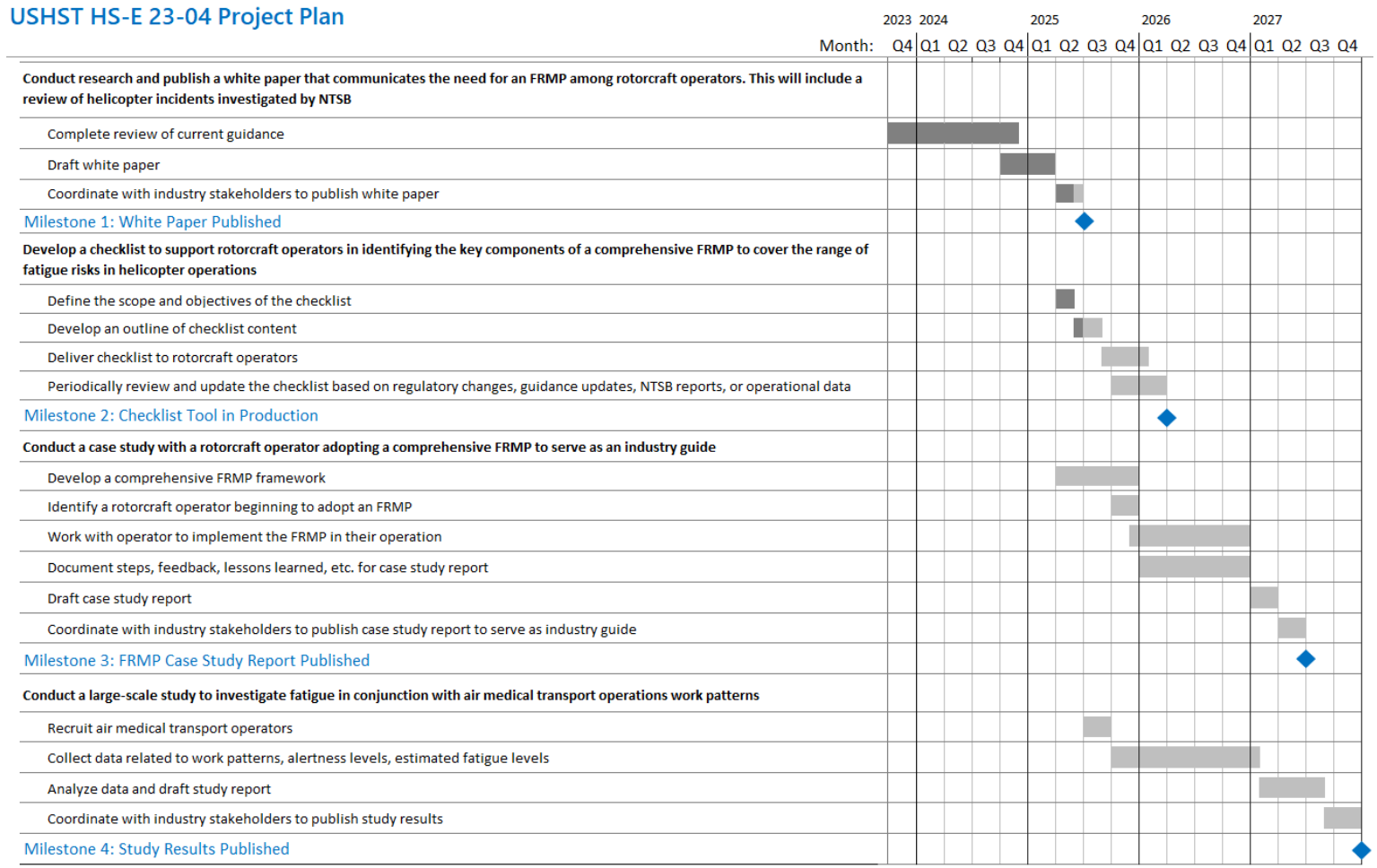
USHST Helicopter Safety Enhancement (H-SE): Fatigue Risk Management	
Helicopter Safety Enhancement Action:	Operators to establish a Fatigue Risk Management Program based on a quantitative objective framework to identify elevated fatigue risk and aid in the selection of risk controls.
Lead Organization:	Pulsar Informatics
Statement of Work:	Fatigue risk impacts all aspects of rotorcraft operations, including air crew, ground crew and support personnel whose mission-critical activities ensure safe and effective operations. Since 1990 NTSB has conducted 6521 helicopter accident investigations. Of these investigations, 28 have cited fatigue or lack of adequate sleep as a contributing factor, which have resulted in 19 fatalities and 18 injuries. Of these, human factors were a contributing factor in 1534 incidents. Fatigue is often under-cited in NTSB helicopter investigations because of a lack of available quantitative information related to fatigue. Based on benchmarks from other industries, fatigue is a factor in 1 in 5 of all incidents. If we assume that number holds true for helicopter operations, that means that the true number of fatigue-related helicopter accidents since 1990 would be several times higher than the 28 reported. It is well known that fatigue-related deficits accumulate relative to factors such as long days, sleep debt, and night work. But how much fatigue is too much? Most rotorcraft operators have policies that enable crew members to take themselves out of duty if they feel too fatigued to safely perform their duties. This approach relies on crewmembers' subjective self-assessment of their own level of fatigue-related deficits. This is problematic because research studies have shown that: • When we have sleep debt, we systematically underestimate the degree of our own alertness deficits • When we are fatigued, our perception about risk changes, and we are willing to accept more risk • Thresholds related to how much fatigue risk is acceptable will vary from person-to-person and may be biased by external factors related to production goals What is needed is a comprehensive approach to fatigue risk management that: • covers all sources of fatigue risk • is based on a quantitative objective framework • has clear thresholds to identify elevated fatigue risk conditions

	• has pre-defined workflows to mitigate fatigue risk • tracks the effectiveness of the whole fatigue risk management process In this project, the USHST will develop guidance material for operators to establish a Fatigue Risk Management Program based on a quantitative objective framework to identify scenarios associated with elevated fatigue risk and to aid in the consistent and reliable execution of effective risk controls. Guidance material will take the form of a white paper to educate operators about the need for an FRMP; a checklist to evaluate FRMP maturity; a case study of an operator adopting an FRMP; and results from a large-scale study of fatigue in air medical transport operations. **Project**: USHST Fatigue Risk Management Working Group will: 1. Conduct research and publish a white paper that communicates the need for an FRMP among rotorcraft operators. This will include a review of helicopter incidents investigated by NTSB 2. Develop a checklist to support rotorcraft operators in identifying the key components of a comprehensive FRMP to cover the range of fatigue risks in helicopter operations 3. Conduct a case study with a rotorcraft operator adopting a comprehensive FRMP to serve as an industry guide 4. Conduct a large-scale study to investigate fatigue in conjunction with air medical transport operations work patterns
Continuation Updates to Work Plan:	The work plan has been revised to serve as a sustainment effort of the original work plan. Specifically, the following updates have been made: • Modified Output 2 to develop a checklist to support rotorcraft operators in identifying the key components of a comprehensive FRMP • Modified Output 3 to include a case study of a rotorcraft operator adopting an FRMP to serve as an industry guide • Added a fourth Output to conduct a large-scale study to investigate fatigue in conjunction with air medical transport operations work patterns • Extended the original timeline to be more realistically aligned with the Working Group Outputs and to account for the Output modifications and additions
Relation to Current Aviation Community Initiatives:	FAA is leading a research effort to investigate fatigue in conjunction with air medical transport operations work patterns.

Key Milestones:	
CICTT Code:	
Output 1:	
Description:	Conduct research and publish a white paper that communicates the need for an FRMP among rotorcraft operators. This will include a review of helicopter incidents investigated by NTSB
Lead Organization:	Pulsar Informatics

Supporting Organizations:	N/A
Actions:	1. Complete review of current guidance 2. Draft white paper 3. Coordinate with industry stakeholders to publish white paper
Target Completion Date:	06/15/2025
Output 2:	
Description:	Develop a checklist to support rotorcraft operators in identifying the key components of a comprehensive FRMP to cover the range of fatigue risks in helicopter operations
Lead Organization:	Pulsar Informatics
Supporting Organizations:	N/A
Actions:	1. Define the scope and objectives of the checklist 2. Develop an outline of checklist sections a. Policies and procedures for fatigue risk management b. Training and education programs for fatigue management c. Scheduling practices d. Fitness for duty processes e. Individual factors 3. Deliver checklist to rotorcraft operators 4. Periodically review and update the checklist based on regulatory changes, guidance updates, NTSB reports, or operational data
Target Completion Date:	03/15/2026
Output 3:	
Description:	Conduct a case study with a rotorcraft operator adopting a comprehensive FRMP to serve as an industry guide
Lead Organization:	Pulsar Informatics
Supporting Organizations:	Rotorcraft operator TBD

Actions:	1. Develop a comprehensive FRMP framework 2. Identify a rotorcraft operator beginning to adopt an FRMP 3. Work with the operator to implement the FRMP in their operation 4. Document steps, feedback, lessons learned, etc. for the case study report 5. Draft case study report 6. Coordinate with industry stakeholders to publish case study report to serve as an industry guide
Target Completion Date:	06/15/2027
Output 4:	
Description:	Conduct a large-scale study to investigate fatigue in conjunction with air medical transport operations work patterns, supported by Pulsar Informatics software
Lead Organization:	Pulsar Informatics
Supporting Organizations:	Air medical transport operators TBD
Actions:	1. Recruit air medical transport operators 2. Collect data related to work patterns, alertness levels (PVT, subjective ratings), estimated fatigue levels 3. Analyze data and draft study report 4. Coordinate with industry stakeholders to publish study results
Target Completion Date:	12/15/2027