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ON THE COVER: The US Coast Guard works in some of the worst weather and sometimes in the sunshine, too. HAI Director of Public Relations and Communications Dan Sweet photographed this Airbus MH-65E on patrol as it passed the Cape Arago lighthouse on Oregon's southern coast, bathed in the glow of a late-summer evening.

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Mark Bennett worked for McDonnell Douglas Helicopter/ Boeing for a decade, then in 1999 cofounded an aerospace-only marketing agency. With 30-plus years of photography and design experience serving the aerospace and defense industries, he founded AeroMark Images to shoot and write for both industry and media.

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Jill Browning
Jill Browning is cochair of the US Helicopter Safety Team's Helicopter Safety Enhancement 127A, Recognizing and Training Degraded Visual Environment (DVE) Conditions Conducive to Spatial Disorientation (SD). She is an experienced air safety investigator and the senior manager of aviation safety for Lockheed Martin–Sikorsky. She supports various commercial and military aircraft, including the S-61, S-92, S-76, H-60/S-70, CH-148, and CH-53E. A US Air Force C-130E/J instructor-pilot combat veteran, Jill holds a commercial multi-engine instrument rating and is a CFI/II/MEI (multi-engine instructor).

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Cade Clark
HAI's VP of government affairs, Cade Clark has directed association advocacy programs for more than 20 years. Growing up, Cade worked at an FBO where he learned to fly, washed planes, got in the mechanics' way, idolized the old-timers and their stories, and deepened his love for all things general aviation.

Jaasmin Foote
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 bachelor's degree in English and is currently pursuing her master's in marketing. Jaasmin is responsible for all the cool posts on HAI's social media platforms. Follow us, drop by, and say hi!

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After an aviation career in the US Army and Coast Guard, Chris Hill oversaw aviation safety management systems throughout the USCG as aviation safety manager. He holds an ATP rating and has logged more than 5,000 flight hours, primarily in military and commercial helicopters. Chris joined HAI in 2018 as director of safety.

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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 editor of *Air Cargo World* and is currently a contributing editor to the Aviation Week Network.

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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 AOPA's Air Safety Institute, where he authored eight editions of its *Joseph T. Nall Report* and nearly 500 articles. He'd rather be flying.

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Paul Koscak is a freelance writer and an aviator. He holds CFI, CFII, and MEI (multi-engine instructor) ratings and has 2,500 total flight hours. A former newspaper reporter and editor, broadcast journalist, and retired US Air Force Reserve officer, Paul recently retired from the US Customs and Border Protection's Office of Public Affairs.

Gina Kvitkovich
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, she is responsible for every error in the magazine that you're reading—and for some of the good stuff, as well.

WRITE FOR ROTOR

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.

James T. McKenna
James T. McKenna has written about aviation since penning a 1978 article on the Wright brothers display at John F. Kennedy International Airport (KJFK) for New York City's Aviation High School newspaper. An award-winning journalist, he has covered airlines, military aviation, spaceflight, and helicopters for *Aviation Week*. Twice editor in chief of *Rotor & Wing,* he has written for the Flight Safety Foundation, *The New York Times, USA Today, Vertical,* and *Vertiflite.* He specializes in covering accident investigations and safety issues.

Zac Noble
Zac Noble, HAI director of flight operations and maintenance, has more than 37 years of experience as a pilot and mechanic. He spent 11 years flying in the air medical sector before coming to HAI and is a veteran of the US Army, where he flew helicopters and multi-engine airplanes. Zac is a dual-rated ATP, a dual-rated CFII, and an A&P mechanic with IA privileges.

Terry Palmer
Terry Palmer is a senior consultant in aviation business strategy, safety, and training and the chair of HAI's Training Working Group. Currently, she serves as the training program manager for the Airborne Public Safety Association, developing and coordinating training opportunities, events, and resources for aviation departments in the public-service sector.

Tyson Phillips
Tyson Phillips is cofounder of AT Systems, a Dallas, Texas–based aviation training company, and co-inventor of the ATS Device, a patented IIMC and DVE training device. Tyson cochairs the US Helicopter Safety Team's Helicopter Safety Enhancement 127A, Recognizing and Training Degraded Visual Environment (DVE) Conditions Conducive to Spatial Disorientation (SD). A combat veteran of multiple deployments with the Oklahoma Army National Guard (OKNG), he currently serves as an instructor pilot for the OKNG. His aircraft qualifications include the UH-60 A/L/M, multiple versions of the US Army C-12, and the civilian EC145.

John Shea
John Shea joined HAI as director of government affairs in 2019. He came to HAI from the National Association of State Aviation Officials (NASAO), where he was interim president in 2018 and lead government affairs representative since 2017. Previously, as a legislative staffer, John advised multiple members of Congress on transportation policy.

Dan Sweet
Dan Sweet joined HAI as director of communications and public relations in 2017. He previously served in the US Navy as a photojournalist. After leaving the Navy, he worked for Oregon-based Columbia Helicopters, performing public relations, communications, and trade show management work for more than 22 years.

Katia Veraza
Katia Veraza is HAI's manager of government affairs and regional relations. Before joining the association, Katia was a managing consultant for government affairs. She earned her master's degree in political science from the Autonomous University of Barcelona.

Jayne Wood
Jayne Wood joined HAI as assistant director of publications and media in November 2022, returning to the part of communications she loves—writing, editing, and publishing—after more than a decade as communications director for a nonprofit association. Before that, she was a communications consultant serving both associations and corporations.

By Jeff Smith

A Midyear Report

Six months into my term as chair, HAI is moving forward!

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.

SINCE I BECAME CHAIR OF HAI ON JUL. 1, 2022, it's been a very busy time for the vertical aviation community, and HAI has been there, stride for stride. With a staff of just over 30, we were able to present at more than two dozen vertical aviation events around the world since the beginning of July, delivering HAI's vision of an economically vibrant, diverse, and sustainable global vertical aviation industry.

In November, the HAI Board of Directors and some staff members went to Cologne, Germany, to assist the European Helicopter Association and the European Union Aviation Safety Agency in holding EUROPEAN ROTORS 2022. In just its second year, this regional trade show had more than 4,000 in attendance to see 15 helicopters and several eVTOL mock-ups on the show floor and take in hours of trainings, panel discussions, and briefings.

Later in November, James and I accompanied HAI staff to Boise, Idaho, to host the HAI Aerial Work Safety Conference. This was the first year for the expanded conference, which previously focused on aerial firefighting and now includes the heavy-lift and construction sectors. James and I toured the US National Interagency Fire Center, which coordinates wildland firefighting policies and activities for eight federal and state government agencies. Their emphasis on sharing supplies, equipment, and personnel to achieve efficient and cost-effective operations is an example to be imitated.

This year wasn't without its challenges. Members across the globe see workforce development and the high cost of aviation insurance as serious challenges to their ability to do business. As a result, the HAI Board of Directors has established working groups to coordinate an industry response to both issues. I was happy to see dozens of HAI members apply for seats on each of these groups, and I wasn't surprised: people who are attracted to our industry want to steer their own ship and be directly involved in creating their future.

Access to airspace remains a concern. Several pieces of legislation introduced and reintroduced at the federal, state, and local levels have been attempts to reverse the doctrine of federal preemption. This long-standing provision of the US Constitution holds that some activities, such as defense, diplomacy, and aviation, are reserved for the federal government. One example is New York's "Stop the Chop" bill, which would have allowed anyone involved in helicopter operations—including operators, FBOs, manufacturers, state agencies, and line personnel—to be sued for helicopter noise pollution, even if the activities complied with all federal laws and regulations. The HAI Government Affairs team of Cade Clark, John Shea, and newcomer Katia Veraza has done an amazing job of playing whac-a-mole and presenting all the reasons why proposals like these should not become law.

Finally, the Board of Directors has completed an extensive review of our association's strategic plan. The resulting plan for executing on HAI's mission contains five initiatives that the HAI board and staff have already started working on. The board also voted to begin a rebranding of the organization, to keep us aligned with the changes in our dynamic industry.

I'm only 6 months into my 1-year term as HAI chair, and I'm very happy with our course and speed. From my colleagues on the board to the HAI staff and the incredible members who volunteer their time to improve the industry, I am proud to work with such an amazing team.

By James A. Viola

Giving Thanks

Our industry has much to be thankful for—and much for which we should be thanked.

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.

THE VAST MAJORITY OF VERTICAL AVIATION FLIGHTS support society's needs. Our contributions to economic prosperity, security, and quality of life require the hard work of every person in our global industry, and it is time they receive some appreciation. So I want to express my gratitude—on behalf of society—to everyone with a role in our industry.

I will start with our first responders. Thank you to the air ambulance teams who sometimes land at well-lit, well-marked heliports and sometimes navigate to the side of a dark highway to take on critical accident victims. Please accept my thanks for your efforts to help all those who are most likely experiencing the worst moments of their lives.

Thank you to the airborne law enforcement teams. Whether you support officers on the ground, conduct search-and-rescue operations, or deploy specially trained officers into extreme situations, I am grateful you are in the air to protect us.

Next, I extend my thanks to the firefighters. Firefighting used to be seasonal work, with downtime to recover and plan for the next season. Now the fire season is longer, hotter, and broader, covering more territory. Yet you endure long, hot, smoky days to save lives and property.

Of course, I have to give my former colleagues, the military aviators, a shout-out. Whether you are in combat, providing support after a natural disaster, or responding to a call for assistance from a storm-battered boat, you are there when we need you.

To those who work to build and maintain our electric grid, I say thank you. Modern society depends heavily on electric power, and helicopter crews play a big part in making that power available to us at the flick of a switch.

Some of you work in agriculture and aerial applications, providing food for our tables. Many people do not realize the contributions you make to help farmers be efficient and productive.

The people in the helicopter usually get all the recognition. Many others in our industry contribute too. To the accountants, the record keepers, the human resources teams, and other staff who handle the paperwork and keep the paychecks coming: your support is critical to your team's success.

Thank you to the regulators. I am confident you have not heard that in a while! I am truly grateful for your efforts. While we can make more progress on harmonization, we have our regulators to thank for the fact that our industry functions as a global community with essential guardrails in place for safety, licensing, and certification.

To the maintenance crews who keep our aircraft airworthy and our pilots and passengers safe: whether you work in a hangar or out in a field, you deserve more credit for your contributions to our industry.

I also want to acknowledge the HAI staff for their dedication in serving the vertical aviation industry. That passion, shared by HAI staff and members alike, is one of the reasons I am confident about our future.

Finally, and most importantly, I thank the HAI membership. Each one of you adds to the strength of our collective voice. Because of your support, HAI is a pacesetter for our industry. If you have any suggestions for how HAI could better serve you in 2023 and beyond, please contact me at president@rotor.org.

By Cade Clark, John Shea, and Katia Veraza

New Year, New Opportunities

A new year promises further gains for the vertical flight industry.

SINCE THE PREVIOUS EDITION OF ROTOR, the HAI Government Affairs team has steadily increased its efforts at all levels to keep your rotors turning. In addition to tracking the 2022 US midterm elections and their effect on the vertical flight industry, we're promoting HAI members' interests in the FAA reauthorization bill and in aviation workforce development, enhancing our plans to represent the industry regionally and locally, and furthering HAI's initiatives for improving relations between the rotorcraft community and our neighbors on the ground.

Visit HAI's Legislative Action Center
rotor.org/lac

2022 US Election Outcomes

By now, the US midterm election dust has settled and the political landscape for 2023–24 has been established. Republicans took control of the House of Representatives after gaining 10 seats; the balance of power in the lower chamber now sits at 222 Republicans to 213 Democrats.

In the Senate, Democrats expanded their majority by one seat after flipping Pennsylvania and holding on to Arizona, Nevada, and Georgia. The balance of power in the upper chamber now sits at 51 Democrats to 49 Republicans.

Four states changed party control in the governor's mansion—one for Republicans and three for Democrats. Republicans now hold 26 of the 50 governor seats. Additionally, members in 88 of the country's 99 state legislative chambers were up for election across 46 states. Democrats gained control of four chambers—the Michigan House and Senate, Minnesota Senate, and Pennsylvania House—bringing their total to 40, and a bipartisan coalition gained control of the Alaska State Senate. With the loss of those five chambers, Republicans now have control of 56 state legislative chambers.

While the outcome of the 2022 midterms was far from the "red wave" many had predicted, it certainly changed the Washington dynamic. With Republicans controlling the House, GOP leadership will set the floor agenda and make committee assignments.

The 118th Congress is off to a historic start. Mitch McConnell (R-Ky.) is now the longest-serving Senate leader in history. Meanwhile, Rep. Hakeem Jeffries (D-N.Y.-8) has been named House minority leader. Jeffries, the first Black to lead a party in Congress, replaces Rep. Nancy Pelosi (D-Calif.-11), who led her caucus for the last 20 years.

For the first time in a century, the Speaker of the House was not elected in a single ballot. After enduring a four days-long revolt from a bloc of 20 far-right conservatives, Rep. Kevin McCarthy (R-Calif.-20) officially secured the speaker's gavel on the 15th ballot. To win over his detractors, Speaker McCarthy made major concessions in the House rules package, offered seats on the powerful Rules Committee, and agreed to several other prominent committee assignments.

The last time there were more than nine ballots was in 1856, and it took 2 months and 133 votes to elect a leader. We're relieved that wasn't the case in 2023—Congress has important work to do, including reauthorizing the FAA! However, all the Speaker drama has certainly led to a slow start for the 118th Congress.

While many committee chair roles have been decided at the time of this writing, many are yet to be named. Here is what we know: Rep. Sam Graves (R-Mo.-06) will be the next chair of the House Transportation and Infrastructure Committee, while Rep. Rick Larsen (D-Wash.-02) will become the next ranking member. Rep. Garret Graves (R-La.-06) will be the next chair of the Aviation Subcommittee.

Democrats retained control of the Senate, but several committee leadership posts will take place in the new Congress. Sen. Roger Wicker (R-Miss.) will leave his

post as ranking member of the Commerce, Science, and Transportation Committee for the top Republican position on the Senate Armed Services Committee.

Sen. Ted Cruz (R-Tex.) will vacate his current position as ranking member of the Commerce, Science, and Transportation Subcommittee on Aviation Safety, Operations, and Innovation to take the position of ranking member of the Commerce, Science, and Transportation Committee. We look forward to working with the next ranking member of the Aviation Safety, Operations, and Innovation Subcommittee.

FAA Reauthorization in Focus

The FAA is currently operating under a 5-year authorization, which expires Sep. 30, 2023. Passing an FAA reauthorization bill is considered one of a small number of "must-pass" bills for 2023. Leaders from both authorizing committees have stated their firm commitment to passing a multiyear bill before the deadline.

Committee leaders began preparing for the FAA reauthorization process in the summer of 2022 by reaching out to industry members and requesting their priorities for the bill. HAI provided an extensive list of priorities under multiple topics, including advanced air mobility (AAM), airspace access, aircraft noise, federal preemption, infrastructure, safety solutions, spectrum policy, sustainability, uncrewed aircraft systems (UASs), and workforce development.

The committees will soon convene multiple hearings on many of these topics, which will allow the members of Congress to hear directly from industry and regulators. While these hearings take place and the reauthorization bill is drafted, the HAI Government Affairs team will work closely with committee staff to provide input and advocate HAI's policy positions when meeting with committee members.

The last FAA Reauthorization Act, passed in 2018, helped pave the way for expanded drone use. This next bill will do the same for advanced air mobility, with committee leaders having stated their intention to dedicate a section of the bill to AAM. This development presents a significant opportunity for HAI to support the future of vertical aviation. The bill is expected to have a section solely on general aviation issues as well.

Regional Representation

In October, Katia Veraza joined the Government Affairs team as manager of government affairs and regional relations. She will play a vital role in the development and execution of advocacy strategies targeted to key government stakeholders at the regional, state, and local levels. Additionally, Veraza will support, coordinate, and promote HAI's federal and international legislative and policy priorities.

Veraza testified in November before the New York City Council's Committee on Economic Development and Committee on State and Federal Legislation. The hearing was focused on oversight of the two city-owned, public-use heliports: the Downtown Manhattan Heliport and the East 34th Street Heliport.

Our team explained how Manhattan's heliports are critical components of New York's transportation network, support the operation of the city's businesses, and contribute to the growth of the economy. We explained the broad range of helicopter operations conducted in the city and how they play an essential role in saving lives and protecting the community.

Speaking about innovative technological advancements, we informed the members of opportunities that AAM and electric vertical takeoff and landing (eVTOL) aircraft would bring to the city. On the issue of community compatibility, Veraza touted HAI's Fly Neighborly program and expressed HAI's continued commitment to forge relationships between operators and communities.

Council members at the hearing were primarily focused on helicopter noise complaints. During the hearing, council members promoted various bills and resolutions that would ban all "nonessential" helicopter operations and effectively shut down the two heliports.

The two witnesses representing the Economic Development Corp. (EDC) provided council members with an overview of the data collected from the city's noise complaint system. EDC explained that the data showed that most helicopter noise complaints could be attributed to air tour operations originating out of state. In response, council members explained that they were working with officials in New Jersey to severely restrict air tour and other helicopter operations.

While the hearing was highly contentious, HAI was pleased to be able to represent our industry. The HAI Government Affairs team will continue to engage legislators and policymakers in New York and New Jersey to defend the industry and improve relationships with neighboring communities.

Community Compatibility

Whether it's the helicopter of today or the AAM aircraft of tomorrow, vertical flight operations should always consider the industry's responsibility to the wider community. HAI's Fly Neighborly initiative is a voluntary noise reduction program that seeks to create better relationships between communities and helicopter operators by establishing noise mitigation techniques and increasing effective

ADVOCATING FOR YOU

continued

communication. Flying safely and in compliance with regulations isn't enough. We must also Fly Neighborly; it's in everyone's best interest.

As part of HAI's efforts on Fly Neighborly, we work with other industry stakeholders to help mitigate helicopter noise. On Jun. 24, HAI, partnering with the Eastern Region Helicopter Council (ERHC), introduced a new helicopter noise initiative for the Washington, D.C., metro area. We established a helicopter noise complaint system for individuals in and around the region to share their concerns.

HAI and the ERHC aim to work with the Washington, D.C., community to review and process noise complaints and use this data to help mitigate helicopter noise. We understand that affected residents desire immediate answers to their noise questions and complaints. Using available flight-tracking data, the system will accurately identify likely aircraft raising concerns and all associated data. The new initiative focuses on airport and aircraft noise complaint–management solutions, noise abatement–procedure compliance monitoring, and related government and community affairs.

HAI Members

HAI is here for you! Contact advocacy@rotor.org with your legislative challenges.

Aviation Workforce Development

Due to pandemic-related economic disruptions, many seasoned pilots and technicians retired early over the past year. This development has only exacerbated the shortage of skilled personnel the industry needs to operate safely and efficiently. Congress, the FAA, and industry members must stay focused and recognize that developing the next generation of pilots and maintenance technicians requires a long-term commitment.

We appreciate Congress setting up the Aviation Workforce Development Grants programs in the 2018 FAA Reauthorization Act and likewise express gratitude for the funds made available for the programs. The grants have encouraged collaboration between schools, aviation companies, unions, and government to find innovative solutions to close the existing skills gap and help more Americans pursue aviation careers. That, in turn, will contribute to the long-term efficiency and competitiveness of US aviation, as well as to the country's overall economic health.

HAI encourages congressional support for innovative state programs that enable outreach to and education for students to get started in the aviation industry. One such effort is the Utah Rotor Pathway Program (URPP), which serves as a first-in-the-nation model for education and training programs preparing high school students for STEM careers in rotary-wing aviation.

The URPP provides students an avenue to earn college credits and learn skills specific to rotary-wing aviation while participating in technical classes and hands-on learning at the secondary-school level. The program has expanded to 32 high schools in Utah, and the number of industry partners continues to grow as well.

This year, HAI participated in an Aviation Workforce Development Roundtable in Salt Lake City, Utah. The event, organized by Rep. Burgess Owens (R-Utah-04), discussed ways to build on the success of the URPP. The roundtable, which consisted of helicopter operators, educators, and government stakeholders, convened to identify federal resources available to support aviation workforce efforts.

We are deeply grateful to Rep. Owens for his efforts to address the continuing shortages of pilots and maintenance personnel in Utah and across the nation. Owens remarked that he enjoyed sitting down with statewide aviation experts to address the workforce shortages affecting this critical industry and ways we can continue to benefit from successful resources such as the URPP, the nonprofits Choose Aerospace and Women in Aviation International, and the FAA Reauthorization Act. We look forward to expanding HAI's Rotor Pathway Program across the nation in 2023.

As we enter the new year, we'll continue to work ceaselessly to support policy changes that will benefit the vertical flight industry and oppose proposals that could harm it.

HAI BRIEFS

SafetyScan for HAI Gives Members Free Access to Global Accident Reports

HAI HAS INTRODUCED A NEW BENEFIT exclusively for its members: an accident and incident research (AIR) tool developed by Swiss company AeroInside.

Called SafetyScan for HAI, the tool provides free access to a global database of rotorcraft accident, incident, and occurrence reports. The database includes some 6,500 reports from seven countries with more countries to come.

"It's a simplified, all-in-one database," says Chris Hill, HAI's senior director of safety. "You don't have to slog through irrelevant reports from databases from different accident investigation agencies. You can conduct all your searches from a single portal customized for rotorcraft."

SafetyScan for HAI was developed to be fast and intuitive. Users can narrow their search by country, time frame, investigation status, helicopter manufacturer, and engine manufacturer and type, as well as other parameters. SafetyScan will return a list of occurrences with date, location, aircraft, and engine model.

SafetyScan for HAI is free to all HAI members and their employees. Visit bit.ly/SafetyScan.

Each occurrence also includes an overview that gives users a few more facts and a link to a preliminary report or the full report. The reports highlight probable cause and contributing factors, and collectively contain nearly 300 safety recommendations and actions. For users who want more customization, AeroInside offers SafetyScan Pro. The Pro version provides deeper access and expanded features, including advanced search filtering, immediate notifications, report tracking, and an embedded newsfeed. HAI members receive a 20% discount on SafetyScan Pro. And for HAI members who require modifications such as a direct ➤

What's more exciting than seeing a vintage MH-65D Dolphin? Seeing the strong and confident women who fly the aircraft and maintain it teaching young girls that they can do the same when they grow up! This video from HAI's Instagram account was taken at the Women in Aviation International (WAI) Girls in Aviation Day on Oct. 4, 2022. It racked up 171,030 views and 13,720 engagements and reached 165,618 accounts. As a gold sponsor for this year's event, HAI appreciates WAI's efforts to help young girls envision an aviation career for themselves.

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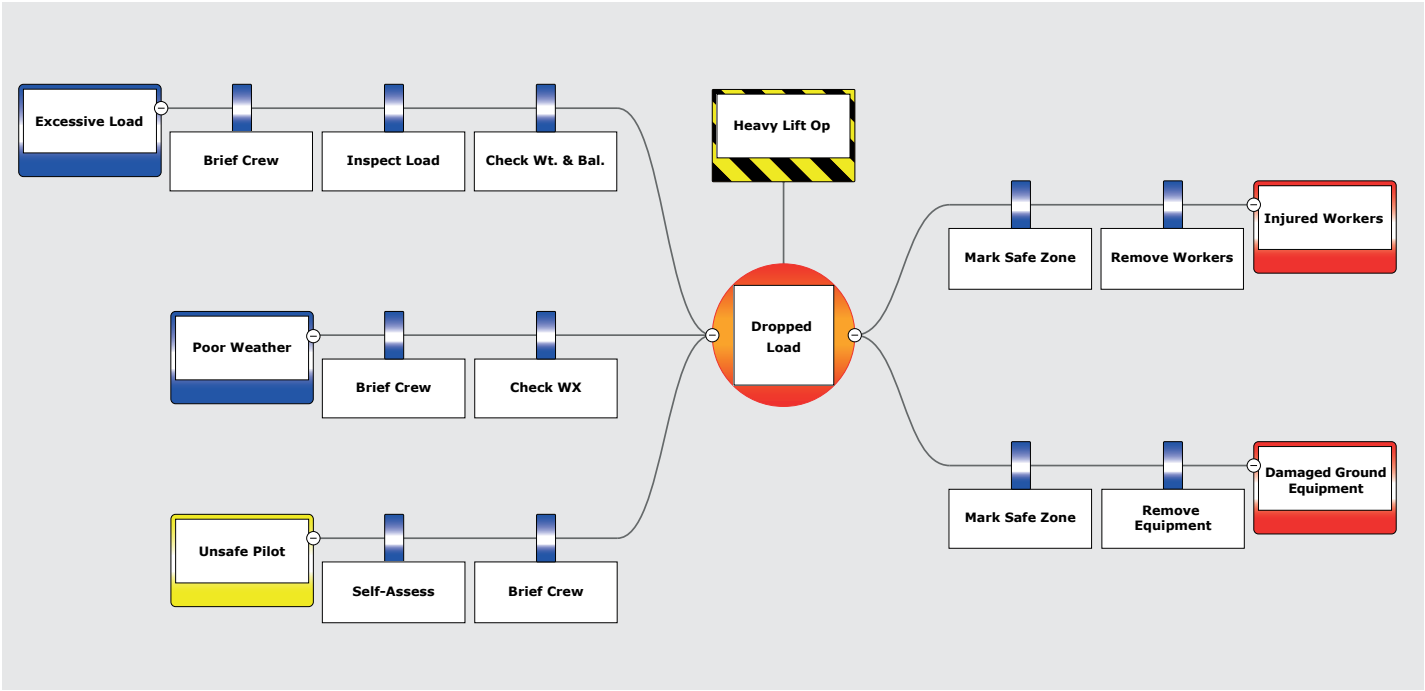


➤ interface for an existing system, AeroInside can collaborate on a solution.

SafetyScan for HAI is free to all HAI members and their employees, each of whom can create a free individual account by visiting bit.ly/SafetyScan.

HAI BRIEFS

HAI Member Exclusive: Assistance with Bowtie Risk Management

THE BOWTIE RISK-MANAGEMENT METHOD is considered a best-in-class approach for effective risk management in highly complex, high-risk industries. Bowtie diagrams provide a clear picture of potential hazardous scenarios and the controls in place to handle them. Now, through a partnership with AeroDirections, HAI members can enjoy a special promotion on BowTieXP software and individualized training to accelerate and enhance their risk-management programs.

Bowtie diagrams make it easy for operators to visualize and plan for complex safety risks. They show how accidents and incidents follow predictable patterns of threats that lead to consequences when safety measures or preventive barriers aren't in place or aren't working effectively.

External-load operations, for example, are hazardous but manageable. In the bowtie diagram, above, users can display potential threats in a heavy-lift rotorcraft operation—an overly heavy load, bad weather, a tired pilot—and the safety measures in place to prevent the load from dropping—a crew briefing, compliance with weather limits, a load inspection, and weight-and-balance checks.

Should those safety measures fail, the risk of the load being dropped increases dramatically and predictable consequences can occur, such as injuries or damaged ground equipment. With a bowtie diagram, operators can see what reactive measures are in place to ensure the incident doesn't escalate to that point. In the diagram above, safe zone markings and a procedure for clearing unnecessary personnel and ground equipment from the area are in place.

With BowTieXP, users can build out hazardous scenarios like this one and see what's preventing and mitigating their impact. The more safety measures or barriers operators put in place on either side of an incident, the better the odds are that the worst-case consequences won't happen. Bowtie diagrams also provide a road map for safety assurance activities, providing insights into critical controls to monitor and measure for effectiveness and corrections when failures are identified.

Using BowTieXP, operators can assign an accountable person for each task or procedure and share the information with others. Any label can be changed to suit an operator's in-house terminology. The software facilitates analyzing hazardous situations, guiding operators to see and address their weakest areas.

HAI members who take advantage of this special offer receive member-only pricing for BowTieXP software as well as a live, online training session. To learn more about this new HAI member benefit, visit BowTieXP.

By Greg Calvert

10 Best Practices for Conducting Crew Briefings

Equip your team with critical safety information before every flight.

HAI/BRYAN MATUSKEY

MANY OF US IN CREWED AIRCRAFT OPERATIONS FUNCTION REGULARLY AS A TEAM, know each other well, and often work on repetitive missions. This can be a positive, but as we all know, it can also be a recipe for stagnation and complacency.

One human-factors study of commercial accident data (Shappell et al., 2007) found that 80% of crew resource management (CRM) failures involved preflight activities, including briefings and planning. A good crew conversation about the PAVE (Pilot, Aircraft, enVironment, External pressures) elements can interrupt the error chain by arming your team with the information it needs to complete individual and collective OODA (Observe, Orient, Decide, Act) loops throughout its shift and flights.

Because 14 CFR 91.103 only scratches the surface of the preflight information available, consider adding these 10 best practices to your crew briefings.

1 Use the IMSAFE (Illness, Medication, Stress, Alcohol, Fatigue, Emotion/Eating) mnemonic. Ask your crew members to continuously evaluate themselves following this model and to formulate answers before arriving at work, with a final evaluation at the beginning-of-shift briefing. With helicopter operators' dynamic work environments, IMSAFE elements can change quickly, thus requiring constant reassessment.

2 Discuss weather and terrain threats. A detailed discussion of forecasted atmospheric conditions and effects gives the crew a better understanding of the environment before the tones ever sound. Be sure to include space weather and its possible effects on GNSS (global navigation satellite systems) and communications. The more information crew members have, the more confidently they can start their shift.

3 Explore light and lunar data. Common in military flight planning but often overlooked in the civilian sector, understanding how light affects operations can be just as important as understanding the weather. Besides reviewing sunrise and sunset, talk about light and dark effects on angles and shadows, especially in mountainous regions; issues related to the use of night-vision goggles and forward-looking infrared sensors; and what to expect when flying from a rural area into population centers, and vice versa. We've had instances of flicker vertigo affecting some crew members, which is important to highlight, day or night.

4 Point out any maintenance issues, including lighting and electrical, especially if they could affect the crew's work. In our air ambulance operations, we depend on the medical crews to keep us up-to-date on any issues with the medical interior, equipment, and oxygen status, and any special equipment we're required to carry. The crew can also be helpful when trying to identify and isolate abnormal sounds or vibrations.

5 Consider weight and balance data. Besides any structural limitations, weight and balance affect flight control travel, performance, and capability. At my company, we use software to game possible scenarios: what our local flying area fuel should be, based on personnel and atmospheric conditions; what our maximum carrying capacity might be for the nearest sending facility or landing zone; how much fuel we can depart with for a long-distance flight; and what the situation is when flying pilot-only, leaving the crew behind. Since we often carry other medical professionals, observers, and sometimes law enforcement escorts, we need to know this type of information, along with seating positions, ahead of time.

6 Review airspace hazards. Contingency planning starts with understanding the surrounding airspaces and their inherent hazards, including the current NOTAMs and temporary flight restrictions, military operations areas and training routes, and potential uncrewed aircraft systems and parachute-jumping activities. In our case, we also factor in helipad alerts that might affect us, as well as any changes to our medical iPad document—a sort of Chart Supplement for established hospital and preplanned landing zone facilities—which we collaborate on with our partner hospital's safety officer.

7 Review the preceding shift's activities. In your beginning-of-shift briefing, collectively go over the debriefings from the previous pilot and crew. Doing so ensures continuity of thought between shifts throughout the week and into the next. In our air ambulance operations, we also take time to review our partner hospital's medical crew utilization-times policy and plan. We cover any equipment recovery and drop-off issues as well as any required pharmacy and blood bank needs.

8 Encourage crew members to bring up any safety topic. Every risk-mitigation conversation should include a chance for everyone to ask questions, express their concerns, and engage in a dialogue about safety. In our briefings, the ad hoc safety topics usually concern a local debrief item that requires attention, recent helicopter incidents and National Transportation Safety Board reports, general safety and operational culture discussions, and a review of an emergency or boldface procedure from the checklist.

9 Check in with an airside briefing. This is the time for an update of any of the items above, as well as an opportunity to address any questions, before moving to the aircraft. It serves as a final check and confirmation that everyone is ready and fit to fly, safely and legally.

10 Conduct an immediate after-flight debriefing. This can be as simple as asking, "Does anyone have any questions or comments about the flight?" Or, it can be as detailed as necessary, depending on the complexity of, or issues with, the operation. This information should be handed off to the next crew to enhance their situational awareness.

With today's technology, a vast amount of flight information is available. Use the crew briefing as the valuable resource it is to communicate and process that data as a collective. This "shared mental model" is a vital part of sound operational planning and risk management and could be the most important piece of hazard and risk identification you conduct. It's also why the crew briefing should perhaps be called the crew conversation.

By Jen Boyer

Claude Vuichard, President, VRASF

The veteran Swiss mountain pilot is changing how aviation approaches emergency procedures.

CLAUDE VUICHARD HAS SPENT his entire career flying in the challenging environment of the Swiss Alps, where winds change in the blink of an eye and altitudes limit recovery times when the situation goes south. Through his own brush with a potentially fatal situation, Vuichard discovered a new, safer way to recover from the vortex ring state. Since then, he's been identifying additional recovery techniques for dangerous situations. He founded the Vuichard Recovery Aviation Safety Foundation (VRASF) to help spread the word.

ROTOR: Share a little about your flying background.

Vuichard: I've been flying for more than 25 years for the Swiss government and performing search-and-rescue missions. I started as a flight instructor and then flew many years in high-altitude operations, including rescue missions for Air Zermatt. I built more than 16,000 hours of flight time—some in airplanes, but most in helicopters—in utility, search-and-rescue, and training in the Swiss Alps.

What led you to discover the Vuichard Recovery Technique for recovering from the vortex ring state?

During a logging operation in 1987, I was descending to bring the line into the forest when suddenly the terminal upwind collapsed and I went into a vortex ring state (VRS). Somehow, I got out of it before the aircraft hit the trees. I spent the next several days thinking about it, doing drawings, and trying to discover how to better recover from VRS.

In mountain flying, you can't go forward to escape VRS the way it had been taught before, because you have the forest and rocks in front of you. In mountain ops, almost all approaches lead to a dead end where an escape to the front is impossible. So I thought, Why not use the tail rotor?

In a hover, the tail rotor acts like a propeller on a fixed-wing, pulling you to the side. You're adding cyclic in the opposite direction to hold a hover. If you add more power and release the cyclic, the ship goes sideways, so I was thinking I needed to catch the upwind part of the vortex to get out of the vortex. Of course, sometimes you can go forward to catch it, but what if you can't go forward?

"If you apply the Vuichard Recovery whenever you feel a sudden lightness in the seat at low G, you can avoid vortex accidents."

After two nights of making drawings and thinking about this, I went out to test my idea. I put the aircraft into a vortex, then added full power and countertorque with the pedal to maintain heading. I then pushed the cyclic in the opposite direction for a 15- to 20-degree bank, 1 second out, then back.

The normal pilot reaction when descending is to pull power and increase power pedal to maintain the axis. Now, you add 1 second of cyclic to the right for US helicopters, left for rotors that go the other way, then back. This affords a way to avoid the vortex completely as well as recover. Remember, pull the cyclic in the opposite direction of the power pedal.

I'm convinced we must have only one way to avoid and recover from vortex. We're wired to remember what we learn first—that's the danger of incorrect training. The Vuichard Recovery Technique works for any kind of hover, even sling loads.

If you feel low G at low speed, that means a vortex ring has started. If you apply the Vuichard Recovery whenever you feel a sudden lightness in the seat at low G, you can avoid vortex accidents.

How did you convince the FAA and EASA to accept your technique?

Tim Tucker, chief instructor for Robinson Helicopter Co., did much of the work. Tim was the big difference because he put his name on it and talked about it, putting it out in the world. He made numerous presentations at safety seminars around the United States, wrote magazine articles explaining the technique, and, of course, incorporated it into Robinson's Pilot Safety Course and maneuver guides.

The big step came in 2015, when the US Helicopter Safety Team (USHST), consisting of representatives from the FAA, helicopter OEMs, and industry, went to Robinson for a meeting and Tim demonstrated the technique to all in attendance, including folks from Airbus, Bell, and Sikorsky. The USHST voted unanimously to

endorse the technique and published a four-page airmanship bulletin on it.

Some manufacturers already had it in their POH [pilot's operating handbook], which helped convince the FAA. They all agreed [that the technique] was a better way for vortex recovery, low G, even upwind approaches in the mountains when the upwind collapses. The FAA was the first civil aviation authority to accept and publish the technique. From there, we took it back to EASA, which also accepted it.

Tell us about the Vuichard Recovery Aviation Safety Foundation.

I kept hearing from people in letters and at conferences that using the technique saved their lives. I didn't want to make money off saving lives, but I needed funding to train people in the technique and get the word out about it. I decided a foundation would allow us to share this educational information. That's the purpose of the VRASF—to cover the costs of teaching these techniques, including through videos and publications on our website, and increase awareness about them. It's my way of paying it forward.

The foundation is about more than just vortex ring state education, however. We have other techniques, for UIMC/IIMC [unintended or inadvertent entry into instrument meteorological conditions], slope landings, and quick-stops. You know, 40% of training accidents occur in autorotation training. We need to change that. Either we do all our autorotation training in the simulator, or we change the procedures.

I developed a technique that makes autorotations way, way easier. It's like doing an auto in slow motion. The moment you start the flare, you use roughly a half inch of collective and less flare than what we were initially taught. Then, at the end of the flare, you level the helicopter firmly, which induces a high rate of descent and therefore consumes braking energy.

This technique enables you to do autos day or night, to ditch on glassy water without ground speed, into confined areas, to land upslope, and with no bad references due to flat light conditions. This technique reduces the risk of crashes tremendously in training and in real autorotations. We've put videos for all these techniques on the foundation website.

Have your safety tips and techniques made a difference in the industry?

I hear from organizations like the US Coast Guard, the Los Angeles Police Department, and Air Methods that they use the Vuichard Recovery. Other techniques, such as our autorotation technique, aren't as well known, but we're getting the word out.

Before COVID, I traveled all around the world doing Vuichard Recovery training sessions. Now, I'm looking to spread the autorotation technique. The difficulty is that aircraft are certificated according to old procedures. To recertificate aircraft is too expensive, but the manufacturers could add a noncertificated/manufacturer procedure. That could increase the safety of operations, and we're trying to encourage it.

I've also developed a technique for preventing wire-strike accidents. You need a clear, systematic WWW to avoid wires. That is, you check the *wind*, the *wires*, and establish the *way* for departure from off-airport sites. I never accelerate a helicopter from a hover without performing the WWW. You also do it systematically on final approach to off-airport landing sites. When you do it systematically, you don't fly into a wire due to your mental energy being distracted by other thoughts.

For all these procedures, it's only a matter of changing the procedure and challenging yourself. Doing so protects you and helps you fly safely.

AERIALSTAGE PHOTO

What Keeps You UP at Night?

If it's operational safety, then take advantage of the new HAI SMS Program.

Same Software & Service Plus DEEP DISCOUNTS for HAI Members

HAI has partnered with these trusted industry providers to provide safety management system (SMS) software to HAI members:

- Air Charter Safety Foundation
- Aircraft Electronics Association
- Baldwin Safety & Compliance
- WYVERN

You'll receive the same level of software and service offered to the industry—but at the HAI member* price.

Elevate Your Level of Safety—Effectively AND Affordably

Contact **safety@rotor.org** to hear how you can take control and start managing your risk. Or visit **rotor.org/sms-program** to learn more.

**Participation in the HAI SMS Program is reserved for HAI member operators.*

Helicopter Association International
SMS

ROTORCRAFT EVENTS

2023

FEB. 23–25
WAI 2023
Women in Aviation International
Long Beach, California, USA
Learn more at wai.org

MAR. 6–9 (EXHIBITS OPEN MAR. 7–9)
HAI HELI-EXPO 2023

Helicopter Association International
Atlanta, Georgia, USA
Learn more at heliexpo.com

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
Learn more at xponential.org

JUN. 19–25
Paris Air Show
Salon International de l'Aéronautique et de l'Espace
Paris, France
Learn more at siae.fr

JUL. 17–22
APSCON / APSCON UNMANNED 2023
Airborne Public Safety Association
Orlando, Florida, USA
Learn more at publicsafetyaviation.org
Visit HAI at Booth #316

JUL. 24–30
EAA AirVenture Oshkosh 2023
Oshkosh, Wisconsin, USA
Learn more at eaa.org
Visit HAI at Booth #363

FlyOver

BROOMFIELD, COLORADO | AUG. 21, 2010
ROTORS OF THE ROCKIES | SCHWEIZER S333
PILOT: MIKE FYOLA

PHOTO BY MARK BENNETT


NO
SMOKING
N411PU

SMS
It's Easier than You Think

There's an affordable SMS solution out there, no matter your size.

By Paul Koscak

HERE ARE THREE ACTUAL SITUATIONS CONFRONTED BY THREE operators:

- Thunderstorms are looming within 3 miles of the airport, and an aircraft needs refueling
- An air ambulance crew is called out for a flight, and the sun is already setting
- A crew isn't sure whether their survival vests should be worn under or over their personal protective gear.

No accidents or incidents resulted because the operators understood the risks involved—an explosion, a crash, a drowning—and worked to reduce them. And whether the operators knew it or not, the process they used to minimize the dangers in each situation was a form of safety management. Identifying risks particular to your operation and taking steps to mitigate those risks are critical steps in a safety management system (SMS).

An SMS helps you to accomplish those tasks in a structured, consistent way and adds a continuous improvement loop where you evaluate the results and determine next steps. That's why any operator, from a single owner to a large company, can—and should—implement an SMS. Without one, your safety program won't be as comprehensive, consistent, and effective as it could be.

Three Questions Will Get You Started

It's easier to get started using an SMS than you might think. The first—and most important—step is to answer three simple questions, says Chris Hill, HAI's senior director of safety and manager of the association's SMS program:

1. What keeps you up at night?

Here's where you determine the safety concerns that worry you the most. One helpful way to begin this exercise is to ask yourself, "If I had an accident tomorrow, what could it possibly be?" Focus on the hazards most likely to occur and those with the most severe consequences.

2. What are you doing about it?

For each hazard you identified in Step 1, assess the level of risk it poses to your organization. Then rank those risks from highest to lowest priority. This way you can budget your time and money to focus on mitigating the risks that pose the biggest threat.

The next step is to uncover the factors that lead to the hazard. Use a team approach here, if possible, to look at both direct and latent factors, including your policies, procedures, and safety culture.

For example, the factor that directly led to the hazard might be a

ISTOCK/NICOELNINO

maintenance technician leaving a tool on an aircraft. But what latent factors are present? Do you have a tool control program? Was the technician trained in that program? Was he or she distracted, fatigued, or pressured to complete the task quickly? Most aviation accidents have a chain of contributing factors, and it's worth looking at how disrupting any of these will break that chain.

Finally, create SMART (Specific, Measurable, Achievable, Relevant, and Time-Bound) goals to address the factors that will best mitigate the risk, either by making it less likely to happen or decreasing the severity of the consequences. For example, if bird strikes are identified as a hazard, then you could direct pilots to avoid routes over landfills known to attract birds, making a bird strike less likely. You could also direct pilots to wear helmets with visors, making the consequences of a strike less severe.

This step will most likely involve other staff members: you may need to create training, change policies and procedures, or purchase protective equipment. While those may cost time and money, the costs are nothing compared with the liability exposure, expense, and potential loss of life associated with an accident.

3. How do you know it worked?

Because in Step 2 you created SMART goals to address risk factors, you can look at the resulting data and see if your risk-reduction goal was met. If you didn't see the results you were expecting, adjust your strategy and try again. This step is called risk assurance.

The structure of SMS has a lot in common with that of total quality management programs, in that it's not a "one-and-done" exercise. Just like quality, safety is not a destination but a cycle of continuous improvement. Another benefit of SMS is that it makes improving safety into a systematic process, helping you to avoid a purely reactive, ad hoc approach.

Keep Reporting Simple, Nonpunitive

The emphasis on hazard reporting is one thing that sets an SMS apart from other safety systems. Keep the report format simple—a single-page form, for instance. It could be as simple as writing down your thoughts after a flight or some maintenance work, or simply when things could have been done better.

"It's important to keep reporting simple, since it's easy to overlook the small things when you're focused on running a business, things that can bite you later," says Rick Kenin, an HAI Board member and COO at Boston MedFlight, a Part 135 air ambulance company.

Requiring too much information can make busy employees feel bogged down in paperwork. Most important, staff need assurances that they won't get in trouble for reporting unsafe conditions and that management will value their reports.

"Consistent reporting is encouraged," says Chris Chop, chief pilot and president of Aviation Safety Partners as well as an IS-BAO (International Standard for Business Aircraft Operations)–certified auditor for fixed- and rotary-wing aircraft, in describing how reporting should be presented. "And it's nonpunitive unless the incident was willful."

While getting a new hazard report on your desk can be hard to view as a positive thing, remember that the report isn't the problem. The hazard is the problem. The more you know about that hazard and the risks it carries, the better equipped you are to create and implement strategies to mitigate those risks. Industry observers say that a large number of reports doesn't mean the company is plagued with safety problems; rather, a significant amount of reporting likely means the operator maintains a healthy safety culture.

For a single operator without a staff, reporting consists basically of self-evaluation. Chop recalls auditing a one-man, one-helicopter operation where the SMS was done manually with spreadsheets. "He developed goals and did his own risk assessment both pre- and post-flight," he says.

In one self-evaluation Chop reviewed, the sole operator noted the times he was in a hurry and had used the manufacturer's abbreviated start checklist rather than the long one. This allowed him to better understand the risks and factors that determined which checklist to use.

"He tracked each use and frequency and evaluated the risk," says Chop. "So you can do it. It's all about what you want to report and manage."

SMS may seem complicated, but it really boils down to this: operators need to systematically and continuously collect information about safety hazards, implement strategies to reduce the identified risk, and then track results and adjust strategies as necessary to ensure that the identified level of risk is reduced. Operators execute their SMS through their safety culture, policy, risk management, assurance, and promotion activities.

Safety Culture and Management Buy-In Are Key

The success of an SMS hinges on a strong company safety culture and buy-in throughout the company, from the line worker to the CEO or owner. Chop credits the success of his company's SMS to his management's commitment, noting that Aviation Safety Partners' leaders consistently promote the program. "Both sides need to build trust [in the system]," he says.

Ideally, under SMS the entire company functions as one big safety team where everyone is empowered to voice safety concerns, with no fear of retribution unless the hazard was

HAI/OCTAVIO CALDERON IMAGE

An SMS Deal Too Good to Refuse

HAI's program lets operators, maintenance organizations elevate safety effectively, affordably.

IT'S JUST A MATTER OF TIME, say aviation safety specialists, until the FAA requires all aircraft operators to have an SMS program in place. But setting one up can seem overwhelming.

A review of FAA Advisory Circular 120–92b and ICAO Document 9859, with their dense technical jargon and mazes of flowcharts, makes it easy to see why an operator might give up on an SMS. Yet, safety organizations and civil aviation authorities around the world recommend that aircraft operators and aviation maintenance organizations should treat safety management as an essential operational function.

That's why HAI created a member benefit to make the whole process easier for their operator and maintenance-provider members. "We asked our members what the most important service is that we could offer," says HAI President and CEO James Viola. "The overwhelming answer was an SMS solution. Now, our members won't have to try to build one from the bottom up."

After evaluating more than a dozen prominent SMS software providers, HAI selected four organizations (see graphic, above) that offer the services that operators and maintenance providers, regardless of size, need to launch a quality, turnkey SMS.

Despite the significant HAI member discounts the providers offer, their services aren't scaled back: HAI members will receive the same software solutions offered to other customers, notes Chris Hill, HAI's senior director of safety and manager of HAI's SMS Program. "All four providers are well-known and respected in the aviation industry and highly regarded by insurers," Hill says.

Because helicopter flight generally involves more manual, nonautomated operations than fixed-wing flying, vertical aviation potentially comes with more risk, making an SMS especially important in rotorcraft work, says Dan Cerkan, founder and CEO of Balefire Safety Systems. Cerkan cites as examples construction work in areas with limited landing options and the demands placed on air ambulance crews picking up patients off-site. Conversely, "typically an airplane takes off, climbs to altitude, and the autopilot takes over," he says.

And with SMS anticipated to become a regulatory requirement for some operations, adopting one now will put your company ahead of competitors. "Don't wait for the regulators, or you'll be behind the curve," advises Jason Starke, Baldwin Aviation's director of safety and product development. "SMS is now a global standard."

Starke adds that good SMS software must adapt to the customer's needs, not the other way around. In other words, it needs to be scalable and easy to use. "If it isn't intuitive or you need to go through a million convoluted steps to submit a report, people won't use it."

Bob Rufli, director of operations at the Air Charter Safety Foundation, agrees, citing simplicity and flexibility as major assets in a good software package: "Participation requires a system that's straightforward, where anyone can file a report without log-ins or passwords."

To encourage participation in the program, there should be multiple ways to enter data, says Sonnie Bates, CEO of WYVERN Ltd. He cites as an example "having the ability for someone on the flight line to just speak into a phone for an entry so there's no typing involved."

In the end, an SMS just makes sense for any aviation operation concerned about safety. "Every business has safety objectives, and an SMS program is simply a tool to help a business continually improve, continually focus, and continually get better," says Ric Peri, VP of government and industry affairs for the Aircraft Electronics Association. "So please, don't be afraid of SMS. Embrace it as a business tool to make your business better."

HAI SMS Providers

AIR CHARTER SAFETY FOUNDATION

AIRCRAFT ELECTRONICS ASSOCIATION

Baldwin AVIATION safety and compliance

WYVERN

Save on SMS! Visit rotor.org/sms.

created through deliberate disregard for regulations, policies, and procedures. If an SMS doesn't gain this level of support, it will be nothing more than a manual on a shelf collecting dust.

Management support is also essential for the success of two other SMS components, safety policy and safety promotion. If deviation from the norms is tolerated or if the message from the company on safety isn't consistent, then your SMS is doomed.

"Top leadership commitment is a must; without it, you're not going to get anywhere," says HAI's Hill.

However, "the larger the company, the more effort it takes to install an SMS," Hill continues. He compares the process of implementing an SMS to steering a big ship, where changing course takes longer than on a smaller vessel.

"Smaller companies, where the chief pilot might also be the safety manager, director of maintenance, and owner, can get on board more quickly because there are fewer people to train," Hill notes.

Getting Started

Starting an SMS can be a big change for both employees and managers. Hill lists hazard identification as a good place to begin. In addition to employee reports, tools such as surveys, audits, inspections, and assessments are effective ways to obtain information about possible hazards.

There's a wealth of SMS information out there; visit the Safety Toolbox section at vast.aero. And, of course, there's the HAI SMS Program (see "An SMS Deal Too Good to Refuse," opposite), which HAI offers exclusively to its operator and maintenance-provider members.

The thought of implementing an SMS in your own operation might seem overwhelming. But when you boil it down, there's no mystery—or complexity—to it. SMS requires you to:

- **Collect information** about safety hazards
- **Implement strategies** to reduce the identified risk
- **Track results and adjust strategies** as necessary to ensure that the identified level of risk is reduced.

This can all be done via an app, Excel, or pen and paper. What's important is that you ask and answer those three questions listed at the beginning of this article—and then systematically continue to do so.

You can't eliminate aviation risks entirely, but you *can* reduce them to an acceptable level, and that's the purpose of an SMS. When an accident occurs, failure to manage is no excuse and your lack of an SMS will be noted by insurers and regulators.

From Mission Driven ... to Safety Driven

Today, risk assessment and mitigation are part of every US Coast Guard mission.

By Dan Sweet

Opposite: During a late-evening exercise, crews aboard a Coast Guard MH-65E train with a motor lifeboat team to conduct rescue basket transfers. The helicopter and lifeboat are both part of Coast Guard Sector North Bend, Oregon.

Below: Lt. Tyler Reynolds (left) and Lt. (j.g.) Jonathan Emas at the controls of an MH-65E.

OPPOSITE: HAI/DAN SWEET; ABOVE RIGHT: COURTESY PA1 TRAVIS MAGEE, USCG

SEE USCG Sector North Bend's rescue swimmers doing cave training

FOR MANY YEARS, THE US COAST GUARD had a reputation for responding to distress calls in some of the worst weather imaginable. More recently, however, the Coast Guard is working to reverse the mission-driven "we have to go out, we don't have to come back" mindset for pilots and boat crews. At US Coast Guard Sector North Bend, based in Oregon, training and rescue operations put safety first.

Oregon's southern coast is a veritable sports enthusiasts' paradise, with opportunities for hunting, fishing, hiking, and beachcombing among the outdoor leisure choices available to residents and visitors. With that abundance of recreational options comes a corresponding number of challenges for the unlucky or ill-prepared who suddenly find themselves in need of rescue. When those rescue calls come in, US Coast Guard Sector North Bend, part of the 13th Coast Guard District headquartered in Seattle, Washington, often responds.

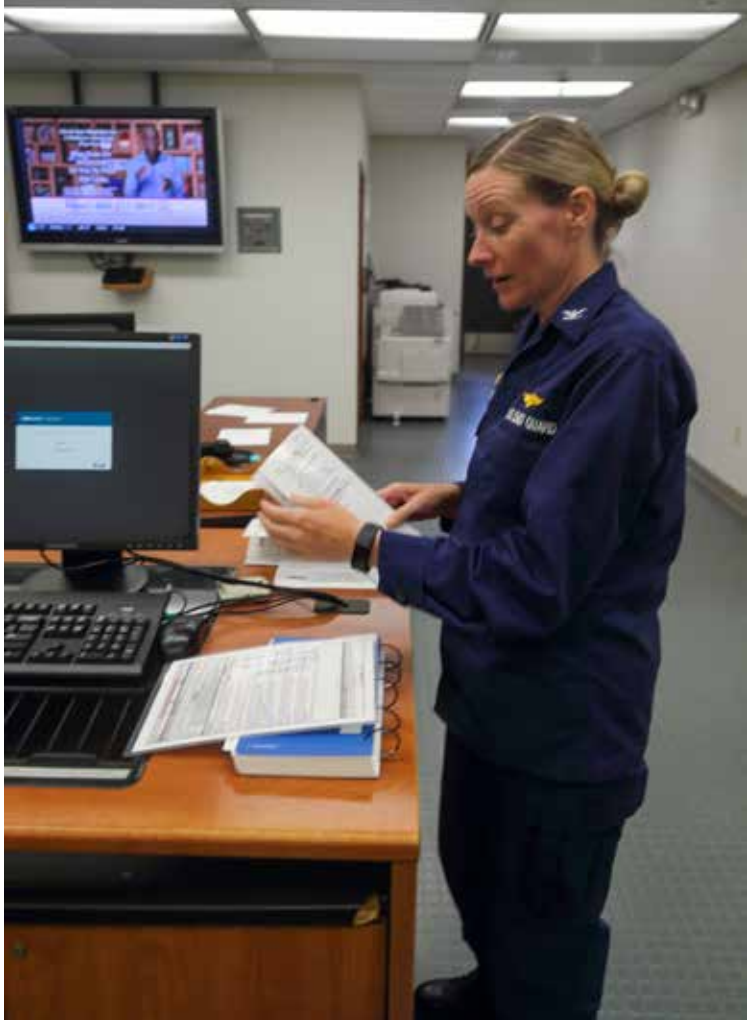
While the sector's fleet of motor lifeboats or its 110-ft. (33.5-m) Island-class cutter handle some of the marine rescues, more often one of its five search-and-rescue (SAR) Airbus/Eurocopter MH-65E Dolphin helicopters gets dispatched. Because the Dolphin is among the only SAR helicopters in Oregon equipped with a hoist, sector crews respond to as many calls for inland emergency services as they do for coastal or offshore rescue. For those rescues, the hoist is used to conduct vertical-surface cliff rescue along the steep bluffs of the southern Oregon coast or to deploy rescue swimmers to vessels in heavy seas. On land, the hoist allows crews to conduct rescues amid tall trees or in other areas unsuitable for landing.

Recognizing that it was receiving more calls for inland hoist rescues, the sector adapted its training program to better meet those requirements. According to commanding officer Capt. Breanna Knutson, inland SAR and associated training is "unique to our AOR [area of responsibility] [and something] that you don't see in a lot of other Coast Guard units."

Sector North Bend's AOR extends 220 mi. (354 km) to the north from Oregon's southern border with California. The sector is based—as its name reflects—in the comparatively remote location of North Bend, Oregon. The versatility of its helicopters and boats enables sector personnel to handle a wide range of missions, from SAR, for which the Coast Guard is best known; to drug interdictions and law enforcement operations as part of the Department of Homeland Security; to supporting marine wildlife research studies, fisheries patrol, and maritime safety programs.

With such a variety of missions and ever-changing weather, risk mitigation is a factor for every person in the command. "I consider my biggest responsibility is ensuring the operational risk management of all of our missions," says Knutson. "We've recognized that each person having an input as well has really changed the way we think about risk and risk management."

Forty years ago, in November 1981, one of the then Air Station North Bend's helicopters crashed in severe weather. The Sikorsky HH-52A SeaGuard was responding to a night call from a fishing boat in distress during a severe storm with winds exceeding 90 kt. and seas with 25-ft. (7.6-m) waves. After launching, the crew realized that the weather was deteriorating fast. While they were trying to return to base, an engine malfunctioned and they crashed attempting an autorotation into the surf line. The three-person crew included station commanding officer Capt. Frank W. Olson, copilot Lt. Glenn Gunn, and rescue swimmer AE2 Kenneth A. Zeigler. Olson died after ensuring



Capt. Breanna Knutson, commanding officer, USCG Sector North Bend, reviews mission risk-assessment cards that her crews must fill out before conducting each mission.

his crew accessed the life raft.

The Coast Guard is working to reverse this mission-driven "we have to go out, we don't have to come back" mindset. "We have a robust and committed safety management system within the Coast Guard, particularly within Coast Guard aviation," says Rear Adm. Melvin Bouboulis, Coast Guard District 13 commander. "And I think it's changed that [mindset] around. We took a real hard look at ourselves, I would say in the 2010 to '15 time frame, maybe even earlier than that, 2007 to '15, where we had a rash of mishaps that was a little surprising for us. And we looked hard at aviation and purposefully changed that philosophy."

Today, risk mitigation begins the minute a call comes into the sector's command center. "We have cards that we follow with our [air] crews," says Knutson. "The boat stations do the same thing. And then when we check in on every mission with our command center, we report what our risk scores are."

Perhaps the largest variable for any rescue mission is the weather. Western Oregon is renowned for heavy, warm rains, long periods of gray cloud cover, and periodic winter storms with hurricane-strength winds. When the summer sun heats the interior of the state, additional fog is drawn off the ocean, lowering visibility.

"In terms of the type of flying that we do, low-visibility situations that can happen in the blink of an eye" are unique to North Bend and the Oregon coast, says Knutson. Consequently, the sector trains extensively for instrument flight, and personnel appreciate the improved radar, avionics, and navigation equipment of the MH-65E, which add to crew comfort with the rapidly changing weather.

Avionics Electrical Technician First Class Tim Gigliotti, a flight mechanic with Sector North Bend, conducts a preflight inspection of the duty aircraft.

Scenario-Based Training Reduces Risk

Personnel stationed at Sector North Bend routinely serve there four years, with senior officers rotating through in about three years. The continuity of crews helps to further reduce risk because those in their second, third, and fourth years have already experienced many of the missions and have a transferable knowledge base to share with incoming personnel. Some personnel have the additional luxury of returning to the area. Knutson was assigned to the sector early in her career, and she has now come back as the commanding officer.

Scenario-based training therefore plays a large role in preparation, risk management, and aircraft-rescue coordination. Planning for potential risks provides personnel the opportunity to consider multiple options before conducting the mission. "We're lucky here because we have a command center," says Knutson. "Not every air station has a command center located with it. But because we're also a sector, we have a command center. We can go into the command center

PHOTOS: HAI/DAN SWEET

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and say, 'Here's the scenario for the pilots and the air crew that don't know what's coming,' and then we'll announce it like it's an actual search-and-rescue case. [When] the pilots come into the command center, [we say], 'Here's what you have. How are you going to do it?'"

Being a sector with both aircraft and boats provides additional resources for training. Crew on a station boat in the ocean pretending to be in distress is one example Knutson gives of a scenario that is used to help flight crews figure out what to do in bad weather in terms of instrument flying and everything else they need to consider.

The Mission: Be Flexible

Mission focus can change at a moment's notice. A flight crew supporting a whale research project with marine biologists aboard, for example, could be assigned a rescue call. In most cases, the crew would return to base, drop off the biologists and refuel, then respond to the rescue. Flight crews are routinely briefed, however, to be prepared to drop passengers at the nearest safe location and conduct the rescue immediately depending on specific situations.

While most Coast Guard rescue missions are deemed successful because crews remove people from dangerous situations, missions can equally be deemed successful when the crew itself avoids danger. Flight crews routinely reassess the risk-to-reward ratio, particularly during missions under adverse conditions.

With some of the only helicopters in Oregon equipped with hoists, Sector North Bend is often called to conduct missions around the state, including rescues from cliffs, forests, and mountains.

Avionics Electrical Technician First Class (AET1) Tim Gigliotti, a flight mechanic, recalls a night rescue at a point called God's Thumb, near Lincoln City, Oregon. A pair of hikers got caught in a cove by high tides, and ground-based ropes crews were unable to assist from above. The helicopter arrived on scene around 11 pm.

According to Gigliotti, the winds were unpredictable, there was a slight overcast layer, and there was no illumination. There are no homes or city lights on that part of the coast to provide reference points, so the pilots were using night-vision goggles (NVG). "So they're on NVGs," recalls Gigliotti. "And I'm trying to use our night sun to illuminate underneath us so I can see what we're doing. But the night sun is blooming out the pilots' NVGs. So we have to basically do this balancing act of, Who needs to be able to see?"

Rescues from tides and cliffs are part of regular training scenarios, and the helicopter crew attempted to follow proven procedures to complete the mission. "We tried to put the [rescue] swimmer down twice, and the pilots were having a hard time maintaining station because there were so few visual references," says Gigliotti. "I'd get to swerve about 20 to 30 feet down, and we'd start to get a swing. I'd have them pull power to arrest the swing, and then we'd pull it back up and reset and discuss with the swimmer. After the second time, I said, 'Why are we doing this? These guys are in no distress. There is no medical emergency.'"

They dropped hypothermia bags and a radio with a trail line and told the hikers the crew would return in the morning to get them out. "So we knew they were safe, and we were a phone call away if conditions changed," says Gigliotti. The next morning, however, the hikers were able to walk out after the tide ebbed.

Part of a Team

Like all helicopter operations—military or commercial—the crew that flies the helicopter is just a small segment of the personnel required to keep the aircraft mission ready. As with other branches of the military, the Coast Guard's command structure is seniority based, with the most experienced officers and senior petty

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Portrait of a Rescue Swimmer: AST1 Rob Sullivan

Aviation Survival Technician Petty Officer First Class (AST1) Rob Sullivan did not plan to join the US Coast Guard. He was deciding between the Navy SEALs and the Air Force Pararescue specialists, knowing that both service branches depended heavily on those teams during wartime. When he joined up, however, no war or conflict was occurring, so he chose the Coast Guard because it was conducting missions regularly instead of just training every day. "I thought I'd be in for a few years, but it's been so much fun I've stuck around," Sullivan says.

Sullivan has served for 24 years and been a rescue swimmer for 21. He is now preparing to transition to the civilian sector. Growing up in Atlanta, Georgia, he learned about Coast Guard rescue swimmers through library books. He says he had to drive more than an hour to find a recruiter because "they weren't going to come to me."

Training to be a rescue swimmer takes 16 weeks over 6 months. Rescues along the Oregon coast usually involve hoisting survivors or recovering bodies from the ocean, but Sullivan is also trained for other environments, including deserts, forests, and cliffs. The breadth of knowledge needed for this work makes the job incredibly challenging, as does the fact that the rescue swimmer is required to work independently once out of the helicopter.

"You have to be able to function on your own," Sullivan explains. "We deploy alone, so you have to be able to take charge of a situation and be prepared to do everything by yourself, and just push through any obstacles you might encounter, to complete the mission."

The Oregon coast where Sullivan does much of his work is about 50% cliffs. "A lot of people take pictures of the sunset or coastline, and they fall off the rocks and injure themselves," he says. Because the ocean water is never warm, hypothermia is always a risk for the people needing rescue as well as the rescue swimmer. While Coast Guard crews routinely wear Mustang Suits when flying, the rescue swimmer's options are more limited: either a wetsuit or a dry suit.

"I've always got to keep hypothermia on my mind. I definitely check patients for signs of hypothermia," says Sullivan. "The water is a bit shocking when you enter. You notice it, but it's not bad because of the protective gear we're wearing. But after a while, you start to feel some cold. But there are worse places to be."

For the record, Sullivan says that Air Station Traverse City, Michigan, was his coldest duty station. "That's where you're floating around in ice chunks."

As he nears retirement, Sullivan says he will miss his job. "My favorite jobs are the daytime hoisting flights on a nice, beautiful day. I just went out this morning and did it. It was a beautiful day, and I was thinking, 'This is great. I'm getting paid to do this. It's so fun.'"

A US Coast Guard MH-65 Dolphin aircrew member looks at USCGC *Steadfast* (WMEC 623) during a search-and-rescue exercise in the Pacific Ocean, Aug. 27, 2021. The Coast Guard conducts these exercises frequently to stay proficient in marine weather environments.

ABOVE RIGHT: HAIDAN SWEET; BELOW LEFT: COURTESY THE USCG

Along the Oregon coast, the weather can change quickly. During a late-evening training exercise, the marine layer (in the background) begins to develop into the gray fog that often blankets the coast. Opposite page: Patrolling past the ocean-side entrance to Sunset Bay State Park, an MH-65E flies past some of Oregon's rocky cliffs and coastline.

officers taking leadership roles. The commanding officer is at the top of the leadership chain, assisted by the executive officer, the second in command. At Sector North Bend, the chief pilot, a commander (O5), also serves as the operations officer. Despite the organization's structure encompassing boat crews, each of the officers holding a leadership role is an aviator.

Most personnel at Sector North Bend have primary roles, such as pilots or maintenance crew. They also hold collateral duties involving flight scheduling, command security, training, standardization, housing, public affairs, or record keeping. "Because we're a sector, not an air station, our operations officer is also in charge of all boat-station operations," says Lt. Tyler Reynolds, a pilot and the sector's collateral public affairs officer. One of the next most senior pilots then takes the role of air operations officer, managing the air side "to take some of the load off of the actual operations officer."

Pilot Lt. Tyler Reynolds reviews mission parameters as part of a flight risk assessment.

Being responsible for many roles means training for both routine and specific scenarios. "From the flight mechanic side, the biggest training that we probably do here is vertical-surface training," says Gigliotti, who, as a senior petty officer, is not only a flight mechanic but also a watch captain, the maintenance control petty officer, a member of the quality assurance team, and a flight mechanic instructor. "There's no place else in my career we've ever done it. It's a very nuanced evolution to get the swimmer down and to get them over to the survivor."

SAR Teamwork

For SAR work, operating an MH-65E typically involves four crew members: a pilot in command (PIC), a copilot, a flight mechanic/hoist operator, and a rescue swimmer. Pilots begin training in flight school and advance through various levels of proficiency. Coast Guard pilots begin with standard copilot qualifications, then upgrade to SAR pilot and then first pilot, which means they are qualified to fly the aircraft.

SAR pilots fly from the right seat—the PIC position in

PHOTOS: HAI/DAN SWEET

Coast Guard aircraft—but they cannot conduct hoist operations until they qualify for that role. First pilots are limited in their mission assignments—no night missions without a copilot—but they can fly with newer copilots. The next upgrade is to aircraft commander, which means the pilot is qualified to perform all missions.

The role of onboard flight mechanic is a jack-of-all-trades, simultaneously conversing with the pilots to execute the mission, operating the rescue hoist and supporting the rescue swimmer, and listening for any unusual sounds from the aircraft—all while working next to an open door, exposed to the elements.

When the Coast Guard responds to an emergency such as a sinking boat or to rescue someone stranded on the side of a cliff or lost in the forest, the rescue swimmer is the person who leaves the aircraft to conduct the rescue. Rescue swimmer training takes 16 weeks and is conducted over a 6-month period.

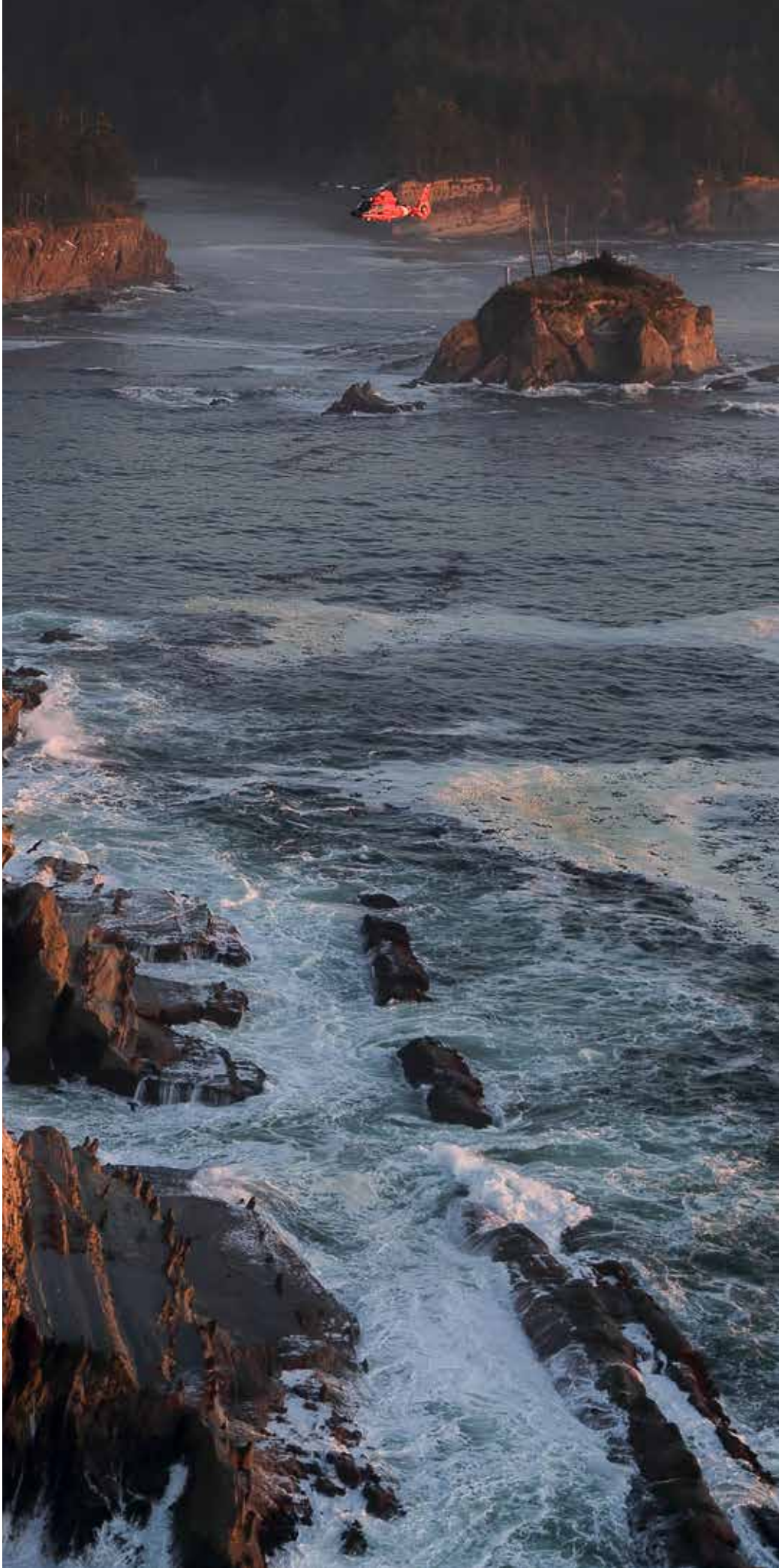
Coast Guard rescue swimmers are in a unique situation: they are part of a rescue team but perform nearly independently as soon as they leave the helicopter. Once out of the helicopter, the rescue swimmer communicates with the pilots and the flight mechanic primarily through hand signals. For more complicated issues, such as giving patient updates while performing medical work or providing a time frame to complete the mission, the rescue swimmer uses a radio.

"We are trained to function on our own," says Aviation Survival Technician Petty Officer First Class (AST1) Rob Sullivan. "We will direct the whole [rescue] as we see fit in the best way possible, whether that's on land, or on the side of the cliff, or in the water."

Much of Sullivan's work involves rescuing visitors who have fallen and injured themselves after climbing the cliffs along the Oregon coast to take pictures. "The vertical-surface aspect is definitely unique compared to the other places that I have been stationed," he says.

As with the other crew members, the rescue swimmer has a voice in whether to proceed with a mission, including once the rescue crew arrives on scene.

"As swimmers, we have the final say as to whether or not we're going to go down," says Sullivan. "I have never been in a situation where



HAI/DAN SWEET

I've said no. But there have been times where I've noticed, Hey, this might be a little bit dangerous. But thinking your way through the situation, having a plan, things like that really help."

Sullivan is aware that rescue swimmers tend to get media attention on many rescues, thanks to cameras the Coast Guard uses during missions. News crews and Hollywood favor this footage because of the dynamic rescue work it captures. But what does he wish the public knew about being a rescue swimmer? "How incredibly difficult it is to become one," says Sullivan. "And that we are trained to conduct rescue missions basically by ourselves in any environment. Whether it's water, mountains, deserts, or forests, we're ready to go."

Aircraft Maintenance Is Serious Business

The Coast Guard operates both MH-65 short-range recovery helicopters and larger, longer-range Sikorsky HH-60 Jayhawks. In 2019, it began transitioning the MH-65 from the Delta to the Echo model. It's been a little over a year since Sector North Bend's Dolphins were upgraded, and pilot reviews are positive. "It's great," says Knutson. "I hear very few complaints. The transition period, people getting used to the aircraft, took a little time. But now that we've been flying it for a year, I only hear great feedback [about] all of the improved avionics and all the upgrades that we got with the Echo."

The maintenance teams give the upgrade positive reports as well. "I've worked on 65s my whole career," says Gigliotti. "I started with HH Charlies and then the MH Charlies, the Deltas, and now the Echoes. I think it's a fantastic aircraft. It's definitely done an exemplary job."

The maintenance rotation for the sector's five helicopters usually has one Dolphin in heavy maintenance, where the aircraft is stripped down, inspected, and rebuilt. The maintenance team works in shifts and includes 40 to 50 personnel. Most are already skilled in specific maintenance areas or have a general knowledge of the entire aircraft. Others are still undergoing training for their rating (military specialty). The crews track the maintenance rotation closely to ensure that a helicopter is always mission ready.

For the heavy-maintenance period, the crews will review flight-hour schedules to determine what components must come off and any additional work that might be needed as a result. "We'll usually look at what big-ticket items are coming due and what maintenance we can do early to ball into that package," says Gigliotti. "If we have to do a little maintenance a month or two early or a hundred hours earlier than needed, it's advantageous for us to try to get those all to sync up."

One element all sector personnel are keenly aware of is salt. Left on aircraft, salt becomes corrosive, aggressively eating into metals and avionics. To combat it, the crews at Sector North Bend regularly wash the aircraft and engines. They become familiar with where corrosion commonly occurs, especially inconvenient, difficult-to-reach places such as the wheel wells and underbelly.

The flight mechanic conducting the mission is responsible for pre- and post-flight inspections. After a mission, any available shift personnel also assist in the inspections. "It's always better to have extra eyes on the aircraft," says Gigliotti. "And the extra hands help to expedite the process."

Safety First

Today, risk assessment is a priority for all Coast Guard missions. "When I first started, we had conversations about it, but it was not as prolific as it is now," says Knutson. "Now, before we go on a mission, even just a routine training mission, we do a risk analysis and talk about all the risk factors for this particular mission, each and every time we go out. I think the Coast Guard's done a really good job of formalizing our risk-management procedures."

Two Airbus MH-65s in the hangar at Sector North Bend. The aircraft in the foreground is on standby for the next mission, while the helicopter behind it is undergoing heavy maintenance.

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Air Tour Management Plans

Planning for Failure?

Flawed process raises deep concerns for aerial tour sector.

By Jen Boyer

COMMERCIAL AIR TOURS OVER US FEDERAL LANDS under the jurisdiction of the National Park Service (NPS) are threatened, now more than ever.

A 2020 order by the US Court of Appeals for the District of Columbia has resulted in considerable air tour restrictions over 23 NPS areas. The lawsuit resulted from the NPS and FAA's failure to produce air tour management plans (ATMPs) as directed by the National Parks Air Tour Management Act of 2000 (NPATMA). Since that court ruling, five NPS areas now have restrictive ATMPs in place and draft ATMPs have been published for 12 more.

Air tour operators with permission to operate in these NPS areas are scrambling to protect their operations. Meanwhile, they report a broken process where decisions critical to aviation safety are made without industry consultation and where the elimination of air tours over NPS lands appears to be the goal.

A Historic Battle

Since the mid-1980s, the NPS has stated that by limiting air tours over the federal lands that it administers, it is protecting the environment and visitor experience, even though by some measures, air tours are less damaging to the environment than ground-based tours while also providing many with improved opportunities for access. By the late 1990s, regulations restricting air tours were well established in Grand Canyon National Park and NPS lands in Hawaii. Then came the NPATMA, passed in April 2000.

The act required commercial air tour operators providing tours over NPS or tribal lands to apply for authority to conduct those tours. The application would then trigger a process where the FAA and the NPS would collaboratively develop an ATMP for the NPS area (the FAA's involvement stems from its responsibility to protect airspace and aircraft operations, while the NPS is charged with managing and protecting the federal lands and parks under its jurisdiction). The resulting ATMP would outline "acceptable and effective measures to mitigate or prevent the significant adverse impacts, if any, of commercial air tour operations upon the natural and cultural resources, visitor experiences, and tribal lands."

To ensure all interested voices were heard in ATMP processes, the act required the formation of a National Parks Overflights Advisory Group (NPOAG), consisting of representatives of general aviation, commercial air tour operators, environmental groups, and Native

SUNSHINE HELICOPTERS PHOTO

American tribes. FAA and NPS representatives serve as ex officio members and cochairs. Formed in 2001, the group was an active participant in providing input on NPS and FAA actions related to the NPATMA until the 2020 court order derailed the ATMP process. HAI President and CEO James Viola represents commercial air tour operators on the NPOAG, as did his predecessor, Matt Zuccaro.

The NPATMA also allowed the FAA to provide interim operating authority (IOA) for existing operators over park and tribal lands pending issuance of the ATMP, but those IOAs were subject to requirements and limitations. Operators were issued annual flight allocations and were limited in altitudes, routes, hours, and more.

In an effort to simplify the process, the NPATMA was later amended to allow, in lieu of an ATMP, a voluntary agreement between all tour operators at a location, the FAA, and the NPS if all parties agreed. Additionally, ATMPs or voluntary agreements were now only required if more than 50 commercial air tours took place or were allocated over a park annually.

The FAA and NPS were successful in securing voluntary agreements for two parks by 2016. However, no ATMPs were in place in 2019 when a coalition of Hawaii residents and the group Public Employees for Environmental Responsibility, representing current and former public employees, sued the FAA and NPS for failure to complete the ATMP process. In legal documents and press releases, coalition members cited excessive noise from aircraft overflights as negatively affecting visitor experience, quality of life, park flora and fauna, and public health.

On May 1, 2020, the US Court of Appeals for the District of Columbia ordered the FAA and NPS to adopt ATMPs or voluntary agreements for 23 named NPS areas. It gave the agencies 24 months to comply. Extensions have been granted to the agencies, provided they continue to report progress to the court.

A Rushed Process

In responses to the court during the lawsuit process, the FAA and NPS cited frequent impasses between all parties as a reason for the delay of ATMP implementation. After the 2020 court order, the agencies have moved forward without consulting either air tour operators or the NPOAG. The agencies developed their plans and then held online public meetings where they outlined the draft ATMP and invited the air tour industry to ask questions in those forums.

"These meetings were one-way presentations of their plans," says Jake Tomlin, president of Papillon Grand Canyon Helicopters and Grand Canyon Scenic Airways. "You had to submit your questions in a forum and maybe they get to them. When we do get to [voice our concerns]? They say, 'That's great, thanks. We'll look into it.' And we don't hear back from them."

The ATMP process seems designed to drastically reduce the number of aerial tour flights. For example, all draft and final ATMPs eliminate the flight allocations assigned in the IOAs. Instead, the agencies calculate the average number of tour flights conducted between 2017 and 2019 by the tour operators holding IOAs for a particular NPS area. That number then becomes the total number of permitted annual commercial tour flights; the flights are distributed among operators based on each operator's average number of flights. This reduces the allowable flights from the potential maximum of the entire IOA allocation to the average of 2017–19 actual flights. In addition, if an operator previously held allotments but made no flights between 2017 and 2019, that operator would no longer be permitted to fly any tours.

For instance, before the ATMP, Death Valley National Park had IOAs authorizing 37 flights among four air tour operators. The average annual number of tour operations during the 2017–19 reporting period was one flight from a helicopter operator and one from a fixed-wing operator. The final ATMP now allows each operator to fly one flight a year. Similarly, one fixed-wing operator flying over Mt. Rainier National Park had its flights reduced from an IOA annual allotment of 34 flights to an ATMP that allows one flight a year.

The new system has raised concerns about economic sustainability of the air tour industry.

HAI/MARK BENNETT

Aerial tours over lands administered by the US National Park Service are threatened by a bureaucratic process that seems designed to ground those fleets permanently. Opposite page: Some natural phenomena, such as this lava flow on the Island of Hawaii, are best—and more safely—seen from the air.

Aerial tours of large wilderness areas with little road access enable a wider audience to experience the scenic beauty.

Tour operators argue that the IOA allocations were essential for their companies to be positioned for a changing marketplace.

"Papillon has allocations in Glen Canyon and throughout Utah, and it is a perfect example of how the markets shift to different parks," says Tomlin. "People change where they want to go, especially with social media. They see something cool, and they want to go there. When the Grand Canyon slowed down, we saw an uptick in Glen Canyon and the national parks in Utah. Suddenly, a lot of our unused IOA allotments became highly used. It was good to have that leeway to meet the demands of a shifting marketplace."

In addition to dictating the number of annual flights permitted by each operator, the ATMPs provide detailed directions on how operators can conduct those flights. They assign routes and altitudes, outline the hours a tour can be operated, and sometimes cap the number of tours allowed per day. For some operators, hours are reduced, some days are designated as "no fly days," and daily tours are limited. For instance, the draft ATMP for Hawai'i Volcanoes National Park proposes alternatives that ban flights on Sundays and another that suggests daily caps. When daily caps are enforced, operators may not reschedule canceled flights, further reducing the number of permitted annual flights.

Glacier National Park's final ATMP is clear in its intended effect on air tour economic viability. It states 144 annual commercial air tours are allowed "until such tours are phased out through attrition or until 11:59 pm local time on Dec. 31, 2029, when all operating authority for the park will be terminated."

Safety Concerns Go Unaddressed

The ATMP process as set forth in the NPATMA includes consultation with the aerial tour industry through the NPOAG. However, air tour operators believe that the ATMP process as practiced since the 2020 court order has silenced their ability to meaningfully contribute, creating unsafe conditions for tour flight operations over the parks.

"We do have safety concerns with how the court mandate to complete the ATMPs has led to a rushed and non-comprehensive creation and implementation process," Blue Hawaiian shared in a statement.

In some cases, airplanes and helicopters share assigned routes with only 500-ft. separations, creating safety concerns. Glacier National Park's final ATMP assigns one route for both aircraft types, assigning a 500-ft. separation as the route ascends into mountainous terrain. In the draft ATMP for Hawai'i Volcanoes National Park, one alternative calls for pushing all flights offshore while another offers routes and altitudes that would often put aircraft in the clouds and over congested visitor areas. Neither option allows safe deviations.

"Since it is known that fast-changing weather is a major hazard in Hawaii and that FAA-issued altitude deviations provide a good mitigation, we will fully support the FAA in stepping in to insist upon these deviations being added to the proposed ATMP to ensure the safety of our crews and passengers.… There are also potential noise issues that do not appear to be considered by the National Parks and the FAA," Blue Hawaiian's statement added.

"We have been working with Hawai'i Volcanoes National Park and Haleakalā National Park since the inception of our agreements in the '80s, and the park superintendents at the time understood shared access and we worked together to reduce impact to ground visitors," says Paul Morris, director of operations at Sunshine Helicopters. "Now the NPS is seeking to reduce flights and mandate specific routes that do not consider the changing weather conditions we face in Hawaii. As a result, this restricts the pilot's ability to deviate, which could reduce the level of safety we currently have in the Hawaii Air Tour Common Procedures

HAI/CATHY STONECIPHER

Manual. That's a major concern for the operators and the flying public."

According to multiple operators, the FAA local flight standards district offices (FSDOs) are not being consulted as the NPS and FAA plan the ATMPs. The NPOAG has not been consulted in the design process, only notified about NPS and FAA decisions in NPOAG meetings. Questions and concerns posed by tour operators and HAI to the NPS and the FAA have gone unanswered, including numerous requests for insight into what led to decisions on issues such as routes, altitudes, and hours.

"This is a bad-faith effort on the part of the NPS," says Black Hills Aerial Adventures co-owner Mark Schlaefli. "The National Park Service has taken the lead in this rushed process over the FAA and is engineering the desired outcomes in a data vacuum. The elimination of aerial tourism, the single least impactful form of visitation, is their stated goal. The information being presented to the public is purposefully misleading. The operators [and] state and local interests have been completely shut out of the process, contrary to the requirements of NPATMA. The actions proposed significantly increase the risks and impact safety. The local FAA FSDO, who has the expertise to help mitigate these issues, has not been consulted."

In preparing this article, ROTOR submitted the following questions to the NPS:

- Why has the NPOAG been excluded from the ATMP process?
- Why do ATMPs assign unsafe routes and routes over visitors on the ground?
- Why were two parks with less than 50 annual flights given ATMPs when the NPATMA excludes them due to their flight volumes?
- Why is the full process to establish ATMPs not followed?

The NPS did not address these questions. Also unaddressed were questions submitted to the FAA about the agency's level of participation in the ATMP process or its input on safety.

In response, both the FAA and the NPS independently sent the same statement: "The NPS and FAA are collaboratively developing air tour management plans (ATMPs) or voluntary agreements, as required by the National Park Air Tour Management Act of 2000, for 23 national parks. ATMPs are in place for four of those parks already. As part of this process, the agencies have released, and will continue to release, draft ATMPs for public comment. We consider the comments received while we prepare the final ATMPs. As the ATMPs or voluntary agreements are developed, the FAA thoroughly reviews all proposed routes to ensure they are safe."

A Coordinated Response

As a result of the 2020 court order, the FAA and NPS have focused on completing ATMPs as quickly as possible, skipping vital stakeholder participation used in past years, explains HAI Vice President of Government Affairs Cade Clark. "I call it 'rulemaking light,'" he says. "Typically, in these kinds of projects, agencies gather information from all stakeholders before preparing a draft. It really doesn't feel like that is taking place, and HAI believes that both economic and safety issues are going unaddressed as a result."

However, Clark and his colleagues in the HAI Government Affairs Department are working to raise awareness about the failure of the ATMP process. Typically, once a draft ATMP is announced, there is a comment period that lasts from 30 to 60 days. Groups supporting ATMPs have a significant advantage, sending form letters to their members to send in supporting the ATMPs.

HAI regularly provides updates on the issue via social media, e-blasts, and its daily and weekly e-newsletters, ROTOR Daily and The VTOL Advocate, asking members and allies to provide comments on each draft ATMP as the comment windows open. It also encourages them to reach out to Congress about their concerns. In fact, HAI has created materials for operators that educate air tour customers about the issue and make it easier for them to share their thoughts with their congressional representatives.

"One place that people who support the air tour industry can submit their comments to at any time is Congress," says Clark. "While the ATMP situation came about from a court order, as the branch of government responsible for funding federal agencies, Congress has considerable sway with those agencies. If enough congressional representatives hear about it, they can investigate how the ATMP process is being derailed and put pressure on the NPS and the FAA to include the NPOAG and operators in the ATMP planning process.

"With each new draft ATMP, there is more awareness of what is happening. More people are commenting," Clark says. "Having our voices heard relies on everyone and every operator working to get their concerns heard and the benefits of air tours in national parks understood."

ISTOCK/RACLRO

Aerial tour operators believe the National Park Service unfairly targets them while overlooking the environmental impact of ground-based traffic congestion, as shown here in Yellowstone National Park.

The Ship That Launched a Thousand Flights

Sikorsky's VS-300

SIKORSKY ARCHIVES PHOTO

Sikorsky's "last-ditch" effort to save his company established an industry.

By James T. McKenna

THE VERTICAL AVIATION INDUSTRY IS ON the threshold of a new era, one promising frequent flights of multirotor aircraft powered by distributed sets of computer-managed electric motors. Advocates for this fledgling sector of electric vertical takeoff and landing (eVTOL) aircraft are developing vehicles capable of carrying small loads of passengers and light payloads between urban and suburban vertiports, independent of runways.

Nearly 200 eVTOL projects were unveiled in 2021, with estimated funding doubling, according to the Vertical Flight Society, which closely monitors the sector. Another 100 were added through July 2022. Most are still confined to drawing boards, but some developers are flight testing aircraft, with ambitious certification goals.

This surge in engineering, development, and financing mirrors a two-decade period 100 years ago in which increased interest, energy, and funding—and the dedicated pursuit of

solutions by aircraft designers and engineers—led to the rotorcraft industry's birth with Igor Sikorsky's development in 1939–41 of the first practical helicopter, the VS-300.

In both eras, engineers and entrepreneurs aimed to advance the state of the art in vertical flight. But their tasks were distinctly different. Sikorsky and his colleagues were working out the essential issues of lift and control in rotorcraft. Today's eVTOL teams are focused largely on building new aircraft power systems that will use multiple small rotors, each with its own motor, and advanced avionics to manage them as lifting devices and flight controls.

Powering Lift

A century ago, the task for the pioneers in rotorcraft was less complicated but completely fundamental to vertical aviation: figuring out how to lift and control their aircraft.

Engine choice, while critical, was limited in the early 1900s to what was available from the automobile and early airplane markets. "There was no useful, analytical engineering base" on performance and stability, aeronautical engineer Eugene Liberatore wrote in his 1998 classic, *Helicopters Before Helicopters*. (It was based on the 18-volume *Rotary Wing Handbooks and History* that he edited in the 1950s for the US Air Force.)

Before beginning his first helicopter design effort in Russia in 1909, Sikorsky visited Paris, then aviation's epicenter. He sought to learn from experts and to find an engine. He returned with knowledge and a 25-hp. (18.6-kW) aircraft engine built by Alessandro Anzani. While that model would power Louis Blériot's first airplane flight across the English Channel on Jul. 25, 1909, the Anzani could not lift Sikorsky's H-1, a basic coaxial-rotor helicopter, off the ground that year in Kiev, which at that time was part of Russia. It could lift his H-2, tested in 1910, but not both craft and pilot.

"Less bad than the rest" was how Sikorsky is said to have described his first engine choice.

Working the Problem of Vertical Flight

Inventors' struggles "to give the helicopter a place" in world transportation have well-documented histories going back more than 250 years, as Franklin Harris summarized in NASA's 2012 *Introduction to Autogyros, Helicopters, and Other V/STOL Aircraft*. Two and a half centuries ago or so, there were several attempts with small coaxial aircraft in Russia, France, and England. Experimentation accelerated through the 1800s. Almost all used coaxial designs to address torque reaction and dissimilar lift in forward flight. All that testing was done with models, according to John Fay, a 1950s

ENJOY this vintage footage of various Sikorsky helicopters in action

ARCHER AVIATION PHOTO

More than 80 years after Sikorsky's first free flight in the VS-300 (opposite), vertical aviation continues to evolve as electric vertical takeoff and landing (eVTOL) initiatives promise production of innovative multirotor aircraft capable of transporting passengers and cargo.

and '60s Westland Aircraft test pilot.

"Given the minimum knowledge of how a propeller worked and some form of power… it was not difficult to design a model lifting device," Fay wrote in *The Helicopter: History, Piloting & How It Flies*, his 1976 book. "It was a much more complex exercise, however," to design an aircraft capable of taking off, hovering, and moving forward under control while carrying a human.

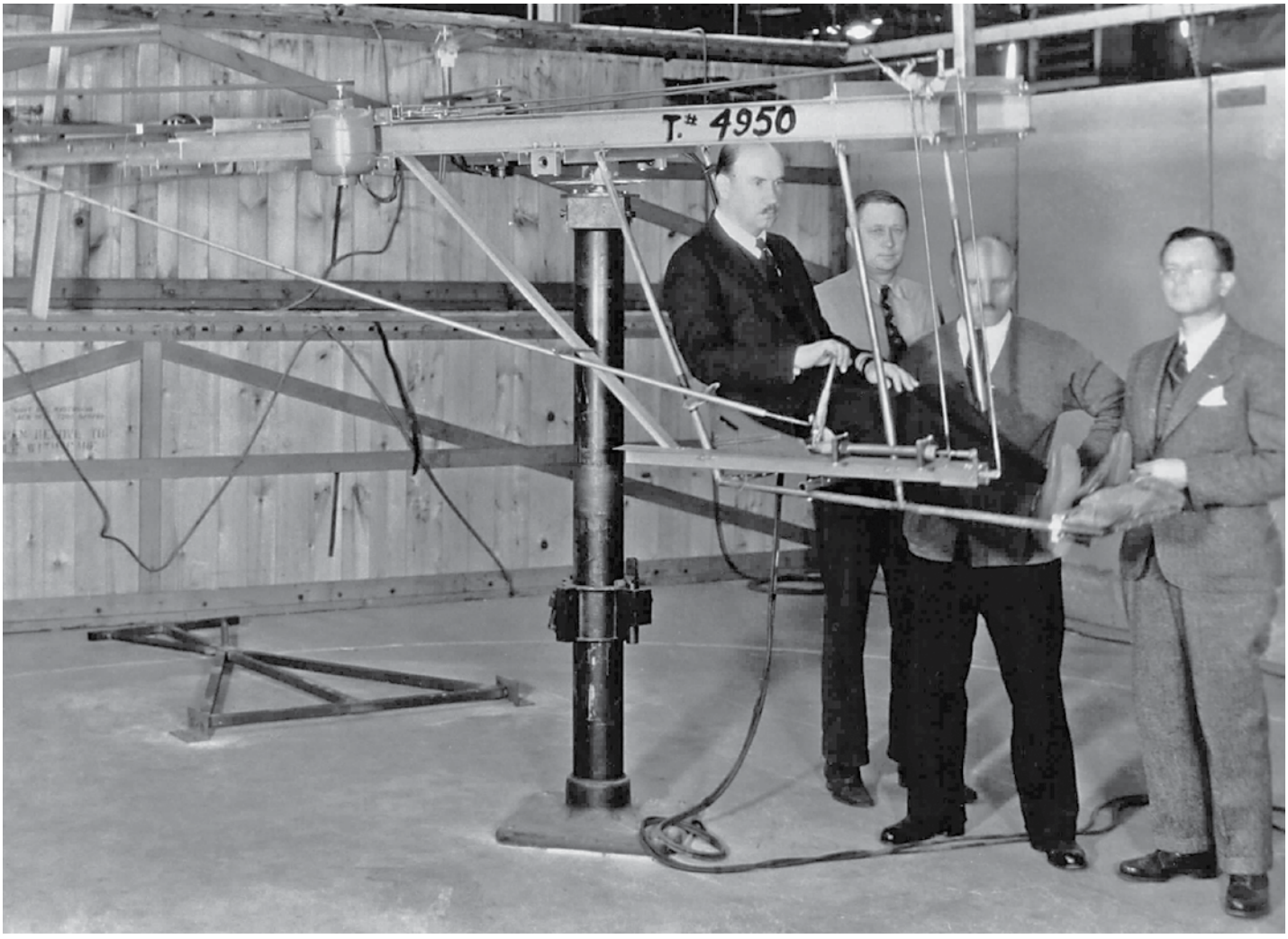
In Germany, Nikolaus Otto's 1876 invention of the four-stroke internal combustion engine created the possibility of power-to-weight ratios sufficient to carry helicopters and their pilots aloft, Fay noted. "But before helicopter flight became a practical reality, there were the mysteries of translational flight and stability to be solved."

The reliance entirely on test models waned in 1907. Brothers Louis and Jacques Bréguet—guided by scientist Charles Richet—built and flew their first gyroplane in a tethered flight south of Lille, in northern France. It rose about 2 ft. (0.6 m). The pilot's only control was an engine throttle.

Also in 1907, in Lisieux, France, Paul Cornu built a twin-rotor helicopter with control vanes below the blades. The rotors were powered by a 24-hp. (18-kW) Antoinette engine built by French engineer Léon Levavasseur. A frame mounted on four bicycle wheels held the machinery. On Nov. 13, 1907, Cornu straddled the frame just behind the engine and ran it and the 20-ft.-diameter (6-m-diameter) rotors up. The helicopter lifted slightly off the ground for about 20 seconds, with no tethers or ground-crew support.

Cornu is credited by, among others, world's record keeper Fédération Aéronautique Internationale, with being the first person to pilot a helicopter in free flight. Some question whether his craft actually flew, saying flight would have required at least a 40-hp. (30-kW) engine. Regardless, Cornu would go on to conduct 15 piloted flights, according to Liberatore.

The significance of Cornu, who died in the 1944 Allied forces bombing of Nazi-occupied Lisieux, lies "in his systematic and scientific attempts to understand the relationship between rotor thrust and power requirements," according



The first phase of the VS-300 program included developing this simulator with three rotors all driven by a 5-hp. (3.7-kW) electric motor. Shown left to right are Igor Sikorsky and development project members Michael Buivid, Bob Labensky, and Michael Gluhareff.

SIKORSKY ARCHIVES PHOTO

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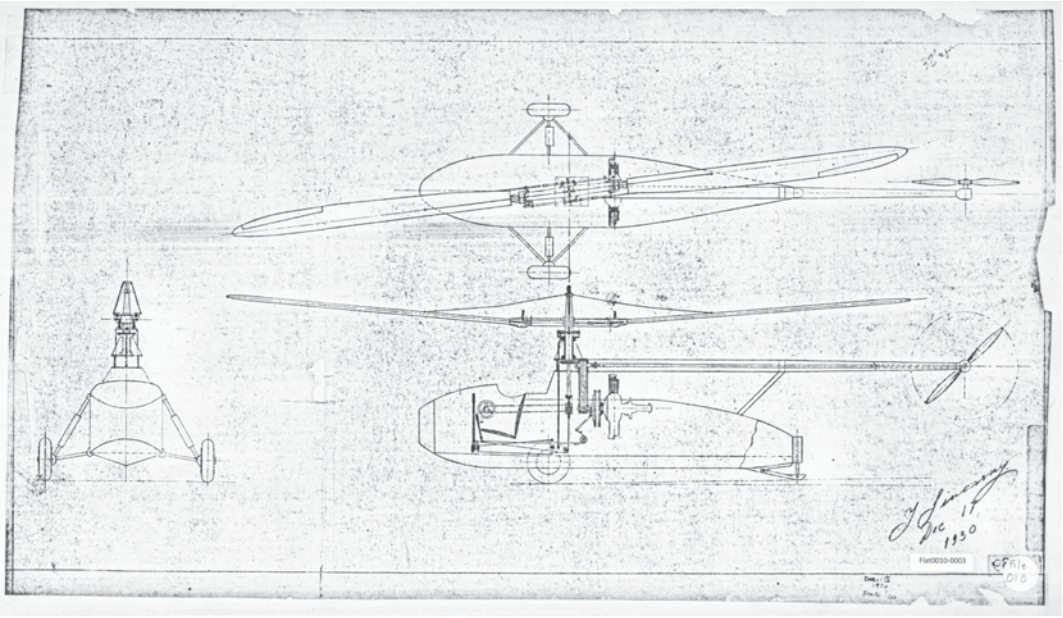
to the Vertical Flight Society, "and in exploring methods of controlling a helicopter in flight and in its forward propulsion."

In the 20th century's first decades, aviation focused on expanding the Wrights' successes. Wilbur Wright's 200-plus demonstrations, starting in 1908, in France, Italy, and Germany whet the appetite of thousands of inventors, some of whom pursued vertical flight. One was Danish engineer Jacob Ellehammer, whose 1912–16 flights in his aircraft with two 25-ft.-diameter (7.62-m-diameter) counter-rotating discs—powered by a custom-built 36-hp. (27-kW) radial engine—demonstrated an early form of cyclic control.



Igor Sikorsky prepared this drawing as part of a 1930 US patent application for a "direct-lift aircraft" with a single overhead lifting rotor and a single tail antitorque rotor, a configuration very similar to the one he and his team would build and fly 9 years later.

The Autogiro's First Flight

World War I focused aviation's attention entirely on fixed-wing craft. After the war, numerous inventors returned to vertical lift. Among the most influential was a man who never built a helicopter: Juan de La Cierva, inventor of the autogiro. The Spanish engineer's aircraft used a tractor engine to propel a fixed-wing airplane and an unpowered rotor to help lift it, with the rotor spinning in autorotation in forward flight. La Cierva's aircraft gained acceptance and success in the 1920s in Spain and England, where he established the Cierva Autogiro Company.

La Cierva concentrated on refining rotor design, relying on other manufacturers to provide the fixed-wing portion of the autogiro. This led in 1922 to his most important rotorcraft contribution: the flapping-hinge rotor, which offsets the differential lift of advancing and retreating blades. Flapping reduces roll resulting from dissimilar lift. It became a common rotorcraft design feature.

La Cierva's success caught the attention of Harold Pitcairn, a Pennsylvania business owner who had founded the predecessor to Eastern Airlines and an airplane manufacturing company, both bearing his name. He licensed rights to develop autogiros.

On Dec. 18, 1928, a Cierva C.8W assembled by Pitcairn Autogiro Company became the first rotary-wing aircraft to fly in the United States. According to the Vertical Flight Society: "Pitcairn subsequently developed a range of autogiros and related technologies" and patents. Many found their way into the first American helicopters. Among them was Pitcairn's articulated rotor-head technology, which Sikorsky licensed for the VS-300.

Born of Necessity

The VS-300 was a last-ditch effort to save Sikorsky's company. Parent United Aircraft Corporation owned engine maker Pratt & Whitney, Vought Aircraft, and Hamilton Standard Sikorsky. The company merged the latter two into the Vought-Sikorsky Division.

After emigrating to the United States in 1919, Sikorsky had made his name building flying boats for the US Navy and airlines, most famously Pan American Airways. But in 1938, the Navy declined to order the next-generation XPBS-1 "Flying Dreadnought." All previous aircraft orders had been filled. With none on the horizon, United Aircraft planned to shutter Vought-Sikorsky.

A company vice president summoned Sikorsky to the Hartford, Connecticut, headquarters to break the news and suggest to Sikorsky that he could undertake a new, small research project. Sikorsky proposed developing the direct-lift aircraft for which he had submitted a patent and plan in 1930, provided he could retain a team of engineers and mechanics. He estimated the work would cost $60,000. United Aircraft gave him $30,000.

Working nights and weekends, Sikorsky and his team turned that 1930 idea into a test aircraft, the H-3. In a 1930 paper titled "The Helicopter Problem," Sikorsky explained to management about the H-3 design: "The most important problem to be solved in order to achieve complete success and to build a directly useful machine appears to be in the question of proper stability and control."

SIKORSKY ARCHIVES PHOTO

To help solve that problem, Sikorsky's team designed and built the first helicopter simulator, Test Rig #4950. Sikorsky and aerodynamicist Serge Gluhareff (who would share VS-300 test-pilot duties) would use it to learn a new skill: how to fly a helicopter.

To power the VS-300's three-blade, 28-ft.-diameter (8.5-m-diameter) main rotor and 40-in.-diameter (1-m-diameter) tail rotor, Sikorsky acquired a 1939 Lycoming four-cylinder piston O-145-C3. Team members bought it secondhand at a local airport, Sikorsky's son Sergei told ROTOR. "The whole program was fairly low budget, low priority at the beginning," he said.

Begun as a mid-1800s manufacturer of sewing machines and bicycles, the company that became Lycoming started producing automobile and truck engines in 1907. After Charles Lindbergh's 1927 solo transatlantic flight, the company began making aircraft engines. The O-145 was Lycoming's first horizontally opposed, air-cooled engine. The O-145-C3 was its most powerful version, producing 75 hp. (56 kW) at 3,100 rpm.

Mounted horizontally, Engine No. 510 powered the VS-300 through a V-belt transmission. On Sep. 14, 1939, Sikorsky flew the VS-300 in its first tethered flight. The aircraft rose a few inches during the 10-second flight at the Stratford, Connecticut, plant. Through 1939, the team tweaked the VS-300 continually, resolving control and stability issues. Tethered flights continued until Dec. 19, 1939, when the prototype was damaged severely in a rollover.

The VS-300's second configuration added arms to a new, steel-tube tail boom that supported two horizontal tail rotors for pitch and roll control. (The main rotor's cyclic control was removed because of controllability issues.) The O-145-C3 went to work again on Mar. 6, 1940, when the redesigned VS-300 flew in a tethered flight. On May 13, 1940, before the public in Bridgeport, Connecticut, Sikorsky lifted off the VS-300 in its first free flight.

Engine 510 logged fewer than 50 hours through Jul. 22, 1940. At that point, Vought-Sikorsky sold it for $225. "They had enough experience to realize they needed more horsepower," Sergei Sikorsky said. An Aircooled Motors Franklin 4AC-199-E replaced it.

The air-cooled, four-cylinder horizontally opposed Franklin produced 90 hp. (67 kW) at 2,500 rpm. It powered the VS-300 through April 1941, when an upgraded 4AC-199 was installed, achieving 90 hp. (67 kW) at 2,680 rpm and 100 hp. (75 kW) at 3,050 rpm. Franklin engines powered the VS-300's 1941

The VS-300 was modified almost daily during the early test flights that preceded its first free flight on May 13, 1940. An early major change was the addition of outrigger booms off the tail to support two small, horizontal rotors added to correct pitch and roll problems.

SIKORSKY ARCHIVES PHOTO

US and international endurance records.

The timing of Vought-Sikorsky's threatened closure proved fortuitous. Impending war in Europe had increased US interest in all aviation. In June 1938, the Dorsey-Logan law called for the War Department to invest $2 million in research, development, purchase, and testing of rotary-wing and other aircraft. Next came a 1940 US Army competition for an aircraft capable of vertical flight and hovering.

The Platt-LePage Aircraft Company won with its XR-1 transverse-rotor design, considered more capable than the bid proposed by Vought-Sikorsky based on the VS-300. But Platt-LePage experienced testing delays. So the army awarded Dorsey-Logan funds to Vought-Sikorsky to develop the aircraft that became the R-4.

Purchased by the US Army Air Forces, Navy, and Coast Guard and by the Royal Air Force and Royal Navy, the two-seat R-4 became the first large-scale, mass-produced helicopter.

Similar Challenges

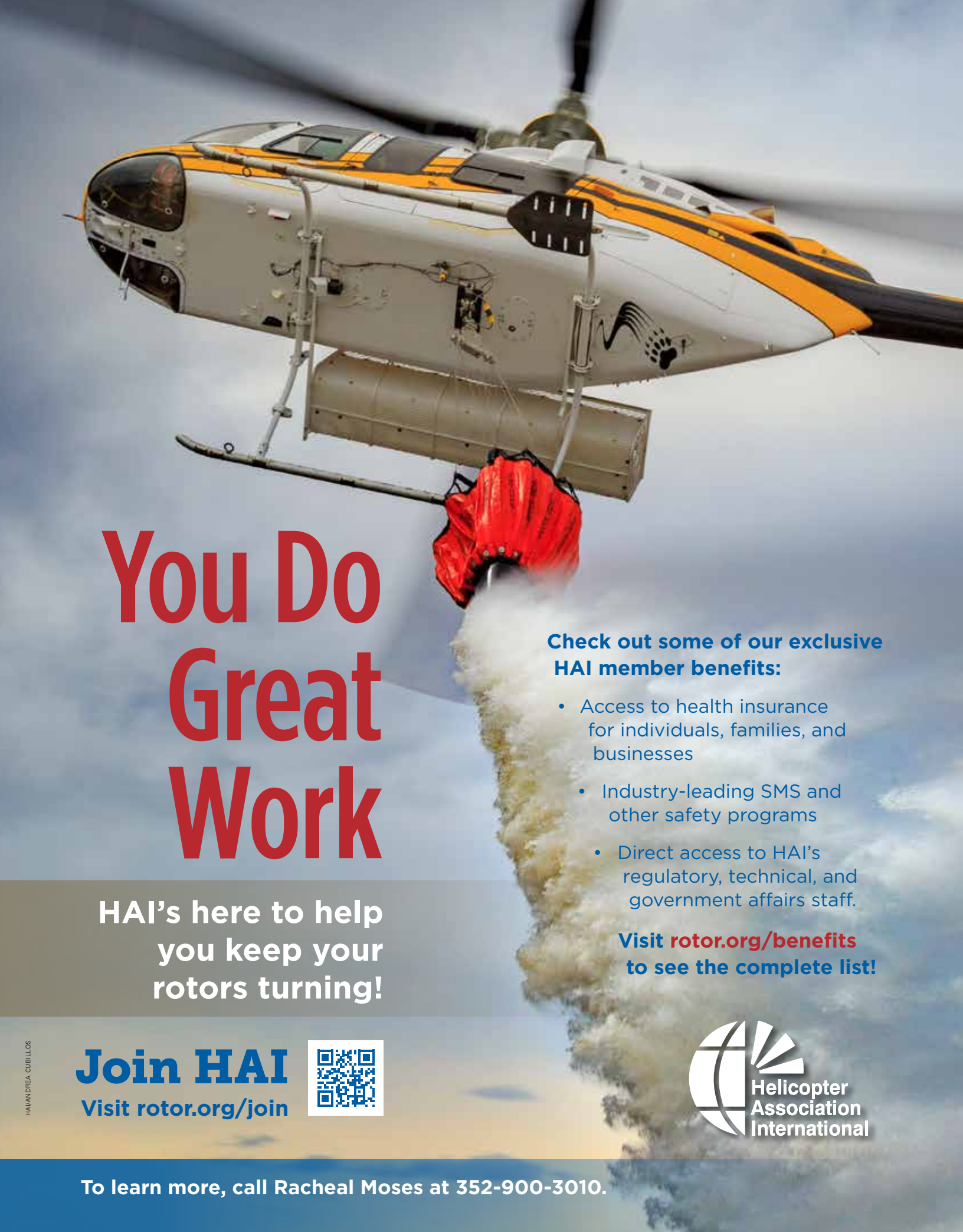
Today's eVTOL and advanced air mobility (AAM) sector "is a thriving market with many start-ups that vie to certify and produce new and innovative aircraft this decade," says Sergio Cecutta, a partner at SMG Consulting, which specializes in aerospace, defense, and automotive technology. Several analysts predict this fledgling industry could be a $1 trillion market by 2050.

But just like Sikorsky and the VS-300, there are still some details to work out.

"You may have an aircraft with six lifting rotors, three or four tilting rotors, and a pusher rotor," says Jia Xu, Honeywell chief technology officer and senior director of engineering for advanced air mobility. "There's not a great way for the pilot to directly control those rotors or some easy way to blend them together mechanically." eVTOL will need systems that can "allocate control power across all of your actuators and all your rotors" in an optimized fashion.

In this August 1944 photo, Igor Sikorsky gets a ride in an HNS-1 (the designation for an R-4 in US Coast Guard service) by Cmdr. Frank A. Erickson. The Coast Guard pilot had flown the first helicopter lifesaving mission earlier that year, rushing blood plasma to sailors injured during the sinking of the USS *Turner* off the New York coast.

US COAST GUARD PHOTO



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QUICK FACTS

Harley Bloecher

Rainbow Helicopters,
Honolulu, Hawaii

CURRENT JOB

I'm a helicopter tour pilot. I fly aerial tours of the island of Oahu as well as the occasional charter flight to off-airport landing sites around the island.

FIRST AVIATION JOB

My first helicopter job was working as a CFII at the school I trained at, American Helicopters Inc. I taught on the Robinson R22 and R44. I worked part-time at the flight school in tandem with a normal 9-to-5 desk job. I typically taught lessons on the weekends and sometimes after work during the week.

FAVORITE HELICOPTER

The MD 500, for its iconic look and sound and the variety of missions it can perform: police, fire, utility, and military applications. It's small but mighty. A close second is the UH-1—another true classic—and its variants.

WATCH
Harley go through his preflight checklist

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

I was a high school student unsure of what I wanted to do, and one day I truly noticed the air ambulance helicopter that would regularly fly over my neighborhood. I thought, "There's a person flying that helicopter for a full-time job. I wonder how you even control a helicopter." That night, I Googled "helicopter flight controls" and started reading about how these aircraft fly. My fascination took off from there.

How did you get to your present position?

I built some flight time as an instructor before deciding to try flying tours. Although I didn't instruct all the way to the 1,000-hour benchmark, I know that teaching for a few hundred hours was vital for my own growth as a young pilot.

Rainbow Helicopters is a Part 135 operator, and the hiring minimum for a 135 VFR pilot is 500 hours. I had around 530 hours when I applied, along with about 80 hours in the R44.

What are your career goals?

It's hard to imagine I'd want to be anywhere but flying tours in Hawaii. This is an awesome job and the most beautiful flying I'll ever get to do. That said, I ultimately want to get into a more "mission-oriented" style of flying, be it air ambulance, search-and-rescue, law enforcement, fire suppression, or government contract work.

What advice would you give someone pursuing your path?

Training is so expensive and probably the biggest barrier to entering this industry. Look for scholarships. Apply to every scholarship you may be even remotely qualified for; $500 here, $2,000 there, $5,000 over there all adds up. Scholarship funds, including those I received as an HAI Commercial Helicopter Pilot Rating Scholarship winner in 2018, helped me immensely in my training, and even though you'll get plenty of nos, you may just get a yes here and there.

Also, take your training one rating at a time and never take your eye off the ball, even if "life happens." It takes years to get there. If you want it badly enough, you'll find a way. I started my private-pilot certificate when I was 18 and finished my CFII when I was 24.

I wouldn't recommend instructing part-time if your goal is to build flight time quickly, nor if you're unwilling to study hard to stay sharp. If you're not instructing every day like the full-timers, you'll always feel a little rusty on the maneuvers and material you're entrusted to teach.

Who inspires or has inspired you?

My parents. My mother is my biggest fan and has always supported me in chasing my dreams. My father and I are incredibly similar. Although we have different interests, we pursue them with the same tenacity. Seeing his work ethic reminds me I'm cut from the same cloth and inspires me to never give up on my goals.

"Once it finally 'clicks,' you unlock a level of freedom you've never known before."

Tell us about your first helicopter ride.

My first helicopter ride was in an MD 520N. I was 16 years old and was visiting a local helicopter company to learn more about how to become a helicopter pilot. After an hour of Q and A with one of the pilots, he asked if I'd like to go for a quick spin in the helicopter. That turned into a short hover lesson and traffic pattern and, like every other helicopter pilot after their first ride, I was totally obsessed. I had no frame of reference at the time, so little did I know how nice that helicopter was.

What still excites you about helicopter aviation?

I just love flying helicopters. As a pilot, you're the critical component that holds this chaotic symphony of moving parts right on the razor's edge between order and chaos. Right there you balance it, sometimes for hours on end. There's something truly captivating about it. It's the bug that bites you on your first flight. And once it finally "clicks," you unlock a level of freedom you've never known before.

What challenges you about helicopter aviation?

Staying sharp. Whether it's knowledge of regulations, aircraft systems, emergency procedures, or a flight maneuver you haven't done in a while, there's always something you can be studying. Skills and knowledge can fade if not exercised. The battle against complacency never ends.

What do you think is the biggest threat to the helicopter industry?

Competing with the fixed-wing industry for pilots, both new and experienced. Experienced helicopter pilots are enticed by substantially higher pay to convert to fixed wing, and they often have their training paid for as well.

Aspiring helicopter pilots face much higher training costs than fixed-wing pilots—some never complete their training. Many choose fixed wing from the start, due to the lower training costs and greater opportunity.

It's true—there are more airplanes than helicopters out there, and you'll generally be paid more to fly them. I've met a few experienced helicopter pilots who made the switch, saying, "I was tired of being paid less to incur more risk."

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

… passengers tell me through the headset, "You seriously have the best job in the world. I can't believe you get paid to do this." Then, I show them whales, dolphins, rainbows, and waterfalls.

Complete this sentence: I love my job, but I'd rather be back at my desk job when ...

… life happens and priorities change. If a good work/life balance as a pilot can't be struck and one thing absolutely has to give, you'll find me in a cubicle with a bunch of cool flying photos tacked to the walls around me.

 By Aaron Karp

Alex Atukwatse, Helicopter Mechanic, Uganda Police Air Wing

Curiosity about "cars moving through the air" leads to a career in helicopter maintenance.

SEE a Uganda Police Air Wing AW109 land

WHEN ALEX ATUKWATSE WAS A SMALL boy grazing cattle on his family's farm in the Sheema District of Western Uganda, he looked up at the sky and was amazed. Atukwatse recalls: "I was wondering, How are cars moving through the air?"

That question was the beginning of an insatiable curiosity about flight and a love affair with aviation that set Atukwatse on a career path leading first to the East African Civil Aviation Academy in Soroti, Uganda, then to Europe for advanced training, and finally to the Uganda Police Air Wing, where he works as a helicopter mechanic.

To gain his current position, Atukwatse had to overcome the high cost of training and he had to travel to Lithuania and Poland for postgraduate experience. He expresses gratitude for government financing that supported his training and for the instructors at the East African Civil Aviation Academy.

"Those instructors are my heroes. I arrived when I was young and didn't know anything about working in aviation," he says. "They really gave us a good background in aircraft systems."

Finding Joy in Work

Atukwatse says he never takes a day of work for granted.

"Every time I enter our hangar, it's a source of joy because I know how much work it takes to get a helicopter into the air," he explains. "Our maintenance work

helps the helicopter to fly safely, and that brings me so much joy."

Safety, of course, is the highest priority. Among other activities, the police force uses helicopters for air ambulance, fire-fighting, and search-and-rescue.

Most days, Atukwatse reports to the Police Air Wing hangar at 8 am for a shift ending at 5 pm. But because of the nature of police work, he can be called in anytime. During a regular shift, he does maintenance work on the aircraft and records any technical work he performs on the helicopter. "In the morning, when the helicopter is due for a flight, I check the logbook first," he says. "Then I check the engines. We have a checklist that we follow. If something is not in order, you should be in a position to know whether it can be addressed and go for a flight or [whether] the issue means it cannot go.

"There is no compromise on safety," Atukwatse emphasizes, remembering an internship he completed with an experienced helicopter mechanic before beginning his current job. "On my first day of the internship, [the mechanic] looked at me and asked whether I would be willing to send my family on an aircraft that I just finished working on," Atukwatse says. "Of course I said yes instantly. He said, 'Perfect, that's the spirit of a professional mechanic.' From that day forward, I knew that as a mechanic I am responsible for the safety of the aircraft and the people on board."

Scholarship Offers Opportunity

Atukwatse has been awarded an HAI scholarship and will use it to attend a training course offered by FlightSafety International at its facility at the Dallas Fort Worth International Airport (KDFW). Specifically, he'll take a Line & Base Maintenance course for Pratt & Whitney Canada PW206/207 series engines.

"The opportunity is to train with the best," Atukwatse says. "This scholarship has opened doors for me to train on Pratt & Whitney engines. I will also be stepping on American soil for the first time."

A Fascinating Field

Atukwatse says he has achieved success because he defined his goals at an early age and maintained discipline in reaching his current position.

"You need to define what you want to become," he explains. "You need to get committed to it. And, most importantly, you must maintain a positive attitude towards what you want to become and stay disciplined. Once you lose your discipline, you lose your character as well and it will not be easy to achieve what you are striving for."

Atukwatse says he would recommend helicopter maintenance to a young person considering a career in aviation: "It is a very interesting, fascinating field, and I 100% encourage anyone interested in becoming a helicopter mechanic."

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 By David Jack Kenny

Blowing in the Wind

Questionable maneuvering, faulty weather assessment leave two pilots seriously injured.

IT'S AN AVIATION CLICHÉ, but sayings don't become clichés without containing some morsel of broadly accepted truth: We deal with the weather that's occurring, not the weather that was forecast. Forecasts aren't exact and are as likely to be optimistic as pessimistic, so plans for a flight in conditions already expected to be difficult need to allow for the prospect that things could be even worse. Whether it's rescheduling, rerouting, or just returning home while that's still an option, the student-pilot lesson of "always give yourself a way out" never stops being relevant.

The Mission

At 9:35 am Pacific on Mar. 5, 2021, a Bell 212 crewed by two pilots lifted off from the Sechelt Aerodrome (CAP3) on British Columbia's Sunshine Coast. The pilots' destination was the staging area for a BC Hydro construction project about 21 nautical miles (nm) to the east in Cypress Provincial Park, where they were tasked with conducting several days of external-load operations supporting the construction of 230-kV transmission lines.

Their planned route crossed the Howe Sound just north of Keats Island, then the Collingwood Channel and Bowen Island. The park is the site of a ski area, and terrain along the flight path is rugged, rising from sea level to 2,388-ft. Mount Gardner, the highest point at the southern end of a long mountain ridge on the west side of Bowen Island, then on to 4,714-ft. Mount Strachan and 4,016-ft. Black Mountain within the park itself.

The Aircraft

The Bell 212 is a twin-engine helicopter with a single two-blade, semirigid teetering main rotor powered by two Pratt & Whitney Canada PT6T-3B turboshaft engines. Each engine has an independent hydraulic system fed by an unpressurized reservoir mounted on the upper deck of the fuselage. Both systems provide boost assistance to the main-rotor flight controls, but only the No. 1 system boosts the antitorque pedals.

A Bell 212 in standard configuration can seat up to

SHUTTERSTOCK/SINGERGM

14 passengers and a single pilot. For this flight, all but the two pilot seats had been removed to increase cargo capacity. The helicopter had also received a factory modification boosting its 5-minute takeoff horsepower rating, making it a version commonly called the 212 HP.

Additionally, in 2013 the 1973-model helicopter was fitted with a Boundary Layer Research Aerospace FastFin system, a modification that involved reshaping the original vertical stabilizer and adding two tail-boom strakes to improve the efficiency of the tail rotor and thereby simultaneously increase hover performance while reducing pilot workload. As of Mar. 5, the helicopter had flown a total of 29,220 hours.

The Crew

The operator's revenue flights, including external loads, were normally flown by a single pilot. Two pilots were on board that day because the more senior, who served as pilot in command (PIC) on the ferry flight, planned to conduct a performance evaluation while the second pilot carried out the longline work. Both held commercial helicopter licenses and were highly experienced in the Bell 212, the local environment, and overall.

The PIC, who was the company president and operations manager, had worked for the company for more than 20 years. He was also a Transport Canada–approved check pilot. His 9,125.5 hours of flight experience included 1,247 in the Bell 212, in which he had completed recurrent training exactly one year earlier. His initial mountain-flying training dated back to 2001, and he completed a refresher on Jan. 9, 2020. A pilot-proficiency check completed on Mar. 6, 2020, had covered abnormal and emergency procedures that included 180-degree and hovering autorotations, engine fires, and engine, governor, hydraulic, and tail-rotor failures.

His colleague had 5,756.5 hours of documented flight experience, including 479.5 hours make-and-model. He had flown about six and a half years for the company. He obtained initial mountain-flying training in 2010 and completed a refresher course on Jan. 22, 2021, followed by general recurrent training on Feb. 19 and a pilot-proficiency check on Feb. 24, 2021.

Both had taken their company's crew resource management training on Oct. 26, 2020. Based on the pilots' recorded work–rest schedules, the Transportation Safety Board of Canada (TSB) concluded that performance was probably not impaired by fatigue.

The Weather

On the morning of the accident, a low-pressure center just north of Vancouver Island was moving inland. With high pressure in the interior of British Columbia, the resulting steep pressure gradient produced gusty southeasterly winds. An associated cold front had been forecast to move through the vicinity of Bowen Island around 10 am. Moderate mechanical turbulence and low-level wind shear were anticipated below 3,000 ft., with turbulence expected to become severe in localized pockets.

The area forecast issued by the Vancouver International Airport (CYVR) terminal called for ceilings at or above 6,000 ft. with good visibility and surface winds from 110 degrees at 18 kt., with gusts to 28 kt. Winds were forecast to ease to a steady 15 kt. after 11 am.

The TSB report notes that the pilots spent considerable time reviewing not only forecasts but also current observations from stations along their planned route, some of which gave them cause for concern. The 9 am reading at Pam Rocks, a few miles north of their route, cited winds from 130 degrees at 32 kt. with gusts to 45. The station at Point Atkinson, just to the southwest, doesn't measure gusts but reported sustained winds of 30 kt. from 110 degrees.

The PIC also contacted the BC Hydro crew at the site for an update on conditions. While anticipating a rough ride, he decided to dispatch the flight in the expectation of improving conditions and a desire to keep the work on schedule.

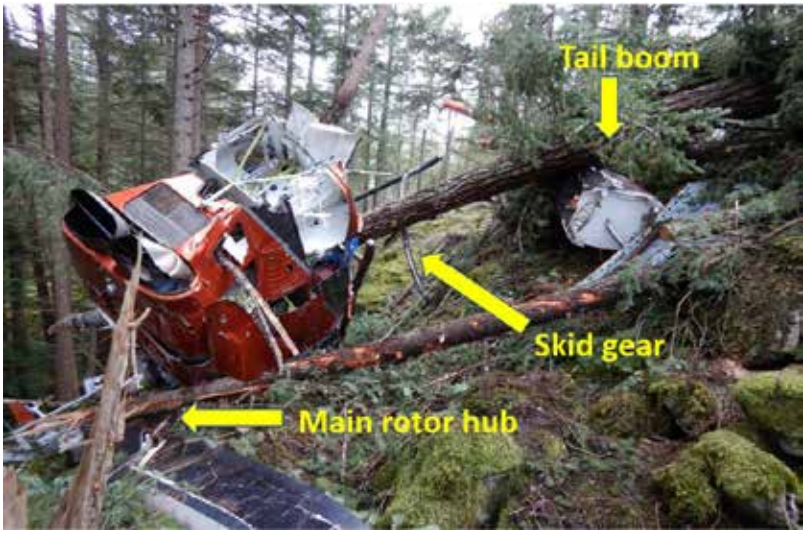
The Flight

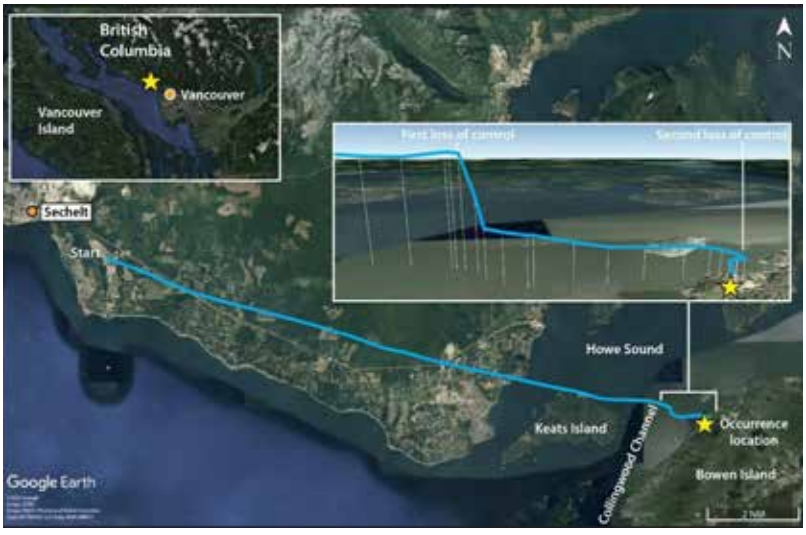
The helicopter initially established cruise flight between 2,300 and 2,600 ft. above sea level, encountering variable easterly to southeasterly winds and light turbulence. The PIC was in the right seat; his colleague, in the left seat, was the pilot flying (PF).

Approaching Keats Island, they noticed "cat's paws" waves produced by strong downdrafts on the surface of Howe Sound and discussed the prospect of increasing turbulence. The PF slowed the aircraft to 75-kt. airspeed and made a slight change of course to the north, but the pilots apparently didn't consider climbing away from the ridge on Bowen Island and the mechanical turbulence that could be anticipated from strong southeasterly winds striking its face. Their cruising altitude of 2,600 ft. was only 212 ft. above the ridge's highest point.

Crossing Collingwood Channel at 2,560 ft., they encountered moderate turbulence and lost 130 ft. of altitude. Moments later, 2 nm west of the lee side of Bowen Island, the helicopter "violently pitched nose down and began a rapid right roll," according to the TSB report, momentarily yanking the cyclic from the PF's hand as the ship "rolled inverted, or close to inverted."

The PIC came on the controls to assist with the recovery as the PF applied full-aft cyclic. The helicopter dropped 1,400 ft. in just over 10 seconds, a rate of 8,220 ft. per minute. Loose items, including a spare headset, a handheld radio, a flight manual, and a lunch box, "launched forward from the rear cabin and struck the pilots on their helmets," knocking the PF's visor over his eyes. Several gauges broke loose from the instrument panel.





The pilots regained some control 0.6 nm west of the coast of Bowen Island at about 1,400 ft. but found the flight controls extremely stiff. A caution light illuminated, indicating insufficient hydraulic pressure; in the chaos, neither pilot was able to see which hydraulic system had failed.

They chose a large field on the island's northwest corner as their emergency-landing site just before the No. 2 engine-out indicator lit up. Still 1.2 nm from their intended landing point and struggling with the controls as they descended through 900 ft., they picked out a closer spot to land. The PIC activated the emergency locator transmitter (ELT), and the PF made a Mayday call that was received by nearby aircraft but not by air traffic control.

The pilots lost yaw control on final approach, and the helicopter began spinning to the right as it descended. The PF pulled both throttles to idle and raised collective to cushion the impact as they descended into the trees. The aircraft hit the ground and rolled inverted onto a rocky ledge about 270 ft. above sea level; ruptured fuel lines leaked Jet A onto the pilots. The PIC helped the PF free a foot pinned in the footwell, and they evacuated the cabin. Nearby residents responded to the scene and transported both to the hospital.

The Investigation

All the wreckage was found within an 80-ft. radius of the fuselage, confirming the helicopter's near-vertical descent. The fuselage was three-quarters inverted in a steep, nose-low attitude. The tail boom was severed at its mounts and found uphill, pointed in the opposite direction.

One main-rotor blade was broken off while the other was essentially intact. The tail-rotor drive shaft and its cover were severed 15 in. from their aft end, consistent with a main-rotor blade strike, and matching damage on the tail-rotor blades' trailing edges and the vertical stabilizer confirmed the tail rotor was spinning freely at impact.

The main-rotor mast showed deformation from "significant contact" with its static stops, indicative of mast bumping that stopped short of catastrophic separation.

Both engines, their accessories, and the transmission were shipped to the manufacturer's facility in Saint-Hubert, Québec, where all test runs were normal and no stored data indicated any in-flight anomaly. A teardown inspection of engine No. 2 confirmed it wasn't running at impact. Pratt & Whitney Canada confirmed that if the helicopter rolled beyond 90 degrees toward inverted, unloading the main rotor and risking an overspeed, the engine governors would reduce or shut off fuel flow to bring main-rotor rpm back within limits.

A roll beyond 90 degrees could also allow air to enter the hydraulic systems via their unpressurized reservoirs, resulting in degradation or loss of hydraulic boost to the flight controls. No anomalies were found in the hydraulic system's pumps, filters, or fluids, or in the tail rotor.

TSB IMAGES

One main-rotor servoactuator was intact enough to allow bench testing. Disassembly of the two remaining main-rotor servos found no internal damage.

The Takeaway

All evidence indicates that the helicopter was airworthy up until the moment of upset. Although both pilots were highly experienced and very familiar with the local environment, they chose not to climb away from a ridgeline buffeted by stiff, perpendicular winds and the rotor currents they generated, despite seeing indications of sharp local downdrafts.

Transport Canada recommends postponing mountain flights if the winds at the peaks are forecast to exceed 30 kt.; the FAA suggests a 25-kt. limit. The FAA also recommends pilots climb to at least 1,000 ft. above a ridge at least 3 mi. before reaching it. Not wanting to climb to, say, 4,000 ft. on a 21-nm flight is understandable, but greater separation from what the TSB characterized as the "complex terrain" of Howe Sound would likely have helped the pilots to avoid the worst of the resulting turbulence.

The pilots' confidence in the forecast of improving conditions may also have been misplaced. By 10 am, about 10 minutes after the accident, winds at Pam Rocks had increased to a base velocity of 36 kt., with gusts up to 52. Between 9 and 10 am, the wind at Vancouver International Airport had likewise increased, from 19 kt. with gusts to 26 to 26 kt. with peak gusts of 38, conditions unfriendly if not downright inhospitable.

As severe as this accident was, it's also worth noting that some things went right. The cargo line, hook, and nets were all secured in the cabin and remained stowed, but various small items were carried in an open milk crate lashed to the cabin floor. These became projectiles when the helicopter departed controlled flight.

The TSB report draws attention to the fact that both pilots wore flight helmets of recent vintage that incurred significant damage from the impact of those objects, thereby protecting the pilots from severe head injuries and enabling them to evacuate quickly after the crash. The use of flight helmets and four-point restraints helped limit the severity of their injuries.

Most crucial is the fact that despite the damage inflicted by the bumping episode, the main-rotor mast held together until the helicopter reached the ground. The FAA notes that "turbulence, especially severe downdrafts," is a known cause of the low-G conditions in which two-bladed teetering rotors are susceptible to mast bumping. Fracture of the main-rotor mast, of course, is generally not survivable, so on that point these two aviators were fortunate indeed.

By Jill Browning and Tyson Phillips

Spatial Disorientation: The Unforgiving Killer

Learn how to recognize and avoid spatial disorientation.

HELICOPTER SAFETY ENHANCEMENT (H-SE) 127A, Recognizing and Training Degraded Visual Environment (DVE) Conditions Conducive to Spatial Disorientation (SD), was established in 2017 after previous US Helicopter Safety Team (USHST) research identified and categorized the leading causes of helicopter fatal accidents and developed safety enhancements to address them. A team comprising a small but dedicated group of industry professionals was formed to lead this H-SE.

To tackle the challenge of recognizing and recovering from SD, the H-SE team examined related accidents and conducted an industrywide survey. Feedback to survey questions about pilot experience with spatial disorientation indicated a gap in both the fundamental understanding of the concept of SD and a pilot's ability to recognize the conditions conducive to SD. Further investigation of related accidents highlighted the complexity, confusion, and unique environment that encounters with SD cause.

Our analysis also prompted a focus on developing techniques for better decision-making, therein emphasizing research the National EMS Pilots Association had conducted with Enroute Decision Points (renamed Enroute Decision Triggers, or EDTs) to identify improved methods of training and techniques to recover from and prevent SD encounters. These techniques are summarized below.

Preflight Planning

Effective risk mitigation begins during the planning phase, including the planning and briefing of the flight.

Visit rotor.org/sos to view and download this and additional safety resources, including videos and posters.

HAI/COLTEN GONZALEZ-HILL DESIGN

During the planning phase, pilots should identify and brief their EDTs.

EDTs are those conditions that, when encountered, trigger a predetermined decision (due to weather, degraded visibility, etc.). These EDTs can include airspeed, altitude, or divergence from the planned route.

The H-SE team opted to provide examples of conditions that may be used to create an EDT (depending on the situation) rather than recommend specific parameters that must be used (see Spatial Disorientation Induced by a Degraded Visual Environment: Training and Decision-Making Solutions, Helicopter Safety Enhancement No. 127A, Output No. 2). The predetermined decisions depend on pilot and equipment capabilities. Examples include:

- Land the aircraft
- Commit to instruments
- Turn to KNOWN good-weather conditions.

Emergency Response

While most pilots agree that instances of decreasing visibility are cause for concern and can lead to an in-flight emergency, most pilots don't treat this emergency the same as emergencies caused by aircraft systems.

For example, a pilot experiencing a WARNING light in the event of an engine fire or a CAUTION light indicating troubling transmission pressure wouldn't second-guess the rotorcraft flying manual and contemplate alternate courses of action.

However, research is teeming with examples of pilots who continued into degraded visibility—flights that should have generated an internal CAUTION or WARNING light in the pilot's head and a corresponding in-flight emergency response.

By establishing and briefing EDTs during the preflight planning phase, pilots are more likely to make better in-flight decisions, taking early action as they would in response to any other aircraft flight manual emergency.

Training

Historically, aviation accident research highlights the importance of more effective training. Survey data confirmed this finding for spatial disorientation, as well, but it also indicated a general misunderstanding of the physiological impact of spatial disorientation.

Many survey respondents who believed they had experienced SD went on to describe illusions rather than spatial disorientation. This finding underscored a fundamental misunderstanding of what true spatial disorientation encompasses, making recognition of the phenomenon more challenging.

A comprehensive pilot-training program should include an academic focus on understanding the mental and physical responses to encountering spatial disorientation. Aircraft training can be conducted in simulators or in aircraft. Limitations associated with each type of training should be well understood, because they do exist, and certain outside factors (such as ops specs, simulator cost and availability, certification, and so on) may preclude one approach versus the other.

Simulators are good at re-creating low-visibility conditions and for teaching basic maneuvers and instrument flying, as well as generally representing rotorcraft handling qualities at a fairly high level. While simulators provide excellent visual illusions, however, most lack the range of motion required to create vestibular illusions. (According to the FAA, it takes 20 seconds of acceleration to create vestibular illusions.)

The importance of combining visual and vestibular illusions is critical in degraded visual environment–induced SD training. The addition of visibility simulation systems to in-aircraft training offers variable control of in-aircraft visibility, providing the critical capability of re-creating both visual and vestibular illusions.

Simulator and in-aircraft training should be scenario based and include decision-making as well as allow full spatial disorientation to develop. As with all training conducted (whether simulator or in-aircraft), safety has to be considered first and foremost.

Recovery

Historically, recovery from spatial disorientation is often lumped in with unusual attitude recovery. Although the techniques can be similar, the visual and vestibular disorientation experienced in SD lead to an overwhelming confusion in the brain that is not the same as the Coriolis effect, in which pilots can feel as though they're pitching, yawing, and rolling simultaneously. SD brain confusion should be introduced during the training phase, but spatial disorientation is unique for each individual, during each encounter.

Each aircraft provides a slightly different set of variables during recovery, including stability augmentation systems, trim systems, and autopilot variants. Despite the many differences in aircraft, a combination of power, attitude, and balance (PAB) can be employed. Pilots who encounter SD should:

- **Power:** set power that will allow for a normal climb rate; care must be taken not to induce a rapid climb rate that can further disrupt the pilot's vestibular system
- **Attitude:** level the wings, place the nose on the horizon
- **Balance:** place and keep the aircraft in trim.

This combination of actions minimizes the instrument scan.

In summary, better decision-making during every phase of flight is critical to avoid conditions conducive to spatial disorientation. Training should include scenarios emphasizing techniques to improve both aeronautical decision-making and the ability to recognize the onset of and recovery from visual and vestibular illusions.

H-SE 127A outlines these intervention strategies and provides a list of resources for pilots to consult to develop better knowledge and appreciation of the dangers posed by low-visibility conditions leading to spatial disorientation.

By Zac Noble

Steer Clear of PINC

Give your pilots, techs, and managers the freedom to follow safety protocols.

ISTOCK/LEOPATRIZI

EVERY MONTH, I REVIEW THE PREVIOUS month's rotorcraft accident report from the US Helicopter Safety Team. I study it looking for possible clues to what caused the accidents listed.

Often, like many of us who've been in aviation for years, I can summarize the sequence of events that led to each crash. What I mean is, give me a typical scenario of an aircraft flying into the ground and with some basic information, I can get a sense of what happened.

Did the aircraft take off with adequate fuel? Were there witnesses who said the engine was running when they last heard or saw the aircraft? What was the general weather trend in the area before the accident or incident? With that little bit of information, a seasoned aircraft pilot or mechanic/engineer can broadly determine why the flight went awry. Usually, we're right in our assessments. What we *can't* surmise is why the pilot or mechanic did what they did to cause the accident.

Accident or Crash?

For the past few years now, I've had an issue with the term "accident." Is it really an accident if the pilot did something he or she knew to be wrong or out of compliance with rules, regulations, or best practices? I don't think so.

If you're driving your car 90 mph in a 45-mph zone and you lose control and hit another object, is it an accident? You were intentionally exceeding the posted speed limit in an area where the safe speed was determined to be much lower. Your intentional action resulted in your losing control of the vehicle. That's not an accident—that's a crash!

In my mind, an accident is when a person does something that results in an unintended consequence. In aviation, we call these occurrences procedural unintentional noncompliance, or PUNC. When the event is intentional, it's known as procedural intentional

noncompliance, or PINC. Life is full of these instances.

I'm not the first to write about PINC. In fact, I've written about the topic before (see "PINC Awareness: Don't Rationalize Skipping Steps," Spring 2018 ROTOR). Procedural intentional noncompliance is something we've all been doing since we became aviation professionals. Some familiar examples: disregarding your aircraft operator's manual, ignoring federal aviation rules, skimping on maintenance procedures, flying when the weather doesn't meet your personal or company minimums. I could go on.

Why Do We Shoot Ourselves in the Foot?

What causes us to take a walk on the wild side of aviation and commit PINC? A high probability of success? The absence of peer pressure or reaction? Complacency? All of these (and other reasons)?

What's been determined through countless studies and evaluations of "accidents" is that the majority of PINC-related crashes have occurred at the hands of veteran pilots and mechanics—people who've been doing the work they specialize in for many years, even decades. Yet, they take it upon themselves to evaluate the risk and then hope the result will be worth the action they took.

They do this knowing they're violating an important safety regulation or guideline. It could be an FAA rule, a company SOP or GOM, a best practice, or maybe even the wise counsel of a colleague.

To avoid promoting an environment where PINC can flourish, plant a culture where your pilots, mechanics, and managers aren't afraid to speak up—to management or to one another.

Give your maintenance personnel the tools, time, and proper work environment to deliver a safe aircraft and perform their work correctly, consistently.

It takes self-discipline to operate an aircraft in a single-pilot role and always comply with safe rules and procedures. So give your pilots the ability to operate within the scope of rules and procedures and, most importantly, within their own comfort level.

And don't forget your managers. They deserve the ability to meet expectations; don't give them situations in which the only way they can do so is by violating rules or guidance that's in place to protect them and your business.

When I was new to flying air ambulance helicopters, my base lead pilot gave me the best advice, telling me all I needed to know about risk management.

"Your No. 1 job is to protect our certificate," he said. With that sage piece of advice, I knew we weren't going to knowingly violate measures put into place to keep us safe.

Fugere tutum!

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 By Terry Palmer

Digital Overload

Overreliance on technology adds danger to the cockpit.

EXPERIENCE the Bell 429 full flight simulator

RECENT ACCIDENTS IN MANY SECTORS OF commercial aviation have been attributed to pilot distraction and excessive dependence on automation. In such cases, weather or other outside-the-cockpit factors require pilots to think beyond the technology and manually solve the problem. When pilots' situational awareness is clouded by a dependence on technology and the desire to accomplish multiple tasks simultaneously, they are unable to recognize simple solutions such as hand-flying the aircraft.

Multitasking is something nearly all of us are guilty of in our daily lives, with varying degrees of success. The wonders of smartphones, tablets, and other portable devices, including electronic flight bags, sometimes lead us to believe we can accomplish more tasks while driving and flying than we safely and effectively can.

The fact is, the more tasks we try to accomplish simultaneously, the less focus we have on any one of them. The probability of distraction increases with each task we take on.

More and more, regulators, accident investigators, and learning institutions are recognizing that an increased dependence on technology, whether that's a cell phone or advanced avionics, can distract the pilot from the basic tasks that ensure flight safety.

Maintain Your Manual Skills

As technology becomes more accurate and reliable, we tend to become more reliant on it. This dependence can help us be more efficient in completing a task. It can also diminish some of the manual skills we still need should the technology stop working.

ISTOCK/NATALYABUROVA

Electronic flight bags contain most of our planning and operating documents, but an overreliance on them can erode the skills that allow us to navigate or manually compute weight and balance. Avionics can accomplish many necessary flight tasks, but they can also lull us into neglecting our manual skills, which require practice to maintain.

Technology is here to stay, but we mustn't lose our proficiency in basic aviation skills. All flight training programs should seek a healthy balance between teaching how to use technology and how to hand-fly the aircraft.

What if Your Tech Fails?

Some newer pilots may find they're proficient in technology but not in basic flying skills. If the equipment does something unexpected or malfunctions, they may find it difficult to control their aircraft, leading to potentially dire consequences.

Building your ability to seamlessly switch from automated flying to hand-flying is an essential skill for pilots. Maintaining that skill requires recurrent practice and realistic, scenario-based training. Self-assessment is critical to this process in determining the manual skills you need to incorporate into your training sessions.

Building your ability to seamlessly switch from automated flying to hand-flying is an essential skill for pilots.

Train for Realistic Conditions

Aircraft technology is constantly evolving. Training in how to use it should be as well. Initial aircraft-specific training should be designed to match the experience level of the student as well as the mission to be performed. For example, a pilot with many hours in a Bell 206 who changes to an EC145 will require more training time than a BK 117 pilot making the same move, even though both involve going from an analog to a digital cockpit.

Because the EC145 is based on a BK 117 variant, the BK 117 pilot will learn the same basic aircraft but now with a digital cockpit and advanced technology. In addition to a digital cockpit, however, the 206 pilot needs to learn a totally different aircraft and twin-engine procedures. The amount of time needed to train to proficiency for the two pilots can vary significantly.

Take advantage of simulator training for its ability to safely administer effective, realistic scenario-based training. Most new aircraft have simulators available at the OEM's training centers and/or commercial training providers. Ask the training facility for scenarios that include technological failures, so you can practice those essential hand-flying skills as well as making the transition from automated flying.

Maintenance Training

We often forget the maintenance side when thinking of our training needs, but producing high-tech aircraft has also changed the way we maintain those aircraft. Technicians now have to train in equipment-specific, computer-based systems that often differ from aircraft to aircraft. Gone are the days of simply checking the ship for mechanical integrity.

Training in and managing technology are major factors in maintaining airworthy aircraft. Most aircraft makers now provide training in new technology; it's crucial technicians seek this training to maintain their aircraft efficiently, effectively, and safely.

Remember, technology is a tool. We can use it carelessly, without attention to our surroundings and competing demands. Or we can use it responsibly, safely, and effectively, with discipline, self-assessment, and proper training to proficiency.

Make the responsible choice.

Frank Robinson

Industry pioneer made rotorcraft accessible to GA owners in the private market.

FRANK ROBINSON, FOUNDER OF ROBINSON HELICOPTER CO. and an acknowledged pioneer in the helicopter industry, died peacefully Nov. 12, 2022, at his home in Rolling Hills, California. He was 92.

Robinson's vision of making a helicopter that was simple, reliable, and affordable for general aviation and the private market led him to start his own company in 1973, after other helicopter companies had shown no interest. That vision redefined the industry and forever changed general aviation.

In just six years, Robinson was able to design, certificate, and deliver the R22, a two-seat, piston-powered helicopter that quickly became popular as a training helicopter and with private owners. The company introduced the four-seat R44 model in the early 1990s and a five-seat turbine model, the R66, in 2010.

The helicopters Robinson designed have a distinct profile and can be spotted easily and frequently all over the world.

"My father really wanted to see the private market—not even the commercial market but the private market—for helicopters grow," said his son, Kurt Robinson, president and chairman of Robinson Helicopter Co., in a 2014 interview with ROTOR magazine. "He wanted to build a helicopter anyone could fly to get from one place to another."

Robinson's fascination with helicopters began in 1939, at age nine, when he saw a newspaper photo of Igor Sikorsky hovering his VS-300 helicopter. The image captivated Robinson and set the course for his life's work. After receiving degrees in mechanical and aeronautical engineering, he began his career with Cessna in the late '50s. Through the '60s, he continued working for many leading aerospace companies, including Bell and Hughes. At the latter, he led the tail-rotor design team on what is now the MD 500.

Robinson retired in 2010 at the age of 80. His greatest legacy is the company he founded in his living room in 1973, which continues to manufacture helicopters for operations all over the world. The list of awards and honors bestowed on Robinson is long, including a lifetime HAI membership; the Daniel Guggenheim Medal from the American Institute of Aeronautics and Astronautics; (twice) the Igor I. Sikorsky International Trophy from the American Helicopter Society (now the Vertical Flight Society); and the Lifetime Aviation Engineering Award from Living Legends of Aviation.

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LAST LOOK

By Mark Bennett

Evolution Helmets
EVO 252 flight helmet
Melbourne, Florida, USA

Founded by Ron Abbott in 2004 as Helicopter Helmet, Evolution Helmets manufactures fully customizable helmets for aircrew in all positions, inside and outside the aircraft. The company produces as many as 130 helmets per month, which, including repairs—on all brands—totals about 2,000 per year. Here, technician Robert Robbins makes final adjustments to a well-appointed EVO 252 flight helmet at Evolution's Melbourne, Florida, facility.

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