

## Research, Engineering, and Development Advisory Committee (REDAC) Meeting Minutes

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**Meeting date & time:** November 14, 2018 9AM to 4PM

**Meeting location:** FAA Headquarters FOB10A, 8<sup>th</sup> Floor, Washington D.C.

<b>Purpose</b>	REDAC Strategic Guidance on the FY 2021 Research and Development Portfolio
<b>Facilitator</b>	Dr. John Hansman, <i>REDAC Chairperson, MIT</i> ; Ms. Shelley Yak, <i>FAA William J. Hughes Technical Center (WJHTC) Director and REDAC Executive Director</i>
<b>Note Takers</b>	Alexandra Papantoniou Nancy Clarke

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**Presentation: Welcome Address and Opening Remarks | Presenter:** *Dr. John Hansman (Professor of Aeronautics and Astronautics, MIT, REDAC Chair), Director Shelley Yak (FAA WJHTC Director and REDAC Executive Director)*

9AM

Dr. John Hansman, MIT, opened the meeting and welcomed the REDAC members. Director Shelley Yak announced the public meeting notice as required and provided an introduction and updates

Ms. Yak, FAA, engaged in a quick review of the agenda. Mr. Greg Burke, FAA NextGen, was to lead off with NextGen perspectives, then there would be a discussion on research landscapes, and a representative from NASA would brief. Ms. Yak said there would be a new approach for this session, namely a panel approach on UAS and innovative technology. She expressed her desire for a robust discussion by the REDAC and panel members that would lead to all being able to walk away with next steps. Ms. Yak stated that the afternoon's agenda would provide for reports from each REDAC Subcommittee. She concluded by saying she was looking forward to hearing the members' findings and recommendations after a busy day.

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**Presentation: FAA NextGen Perspectives | Presenter:** *Mr. Gregory Burke (Deputy Assistant Administrator for NextGen, Acting)*

9:15AM

Mr. Burke, FAA NextGen, thanked the committee and chairman for their time, expertise, and support. There was a discussion about deploying new technologies and making considerable progress. Other discussions included aircraft being properly equipped with ADS-B to offer better tracking. DataComm, which is text-based data and supplemental to voice communications for controllers. Performance Based Navigation, (PBN) to which the FAA has already published more than 9300 PBN procedures and routes in the NAS. This saves time and fuel while reducing emissions, System Wide Information System (SWIM), which is the digital sharing backbone of NextGen. It simplifies how the FAA shares NAS data within the FAA and with aviation partners. Mr. Burke said he was pleased with the progress while more work was needed in weather by collaborating with industry partners, surface management, and tower automation. It was mentioned that work was being done on operationalizing NextGen across

United States and that emerging technology and new entrants were a challenge. The FAA UAS Data Exchange is an innovative, collaborative approach between government and private industry facilitating the sharing of airspace data between the two parties. Under the FAA UAS Data Exchange umbrella, the agency will support multiple partnerships, the first of which is the Low Altitude Authorization and Notification Capability (LAANC).

Mr. Burke discussed an area of innovation: remote tower technology where private industry would be leading development while FAA provides certification. Many changes have already been accomplished, however, continuous change will always be on the horizon. In order to achieve this vision, stakeholders need to be committed. Another area of interest that was mentioned was innovation beyond NextGen where there was need to be open to developing and recruiting workforce of the future. People who have the ability to create and sustain partners, effectively research and communicate metrics and results, engage with community, etc. He stated that commitment to fostering a learning environment and promoting opportunities in the future of aviation was a must. Mr. Burke expressed the importance of REDAC when it comes to continuing collaboration work in an effort to achieve integration and paving the future for workforce recruitment.

A REDAC Subcommittee member posed a question on noise abatement in the community. Mr. Burke answered explaining that they have been developing a process to keep the community informed as well as engaging them. He stated that not all solutions towards noise abatement will work in all communities. The FAA makes a continuous effort to address all relevant issues such as this.

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**Presentation: FAA R&D Landscapes | Presenter: Ms. Maureen Molz (Research & Development Management Division, Manager)**

9:30AM

Ms. Molz, FAA, briefed the REDAC on the FAA R&D Landscapes. Discussions included a summary of the REDAC feedback to the FAA's Landscape efforts such as providing aid in strategic planning and prioritization of R&D investments, ensuring research not being duplicated by industry, and support education needs of next generation of aviation professionals. The REDAC also expressed that they were impressed with the effort to structure dialogue for collaboration on strategic directions and have made requests to be regularly updated.

Ms. Molz explained that the R&D Landscape was a collection of research drivers that represent technology trends, aviation industry needs as well as FAA requirements. Complexities of the research drivers were also explained. It was mentioned that not all drivers were equal and attempts were being made to organize the drivers by level of importance, prioritization and what would be considered more strategic as well as what the commonalities were across areas. Roles and responsibilities were mentioned which encompassed the R&D Management Division, Research Domain Area Leads, MITRE, Advisors and Stakeholders.

Discussions also covered the R&D Landscape Approach and a schedule which included a timeline on plan development, compiling drivers, framing the landscape structure, drafting documentation/brief, REDAC review and finally completing the 1<sup>st</sup> landscape.

### **Questions/Comments:**

Dr. Hansman asked if the R&D Research Domain Areas were mapped to the REDAC Subcommittees. Ms. Molz answered that it was attempted, although, not a perfect match.

Ms. Yak asked if a Subcommittee would be needed in Digital Systems, Cyber Security and Artificial Intelligence area. This idea may spark a future conversation.

Mr. David Polland, Boeing, asked how industry trends can be determined. Ms. Molz responded that it was a challenge to determine. She stated that researchers work with industry to gather information, however, heavily rely on REDAC. Dr. Hansman added that some of the industry trends were dynamic and fast moving. He expressed that the Subcommittees can assist with that.

Ms. Yak indicated that a future agenda would include landscape discussions at each Subcommittee meeting.

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**Presentation: NASA Perspectives | Presenter: Mr. Bob Pearce (Aeronautics Research Mission Directorate, Deputy Associate Administrator)**

9:45AM

Mr. Pearce gave a briefing on NASA Perspectives. Discussions were about major transitions for NASA Aeronautics which included completing the Advanced Composite Project in FY 2019, ATM Technology Demonstrations, UAS in the NAS and ATM Projects in FY 2020. He mentioned that there was a lot of interest in Urban Air Mobility (UAM) as it relates to testing and eventually certify these systems in collaboration with the FAA. He also stated that NASA has an interest in partnering with the FAA and industry. Mr. Pearce also talked about new ATM-X and SWS Projects in NASA technology development as it pertained to NAS Operations and In-Time Safety Management. A new project to tackle UAM as a next step beyond UAS in the NAS and UTM was expected to begin in FY 2020. In FY 2021, X-59 First Flight was planned as part of the Low Boom Flight Demonstration (LBFD)

Mr. Pearce spoke positively about the NASA budget trend. It was stated that Congress has been consistently appropriating funding up to 18% over the President's Budget since FY 2015 and that Congress has been fully supportive of NASA Aeronautics Strategy.

Mr. Pearce added that UAM has been rapidly developing and cited several big players making innovations. Uber announced a new 6<sup>th</sup> vehicle development partner, Karem Aircraft, in addition to five existing partners (Aurora Flight Sciences, Embraer, Bell, Pipistrel Aircraft and Mooney). Boeing announced the formation of NeXt to take a lead position in UAM by leveraging Boeing Horizon X and Aurora Flight Sciences. Rolls Royce, Aston Martin, and Airbus to announce their plan to develop UAM vehicles. The Japanese government was also going to invest \$40M to accelerate UAM development. Furthermore, well-funded new entrants to continue vehicle development and flight testing

The remaining slides addressed UAM Framework and Barriers, Grand Challenge Series Framework, and Low Boom Flight Demonstrator (LBFD) Mission.

### **Questions/Comments:**

Dr. Hansman inquired about the scope of programmatic activities that included UAV, UAM, separation standards and connectivity to the FAA. He also asked about Class B airspace noting a problem with transport category airplanes and how guarantees were provided. Mr. Pearce indicated that all those issues were being evaluated and what was doable in the current system.

Dr. Hansman inquired about the NASA and FAA collaboration effort as it related to data collection for the justification of reduction in VFR separation. He additionally noted that separation standards were a fundamental issue. He further asked about a need for a deeper look into separation standards and methods to relax those standards. Mr. Pearce also added that UAS's were a part of the consideration as well.

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### **Presentation: FAA Cybersecurity Risk Model | Presenter: Kelly Mesveskas (ANG-B31)**

9:48AM

Ms. Mesveskas gave a briefing on FAA Cybersecurity Threat Model: Status, Results and Model Composition. She explained what the FAA Cybersecurity Risk Model (CyRM) was. It identified a framework for assessing cyber risk that would be integrated into the FAA through use of end-to-end analysis. This analysis will provide a more realistic and holistic understanding of cyber threats, risks, and vulnerabilities to the FAA. It will further help the FAA identify potential impact in meeting mission objectives. The CyRM also builds upon existing system level security certifications, information and processes and does not replace existing Security Authorization Process which will remain as the cornerstone to ensure system level compliance with NIST 800.53. Ms. Mesveskas also stated that CyRM identified the potential of new threats, vulnerabilities, impacts and changes to the likelihood of impacts brought by changes to underlying services which can provide quick assessments.

Ms. Mesveskas explained the use of CyRM for improved decision making. It helps prioritize future planning and investments based on risk to service vs. system compliance, enables common framework to be applied across the three FAA network domains (NAS, Mission Support and R&D), and provides a way to prioritize cybersecurity testing.

The FAA Mission for Safety and Efficiency is supported by five Mission Essential Functions (MEF) which are 1) provide Air Navigation Service (ANS), 2) Use of ANS for National Defense, 3) provide Certification of Airports, 4) provide Aviation Regulatory Oversight, and 5) facilitate Civil Reserve Air Fleet (CRAF).

Ms. Mesveskas ended the presentation by explaining the four focus areas of CyRM which were on Mission Essential Functions (MEF) Structure and Alignment, Cyber Threat Intelligence (CTI), Integrate Risk Management, and Enterprise Cyber Security Architecture.

### **Questions/Comments:**

Dr. Hansman asked why there was worry over R&D risk as it seemed like a low priority.

Ms. Mesveskas answered that is it was due to the connectivity between R&D and NAS.

Ms. Yak added that Mission Support can be IT systems and NAS systems and that many of the laboratories are interconnected at the William J. Hughes Technical Center (WJHTC),

Dr. Hansman asked what the actual risk behaviors were that were being tracked and defined.

Ms. Mesveskas said that she was not sure if any behaviors were defined.

Dr. Hansman added that behaviors should be defined and prioritized.

Dr. Hansman also asked for examples of risks and how they would be modeled and assessed.

Ms. Mesveskas said that the messages are spoofed.

Dr. Hansman asked about the consequences.

Ms. Mesveskas explained that a spoofed search and a rescue message will state that an aircraft is missing. If the message is dismissed, that can be a risk. If there are too many messages, there could be an issue of credibility.

Ms. Yak asked if the spoofing has been applied to other services and what the results were.

Ms. Mesveskas said that it was limited due to sensitivity.

A REDAC member had stated that Cybersecurity was a buzzword. Dr. Hansman indicated that he had concerns that cybersecurity was a buzzword as well. He asked if there was a list of FAA-specific vulnerabilities. Ms. Mesveskas answered that a high priority list existed. Ms. Yak added that the FAA was working collaboratively with the TSA and other agencies.

Dr. Hansman also mentioned that there should be more concern on risks and gaps and less on developing tools. The focus should be on mitigations that were unique to the FAA. Ms. Mesveskas stated that tools would aid in visualizing the gaps and risks, however, Dr. Hansman reiterated that he would rather see a development in manual process than “another tool” and to shift focus more on evaluating risks and vulnerabilities. He also asked if there was a classified group working on this. Ms. Mesveskas said that Bob Pearce was working on this on the NASA side.

Mr. Wes Ryan, FAA, stated that the FAA was aware that it needed to better crosstalk and move to greater automation. Dr. Hansman said that the current mitigation was “humans” and that depended on humans to evaluate potential spoofs which was different from “go to” automation.

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**Presentation:** *FAA UAS and Innovative Technologies Panel* | **Presenter:** *Ryan Steinbach, Wes Ryan (FAA)*

10:15AM

Mr. Steinbach and Mr. Ryan, FAA, facilitated a panel discussion on FAA UAS and Innovative Technologies pertaining to elements such as Operations Over Air Density, Highly Automated Vehicles, and Electric Propulsion.

Mr. Ryan talked about UAS Airworthiness as it pertained educating pilots. He noted mitigating risks like staying within visual line of sight. He also spoke about the emphasis on aircraft certification to permit pilot UAS operation. CNN was referenced as an example where the use UAS without airworthiness, however, with negligible risk.

Dr. Hansman asked if there was an airworthiness standard across the board. Mr. Steinbach answered that section 333 was near expiration, however, will need to develop an airworthiness standard. He also added that the risk principle was to have sufficient power reserves to manage contingencies which can be a challenge with UAS as they are battery operated. He stated that battery operational power eventually decline which could be a concern in certification. Mr. Steinbach also noted that they did not want to continue to write exemptions irrelevant to UAS.

Dr. Hansman asked if there was a plan to reevaluate the regulatory structure such as new class of vehicles. Mr. Steinbach expressed that the ultimate vision was to integrate all aircrafts as

flight safety was standard all around. However, he noted that from a certification standpoint, it would differ and that a drastic change would be needed to be agile enough for the current industry.

Mr. Ryan said that they were approached by companies seeking certification which had been time consuming on a case by case basis. He said that it led to a proposed risk-classification scheme which was in the middle of an approval process. He added that this would alleviate a few certification requirements in low airspace or low land density. Regulatory language was also being crafted for integration by the name "MOSAIC". Mr. Ryan said that more information on this would be delivered eventually.

The first slide discussed using Innovation to Enhance Safety. Mr. Ryan stated that their number one priority was safety improvements and that there is a history of bringing new technology into the NAS safely such as GPS, ADS-B, Glass Displays, Envelope Protection, AOA.

The second slide discussed future vision for innovation/safety. Per Mr. Ryan, the FAA has a vision for the future of automation that is fueled by the innovative ideas of the industry to enhance safety and reduce fatal accidents with the use of technology.

Mr. Ryan noted that with the vision, there needed to be a selectable level of automation. He stated that the DoD had retrofitted aircraft to have different levels of automation. Examples of this were cited such as those that can be flown with or without crew and operated via an iPad from ground level. He mentioned that there were opportunities to partner with DoD on this. A concern that was expressed as well was the possibility of regulatory issues as it pertained to different levels of automation/autonomy. Lesser pilot requirements would mean a greater need for certification requirements. Mr. Steinbach posed the question as to whether the Operator or Manufacturer be responsible for safety when the transition to full autonomy could result in a paradigm shift from previously written regulations.

The remaining slides that were discussed dived into Electric Propulsion, Flight Controls & Simplified Operations, NASA Collaborations, and supporting material as it pertained to UAS Innovation Technology.

Discussions also covered concerns over full autonomy as it related to safety, decision making capabilities made by humans as well as diagnostics normally performed by humans (human in the loop).

Mr. Leo Prusak, PASSUR, brought up a point on what would be considered for autonomy safety in today's aviation. Mr. Ryan answered that it this was something that would require some time to fully remove humans from the loop. However, it was also noted by Mr. Prusak that synergism between human and automation was key to a safe future rather than full automation. He added a concern about a fully autonomous system making important context based safety decision any time soon. Dr. Hansman spoke about policy and technical issues remaining where continuous research was still needed to be done in the field of autonomy. He favored a more proactive rather than reactive approach as it related to certification.

There was a continued discussion regarding emerging technologies and the need to create a dynamic innovation incubator within the FAA. The process will include collaborative input from industry partners and other federal agencies like NASA and DoD. There needed to be continued focus on resource development ensuring that a skilled workforce continuously trained and available.

Another significant topic included safety aspects necessary with the introduction of new technologies. There needs to be an appreciation of the safety culture. Awareness, education, and reinforcement of good practices are essential to maintain safety in all environments.

Safety Risk Management is an important aspect to be included in the success of new entrants and future technologies.

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**Presentation: Subcommittee Report – Environment and Energy | Presenter: Steve Alterman**  
(Cargo Airline Association, CAA)

11:23AM

Mr. Alterman, CAA, discussed the Subcommittee's Findings and Recommendations. The Findings and Recommendations covered topic areas in Alternative Jet Fuels, Public-Private Partnerships, Noise Research, Global Research, and Staffing.

He mentioned that the subcommittee met in Washington, DC back in September 2018 where the focus was on the review of the R&D portfolio in Environment and Energy for 2019. They evaluated the impacts that the President's proposed budget would have on the programs out to 2025. The subcommittee was also pleased to learn that the House and Senate had reached an agreement to increase FAA RED funding and that the FAA should be congratulated on their part in the recent adoption of the CORSIA standard by ICAO.

Discussions identified that the work on alternative jet fuels was critical to the US industry and should be supported in addition to continued use of public-private partnerships. . There was also dialogue about noise research, international leadership through ICAO and future resource and talent development. There was an acknowledgement in the FAA's vital role in these areas.

Discussion concluded that investment in the workforce was necessary as well.

Ms. Nan Shellabarger, FAA, stated that she appreciated the Subcommittee's report and recommendations. She also expressed her appreciation on the implementation of Alternative Jet Fuels and the FAA's leadership role in that while leveraging the partnership with the private sector. She stated that noise was clearly an ongoing issue and that the Office of Environment and Energy was working on understanding the issues and drive focus on the solutions. Ms. Shellabarger also acknowledged that the Administration understands the importance of their leadership in the CAEP area. She conclude that staffing availability was being worked on and were in the process of executing a hiring plan.

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**Presentation: Subcommittee Report – NAS Operations | Presenter: Leo Prusak** (Subcommittee Chair, PASSUR)

11:34AM

Mr. Prusak discussed the Subcommittee's Findings and Recommendations on topic areas that included Human Factors and Commercial Space Transportation. He mentioned that the Subcommittee on NAS Operations received a briefing from FAA NextGen Human Factors.

Action items for the Subcommittee were also mentioned on New ATM Requirements, Operations Concept Development and Infrastructure and UAS.

Mr. Prusak spoke on Human Factor processes indicating that they can be improved for future effectiveness.

In regards to Commercial Space Transportation (CST), Mr. Prusak stated that integration of CST into the NAS was currently being done with existing tools, however, noted that investment in improved tools was necessary for consideration.

Mr. Prusak noted that there seemed to be a chasm between innovation, industry and R&D. Carl Burleson, FAA, suggested that “innovation incubator” may help.

Dr. Hansman expressed an awareness in the criticality in the HF process. Mr. Prusak stated that the current research did not seem to support a clear connection to Nextgen priorities and initiatives. Dr. Hansman, in turn, asked what research areas Mr. Prusak could recommend. He said that he could provide after the meeting. Ms. Barbara Holder, Human Factors Subcommittee, had also requested a list of emerging issues as she had similar concerns on research areas as Dr. Hansman.

Mr. Prusak concluded that the UAS research portfolio plan was overall a good plan and a step in a positive direction which also welcomed an opportunity for improvement.

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**Presentation: Subcommittee Report – Airports | Presenter: Chris Oswald (Subcommittee Chair)**

11:45PM

Mr. Oswald discussed the Subcommittee’s Findings and Recommendations. He mentioned that the subcommittee met in August 2018 for their summer/fall meeting. They had an opportunity to review the progress of the FAA’s Airport Technologies Research Program and provided comments to the Program’s priorities.

The findings and recommendations covered topic areas in Commercial Space, Cyber Security R&D Plan, Polyfluoroalkyl substances (PFAS) used in aqueous film-forming foam (AFFF), FAA DOT Strategic Research Priorities alignment, and several key program topics.

Mr. Oswald discussed the impact of Commercial Space Transportation (CST) as it pertained to the Airport environment.

Dr. Hansman made a comment that UAS was more dynamic than Commercial Space. Mr. Oswald agreed with his statement but also added that they faced significant challenges with policy from Front Range Spaceport.

Mr. Oswald stated that there was a lot of interest in Cybersecurity from the Subcommittee. He mentioned that there should be focus on ensuring flight safety, reliability and protection of flight data.

Mr. Oswald described PFAS used in airports which is mandated by DoD and adopted by the FAA for putting out aircraft fuel fires. The Subcommittee encourages the Agency to continue expediting research in alternative solutions that are less toxic which stem from scientific and public concerns for the environment.

Mr. Jim Hileman, FAA, added that the Subcommittee on Environment and Energy had a briefing on firefighting foams. Dr. Hansman asked if the recommendation would be to find an alternative to PFAS. Mr. Oswald agreed to the question and added that practical ways would need to be looked into for the environment.

The remaining findings and recommendations focused on UAS and concepts of use for drones on airport property. Examples of test sites that were mentioned were Memphis and Reno as it pertained to airport related use cases. Research needs to continue to be a topic of discussion

and focus.

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**Presentation: Subcommittee Report – Human Factors | Presenter: Ms. Barbara Holder**  
(Subcommittee Chair)

1:15PM

Ms. Holder discussed the Subcommittee's Findings and Recommendations. The topic areas covered were on the FAA's R&D Landscape and Flight Crew Information Management. Other topics of discussion included UAS Integration Plan and deep dives (Flight Deck Core, NextGen Research Program, and NextGen Enterprise ATC).

Ms. Holder noted that the Subcommittee believed the Landscape will become an effective method for identifying, planning, and prioritizing key research drivers across domains within and outside the FAA.

General comments were made that the briefings were too high level and that there was a need for additional technical detail on research specifics. Urgent research gaps were indicated as well as possible mismatch in alignment with emerging HF issues.

The Subcommittee on HF expressed a lack of clarity on the prioritization process and noted that not all of the work needed to be identified as high priority. Dr. Hansman asked if the Subcommittee had identified what research should not have been prioritized. Ms. Holder took an action for the Subcommittee to provide feedback on the research areas(s) in question.

A comment was made on the UAS Plan in slide 7 of the HF presentation as it pertained to the timeline. It was indicated that the timeline should be more aggressive and expand beyond 5 years.

The two findings and recommendations focused on Landscape as it pertained to budget and high priority research areas in relation to HF emerging issues and the evaluation of workload of systems as it pertained to the Flight Crew Operators.

Dr. Hansman asked if there was evidence of workload problems on the system, Ms. Holder responded noting that the operators at ALPA said yes. The operators stated a challenge with a lack of sufficient guidance for approvers as well.

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**Presentation: Subcommittee Report – Aircraft Safety | Presenter: David Polland (Boeing)**

1:45PM

Mr. Polland gave a summary briefing that included Findings and Recommendations on topic areas that covered Research Focus Areas as it related to the R&D Landscape and guide planning, execution and output, Annual Planning and Research Prioritization, UAS Research Plan, Automation and Artificial Intelligence, and Runway Friction Research.

He mentioned that the Subcommittee had met during Summer/Fall 2018 with several objectives. They reviewed and provided comments on the FAA's ongoing safety research plan accomplishments and ongoing research. They also provided commentary on the FAA's recently released UAS Research Plan at the request of FAA leadership and the REDAC, and continued discussing and reviewing topics of interest that included UAS, General Aviation Safety and Fatigue Management.

Mr. Polland stated that there has been improvement in the research conducted by the FAA which helped the Subcommittee better understand and noted that the Subcommittee also appreciated the FAA sharing the Agency's R&D Landscape.

Mr. Polland added that the Subcommittee was unclear on how the prioritization was being developed and applied.

**Questions/Comments:**

Dr. Hansman had a question on whether NASA was doing any work on Additive Manufacturing. Mr. Pearce said that an advanced manufacturing workshop has been ongoing, with additive being an element, however, no decision yet on work being done on it by NASA. Mr. Polland added that work was being conducted on Additive Manufacturing by the ACP program.

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**Presentation: Committee Closing Discussion | Presenter: Dr. John Hansman (REDAC Chair, MIT)**

2:15PM

Dr. Hansman discussed topic areas to include for the cover letter that will accompany the REDAC report of Findings and Recommendations to the FAA Administrator.

He picked several high level issues which focused on emergence of automation issues, datamining and process challenges in research funding through COE grants

2:45PM ADJOURNED

**Research, Engineering and Development Advisory Committee  
Federal Aviation Administration (FAA)  
FAA Headquarters, 800 Independence Avenue, SW  
Washington, DC – 8<sup>th</sup> Floor Conference Rooms  
November 14, 2018**

**Agenda**

9:00 am	Welcome Address and Opening Remarks	John Hansman Shelley Yak
9:15 am	FAA NextGen Perspectives	Gregory Burke
9:30 am	FAA R&D Landscapes	Maureen Molz
9:45 am	NASA Perspectives	Bob Pearce
10:00 am	FAA UAS and Innovative Technologies Panel <ul style="list-style-type: none"><li>- Operations Over Air Density</li><li>- Highly Automated Vehicles</li><li>- Electric Propulsion</li></ul>	Ryan Steinbach Wes Ryan
10:45 am	FAA Cybersecurity Risk Model	Kelly Mesveskas
11:00 am	Break	
11:15 am	Subcommittee Report – Environment and Energy	Steve Alterman
11:45 am	Subcommittee Report – NAS Operations	Leo Prusak
12:15pm	Lunch	
1:15 pm	Subcommittee Report – Human Factors	Barbara Holder
1:45 pm	Subcommittee Report – Aircraft Safety	David Polland
2:15 pm	Subcommittee Report – Airports	Chris Oswald
2:45 pm	Break	
3:00 pm	Committee Closing Discussion <ul style="list-style-type: none"><li>- Recommendations</li><li>- Future Actions</li></ul>	John Hansman
4:00 pm	Adjourn	

**November 14, 2018**  
**Attendance List**

<b>Name</b>	<b>Affiliation</b>
Dres Zellweger	Retired FAA
Barbara Holder	Honeywell
Eric Neiderman	FAA
Paul Krois	FAA
Michael Buse	Lewis-Burke Associates
Maureen Molz	FAA
Patrick T.	FAA
Colleen Donovan	FAA
Bob Pearce	NASA
Lee Olson	NASA
Chris Seher	ARA
Patricia Hiatt	FAA ARP
Rick Toth	FAA AIR
Shelli Brunswick	Space Committee
Andrew Lacher	MITRE
Joseph Post	FAA
Nan Shellbarger	FAA
Joe Bertapelle	Jet Blue
Mark S. Orr	FAA
Chris Oswald	ACI-NA
Leo Pruzak	PASSUR
Wes Ryan	FAA
Shelley Yak	FAA
Michel Hovan	FAA
Steve Alterman	CAA
Steve Summer	FAA
Jimmy Bruno	FAA
Mike Gallivan	FAA
Greg Burke	FAA
Daniel Brock	FAA
David Polland	BOEING
Francisco Bermudez	FAA
Dan Herschler	FAA
Monique Moore	FAA
Nancy Clarke	E4/FAA
Alexandra Papantoniou	E4/FAA
Chinita Roundtree-Coleman	FAA