

**Helicopter Safety Enhancement (H-SE) 130:
Education and Simulation on Hazards of Over-The-Counter Medication**

<p>Safety Enhancement Action:</p>	<p>FAA and industry to emphasize the hazards of pilots flying impaired by sedating over-the-counter (OTC) medications—particularly antihistamines—including through renewed education/awareness initiatives and the exploration of the use of simulation during initial and recurrent simulator training.</p>
<p>Expected Implementers:</p>	<ul style="list-style-type: none"> • USHST Outreach Team • CAMI • OEMs • FFAST • GAMA • flight simulation providers
<p>Statement of Work:</p>	<p>Helicopter accidents continue to occur with pilots impaired by sedating OTC medications. Because OTC medications are readily available, pilots frequently underestimate the deleterious effects of these medications on their abilities to fly.</p> <p>Within the UIMC dataset, the working group determined that the pilot’s use of impairing substances was either the cause or a contributing factor in one accident. It may, however, be difficult to determine whether impairment by sedating OTC medications caused or was a contributing factor in an accident. Evidence suggests that the UIMC dataset underrepresents the prevalence and patterns of OTC drug use, see, for example, National Transportation Safety Board (2014): <i>Drug Use Trends in Aviation: Assessing the Risk of Pilot Impairment</i>, Safety Study NTSB/SS-14/01 and DOT/FAA/AM-07/12 Report: <i>First-Generation H1 Antihistamines Found in Pilot Fatalities of Civil Aviation Accidents, 1990–2005</i>. These reports suggest that in spite of specific Federal Aviation Regulations and past education and outreach efforts to prevent pilots from flying while impaired, OTC medication use remains a factor in 10 to 13% of aircraft accidents.</p> <p>The expectation is that this H-SE will energize the helicopter community to increase awareness of the potentially disastrous results of flying while impaired by OTC medications. By expanding awareness of the hazards of certain OTC medications, the helicopter community can reduce fatal accidents. To achieve</p>

	<p>increased awareness, methods to convey the effects of OTC medications on one’s ability to fly in a way that is understandable and lasting should be consider. This should include research into utilizing readily available simulation technology that permits pilots to experience some of the potential consequences of impaired flying.</p> <p>Project:</p> <ol style="list-style-type: none"> 1. USHST Outreach Team educate the helicopter community on the impairment caused by certain OTC medications through a variety of messaging through media and face to face events. 2. Discuss the feasibility and plan the development of virtual reality (VR) or augmented reality impairment simulation. 3. As appropriate, conduct formal validation of the simulation to determine effects on pilot performance. <p>The following accident prompted this SE: CEN10FA019</p>
<p>Relation to Current Aviation Community Initiatives:</p>	<ul style="list-style-type: none"> • FAA and GA Community <i>Fly Safe</i> campaign. https://www.faa.gov/news/updates/?newsId=83106 • FAA and industry Fact Sheet. <i>Prevention of Aircraft Accident Resulting from the Pilot's Use of Impairing Medications.</i> www.faa.gov/licenses_certificates/medical_certification/media/impairingmedications.pdf • GAJSC SE-15 <i>Flight After Use of Medication with Sedating Effects.</i> http://www.gajsc.org/loss-of-control/ • GAJSC SE-17: <i>Flight with Impairing or Incapacitating Medical Conditions – Barriers to Communication</i> • FAA guidance to Aviation Medical Examiners and pilots: https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/aam/ame/guide/pharm/
<p>Performance Goal Indicators:</p>	

Key Milestones:	<table border="1"> <thead> <tr> <th></th> <th><u>Total Months</u></th> <th><u>Start Date</u></th> <th><u>End Date</u></th> </tr> </thead> <tbody> <tr> <td>Output 1:</td> <td>6</td> <td>Jun. 1, 2018</td> <td>Dec. 1, 2018</td> </tr> <tr> <td>Output 2:</td> <td>12</td> <td>Dec. 1, 2018</td> <td>Dec. 1, 2019</td> </tr> <tr> <td>Output 3:</td> <td>12</td> <td>Dec. 1, 2019</td> <td>Dec. 1, 2020</td> </tr> </tbody> </table> <p>Completion: Output 1, 6 months. Outputs 2 and 3, 24 months.</p>		<u>Total Months</u>	<u>Start Date</u>	<u>End Date</u>	Output 1:	6	Jun. 1, 2018	Dec. 1, 2018	Output 2:	12	Dec. 1, 2018	Dec. 1, 2019	Output 3:	12	Dec. 1, 2019	Dec. 1, 2020
	<u>Total Months</u>	<u>Start Date</u>	<u>End Date</u>														
Output 1:	6	Jun. 1, 2018	Dec. 1, 2018														
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Potential Obstacles:	<p>Currently, there is no mechanism in place from an aviation simulation technology standpoint to carry this recommendation out. There are simulators available for automobiles that permit the general public to experience impaired driving, but no such simulators exist for aviation. Although simulators have been used to study impaired flying, these have been under strict research conditions and with techniques that, for obvious reasons, cannot be used commercially or for demonstration to the general public. Development of technology that simulates some or all of the effects of sedating OTC impairment, such as deficits in working memory and vigilance, reduced alertness, slowed reaction time, and altered cognition, will be a challenge.</p>																
Detailed Implementation Plan Notes:																	
CICTT Code:	UIMC																
Output 1:																	
Description:	USHST Outreach Team to educate the helicopter community on the impairment of OTC medication through a variety of messaging.																
Lead Organization:	USHST Outreach Team																
Supporting Organizations:	<ul style="list-style-type: none"> • CAMI • FAAST 																
Actions:	<ol style="list-style-type: none"> 1. USHST Outreach Team will request CAMI provide education/awareness materials about sedating OTC medication. In addition, the USHST Outreach Team also will request CAMI either provide or develop materials more specific to helicopters operations, if possible. 2. USHST Outreach Team will review CAMI materials and discuss additional methods of outreach to best convey to 																

	<p>pilots the effects of OTC medications on flying abilities in a way that is concrete and understandable.</p> <p>3. USHST Outreach Team will use the USHST website, mass media distribution, and face to face venues to distribute education/awareness materials. Face-to-face venues will include but not be limited to FAAS Team regional helicopter events and industry sponsored events, such as HAI's Heli-Expo.</p>
Output Notes:	<p>USHST Outreach Team will monitor and track progress through the following:</p> <ol style="list-style-type: none"> 1. Development of outreach materials. 2. The number of events where this message is conveyed, and preferably the number of attendees present at these events. 3. The number of website "hits" or video views specific to this subject. <p>USHST Outreach Team should consider messaging used to convey the impact of impairment in other modes of transportation.</p>
Time Line:	6 months
Target Completion Date:	Dec. 1, 2018
Output 2:	
Description:	USHST to create a team, led by CAMI, to discuss the feasibility of the development of virtual reality (VR) and augmented reality impairment simulation.
Lead Organization:	CAMI
Supporting Organizations:	<ul style="list-style-type: none"> • Flight simulation provider(s) • GAMA • OEMs
Actions:	<ol style="list-style-type: none"> 1. USHST will create a team of experts, led by CAMI. 2. The team will consult with industry regarding the feasibility of developing a VR simulation scenario incorporating known impairing side-effects of sedating OTC antihistamines, <i>e.g.</i>, prolonged reaction times, impaired attention leading to missed alerts and radiocalls, impaired decision-making, etc. 3. If the project is deemed technically feasible, the Team will assist programmers and developers as needed to ensure USHST objectives are met (Validation in Output 3).
Output Notes:	Research papers and clinical reports on the adverse side effects of sedating antihistamines will be provided to simulation development

	<p>subject matter experts for their review and use in developing the simulation software.</p> <p>On cognitive tests the effects from the use of diphenhydramine, a commonly available antihistamine used for allergies and as a sleep aid and the most frequently found OTC in aviation accidents, are like those noted after alcohol intoxication. * The ability to simulate this in a non-impaired individual will be, to say the least, technically challenging.</p> <p><i>*1. The effects of antihistamines on cognition and performance. Kay GG. J Allergy Clin Immunol. 2000 Jun;105(6 Pt 2):S622-7. 2. NHTSA, Drugs and Human Performance Facts Sheets – Diphenhydramine.</i></p>
Time Line:	12 months
Target Completion Date:	Dec. 1, 2019
Output 3	
Description:	(Conditional on Output 2.) Conduct formal validation of the VR simulation to determine effects on pilot performance.
Lead Organization:	Flight simulation providers
Supporting Organizations:	<ul style="list-style-type: none"> • GAMA • CAMI
Actions:	<ol style="list-style-type: none"> 1. Discuss with VR simulation developers and operators the feasibility and applicability of software changes that simulate the potential impairments found with use of sedating medications (<i>e.g.</i>, prolonged reaction times, impaired attention leading to missed alerts and radiocalls, impaired decision-making, etc.). 2. Once final validation is completed, the Team will recommend implementation into current helicopter simulator training curricula.
Output Notes:	Once a prototype is completed, initial validation will be accomplished using pilot members of the USHST will be asked to “fly” an unaltered VR flight simulation and then the impairment VR simulation. Results will be compared and discussed with the pilots and programmers to assess the validity of the simulations. Programming changes should be made as needed to enhance the simulation. Scenarios should be run using pilots with different levels of experience to offer some degree of comparison.

Time Line:	12 months from end of Output 2
Target Completion Date:	Dec. 1, 2020