REDAC Subcommittee on Airports FAA – William J. Hughes Technical Center Building 296 – Main Conference Room Spring Meeting 2016 March 15 - 16 Meeting Minutes – Erin DeBarth

Day One Tuesday, March 15th

Meeting formally started at 12:30 p.m. with opening remarks by Mr. Christopher Oswald, Subcommittee Chairperson. Mr. Oswald welcomed everyone and thanked them for attending. He also introduced Shelley Yak, FAA Technical Center Director, and thanked her for attending. Shelley Yak responded, stating her objectives for this meeting. She would like to find out what is working, and what needs improvement. She would like to see how she can contribute to the Research and Development Division within her new role. Chris Oswald informed every one of the vacancies in the subcommittee and stated that the discussion for recommendations would be had at a later time. The meeting proceeded with introductions of subcommittee members and attendees.

Ms. Shelley Yak, FAA Technical Center Director, Ms. Yak continued stating she is appreciative of the work REDAC is doing. Ms. Yak informed the Subcommittee that she attended a NASOPS Meeting last week and reiterated she is interested in hearing where things need to improve and what needs to be different. Ms. Yak stated she believes the commitment to research has an impact on the Aviation Industry and academia as well. She asked the subcommittee to give some insight on what is working and what could be done differently, stating that the FAA is open to suggestions.

Plaque Dedication to Mr. Jeff Rapol, due to unforeseen circumstances, this was rescheduled and will be included in the agenda for the Fall REDAC Subcommittee Meeting.

Dr. Michel Hovan, Airport Technology R & D Branch Manager, began by introducing the Subcommittee Members. He proceeded with giving an overview of the budget, stating that he would like to get input on moving forward. Dr. Hovan explained that in FY16, projects were grouped by RPDs, and going into FY17-18 projects will be grouped as RPAs. He stated this was something that was discussed at the last REDAC meeting, explaining that the Research Program Areas will be grouped based on similar areas, so it will make more sense. Dr. Hovan proceeded by reviewing the budget, stating the only difference between FY17 and FY18 is the 3 percent inflation rate. He stated that otherwise the budget is stable. Dr. Hovan explained the breakdown for the new RPAs will be Safety RPAs, Pavement RPAs, and Airport Environmental Research RPAs. Dr. Hovan spoke specifically about the budget "above the line" item as a potential request. He explained some items will need more internal discussion but he felt it should be included. The Subcommittee asked if there was a Master Plan for the Research and Development Facility. Ms. Shelley Yak responded, stating the Technical Center has one for the entire facility, but not a specific one for the R & D Facility. The Subcommittee inquired if funds are carried over from year to year. Dr. Hovan responded stating that all of the funding for R & D comes from AIP and it cannot be carried over. He explained further by stating 99.99% of the funds are obligated by the end of the year. Dr. Hovan informed the Subcommittee the funding comes with a one year obligation and has challenges vs. having an R & D budget over multiple years. Eric Neiderman, stated eighty percent of the funding was appropriated until December 20, and then there is a bit more flexibility. The Subcommittee asked if the Project Managers can start thinking two years down the road in regards to the budget cycle and have the numbers ready. John Dermody, AAS-100/HQ, interjected explaining the money is available and R&D is in a good position. He explained that while the funding cannot carry over from year to year, some projects can and that can help with calculating what needs to be obligated. Mr. Dermody stated there are "Pop-Up" projects that occur, using the Trapezoidal Grooving project as an example of having no plan for it within the budget process. Chris Oswald interjected suggesting knowing when a project is winding down will assist in gaging when it's time to take on additional projects which fall in line with funding. Dr. Hovan responded this is one of the reasons it was important to move into the RPA system. He further explained the idea behind the RPA system is to gain more flexibility with funding and not be so rigid, as it was with the RPD system. The Subcommittee commented as the budget increases the Subcommittee should have input as to whether the funding is being spent appropriately. The Subcommittee stated they should be able to track the budget by use of the budget cycles at each meeting. Chris Oswald added tracking the funding will assist in ensuring the spending is in line with research expectations and knowing if the research is providing a meaningful impact. Dr. Hovan stated he would like the Subcommittee to review the agenda and provide feedback on which projects need "deeper dives" and give the Subcommittee the option to pick and choose which projects they need to see. He expressed the need for quality presentations over quantity of presentations. The Subcommittee reviewed the RPAs and inquired why noise is not listed under environmental research. It was stated the noise project is a legacy project that has been there and there is much more involved than just noise. John Dermody, stated there was controversy with the noise project. He stated it was only supposed to be a one year project and now it's on its third year. Mr. Dermody explained there is an increased need for further environmental research coming out of the Office of Airports. He stated the need for environmental research is growing and work needs to be planned. Mr. Dermody continued stating the bulk of the research done at the Technical Center R & D Branch is pavement testing and environmental research needs resources to expand. The Subcommittee stated the Trapezoidal Grooving project has a sizable number in regards to the budget and it is listed as carrying on through FY17. Dr. Hovan suggested to wait to hear Joe Breen's presentation and how the project is broken up into Phase 1 and Phase 2 and it includes real time testing. Dr. Hovan continued commenting on the EI Project informing the Subcommittee R & D is working closely with Office of Airports and AAE to get more of a push. Dr. Hovan informed the Subcommittee they will get a closer look into The Subcommittee asked if they will be the environmental research aspect on Day Two. getting a summary on the line items for the RPAs. Jeff Gagnon informed the Subcommittee as he presents he will have the transition from RPDs to RPAs included. Chris Oswald continued stating he would like to have a completed list of the RPAs. He explained that the concept was introduced and proven to be more flexible and shows a more meaningful grouping. He agreed there were no objections and the reasons for reorganizing were sound, but he stated there needs to be a discussion on how to track the research. Mr. Oswald stated he would like the Subcommittee to be able to see what has been spent overall for a specific project. He believes it is beneficial to be able to see the life of a specific project including the spending and the end benefit. Mr. Oswald believes this kind of tracking is helpful in determining the need for specific Dr. Hovan responded the information is not prepared for this research should continue.

meeting. Mr. Oswald agreed and stated it would be helpful to have a total picture to better understand the focus not only for each fiscal year but overall. Shelley Yak commented she thought it was a good idea to look at the cumulative spending. Dr. Hovan continued stating the R & D Branch receives its request for research from headquarters and R & D responds to the request with a plan including how much the research will cost. Dr. Hovan explained "Pop Up" research will not be included in the budget from two years ago and the funding for them has to be found in whatever funding R & D has already. He explained the RPA system will be seen at a high level due to the line items, and the Subcommittee will be able to see the change from year to year. The Subcommittee asked if the budget works the same way within the RPD and RPA systems. Dr. Hovan responded that the RPA system will be more flexible than the RPD categorizations. Mr. Oswald stated there needs to be prioritization within the RPAs and FY18 numbers. He explained the allocation should be built off the history of the project and inflation rate. Mr. Oswald informed the Subcommittee while looking at the RPAs ask if there is something major missing that would change major allocations. The Subcommittee asked if this was the strategic meeting and was informed that it is not and the strategic meeting is in Summer/Fall. Chris Oswald explained over the day and a half to look to see what's missing. He stated to look at individual projects and see if the Subcommittee gets the overall picture. Mr. Oswald suggested possibly scheduling a meeting around RPAs to be able to review activities and refine FY18.

John Dermody, AAS-100/Headquarters Update, began by introducing himself. He stated the focus is moving toward safety projects.. Mr. Dermody spoke to EMAS and informed the Subcommittee there are now two vendors the Legacy Compapacy Zodiac/Esco and the new one Runway Safe. He explained the FAA is working both vendors with Cooperating Research Development Agreements. Mr. Dermody stated the research is focusing on the longevity of the EMAS systems, for example, how to test them on site, how to perform field strength test, performance strength tests over time, the effects of moisture, temperature, and analyze the effects, knowing when to replace beds. Mr. Dermody stressed this is all research that is taking place through the Technical Center. He spoke of the EMAS-Runway Safebed that has been installed at Chicago Midway, including it was done without AIP funding. Mr. Dermody continued speaking of the Runway Incursion project being started as a request from headquarters. He mentioned Project Manager Lauren Collins and what is being looked at including the data mining project, pulling accident data from NTSB and seeing where safety improvements need to be made and how to make those improvements. Mr. Dermody proceeded stating in regards to the RIM(Runway Incursion Mitigation) project the Technical Center was instrumental in identifying where to focus activities such as Airport Geometry and lighting. He stated the project has become very specific to pinpointing where events happened, what has been done to alleviate these issues, and what effects have the improvements made. Mr. Dermody stated it's very gratifying to see improved safety as a result of this research. He stated he is excited about the new NAPMRC Facility and he's excited to hear what pavement research is being performed there. Mr. Dermody explained that headquarters looks at this avenue and relies heavily on the Technical Center to perform this research. He informed the Subcommittee Jim Patterson, Safety Area Program Manager, has been assigned to the UAS office for the past six months. Mr. Dermody explained this is new research and there has been lots of work on this subject at headquarters and Office of Airports. He explained how this will be something that needs to be staffed appropriately, and integrated into the research plan.

Review of REDAC Recommendations – Spring 2015

The Subcommittee reviewed the recommendations.

P. M. Break - 2:15p.m. - 2:30p.m.

The PEGASUS Staff distributed a brochure and invited anyone who could attend to the annual meeting on May 7, 8 and 9 at Iowa State.

Mr. Jeffrey Gagnon, 2015 Pavement Projects + *Plans for FY-17-18,* Mr. Gagnon began his presentation by giving an overview of the pavements projects and plans presentation. He introduced, Ben Mahaffay, who will take over Heated Pavements for the FAA after Charles Ishee's departure. Mr. Gagnon proceeded by giving an overview of the budget and explained the transition of RPDs to RPAs, pointing out that the NAPMRC Facility will have its own RPA. He explained that funding has been allocated between the NAPMRC and NAPTF facilities, as well as the increase in funding from FY17and FY18. Mr. Gagnon informed the Subcommittee of the upcoming events including a job opening for a new Civil Engineer and the 2017 Technology Transfer Conference. He informed the Subcommittee that the FAA has been working with ASCE on partnering for the conference, which will be held in Philadelphia, Pennsylvania on August 26-30, 2017. Mr. Gagnon proceeded by informing the Subcommittee of the International Cooperation Agreements and Papers and Report Publications from the FAA R & D Division from 2011- 2015.

Mr. Ben Mahaffay, Heated Pavements, Mr. Mahaffay began his presentation by introducing himself and giving a brief overview of his background and experience. Mr. Mahaffay spoke of the funding requirements needed to complete the research, noting that it was stable with no change from FY15-FY18. He reviewed the project timeline, materials being used, and the purpose for the research. Mr. Mahaffay spoke of the partnership with PEGASUS and the grant with Christopher Tuan from the University of Nebraska. He continued his presentation informing the Subcommittee of the latest highlight for the Greater Binghamton Airport was connecting the Geothermal System to the Terminal building and presented support pictures. Mr. Mahaffay continued with the Energy and Viability overview. He presented the cost breakdown vs conventional methods and the benefits. The Subcommittee inquired if injury prevention of airport personnel was factored in. Mr. Mahaffay responded that they had factored that in and found enhanced safety benefits as a result of the system. The Subcommittee asked if the research was looking at the adaptability for each airport. Mr. Mahaffay responded not at the present but they are working on getting a baseline and looking at what conditions make this viable, so the plan is looking at it generally and not airport specific. Mr. Mahaffay continued by giving a review of the Nano Technology objectives and materials being used. He proceeded with and overview of FY2017 -FY2018 Plans, commenting that 2018 is very similar to 2017 including the Electrically Conductive Asphalt Concrete for Heated Airfield Pavements, superhyrophobic and Icephobic Materials for Nano-Modified Heated HMA Pavements and Full Scale airport heated Pavement Testing. The Subcommittee asked how the Superhyrophobic Coating was applied. Mr. Mahaffay explained it was applied by layers and not incorporated throughout. The Subcommittee asked if there has been any research done on de-icing chemicals

or residual from engines damaging the coating. Mr. Mahaffay stated the research is not to that point yet. He explained the focus right now is on mass application, stating that the research has only been performed on small areas. The Subcommittee asked if the research is focusing on just one material and Mr. Mahaffay replied various materials and application processes are being looked into. The Subcommittee asked if there was a timeline on resolution and suggested cost be looked at first. The Subcommittee commented that this could price itself out and it should be the first step, then look at the pros and cons. The Subcommittee explained it's important to know the cost because if it's not feasible on a larger scale then the project will have to have an end date, but suggested putting it out to the industry because if they find it usable they will make it work.

Dr. Navneet Garg, National Airport Pavement Materials and Research Center, Dr. Garg began his presentation by reviewing the budget and the research goals for the NAPMRC facility. He presented a layout of the Test Cycle performed including Materials, Tire Pressure and Binder Type used during the testing. He went over the Deflectometer testing and presented pictures and results of the testing explaining they found highest deflection with warmer asphalt. Dr. Garg proceeded with his presentation explaining the detail of the traffic testing including failure criteria. He spoke on the current testing being performed and stated that failure is expected next week. Dr. Garg continued to explain Test Cycle 2 and Future Research Plans. He explained the issue is a lack of guidance, standards, and specifications and what they are hoping to achieve at the facility is to take the results and make new standards.

Mr. Murphy Flynn, New R & D Facilities Update, Mr. Flynn began his presentation with a recap of the last REDAC and presented 2017 and beyond. He explained the need for a Photometric Laboratory, NextGen Pavement Lab expansion, expansion of office space, and the need for Airport Safety Tech Storage/warehouse, as well as reviewing the Technical Center Construction Approval Process. Mr. Flynn presented a site selection slide and explained the water, fire, and sewer lines were extended during the current construction for accommodate new construction. He informed the Subcommittee the Environmental Assessment was submitted February 4, 2016 and returned with comments. Mr. Flynn stated the comments are being addressed and was resubmitted March 2, 2016. He explained R & D is hoping to have the Environmental Assessment phase completed by June 2016 with a potential award of design construction by August 2016 if funding is available. The Subcommittee asked if the design gets put out for bid. Mr. Flynn responded explaining the Technical Center has a on-call design contract that is used. The Subcommittee asked where the funding for this is coming from. Dr. Hovan explained this was the above the line item that was listed on his budget overview. He stated the R & D Division needs to have an internal discussion to see if it will fit within the \$31 million budget, can it be justified and does it make sense. Dr. Hovan stated a formal discussion had not occurred and that this was preliminary information. The Subcommittee discussed the funding for this being Capital vs Project and voiced concerns of taking the funding from AIP having an impact on other projects. The Subcommittee stated the goal of keeping testing in house is understood but the cost benefit of doing so needs to be evaluated when there are commercial labs and universities that are capable of performing the work. Jeff Gagnon explained the example of sending asphalt testing to Rutgers University explaining sending materials out to be tested slows down the process. The Subcommittee agreed this needed further discussion and would be revisited on Day Two.

Dr. Navneet Garg, Full Scale Testing – Perpetual Pavement - Update, Dr. Garg began his presentation reviewing of the primary objectives of CC-7 and the definition of Perpetual Pavement. He presented a table explaining the test section design details. Dr. Garg explained the asphalt is 8 to 15 inches thick and if the model is correct 8 inches should fail in 3,000 passes and 15 inches should fail at 30,000 passes. The Subcommittee asked what the load is and Dr. Garg replied the load is 55,000 pound with six landing gear, mimicking a Boeing 777. Dr. Garg continued his presentations by reviewing the instrumentation details and data collection. He gave a summary of the CC-7 project stating traffic tests will continue through spring 2016.

Dr. David Brill, Full Scale Testing - Overload Update, Dr. Brill began his presentation by giving a review of the current ICAO Overload Criteria for flexible and rigid pavements, noting the criteria are outdated and conservative. He reviewed the most recent CC-8 test for Rigid Pavement Objectives and stated testing began February 22, 2016, continued for two weeks ending on March 2, 2016, and will resume in spring 2016 with a date TBD. He presented a test area layout explaining the test slabs are 12x12 and 9 inches thick to represent what will be found in a light load general aviation facility. Dr. Brill explained what is being looked at is what would happen if a larger aircraft was brought into a light load facility. He reviewed the Initial Traffic plan including the dates, amount of wanders, and the overload during the wanders. Dr. Brill reviewed the initial traffic results and Strain gage date analysis. He continued explaining the revised traffic plan with increased loads and reviewed the results. Dr. Brill proceeded with presenting the Eddy Current Sensor responses and stated he was pleased with this tool and R & D is going to continue to use them. The Subcommittee commented based upon the data presented the AC 5% number is incorrect in regards to overload criteria and damage. Dr. Brill agreed stating to keep in mind the testing is done in a limited construction area with limited variables but believes the 25% number is probably fine. Dr. Brill proceeded with CC-7 Overload Update stating trafficking is on hold while completing CC-7 north but is planned to resume in the spring. He reviewed the preliminary observations from last REDAC Meeting in August 2015 and the CC-7 test layout. Dr. Drill presented test items, instrumentation layout, general test procedures, and a CC-7 test summary as of March 15, 2016. He proceeded explaining the process for Rut Depth and Upheaval monitoring and data analysis. Dr. Brill concluded his presentation with Future Testing Plans.

Mr. Al Larkin, Pavement Roughness, Mr. Larkin began his presentation updating the Subcommittee on NDT Pavement Technology highlighting FY2016 Accomplishments. Mr. Larkin explained the Research Goals are to develop a new Pavement Roughness Index for inservice airport pavement. He explained the Alternative Profiling Technologies for Airport Pavement acceptance and the overview of the research plan including a site visit to Wright Patterson Air Force Base and the use of simulators in Oklahoma City. Mr. Larkin stated the new index will be developed from data collected from the simulator project because it correlates to pilots direct responses. He continued presenting the data collected from the simulators, stating it was one pilot's evaluation. Mr. Larkin proceeded with the overview of the Wright Patterson Air Force Base site visit including site numbers, a table of pavement description and a table listing profiling devices that will be used. Mr. Larkin concluded with giving an overview of the Data Analysis Procedure for the site visit data. The Subcommittee asked how many profiles will be performed. Mr. Larkin stated it will vary. The Subcommittee asked when the site visit is scheduled. Mr. Larkin replied they are shooting for the week of March 28, 2016.

Day One Presentations – Concluded

The Subcommittee discussed if there were any recommendations needing discussion. The Subcommittee agreed all the projects were impressive and on the right track. The Subcommittee commented on everything being done in R & D is outstanding but the concerns are where the funding is going. The Subcommittee agreed a list of activities with the funding attached is needed and it will be discussed further at a later time.

Meeting adjourned 5:20p.m.

Day Two Wednesday, March 16, 2016

Dr. Hovan gave a brief overview of the topics that will be discussed. He also thanked Mr. Ryan King for stepping in and taking on the interim role as Safety Area Manager in Mr. Jim Patterson's absence. Dr. Hovan explained Mr. Patterson was assigned to UAS Research for the past six months.

Mr. Jim Patterson, 2016 Safety Projects + Plans for FY-17-18, Mr. Patterson began his presentation by giving an overview of the Safety Projects and Plans and the Safety Budget Summary. He presented the new transition from RPD's to RPA's, as well as explaining how the organization of projects will fall under the new RPAs. He stated some of the budget will get allocated to the Environmental Research Project, but the amount has not been decided upon at this time. Mr. Patterson continued speaking on personnel and informed the Subcommittee the R&D Division is looking for new environmental personnel. He gave an overview of the FY16 projects currently underway, highlighting the new competitor to the market for EMAS, digging dirt in Cape May, LED Lighting, and the new ARFF fire truck. Mr. Patterson reviewed the Major Cooperative Efforts with PEGASUS, ICAO and the ARFF Working Group. He highlighted how positive and successful the PEGASUS program is for R&D. He commented on how the PEGASUS program has exceeded expectations and makes it possible to complete quick exploratory work when needed. Mr. Patterson continued by reviewing the Report Publications, stating there have been five new publications since the last REDAC Meeting. He informed the Subcommittee the reports can be accessed via the FAA website in the FAA Library.

Mr. Robert Bassey, Research Taxiway, Aeromacs, Low Cost Ground Surveillance Radar, Mr. Bassey began his presentation with an overview of the budget for the Research Taxiway Project for FY16-FY18. He explained there is a drop off in funding from FY17-FY18 due to most of the construction for the Cape May project being completed. Mr. Bassey informed the Subcommittee the Construction Contract has been awarded to CJS and Atlantic City Electric will be installing hardware for the light fixtures. Mr. Bassey stated R&D is anticipating completion in the summer 2016 and will be able to provide a demonstration at the next REDAC. Mr. Bassey continued by giving an overview of the Innovative Airport Sensor Technologies highlighting the installation of non-federal AeroMACs System at Boston Airport and the development of the CONOPS framework for Lost Cost Surveillance Systems. He stated the need for this research at the larger airports is to improve situational awareness, provide better understanding of aircraft movement, and airport personnel. Mr. Bassey stated it will give improved real time management. He explained the benefits for the small to medium sized

airports would be improved effectiveness of personnel. He commented there is a lot of work to match the system with the airport. Mr. Bassey presented examples of tracking with the Optical System and the Thermal Imaging tracking. He explained the tracking was real time and also completed with GPS so result could be compared. Mr. Bassey informed the Subcommittee the data between the two tracking systems was less than 10 meters difference. Mr. Bassey informed the Subcommittee based on their recommendation a CONOPS document is currently in development and will be completed in June 2016. He explained the document will include integration of other systems, complexity of airports, technology requirements and costs. Mr. Bassey proceeded stating the current work being performed is looking at supporting sensor ground radar with the optical system and tracking aircraft. He stated a next step would be optimizing systems to make them more accurate. The Subcommittee questioned if the systems are all weather compatible, Mr. Bassey replied yes, they have been tested in all weather conditions. The Subcommittee inquired if the thought has been to integrate this with ADSB. Mr. Bassey responded not at this time. He explained the basic idea for this system is to track airport operations on ramp area. The Subcommittee asked if this data will go to the tower. Mr. Bassey responded it will not go to the tower but to the Airport Operator. The Subcommittee asked if potential uses will be included in the CONOPS Document and Mr. Bassey replied yes. The Subcommittee commented this could be useful in mitigating runway incursions and Mr. Bassey stated if that is so, then you get into Air Traffic and that is beyond the scope at this point. Mr. Bassey proceeded with his presentation by reviewing the AeroMACs acronym = Aeronautical Mobile Airport Communication System and commented this could be the future of communication. He stated this is a protected wireless service to aviation users for specific uses in FAA Air Traffic Control, Airlines, and Airport Operators. Mr. Bassey explained this will provide ease of optimization and improved security at a lower cost. He presented examples of the systems and described operation of them. The Subcommittee suggested painting the cost benefit picture more clearly and informing them of what the research is leading to and what the end result will be. Mr. Bassey responded stating there will be a generic plan that will have to be specified according to airport needs. The Subcommittee discussed the potential of cost savings due to not having to run cables. The Subcommittee suggested starting focusing on benefits tailored to airports. The Subcommittee agreed there could be a use for this on the airline side, as well, but the question is how it will play into standards. The Subcommittee asked if R&D is communicating with other players. Mr. Bassey agreed the R & D if effectively communicating with other players and at this time light data being shared. He explained they are only testing this on non-critical assets, which is why the program is being phased. Mr. Bassey explained as the results are satisfactory security, etc. will be added. The Subcommittee commented that resiliency is an issue and asked if the station installations themselves need to be resilient. Mr. Bassey replied that consideration is being put into the design.

Mr. Ralph Tamburro and Ms. Emily Stelzer, PANNYNJ, Low Cost Optical System, Mr. Tamburro and Ms. Stelzer began their presentation by giving a background and overview of the project at Teterboro Airport. They explained this was a collaboration of the Port Authority and MITRE, at no cost to the Port Authority. They continued stating MITRE has an internal research program looking at similar surveillance systems and the importance of the surveillance systems. Ms. Stelzer gave an overview of the ASDE-X System and stated that for a small to medium airport there might not be a cost benefit due to the 25 million dollars it costs to install. Ms. Stelzer informed the Subcommittee there has been a reduction of runway incursions due to

the system. Ms. Stelzer and Mr. Tamburro presented slides on the research and different approaches that were taken. Ms. Stelzer the biggest concern was with was the approaches of what was being looked at and the accuracy of the results. Ms. Stelzer explained they took controllers to a simulator after a prototype was developed. The controllers who participated were from Manassas Airport in Virginia. Ms. Stelzer stated they were hoping to see a safety benefit from this research and to make sure it is operationally useful and acceptable. Ms. Stelzer stated after potential benefits were determined the next stage was a field demonstration. She explained cameras were placed at "hotspots" at runway crossings at the departure end of the airport. The Subcommittee asked if there was a performance target in mind for this project. Ms. Stelzer responded there isn't a defined target and the concept is to try to keep everything low cost therefore, there has been no integration with other airport data. She stated for the ASDE-X System second tier, costs 2 million dollars over 10yrs for implementation and maintenance. She commented that a basic function of the system could be sufficient for some airports and the system could be scaled according to specific airport needs. The Subcommittee asked the range for this system. Ms. Stelzer responded it is dependent on the pixel in the camera and how it views the distance, but she believes it is less than one mile. The Subcommittee asked if the testing was completed with HD Cameras and Ms. Stelzer replied the test was completed with FLIR Cameras with a 45 degree field of view. The Subcommittee asked what the cost of a FLIR Camera is and Ms. Stelzer responded it costs around three thousand dollars per camera. She commented the cost estimate would have to be adjusted based on airports and the availability of camera locations. Ms. Stelzer reviewed the Airport Operations feedback stating it has reviewed both low and high feasibility and they are moving forward. She informed the Subcommittee they are in the process of compiling a market assessment and they have been speaking with Robert Bassey and NextGen on continuing the project. The Subcommittee commented how this might be helpful for pavement inspection and maintenance. The Subcommittee agreed they would like to see more of this and know of any other research projects currently underway on this subject.

Lauren Collins, Airport Noise, Safety Database, RIM, Ms. Collins began her presentation by reviewing the project updates, highlighting the transition from RPDs to RPAs. She reviewed the need for the Noise project stating it has been included in the budget since 2012. Ms. Collins reviewed the budget explaining the breakdown in funding in relation to the RPAs. She proceeded by informing the Subcommittee that Phase One and Two are completed and Phase Three has a goal to receive 10,000 survey responses and make 2,000 phone calls. Ms. Collins stated the mail drop began October 13, 2015 and the surveys are confidential, signed by the Department of Transportation. She updated the Subcommittee stating the mail drop is scheduled in six waves and occurs every two months with the final wave occurring September 27, 2016. Ms. Collins informed the Subcommittee the response is exceeding expectations with 4,676 surveys completed to date. Ms. Collins presented future work and informed the Subcommittee the purpose of the research is to determine if the current standards need to change. The Subcommittee asked if there is a plan to segregate the data to look at where the curve of complaints is. The Subcommittee explained airports have changed approaches, etc. and the complaints may not be linked to decibels. The Subcommittee asked if people were more susceptible to noise once they got the survey. Ms. Collins responded no explaining that the survey is not labeled as a noise survey. The Subcommittee commented that noise is related to perception which is why it can be hard to understand the data. Ms. Collins proceeded by

moving on to Data Mining Database Project. She began by presenting the transition from RPDs to RPAs. Ms. Collins gave an overview of highlights since August 2015 noting the database continues to be an asset to the Office of Airports. Ms. Collins gave a short demonstration commenting this database is different from ASIS because it has the ability to streamline what is being looked for. The Subcommittee asked if the database was public. Ms. Collins responded that it was not public but they would like to make it available to airports if they asked. She stated in the future they are hoping to pull in more data based on needs. Ms. Collins continued by giving a brief background overview of the RIM Project. She informed the Subcommittee due to the transition from RPDs to RPAs RIM will be under Airport Planning and Design. Ms. Collins gave a review of the research goals including initiating a 10 year improvement program to correct high-risk areas at airports with complex non-standard geometry, as well estimate construction unit costs for locations identified. She informed the Subcommittee of accomplishments since the last meeting in August 2015. Ms. Collins noted in September 2015 eight airports received AIP money for RIM Projects and the inventory was updated in December 2015. The Subcommittee commented a dashboard tracking system should be done for headquarters soon. The Subcommittee asked what the factors are that determine a location to be an incursion issue. Ms. Collins responded stating if there were six or more incidents from 2007-2013 they were flagged for the RIM list. The Subcommittee asked who makes the final determination for the RIM list. Mr. Dermody answered stating the Safety Action Teams bring up the issue and if it warrants a request for research it is brought down by Runway Safety Office - Office of Airports. Ms. Collins explained next steps of the project are to load FY15 incursion data. The Subcommittee asked who is responsible for entering data into the database. Mr. Dermody explained each airport involved in this research has a FAA employee who is a RIM Contact, and entering this information has been approached as part of a normal business day duty. The Subcommittee inquired who has access to the information. Ms. Collins stated once it has been finalized, anyone with airport credentials will have access. The Subcommittee asked if there was a strategic plan in place to help anticipate needs and stay on track. Mr. Dermody answered stating Runway Safety Action teams are ensuring how touch points are maintained and there is an RSAT developed at each location. The Subcommittee asked how that was being integrated and Mr. Dermody responded it is being integrated regionally, and the Office of Airports at headquarters is working on infrastructure. Mr.Dermody explained the Airport Operator makes the decisions. He stated the FAA provides dates, recommendations, and financial evaluation.

Don Gallagher, Robert Bassey, Rumble Strips, LED Projects, Mr. Gallagher began his presentation by reviewing the Rumble Strip Project background and their partnership with PEGASUS – Center of Excellence. He explained how the test was completed with temporary, thermoplastic, and saw cut strips, and explained installation of each. He reviewed the seven different GA Aircraft that were used to perform the tests and presented a graph with acceleration data. Mr. Gallagher informed the Subcommittee sensors were placed on the pilot seat and seat rails. The findings were significant airframe acceleration must occur for the pilot to feel the rumble strip and airframe manufacturers are concerned about the damage the strips could do to the gears over time. Mr. Gallagher reviewed the test results from the durability test performed in April 2015 stating there are problems with the durability of the ninety degree saw cut strip, construability challenges with the forty-five degree bevel saw cut, although it was proven more durable than the ninety degree saw cut. Mr. Gallagher explained the thermoplastic strip was

easy to install and it was installed thicker than a usual strip, but it showed durability issues as it was removed by a steel blade snow plow. The Subcommittee asked why the Thermoplastic was installed thicker than usual. Mr. Gallagher explained it has to be thicker than highway strips because a larger vehicle is being tested. Mr. Gallagher explained the temporary strips fared well, were easy to install and remove, but there is a concern about causing fatigue to the aircraft. He proceeded by reviewing the conclusions for the project, noting they found temporary strips would not be ideal for preventing runway incursions, but there might be other uses for them. The Subcommittee asked if there was a speed threshold for the testing. Mr. Gallagher responded they tested at twenty knots however it is the size of the aircraft that matters more than the speed. Mr. Gallagher stated it's hard to classify how each aircraft will respond due to manufacturing differences. The Subcommittee asked if the idea of testing a laser strip was ever discussed. Mr. Gallagher responded that a laser strip would do essentially what runway lights already do. He explained there are different concepts but not addressed in this study. Mr. Gallagher proceeded reviewing the LED High Intensity Runway Edge Light Project. He explained this is a "Pop- Up" project that was requested by AAS to explore the requirements for developing a FAA L-862 (L) (HIRL) with and IR emitter, designation to be L0682(L-IR) and to ensure it compatibility with aircraft currently equipped with EFVS. Mr. Gallagher explained that in September of 2014 FAA Office of Airports restricted the use of AIP funds for certain He continued explaining the objectives of the project are to develop IR LED lights. requirements based on legacy L-682 incandescent fixture measurement and use visual light requirements from FAA AC 150/5345-46, which is the current version and FAA EB67. Mr. Gallagher informed the Subcommittee the Phase 1 – Broad Agency Announcement was posted on February 2, 2016 and was closed on February 19, 2016. He stated the evaluation period closed on March 10, 2016 and the Phase II Request for Proposals will go out on March 25, 2016. Mr. Gallagher explained for Phase II proposals, only offers which Technical Summary meets or exceeds future program requirements will be considered. He stated the Technical Summary must contain; purpose of research, description of research, current state of development, estimated time completion, estimated funds required, as well as description of testing and evaluation procedures. He explained the proposal submission will start on March 28, 2016 and end on June 25, 2016. Mr. Gallagher informed the Subcommittee the evaluation period will take place from June 27, 2016- July 25, 2016 and Contracts award notification will be out on August 25, 2016. Mr. Gallagher stated the completion date for Phase II is projected for February 28, 2017.

Mr. Robert Bassey, Visual Guidance, Mr. Bassey began his presentation reviewing the budget for FY16-FY17 and explaining the purpose of Visual Guidance projects is to provide better visual cues to pilots to reduce the risk of incursion. He continued by giving an overview of the LED Lighted "X" testing. Mr. Bassey presented a picture of the lighted X explaining each arm is under sixteen feet in length and it has nine light sources. He informed the Subcommittee the flight testing is being performed through the PEGASUS Program and they are collaborating with the Florida Institute of Technology, Purdue University, and The Ohio State University for flight test locations. Mr. Bassey continued by presenting examples of the LED Lighted "X" in day and night flight situations. He proceeded with informing the Subcommittee of Milestones and a Project Schedule explaining the Performance Standards will be completed by March 2016, Photometric Testing will be completed in April 2016, Flight Testing will be completed in March 2016, with a Final Report completed in June 2016. The Subcommittee agreed this could be

something that would be beneficial to all airports, but the issue being who is responsible paying for it. The Subcommittee asked if the project is tracking how many bulbs need replacement, how often, etc. Mr. Bassey replied yes, and it's a hard issue. Mr. Bassey proceeded with explaining the LED Infrastructure Research. He stated the issues resulting from LED implementation into the current 6.6A Series Airfield Lighting System are the added complexity and cost to the LED fixture due to the addition of electronics to mimic the non-linear dimming curve of incandescent lighting. He stated the possible solution to this is using the light only when it is needed. Mr. Bassey gave an overview of the different architectures used in the testing and presented a road map for the testing phase. He informed the Subcommittee the locations for were at the FAATC and PEGASUS Airport. Mr. Bassey stated lights were installed and the next phase is monitoring equipment and then continuing on to data collection. Mr. Bassey explained data collection will be bi-weekly starting in March 2016 and will continue for six months. Mr. Bassey continued with New Technologies, explaining the FAA R & D Visual Guidance Program has continued to explore new technologies to increase surface safety and reduce the rate of runway incursions. He informed the Subcommittee a literature review was completed in November 2015 and one technology that was mentioned in the report that is being considered is addressable airfield signage. He reviewed the potential application of LED use on signage and the research proposed. Mr. Bassey stated the outcome of this study will be a recommendation for standards for addressable signage use and technical specifications.

Dr. John Cavolowsky, NASA Updates- Webex/Phone, Dr. Cavolowsky began his presentation providing the budget requested from OMB is a generous allocation and the opportunities available in research. He stated his belief is the impact of the research is also relative to the airports scope of communication. Dr. Cavolowsky explained to look at the global growth in Aviation from both the passenger side as well as the job growth rate, stating it presents opportunities as well as challenges. Dr. Cavolowsky stated the challenges are competitiveness, environment, and mobility. He stressed that the environmental issues continue to grow. Dr. Cavolowsky gave an overview of the projects NASA is working on in collaboration with airlines such as; American Airlines - weather rerouting and terminal sequence and spacing, America Airlines - Surface Management, Southwest Airlines - data mining to improve efficiency and safety. He also listed airports NASA is in collaboration with such as; Denver International Airport - Efficient Decent Advisor- improving arrival efficiencies and Dallas Fort-Worth international Airport- precision departure release capability- increasing departure time conformance. Dr. Cavolowsky stated this research is part of the reason why the OMB allocation is so generous. He proceeded by explaining the NASA Aeronautics Accomplishments and Planning. Dr. Cavolowsky stated the N+3 Subsonic and Supersonic concept /technology studies and N+2 Environmentally Responsible Aviation (which was ERA implemented) projects have made great improvements. He continued explaining FY17 budget is an increase of seven percent from FY16 and the 10 year budget plan still has to go before Congress. Dr. Cavolowksy explained classically the budget look is five years ahead, but they have provided a ten year outlook to be able to see areas of growth and plan research efforts accordingly. Dr. Cavolowsky stated the planning efforts should be collaborative with the FAA and believes there is a connection with NASA research and airports. Dr. Cavolowsky explained the New Aviation Horizon Flight Demo Plan stating NASA is researching Hybrid Electric Propulsion Demonstrators as well as high speed flights. He communicated the collaborative effort for these research topics should be focused on long term. Dr. Cavolowsky explained the research being performed with Next Gen is New Trajectory Based Operations looking at Gate to gate optimization and complex terminal area trajectory management. He explained the goal is to have the systems integrated and demonstrated. Dr. Cavlolowsy reiterated the budget is subject to Congressional approval and while there is uncertainty, NASA is remaining optimistic. The Subcommittee commented it is important to be aware of the common interest research and what's going on. The Subcommittee commented the surface work being performed is of great interest and they agreed it is pretty critical. The Subcommittee agreed the concepts of time based operations are useful but concerned what the impact would be on the Operator role. The Subcommittee commented the flight efficiencies research can make a difference in the long run and benefit the system overall.

Mr. Nick Subbotin, Arrestor Systems, Mr. Subbotin began his presentation stating the transition from the RPD to the RPA. He reviewed the project overview and the need for the research. Mr. Subbotin reviewed the FY16 budget stating the project has been busy the past two years. Mr. Subbotin informed the Subcommittee Zodiac-Esco is proposing new core materials to replace the current. He informed the Subcommittee that fire tests were performed two weeks ago to coincide with the Advisory Circular that materials should be fire resistant. A report is being compiled and will be sent to FAA Headquarters. Mr. Subbotin reviewed information of the Runway Safe beds at Chicago Midway Airport stating the plan is to replace all EMAS beds with Runway Safe beds with their own funding. Mr. Subbotin presented an example of the runways the beds installed at Chicago Midway and stated Chicago O'Hare Airport is considering replacing their beds as well. He informed the Subcommittee he is working with Headquarters on report approval for Runway 4-22. Mr. Subbotin stated R & D is waiting on a new CRDA with Runway Safe due to the old one expiring. He informed the Subcommittee Runway Safe is also proposing a domestic made aggregate to align with AIP requirements. Mr. Subbotin continued by presenting future plans including Full Scale Testing for summer 2016, and the possibilities of collaborating with three or four new manufacturers. Mr. Subbotin reviewed R & D activities informing the Subcommittee of a new Subcontractor ARA –Jim White has joined the EMAS Team, and the ARA team was tasked with observing the entire process of installation and developing a quality control plan. He explained further research will be looking at longevity factors in regards to materials used and environmental factors. Mr. Subbotin stated there will also be a focus on maintenance and an inspection regime stating that maintenance is an important part of the integrity of the bed. He explained they will be choosing airports with beds six years old or older and gather inspection and maintenance reports, as well as costs from those airports. Mr. Subbotin stated the goals for the EMAS Project are to make decisions on EMAS longevity; find issues with inspection and maintenance, and make updates to the AC. He stated the Inspection and Maintenance Plan is due April 2016. Mr. Subbotin informed the Subcommittee an early finding is the procedures for inspections and maintenance are not very practical. Mr. Subbotin continued presenting FY18 Plans including field testing (location TBD), Cost Analysis to include material and labor hours, and to put together better guidance for maintenance and inspection. The Subcommittee asked if there is a failure criterion. Mr. Subbotin stated that is up to the manufacturer and the issue is the manufacturer won't certify. The Subcommittee asked who is responsible for maintenance and inspection the manufacturer or airport. Mr. Subbotin stated the manufacturer does an annual inspection but the airport pays for the manufacturer visit. Mr. Subbotin stated part of the research is looking into whether maintenance plans differ depending on airport. The Subcommittee commented the long term issue is replacement and each manufacturer has its own criteria.

Mr. Keith Bagot, ARFF Program Updates, Mr. Bagot began his presentation with a review of the program needs and research goals. He highlighted the FY16 Accomplishments informing the Subcommittee of the delivery of a new ARFF Research Vehicle. Mr. Bagot reviewed the FY17 budget explaining the increase is due to the construction of a new fire test building. He explained the FY18 budget numbers drop down to more of an operational level. Mr. Bagot reviewed the current projects being performed and stated that there are other projects in progress that aren't included in the presentation. He informed the Subcommittee he will be happy to talk about the other projects if the Subcommittee is interested. Mr. Bagot informed the Subcommittee of the trip to the Rosenbauer Plant to perform the truck inspection and performance tests that were required to take delivery. He explained the plan for the truck is to perform Compressed Air Foam (CAFs) and High Pressure testing. Mr. Bagot informed the Subcommittee it is the only truck of its kind worldwide. Mr. Bagot proceeded with an update on the new fire test building presenting examples of comparable facilities and examples of the testing that will be performed. He explained the need for testing inside vs. outside is because it takes away some environmental concerns, weather issues, and gives the ability for the repeatability of testing which is needed. Mr. Bagot informed the Subcommittee the FAATC MPSB approval was received in May 2015 and the obstruction evaluation was approved in July 2015. He explained the current efforts have been the study on potential emission control levels and state permitting. Mr. Bagot explained they are waiting on NJ DEP ruling on emission control requirements. Mr. Bagot informed the Subcommittee R & D is preparing a SOW and other contract documents and designs. Mr. Bagot proceeded giving a brief review of the Thermal Imaging and FLIR projects presenting examples of the key functions and ranges. He continued his presentation with a review of the fire testing/FLIR radiant panel testing with the L1011. He commented they had more success with this test determining hot spots vs what the findings were from the testing performed in California. Mr. Bagot presented New Research Projects for FY16/FY17 Alternative Clean Agent Evaluation, input based foam proportioning system testing technologies. He also presented new research for FY17/18 being Military Specifications vs ICAO Test Protocols. The Subcommittee commented there are pros and cons to both technologies (Military vs ICAO) on an industry level and believe there is a sense of urgency to revise ARFF Operations for aircraft. The Subcommittee discussed the issues of larger aircraft and the limitations it puts on what airport that airplane can fly into. The Subcommittee agrees this is an opportunity for the FAA to contribute to modification studies, due to the fact that there aren't many ARFF experts out in the industry to speak on this. The Subcommittee agrees there is good testing that is being performed. John Dermody interjected agreeing stating the work the Tech Center is doing is great and needs to continue.

Lauren Collins, Kent Duffy, Airport Planning and Design, Ms. Collins began the presentation giving an overview of the re-organization of RPDs to RPAs. She explained the FY16 RPD encompassed Airport Design (RPD 133), Complex Geometry (RPD 142), and Airport Planning (RPD 132). Ms. Collins explained for FY17 under the new RPA those projects will all fall under RPA S1 - Airport Planning and Design. Ms. Collins added Trapezoidal Grooving will also fall under Airport Planning and Design S1.4 and it is accounted for within the three million for RPA FY17. Ms. Collins commented to the FY18 budget being blank because R & D isn't

sure of the priorities at this time. Kent Duffy introduced himself and Dr. Michel Hovan introduced Mike Heinz from the Office of Airports. Mr. Duffy proceeded by presenting the FY16 budget and the REDIM Replacement Project. He explained the REDIM is outdated and the objectives are to develop a tool that is compatible with current software, provide estimates of runway exit probability for aircraft location and geometry of runway exit and input for capacity simulation software. Mr. Duffy explained the methodology for this will be using the ASDE-X data and or update the REDIM database with updated manufacturer data. Mr. Duffy reviewed the FY16 GA Runway Length tool stating the issue is aircraft performance data availability and the objective is to develop a web-based tool that makes use of the statistical dataset develop in previous phase to allow for streamlined runway length needs assessment. He continued with FY17 Plans including Runway Simulator development and integration of aircraft datasets. Mr. Duffy explained with the development of the web- based tool it would require industry outreach to ensure data is being used correctly. He explained for the GA Runway Length Tool the lift off point can be calculate from the ASDE-X and there would be a small number of aircraft types that data would be needed. The Subcommittee commented that using ASDE-X is fitting a situation into what has already been proven. Mr. Duffy responded stating there is probably an issue using that data exclusively for what is trying to be accomplished. He proceeds with FY17 Plans for runway simulator highlighting quarterly training sessions, stating they have had 90 people complete the training. Mr. Duffy informed the Subcommittee there is an academic version coming soon for use at universities, as well as added functionality with the delay module.

Dr. Jim Hileman, Airport Environmental Research, Dr. Hileman began with an overview of his presentation. He explained the Aviation Environmental challenges noting Noise to be the most immediate issue. Dr. Hileman stated there has to be a multiple prong approach to site the challenges and then to mitigate those challenges. He explained in 2012 the FAA put out an Aviation Environmental and Energy Policy Statement with the vision and guiding principles. Dr. Hileman reviewed the statement stating the goal being increased mobility with less environmental impact and enhanced energy availability and sustainability. Dr. Hileman presented the environment and energy goals stating the noise research goal are to reduce the number of people exposed to significant noise around U.S. airports in absolute terms, notwithstanding aviation growth, and provide additional measures to protect public health and welfare and our national resources. He explained the overall vision is the next level of safety. Dr. Hileman reviewed the Five Pillar Approach to research and the collaboration with other agencies. Dr. Hileman continued with an overview Airport Environment research objectives that are performed with AIP funds. Dr. Hileman stated a focus on research is Evaluating Fixed dB Values used in Determining Noise Level Reduction Requirements [with sound insulation programs] Noise Dispersion with ELSO PBN departures, Develop air quality screening criteria for airport actions, Review of Airport Guidance for Climate Adaptation and Resiliency, as well as Research on Airport Environmental Concerns and Mitigation Measures. He believes this research will be a tremendous help to airport communities as well as give better integration knowledge and help with the overall planning processes. Dr. Hileman's summary included the collaboration between the Technical Center, ARP, and AEE and explained five new projects being started this year with FY16 funds. He reviwed FY17 budget stating current efforts are directed to FY17, FY18 and beyond. Dr. Hileman commented the plans will include reducing aviation noise and improving air quality impacts, sustainability in regards to water and energy

use, and climate change and adaptability, as well as enhancing analytical abilities and land use planning using AEE for ground support and modeling. Dr. Hileman stated there needs to be an improvement on the ability to model and more database development in sharing information. He informed the Subcommittee there needs to be a long term research plan.

Due to time constraints Mr. Chris Oswald, Chairperson, had to omit the question portion of the presentation. Some Subcommittee Members had to leave due to travel arrangements. Mr. Oswald stated he would prepare recommendations and send them to all members, asking for feedback after they have been reviewed. He reminded all members the next meeting will be August 16 and 17 2016 and the first day meeting will start at 8:30 a.m.

The Subcommittee continued the discussion on Dr. Hileman's presentation stating a concern that the FY18 sleep study/noise will be more than what the budget entails. The Subcommittee agrees there is a need and a lot can be done to be sustainable and reduce the environmental impact. The Subcommittee stated they are looking forward to the FY18 plan and commented the plan should include plan outside the research budget. The Subcommittee agreed AEE has a large, broad portfolio and the research topics being concentrated on are airport centric PBN work. The Subcommittee questioned whether it is reasonable for compiling a 10 year plan. The Subcommittee agreed to put this discussion on hold until the Summer/Fall Meeting. They agreed there has to be assurance that efforts aren't being duplicated or repeated and they agreed more discussion is needed to be able to structure. The Subcommittee discussed if it was practical to present a ten year plan at the full meeting.

Mr. Joe Breen, Trapezoidal Grooving, Aircraft Braking, In- Pavement Light Bolt Frangibility, Mr. Breen began his presentation by explaining the FY17 RPA for Trapezoidal Grooving. He gave a brief review for the reason for research and testing methodologies discussed at the last meeting. Mr. Breen reviewed the project objectives and project plans. He explained the plans are divided into Phase I and Phase II. He explained Phase I will consist of ACY runway 4-22 evaluation and grooving test bed design, evaluate condition of planned PCC test bed, calculate impact of reducing pavement thickness, evaluate load carrying capacity and remaining life, develop design for construction of test bed and plans, including specifications, schedule, and cost estimate. Mr. Breen added Runway 4-22 has a combination of different test grooving from the 1980's so the plan has to include demolishing the old grooving and reconstructing the test bed. He proceeded with explaining Phase II plans to be construction and full scale performance testing, including construction of grooving test bed, obliterate existing grooving, machine trapezoidal shaped and FAA standard grooving, regrind half depth grooving sections, and machine new FAA Standard Full Depth Grooving. Mr. Breen continued with giving an overview of testing plans as well as reviewing aircraft parameters. Mr. Breen highlighted the recent project progress informing the Subcommittee Phase I has received approval by ACY Management and there is a meeting scheduled for March 17, 2016 for contractor proposal. He explained they are expecting a four month completion date and the results of Phase I will be presented to ACY Management. Mr. Breen stated that Phase II will begin after the successful completion and ACY Management approval of Phase I. Mr. Breen reviewed the FY16 and FY17 budgets explaining R & D was hoping to have this project completed in FY16. He informed the Subcommittee due to the fact that approval was just granted from ACY to begin Phase I this project is going to flow into FY17. The Subcommittee asked what the parameters for testing were. Mr. Breen responded they are planning a couple of tests; a baseline, two full depths on one side and half depth grooving on the other side. Mr. Breen continued with presenting the Aircraft Braking Friction Project by reviewing the FY17 budget and RPD and explaining the transition into the FY17 budget and RPA S6.1. He reviewed the purpose of research as well as the methodology used. Mr. Breen informed the Subcommittee this was established by a NTSB recommendation after the 2005 Chicago Midway Aircraft Accident. He continued by reviewing the unique capabilities of the B727-25C Test Aircraft. Mr. Breen highlighted recent progress including the installation of the operable programmable braking system, trial runs on runway 4-22 at ACY, trial runs on FAA Ramp at ACY, installation and operation of new data acquisition and display systems, and the trial runs of both of those systems on runway 4-22 and the FAA Ramp. He informed the Subcommittee the trial runs for winter weather test operations were performed on manufactured and natural snow, and the two test series were performed with main gear brakes using a single four hundred foot test strip and dual four hundred foot test strips. Mr. Breen provided examples of essential measurements and explained there are five parameters to assess during testing to come up with algorithm for aircraft braking when landing. Mr. Breen presented video and pictures of testing. The Subcommittee asked what the reason was to test on manufactured snow using one strip and dual strips. Mr. Breen responded they wanted to be able to validate during the snow. The Subcommittee asked if the ramp was graded. Mr. Breen responded no. Mr. Breen explained the testing strips are eight feet wide and there was a consistent fuel level throughout the testing procedure. The subcommittee agreed they were not enthusiastic about this project when it first started and commented that this is a proud moment and they enthusiastically support this. The Subcommittee was asked what made them turn the corner. The Subcommittee responded the return on investment. The Subcommittee explained the airplane was purchased without a defined project and now there is a defined project with defined goals and agreed there is nowhere else to get this information. The Subcommittee asked when this will be completed. Mr. Breen responded he is hoping to have fully developed analysis by June. He presented the data display and explained the process noting the data being presented is real time data. Mr. Breen presented future project test strategy stating he would like to give balance to testing on manufactured snow by using chipped ice machine and runway 4-22 would be included in the validation process. Mr. Breen stated there also needs to be development of data and validation could be on our aircraft. The Subcommittee agreed there is a need and value to have this on actual flying aircraft. The Subcommittee asked what the timing is for validation. Mr. Breen responded to finish all winter testing for 2016 and 2017, convert the data to algorithm, test on the 727, then move to test on flying aircraft. He commented that could probably start as early as October 2016. The Subcommittee asked if the algorithm could be started now. Mr. Breen responded he would look at that.

Due to time constraints, Joe Breen did not present on In-Pavement Light Bolt Frangibility.

Mr. Jim Patterson, Updates on UAS, Mr. Patterson began his presentation explaining the Technical Center developed a UAS R & D Team and he was asked to serve on the team. He explained it was six month assignment and presented the topics to be covered during his presentation. Mr. Patterson continued stating the reasons for the research and the development of the research team are due to the expansion of UAS Systems and the amount that are being sold. Mr. Patterson gave an overview of the Technical Center UAS Laboratories and the work

that is performed. He presented highlights of the UAS R & D efforts noting the Pathfinder Program. Mr. Patterson explained how the FAA is working with industry partners on focus areas: Pathfinder 1 – Visual line of sight operations in urban areas- how to use UAS safely for news gathering in populated areas; Pathfinder 2 – Extended visual line of sight operations in rural areas - this involves UAS flights outside the pilot's direct vision. UAS Manufacturer Precision Hawk is exploring how this might allow greater UAS use for crop monitoring in precision agricultural operations; Pathfinder 3 – Beyond visual line of sight in rural/isolated areas - BNSF Railroad will explore command and control challenges of using UAS to inspect rail system infrastructure. He also explained Pathfinder 4 – CACI UAS Detection Technology - this is the ability to detect the presence of a UAS and its operator through the use of radio frequency geolocation. Mr. Patterson showed the sensor configurations and locations placed at the Technical Center. He presented the map that is a result of the sensors "talking" to each other and then mapping out the locations of the UAS. Mr. Patterson added the range is about two miles for this system. He highlighted milestones and commented on the fast pace of the research noting the kick off meeting was in October 2015 and moved to flying UAS in January and February 2016. Mr. Patterson explained the research team worked with ACY Airport and Air Traffic Operations. He also mentioned collaboration with the University of Maryland due to the fact their researchers are certified to be able to fly the different variations of drones being used for testing. Mr. Patterson presented and operations view of the CACI display noting the confidence eclipse which is a blue dot that gives you the location of the UAS. Mr. Patterson informed the Subcommittee of Future UAS work siting the plan to deploy Detection Technology at five airports in eighteen months, noting JFK is in cooperation with FBI Blackbird System and DFW has been suggested by Gryphon Sensors. He explained three additional airports still need to be selected. The Subcommittee asked how long it takes for the detection system to identify a UAS. Mr. Patterson replied that it is almost instantaneous, commenting the FBI stated they can get the person before the system is even deployed. He continued stating there will be a system at Lexington Airport in summer 2016. Mr. Patterson explained other future work being performed is Counter UAS – meaning several technologies that exist have the capability to take over control or disable airborne UAS. He explained most are developed and used by the military and operate under top secret security classification and the FAA has an interest in this technology. Mr. Patterson also explained there are issues with responsibility for regulating these systems and their use. He spoke on possible other uses for these systems such as: a way to deter wildlife, airport surface safety inspections, EMAS Beds inspections, Aircraft Rescue Firefighting, and Airport Security. The Subcommittee commented who controls the airspace and the authority over vehicles operating in the air space. The Subcommittee discussed there regulations already in place and wondered why there was no line funding for this research.

Recommendations of the Day

Airport Planning – the Subcommittee discussed and agreed to close the spring 2015 recommendation and it would be re-visited if necessary. Chris Oswald, Chairperson stated the Subcommittee will review again at the Fall Meeting and he will send the budget request and would like feedback. He also stated a breakdown of the budget is needed as well as a deeper dive into the planning. Dr.Hovan agreed that at the present time there is no plan, but added that can change. He explained there are constraints on budget request approval for FY18 and agreed with the Subcommittee's need to understand projects that are seeking the money in 2018.

RPA *Project Level Budget* - the Subcommittee discussed the need for project level budgets as well as asking Dr. Hovan if environmental shouldn't be included in noise. Dr. Hovan responded that noise is specific to annoyance.

The Subcommittee discussed the need for a deeper dive into airspace maintenance, industry involvement and 10 year plan. Dr. Hovan stated he is comfortable with the FY18 budget and he would like to ask for additional funding to expand the lab areas. He explained if he doesn't receive additional funding the other options is to have the research programs absorb the costs or don't expand the labs. The Subcommittee suggested looking at the legitimate function expanding the labs will provide, and suggested it should be looked at to provide something that is not commercially available. The Subcommittee asked if the FY17 budget can be changed explaining there are no subject matter expertise to know what is needed. The Subcommittee asked if there was year-end money available and is this something to use the year end money for. Dr. Hovan responded his plan for FY17 and FY18 is to expand the Pavement Lab and then the Photometric Lab and it needs support. He explained that money becomes available July 1st and not everything on the list is a priority. Dr. Hovan continued that first we see if the need is there and then we determine how we pay. He expressed this is something that cannot wait until FY18- FY19. The Subcommittee suggested waiting for FY17 end of year money to proceed with design or construction stating the documentation has already been submitted to the Subcommittee. The Subcommittee asked Dr. Hovan if there was another way to address this need, such as looking at the budget and seeing where it can fit. The Subcommittee also suggested a separate capital budget might need to be figured in so money isn't being taken away from the research budget. The Subcommittee asked Dr. Hovan to look at the possible impacts and scenarios if the funding doesn't come through and if the scenario doesn't look that bad then it may not be a priority right now. Dr. Hovan stated the Photometric Lab is a priority. The Subcommittee asked what the design cost is. Dr. Hovan stated it is ten to fifteen percent of the total cost and it can be under the umbrella of the Technical Center. The Subcommittee asked Dr. Hovan to provide justification to get a consensus of support. They are aware it might not be within the timeline but explained it does not fall under research programs, as it is an upgrade to facility. In addition, the Subcommittee asked Dr. Hovan to provide in depth budgets for projects to include POPs.

The Subcommittee agreed they would review the budgets and look for anything that could be missing. The Subcommittee agreed on the pressure to find finding for UAS Research and questioned if that is FAA Responsibility or R & D Airports responsibility. The Subcommittee agreed it was a big budget issue and there should be an agency wide strategic plan for each line of business, including funding for respective areas. The Subcommittee recommends exploring allocating of funding and where it would need to be for the Safety and Surveillance RPAs going into 2018. The Subcommittee discussed whether it is appropriate to ask for a plus up in consideration of including UAS into the FY18 budget.

ARFF Guidelines – the Subcommittee agreed this is not really R & D but more of policy guidelines under ICAO.

RIM – the Subcommittee agreed at some point this should transition out of research, the data is out there and there is awareness about it. The Subcommittee discussed there should be meeting on mechanisms of training for databases and the issue of coordinating Runway Safety infrastructure under it. Dr. Hovan informed the Subcommittee of a new awareness requirement as of January 2016, called Data DMPS which came from DOT and the White House. He

explained that after every project is completed the FAA has to provide a DMP to the public. He stated there are still discussions as to how long to keep data and length of data.

The Subcommittee discussed the venue for the next meeting and agreed it will be in the Technical Center Director's Conference Room (Bldg. 300). The Subcommittee agreed it will be two full days with both days stating at 8:30a.m and the second day ending by 3pm. Due to the fact that the FAA Shuttle arrives at 9a.m., a soft start for 8:30a.m.was discussed. The Subcommittee also agreed that fifteen minutes for presentations is not feasible. The Subcommittee stated they would like to see three or four presentations with the ability for deep dives, if necessary. Dr. Hovan stated he will draft the agenda and send a month before and would like feedback from the Subcommittee before it is finalized. The Subcommittee gave a brief overview of what they would like the agenda to encompass as follows:

Day One

Summary of RPAs with initial report

Reserve time for review of recommendations in the afternoon

1-2 deep dives

Day Two

Safety RPAs

3-5 presentations

Reserve time for discussions and recommendations in the afternoon

A reminder that the Summer/Fall Meeting is strategic focus

Meeting adjourned 5:30p.m.

REDAC Subcommittee on Airports Spring Meeting 2016 March 15-16 Action Items

Airport Planning – the Subcommittee agreed to close the recommendation from spring 2015 and discuss this further at the fall 2016 meeting. Mr. Oswald asked for the budget request to include the budget breakdown and be sent to him. He stated he will distribute to Subcommittee members and would like feedback. Mr. Oswald informed Subcommittee members the need for a deeper dive.

RPA Project Level Budget – the Subcommittee requested Dr. Hovan supply them with more detailed budgets for all projects, including Period of Performance.

Discussion on fall 2016 Meeting – Dr. Hovan agreed to draft and agenda and distribute one month prior to scheduled meeting. The Subcommittee agreed to review and send feedback before the agenda is finalized.

Remaining Action Items – Mr. Oswald informed attendees he would compile a list of items he felt needed priority attention and distribute to the Subcommittee members for review, feedback, and approval. If a conference call is needed to discuss he will send an invite via email in the near future.

List of Attendees

Day One:

FAA – WJHTC Jim Patterson David R. Brill Murphy Flynn Ryan King Karen Mercer Shelley Yak Eric Neiderman Michel Hovan Car Coleman Jeff Gagnon Benjamin Mahaffay Navneet Garg Peter Sparacino **CSRA** Bill Allen Jerry Connelly Eric Plyler Kent Hauser – NAPA Mike Maas – ALPA Rich Speir – ARA Halil Ceylan – Iowa State University John White – ALPA Doug Johnson – FAA AAS-100 Grege Cline – FAA AAS- 100 John Dermody – FAA AAS – 2- HQ Chris Oswald - ACI-NA Jaime Figueroa – FAA HQ Monte Symons – Montista Consultants Gary L. Mitchell – ACPA Steve Jangelis – ALPA Barb Busiek – NWARA - XNA Scott Marsh – Port Authority of NY&NJ Sarah Brammell – ERS Sarah Hubbard – Purdue University Shailesh Gongal – Massport

Day Two: FAA – WJHTC Holly Cyrus Peter Sparacino Shelley Yak Ryan King Robert Bassey Michel Hovan Eric Neiderman Keith Bagot Karen Mercer Xiaogong Lee CA Roundtree – Coleman Joe Breen David R. Brill Mike Maas – ALPA Rich Speir – ARA Shailesh Gongal – Massport Kent Hauser – NAPA Sarah Hubbard – Purdue University Gary L. Mitchell – ACPA Monte Symons – Montista Consultants John White – ALPA Jim White – ARA Jaime Figueroa – FAA – HQ Ralph Nicosia - Rusin - FAA ANE-610 Chris Oswald - ACI- NA John Dermody – FAA – HQ AAS – 2 – HQ Ralph Tamburro – Port Authority of NY& NJ Chris Bartone – Ohio University Halil Ceylan – Iowa State University Mike Hines – FAA – HQ Tom Cuddy - FAA - HQ Kent Duffy – FAA HQ Doug Johnson – FAA – AAS 100 – HQ Scott Marsh - Port Authority of NY& NJ Eduardo Juranovic – Boeing Barb Busiek – NWARA - XNA Sarah Brammell – ERS Steve Janguelis – ALPA Chris Seher – ARA Eric Plyler – CSRA Emily Stelzer – MITRE Larry VanHoy – LVH Aviation, LLC Katrina Warren - Zodiac Arresting System

Research, Engineering and Development Advisory Committee PPT Briefing to Sub-committee on Airports: March 15 – March 16 - 2016

Building 296 Conference Room

DAY 1 – March 15, 2016

12:30 pm	Mr. Christopher Oswald ACI-NA, Subcommittee Chairperson	Introduction
12:45 pm	Ms. Shelley Yak, FAA Technical Center Director	William J. Hughes Technical Center Updates
1:00 pm	Mr. Jeff Gagnon, Mr. John Dermody and Christopher Oswald	Plaque Dedication to Mr. Jeff Rapol
1:30 pm	Dr. Michel Hovan Airports Technology R&D Branch Manager	Welcome New Members Budget Updates
1:45 am	Mr. John Dermody Deputy Director, FAA Office of Airport Safety and Standards, AAS-2	AAS-100/HQ Update
2:00 pm	Subcommittee Members and Others	Review of REDAC Recommendations
2:30 pm	Break	
2:45 pm	Mr. Jeffrey Gagnon	2016 Pavement Projects + Plans for FY-17-18
3:00 pm	Mr. Ben Mahaffay	Heated Pavements
3:15 pm	Dr. Navneet Garg	National Airport Pavement Materials and Research Center
3:30 pm	Mr. Murphy Flynn	New R&D Facilities Update
3:45 pm	Dr. Navneet Garg	Full Scale Testing – Perpetual Pavement Update
4:00 pm	Dr. David Brill	Full Scale Testing – Overload Update
4:15 pm	Mr. Al Larkin	Pavement Roughness
4:30 pm	Adjourn	

6:00 pm Hors D'oeuvres at Eric's Beach House – All are invited

DAY 2 -March 16

8:30 am	Mr. Ryan King Acting Airport Safety R&D Section Manager	2016 Safety Projects + Plans for FY-17-18
8:45 am	Mr. Robert Bassey	Research Taxiway Aeromacs Low Cost Ground Surveillance Radar
9:15 am	Mr. Ralph Tamburro	PANYNJ/Mitre Low Cost Optical System
9:35 am	Ms. Lauren Vitagliano	Airport Noise Safety Database RIM
10:00 am	Mr. Don Gallagher /Robert Bassey	Rumble Strips LED Projects
10:15 am	Break	
10:30 am	Mr. Nick Subbotin	Arrestor Systems
10:50 am	Ms. Lauren Collins and APP	Airport Planning and Design
11:20 am	Dr. John Cavolowsky	NASA updates (Webex – Phone)
11:40 am	Mr. Keith Bagot	ARFF Program Updates
12:00 pm	Lunch	
1:00 pm	Mr. Joe Breen	Trapezoidal Groove Aircraft Braking In-Pavement Light Bolt Frangibility
2:00 pm	Dr. Jim Hileman/Mr. Ryan King	Airport Environmental Research
2:30 pm	Mr. Jim Patterson	Updates on UAS
3:00 pm	Sub-Committee members	Recommendations of the day
3:30 pm	Adjourn	