

**Helicopter Safety Enhancement (H-SE) 123:
Increased Simulation/Education to Develop Safe Decision Making**

Helicopter Safety Enhancement Action:	Training: FAA and industry to increase the use of relevant simulation to rehearse at risk scenarios to develop safe decision making and educate.
Expected Implementers:	<ul style="list-style-type: none"> • FAA – AFS-205, National Simulator Program (NSP) • FAA Safety Team (FAAST) • USHST Special Emphasis Area (SEA) Training Team • Flight Simulation Organizations (e.g., FRASCA, Redbird, Elite, Flight Safety, CAE, L3) • Flight Training Organizations (e.g., Bristow Academy, Colorado Heli Ops, Hillsboro Aero Academy, ERAU Embry-Riddle Aeronautical University (ERAU))
Statement of Work:	<p>This H-SE seeks to prevent fatal helicopter accidents resulting from at risk scenarios. The helicopter community should promote the wider use of all available simulation to create increased awareness and educate all pilots during both ab initio training and front line operational recurrent training regarding the at risk situations identified by the USHST’s data driven analysis. This promotion effort applies to the full spectrum of simulation, to include both high and low fidelity as well as full motion and non-motion devices. A facet of the promotion should consider increasing training credits to further incentivize simulation use.</p> <p>The phrase “at risk” used in this H-SE is vague. Without further explanation, there is the potential that “at risk” could be misapplied and this H-SE could wander in directions far beyond the original intent of the USHST’s working group. For this reason, the definition of “at risk” will be limited to only the specific scenarios observed in the twenty-one (21) fatal accidents where H-SE 123 was assigned during the USHST’s analysis of fifty-two (52) LOC-I, UIMC, and LALT fatal accidents from 2009–2013.</p> <p>The twenty-one (21) fatal accidents involving H-SE 123 were distributed as follows: 8 LOC-I, 12 UIMC, and 1 LALT. In each of these cases, the working group determined H-SE 123 could have changed the outcome. All involved some aspect of pilot’s poor judgement or lack of aeronautical decision making (ADM) that placed the aircraft in an at risk situation. The at risk situation either caused or was a contributing factor to the fatal accident. This H-SE targets greater use of simulation at all levels of fidelity (BATD to Level D) in both</p>

initial professional helicopter training and during recurrent training sessions. This will allow pilots to learn from their mistakes in a safe environment and will make them less likely to repeat the error during actual flight.

Project:

1. USHST SEA Training Team will form an H-SE 123 Subject Matter Expert (SME) team composed of simulation subject matter experts from FAA and industry.
2. H-SE 123 SME team will work to eliminate any barriers in existing guidance and oversight that may currently inhibit or discourage increased use of helicopter simulation devices. The specific intent is to prevent future fatal accidents by enabling a greater number of pilots to be safely educated on at risk scenarios at all levels of simulator training.
3. In parallel with Output 2, the USHST SEA Training Team will work with industry to identify specific at risk scenarios, address the feasibility of their inclusion or further emphasis in simulator training for both ab initio and recurrency sessions, promote their inclusion, and recommend how the most recently identified at risk scenarios can continue to be routed to the simulation training providers.

The following 21 accidents prompted this H-SE and these accidents should drive the initial scenarios:

- LOC-I:
 - ERA12MA005
 - ERA11FA272
 - WPR13FA343
 - WPR09FA459
 - WPR10FA277
 - CEN12FA621
 - WPR10FA055
 - CEN13FA010
- UIMC:
 - CEN09PA348
 - ERA09FA537
 - CEN10FA019
 - ERA10FA403
 - CEN10FA509
 - CEN11FA468
 - ERA12MA122
 - ERA13FA014

	<p>CEN13FA096 ANC13GA036 ERA13FA273 ERA13FA336</p> <ul style="list-style-type: none"> • LALT: ERA13LA057 <p>If the opportunity arises, consider inclusion of Technology/Equipment H-SE 81 in conjunction with this H-SE to specifically address LOC-I fatal accident WPR12GA106. H-SE 81 states “Industry improve simulator mathematical physics models for quick stop and Loss of Tail Rotor Effectiveness (LTE). Level A-D FFS and Level 4-7 ATD's, AATDs and BATDs.</p>
<p>Relation to Current Aviation Community Initiatives:</p>	<ul style="list-style-type: none"> • USHST Training Working Group Position Paper 12 July 2016, Safety Through Helicopter Simulation; Recommendations by the Training Working Group for actions to improve the use of helicopter simulators and enhance safety. Submitted to the FAA AFS 800, Aug 2016. http://www.ihst.org/portals/54/repository/Simulation%20Position%20Paper%20July%202016%20Final.pdf • NTSB Safety Alert: Safety Through Helicopter Simulators - Use of simulators can prepare helicopter pilots for emergencies and prevent accidents: <ul style="list-style-type: none"> ○ https://www.nts.gov/safety/safety-alerts/Documents/SA_031.pdf ○ https://www.youtube.com/watch?v=r8TgM3oP98U • Airmanship Education Research Initiative (AERI) Study – Dr. Bill Rhodes PhD. DoD, DARPA, USAF Academy: 108 participants (Pvt-ATP), 2 Scenarios (VFR into IMC, Fuel Leak), 2 FTDs, 2 Groups, FAA ADM & Trustworthy Pilot on-line courses in between. Pilots with good ADM skills performed well in both scenarios. Pilots who made ADM errors in first scenario were significantly reduced in second scenario and they learned from their mistakes. • Use additional research available to validate changes of in-flight behavior (e.g., LOSA initiative: AC 120-90).
<p>Performance Goal Indicators:</p>	

Key Milestones:	<u>Total Months</u>	<u>Start Date</u>	<u>End Date</u>
	Output 1: 2	Mar 1, 2018	May 1, 2018
	Output 2: 36	May 1, 2018	May 1, 2021
	Output 3: 36 Concurrent with Output 2	May 1, 2018	May 1, 2021
Completion:	38 Months		
Potential Obstacles:	The FAA will require authorization and funding to conduct a full review of helicopter simulation usage in the U.S. Any substantial delay will impact the potentially significant safety benefits of this H-SE as well as the preference of the USHST to initiate implementation as soon as possible.		
Detailed Implementation Plan Notes:			
CICTT Code:	LOC-I/UIMC/LALT		
Output 1:			
Description:	Form H-SE 123 Subject Matter Expert (SME) team composed of simulation subject matter experts from FAA and industry.		
Lead Organization:	USHST SEA Training Team		
Supporting Organizations:	<ul style="list-style-type: none"> • FAA AFS-800 • HAI Training Committee 		
Actions:	<ol style="list-style-type: none"> 1. USHST SEA Training Team and the FAA to conduct outreach to convene a team of SMEs to define competency in list of subject areas noted in this H-SE. 2. H-SE 123 SME team to establish a team lead, define roles, and establish a meeting schedule. 		
Output Notes:			
Time Line:	2 months		
Target Completion Date:	May 1, 2018		
Output 2:			
Description:	H-SE 123 SME team will work to eliminate any barriers in existing guidance and oversight that may currently inhibit or discourage increased use of helicopter simulation devices. The specific intent is to prevent future fatal		

	accidents by enabling a greater number of pilots to be safely educated on at risk scenarios at all levels of simulator training.
Lead Organization:	H-SE 123 SME Team (identified through Output 1)
Supporting Organizations:	<ul style="list-style-type: none"> • FAA AFS-205 • USHST SAT • USHST SEA Training Team • HAI Training Committee • FAA – National Simulator Program (NSP) • flight simulator manufacturers
Actions:	<ol style="list-style-type: none"> 1. The H-SE 123 SME team will conduct a full review of guidance and oversight for all helicopter simulation in the U.S. The team should provide recommendations to the FAA on the necessary revisions to guidance and oversight that would allow as much simulator training and checking credit as possible. If the recommendations are implemented, they would serve to promote increased use of simulation for at risk scenarios. 2. If necessary, the USHST SAT can brief the H-SE 123 SME team on the LOC-I, UIMC, LALT analysis and scoring process that led to the prioritization of this particular H-SE. 3. The USHST SEA Training Team can provide assistance in Output 1 through either direct participation on the team, or through connection, networking, and promotion of the effort in the simulation/training communities. 4. Considerations in the H-SE 123 SME team review should include the scenario of avoiding the cost of additional sim training being transferred to the paying student without credit. In addition, USHST data notes that the personal/private sector is of particular high interest for reduction of fatal accidents. With this in mind, some discussion in the review should include allowance for more credits for simulator flight time (VFR and IFR) for within the Private Pilot License (PPL) curriculum. 5. Once complete, the recommendations of the H-SE 123 SME team should be captured in a formal document and provided to the FAA as justification for the necessary revisions.
Output Notes:	
Time Line:	3 years (<i>AC change, minimum 24–36 months</i>)
Target Completion Date:	May 1, 2021
Output 3:	

Description:	Work with industry to identify specific at risk scenarios, address the feasibility of their inclusion or further emphasis in simulator training for both ab initio and recurrency sessions, promote their inclusion, and recommend how the most recently identified at risk scenarios can continue to be routed to the simulator training providers.
Lead Organization:	USHST SEA Training Team
Supporting Organizations:	FAA – AFS 205, FAA – National Simulator Program (NSP), HAI Training Committee, flight training organizations, flight simulator manufacturers, USHST Outreach Team
Actions:	<ol style="list-style-type: none"> 1. In parallel with Output 2, the USHST SEA Training Team will define specific at risk scenarios using the results of analysis from the 21 fatal accidents that recommended H-SE 123 as an intervention. Flight training organizations, flight simulator manufacturers, and HAI Training Committee should partner in this effort to ensure its success. 2. Once specific at risk scenarios are defined, the USHST SEA Training Team will then determine the feasibility of introducing these scenarios into the simulator training environment, or use insight from the USHST’s 2009–2013 fatal accident analysis to expand on existing at risk scenarios. 3. USHST Outreach Team should promote the findings of Actions 1 and 2 to the broader flight training and flight simulation industry. 4. The USHST SEA Training Team will recommend a real-time mechanism for feedback such that at risk scenarios identified by front line helicopter operators can be considered for an Evidence Base Training (EBT) approach that would feed these scenarios back into the simulator training environment.
Output Notes:	
Time Line:	36 months
Target Completion Date	May 1, 2021