Research, Engineering and Development Advisory Committee (REDAC) | MINUTES

Meeting date | time *10/09/2014 - 9:30 am* | **Meeting location** *FAA – 800 Independence Avenue, SW. Washington, DC*

Purpose	REDAC Recommendations on the FY 2017 Research and Development Portfolio and Special Assignment Discussions on Emerging Issues and Future Opportunities
Facilitator	Dennis L. Filler, REDAC Executive Director
Note Taker	Candice Albert

Mr. Dennis L. Filler opened the meeting by welcoming everyone and reading the public meeting announcement.

Presentation Comments- REDAC Executive Director | **Presenter** Mr. *Dennis Filler*

Discussion: Dr. John Hansman informed the group of the tasking activities that had been occurring during the subcommittee meetings. That task was assigned by Dennis Filler for them to address derivative issues or opportunities they could enforce in the future.

Mr. Filler first welcomed the new members; subcommittee chairs to the Research, Engineering & Development Advisory Committee (REDAC). He continued to state that they typically provide guidance to the Federal Aviation Administration (FAA) for the upcoming Research and Development (R&D) Portfolio however; this year the FAA had a different task for the Research, Engineering & Development Advisory Committee (REDAC) and the subcommittees. This task was to look into the future, ten years from now. Based on their expertise and knowledge of the industry, they are seeking the advice that will enable them to develop a Research and Development (R&D) Portfolio that is strategic, responsive and addresses future R&D needs of Federal Aviation Administration (FAA). According to Filler, "This task will serve as a guide for us to examine where there are major gaps, where we are blind, and where we are not being responsive in our Aviation needs. The goal is for us to lead and retain Aviation leadership worldwide."

Upon analyzing the subcommittee reports, Dr. Catherine Bigelow applied a grouping technique to the most common identified areas. Some examples of the results acquired were as follows; Modeling and Simulations needs, Big Data across multiple domains, Unmanned Aircraft Systems (UAS) and Commercial Space, Verification and Validation (V&V) in Complex Systems, such as software, etc., General Aviation (GA) Safety, and lastly; Human Factors Automation/Autonomy Roles and Responsibilities. Mr. Filler continued to state that he hopes

that the output from this meeting as these topics are discussed are further developed to compose a strategic set that the Federal Aviation Administration (FAA) can look at as they move forward.

Presentation NextGen Organization Update | **Presenter** *Mr. Edward Bolton*

Discussion: Mr. Bolton began by stating that both Mr. Michael Huerta and Michael Whitaker regretfully had to decline attending the Full Research, Engineering & Development Advisory Committee (REDAC). After thanking the members for their contributions and participation; he discussed the emerging issues, challenges and opportunities then, elaborated on what they are doing in NextGen in three parts; near-term (1-3 years), mid-term (5 years +/- 2years) and lastly, long-term (anything more than 7 years). The third piece, especially, will include the work that the Subcommittees are doing to help build a better foundation.

The near-term is delivering capabilities, the mid-term is executing programs and the long-term is building our future. For delivering capabilities, they had the NextGen Advisory Committee (NAC) prioritize in dialogue the work that needed to be done. In doing so; they divided it into 3 levels; Tier 1, Tier 2 and Tier 3. Tier 1 includes areas that address enhanced capability development resulting in tangible outcomes and plans. Tiers 1A and B hold things that can be accomplished within 1-3 years. Mr. Bolton added that they culminated a six and a half month effort in which several hundreds of people, industry, FAA and everything in between into teams of four areas; Multiple Runway Operations (MRO), Data Communication (DataComm), Surface Operations, and Performance Based Navigations (PBN). With these areas they were able to build detailed implementation plans delivering capabilities with a tasking from Congress in each of the areas. Included in each of these areas are timelines, milestones, locations, costs and metrics. As of October 17th, 2014 Mr. Bolton stated that this plan will be available.

In the mid-term timeframe they are executing programs. Most of the money that they are spending is going to seven programs; Automatic Dependent Surveillance-Broadcast (ADS-B), En Route Automation Modernization (ERAM), Data Communications (Data Comm), System Wide Information Management (SWIM), Terminal Automation Modernization and Replacement (TAMR), Trip Data and Safety Management (TDSM), and National Airspace System Voice System (NVS). With these seven programs, they have acquired nineteen major milestones that they have committed to doing in 2014 and 2015. As of September 2014, they are twelve for twelve in completion.

For the longer terms they are focused on building the future. Mr. Bolton stated that hardware is becoming less relevant. For example, he points out to the group that judging from your cellphone; the number is older than the actual device. Cyber issues are major concerns for the future because of how easily it has become to access things on the internet i.e.; you are able to tell what song is on the radio from streaming on your cellphone. Based on how easy it is to perform these tasks, it makes this a tremendous vulnerability. Mr. Bolton expressed how

important international harmonization is to him and the Federal Aviation Administration (FAA). Most importantly with Europe, they are extremely enthusiastic about that relationship.

Questions and Comments

Dr. John Hansman inquired about the seven programs Mr. Bolton referenced earlier and stated that the Agency is reasonably good with buying and implementing change but has been slow in getting computers and capabilities. He also asks are these in plans specifically?

Mr. Bolton stated that it is a very good question and concern and this could have been a part of his presentation. One of the things he can answer is that it is not a part of the acquisition programs. A huge reason why they perform this work in the one to three year timeframe is that they have programs that were being completed but then delivered to a site without execution. Now they have acquired specific implementation plans to prevent this to which they intend to use for the next set of programs as well. He also added that they are now doing "examine and renew", where they had MITRE come in and do an assessment to specifically look at this issue. Mr. Bolton stated that he has now acquired the recommendations and is willing to share the results with the committee if needed be.

Dr. Steve Bussolari added to the discussion and inquired more about the framework phases. The first two are in progress but acknowledges that with the third one there is a new paradigm. Now you are in the procedural changes that derive the real benefits. They should already be in the lab presently because seven years is not a long time. He advised Mr. Bolton if we are dealing with concepts changing they should already have work being done. Mr. Bolton agreed with Dr. Bussolari's comment and stated that they are trying to execute. He then assured the committee that he is very passionate about the work being done and he is trying to build an environment to encourage teamwork in order to get things done.

Presentation Interagency Planning Office (IPO) Update | **Presenter** *Ms. Gisele Mohler*

Discussion: Ms. Mohler addressed the transition from Joint Planning and Development Office (JPDO) to the Interagency Planning Office (IPO). The Federal Aviation Administration (FAA) was asked to absorb Joint Planning and Development Office (JPDO) into Operations (Ops) into NextGen because their funding was eliminated in January 14th, of 2014. As of March, 2014, the transition plan was then released granting Edward Bolton authority to accomplish the work. The Board needed to be consistently updated on the progress of this transition because the members of the board are all from different agencies. Michael Whitaker was designated as the Chair for this board and the transition was sixty days duration. Although several people that worked in JPDO were all gone, the partners remained unchanged.

Ms. Mohler stated that the work being executed or reviewed is done in work groups. The partner for each group provides a subject matter expert. At that point if the work matures, they then enter into an agreement with the emphasis on accountability. Once this work matures it will then be sent to technology research. At this point in time they take the report and split it into three sections to avoid anyone from overlooking any details. The three parts are as follows; executive summary, initial results and supporting data and appendices. Ms. Mohler assured that the Interagency Planning Office (IPO) is not doing the work themselves; instead they seek out where the research exists in certain areas. They then pull all of that information together and consolidate them to have one cohesive status or view of that specific research. The NextGen Research, Engineering & Development (R, E&D) Working Group identified six capabilities for multiagency prioritization in support of NextGen. Those are as follows; Multifunction Phased Array Radar (MPAR), Aviation Cyber Security, Alternate Positioning Navigation and Timing (APNT), Integrated Arrival/Departure/Surface (IADS), Applied Traffic Flow Management (Weather Integration and Oceanic), AutoMax (automation and autonomy concept exploration).

Questions and Comments

Dr. John Hansman asked Ms. Mohler to elaborate more on what needs to be done or how it should be prevented. Her response to that was at the moment they are looking at the threats for the tabletop exercises. An example of this is; virtual environment and radiation then looking at the threats they adhere. They look thoroughly into what needs to be done and mitigating them. Dr. Hansman continued to ask if this is the vision that she is going to use to generate research requirements. Ms. Mohler stressed that from her understanding it will depend on what needs to take place to mitigate the threats that is what is being identified. Ms. Mohler added to the committee that the working groups are collecting information to hypothesize what is to be done next. In other words, this provides a mechanism for how they should proceed forward.

Mr. Dennis Filler asked if the outputs from the Interagency Planning Office (IPO) are documents that will be used in budget builds, all the other architecture and everything else. Ms. Mohler stated that these will probably drive the requirements on the architecture and it will also go into our requirements for a better determination on how to prioritize them. She then added that because they are Operations (Ops) funded, this provides a great challenge for them. She also stated that since they are not doing the work themselves this allows them to find out where the work is occurring and permits giving it the appropriate attention needed. She said that there is still a lot of work being done and hopes to be invited to the next Full Research, Engineering and Development Advisory Committee (REDAC) meeting to update the committee on the continued progress of the Interagency Planning Office (IPO).

Presentation NAS Operations Subcommittee Report| **Presenter** *Dr. Steve Bussolari*

Discussion: Dr. Bussolari stated that they did not restrict their quad charts purely through the subcommittee charter although NAS Operations (Ops) is a broad charter. He continued to state that the tasking that was given by Mr. Filler was distinguished between the issues and research opportunities finances. They found many of them to be interrelated; things that had issues were also long term research opportunities. Dr. Bussolari stated that the one immense issue they found was that the Federal Aviation Administration (FAA) needs to get ahead of integrating Unmanned Aircraft Systems (UAS) into the National Airspace System (NAS). The Subcommittee concluded that traditional traffic management techniques will not be sufficient enough due to the sheer volume of future demands. Hence, why would the FAA not only address this issue faster but also coordinate with National Aeronautics and Space Administration (NASA). NASA is currently working on a segregated airspace from the vast majority. This will ensure a more optimizing way of controlling the Air Traffic Management.

A second finding they encountered was that of General Aviation Safety which is stated in the Federal Aviation Administration (FAA) strategic documentation. The subcommittee noted that there has been some improvement in Part 135 in Corporate Aviation Safety as the Personal Aviation Safety has not been fully substantiated. The subcommittee suggested that there needs to be progress of a clear explanation of the causality of accidents and how Weather in the Cockpit (WTIC) addresses those directly. There needs to be a better effort in articulating this causality which will open a long term research opportunity.

A third issue the subcommittee found is Data Integrity, there has been a significant growth in the quantity and diversity of data collected a part of the Aviation System. There is a need to protect all of this data from accidental or intentional corrupting this data. The subcommittee recommends that the Federal Aviation Administration (FAA) establish a more appropriate policy for processing storage protection and dissemination.

Lastly, there is the Verification and Validation (V&V) of National Airspace System (NAS) Systems. There is a need for V&V for deterministic and non-deterministic systems. We need to have the people that are developing for the National Airspace System (NAS) capabilities think about how those capabilities would be validated. During the development phase of new concepts; the developers should think about how these would be validated when writing the algorithms.

Dr. Bussolari then continued on to the Research Opportunities the Subcommittee found; Increasingly Autonomous Systems in the National Airspace System (NAS). This could significantly improve the NAS safety and performance. It could be applied in the processes of planning, negotiating, and real-time monitoring of aircraft trajectories that satisfy user preferences of dynamic and stochastic airspace constraints. This would be beneficial long-term research because of how much Research and Development (R&D) it will require to achieve such

benefits. The second opportunity is Big Data/Measuring the NAS due to the complexity of the research as well as learning how to evaluate the impact of real-time decisions. More research is needed to fully understand the National Airspace System (NAS) in the correct context. The final research opportunity is Modeling and Simulations (M&S); this helps us to understand how the NAS could operate in the future. Before investing in more complex trials, this will assist researchers to test new concepts. The Subcommittee noted that the Federal Aviation Administration (FAA) has scaled back in this field due to the lack of funding. However, to avoid high risks, this is something that should be funded and invested in.

Questions and Comments

Dr. Hansman asked if the issue is really data integrity or vulnerability. Dr. Bussolari stated that the issue here is both integrity and vulnerability because of corruption; whether it is intentional or accidental. Dr. Hansman continued to ask if this could possibly be a cyber-security concern rather than data vulnerability for research. Dr. Bussolari insisted that both of those points are in the issue. We need a better way for the research community to get access to the data but there is an integrity piece of it to where it is not corrupted.

Mr. Filler stated that he is overly pleased with the inputs of the NAS (Ops) Operations Subcommittee. These are all good points but now the need is to figure out how to take them and continue with the budgets in order for these ideas to be heard. Dr. Bussolari stated that these points can be used as priorities to incorporate into their budgets for our research portfolios.

Presentation Aircraft Safety Subcommittee Report| **Presenter** *Mr. Kenneth Hylander*

Discussion: Mr. Hylander addressed the committee and stated that he is new in the position of Chairman for Aircraft Safety Subcommittee. During their subcommittee meeting they did not acquire any Findings and Recommendations but as their meeting progressed that changed. They focused on the tasking that was given to them and had a total of 18 presentations from different subject matter experts in the Aviation Industry. In their discussions they found several emerging issues. The first is Real-Time System-Wide Safety Assurance due to continuous advances in technology, computation, etc. Data analysis needs to get faster. As the system becomes more complex we need the ability to do things in more real-time. The Dependability of Increasingly Complex Systems a key theme for this Subcommittee and is the second emerging issue. For software, automation, and autonomy advances in processing, sensors, networking they require advances in resiliency to design defect or corrupt data and deliberate attack. Therefore, the certification processes and analytical techniques for verification, validation test and evaluation should be revised. There is a Data Integrity need because of the exponential growth in volume and distribution of operational data. Updated Federal Aviation Regulations (FARs) and Means of Compliance is the last part of this issue. This is due to the pace of innovation, existing FARs

developed too long ago and needs to be updated with a more modern design and technique. The third emerging issue is Certification of Advanced Materials and Structural Technologies. New Material systems and structural concepts continue to be introduced such as integrated engine and airframe designs. New manufacturing techniques continue to evolve which drives the issues of standardization and so on, additive manufacturing should be considered. And lastly for emerging issues are High-Energy Density Storage, Management and Use. This is because of continued evolution away from traditional electrical systems to improve performance and decrease operating costs, steady increase in electrical components and more integrated systems and avionics.

The Subcommittee also found several areas that they felt were worthy of future research consideration. To begin with, Commercial Space Integration with the National Airspace System (NAS) because this will allow us for worldwide expansion, grow the US industry of human and cargo space flights, the current mechanisms for the NAS safety focus on setting up restricted airspace for launch and recovery, and lastly currency focus on Space Vehicle Occupant safety vs public safety. Secondly, General Aviation's Role in Safety Systems Development because there is a significant community size, is a pipeline for qualified pilots and mechanics and also a unique incubator for introduction of new safety technologies in a timely manner. The third future research area is Effects of Breakthrough Medical Technologies on FAA Medical Certification Standards. This is important because the advancements in medical science are occurring at an unprecedented rate. Historic medical conditions may not result in terminating flying careers and ongoing approvals of novel drug therapies and revolutionary surgeries. And lastly for future research is Identification and Segregation of Strategic Research and Development (R&D) needs because it is ruled by known, near-term needs, it is reactive to unforeseen forces and it is limiting on true long-term R&D focus and funding.

Questions and Comments

Mr. John Hickey was not pleased on the idea that there were no Findings and Recommendations for the FY 2017 Guidance. He asked Mr. Hylander as to why they did have any Findings and Recommendations for the FY 2017 Guidance. He also indicated that his office should be included in any new approaches to Research and Development (R&D) efforts. Mr. Hylander stated that because they were tasked to do something different; they took it as homework and focused on getting that completed. Dr. John Hansman also stated that the intent of the special task was to foster approaches to thinking outside of the box. Mr. Hickey then continued to point out that the Federal Aviation Administration (FAA) spent a grave amount of time researching crash ordinance. He went through all of the emerging issues as well as the future research points and clarified to Mr. Hylander what the Federal Aviation Administration (FAA) saw as practical for them and what was not, what they had done extensive research on in the past and the results it has given us today and so on.

Mr. Hickey stated that he is not bias against any of the points that were brought up but there should be further discussions on what appropriate research is and where they need to put their concentration on.

Presentation Human Factors Subcommittee Report | **Presenter** *Mr. Jack Blackhurst*

Discussions: Mr. Jack Blackhurst stated that the driver for their subcommittee meeting was to "focus on developing a list of emerging issues and future opportunities." Out of the fourteen topics they had acquired, they listed the six most relevant to their concerns. Initially, there is System Information Management. There is an increase in demands for pilots, controllers, dispatchers, and traffic managers. This could cause a human factors risk and vulnerability because it will increase the workload, increase the task time and leave more room for error.

Secondly, there is Automation/Autonomy Roles and Responsibilities. One must understand the appropriate roles and responsibilities between humans and automated systems to both enable optimal design of NextGen as well as adequately certify more automated aircraft systems and flight decks.

The third emerging issue found was Integration of Unmanned Aircraft Systems/Remotely Piloted Aircraft Systems (UAS/RPAS) into the National Airspace System (NAS). Mr. Blackhurst stated that there has been an unprecedented demand by the UAS/RPAS community for access to the NAS. With similarities to other events, demand will likely drive the UAS operational density to levels much higher than can be managed using manual Air Traffic Control (ATC) methods, particularly as small UAS operations extend beyond operator line-of-sight and become more autonomous. They do not feel that the Federal Aviation Administration (FAA) is ahead of this even though they recognize their devoted efforts to the issue.

Another emerging issue the subcommittee found is dealing with Mixed Equipage Operations in the Design and Evolution of the National Airspace (NAS). There is an operational concern. They are aware that there are numerous advances planned under NextGen that are likely to be phased in, rather than mandating a change by all of the flight operators at one point in time. This leaves for Human Factors concern that if the cognitive complexity or task load is too high then the risk for errors increases for the controller this will then negate the benefit of the NextGen improvement.

The fifth emerging issue found was Human Machine Design, Integration, and Certification. Mr. Blackhurst elaborated that airspace system complexity will increase dramatically given the number and diversity of aircraft, aircraft equipage levels, airborne and ground-based capabilities as well as operator cultures and proficiencies. They do not feel that the operators in the system will be able to keep track of and properly manage this complexity.

The last emerging issues he discussed were Workforce Selection, Training and Proficiency. Mr. Blackhurst stated that understanding the human factor aspects and required skills, aptitude, and traits for the human components required for NextGen is essential for the optimal design of NextGen and for hiring, training, and maintaining a workforce. This will enable the workforce to continuously adapt to increasing demands of interacting with automated systems. Employees will maintain stability while remaining proficient in manual handling operations in order to provide the flexibility and safely handle the variability in the system to mitigate operational and safety risk.

Questions and Comments

Mr. John Hickey stated that the Mixed Equipage Operations is one of their biggest challenges that they face as they are moving NextGen along. He agrees that the Federal Aviation Administration (FAA) has a role in these types of efforts. He advised Mr. Blackhurst to speak with Mr. Bolton more on this topic since he is so involved in NextGen. The System Information Management, he had spoken about this prior is also important. The synergy of all of this is quite complicated. Mr. Hickey asked Mr. Blackhurst to elaborate more on Workforce Selection so he could get a better of understanding of the intent.

Mr. Hickey stated to Mr. Blackhurst and the remaining committee members that he hopes that he was able to clarify some of the misunderstanding of data and update on where the Federal Aviation Administration (FAA) stands. He appreciates the effort they have all put into the tasking and their recommendations.

Presentation Airports Subcommittee Report | **Presenter** *Mr. Chris Oswald*

Discussion: Mr. Oswald stated that the subcommittee took the tasking given and did not want to limit themselves just airport specific programs but research programs as well. He stated that they had an extensive conversation during their meeting in regards to the critical need for the Airports Office to rely on the Airports Technology Research Program to address their own immediate and tactical needs. Upon listening to the other Subcommittee reports, Mr. Oswald found common grounds with the emerging issues. To begin with, a common emerging issue is the Integration of New Generation Aerospace Vehicles into the National Airspace System (NAS) has been a big issue for airports. He stated that the emergence of commercial space operations and unmanned aerial systems (UAS)/remotely piloted aircraft (RPA) pose significant new challenges for the Federal Aviation Administration (FAA), vehicle operators, airport/spaceport operators, and local communities. More research needs to be done to eliminate the challenges of integration to ensure safety.

The second issue found is Effects of Climate Change on Aviation Infrastructure and Operations; this is a big issue for airport operators. Mr. Oswald stated that the scientific community has reached general consensus that anthropomorphic climate change is occurring, driven by global

increases in the use of fossil fuels and other activities that generate greenhouse gases. He continued to state that this is going to be a huge planning issue especially for engineers.

The third emerging issue is Managing Airport Operations in a NextGen Environment. Mr. Oswald stated that he felt that this was more of a planning issue rather than a technology issue. As NextGen capabilities are introduced over the next five to six years, they are expected to bring substantive improvements to airport capacity, shared situational awareness, and collaborative decision making.

NextGen and Noise in the Airport Environment was their fourth issue found. Mr. Oswald stated that this is not specifically a NextGen issue but has become a black-point because of Performance Based Navigation (PBN) deployment. There is already some research that is ongoing however; they feel it necessary for a continued need for this.

Lastly the Advanced Pavement Materials was the last issue. Mr. Oswald stated that maintenance and reconstruction of airport pavement represents a major financial commitment to the airports and the Federal Aviation Administration (FAA). Improvement and innovation in paving materials represents the most direct way to extend pavement life also, looking to make smaller improvements is cost saving. He believes that there should be more study done for heated pavements to make them more reliable as well as low cost as possible.

Mr. Oswald stated that they do not have a lot of Findings and Recommendations because they were focused on the tasking. They were able to close some of their Recommendations and re-opened a pre-existing one with a slightly different approach; the airports safety database project that the FAA has been engaged in. This has taken on the Office of Airports side along the Airports Technologies front taking a number of safety databases and finding out the Office of Airports' data to get a better sense of problematic taxiway; which seems to be a big focus. They need to figure out a way to share this information with the airport operators to advance the material. They are currently still working on the heated pavements research and are looking forward for more data collection this winter.

Questions and Comments

Dr. Hansman wanted to assure that the Committee would be briefed once this data is available and Mr. Oswald agreed. James White stated that there are some good ideas that came out of the subcommittee meeting. He plans to take some of the proposed ideas and turn them into future research projects. Airports have continuously been working to improve runway safety areas since 2000 spending about $250 million dollars of Airport Improvement Program (AIP) money yearly. Their next in depth research area is Taxiway Geometry. They have already started the work on this area and are progressing smoothly.

Presentation Environment and Energy Subcommittee Report | **Presenter** *Mr. Mahendra Joshi*

Discussion: Mr. Joshi explained that at their Subcommittee Meeting, the first day was dedicated to their presentations as well as Findings and Recommendations and the second day they spent discussing the tasking that was given. He briefly summarized the Findings and Recommendations that were found from the prior meeting held. Mr. Joshi stated that though the subcommittee supports the consideration of longer term needs they are concerned that some of the near-term and mid-term programs are not sufficiently funded to fully obtain their objectives. He then continued on to discuss the emerging issues found from their task.

The first emerging issue Mr. Joshi addressed is the Low Emissions Aviation Alternative Fuels. Due to the fact that alternative fuel is a significant component of aviation stakeholders' strategy for environmentally sustainable growth more extensive research is needed to develop a fuel qualification based on chemical composition related to engine operational figures of merit. Mr. Joshi stated that this research could possibly lead to alternative fuels with reduced climate and air quality impacts.

The second topic discussed is Advanced Technologies and Configuration Maturation. Mr. Joshi stated that a significant effort is required to mature the technologies to a higher technology readiness level coming from NASA, FAA and industry's research portfolio. The FAA's Continuous Low Emissions Energy and Noise (CLEEN) program has been effective in achieving this for low NOx combustor, Composite Matrix Ceramic (CMC) nozzle and fan blades, advanced wing training edge, among others are prime examples of relevant systems to be a candidate for application to an airplane design. He added that CLEEN-2 is expected to mature several more technologies in the next 5 years.

Mr. Joshi then addressed Technology Certification Process. He stressed the importance of the processes needing to be more efficient for demonstrating safety and environmental compliance is becoming more complicated, lengthy, and costly. This process can be achieved by using more analysis and less testing for certification.

The fourth topic area is Incorporation of "Growth/Diversification" Areas into National Airspace System (NAS). Mr. Joshi stated that methods and procedures for this integration need to be established. Environmental areas of concern are UAS operations at low altitudes and in urban environment.

Another topic area is Big Data/Information Technology Integration. In order to improve the operational efficiency and environmental impact of air vehicles, real-time information-based decisions are critical. Technology to integrate relayed information with cockpit information is needed, information such as weather, 4D trajectory, and so on. This will then enables higher level of on board automation and reduce environmental impact in the future.

Lastly, Mr. Joshi spoke about Integrated Modeling and Simulation. He stated that in order for NextGen applications a pervasive integration of the entire FAA tool chain is desired. This will also require the enhancement tools in probabilistic use of modeling and simulation. Mr. Joshi reassured that these improvements will enable informed decision making with reduced environmental impact.

Questions and Comments

Mr. Carl Burleson made a statement about the first Recommendation Mr. Joshi spoke about. He stated that he agreed with the recommendation. He continued to go through the Recommendations that were addressed and told Mr. Joshi they would definitely take them into consideration.

Dr. Hansman stated that he would write the summary letter to Mr. Michael Huerta as he normally does using the common findings from each Subcommittee as a header. These are the high level issues to be addressed. He will then advise him that this process is more of an informal internal process. He stated that these are brainstorming ideas and he will let the Agency know that they are not obligated to respond to everything/topic that was mentioned.

He thanked the members for their participation and attendance and the meeting adjourned.

Members in Attendance

Joe Bertapelle
Jack Blackhurst
Ed Bolton
Dennis Filler
John Hansman (Chair)
John Hickey
Ken Hylander
Mahendra Joshi
Chris Oswald
Jaiwon Shin
James White

Others in Attendance

Candice Albert, FAA/JMA
Catherine Bigelow, FAA
Kathy Abbott, FAA
Daniel Brock, FAA
Chinita Roundtree-Coleman, FAA
Jason Demagalski, FAA
Colleen Donovan, FAA
Gloria Dunderman, FAA
John Egentowich, FAA
Mike Gallivan, FAA
Mohan Gupta
Wendell Griffin, FAA
Walt Hogan, FAA/BAH
Michel Hovan, FAA
Andrew Lacher, MITRE
Eric Neiderman
Lee Olson, FAA
Mark Orr, FAA
Catherine Riccio, FAA
Sam Rozier, CSSI
Nick Stoer, NCAR
Rachel Seely, FAA
Paul Tan, FAA
Gale Thornton, FAA
Michelle Yeh, FAA
Amer Younossi, FAA
Dres Zellweger

Research, Engineering and Development Advisory Committee
Federal Aviation Administration (FAA)
FAA Headquarters, 800 Independence Avenue, SW
Washington, DC – 10th Floor Round Room
October 9, 2014

Agenda

9:30 am	Welcome	John Hansman Dennis Filler
9:45 am	Comments	Michael Huerta
10:45 am	Update - NexGen	Edward Bolton
11:00 am	Update - Interagency Planning Office (IPO)	Gisele Mohler
11:15 am	Break	
11:30 am	Subcommittee Report – NAS Operations	Steve Bussolari
12:15 noon	Lunch	
1:00 pm	Subcommittee Report – Aircraft Safety	Ken Hylander
1:30 pm	Subcommittee Report – Human Factors	Jack Blackhurst
2:00 pm	Subcommittee Report – Airports	Chris Oswald
2:30 pm	Subcommittee Reports – Environment & Energy	Mahendra Joshi
3:00 pm	Committee Discussion - Recommendations Future Committee Activity	John Hansman
4:00 pm	Adjourn	

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