helicopters for the Coast Guard, my first bit of advice would be to believe the hype. Coast Guard

How did you get to your present position?

I began speaking and presenting on aviation safety while I was on active duty and flying. I traveled to numerous aviation units to perform training, and folks seemed to find great value in it. I still receive invitations to speak—basically through word-of-mouth chatter in the community.

What are your career goals?

In the aviation realm, I plan to continue speaking whenever and wherever I'm invited to do so. Much of my speaking is about how my crew and I survived a catastrophic helicopter mishap when we shouldn't have. My presentations tell the story of the mishap flight, our hours in a life raft awaiting rescue, and the many lessons we learned.

Even though my personal flying



aviation is as exciting, fulfilling, and challenging as any aviation career you can hope to pursue.

Educate yourself on every existing pathway, program, and opportunity to get into the Coast Guard and, ultimately, into Coast Guard aircraft. Locate and contact someone who's actively flying in the Coast Guard and get as much insider wisdom and guidance as you can. Be aware that you are up against a bureaucracy of sorts, so be patient, passionate, and persistent. And, of course, get razor sharp on your aviation knowledge.

Who inspires you?

The entire first shelf of my bookcase is dedicated to George Washington. I have no words to adequately describe his importance to world history or the timelessness of his lessons on leadership, character, and pure grit. I would love to have served with him. Vice Admiral Jim Stockdale, US Navy,

also comes to mind. He was a naval aviator, the senior American prisoner of war in Hanoi [in then-North Vietnam] for seven years, and a Medal of Honor recipient. When I really need a shot of strength or inspiration, I'll read one of his speeches, contemplate the man's character, and be awestruck all over again. My son's middle name is Stockdale.

In a more contemporary timeframe, I'm inspired by people in any venue who pursue excellence with sublime passion. It could be [quarterback] Tom Brady, [rock climber] Alex Honnold, or the kid tending bar at the resort who tells me he's going to own the whole place someday and really means it.

Tell us about your first helicopter ride.

I was in the Navy at the time, contemplating a cross commission to the Coast Guard and a change from fixed-wing to

helicopters. I went out on a flight in an HH-65 with a crew from Coast Guard Air Station Corpus Christi, Texas, and said, "Oh, yeah! It's going to be helicopters for me!"

What still excites you about helicopter aviation?

Maritime search-and-rescue: it's some of the coolest work in the world.

Complete this sentence: I know I picked the right career when ...

... I look over my shoulder into the aircraft cabin and see a person we just rescued looking back at me—soaking wet, cold, but wearing a big smile. They're going home to their family tonight.

Complete this sentence: I love my job, but I'd rather work for a paper company in Scranton when ...

... I get drafted to do a track-and-balance! 📍

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LEARN how PJ Helicopters envisions its mission as an operator

Robert Baumgartner, Helicopter Maintenance Technician, PJ Helicopters

Working as a landscaper for his current employer was the precursor of a career in aviation.

AFTER GRADUATING FROM California State University in Chico, Robert Baumgartner returned to his hometown of Red Bluff, California—also home to PJ Helicopters—and began work as a landscaper at the company.

“I didn’t have a clue about wanting a career in aviation,” Baumgartner says.

As he tended the grounds, he looked up and saw the company’s helicopters flying various operations, including aerial surveillance, search-and-rescue, and aerial photography, among others. “These are just beautiful machines,” Baumgartner thought to himself.

One day, PJ Helicopters had an opening for an aviation maintenance apprentice, and Baumgartner jumped at the opportunity. Now 24 years old, Baumgartner works as an aviation mechanic on PJ Helicopters’ Bell 407s. He says he loves his job and is looking forward to a long career maintaining helicopters at the company.

To support the continuation of that career, in 2022 Baumgartner won a Bill Sanderson Aviation Maintenance Technician (AMT) Scholarship, which includes a two-week training program at MD Helicopters in Mesa, Arizona. “So, with us having a few MD

helicopters at PJ’s, the scholarship is going to provide a lot of knowledge to me that I can pass on to others here as well,” he says.

Words of Wisdom to Wannabes

Baumgartner is encouraging when asked what advice he would give others considering a career in aviation maintenance.

“Come to work every day a little bit early and soak in all the knowledge you can get,” he says. “If you work hard, you get yourself


in a mindset where you know you want to succeed and you’ve just got to push for it.”

And always be open to learning, he adds, noting that listening to stories in the company break room from veteran aviation techs gave him key insights. “I was just lucky enough to get in at a good company and have a lot of good guys around me who feed that fire I feel for my work.”

Safety First

Baumgartner says the most important part of his job is safety. “Aviation is very, very rewarding and also very terrifying. The rewarding part of my job is having a helicopter come in safely,” he says. “I do the inspection. I do whatever needs to be done—even the small stuff. Then, the helicopter lifts off the ground, and I say a little prayer.”

Key to safety success, Baumgartner says, is a safety culture, which he calls “huge,” adding that it’s “a massive deal in aviation. There’s never a point where you should be an ‘I-know-everything’ kind of person. I ground myself constantly and believe in being humble.

“This is somebody’s life on this helicopter after I do my maintenance on it. In a split second, it can come down. So being humble is my biggest piece of advice.” 



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Trust We Must

It takes a team to overcome single-point failures that lead to aviation accidents.



AVIATION INEVITABLY RELIES on physics and money, not necessarily in that order. But there's an equally essential requirement that's sometimes overlooked: trust.

The act of firing up the engine(s) and lifting off the ground would be almost unthinkable for a pilot without trust in the ground crew who loaded the fuel; the technicians who inspected, maintained, and repaired the machine; the factory test pilots who identified unforeseen quirks in the aircraft's performance; and ultimately the engineers who designed the contraption in the first place—not to mention air traffic control when their services are either required or unavoidable.

Flight crews can double-check some potentially weak links, such as fuel quantity and grade, but they have no

realistic way to confirm that technicians correctly performed major maintenance on inaccessible assemblies or that certification test pilots visited every corner of the flight envelope. And following maintenance, a meticulous inspection and a carefully staged test flight are essential precautions, during which discrepancies are expected to reveal themselves right away. A few subsequent hours of trouble-free operation inspire confidence that the work was indeed performed correctly.

The Mission

On Mar. 27, 2019, an Aérospatiale (now Airbus Helicopters) AS350 B3 operating under contract to the US Forest Service was dispatched to assist with a controlled burn in the Sam Houston National Forest in Texas.

Two Forest Service employees were on board to initiate the burn by dispersing small incendiary devices at selected locations in the forest.

The Aircraft

The AS350 B3 is equipped with a three-blade, fully articulated, hingeless main-rotor system and a conventional two-blade tail rotor driven by a single Safran Arriel 2B1 turboshaft engine. The engine in the 2009 model helicopter tasked with the Forest Service contract was rated for 871 shaft horsepower (shp) and had been operated for approximately 1,750 hours since new; the airframe had been flown for approximately 5,027 hours. Its most recent inspection had been performed 72 hours earlier.

To conduct the fire-seeding operations, the helicopter had been fitted with an SEI Industries Premo MK III Plastic Sphere Dispenser (PSD). According to the manufacturer, this device's function is "to inject ethylene glycol into plastic spheres containing potassium permanganate and then immediately eject the activated sphere from the aircraft. The addition of ethylene glycol to potassium permanganate creates a rapid exothermic reaction that has sufficient intensity to ignite the plastic spheres and ignite the designated burn area."

The mechanism was mounted in the opening created by removing the helicopter's right-side cabin doors. The first Forest Service crew member straddled the PSD to

operate it, secured by a chest harness. The second Forest Service crew member sat in the left front seat, with that station's flight controls removed.

The Pilot

The 50-year-old commercial pilot also held a helicopter instructor's certificate and a current second-class medical certificate. His estimated 8,760 total hours of flight experience included 3,886 hours in the AS350 B3.

The Flight

The crew completed the PSD application without incident and had turned back toward their staging area. Weather was good, with clear skies and 7-kt. southeast winds. At 2:10 pm central daylight time, the engine abruptly lost power. The Forest Service crew member in the left front seat later told investigators, "The engine just quit, and everything went silent." The pilot entered autorotation into 70-ft. trees at a descent angle later estimated as 40 to 50 degrees.

The helicopter came to rest on its right side about 60 ft. from the point of the first tree strike: a pine tree puncturing the right side of the cockpit just below the instrument panel and stretching across the pilot's lap. The pilot was hospitalized with serious injuries. The left-seat crew member escaped with minor injuries, but the Forest Service employee operating the PSD was




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“partially ejected from the helicopter” and killed.

The Investigation

Investigators found two of the three main-rotor Starflex arms separated at nearly right angles to the blades and the tail boom broken in two places, all damage consistent with impact forces. The third main-rotor blade was “daggered into the ground.”

Flight control continuity was confirmed to the main- and tail-rotor systems. The hopper of the PSD machine was empty, its payload having been used up during the flight. The bottom of the fuel tank was crushed and breached, but with the helicopter resting on its side, about 20 gal. remained in the tank.

The engine’s axial compressor was free of foreign object debris, and the axial compressor/gas generator was easily rotated by hand. Sheared front-support bolts bound

the freewheel shaft, preventing rotation of the free turbine.

Electrical connections were secure, and all other fuel, oil, and air lines were tight and correctly safetied. However, the main fuel line between the firewall and the hydromechanical unit (HMU), which includes the fuel shutoff valve, was found loose with no safety wire installed.

Data downloaded from the digital engine-control unit after it was returned to the engine manufacturer recorded a fault for “P3 drift or engine flameout,” with rapidly decreasing N1 (low-pressure compressor) speed.

The operator’s director of maintenance reported that on Feb. 14, about six weeks before the accident, the Forest Service had requested verification of the weight and balance of all the helicopters used on its contracts. To provide this information, the operator had to empty each helicopter of fuel to determine its basic empty weight,

which in turn necessitated disconnecting the main fuel line from the HMU.

The technician who’d reconnected the line after the weighing operation on this helicopter was “confident that he had torqued and secured the line,” but no fragments of safety wire were found inside the cowling.

On Feb. 23, the helicopter failed to start, which was addressed by replacing “the engine’s igniters and/or igniter box.” No other anomalies were observed during the 25 hours it had flown since being refueled, except a brief flickering of the fuel-pressure light that the pilot reported a few days before the accident. This was resolved by briefly turning on the boost pump. The pilot was instructed to monitor the situation and report any recurrence.

A follow-up inspection confirmed that the fuel lines of all the operator’s other helicopters were correctly torqued and safety-wired.

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The Takeaway

Flying anything much more complicated than a kite requires a willingness to place faith in things the flight crew can't verify directly, from installation of the correct grade of hardware to the accuracy of charts and third-party navigation databases. The assumption of continuity can assuage some potential worries: if the main-rotor blades installed at the factory haven't been removed, they're probably still the right parts. Preflight inspections and run-up checks are therefore directed at components that might have been damaged or fluids that could have been compromised during or since the last flight. Notably, the AS350 B3 preflight checklist, as demonstrated by a factory test pilot in an Airbus Helicopters video, doesn't call for opening any of the engine cowlings but merely making sure their latches are securely closed.

Not surprisingly, the National Transportation Safety Board (NTSB) found the probable cause of the accident to have been "maintenance personnel's failure to properly reinstall and secure a fuel line, which resulted in a total loss of engine power."

It's also not surprising that the technician who connected the line felt sure he'd torqued and safety-wired it as required. Perhaps he did—all the operator's other helicopters were found to be airworthy. It's also possible he simply couldn't imagine, much less remember, having missed such a crucial step.

The aviation industry has put immense effort into reducing the risk of single-point failures, but they haven't been eliminated and may never be. Some large operators require that another (usually more senior) maintenance technician inspect and sign off on crucial maintenance tasks, but even that safeguard has occasionally fallen short: the failure in October 2019 of a Hawker 800XP jet's nose gear to extend was traced to the heavy-check maintenance provider's failure to install the washer, nut, and cotter pin on the drag stay during overhaul, although a

quality-assurance inspector had signed off on the work.

The well-known tendency to see what one expects to see has proven hard to disrupt, particularly when similar assemblies are inspected in quick succession. Because the oversights are so rare, imposing further layers of scrutiny risks increasing overhead more than it improves safety.

The near-universal availability of digital photography at least offers maintenance

personnel an option for rebutting accusations. Clear photos of the finished assembly from whatever angles are needed to document essential details, tagged with date and time, could settle the kind of question raised by the Texas accident—and just taking the picture might prompt a fresh look at the work. Cell phones have cameras, and almost everyone in aviation carries one. Taking a few quick snaps might not be a bad idea. [📷](#)



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No More Excuses

Always do your safety homework: risk management doesn't take a sabbatical.

IT'S TIME WE ROTORHEADS STOP LAMENTING or seem surprised when things go bad. Instead, we need greater focus on making positive change for our industry. And yes, each of us plays a role in the outcome.

The fatal accident rate in the helicopter industry still isn't improving like it should be. In its cumulative FY 2022 rotorcraft accident summary, October 2021–May 2022, the FAA reported 71 accidents and 15 fatal accidents, with 26 fatalities, in the United States. The FY 2022 estimated fatality rate through May was 1.35 per 100,000 hours—way too high!

In December 2021, the industry experienced four fatal accidents with a loss of seven lives. According to the FAA data, the number of fatal accidents was the highest for any December since FY 2005, and the seven fatalities were the second highest recorded for a December in the past 10 fiscal years.

These statistics are alarming and should motivate you to take stock of your own processes and the processes

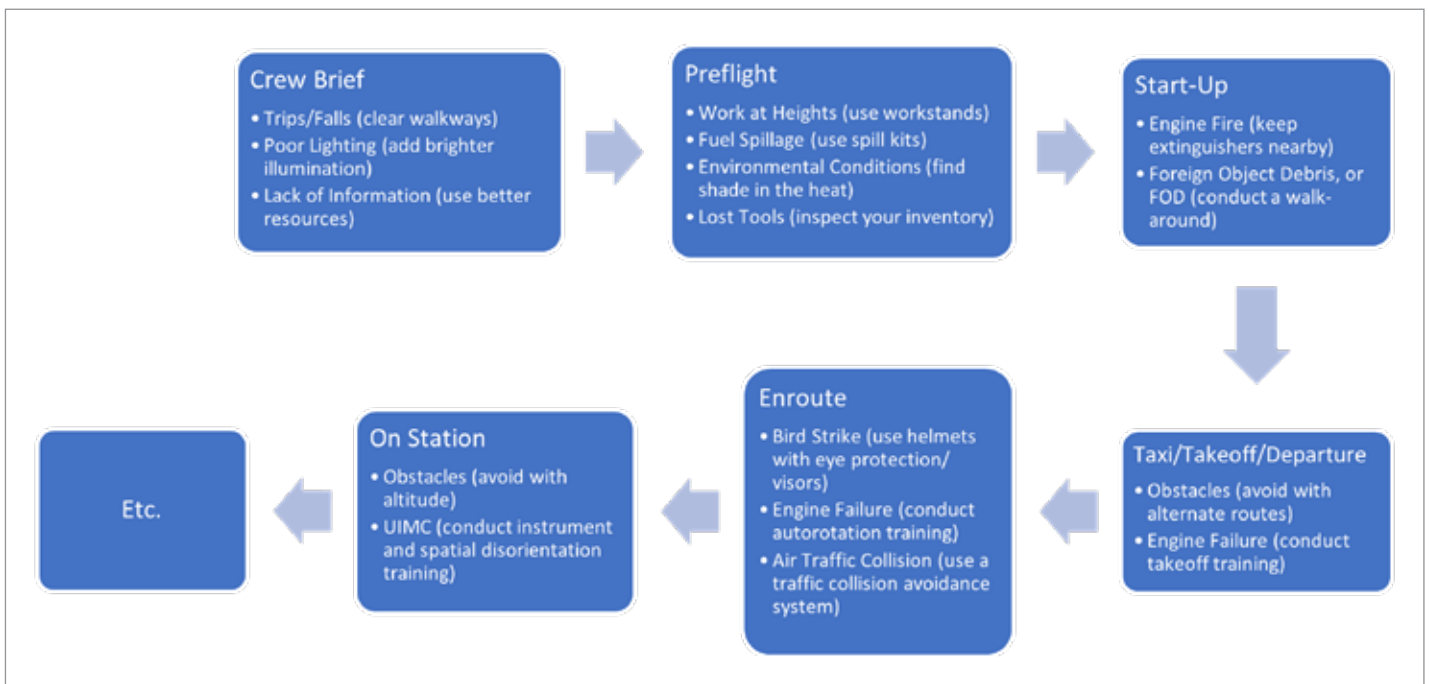
in your organization. We need to stop making excuses and always do our safety homework. Risk management doesn't take a sabbatical.

The 7 Ps

When I was young, I distinctly recall my father—who spent a career in the US Navy—often using an old military adage at home. Perhaps you've heard it: "Prior Proper Planning Prevents Piss-Poor Performance." The saying originated in the British Army and can be recognized nowadays in several variations.

I was fortunate to be reminded of this expression in my own military profession by instructors who constantly reinforced its importance (and not always with a sympathetic delivery). No matter what version of the adage you might be familiar with, it speaks to the need for preparation in producing positive outcomes.

Consistent, successful performance of aviation activities doesn't happen because the work is easy or good luck is with you. Successful performance results from



constantly doing your homework. As Todd Conklin, a senior advisor at the US Department of Energy's Los Alamos National Laboratory, says, "Safety isn't the absence of accidents. For us, safety is really the presence of defenses. We have to move away from reacting to consequence and start responding to context."

The context Conklin refers to is the connection between all the factors leading to a negative result in a complex operating environment. Having a deeper understanding of all the mission components and how the overall aviation system influences performance is critical to an individual or organization's ability to create and implement the proper defenses.

Knowing each step needed to accomplish a task (in flight or on the ground) is a vital element of risk mitigation. We need to remove the guesswork and disorder from our daily operations to fully appreciate the potential for hazards.

When we look at industry safety management guidance regarding hazard identification, the system description is almost universally accepted as the primary method for initially understanding the aspects of the operation that might be exposed to harm. Unfortunately, many of us don't spend the necessary time to complete this very important activity (i.e., we don't do our homework). We skip it altogether, make only a cursory effort to finish it, or think it's too late in our business life cycle to do it.

This approach often results in a reactive nature within our organization because we never consider or anticipate what might go wrong. Instead, we wait for the consequence rather than reduce the likelihood of a negative event by preparing for it beforehand.

As Conklin explains, "Focusing on the consequence is not the priority because it has already happened—it is too late to stop it. If we spend time reacting to the consequence, what we're missing is the opportunity to respond to context."

Remember, the context is all the factors contributing to or enabling the

consequence. In other words, the context is the environment in which the failure is allowed to occur.

Using System Descriptions to Improve Safety Outcomes

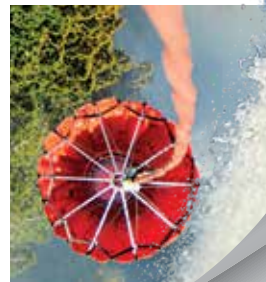
The FAA describes systems as "integrated networks of people and other resources performing activities that accomplish some mission or goal in a prescribed environment."

Any combination of elements can affect a system at any given time. This is especially true in our aviation system: operations are dynamic and often unscripted, resulting in risk being extremely fluid. As a result, the underlying processes or activities of your system need to have safety concepts integrated into their design if you are to expect optimal safety outcomes.

So, in developing your system description, ask the context question "How does



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this happen, and what affects it?” for each of your work tasks. This step will help you better understand context and produce viable solutions, or safety capacity.

Using a simple flowchart can help you visualize each of the steps in this process and account for all your system’s activities (see sample, p. 72). As an example, for a patrol-type mission, you might begin documenting the process with the crew brief, followed by the aircraft preflight. Then, add the start-up, taxi/takeoff/departure, en route, on station, and so on. For each of these steps, you’ll want to brainstorm the different possible hazards and the factors contributing to them.

During the preflight, for example, you might list as potential hazards working at heights, fuel spillage, unfavorable environmental conditions (heat or rain), missing tools, and blown debris from nearby aircraft. Or, during the enroute phase you might identify the potential for bird strikes, engine failure, air traffic collision, weather-related issues, and airborne obstacles.

Once you’ve identified the hazards, you can assess the risk of them occurring and their potential impact. Last, you’ll want to identify the controls or mitigation that will reduce the likelihood of any of these hazards causing harm (such as additional training, alternative routes, new equipment, and the like).

Creating a flowchart may seem like a time-intensive way to document processes, and maybe that’s why so many organizations don’t complete this crucial step. Often, they say it’s too time-consuming; they have other, more important things to do; their operation is too small for it to matter; or they already *know* what they need to do. *Everybody hates to do their homework!*

It’s also common—when organizations do document their processes—for them to neglect to include the people performing the work and the process owners (typically the department or division leaders, such as the director of operations or the director of maintenance). Reasons given include the individuals are never available or it’s inconvenient to include them. But involving the people who perform the work will help you more effectively identify what takes place, because they’re the specialists and are closest to the potential hazards your system faces.

The Rewards of Doing Your Homework

I get that you’re managing a business and trying to generate revenue. However, I urge you to think of the impact an unanticipated hazard event resulting in damage, injury, or—worst case—a fatality could have on your organization. Looking beyond the harm to your reputation and finances, consider first your employees and families (yours and theirs), the emotional strain such an event could place on them, and the potentially lasting effects (if the event doesn’t cause you to cease your operation).

I can’t promise that completing a comprehensive system description will be a panacea, but I can promise that

by composing one you’ll produce greater awareness, build engagement, and gain perspective on and better understanding of the context in which you operate. As a result, your organization will


improve its margins for safety, produce more reliable outcomes, and create success by planning for the necessary support.

Numerous owners and managers who’ve completed system descriptions have told me they discovered various hazards and solutions they hadn’t previously thought of, despite being in business for many years.

Be aware: maintaining system descriptions is a continuous work in progress; you should expect to review them regularly for adequacy and change. But with your processes documented, you now have an effective tool for training, budgeting, and demonstrating your diligence to the public, customers, insurance providers, lawyers, and regulators.

The work involved in following this approach to hazard identification isn’t overwhelming. For it to provide real perspective, however, every operator—large or small—must take it seriously. You’ll find it’s a much more effective and less costly method of risk management than waiting for the consequence to occur.

Our industry and your operation depend on the ability to effectively manage the risk exposures we encounter every day. By doing a little extra homework, you’ll be on a path to safety and reliability.

The Los Alamos National Laboratory’s Conklin said it best: “Create stability and have the capacity to fail safely.” 

With your processes documented, you now have an effective tool for training, budgeting, and demonstrating your diligence to the public, customers, insurance providers, lawyers, and regulators.



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Managing the Dirty Dozen

We must do all we can to minimize human errors.



WATCH
the Oct. 27,
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Work webinar
for more on
the Dirty
Dozen

IT'S WELL DOCUMENTED that approximately three out of four aviation maintenance–related mistakes revolve around human factors. Folks, that's three-quarters, or 75%, of maintenance mistakes—mistakes that are completely preventable.

These aren't material failures or design flaws; they're errors committed by you and me, the aircraft maintenance mechanic/technician—errors that are within our control.

You've no doubt heard of the aviation maintenance "Dirty Dozen." If not, here's a quick rundown of this infamous group of 12 traps to avoid.

1. Lack of Communication: Listeners typically absorb only a third of what they hear. To optimize your

crew's retention rate, provide the important information up front and summarize it at the end of your presentation.

- 2. Complacency:** Complacency stems from being overly confident about a task you've done many times before. Beware of and avoid anticipating what you'll see or what will happen as you do your work. Instead, expect to see something different each time you perform your tasks.
- 3. Lack of Knowledge:** If you're light on training or experience, let someone in your chain of command know you're not comfortable with your level of knowledge to perform a task properly and ask for guidance or assistance.

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4. **Distractions:** Anything that diverts your attention from the job constitutes a distraction. Focus on the task at the moment and set aside time to handle distractions. I bet your phone is your biggest distraction. Learn how to harness it!
5. **Lack of Teamwork:** If you and your crew are unable to come together to complete a common task, your work will suffer. Everyone has an opinion. Some of you will have more experience than others, but all of you bring something valuable to the table or you wouldn't be there. Learn how to communicate respectfully with one another and appreciate your team members' input.
6. **Fatigue:** You know yourself better than anyone, and that includes knowing when to stop working. Recognize when you're taking a shortcut you wouldn't normally take. If you're working with someone else, recognize when they, too, aren't performing as usual and speak up.
7. **Lack of Resources:** If you don't have what you need to do the job correctly, mistakes can happen. Usually, in our field, the resource we're most often short on is time.
8. **Pressure:** Do you find yourself cutting corners to meet someone else's expectations? If so, stand up for yourself.
Be clear about the task and what you feel you need to complete the job successfully. That may be more time, extra help, or additional material resources such as parts or tools.
9. **Lack of Assertiveness:** Speak up when you're unclear about expectations or are clear about expectations but aren't being forthright about what it will take to complete the job within the expected parameters. If you don't relay your concerns, it's unlikely anyone else will.
10. **Stress:** Stress is the perceived inability to meet a demand. Think through what's causing your stress and take measures to alleviate it. Share your thoughts with someone on your team who can help reduce your stress. Develop a realistic plan and follow it.
11. **Lack of Awareness:** You don't know what you don't know. Educate yourself as much as possible about a task before performing it.
12. **Norms:** These might include unwritten rules, guidance, or expectations that should be brought into question. "We've always done it this way" isn't a good enough reason to continue a past approach. Follow good safety practices and discourage negative behavior and thought patterns in your shop.

I've put my own twist on the Dirty Dozen because sometimes seeing or hearing something a different way resonates with people. Managers and mechanics/technicians can scale down the Dirty Dozen to small, manageable areas by doing the following:

Managers

- Communicate your job **expectations** to your team (tasks, parts, tools, and time).
- Train your mechanics/technicians and require them to do recurrent **training**.
- Manage and minimize your team's exposure to **distractions**.
- Promote **teamwork** and train for it. Human resources departments and private businesses know professionals who specialize in team-building training.
- Clearly illustrate the **norms** you want to maintain in your shop. Make them tangible and accessible, such as through safety programs and printed materials.


Aviation Mechanics/Technicians

- Ensure that you understand the **job requirements**, including parts, tools, time, and assistance, if needed.
- Adjust your **expectations**. Don't expect the same outcome on similar jobs. Think inspections! Just because something was OK the last time doesn't mean it will be this time.
- Seek **education**, on-the-job training, recurrent training, or assistance from someone who's performed the given task correctly many times before.
- Minimize **distractions** and follow shop standards. Set aside time to check emails, texts, or calls *after* completing important work tasks.
- Take advantage of your company's **training** opportunities.
- Set your own **personal standards** and stick to them. Do the job in accordance with published and accepted practices, and set your own pace. Don't give in to pressures that cause stress and fatigue.

As you can see, boundaries whose lines shouldn't be crossed exist for both managers and mechanics/technicians. If boundaries are addressed and managed properly, the rest will fall into place.

We must do all we can to minimize maintenance and pilot errors. These are errors we should be able to control.

If we eliminate the human-factor aspect of accidents and incidents, we'll soon achieve the seemingly elusive goal of zero crashes, because material or aircraft component failure is very rare these days.

Fugere tutum! 

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