

Safety Enhancement 126.3
Cargo – Mitigations for Hazardous Material Fires

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| Safety Enhancement Action: | To reduce the occurrence of accidents and incidents from fires involving high-consequence hazardous materials, develop systems to contain or suppress such fires as a final line of defense for personnel, equipment and cargo. The system should be usable for both ground (e.g., cargo loading/unloading, and ramp movement) and flight operations. |
| Implementers: (Select all that apply) | <input checked="" type="checkbox"/> Air Carrier <input checked="" type="checkbox"/> Industry Association <input checked="" type="checkbox"/> CAST <input checked="" type="checkbox"/> JIMDAT <input checked="" type="checkbox"/> Research Organization <input checked="" type="checkbox"/> Labor Organization <input checked="" type="checkbox"/> Manufacturer <input checked="" type="checkbox"/> Regulator <input type="checkbox"/> Other (specify) |
| Statement of Work: | Develop and deploy systems that provide a final line of defense against hazardous material fires for personnel, equipment and cargo, usable both on the ground and in flight. |
| Total Financial Resources: | 4.0 FTE labor, \$160K travel and administrative costs |
| Relation to Current Aviation Community Initiatives: | <ul style="list-style-type: none"> • SAE and ISO standards activity for fire-resistant container unit load devices (ULDs) and fire containment covers (FCCs) • Industry R&D activities to develop improved container ULDs • Other R&D on suppression agents (e.g., “Firebane”, halon replacements) |
| Performance Goal Indicators: | Supports CAST 2025 metric of reducing fatality risk by 50% from 2010 level by addressing the significant current level of risk posed by in-flight fires on cargo airplanes |
| Key Milestones: | <p>Milestones:</p> <ol style="list-style-type: none"> 1. Completion of gap analysis (which includes): <ul style="list-style-type: none"> • A summary of cargo accidents and incidents resulting from hazardous material fires and an overview of their causes and contributing factors. • A list of approved mitigation technologies that are currently available (in-production / in-stock) • A list of potential mitigation technologies that are not yet available (approved but not in production, approved but in limited supply) • A list of mitigation technology under development but not yet approved 2. List of mitigation technology not in development (to fill gaps – not addressed under bullets above) 3. Completion of risk assessment for hazardous material fires and prioritization for development |

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| | <p>technology to mitigate that risk.</p> <ol style="list-style-type: none"> 4. Completion and approval of master hazmat safety improvement plan which will include <ul style="list-style-type: none"> ○ Implementation plan for incorporation of mitigation improvements in industry ○ R&D Plan to address gaps in available mitigation technology 5. Approval and commencement of research projects 6. Development of performance management plan to monitor: <ul style="list-style-type: none"> ○ Progress of research efforts ○ Implementation of mitigation improvements throughout industry ○ Accident /incidents and ASIAs precursor metrics, to ensure effectiveness of mitigations |
| Potential Obstacles: | <ul style="list-style-type: none"> • Technical challenges associated with development of new mitigations to suppress in-flight hazardous material fires • Harmonization with regulatory activities • Economic issues surrounding future shipping trends of lithium-based batteries |
| Detailed Implementation Plan Notes: | This SE was originally approved as an R&D SERFI by CAST in 2006 as a result of Remaining Risk JSIT. |
| CICTT Code: | F-NI |

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| Output 1: | |
| Description: | Results of an analysis defining and characterizing any gaps between: <ul style="list-style-type: none"> • the causes and contributing factors of recent cargo fires that involved hazardous materials, and • existing technologies to contain or extinguish such fires. |
| Lead Organization: | Joint Implementation Measurement and Data Analysis Team (JIMDAT) |
| Supporting Organizations: | <u>Potential organizations for supplying SMEs:</u> Aerospace Industries of America (AIA) Airlines for America (A4A) Air Line Pilots Association (ALPA) Airbus Allied Pilots Association (APA) Boeing Cargo operators FAA Flight Standards Service (AFS) FAA Aircraft Certification Service (AIR) FAA Office of Accident Investigation and Prevention (AVP) FAA Office of Security and Hazardous Materials (ASH) FAA Technical Center Mitre National Air Carrier Association (NACA) National Aeronautics and Space Administration (NASA) Regional Airlines Association (RAA) |
| Implementers: (Select all that apply) | <input checked="" type="checkbox"/> Air Carrier <input checked="" type="checkbox"/> Industry Association <input checked="" type="checkbox"/> CAST <input checked="" type="checkbox"/> JIMDAT <input checked="" type="checkbox"/> Research Organization <input checked="" type="checkbox"/> Labor Organization <input checked="" type="checkbox"/> Manufacturer <input checked="" type="checkbox"/> Regulator <input type="checkbox"/> Other (specify) |
| Actions: | 1. Task a working group to accomplish the following: <ol style="list-style-type: none"> Review recent cargo accidents and incidents resulting from suspected hazardous material fires, including: <ol style="list-style-type: none"> the UPS DC-8 accident at Philadelphia, the Asiana 747-400F accident over the Pacific Ocean, and the UPS 747-400F accident in Dubai. Identify the causes and contributing factors of the cargo fires. |

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| | <ul style="list-style-type: none"> c. Identify and assess current and near-future technologies capable of suppressing or extinguishing hazardous materials fires for readiness, effectiveness, and feasibility of implementation. This should include technologies currently addressed in CAST SE 127. d. Perform a gap analysis to determine R&D requirements for additional system requirements by correlating causes and contributing factors against available mitigations. e. Prioritize, based on risk, the implementation of available mitigations and development of new mitigations. f. Document the results in a report <p>2. Based on the report from action 1:</p> <ul style="list-style-type: none"> a. Develop follow-on plans in SE 126 for implementing the most effective and feasible recommendations (output 2), and b. Develop research and development plans for addressing any gaps discovered (output 3). |
| Financial Resources: | <p>2.25 FTE labor(15 team members @0.15 FTE per member) \$90k travel (15 team members @\$6k per member) \$10k administrative (meeting support, shipping of equipment, logistics)</p> |
| Itemized Resources: | <p>12-15 team members working part-time for one year</p> <p><u>FTE costs per team member</u></p> <ul style="list-style-type: none"> - 4 quarterly face-to-face meetings, 5 days including travel days (40 hrs per mtg, 160 hours total) - Bi-weekly telecoms (~4 hours per month, 48 hours total) - Additional work between meetings (~8 hours per month, 96 hours total) - Total hours per team member = ~300, or about 0.15 FTE <p><u>Travel costs</u></p> <ul style="list-style-type: none"> - \$1500 per team member per meeting, \$6000 per team member total |
| Output Notes: | <p>Working group will report to JIMDAT. Charter to be developed by JIMDAT and approved by CAST. WG will generally involve different personnel than those currently supporting JIMDAT full time.</p> |
| Time Line: | 12 months |
| Target Completion Date: | 6/30/13 (Completed) |

| Output 2: | | | |
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| Description: | An implementation plan based on the results of output 1, to encourage deployment and incorporation of currently feasible technology mitigations that reduce the risk of cargo fires involving hazardous materials . | | |
| Lead Organization: | JIMDAT | | |
| Human Resources: | Aerospace Industries of America (AIA) Airlines for America (A4A) Air Line Pilots Association (ALPA) Airbus Allied Pilots Association (APA) Boeing Cargo operators FAA Flight Standards Service (AFS) FAA Aircraft Certification Service (AIR) FAA Office of Security and Hazardous Materials (ASH) National Air Carrier Association (NACA) Regional Airlines Association (RAA) | | |
| Implementers: (Select all that apply) | <table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <input checked="" type="checkbox"/> Air Carrier <input checked="" type="checkbox"/> Industry Association <input type="checkbox"/> CAST <input checked="" type="checkbox"/> JIMDAT <input type="checkbox"/> Research Organization </td> <td style="width: 50%; vertical-align: top;"> <input checked="" type="checkbox"/> Labor Organization <input checked="" type="checkbox"/> Manufacturer <input checked="" type="checkbox"/> Regulator <input type="checkbox"/> Other (specify) </td> </tr> </table> | <input checked="" type="checkbox"/> Air Carrier <input checked="" type="checkbox"/> Industry Association <input type="checkbox"/> CAST <input checked="" type="checkbox"/> JIMDAT <input type="checkbox"/> Research Organization | <input checked="" type="checkbox"/> Labor Organization <input checked="" type="checkbox"/> Manufacturer <input checked="" type="checkbox"/> Regulator <input type="checkbox"/> Other (specify) |
| <input checked="" type="checkbox"/> Air Carrier <input checked="" type="checkbox"/> Industry Association <input type="checkbox"/> CAST <input checked="" type="checkbox"/> JIMDAT <input type="checkbox"/> Research Organization | <input checked="" type="checkbox"/> Labor Organization <input checked="" type="checkbox"/> Manufacturer <input checked="" type="checkbox"/> Regulator <input type="checkbox"/> Other (specify) | | |
| Actions: | <ol style="list-style-type: none"> 1. A subset of the WG members from Output 1 will develop an implementation plan for currently available technology mitigations for hazardous material fires. The plan will include: <ol style="list-style-type: none"> a. A risk assessment methodology to be used by operators to assess their specific operational risk b. A review of current and potential future regulations governing the design for and transportation of HazMat c. An agreement from manufacturers and operators to implement the identified technologies, as feasible d. A plan to assess and revise FAA guidance material and policy as necessary to support implementation e. ASIAs metrics to assess progress and performance of implementations 2. Affected organizations commit to carry out the implementation plan. | | |

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| Financial Resources: | <u>Implementation Plan</u> 1.0 FTE (10 team members, 0.1 FTE per member) \$30k for travel (10 members, two face-to-face meetings) \$5k administrative cost (meeting support, logistics) <u>Follow-on</u> Additional costs of implementation not estimated – this will be part of the implementation plan. |
| Itemized Resources: | 0.1 FTE and \$3000 per organization |
| Output Notes: | Extended from 10/31/14 to 8/31/15 in Rev 0.1 Extended to 2/29/16 in Rev 0.2 |
| Time Line: | 31 Months |
| Target Completion Date: | 2/29/2016. Completed and closed 12/1/2016. |

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| Output 3: | |
| Description: | Research plans for technology development to close any gaps identified in output 1. |
| Lead Organization: | FAA Aircraft Certification Service (AIR) |
| Human Resources: | Boeing Airbus Cargo operators FAA Aircraft Certification Service (AIR) FAA Office of Security and Hazardous Materials (ASH) FAA Technical Center National Aeronautics and Space Administration (NASA) |
| Implementers: (Select all that apply) | <input checked="" type="checkbox"/> Air Carrier <input type="checkbox"/> Industry Association <input type="checkbox"/> CAST <input type="checkbox"/> JIMDAT <input checked="" type="checkbox"/> Research Organization <input type="checkbox"/> Labor Organization <input checked="" type="checkbox"/> Manufacturer <input checked="" type="checkbox"/> Regulator <input type="checkbox"/> Other (specify) |
| Actions: | 1. Develop research plans to close identified gaps. Plans to include: <ol style="list-style-type: none"> Performing organizations R&D expected outcomes Funding sources Performance monitoring Regulatory impacts Technology readiness levels and transition to industry / manufacturers. 2. Affected organizations commit to carry out the research and report back periodically to CAST |
| Financial Resources: | <u>R&D Planning</u> 0.7 FTE (7 team members, 0.1 FTE per team member) \$20k for travel (7 members, two face-to-face meetings) \$5k administrative cost (meeting support, logistics) <u>Follow-on</u> Additional costs of research not estimated – this will be part of the R&D plan. |
| Itemized Resources: | 0.1 FTE and \$3000 per organization |
| Output Notes: | Extended from 10/31/14 to 8/31/15 in Rev 0.1; extended to 2/29/16 in Rev 0.2 |
| Time Line: | 31 Months |
| Target Completion Date: | 8/31/2015 (revised from 10/31/2014). Completed and closed 12/1/2016. |