Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	1	I did notice that there are no quad charts for legacy SSM-01, SSM-02, SSM-03, SSM-04, SSM-05, TAS-01, TAS-02, TAS-03 and cannot find linkage to these in the Rosetta stone. Am I missing something?	Hossein Eghbali/Jim White	These requirements are not funded in FY17.
A11.a Fire Research and Safety				
Chris Kmetz	15	Aircraft Fire Safety (A11A.FCS.1) 2015 activities appears focused on continuing work to adapt and finalize procedures but it Is unclear if the end state will result in new advisory material, standards or regulation. Please clarify specific standards target for improvement.	Gus Sarkos	The decision by AVS related to implementation will depend on the effectiveness and practicality of the research results, and may also require a cost-benefit analyses if rulemaking is under consideration.
Chris Kmetz	19	2015 will also focus on heat release measurement in the OSU method but this procedure will not be finalized until 2017? What is the reason for such a long gestation period?	Gus Sarkos	The OSU is being improved in stages, with work in 2016 related to accuracy of air flow measurement and improved piloted ignition, followed by round-robin tests in the US (e.g., Boeing) and abroad (e.g., Airbus) in 2017 with chambers incorporating the improvements to determine the gains in between-laboratory reproducibility.

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	21	Many of the elements of F&CS-14-04 appear to have been dropped. Where will these planned activities be defined?	Gus Sarkos	Of the 8 planned activities in FY-15, the first 4 will be completed in FY-15, the 5th will continue into FY-16, the 6th will be delayed TBD because it depends upon both the 7th which will now be completed in FY-16 and the 8th in FY-17, providing funds are available (early indications are the Congress will cut the program by $643K).
A11.b Propulsion and Fuels Systems				
Chris Kmetz	25	Advanced Damage Tolerance & Risk Assessment Methods for Engine Life-Limited Parts (A11B.PS.1) Recommend continued research into probabilistic methods for damage tolerance assessments	Dave Galella	Current plans call for continued development and refinement of the DARWIN engine probabilistic risk assessment and lifing software through FY19. In addition to supporting probabilistic analysis of attachment slots and turned surfaces, DARWIN will be investigated for its ability to analyze large 3-D FE models of non-rotating, life limited engine parts.
Chris Kmetz	27	Research into the influence of cold dwell effects and texturing in Titanium alloys is recommended. This is an opportunity for partnering with industry to continue JETQC efforts. Additional focus areas could focus on assessment of industry-wide “white spot” issues	Dave Galella	Prior FAA research of the cold dwell effect was basic in nature and made progress in understanding how and why cold dwell occurs. A practical engineering model that could be incorporated into DARWIN to predict and control cold dwell is still needed. At the last JETQC meeting, it was decided that a dedicated meeting was needed to discuss possible follow-on work. Planning for this meeting is in its early stages

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	30	Has there been any consideration for assessing the impact of "hot corrosion" on LCF and damage tolerance on Ni rotors?	Dave Galella	Yes, SwRI, with funding from NASA Glenn has been developing the framework within the DARWIN code to describe and predict how and when "hot corrosion" pits will turn into growing fatigue cracks. Recent work, also funded by NASA, seeks to predict the occurrence of hot corrosion. Enhancements to the DARWIN code funded by other government agencies (DoD and NASA) are available to the FAA and all licensed users.
Chris Kmetz	32	Is there any intent to conduct research into advanced computational materials methods to evaluate changes in microstructure over time?	Dave Galella	There is a lot of work going on currently in developing new computational materials methods to predict microstructural evolution during the manufacturing (forging/heat treating) process, to predict the effect of microstructure on properties, and hence to predict the effects on life/risk. SwRI is working these issues as part of a large AFRL program to address these in DARWIN. This program started less than 1 year ago (prior to 8/2015).
Chris Kmetz	34	Funding to support NDE for critical engine components should be restored (0 in FY16 / TBD in FY17)	Dave Galella	Agreed and note in FY17, NDE for Critical Engine Components was again unfunded. Nondestructive methods, particularly those that can assess material microstructure and those that can replace and improve upon Fluorescent Penetrant still need to be developed and implemented.
Chris Kmetz	37	Research in the area of fuel icing appears to be needed at the aircraft and propulsion levels. Current industry guidance is by ARP.	Dave Galella	Totally agree, the Propulsion and Fuels research does not contain any efforts with regard to fuel icing.
A11.c Advanced Materials/Structural Safety				

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	41	Airframe Structural Crashworthiness Response Characteristics (A11C.FCS.1) Please provide clarity on what type of "model" is envisaged in this task	Ed Weinstein/Curtis Davies	Currently research is being conducted to review structural factors influencing the survivability of occupants in airplane accidents over the last 40 years which will supplement an older study on the subject. The results will be used to identify future research and the information will also be provided to the ARAC on Crashworthiness and Ditching. Feedback from the ARAC will be factored into future efforts.
Chris Kmetz	43	Are there criteria for the gap assessment planned in 2017?	Ed Weinstein/Curtis Davies	Research regarding gap assessment is contingent on current research and ARAC recommendations. Gap assessment will focus on many variables which effect crash dynamics including airplane size, configuration passenger distributions.
Chris Kmetz	45	Transport Airplane Ditching (A11C.FCS.2) Desired outcome is data driven criteria for foreseeable water landings. This seems inconsistent with the premise that assumptions seem to be required to approve the airplane(s). Are there known gaps in the existing rules and regulatory guidance? Perhaps this gap assessment should be the focus for 2016?	Ed Weinstein/Curtis Davies	There are no current structural requirements for transport airplane ditching. Existing rules and guidance address pre and post-crash ditching issues (e.g. airplane configuration, airplane flotation requirements and emergency evacuation). The research effort and the recommendations from the ARAC on Crashworthiness and Ditching will be used to guide future ditching research and policy.

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	51	Damage Tolerance of Composite Structures (A11C.SIC.1) Recommend the inclusion of environmental effects if not already planned	Ed Weinstein/Curtis Davies	Environmental and aging have always been a part of substantiation of composite structures research. At one time there was a separate requirement for those assessments. Currently we have incorporated those considerations into the other requirement areas as part of the overall evaluation.
Chris Kmetz	53	Suggest a goal be clearly stated to rely less on testing and more on analysis in the future.	Ed Weinstein/Curtis Davies	Evaluation of the ability of simulation and computer modeling to represent the structural response is always part of current research. The reduction of physical testing relies on the ability of the simulation to accurately predict the response. When the predictions are reliable and accurate simulations can be used. Our research identifies the accuracy of the methods for regulators make decisions to allow simulation to be used.
Chris Kmetz	54	Include effects of defects (naturally occurring from manufacturing or field induced), which leads us to improved methods for fracture mechanics, damage progression and lifing	Ed Weinstein/Curtis Davies	Current research High Energy Wide Area Blunt Impact (HEWABI) is focused on service vehicle damage and resulting substructure damage. The effort has evaluated the ability to predict through simulation and these unseen damages and account for them in design and substantiation. Other work I this area addresses the use of sandwich structures for civil aircraft including standardized test methods and analytical protocols.

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	56	Industry / government collaboration is essential as there is ongoing research in this area including NASA and AFRL. Has an assessment been completed of the ongoing activities?	Ed Weinstein/Curtis Davies	The composites effort within the FAA is highly coordinated with the research being performed at NASA, AFRL, Navy and Army. The FAA is a collaborator with NASA in the Advanced Composite Project (ACP) and a partner in the Advanced Composite Consortium (ACC) along with United Technologies Corporation, Boeing and General Electric. We serve on review boards for the current AFRL Certification of Composites Tech Scout Program, DARPA OM and Navy Sea Based Aviation Research Program.. Recently we have been collaborating with the DoE on their new Institute for Advanced Composites Manufacturing Innovation.
Chris Kmetz	59	Composite Maintenance Practices (A11C.SIC.2) Database of composite repair methods and associated properties could be added to CMH-17 as an outcome	Ed Weinstein/Curtis Davies	This is already a project within the handbook. The Supportability Working Group has added material properties into the handbook for repair materials from the SAE Commercial Aircraft Composites Repair Committee (CACRC) and works closely with that group to provide effective guidance on repairing composite structures.

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	63	Crashworthiness Issues Unique to Composite Materials (A11C.SIC.3) Consider benchmarking ongoing industry efforts (NASA Advanced Composites Research Partnership) as a 2015 objective. FAA has played an integral role in defining the collaborators in this program early on. Would be a good opportunity to maximize benefit with the limited funds.	Ed Weinstein/Curtis Davies	The FAA is a collaborator with NASA in the Advanced Composite Project (ACP) and a partner in the Advanced Composite Consortium (ACC) along with United Technologies Corporation, Boeing and General Electric. We are closely aligned with federal and industry programs in this field.
Chris Kmetz	68	Structural Integrity of Adhesive Joints (A11C.SIC.5) May need to include classes or categories of bonded joints; critical structural, non- critical, etc.	Ed Weinstein/Curtis Davies	Current research is focused on the causal issues of improper processing and assessment of durability of adhesively bonded joints. This is background material to making decisions on categories of bonded joints. Currently many non-critical bonded joints are used on aircraft but the concern is how to substantiate the reliability of joints that are critical.
Chris Kmetz	70	There are many aspects to this topic that need further development, including manufacturing process control, non-destructive inspection techniques, and accurate design/analysis methods.	Ed Weinstein/Curtis Davies	Concur and the research efforts within the FAA are focused on addressing those issues as fast as allocated resources allow.

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	73	Composite Materials Handbook 17 (A11C.SIC.7) Recommend expanding handbook to include environmental durability and chemical exposure data for characterized materials	Ed Weinstein/Curtis Davies	The handbook is capable of including those items. In the past the common interest across a large number of users has developed the base information set for evaluation of materials and use for designing structures. Environmental exposures became difficult to get an agreed base set as each end user has different expectations of the environmental exposures. If resources were made available the handbook could include them but currently the datasets being presented to the handbook do not include exposure data.
Chris Kmetz	76	Recommend the creation of methodology that enables certification by analysis (Modeling) and creation of methodology for validation of models for certification by analysis. This approach will reduce required testing and result in less reliance on a building block approach to certification.	Ed Weinstein/Curtis Davies	Simulation and computer modeling are useful tools and evaluation of their predictive capabilities is considered in any research. The handbook addresses these capabilities but defers to other sources for development of simulation and predictive analysis. The NASA ACP program is working to develop better capability to predict strength, durability and failure. When that research is completed the results will be added to the handbook.
Chris Kmetz	79	May be of interest to increase specific types or classes of composite materials into database.	Ed Weinstein/Curtis Davies	The handbook is willing to include any materials that are available. The original structure of the handbook identified many materials type. The types which have been supported with funding for testing and of interest to the handbook coordination committee members and industry are the ones currently being addressed. DoE has express interest in using the handbook for a number of materials that they will be characterizing and discussions are underway to include those materials in the handbook.

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	80	For CMC database, may be useful to start further interactions with OEMs on material and property types	Ed Weinstein/Curtis Davies	Currently there is a large commitment of resources from industry members; Boeing, GE, P&W and Rolls Royce; in the CMC effort in CMH-17. They are playing an essential role in developing the property and database requirements for the standardization of CMC materials.
Chris Kmetz	82	Pratt & Whitney is supportive of participating on the CMH-17 committee	Ed Weinstein/Curtis Davies	The handbook and the FAA are encouraged by this comment. The handbook holds public coordination meetings every eight months which we invite any interested P&W personnel to attend. We currently have participation in the CMC area by Michael Abbott David Jarmon, Tania Bhatia Kashyap, Rajiv Naik, and Kevin Rugg; and PMC area by April Cuaresma and Rajiv Naik. We always ready to assist in expanding P&W participation.
Chris Kmetz	84	Continued Operational Safety (COS) & Certification Efficiency (CE) for Emerging Composite Technologies (A11C.SIC.12) How will this activity link to CMH-17? Would think that CMH-17 can benefit by the data developed on chemically exposed and thermally exposed composites. This should be a mandate.	Ed Weinstein/Curtis Davies	There is a synergistic relationship between the research that the FAA performs and the content in the handbook. The research has provided detailed background and handbook guidance on areas researched by the FAA. All FAA research activities are coordinated with existing handbook information and the handbook is updated accordingly when the research reaches maturity.
A11.d Advanced Materials/Structural Safety				

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	92	Research on Ice Crystal & SLD (Appendix C Exceedance) Icing Conditions to Support Means of Compliance (A11D.AI.1) Funding level of $200k seems insufficient for research.	Tom Flournoy/Jim Riley	Our sponsors are attempting to get the level raised back to the previous level of $500K, and to restore funds not provided in FY16 and FY17.
Chris Kmetz	95	Recommend that the FAA sponsored research be focused on the basic physics of ice crystal icing, such as thermal modeling, particle impact dynamics, ice particle melting (in warm air/on impact).	Tom Flournoy/Jim Riley	The research under this requirement has been focused on the investigation of the basic physics associated with the formation of ice accretions in low pressure compressors. The FAA has supported the use of this information for scaling of engine testing in ice crystal conditions, and it is available to engine manufactures for modeling and cycle deck analysis.
Chris Kmetz	98	Recommend continued partnering with industry (Ice Crystal Consortium) to leverage industry for performance/stability impact assessments	Tom Flournoy/Jim Riley	The FAA will continue partnering with industry, which we feel has been fruitful for both the FAA and industry
Chris Kmetz	100	Scaling methodology will require validation to assure that any requirements are not overly conservative	Tom Flournoy/Jim Riley	The scaling methodology that has been developed with support from the FAA thus far is based on testing in the NRC RATfac, a very small pressurized facility. All testing has been "static," i.e., a rotating rig has not been available for the research. It is planned that testing with a rotating rig will begin in FY16 and FY17. Validation of the scaling methodology is challenging technically and requires substantial resources, and little has been done thus far.

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	103	Safe Operations & Take-off in Aircraft Ground Icing Conditions (A11D.AI.2) Is there a more specific desired outcome such as a reduction in a number of specific type events?	Jim Riley	No, there is not.
Chris Kmetz	106	Would like to see timing of the milestones	Jim Riley	Agreed. Expanded information on timing has been incorporated in the FY18 requirement.
Chris Kmetz	107	How does this research link to Terminal Area Icing Weather Information for NextGen (A11K.WX.2)	Jim Riley	The TAIWIN research is much broader, addressing icing issues for both takeoff and landing, and both at the ground and aloft in the terminal area. The ground icing research requirement focuses only on ground operations and takeoff, not considering icing in flight. The expanded, more reliable, and more accurate icing information in the terminal area envisioned under TAIWIN will be valuable for ground operations and takeoff.

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	110	Simulation Methods Development, Validation to Support Appendix C Icing Certification & Continued Operational Safety (A11D.AI.3) Please provide linkage between the critical milestones in FY17 and the desired outcome of an improved certification process. It is not clear that the stated objective can be completed without follow-on activity in FY18	Jim Riley	The FY18 research requirement does call for further research in FY18, and additional funding will be requested. The key products are the databases of 3d ice shapes and their aerodynamic effects, which can be used by manufacturers to validate the CFD tools and FAA certification officials to assess the adequacy of the tools for use in certification.
Chris Kmetz	116	SLD Engineering Tools Development & Validation (A11D.AI.5) The task seems to be limited to evaluating the capability and developing strategy. The level of funding doesn't seem appropriate for targeted technical research.	Jim Riley	The FY18 requirement provides further information on research to be conducted in FY18 through FY20. The work in FY 16 and FY17 is mainly intended to identify the most important and promising areas of research concentration.

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	119	Please provide linkage between the critical milestones in FY17 and the desired outcome of an improved certification process. It is not clear that the stated objective can be completed without follow-on activity in FY18	Jim Riley	Agreed. As described in the preceding response, follow-on research for FY18 through FY20 is described in the FY18 requirement.
Chris Kmetz	123	Onboard Network Security & Integrity (Aircraft Systems Information Security) (A11D.SDS.1) Research into data integrity was endorsed by the SAS at the Fall 2014 meeting. Recommend a review of the minutes and recommendations to provide more specificity in terms of the sponsor outcome	Isidore Venetos	The Aircraft System Information Security Protection (ASISP) sponsor requirements were restructured in April 2015 and the research efforts have been adjusted to accommodate the new requirements. A presentation in the fall 2015 SAS meeting will brief the changes and associated research efforts from 2015 -2020.
Chris Kmetz	127	"No tamper" requirements have existed in military applications for some time. Recommend benchmarking exercise prior to committing to additional research in that area	Isidore Venetos	The Aircraft System Information Security Protection (ASISP) sponsor requirements were restructured in April 2015 and the research efforts have been adjusted to accommodate the new requirements. A presentation in the fall 2015 SAS meeting will brief the changes and associated research efforts from 2015 -2020.

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	129	Recommend that this task include research into use of COTS systems / software and how these will be handled from a certification perspective. How do the regulation and/or MoC need to be modified to address COTS	Isidore Venetos	The Aircraft System Information Security Protection (ASISP) sponsor requirements were restructured in April 2015 and the research efforts have been adjusted to accommodate the new requirements. A presentation in the fall 2015 SAS meeting will brief the changes and associated research efforts from 2015 -2020.
Chris Kmetz	132	Would like to see some research on analytical MoC for DAL A and B software	Isidore Venetos	The Aircraft System Information Security Protection (ASISP) sponsor requirements were restructured in April 2015 and the research efforts have been adjusted to accommodate the new requirements. A presentation in the fall 2015 SAS meeting will brief the changes and associated research efforts from 2015 -2020.
Chris Kmetz	133	Would like to see timelines for the milestones	Isidore Venetos	The Aircraft System Information Security Protection (ASISP) sponsor requirements were restructured in April 2015 and the research efforts have been adjusted to accommodate the new requirements. A presentation in the fall 2015 SAS meeting will brief the changes and associated research efforts from 2015 -2020.

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	135	System Considerations for Complex Software Intensive Systems (A11D.SDS.4) Initiative is aligned with the Fall 2014 REDAC strategic recommendation but lacks specificity in terms of milestones, deliverables and desired outcomes. Interesting that a similar recommendation was made by SAS in 2008	Alanna Randazzo /Srini Mandalapu	It is difficult to explain this requirement within the confines of one quad chart. This subject will be presented in more detail during the SDS deep dive briefing in the fall SAS meeting.
Chris Kmetz	139	Recommend review of the fall 2014 minutes and recommended actions as it relates to research focused on software, automation and autonomy, data integrity and updated FARs and MoC to include the concerns identified by other SAS members	Alanna Randazzo /Srini Mandalapu	A data integrity task was executed under software technologies and tools requirement and the results of the research have been adopted in draft AC-20. Autonomous software is not specifically addressed but is part of verification and validation of aircraft software. This is being addressed under several tasks in software tools and technologies requirement model based development, formal methods and assurance case tasks. Automation specifically may be addressed in UAS program.
Chris Kmetz	142	Funding level appears to be too low to conduct meaningful technical research	Alanna Randazzo /Srini Mandalapu	Agree. Requirements were prioritized via the AVS process. We are working with the TCRG to improve the justification for an increase level of funding.
A11.e Continued Airworthiness				

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	144	A11.e Continued Airworthiness (pg. 22) Fuel Cell Systems for Aircraft Applications (A11E.ES.3) Does the timeframe of the research support industry trends / need? Is there any existing guidance that would be used in the near term in the event an applicant brought forward a configuration including fuel cells?	Alanna Randazzo /Michael Walz	Yes we are working with industry through the SAE AE7A committee on fuel cells. We are also supporting the Aviation Rulemaking Committee on Regenerative fuel cells. The proposed research will support both efforts starting in FY16. Also, there have been experiential flights to help us understand the issues. We are working with other government agencies and are using their guidance such as NASA "SAFETY STANDARD FOR HYDROGEN AND HYDROGEN SYSTEMS" DoE Safety Planning Guidance for Hydrogen and Fuel Cell Projects"
Chris Kmetz	150	Recharge Lithium Batteries & Battery Systems for Aircraft Applications (A11E.ES.4) Is the intent to also capture the elements of F&CS-14-04 here?	Alanna Randazzo /Michael Walz	Where possible. However this program is for LI battery used in aircraft systems and not as cargo or in the overheads. While we will share data the programs have different goals. In this program we will be looking if an aerospace standard will be required for LI battery cells used on aircraft and technology to prevent and mitigate thermal runaway.

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	153	Stall Departure Identification, Recognition & Recovery (A11E.FCMS.1) The desired outcome of a reduction in loss-of-control accidents is appropriate. It is not clear that the defined milestones and planned research will translate into requirements to drive the desired reduction.	Alanna Randazzo /Bob McGuire	As stated, the desired outcome of this research is a reduction in loss of control accidents resulting from aircraft stalls. Reducing stalls in transport category airplanes is a complex issue. The FAA currently has multiple research efforts addressing this issue which are being coordinated by AIR-100. The combination of the research efforts will ultimately allow the FAA to achieve the desired outcome.
Chris Kmetz	157	Are the elements of FCMS-03 embodied in this task ticket?	Alanna Randazzo /Bob McGuire	If by FCMS-03 you are referring to the FY14 requirement "Preventing loss of control in Part 23 with sensed angle of attack and better automation", then the following answer applies. If not please clarify FCMS-03. No, while both research efforts aim for a reduction in loss of control accidents, this effort focuses on stall models for transport category simulators, while FCMS-03 focuses on adding Angle of Attack systems to GA airplanes to prevent stalls.
Chris Kmetz	159	Tire Failure Characteristics (A11E.FCMS.6) Recommended research does not appear to address NTSB recommendation (TPMS)	Alanna Randazzo /Bob McGuire	The intended research effort is much more detailed then can be included in the high level quad chart. However, this research effort will address NTSB released recommendations to the FAA relative to tire failures.

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	161	2017 milestones do not seem supportive of sponsor outcome (improved rules, etc)	Alanna Randazzo /Bob McGuire	There will be a number of tire tests under this effort, including tests to improve current tire debris models. These tests combined with others will be used to improve rules, advisory circulars, policy memos, and updated TSOs to support improved safety; as noted in the sponsor outcome.
Chris Kmetz	163	Airplane System & Occupant Safety in Volcanic Ash (A11E.FCMS.7) Milestone specificity is appreciated	Alanna Randazzo /Bob McGuire	Thank you!
Chris Kmetz	165	Research is well targeted. Regardless of whether engines can or cannot sustain limited operation in an ash environment, passengers and crew may have less tolerance to it. Crew, in particular, could be at risk if the industry sets a “min tolerance level” of ash	Alanna Randazzo /Bob McGuire	Agree

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	169	Integrated Flight Path Control to Address GAJSC and FAA GA Safety Interventions (A11E.FCMS.8) Recommend a 2017 milestone to assess the potential benefit of the prior FAA research to quantify the expected reduction of CFIT and Control accidents.	Alanna Randazzo /Bob McGuire	FAA sponsors and providers will consider adding this milestone. Currently reduction of LOC and CFIT accidents is listed as an Outcome so there is potential benefit to add it as a milestone.
Chris Kmetz	173	Low Energy Alerting & Awareness Systems (A11E.FCMS.9) I like the use of the data developed by NASA in prior research to guide this task.	Alanna Randazzo /Bob McGuire	Agree. Will evaluate the data as soon as we commence the research.
Chris Kmetz	176	Inspection & Tear Down of Bonded Repairs (A11E.MI.1) Would like to see a feel for timing of the critical milestones	Ed Weinstein/David Westlund	Procurement of bonded repair components Q4 FY15 Teardown of components into respective specimens Q1 FY16 Completion of Mechanical Testing Q1 FY18 Project Completion Q4 FY18
Chris Kmetz	178	What is envisaged in terms of the life of the structural components returned for teardown? End of Life? Mid-Life?	Ed Weinstein/David Westlund	During the initial phase of specimen procurement, we are considering all options. Once we have a better idea of what kinds of structure are available, we can make a determination as to what age structure to focus on. In general though, we would like to look at structure that has experienced, at the very least, a significant service life.

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	180	What criteria is anticipated in evaluating these teardown repair parts or is this data collection at this point?	Ed Weinstein/David Westlund	Structurally, we will evaluate these parts in terms of residual strength of some measure, as well as durability in terms of remaining fatigue life. The details, however, are still forthcoming as we develop our detailed experimental matrix. Other ways we intend to evaluate the structure include, chemical structure, contamination, moisture uptake (if applicable), and others.
Chris Kmetz	183	Volcanic Ash Engine Ingestion (A11E.PS.2) - I am concerned about the implications of the objective to develop risk-based operational guidelines that allow airline operators a limited amount of inadvertent exposure to ingested ash. Avoidance is still the best, most effective method.	Ed Weinstein/Dave Galella	Control Account # revised to A11.b.PS.2
Chris Kmetz	188	Emerging Technology – Active Flutter Suppression (A11E.SIM.3) Is this a continuation of the Active Flutter Suppression Technology Evaluation Project out of the University of Washington?	Ed Weinstein/David Westlund	Yes

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	191	How does what is being proposed in terms of outcomes relate to the special condition granted to the 747-8? Is that approach not seen as adequate in the near term?	Ed Weinstein/David Westlund	The goal of this research in terms of an outcome is to bring the FAA to a state where it has the data necessary to determine whether or not the current regulations are adequate to address the certification of an active flutter suppression system. Special conditions provided to the B747-8 were uniquely tailored to address their novel system. This research takes a broader look at the whole array of active flutter suppression technology.
Chris Kmetz	194	MMPDS Support & Design Values for Emerging Materials (A11E.SIM.4) This research is also well targeted and should see broad industry support.	Ed Weinstein/John Bakuckas	Concur – A primary focus of this requirement is leveraging resources and partnering with industry. The MMPDS has a formalized Industry Steering Group consisting of 24 companies representing the major material suppliers and users world-wide.
Chris Kmetz	196	Consider stronger validation of pedigree information for specs and data input into MMPDS curves (avoid Western Ti-like issues).	Ed Weinstein/John Bakuckas	Requirements for data submittal to the MMPDS are covered in Chapter 9 and require ties to specifications. Efforts to improve Chapter 9 guidelines are an ongoing task within the MMPDS. However, it is really outside the MMPDS purview to ensure data submitted conforms to the specifications. (i.e distribution of "nonconforming" titanium by Western)
Chris Kmetz	198	Recommend that the material definitions link design curves with quality requirements.	Ed Weinstein/John Bakuckas	Quality requirements are defined in the material specifications. All material properties values published are linked and traced to the appropriate controlling material specifications.

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	200	Damage Tolerance & Durability Issues for Emerging Technologies (A11E.SIM.5) The FAA collaboration with industry in this area is noted and supported. Broader collaboration may help expand scope or accelerate outcomes	Ed Weinstein/John Bakuckas	Concur – A primary focus of this requirement is leveraging resources and partnering with industry. We will continue to look for opportunities to expand collaborations.
A11.f Aircraft Catastrophic Failure Prevention Research				
Chris Kmetz	204	Advanced Analysis Methods for Impact of Composite Aircraft materials in Rotor Burst & Blade Release (A11F.PS.1) Research is well targeted	Ed Weinstein/William Emmerling	Thank you.
Chris Kmetz	208	Recommend industry collaboration – particularly on impact dynamics.	Ed Weinstein/William Emmerling	Collaboration is Ad-Hoc with the LS-DYNA Aerospace Working Group. This group did arrange for FAA AVS EPD to request official AIA support in 2006. An official group was not sponsored by AIA. We continue in Ad-Hoc Status with good industry participation.
Chris Kmetz	209	Any linkage to rotor integrity sub-committee?	Ed Weinstein/William Emmerling	We work in complementary areas but there is no official linkage. A11f primarily develops the new analytical tools for impact and penetration. My understanding of rotor integrity is limited but I believe it is fatigue management rather than impact resistance and failure
A11.g Flightdeck/Maintenance/System Integration Human Factors				

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	212	Enhancing Aviation Safety through Advanced Procedures, Training & Checking Methods, to include Loss of Control Detection, Avoidance & Recovery (A11G.HF.1) Is there a current benchmark identified for each of the targeted research areas? How will you know what has been achieved is good enough?		
Chris Kmetz	216	Would like to see timing on the milestones		
Chris Kmetz	218	Avionics & New technologies (A11G.HF.2) Research is well targeted.		
Chris Kmetz	220	Would like to see timing on the milestones		
Chris Kmetz	221	Is there an opportunity to partner with government on this research. Would believe some of these bridges may have been crossed already (NASA / AFRL?)		

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	224	Advanced Visions Systems – EFVS, EVS, SVS & DVS, HUD, HMD – Certification & Operational Approval Criteria (A11G.HF.4) Is there a current benchmark? USG / Military?		
Chris Kmetz	227	Would like to see timing on the milestones		
Chris Kmetz	228	Is there an opportunity to partner with government on this research. Would believe some of these bridges may have been crossed already (NASA / AFRL?)		
Chris Kmetz	231	Fatigue Mitigation in Flight Operations (A11G.HF.8) Would like to see timing on the milestones		
Chris Kmetz	233	Is there an opportunity to partner with government on this research?		

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	235	Maintenance Human Factors to Support Risk-Based Decision Making (RBDM) & Maintenance Safety Culture (A11G.HF.10) The concept of risk based decision making here seems very synergistic to the weather uncertainty study. Is there an opportunity for collaboration on some of those elements to assure a consistent approach?		
Chris Kmetz	240	Would like to see timing of the milestones. If this activity is intended to support development of SMS it feels like FY17 and beyond is too late		
A11.h System Safety Management/Terminal Area Safety				

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	243	Rotorcraft FDM Data Gathering & Analysis for ASIAS (A11H.SSM.9) Timing of the work in FY16 and beyond is inconsistent with the goal of 80% reduction in civil helicopter accident rate by 2016.	Hossein Eghbali /Cliff Johnson	The International Helicopter Safety Team (IHST) was formed in 2005 to lead a government/industry cooperative effort to address issues affecting an unacceptably high helicopter accident rate. While the initial goal of IHST was to reduce the accident rate 80 percent by 2016, the overall vision is a civil helicopter community with zero accidents. To that end, the FAA has been engaged in research to support developments in Helicopter Flight Data Monitoring (HFDM). FAA research efforts have included a literature review of the current state of HFDM; initial establishment of rotorcraft research supporting the Aviation Safety Information Analysis and Sharing (ASIAS) program; and initial documentation of relevant HFDM parameters – all supporting USHST efforts to reduce the accident rate. While there were delays during FY14/15 associated with the establishment of an industry-wide HFDM working group, ongoing FAA research efforts support the goal of improved safety in the helicopter community. As the timeline draws near for the original goal, and USHST considers future goals, FAA research on HFDM will continue with the following efforts: • Providing analysis of new data sources from rotorcraft operators; • Fusing new data sources with existing data sets; • Defining appropriate parameters to identify precursors to fatal rotorcraft occurrences; • Developing meaningful metrics to monitor identified precursors to rotorcraft incidents. Continued HFDM research efforts will support government and industry collaboration on data sharing/analysis to discover safety concerns before accidents occur and development of timely mitigation and prevention strategies, leading to a goal of reducing the civil helicopter accident rate.

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	248	Safety Oversight Management System (SOMS) (A11H.SSM.11) Has there been any benchmarking of ICAO planned with respect to this initiative?	Hossein Eghbali / Vasu Kolli	SOMS research will consider adoption of ICAO Annex 19 recommendations for international standards and best practices for safety management.
Chris Kmetz	250	How does this activity link to SASO (not mentioned in quad chart)	Hossein Eghbali / Vasu Kolli	SASO is an AFS initiative but SOMS is an AOV initiative. We will use ANG-E272 staff's collective knowledge of research gained during conducting SASO research requirements to design SOMS.
Chris Kmetz	252	Integrated Domain Safety Risk Evaluation Tool (ID-SRET) (A11H.SSM.13) Would like to understand a bit more about the vision for the critical systems model and decision making tool.	Hossein Eghbali / Huasheng Li	The model integrates NAS architecture and system safety data including hazards, causes and controls associated with critical systems, which will identifies the interactions and interdependencies among the NAS systems and safety data. The ripple effect of a system change in the NAS can be traced and analyzed through the model. A set of safety indicators including NAS change impact, system impact, control effectiveness, system safety influence, system instability, system unavailability, and system anomaly rate are developed to characterize the NAS safety status. The ID-SRET, as a decision-making support tool, will assist AOV with SRMD evaluation, high risk control approval, NAS change impact analysis, and other safety oversight activities by identifying and assessing potential safety concerns with legacy and future systems.
Chris Kmetz	255	Similar to other tasks it would be good if there was consistent application of risk based decision making principles.	Hossein Eghbali / Huasheng Li	Totally agree. The data-driven risk based decision making support tool, like ID-SRET, will definitely enhance FAA's capability in safety risk analysis and further improve aviation safety.

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	258	Development of Stable approach Criteria (A11H.TAS.4) Would be interesting to look at the simulator testing in a deterministic and probabilistic manner	Hossein Eghbali / Andrew Cheng	Agreed. Both deterministic and probabilistic factors will be considered in the simulator experiment.
Chris Kmetz	260	Suggest that this task is also aligned with the risk based decision making sub-initiative	Hossein Eghbali / Andrew Cheng	Agreed. This research will investigate whether or not a go-around decision can be linked with risk factors of runway overruns and excursions.
Chris Kmetz	261	Appears as the 2015 activity to develop criteria will be superseded by the 2017 activity. Is that the intent?	Hossein Eghbali / Andrew Cheng	The FY17 research will continue testing the draft criteria developed through the analyses in 2015 activities.

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	264	Helicopter Operational Safety Improvements using Advanced Vision systems (A11H.TAS.5) The funding level appears to be inconsistent with the work scope and desired outcome	Hossein Eghbali / Cliff Johnson	The funding level proposed considered a subset of Advanced Vision Systems technologies and operational scenarios for testing limited almost exclusively to Point-In-Space (PInS) instrument approach procedures for rotorcraft. However, Advanced Vision Systems technology offers benefits for other instrument approaches including onshore and offshore precision and non-precision instrument approaches (i.e. Search & Rescue, OGP, etc.). In addition, the funding allocation assumes strong contributions from industry as part of the overall research effort. Additional funding, however, would allow the research team to investigate more operational issues associated with using Advanced Vision Systems on helicopters, as many of the devices are not designed specifically for helicopter operations and lack some of the increased cues (visual, sensory, symbols, etc.) necessary for helicopter pilots over a broader range of instrument approaches and helicopter platforms which would aid in the lofty goals set for rulemaking activities in 2017 and beyond.
Chris Kmetz	266	Is there a quad chart for 2015 / 2016?	Hossein Eghbali / Cliff Johnson	A quad chart for 2015 was prepared and has been included in the SAS portfolio of materials for the upcoming meeting. A 2016 quad chart will be prepared for the 2016 SAS Fall Meeting per the AVS RE&D Group's process.

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	267	Should this effort be combined with Advanced Visions Systems – EFVS, EVS, SVS & DVS, HUD, HMD – Certification & Operational Approval Criteria (A11G.HF.4)?	Hossein Eghbali / Cliff Johnson	While both A11H.TAS.15.05 (Helicopter Operational Safety Improvements using Advanced Vision Systems) and A11G.HF.4 (Advanced Visions Systems – EFVS, EVS, SVS & DVS, HUD, HMD – Certification & Operational Approval Criteria) comprise research activities on Advanced Vision Systems, their purposes are entirely different and combining these activities would not suit the needs of the FAA or the helicopter industry. A11G.HF.4 is focused on Advanced Vision Systems' certification guidelines, an Aircraft Certification issue, and is examining a broad range of devices for use by commercial, general aviation, and rotorcraft platforms. Conversely, A11H.TAS.15.05 is focused on the utilization of Advanced Vision Systems for operational credit to lower the established visibility minimums for helicopter instrument approach procedures, which is a Flight Standards, Technologies, and Procedures issue. In the case of A11H.TAS15.05, the research is entirely focused on pilot performance and the associated safety implications (benefits/pitfalls) of using these devices as part of a helicopter instrument approach procedure. It is important to note that both teams are coordinating regularly at both the sponsor and performer levels and are sharing resources and leveraging capabilities to insure successful completion of both activities.

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	270	Angle-of-Attach Displays for Upset Recovery and Air Data System Failure Diagnosis (A11H.TAS.6) Is there an opportunity to combine this effort with Avionics & New technologies (A11G.HF.2) or Advanced Visions Systems – EFVS, EVS, SVS & DVS, HUD, HMD – Certification & Operational Approval Criteria (A11G.HF.4)?	Hossein Eghbali / Andrew Cheng	Hossein Eghbali / Andrew Cheng
A11.j Aeromedical Research				

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	275	Aerospace Medical Systems Analysis (A11J.AM.1) The research is important and well targeted. It is only unclear to me what will be done with the technical report once written. Are there changes to rule expected to improve safety?	Dr. Estrella Forster, AAM-600, 405-954-6131, Estrella.Forster@faa.gov	Implementation of recommendations offered by the technical reports and other publications, including the use of research data in regulatory language is performed by Medical Certification (AAM-300), Education (AAM-400), Accident Investigation (AVP), Aircraft Standards/Certification (AFS/AIR) and other FAA personnel as those organizations deem appropriate. Our research may also respond to NTSB recommendations. Implementation of the research knowledge presented in the reports may be through the revision of standards, orders, and other documents regarding airmen medical certification; AVS Quality Management System Processes; Education and Training Plans and Didactic materials; FAA Forms; biochemical, molecular biology, and calibration laboratory processes; engineering testing SOPs, etc.
Chris Kmetz	280	Accident Investigation & Prevention (A11J.AM.2) Same comment as above	Dr. Estrella Forster, AAM-600, 405-954-6131, Estrella.Forster@faa.gov	Same as above
Chris Kmetz	283	Human Protection & Survival (A11J.AM.3) Same comment as above	Dr. Estrella Forster, AAM-600, 405-954-6131, Estrella.Forster@faa.gov	Same as above

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	286	System Level Crashworthiness Injury Criteria & Certification Methodology (A11J.FCS.4) The research requirement cites the goal that occupants of all aircraft are afforded the same level of protection as all metal aircraft suggesting a concern with the injury criteria applied to alternate constructions. However, there appears to be no research directly associated with this goal. Please explain.	Dr. Estrella Forster, AAM-600, 405-954-6131, Estrella.Forster@faa.gov	The impact severity and loading directions used to qualify seats are based on the seating configurations, impact scenarios and crash characteristics of aircraft designs (all metal construction) typical at the time the rules were developed (1988). One part of this project is to re-assess the most likely impact scenarios, severities, and occupant loading based on the latest seating configurations and crash characteristics of current aircraft (which could include composite construction). This assessment will focus on whether the overall impact scenario has changed in a way that would affect occupant loading. Its scope does not include a detailed comparison of metal vs composite aircraft impact response. The principal goal of this project is to identify a set of injury criteria that can be used to ensure the intended level of safety (safe egress after a survivable crash) for all aircraft seats, regardless of the aircraft type, seating configuration and impact scenario. For clarity, perhaps the last sentence under the requirements section would have been better as follows: *Application of the research should reduce injuries and fatalities during survivable aircraft crashes by ensuring that occupants of all aircraft are afforded the originally intended level of protection, which includes safe egress after a survivable crash.*

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	292	Evacuation Equipment & Aids (A11J.FCS.5) Thankfully the number of evacuations has been reduced significantly over the years so limited data may exist. But I am curious if has ever been research conducted to compare the effectiveness of the various aids used on a particular aircraft versus another or with a particular operator versus another.	Dr. Estrella Forster, AAM-600, 405-954-6131, Estrella.Forster@faa.gov	The short answer is No, we are not aware of any studies designed in the manner suggested. Evacuation equipment/aids can refer to a large number of safety and survival equipment, e.g., assist means to the ground (escape slides/stairs), emergency lighting (signs, markers, escape path marking), cabin crew procedures (briefings, commands), passenger safety information (briefings, briefing cards, educational media). Procedures, aircraft, and safety and survival equipment can vary greatly within and between operators. Consequently, with so much variability, it would be very difficult to make comparisons across aircraft or operators. Researchers are more likely to study a specific escape slide that can be equipment on several aircraft, or a type of pictogram that could be included in various briefing cards, or different sizes of exit signs that could be used on multiple aircraft, for example. For Cabin Safety Research, these studies would be conducted in support of certification activities and regulatory/guidance development. For Serious Games and other passenger education tools, future research is intended to examine their effectiveness by human performance testing.

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	298	Emergency Exit Operation & Location (A11J.FCS.6) Is $25k adequate for the desired outcome and planned milestones?	Dr. Estrella Forster, AAM-600, 405-954-6131, Estrella.Forster@faa.gov	Yes. It is the amount requested, circa 12/2014, for materials and supplies.
A11.k Weather Program				
Chris Kmetz	302	Terminal Area Icing Weather Information for NextGen (A11K.WX.2) Does the 2015 and 2016 research provide a current state assessment of TAIWIN capability?	Tom Flournoy/Jim Riley	The TAIWIN team has developed a Concept of Operations document and is working of a work break down structure. The Concept of Operations identifies four stages in the evolution for TAIWIN. Stage I is essentially the current capability, and a draft report has been developed assessing this capability, which will be augmented by a further study described in the FY15 TAIWIN Project Plan.
Chris Kmetz	304	Would like to see the timing associated with the milestones	Tom Flournoy/Jim Riley	FY 2015-16 Evaluate predictive technologies to determine their applicability for supporting icing cloud properties information that can augment current TAIWIN capabilities FY 2016 Determine the practicality of their use by conducting a cost/benefit analysis for these technologies around the terminal area. FY 2016 Evaluate on-aircraft sensing equipment that can report icing conditions information and provide automated updating to the icing weather information stream that supports TAIWIN capability. FY 2016-17 Develop an integration plan for supplementing TAIWIN with these enhanced capabilities.
Chris Kmetz	305	Sponsor stated outcomes are well targeted.	Tom Flournoy/Jim Riley	Thank you.

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	306	How does this research link to Safe Operations & Take-off in Aircraft Ground Icing Conditions (A11D.AI.2)	Tom Flournoy/Jim Riley	The TAIWIN research is much broader, addressing icing issues for both takeoff and landing, and both at the ground and aloft in the terminal area. The ground icing research requirement focuses only on ground operations and takeoff, not addressing icing in flight. The expanded, more reliable, and more accurate icing information in the terminal area envisioned under TAIWIN will be valuable for ground operations and takeoff.
Chris Kmetz	309	Mitigating the Ice Crystal Weather Threat to Aircraft Turbine Engines (A11K.WX.3) How does this research link to Research on Ice Crystal & SLD (Appendix C Exceedance) Icing Conditions to Support Means of Compliance (A11D.AI.1)	Tom Flournoy/Jim Riley	This research focuses on the collection of atmospheric data in high ice water content (HIWC) ice crystal conditions through flight campaigns, and the processing and analysis of the data. This data is to be used to evaluate the certification envelopes in Part 33, Appendix D, to determine appropriate conditions for facility simulation of HIWC for certification of engines and investigative testing of engines which have had in-service events, establishing the link to A11D.A1.1. The data is also being used for the development and evaluation of HIWC diagnostic algorithms, and development and evaluation of awareness and avoidance technologies for HIWC conditions.
Chris Kmetz	312	Sponsor outcome speaks to development of a data archive to support methods and tool development. If the intent is to update regulation or guidance material this should be added to the sponsor outcome.	Tom Flournoy/Jim Riley	The intent includes data and analysis in support of evaluation of Part 33, Appendix D, and this is the foremost sponsor outcome, so it is agreed that this should be added. Data and information for the update of guidance material falls primarily under A11D.A1.1.

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	315	Recommend that the FAA sponsored research be focused on the basic physics of ice crystal icing, such as thermal modeling, particle impact dynamics, ice particle melting (in warm air/on impact).	Tom Flournoy/Jim Riley	This research falls under A11D.A1.1.
Chris Kmetz	318	Recommend continued partnering with industry (Ice Crystal Consortium) to advance the research	Tom Flournoy/Jim Riley	The FAA will continue partnering with industry, which we feel has been fruitful for both the FAA and industry.
Chris Kmetz	321	Convectively Induced Turbulence – Extent, Severity, and its impact on Aviation (A11K.WX.9) Is there any linkage between this proposed research and the Weather Uncertainty study that was performed? Seems like very similar scope	Mark Mutchler	There is no direct linkage at this time. The purpose of the Weather Uncertainty study was to understand convective weather forecast uncertainty needs of air traffic management personnel. It was a broad focus on the current state of communicating convective weather uncertainty by weather providers and the use of that weather information by air traffic management and airline personnel to support decision making. The CIT effort is a specific effort to conduct a gap analysis on the state of research and current capability to understand the atmospheric processes related to Convectively Induced Turbulence with the goals of understanding the state of the atmosphere at specific horizontal and vertical distances from the convection. The result of the research will be to provide better guidance to all NAS users (ATC, airlines, general aviation, etc.) pertaining to the safe operating distances from convection both in real-time operations as well as forecast products. The research will also lead to updates to operating guidance, regulations, and standards (AIM, ACs, etc.) pertaining to safe operating distances from convective activity.

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	325	Validation of Advanced Airborne Radar Weather Hazards Detection (A11K.WX.10) The funding profile seems inconsistent with the milestone plan. It would seem as the testing planned for FY17 would drive a higher spend than FY18 and FY19.	Lee Nguyen	FY17 requested funding amount was determined by the TCRG prioritization process.
Chris Kmetz	328	What is planned beyond FY17?	Lee Nguyen	FY18: Complete flight test validation of advanced airborne radar detection of icing conditions, including high altitude ice crystal icing conditions. FY19: Conduct assessment and flight testing to quantify the advanced radar capabilities for detection of severe convective events.
Chris Kmetz	329	Outcome suggests updates to ACs and TSO but these are not reflected in the milestone plan.	Lee Nguyen	Will be reflecting in the milestone plan: The RE&D results will impact future revisions of AC 20-182, Airworthiness Approval for Aircraft Weather Radar Systems, and TSO-C63(), Airborne Weather Radar Equipment.
Chris Kmetz	330	Any opportunity for partnering with government in this area (NASA / AFRL)?	Lee Nguyen	Establishing collaborative RE&D with NASA Langley Research Center's Airborne Weather Radar Technology Assessment on Validation of advanced airborne radar detection of icing conditions, including high altitude ice crystal icing conditions.
A11.l Unmanned Aircraft Systems Research (COMMENTS ADDRESSED IN UAS FOCUS SESSION)				

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	336	UAS system Safety Criteria (A11L.UAS.7) Suggest that additional milestones are required for 2017 based on the expected outcome (or range of outcomes) of the FY15 and FY16 activities.		
Chris Kmetz	339	Given the acceleration of UAS development is the timing of the research consistent with need?		
Chris Kmetz	345	Small UAS (sUAS) Detect and Avoid Requirements Necessary for Limited Beyond Visual Line of Sight (BVLOS) Operations (A11L.UAS.22) Any opportunity for partnering with government in this area (NASA / AFRL)?		

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
Chris Kmetz	349	UAS Command and Control Link Compatibility (A11L.UAS.23) Would like to better understand the timing of the milestones. The research as described appears to be more than one year of effort as suggested in the quad chart.		
Chris Kmetz	353	UAS Human Factors Control Station Design Standards (A11L.UAS.24) I believe the research is well targeted but question the timing of the work relative to the acceleration in UAS development.		
Chris Kmetz	357	UAS Navigation Performance, Accuracy, & Reliability (A11L.UAS.25) • Any opportunity for partnering with government in this area (NASA / AFRL)?		
A11.m NextGen – Alternative Fuels for General Aviation (ADDRESSED in UAS FOCUS SESSION)				

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
	363	Alternative Fuels for General Aviation Is it possible to clarify which Phase of the PAFI initiative is described by the FY17 efforts?	Tom Flournoy/Dave Atwood	FY17 engine and aircraft testing will be performed as part of Phase 2 testing. Phase 1, which consists of laboratory, rig, materials compatibility, toxicological risk assessment, and initial small scale engine testing, is on schedule and is set to conclude in mid-January 2016 when the down selection of fuels for entrance into Phase 2 will occur.
	364	Glad to see this as a topic for special discussion at the Spring Meeting	Tom Flournoy/Dave Atwood	Thanks for the interest in this program.
	366	Understanding Probabilistic Weather Information Would it be possible to understand a few more details with respect to the deterministic and uncertainty data that was provided to the pilots? This is more out of my own curiosity and interest in risk based decision making than anything else.		

Comments on FY17 Quad Charts as presented at Spring 2015 SAS Meeting				
Reviewer	**Line #**	**Comment/Rationale**	**FAA POC**	**Resolution of Comment**
	370	Was there any attempt to assess if there was any bias present in the behavior of the pilots. Specifically thinking of: o Anchoring Bias – Reliance on the first information received (initial impressions) o Availability Bias – Reliance on familiarity o Overconfidence Bias – Underestimation of Uncertainty		
	375	The literature review is impressive. Harvard Business Review "The Hidden Traps in Decision Making" explores underlying bias in an article by Hammond, Keeney, Raiffa (2005?) if anyone would like to explore it further.		
End				