Federal Aviation Administration

AVS Research, Engineering and Development

AVS RE&D Portfolio:

Continued Airworthiness – Systems/ Structures (A11E)

Research Plan: 2022- 2027

January 26, 2022

Part 1: BLI Definition and Scope

Program Area: Continued Airworthiness – Systems/Structures (A11E)

FAA Domain: Aircraft Safety Assurance

BLI Scope: Continued Airworthiness – Systems/Structures

The Continued Airworthiness research program supports the FAA's aviation safety oversight responsibility to ensure that aircraft maintain operational safety, as they age, or as new technologies are introduced. The FAA accomplishes this by anticipating aging issues during the certification process and ensuring risks are adequately addressed in operations, maintenance, and inspection protocols.

Risks and corresponding mitigation approaches are identified and addressed according to the type of aircraft and its operational use, based on the FAA's principles of safety continuum.

The agency monitors in-service data, identifying concerns at the earliest possible point, and communicates potential risks through advisories, directives, regulations, or other guidance. The program considers the aging of all aircraft systems. The FAA will perform research prioritized in the following areas in FY 2022-FY2027, with applicability to continued operational safety of transport aircraft, as well as emerging aircraft, systems, materials, operations and procedures:

- Structural integrity, fatigue, and damage tolerance of new metallic technologies and novel materials
- Structural health monitoring and advanced inspection technology to detect problems in the very early stages of deterioration
- Effect of turbulence on the life of general aviation aircraft, and on eVTOL performance.
- Safe and realistic freeplay limits to preclude unsafe condition of freeplay-induced vibration.
- Improved risk-based, data-driven approach to address fatigue failure risks faced by general aviation fleet.
- Improved certification efficiency for emerging aircraft and systems, including a focus on advanced air mobility and small personal aircraft
- Safety of Aircraft electrical systems, including high voltage electrical systems/battery safety.
- Flight controls and mechanical systems, and augmented digital flight path control systems.
- Rotorcraft systems

Part 2: Service/Office Research Requirements and Research Gap Analysis

1.0 Operational Capability: *[Helicopter Crash Safety]*

Definition: To understand the effect on test results of different test platform material used in helicopter fuel system drop tests as prescribed in Fuel System Crash Resistance § 27/29.952.

Primary S/O: Diane Cook, AIR-624
Secondary S/O: Martin Crane, AIR-621

S/O Priority: 1

Outcome: Revise existing Part 27/29 Advisory Circular guidance information defining the standardized process and acceptable method of compliance with respect to AC 27.1/29.2 Par. AC 27/29.952.

Research Gap Analysis

Research Questions	Contribution	Research Output
1.1 What types of materials have historically been used to create a platform during rotorcraft fuel system drop testing?	10%	Review past certification projects to learn what types of materials have historically been used for platforms during fuel systems drop testing. Produce memo report to be used during research test planning (ref. 1.3)
1.2 Is there a correlation between certain rotorcraft fuel system characteristics and post-crash fires?	10%	Review NTSB data on accidents with post-crash fire, determine if there are similarities in fuel system design among rotorcraft involved in post-crash fires. Produce memo report to be used during research test planning for test specimen definition. (ref. 1.3)
1.3 Do different platform materials effect the results of fuel system drop testing by absorbing impact energy that would otherwise be transferred to the fuel system being tested?	80%	Construct platforms of different materials and perform fuel system drop testing with the design of the fuel system the same for all tests. Determine the effect of different platform materials on test results. Produce formal report for review by AIR-600 policy to revise certification guidance material.

2.0 Operational Capability: *[Fatigue and Damage Tolerance]*

Definition: Identify potential risks and demonstrate fatigue and damage tolerance capabilities of new structural alloys, joining technologies, and other relevant processes and materials adapted by the Aerospace community for use in the NAS to improve safety, increase efficiency, and validate procedures.

Primary S/O: AIR-621 / AIR-600 **Secondary S/O**: N/A		
S/O Priority: 4		
Outcome: The focus of this effort is to support development of performance-based regulations, standards and policy for conventional and innovative technologies.		
Research Gap Analysis		
Research Questions	**Contribution**	**Research Output**
2.1 What are the fatigue and damage tolerance characteristics of emerging metallic technologies?	33%	Partnering with industry, generate data to assess and verify capabilities of emerging technologies to improve fatigue and damage tolerance in metallic structural applications compared with conventional materials and fabrication processes. Facilitate the development of performance-based standards and policy to ensure safe and efficient implementation of emerging technologies in aircraft products.
2.2 Are current methodologies and data sufficient to account for Thermal Loads of Hybrid Composite-Metallic Structures in full-scale test.	33%	Address ARAC recommendations to develop data to evaluate and verify industry methods appropriately account for thermal induced loads in hybrid metallic-composite structure when designing, constructing, and testing as part of the certification process and compliance with § 25.571.
2.3. How to proactively address the risk associated with fatigue failure of general aviation fleets in the absence of service difficulty reports using advanced probabilistic methods?	33%	Combine the past developments and develop the required additional capabilities, tools and probabilistic methodologies to provide the FAA, industry and the user community with a state-of-the-art, robust, safe and reliable software package that includes database, training material and user-manual free of charge as safety management and risk-based decision making becomes the FAA's focus.

3.0 Operational Capability: *[Structural Failure Prevention]*

Definition: Collaborate with NASA, DoD, and industry to develop standardized tools, methodologies and data to mitigate the risks associated with structural failures, to support aircraft certification and continued airworthiness, and to enable the FAA and industry to operate in cost effective and efficient manner.

Primary S/O: AIR-621 / AIR-600
Secondary S/O: N/A

S/O Priority: 5

Outcome: Enter Information here: Provide standardized design and certification compliance data and tools necessary to enable the FAA and industry to operate in cost effective and efficient manner while ensuring product safety

Research Gap Analysis

Research Questions	Contribution	Research Output
3.1 Are standardized guidelines and allowables available and sufficient to address § xx.613 and other relevant regulations for conventional and emerging metallic materials?	25%	Leverage FAA resources through government – industry consortia in the development of the MMPDS. This is recognized worldwide as the premier source of metallic allowables needed for certification and continued airworthiness of aircraft structures per § xx.613 for conventional and emerging metallic materials. Support development of performance-based requirements and standard certification approaches to enable the FAA and industry to operate in cost effective and efficient manner.
3.2 Are analytical methods and material properties available and sufficient for standardized industry approach for damage tolerance analysis?	25%	Leverage FAA resources in a collaborative government – industry effort to promote consistent and uniform level of safety throughout the aviation industry through standardization efforts for validated material fatigue and fracture compliance data and damage tolerance assessment tool supporting § xx.571 (NASGRO). Development of standard approaches enables the FAA and industry to operate in a consistent and efficient manner.
3.3 Are structural health monitoring technologies providing equivalent or better level of detection capability and reliability as traditional NDI?	10%	Develop method and data to assess the reliability of SHM on transport category aircraft using the Probability of Detection (PoD) approach. The goal is to ensure SHM systems provide the required level of confidence and reliability as required of inspection systems in accordance with AC 25-571 Damage Tolerance and Fatigue Evaluation of Structure

3.4 Are existing and advanced Nondestructive Inspection technologies effective in reliable damage detection in emerging structural technologies?	10%	Generate data to develop policy and guidance on the certification and continued airworthiness use of existing and advanced inspection on aircraft structure by understanding the unique maintenance and inspection challenges associated with them.
3.5 Are Automated Nondestructive Inspection technologies effective in reliable damage detection for large area inspections?	5%	Provide FAA with information to assess the inspection techniques using automated platforms and provide guidance and training to prepare the industry for the implementation of these technologies
3.6 Is standardized public data and methodologies available and sufficient to support validation of modeling and simulation (M&S) tools for assessment of aircraft structures?	25%	Using existing testing facilities at the FAA Tech Center, generate data necessary to evaluate the effectiveness of experimental validation frameworks for advanced M&S applications. This work will be informed by the outcomes of the industry-government Airframe M&S working group developing a Credibility Assurance Framework (CAF), and will be performed in close collaboration with industry partners. The outcome is intended to support industry and FAA confidence in the more extensive use of modeling and simulation (M&S) tools for assessment of aircraft structures using the CAF.

4.0 Operational Capability: *[Control Surface Free-play Induced Flutter]*

Definition: By addressing the unsafe condition caused by inadequate and unrealistic freeplay limits, this operational capability strives to obtain data, develop methodologies, and create nonlinear models required to establish safe and realistic freeplay limits for control surfaces of transport category aircraft to prevent freeplay-induced flutter.

Primary S/O: AIR-600, AIR-610 Leads (AIR-614, -615, -616) AIR-700 Leads
Secondary S/O: N/A

S/O Priority: 7

Outcome: Due to investigations of incidents during the past ten years it has been proven that freeplay induced flutter guidance is inadequate, while Military Specifications are conservative. Therefore, the development of up-to-date and applicable freeplay limits of control surfaces of transport category aircraft via criteria guidance for such limits.

Research Gap Analysis		
Research Questions	**Contribution**	**Research Output**
4. 1 Testing via wind-tunnel tests and analysis for data will be needed to develop guidelines for appropriate and up-to-date freeplay limits for control surfaces of transport category aircraft for the prevention of unsafe freeplay induced flutter.	100%	Generate data to develop updated freeplay-limit criteria for inclusion in guidance and policy material for transport airplanes. Estimate new freeplay limits using enhanced non-linear models in conjunction with stability and probabilistic analyses.

5.0 Operational Capability: *[Reduce General Aviation Fatal Accidents and Enable Emerging Aircraft Technology]*

Definition: By using risk-based introductions of technology, this operational capability is designed to leverage technology including advisory systems, assistive and emerging technologies, visual aids, and automatic means to enhance GA safety, while also driving advanced air mobility concepts for eVTOL aircraft from demonstrating key technological facets first on GA aircraft.

Primary S/O: AIR-600, AIR-610 Leads (AIR-614, -615, -616) AIR-700 Leads
Secondary S/O: N/A

S/O Priority: 3

Outcome: To have proposed and/or enabled means to gather data to quantify the effect of turbulence on the structural integrity of GA and eVTOL aircraft systems, possibly including modifications to FAA Part 23 and Part 27 loads rules.

Research Gap Analysis		
Research Questions	**Contribution**	**Research Output**
5.1 How can fatal GA accidents be reduced with the implementation of advisory technologies?	16.67%	Quantify the impact of advisory technology on GA safety.
5.2 What technological traits are necessary for transitioning from “advisory” to “assistive” to “responsible” technology and automation to enable eVTOL/AAM/UAM operations?	15.67%	Identify advisory systems, assistive and emerging technologies that meets the safety requirements for manned and unmanned aircraft certification applications.
5.3 What technology and design traits are necessary for acceptable control system design and control inceptor interface for eVTOL/UAM/AAM aircraft? How are these traits different from traditional fixed wing or rotorcraft control concepts?	15.67%	Identify human/machine interface for control inceptors on eVTOL aircraft and compare to current fixed wing or rotorcraft control concepts.

5.4 What key technology enablers could be explored on GA aircraft as surrogate R&D platforms? Can allowing real operational experience with prototype technologies help identify necessary certification requirements, operational challenges, and training gaps?	15.67%	The technology connections between moving from a test GA surrogate aircraft to an operational UAM/AAM vehicle.
5.5 How can the equivalent level of safety be proven by emerging flight concepts/technology for performance-based regulations?	15.67%	Identification of regulatory barriers and potential solutions for testing equivalent level of safety of emerging technologies for performance-based regulations
5.6 Assess the applicability the of current FAA Part 23 and Part 27 load rules for eVTOL systems. What data would be required for necessary publication of turbulence on airframe structural integrity and quality of ride characteristics for specific aircraft/eVTOL system.	15.67%	Identify the need for modification in the current FAA Part 23 and Part 27 load rules for eVTOL systems. Publication and standards/guidance about the effect turbulence on airframe structural integrity and quality of ride for specific aircraft/eVTOL system
5.7 What compatibility issues currently exist between Night Vision Goggles and Aviation Lighting (i.e. LEDs)?	5%	Technical Recommendations and associated data for: • The development of a minimum operational performance standard (MOPS) • Necessary updates to technical standard order TSO-C164a or necessary data to create a new standalone TSO to reflect policy and operational changes to allow for the use of improved Night Vision Goggle (NVG) or Aviation Lighting light-enhancing technology

6.0 Operational Capability: *Reduce Rotorcraft Fatal Accidents and Enable Emerging Rotorcraft Technology*

Definition: This operational capability addresses a gap in the ability of the agency to understand and mitigate the hazards resulting from loss of control in flight (LOC-I), low altitude (LALT), and unintended instrument meteorological conditions (UIMC) encounters for rotorcraft by focusing on emerging technologies such as LOC-I improved mathematical/predictive risk and severity models, hazard avoidance systems, new Night Vision Goggle (NVG) and Aviation Lighting products, and other related tools to reduce the rotorcraft fatal accident rate.

Primary S/O: AIR-600, AIR-610 Leads (AIR-614, -615, -616) AIR-700 Leads
Secondary S/O: N/A

S/O Priority: 2

Outcome: Successful development and refinement of existing models, pilot warning systems of impending hazards, and other potential technological solutions (i.e. visual aids) to detect the presence of the onset of loss of control and/or provide recovery guidance control authority for hazardous conditions.

Research Gap Analysis

Research Questions	Contribution	Research Output
6.1 Are there improvements that could be made to current mathematical/predictive models that identify and detect LOC-I anomalous conditions for rotorcraft/vertical lift prior to the conditions occurring? Are there causes of LOC-I that we are not currently aware of? Are there additional systems that can be implemented to warn pilots about impending LOC-I conditions? Would it be possible to alter flight controls to mitigate LOC-I conditions?	70%	Technical Reports describing: • Conditions and models to detect and understand LOC-I • New LOC-I prevention/avoidance systems and their detection capabilities • List of mature systems/technologies with TRL's • Human factors' issues identified in the assessments of the various technologies/systems The reports will provide data to inform recommendations and guidance material to promote the development of mitigation technology for the risk of LOC-I, including electronic displays/systems to detect states where LOC-I might exist. Additionally, recommendations of training procedures for said technology to recognize LOC-I potential conditions will also be produced.
6.2 What certification challenges/barriers currently exists for the identification and examinations of hazard avoidance	20%	Technical Reports detailing: • Investigations of current regulatory gaps for hazard avoidance systems

systems (i.e. wire strike avoidance, bird strike avoidance, UAS avoidance, etc.) for such a technology to be successfully implements in current and new helicopter aircraft systems?		Recommendations for safety enhancing technologies that could be implemented through future certification applications and/or TSOs
6.3 What compatibility issues currently exist between Night Vision Goggles and Aviation Lighting (i.e. LEDs)?	10%	Technical Recommendations and associated data for: • The development of a minimum operational performance standard (MOPS) • Necessary updates to technical standard order TSO-C164a or necessary data to create a new standalone TSO to reflect policy and operational changes to allow for the use of improved Night Vision Goggle (NVG) or Aviation Lighting light-enhancing technology

7.0 Operational Capability: ***Safe Civil Use of High Voltage Electrical Systems for Emerging Aircraft Concepts***
Definition: Due to the high influx of eVTOL and electric aircraft manufacturers for Type Certification, this operational capability is meant to investigate best practices, design considerations, and performance-based requirements necessary for obtaining the same level of safety for certification applications of these vehicles.
Primary S/O: AIR-600, AIR-610 Leads (AIR-614, -615, -616) AIR-700 Leads **Secondary S/O**: N/A
S/O Priority: 8
Outcome: Recommendations of design best practices, necessary considerations of productions practices, and maintainability considerations of airworthiness of high voltage electric aircraft systems.

Research Gap Analysis		
Research Questions	**Contribution**	**Research Output**
7.1 What gaps exist in current regulations and policy for the full implantation of high voltage electric aircraft systems in certification applications, and how can expanding existing electric propulsion-related policy drive necessary data requirements needed for collaboration with industry standards bodies for electric propulsion system requirements?	100%	Recommendations on best practices for safe design and use in service for high voltage systems in an aviation environment. Data, testing procedures, and recommendations for the expansion of current electric propulsion performance-based policy that would augment standards development by SDOs for electric propulsion system requirements.

8.0 Operational Capability: *Crash Impact Characterization for Emerging Products*

Definition: By 2026, ensure the existing levels of safety are maintained by developing crash impact parameters for newly emerging concepts such as supersonic transports, E-VTOL aircraft and other types of UAM vehicles.

Primary S/O: AIR-600
Secondary S/O: AIR-626

S/O Priority: 6

Outcome: Successful development of guidance material to document crash impact conditions and certification methods for newly developed aircraft.

Research Gap Analysis

Research Questions	Contribution	Research Output
8.1 What are the potential crash impact conditions for supersonic transports?	35%	Report documenting current literature and test data to envelope to conditions for occupant protection in supersonic transport
8.2 What does a generalized occupant safety standard include for multiple configurations?	35%	Revised guidance material to certify passenger seats regardless of installation orientation. Note: This supports expansion of oblique seats beyond 45 degrees, development of HIC Lite 2.0, and supports the 25.785/561/562 rule making effort
8.3 Can the vertical seat test be replaced for general aviation aircraft?	20%	Revised guidance material and industry standards documents to provides a certification path for a simplified test methodology for general aviation seats. Note: This supports the parallel path to seat certification of Part 23 Level1/2 aircraft
8.4 What are the potential crash impact conditions for eVtol capable aircraft?	10%	Guidance material and industry standards on how to certify passenger seats for installation into eVTOL and aircraft used in AAM operations where now special conditions are used. Note: This supports the validation of how to certify seats that now have different failure modes. Note2: Not sure if this should stay here as it may now be covered in AUS on the long term plan, so maybe here it is just noted but relies on the other BLI?

Part 3: RE&D Management Team Programming

BLI Planning 3 Year Funding Profile (FY22-24) as of 01/28/2022

YEAR	Appropriation or Formulation Contract Funding ($)	INITIAL BLI TEAM PLANNING CONTRACT FUNDING – AFN BLI Target minus the Hold Back ($)	AVS-1 APPROVED CONTRACT FUNDING ($)
FY22 formulation or appropriation (if known)	**$4,812,678**		
FY23 formulation	**$8,091,712**		
FY24 AFN funding allocation target		**$4,146,202**	**$4,211,202**

BLI Plan 5 Year Outlook (FY22-27)

Completed (C)	In Process (IP)	Planned (P)	Need (N)

Research Activities	FY22	FY23	FY24	FY25	FY26	FY27
Operational Capability 1.0: *[Helicopter Crash Safety]*						
1.1 What types of materials have historically been used to create a platform during rotorcraft fuel system drop testing?	*N*	*N*	*N*	*N*	*N*	*N*
1.2 Is there a correlation between certain rotorcraft fuel system characteristics and post-crash fires?	*N*	*N*	*N*	*N*	*N*	*N*
1.3 Do different platform materials effect the results of fuel system drop testing by absorbing impact energy that would otherwise be transferred to the fuel system being tested?	*N*	*N*	*N*	*N*	*N*	*N*
Research Activities	**FY22**	**FY23**	**FY24**	**FY25**	**FY26**	**FY27**
Operational Capability 2.0: *[Damage Tolerance]*						
2.1 What are the fatigue and damage tolerance characteristics of emerging metallic technologies?	*IP*	*IP*	*IP*	*N*	*C*	*C*
2.2 Are current methodologies and data sufficient to account for Thermal Loads of Hybrid Composite-Metallic Structures in full-scale test?	*IP*	*IP*	*IP*	*N*	*C*	*C*
2.3. How to proactively address the risk associated with fatigue failure of general aviation fleets in the absence of service difficulty reports using advanced probabilistic methods?	*IP*	*N*	*C*	*C*		
Research Activities	**FY22**	**FY23**	**FY24**	**FY25**	**FY26**	**FY27**
Operational Capability 3.0: *[Structural Failure Prevention]*						
3.1 Are standardized guidelines and allowables available and sufficient to address § xx.613 and other relevant	*IP*	*IP*	*IP*	*IP*	*IP*	*IP*

regulations for conventional and emerging metallic materials?						
3.2 Are analytical methods and material properties available and sufficient for standardized industry approach for damage tolerance analysis?	*P*	*N*	*N*	*N*	*N*	*N*
3.3 Are structural health monitoring technologies providing equivalent or better level of detection capability and reliability as traditional NDI?	*IP*	*P*	*N*	*N*	*N*	*N*
3.4 Are existing and advanced Nondestructive Inspection technologies effective in reliable damage detection in emerging structural technologies?	*P*	*N*	*N*	*N*	*N*	*N*
3.5 Are Automated Nondestructive Inspection technologies effective in reliable damage detection for large area inspections?	*P*	*N*	*N*	*N*	*N*	*N*
3.6 Is standardized public data available and sufficient to support validation of modeling and simulation (M&S) tools for assessment of aircraft structures?	*P*	*P*	*N*	*N*	*N*	*N*
Research Activities	**FY22**	**FY23**	**FY24**	**FY25**	**FY26**	**FY27**
Operational Capability 4.0: *[Transport Control Surface Vibration]*						
4.1 Testing via wind-tunnel tests and analysis for data will be needed to develop guidelines for appropriate and up-to-date freeplay limits for control surfaces of transport category aircraft for the prevention of unsafe vibrations?	*IP*	*IP*	*IP*	*C*		
Research Activities	**FY22**	**FY23**	**FY24**	**FY25**	**FY26**	**FY27**
Operational Capability 5.0: *[Reduce General Aviation Fatal Accidents and Enable Emerging Aircraft Technology]*						
5.1 How can fatal GA accidents be reduced with the implementation of advisory technologies?	*IP*	*IP*	*IP*	*IP*	*C*	*C*
5.2 What technological traits are necessary for transitioning from “advisory” to “assistive” to “responsible” technology and automation to enable eVTOL/AAM/UAM operations?	*IP*	*IP*	*IP*	*IP*	*IP*	*C*
5.3 What technology and design traits are necessary for acceptable control system design and control inceptor interface for eVTOL/UAM/AAM aircraft? How are these traits different from traditional fixed wing or rotorcraft control concepts?	*IP*	*IP*	*IP*	*IP*	*IP*	*C*
5.4 What key technology enablers could be explored on GA aircraft as surrogate R&D platforms? Can allowing real operational experience with prototype technologies help identify necessary certification requirements, operational challenges, and training gaps?	*IP*	*IP*	*IP*	*IP*	*IP*	*C*
5.5 How can the equivalent level of safety be proven by emerging flight concepts/technology for performance-based regulations?	*IP*	*IP*	*IP*	*IP*	*IP*	*IP*
5.6 Assess the applicability the of current FAA Part 23 and Part 27 load rules for eVTOL systems. What data would be	*IP*	*IP*	*IP*	*IP*	*IP*	*IP*

required for necessary publication of turbulence on airframe structural integrity and quality of ride characteristics for specific aircraft/eVTOL system.						
5.7 What compatibility issues currently exist between Night Vision Goggles and Aviation Lighting (i.e. LEDs)?		*N*	*N*			
Research Activities	**FY22**	**FY23**	**FY24**	**FY25**	**FY26**	**FY27**
Operational Capability 6.0: *Reduce Rotorcraft Fatal Accidents and Enable Emerging Rotorcraft Technology*						
6.1 Are there improvements that could be made to current mathematical/predictive models that identify and detect LOC-I anomalous conditions for rotorcraft/vertical lift prior to the conditions occurring? Are there causes of LOC-I that we are not currently aware of? Are there additional systems that can be implemented to warn pilots about impending LOC-I conditions? Would it be possible to alter flight controls to mitigate LOC-I conditions?	*P*	*P*	*P*	*N*	*N*	*C*
6.2 What certification challenges/barriers currently exists for the identification and examinations of hazard avoidance systems (i.e. wire strike avoidance, bird strike avoidance, UAS avoidance, etc.) for such a technology to be successfully implements in current and new helicopter aircraft systems?			*P*	*N*	*N*	*C*
6.3 What compatibility issues currently exist between Night Vision Goggles and Aviation Lighting (i.e. LEDs)?		*P*	*P*	*C*	*C*	*C*
Research Activities	**FY22**	**FY23**	**FY24**	**FY25**	**FY26**	**FY27**
Operational Capability 7.0: *Safe Civil Use of High Voltage Electrical Systems for Emerging Aircraft Concepts*						
7.1 What gaps exist in current regulations and policy for the full implantation of high voltage electric aircraft systems in certification applications, and how can expanding existing electric propulsion-related policy drive necessary data requirements needed for collaboration with industry standards bodies for electric propulsion system requirements?	*IP*	*P*	*P*	*N*	*C*	*C*
Research Activities	**FY22**	**FY23**	**FY24**	**FY25**	**FY26**	**FY27**
Operational Capability 8.0: *Crash Impact Characterization for Emerging Products*						
8.1 What are the potential crash impact conditions for supersonic transports?		*P*	*N*	*N*	*N*	*C*
8.2 What does a generalized occupant safety standard include for multiple configurations?			*P*	*N*	*N*	*N*
8.3 Can the vertical seat test be replaced for general aviation aircraft?			*P*	*N*	*N*	*N*
8.4 What are the potential crash impact conditions for eVtol capable aircraft?			*P*	*N*	*N*	*N*

Part 4: BLI Team Members

Participants Name	Role	Routing Symbol
Jorge Fernandez	BLI Chair	AIR-670
Michael Gorelik	*CSTA / BLI Lead*	AIR-600
Walt Sippel	*Sponsor SME*	AIR-600
Martin Crane	*Sponsor SME*	AIR-621
John Bakuckas	*Performer SME*	ANG-E281
Sohrob Mottaghi	*Performer SME*	ANG-E281
Kevin Stonaker	*Performer SME*	ANG-E281
Yongzhe Tian	*Performer SME*	ANG-E281
Danielle Stephens	*Performer SME*	ANG-E281
Cliff Johnson	*Performer SME*	ANG-E272