REDAC Subcommittee on Airports | MINUTES

Meeting date: September 6-7, 2023

Meeting location: Hybrid meeting (FAA William J. Hughes Technical Center & Zoom)

Purpose: To provide advice and recommendations to the FAA on its airport technology research and development program.

Facilitator / Chair: Chris Oswald

Note taker: Alex Tsalyuk

Timekeeper: Chris Oswald

DAY 1 – September 6, 2023

Presentations 1 & 2 Introduction & Opening Remarks **| Presenter** Chris Oswald & Shelley Yak

In the Research Engineering and Development Advisory Committee (REDAC) Subcommittee on Airports meeting, Shelley Yak opened by reflecting on the committee's evolving, forward-leaning agenda over the past eight years. She discussed expectations for the Fiscal Year 2024 budget and expressed hope for another 5-year reauthorization of Federal Aviation Administration (FAA) programs. Ms. Yak also revealed plans for FAA employees to return to onsite work for three days a week, possibly with mandatory core hours on Wednesdays. She highlighted the first Advanced Air Mobility (AAM) Summit held in August and the FAA's "crawl, walk, run" approach to integrating emerging technologies like electric vertical takeoff and landing aircraft (eVTOLs) and unmanned aircraft systems (UAS).

Ms. Yak emphasized the importance of clear messaging about the value and impact of FAA research to stakeholders like Congress and welcomed input on research gaps and partnership opportunities for Fiscal Year 2026 budget planning. Chris Oswald asked for specific feedback that REDAC could provide, and Ms. Yak expressed interest in hearing about opportunities for partnerships and any gaps in the current research portfolio. John Dermody inquired about potential synergies with other partners, including academia and industry, while Jim Layton was interested in any gaps in their research and mentioned possible gaps in lab capabilities related to sustainability and resiliency.

Presentation 3 FAA Office of Airports (ARP) Update **| Presenter** John Dermody

John Dermody discussed the ongoing work on vertiport design standards, mentioning that interim guidance was released in September 2022. Operational testing is underway to ensure the standards align with modeling efforts.

Kudos were given to Keith Bagot and the Aircraft Rescue & Fire Fighting (ARFF) team for their work on the Military Performance Specifications (MILSPEC) for Fluorine-Free Foam (F3), which was released ahead of schedule. The team also fulfilled a congressional requirement to develop an F3 transition plan by working with industry. Jim Layton was acknowledged for his role in advancing various projects.

Mr. Dermody also touched on strategic planning, emphasizing the need to align with Department of Transportation (DOT) and FAA priorities, including embodied carbon and sustainability at airports. Advances in solar lighting and artificial intelligence for smart airports were mentioned.

The budget is stable, with an enacted budget of about $40 million, approximately half of which is allocated to pavement and the other half to safety. For Fiscal Year 2024, similar funding levels are expected. Mr. Dermody concluded by emphasizing the need for additional resources to advance ongoing and future projects.

Presentation 4 Airport Technology Program Update **| Presenter** Jim Layton

Jim Layton began by introducing a 2-minute and 30-second video, included in his presentation, which focuses on sustainability and resiliency. He emphasized how the content and multimedia format aligns with the agency's strategic goals.

Mr. Layton provided an overview of the organizational structure. He highlighted the contributions of section managers Murphy Flynn on pavement research, Ryan King on safety, and Jim Patterson on detail to Section 383. Mr. Layton praised the passion and dedication of the team and acknowledged the support from Shelley Yak, John Dermody, and Shannetta Griffin, Associate Administrator for Airports, who visited the team last week. New team members Dr. Dan Offenbacker and Sean Van Dongen were introduced, and special thanks were given to Mr. Flynn for lending a pavement section position/FTE to support emerging entrants.

On the topic of facilities, Mr. Layton thanked Mr. Flynn for his contributions and mentioned planned facilities like a materials lab and a helipad repair project at Atlantic City International Airport (ACY), which will also support vertiport work. He then discussed updates to the Strategic Outlook for Research (SOR) chart, stating that environmental testing and pavement research have moved up in priority. 'Mr. Layton noted the focus on infrastructure, airport guidance, AAM, and emerging entrants, as well as safety research led by Ryan King and his team.

Mr. Layton emphasized the importance of aligning their work with the strategic goals of the DOT and the FAA. He mentioned the 2022-2026 plan under sustainability, which aims to substantially reduce greenhouse gas emissions and pollution. Upcoming presentations from Mr. Flynn and Lauren Vitagliano on sustainability were noted to align perfectly with these strategic goals. He also highlighted the team's global leadership, mentioning presentations given around the world on various topics.

Recent achievements include the publication of four safety and nine pavement reports. The vertiport design standards team was acknowledged for winning an award. Mr. Flynn added that

they are in the process of rebuilding their website to make it more accessible and understandable to the general public. Mr. Oswald offered to provide a focus group for the website if needed.

Presentation 5 Review of Outstanding REDAC Recommendations **| Presenters** Subcommittee Members and FAA

Jim Patterson opened the discussion by highlighting that the file containing all REDAC recommendations has expanded to 117 pages. He focused on the draft findings from the winter 2023 meeting. The first finding, titled "Strategic Outlook for Aviation Research (SOAR)," was well-received by the Subcommittee. They appreciated the overview provided by the Branch staff and suggested that the FAA should prioritize research in green pavement technologies, including the use of recycled pavements and carbon capture technologies. Additionally, they recommended focusing on standards for automated and autonomous ground vehicle operations on the airside.

The second finding discussed was about the Aircraft Rescue and Fire Fighting (ARFF) Advisory Group. Mr. Patterson noted the increased urgency in transitioning from Aqueous Film Forming Foam (AFFF) to Fluorine-Free Foams (F3), especially after the Department of Defense published the MilSpec for F3. The Subcommittee recommended that the FAA continue to engage with the ARFF Advisory Group to facilitate this transition. Mr. Oswald added a suggestion that direct firefighter representation in the ARFF Advisory Group could be beneficial for achieving similar goals. Scott Marsh inquired about any airports that have transitioned to F3, and Mr. Oswald confirmed that none have transitioned yet.

Presentation 6 REDAC Membership & Emerging Research Needs**| Presenter** Chris Oswald

Chris Oswald opened the session by discussing the REDAC revitalization process and the need for new committee members with expertise in vertiport infrastructure and firefighting. He highlighted the ongoing vetting process for new members, which now falls under the FAA's jurisdiction. Mr. Oswald also touched on the importance of having a diverse committee that can provide a broad range of insights, particularly as the FAA navigates new and emerging technologies. He mentioned that while there is no fixed number of seats on the committee, the focus is on filling the existing gaps, especially in areas like vertiport infrastructure and firefighting.

Chinita Roundtree-Coleman elaborated on the administrative aspects of the REDAC revitalization. She explained that potential members are currently being vetted through the FAA's Office of Ethics and that the rules and policies governing the committee are likely to change. She also mentioned that a special government employee would be required to provide a financial disclosure statement and take a yearly ethics course. She emphasized that while the FAA is now the authorizing entity for the committee, the information still needs to move forward to the White House for approval.

Mr. Oswald shifted the focus to the research needs and emerging technologies in the aviation sector. He mentioned that there is strong representation in pavement research but saw the need for more voices in areas like autonomous vehicles on airports and hydrogen energy solutions. Gary Mitchell suggested that the committee should have a document outlining the process for member rotation, especially for those considering stepping down in the next few years. Mr. Oswald agreed, stating that anyone thinking about rotating should give around a year's notice for smooth transition.

In the discussion, John Dermody mentioned the pathways for emerging technology certification, including one through the Office of Next Gen (ANG) and their concept evaluation group, leading to cooperative research development agreements (CRDAs) with vendor-agnostic standards. ARP primarily focuses on certifying lighting. Chris Oswald suggested a progression for airside autonomous vehicles similar to UAS, including Beyond Line of Sight (BLOS) operations. Keri Lyons highlighted increased collaboration between the Office of Airport Safety and Standards (AAS) and the Air Traffic Organization (ATO). Mr. Oswald also mentioned third-party support for autonomous vehicle deployment, focusing on electric battery challenges and fire protection on the airside. Scott Marsh emphasized the importance of providing power for electric vehicles and the need for regulations, and Keri Lyons noted that addressing infrastructure goes beyond the FAA's scope, involving Department of Energy (DOE) and utilities. John Dermody stressed the growing demand for battery charging operators, and Scott Marsh used an analogy, comparing adding charging stations to adding McDonald's to the power grid, emphasizing infrastructure significance. Mr. Oswald noted the need to address various policy questions in this context.

The discussion concluded with an open forum on various research topics, from the use of autonomous vehicles to the challenges with electric batteries. Mr. Oswald emphasized the need for policy discussions to address these emerging technologies, especially as they become more integrated into airport operations. He also mentioned that the DOE is focused on the electric vehicle side of things and that there are many policy questions that still need to be resolved. The session ended with Mr. Oswald reiterating the importance of collaboration and open communication among all stakeholders to navigate the complexities of modern airport operations.

Presentation 7 Airport Cooperative Research Program (ACRP) Update **| Presenter** Matt Griffin

Matt Griffin provided an in-depth update on the Airport Cooperative Research Program (ACRP), beginning with a focus on future electrical demands. The project has been divided into two phases, initiated this past spring, with an initial planning guide expected to be released soon. He also mentioned that a meeting with their oversight committee occurred at the end of July, and all research projects are expected to be published before Christmas.

For FY24, several research projects are in the pipeline. A general project on automation aims to explore avenues for airports to adopt automated technologies. Another project will delve into seismic resilience for horizontal infrastructure. Mr. Griffin also highlighted the first round of

funded insight events since the COVID-19 pandemic. These events will cover a range of topics, from DEIA (Diversity, Equity, Inclusion, and Accessibility) and racism, to the future of aviation, and airport finance. A publication discussing on-demand aviation is expected in the coming weeks.

Mr. Griffin also discussed recent publications and upcoming events. In 2018-19, the ACRP looked at environmental products to determine what needs updates. The outcome of that phase 1 process was recently published, focusing on prioritization in the human resources field. Now, attention is being turned to the airport operations field. He mentioned that Request for Proposals (RFPs) should be coming out soon and highlighted the release of ACRP 255 and ACRP 253, which also reference lessons learned from the COVID-19 pandemic.

In closing, Mr. Griffin opened the floor for questions and suggestions, particularly concerning FY24 research projects. He encouraged attendees to share ideas or topics that resonate with their organizations, emphasizing the program's commitment to addressing current and future challenges in the aviation industry.

Presentation 8 Overview of Safety Projects Underway**| Presenter** Ryan King

Ryan King presented an update on various safety research initiatives. He emphasized the importance of data-driven approaches, specifically mentioning the Airport Safety Database and the Wildlife Strike Database. The latter has recorded about 12,000 strikes in 2023, a figure that is expected to match or exceed previous years. Dr. Wesley Major clarified that the increase in reported strikes is likely due to enhanced reporting methods rather than an actual uptick in incidents.

Discussing new avenues for data collection, Mr. King mentioned the use of Automatic Dependent Surveillance–Broadcast (ADS-B) systems. These systems will enable the collection of new types of data that were previously unattainable. In the realm of wildlife research, Mr. King presented an ongoing project with the U.S. Department of Agriculture (USDA) focused on understanding how various bird species react to different light sources. The aim is to develop strategies that either attract or repel birds, thereby mitigating risks.

Mr. King also provided updates on the paint marking research project, which is currently in its analysis phase. The team is consolidating data from various field projects into a single report, expected to be complete by November. The final report is slated for release next year. He also touched on the advancements in Foreign Object Debris (FOD) and wildlife detection technologies, stating that as these technologies improve, they become increasingly viable for airport applications. The team is currently conducting literature research and gap analysis to identify the next steps in research and testing.

During the Q&A, Scott Marsh raised a specific concern about the application methods for glass beads used in airport paint marking. He questioned whether the research accounts for the precision required in the application process, given that traditional methods may no longer be suitable. Mr. King acknowledged the concern, indicating it could be an area for future research.

Presentation 9 Light Tower & Solar Lighting Research**| Presenters** Darian Byrd & Jeremy Casey

Jeremy and Darian presented updates on several ongoing research projects. They began by discussing the evaluation of light towers, which commenced in 2019. The primary aim of this project is to assess the stability, ease of operation, and compliance with FAA requirements of these towers. The timeline for this endeavor includes the issuance of a statement of work (SOW) to a contractor, the approval of a test plan, and an upcoming 180-day observation phase. The final report for this project is expected in May 2024. Notable achievements so far include modifications to the tower foundations and the execution of the SOW by CTR. These towers are considered suitable for approach lighting systems.

The second project they addressed focused on solar-powered lighting, initiated in late 2019. The purpose of this research is to provide airports, particularly general aviation (GA) airports, with alternative lighting solutions. This project involves evaluating the performance, durability, and cost-effectiveness of these systems in various geographical regions, including Cape May New Jersey, New York, Arizona, and Washington state. Darian highlighted the importance of performance during the winter months and the challenges faced, such as missed radio commands and low voltage disconnect anomalies. He emphasized the need for regular battery maintenance and the evaluation of different control methods, such as photocell control vs. pilot radio control. The research team is also planning updates for the program in 2023.

Darian discussed the research on lighted X markings on runways. This research was initiated in response to an NTSB recommendation and involved investigating the effectiveness of variations in lighted X designs. Findings from scale model testing in a lab setting were presented, with varying intensities and sizes of lighted Xs being evaluated. It was noted that different intensities had different impacts on visibility, with daytime conditions showing different results than nighttime conditions. LED lights generally performed better, and there were size comparisons between 20ft and 28ft designs. The research is now moving into the analysis phase.

Presentation 10 Alternative Aircraft Fire-Fighting Agent Research**| Presenter** Keith Bagot

Keith Bagot presented an update on the Alternative Aircraft Fire-Fighting Agent Research, focusing on the need to replace Per- and Polyfluoroalkyl Substances (PFAS) in fire-fighting foams due to their toxic and persistent nature. The research has explored around 60 different fluorine-free formulations and conducted over 850 fire tests. Various discharge technologies were tested, including different nozzles and chemical options. Compressed Air Foam Systems (CAFS) provided the best foam blanket, closely followed by foam tubes. However, fire reignition was more commonly observed with foam tubes.

Mixed agent application was another area of focus. Unlike Aqueous Film-Forming Foam (AFFF), fluorine-free foams (FFFs) have different formulations and cannot be mixed. Tests were conducted to see the effects of using multiple agents, including AFFF and FFF, or two different

FFFs. The results showed a lot of variability but did not indicate that using multiple agents adversely affected fire-fighting ability.

Regarding the transition from AFFF to FFF, Mr. Bagot mentioned that both products would be available for some time. Manufacturers are announcing order stops for some products, which will affect the transition period. States have diverse requirements on PFAS, and the FAA is focusing on transition planning while additional research is being conducted. Training materials for the transition are nearly complete, and webinars will be conducted to educate the industry.

In the Q&A session, Mr. Bagot mentioned that there is not enough data yet on water additives for extinguishing lithium fires. He also stated that the FAA is continuing to look at new technologies to improve fire-fighting agents and that the transition to FFF is being pushed by both industry and states, even though the FAA is not yet involved.

Presentation 11 F3 Transition Q&A**| Presenter** Subcommittee & Office of Airport Safety and Standards (AAS) Personnel

During the F3 Transition Q&A session, Keith Bagot addressed the ongoing efforts by various companies to develop better F3 formulations. He expressed optimism about the industry's push to create a product that could match the effectiveness of AFFF on a 1:1 basis. Mr. Bagot also mentioned that current testing with prototypes involves short batch tests conducted a few days a week. These tests are particularly beneficial for smaller companies that may not have the resources to approach larger testing facilities like the Naval Research Laboratory (NRL) without some level of confidence in their product's performance.

Presentation 12 Emerging Entrants Update**| Presenter** Keri Lyons

In the Emerging Entrants Update, Keri Lyons discussed the new division within the Office of Airports, which is focused on emerging technologies and their integration into the aviation ecosystem. The division is currently supported by both permanent staff and staff from field and regional offices and is actively involved in projects like developing UAS and AAM guidance.

Ms. Lyons highlighted the daily challenges they face, including the expected certification of the first AAM aircraft by 2025 and the transition from piloted to fully automated aircraft. She also mentioned cross-agency efforts, like Innovate28, aimed at integrating AAM by the year 2028. Initial operating locations for AAM technologies are expected to be in areas with fair weather conditions, including Los Angeles, the Bay Area, and south Florida.

The DOT-led AAM interagency working group is identifying key issues such as security, power, and infrastructure. Electrification might fall under the Department of Energy's purview, while other departments like Labor and Education may also need to get involved. She emphasized the need for local governments to establish zoning and licensing requirements for new technologies like vertiports.

The division is supporting the development of a performance-based advisory circular on vertiport design and is also working on UAS integration.

Hydrogen-powered aircraft are also on the radar, especially with manufacturers on the West Coast actively testing these technologies. Ms. Lyons mentioned that they have developed a tiger team to provide technical assistance to FAA office processing proposed hydrogen storage on airports. Electric aircraft, which are not limited to AAM, are also part of the division's focus. She mentioned that manufacturers are planning electric charging stations at various airports.

The division is also exploring the concept of drone ports and aiming to provide comprehensive guidance to airports on rocket engine testing facilities.

Ms. Lyons concluded by mentioning their efforts to disseminate information through their newly launched "New and Emerging Entrants on Airports" webpage, with more specialized pages in the pipeline.

Presentation 13 Vertiport Design Standards Research**| Presenter** William (Russ) Gorman

In Russ Gorman's presentation on Vertiport Design Standards Research, the focus was primarily on the challenges and opportunities presented by electric and hydrogen technologies. Mr. Gorman delved into an eVTOL electrification study that modeled different scenarios at four sites, revealing that current electrical grids are insufficient for the projected loads of these new technologies. He also discussed the risks associated with cybersecurity and electric hazards, emphasizing the need for comprehensive assessments to mitigate these risks. Operational testing is underway to understand the downwash, outwash, turn radius, and approach and departure profiles of these new types of aircraft.

The latter part of the presentation covered symbology testing for vertiports and an early-stage hydrogen infrastructure study. Different symbols for vertiports were evaluated for their effectiveness, and the tests will be expanded to include more pilots and different approach angles. On the hydrogen front, Mr. Gorman noted that the West Coast is a hot spot for hydrogen research. The study aims to understand the fueling requirements for hydrogen at different commercial sites, with the acknowledgment that hydrogen-powered airframes would likely have lower passenger capacities. Overall, the presentation underscored the multi-faceted challenges in developing vertiport standards, particularly in adapting to new and emerging technologies.

Presentation 14 UAS Applications & Drone Ports**| Presenter** Mike DiPilato

In Mike DiPilato's comprehensive presentation on UAS Applications & drone ports, he covered a wide range of topics, from obstruction analysis to wildlife dispersal. Mr. DiPilato emphasized the utility of drones in various airport operations, such as perimeter fence line inspections, ARFF live monitoring, and construction monitoring. He noted that drones offer higher-resolution imagery compared to traditional methods, making them valuable for small-scale applications. However,

he also cautioned that drones should supplement, not replace, existing procedures. For instance, drones can enhance situational awareness for first responders but are not a substitute for traditional methods. Reports on these applications are in various stages of completion, and some have already been published.

Mr. DiPilato also delved into the future of drone ports, outlining a two-phase research approach that includes a literature review and operational evaluations. He mentioned the ASDAP contract, under which this research is being conducted, and highlighted the timeline for the draft final report for phase one. The aim is to integrate UAS into the environment and improve infrastructure to facilitate that. He also touched on the potential for drone ports to be located at industrial sites, raising the question of whether companies like Amazon might need such facilities in the future. Mr. DiPilato's presentation offered a thorough overview of the current state and future prospects of UAS applications in airport operations.

Presentation 15 UAS Detection & Mitigation Research**| Presenter** Jim Patterson

The presentation focused on Section 383, which deals with UAS detection and mitigation technologies. The program timeline remains unchanged, with draft standards developed and on track for completion. However, some of the technologies intended for testing were sent to Ukraine and were damaged or destroyed. The testing is divided between the presenting team and their colleagues at the Office of Security and Hazardous Materials Safety (ASH). They have recorded about 1,600 flights for mitigation purposes and will wrap up testing on four technologies by the end of September.

The presentation then delved into the specifics of vendor two, which had two radar systems and one RF (Radio Frequency) system. They have been testing with the DJI M600 drone platform, focusing on the Key Performance Indicator (KPI) of position accuracy. Three types of errors were discussed: cross-track error (left or right), along-track error (forward or back), and vertical error. The findings indicate that within each radar technology type, the difference in errors is negligible. However, when comparing radar to RF, the difference is significant. Radar struggles with altitude but excels in horizontal error, while RF performs well in vertical error. Overall, the presentation provided a detailed overview of the current status and findings of UAS detection and mitigation technologies.

Presentation 16 Airport Planning Update**| Presenter** Lauren Vitagliano & Kent Duffy

Lauren Vitagliano provided a comprehensive overview of various topics related to airport planning and noise management. She discussed the ongoing sleep study project aimed at quantifying the impact of aircraft noise on sleep, which is nearing its data collection phase. The team has sent out 29,000 recruitment surveys and is close to gathering 2,000 participants. She also touched on the efforts to standardize aviation noise messaging, revealing that interviews with airports are almost complete and field staff will be next. Another noteworthy project she mentioned is a new collaboration with Ohio State University to explore how the FAA can have

more influence on local land use decisions around airports, especially in the context of new noise abatement thresholds.

On the topic of airport resiliency, Ms. Vitagliano highlighted the development of risk-based recommendations for how the FAA and airport operators can address the impacts of climate change and severe weather. The team has finalized the Airport Resilience Analysis Framework (ARAF) framework for case studies and has put together climate exposure reports for each airport they worked with. They identified six hazard areas, including coastal flooding and wildfires, and are working on making these frameworks into publicly accessible tools. Guidance on this is expected to be released around 2025.

Kent Duffy focused on various tools and databases that are being developed or updated. He discussed the FAA climate inputs for runway length, which consider future temperature and precipitation trends. He also mentioned the REDIM/Aircraft Characteristics Database, which is fully synchronized with air traffic data and covers a large number of operations. Mr. Duffy emphasized the need for updated data, as much of the information currently used in models is outdated, dating back to the 1970s.

One of the more challenging projects Mr. Duffy discussed was the Runway Length Statistical Evaluation Tool (RWLSET) runway length statistical evaluation tool. The initial approach used Eurocontrol BADA drag coefficients, but this was found to be limiting. The team is now working with the Society of Aircraft Performance and Operations Engineers to develop a revised approach that doesn't rely on Base of Aircraft Data (BADA). They are starting to see good correlation between takeoff distance and field length across different aircraft models.

Lastly, Mr. Duffy touched upon the complexities of gate ramp efficiency modeling. The team has been trying to understand how many penalty boxes and reserve gates are recommended for large hub airports, especially as delays are increasingly absorbed on the airport surface rather than in the air. However, the data on gate usage and surface decisions is noisy, making it difficult to draw conclusive results. Ms. Vitagliano and Mr. Duffy provided a deep dive into the FAA's ongoing projects and future plans, showcasing a multi-faceted approach to improving airport operations and planning.

DAY 2 – September 7, 2023

Presentation 1 Airport Pavement R&D Program Update **| Presenter** Murphy Flynn

Murphy Flynn provided an update on the Airport Pavement R&D Program, touching on staffing changes, construction cycles, and contract timelines. He mentioned that some of his open positions are being loaned to safety for UAS efforts. He introduced Pavement Section new hire, Dr. Dan Offenbacker. Mr. Flynn also discussed the completion of construction cycles and the ongoing efforts to make the lab manager a federal position. A significant part of the update was about making the pavement website more accessible to the general public, including the production of videos to showcase ATR's work on pavement.

Mr. Flynn highlighted the team's recent accomplishments, noting that it's been a busy year with staff attending numerous conferences. He mentioned that they are working through a lot of reports, with Dr. Navneet Garg taking the lead on this front. The realignment of programs was also discussed, with engineered material arresting system (EMAS) now falling under Pavements as it becomes more of a materials issue. He also mentioned aiding a Taiwanese delegation on procuring EMAS materials.

On the contractual side, Mr. Flynn revealed that their pavement consultant contract is set to go until 2024, after which a new 5-year contract will be put in place. He mentioned that they are exploring collaboration with the U.S. Army Corps of Engineers for traffic analysis and that a new contract is currently under legal review. Mr. Flynn also touched on the issue of National Airport Pavement Association (NAPA) funding being delayed due to a lack of available lawyers but expects it to be awarded by the end of the fiscal year.

Infrastructure needs were also addressed, including the National Airport Pavement and Materials Research Center (NAPMRC) roof requiring repairs costing around $60,000 and the procurement of a power conditioner to protect critical components. Mr. Flynn concluded by mentioning ongoing pavement research at Cape May Research Taxiway, with Applied Research Associates (ARA) tasked with providing an assessment. Overall, the presentation offered a comprehensive look at the current state and future directions of the Airport Pavement R&D Program.

Presentation 2 Section 744 Update – Airport Concrete Pavement Technology Program (ACPTP)**| Presenter** Peter Taylor

Peter Taylor provided an update on the Section 744 ACPTP program, emphasizing that funding for 2023 has been secured. The program operates under the guidance of a "nation group," which serves as an advisory board for each project. The coordination group is also in place to identify issues, recommend priorities, and review findings. Each project has a technical panel responsible for defining the scope, reviewing resources, and selecting the best proposals.

The program has several high-priority projects. The first aims to mitigate Alkali-Silica Reaction (ASR) by developing new test methods for aggregates and mixtures, taking a chemical approach. Another project focuses on adapting highway pavement mixtures for airfield use. The program is

also looking into best practices for rapid rehabilitation using current technology. Other projects include developing a quality control manual, exploring rubber removal techniques, and studying the effects of diamond grinding on pavement.

Additional projects are in the pipeline, such as developing thin concrete airfield pavements for light aircraft and examining the performance of existing runways. Another project aims to provide guidance on whether to start/stop or slow down paving machines if concrete deliveries are insufficient. A particularly timely project focuses on flooding resilience, aiming to design systems that minimize impacts and quickly return to service after flooding.

The program is also considering future projects in areas like fatigue/stress management and new pavement materials. Several tech transfers are in development, including those related to limestone cements, strength measurements, and sustainability methods. Despite receiving 45 proposals, the program faces the challenge of managing all these initiatives effectively. Overall, the ACPTP program is making significant strides in concrete pavement research and technology.

Presentation 3 Section 744 Update – Airport Asphalt Pavement Technology Program (AAPTP)**|** **Presenter** Brett Williams

Brett Williams presented an update on the Section 744 AAPTP program, which closely mirrors the ACPTP program but focuses on asphalt pavements instead of concrete. The program is overseen by a Program Coordination Group (PCG) that provides feedback and direction. The first project aims to update the asphalt mixture paving handbook from 2000, with an accompanying interactive website.

Several other projects are underway, including guidance on the selection of asphalt binder grades, balanced mix design rutting tests, and balanced mix design cracking tests. The rutting tests project has expanded its scope to include balanced mix design and specifications. The cracking tests project is a three-year initiative focused on colder climates. Another project aims to improve the performance of longitudinal joints in airfield asphalt pavements, exploring new technologies and best practices. The program is also investigating the mitigation of plastic flow and delamination at high-speed exits, with ongoing finite element analysis work.

Additional projects include the feasibility of using Cold Central Plant Recycling (CCPR) asphalt mixtures for airports, validation of gyrations for Superpave gyratory compactor, and the use of Recycled Asphalt Pavement (RAP) in P-401 mixtures. The latter aims to optimize the use of RAP for economic and carbon reduction benefits. A shelved project focused on a Quality Control Data Submittal System, which was reallocated to develop an Asphalt Airfield Video Series aimed at training practitioners.

Mr. Flynn contributed at various points, discussing logistical and environmental challenges for some projects, such as the CCPR feasibility study. He also mentioned the need for more in-depth conversations with environmental points of contact to make certain projects happen. The presentation concluded with a discussion on the relationship between the program and the

Technical Center, emphasizing the need for broader perspectives and validation testing. Overall, the AAPTP program is making significant strides in asphalt pavement research and technology.

Presentation 4 Sustainable Pavement Update**| Presenter** Murphy Flynn

Murphy Flynn provided an update on Sustainable Pavement, focusing on two key areas: PANDA-AP (Pavement Analysis tool for Non-linear Damage Assessment) and lifecycle assessments. A significant portion of the ARP budget is allocated to pavements, and even incremental changes can lead to substantial cost shifts. One of the challenges is the increasing weight and pressure on asphalt pavements due to trends in commercial aviation, such as lengthening fuselages.

The Office of the Secretary of Transportation (OST) has been working on embodied carbon to reduce greenhouse gas emissions, focusing on the final disposition of reused and recycled materials. Current projects are exploring warm mix technology combined with Recycled Asphalt Pavement (RAP) to generate performance data on these materials. These projects aim to quantify the benefits of different warm mix additives and assess their impact on rutting and cracking thresholds. The work has led to several peer-reviewed papers, with one winning an award at an American Society of Civil Engineers (ASCE) international conference.

PANDA-AP is a pavement analysis tool using non-linear damage assessment for airports. The goal is to conduct lab tests to compare the performance characteristics of conventional and greener materials which can then be input into PANDA-AP. These tests will help in developing specifications and making better material choices. Lifecycle assessments are also underway to create a 'nutrition label' for products, detailing their environmental impact. The end goal is to develop a web-based tool for this, which the Federal Highways Administration (FHWA) also plans to adapt for highway use.

The long-term vision includes integrating quality control data into a QA database, which can then be analyzed for future bids using the PANDA tool. This is part of a broader initiative to shorten the cycle of implementing sustainable practices in pavement construction. Other sustainable pavement initiatives include collaboration with the French on biobinders and exploring the concept of perpetual pavement, which involves using higher quality materials for the base layer so that only the top layer needs to be replaced.

Overall, the focus is on making sustainable choices in pavement materials and construction methods, and these initiatives are gaining traction within the agency. The next steps involve moving these sustainable practices from the research phase to implementation.

Presentation 5 Software Integration **| Presenter** Qingge Jia

Qingge Jia provided an update on PAVEAIR and software integration, all designed to align with AC150/5380-7B. He began by highlighting the advancements in FAA PAVEAIR, a web-based Airport Pavement Management System that is publicly available and free to use. The system has seen significant growth, now hosting 1759 databases and boasting 3400 registered users. It

offers multi-language support, including English, French, Spanish, and Portuguese, and provides both English imperial and metric units. One of the key enhancements is in the Maintenance & Rehabilitation (M&R) features, which now allow for a more nuanced comparison of cost and condition in both tabular and graphical formats.

Moving on to software integration, Mr. Jia emphasized the critical need for keeping the FAA's suite of software programs up to date. Developed by the pavement group since 1996, these programs have evolved significantly, and there's a pressing need to upgrade them to modern frameworks, technologies, and operating systems. The objective is not just maintenance but also making the software easy to understand and user-friendly, adhering to industry best practices. A significant part of this effort is aimed at establishing seamless communication between different FAA software programs like PAVEAIR and FAARFIELD. This interoperability will allow for smooth data transfer and will enable the creation of templates for each format from Falling Weight Deflectometer (FWD) manufacturers.

Mr. Jia also touched upon the updates to the branch website, which serves as a one-stop resource for publications, news, software programs, research plans, and databases. The website has been experiencing high traffic, with around 300,000 visits per month. A new contract to support the website is under legal review.

Presentation 6 Pavement Sensors Advancements**| Presenter** Wilfredo Villafane

Wilfredo Villafane opened his presentation by emphasizing the critical role of sensors in pavement research. He explained that sensors like strain gauges, pressure cells, and eddy current sensors are indispensable for measuring various pavement responses, such as strains, stresses, and moisture levels. These sensors provide a microscopic view into the pavement's behavior, allowing for early detection of potential issues. The data collected is then fed into mathematical models, which help in predicting pavement damage and assessing its remaining lifespan.

Mr. Villafane delved into the complexities and considerations involved in sensor selection. He noted that sensors must be able to withstand extreme conditions, such as the high temperatures encountered during asphalt laying. The presentation covered a wide range of sensors, each with its unique applications and challenges. For instance, the multi-depth deflectometer, while effective, is bulky and requires a 6-foot hole in the pavement for installation. On the other hand, the Smart Rock Sensor, designed for monitoring movement at the Hot Mix Asphalt (HMA) layer, faced issues with battery life. Villafane also mentioned the ovalization sensor, developed in collaboration with the French civil aviation center, and the ultrasonic crack detection sensor, which unfortunately did not meet expectations.

The talk also highlighted the use of specialized, often custom-developed sensors like the coil sensor and fiber optics strain sensor. These sensors are not readily available off-the-shelf and often require custom development or assembly. Mr. Villafane mentioned collaborations with external organizations like New Zealand's asphalt test facility, Captive, for the development of these specialized sensors. He also spoke about the team's ongoing efforts to explore

partnerships with universities and the private sector to develop innovative sensors capable of detecting initial cracks and other early signs of pavement deterioration.

Sensors are strategically placed across different layers of the pavement structure, from the surface layers of asphalt or concrete down to the base and sub-base layers made of aggregates. Mr. Villafane discussed the use of unique sensors like the piezo-electric energy accumulator, bender element sensor, and coda wave interferometry sensor, which are not readily available and often require custom development. These sensors serve not only to improve existing models like BAKFAA and FAARFIELD, but also to develop better design models that can resist the impact of aircraft loads and environmental effects. The ultimate goal is to use the principles learned through sensor data to prolong the life of the pavement inventory in the most cost-effective way.

Presentation 7 Pavement Roughness Research**| Presenter** Mat Brynick

Mat Brynick began his presentation by highlighting a critical issue that pilots have been vocal about: the roughness of runways due to multiple events. To address this, his team developed a new method using publicly available software and three types of tools: a 12-foot rolling straightedge (Type 1), PI-25 (Type 2), and PI-100 (Type 3). After examining 70 airport runways, they were able to categorize them into those that were smooth and those requiring maintenance. The team used ProFAA software to calculate the Boeing Bump Index (BBI), a standard measurement for roughness. Interestingly, the PI-100 tool was particularly effective in detecting multiple events of roughness that other tools had missed.

The new approach offers several advantages, including its applicability to both runways and taxiways. It also allows for the simulation of maintenance actions, providing practitioners with the ability to model and adjust until they achieve satisfactory conditions. However, Mr. Brynick pointed out existing limitations, such as the system only allows for the simulation of constant-speed taxiing and being restricted to five older aircraft types. He mentioned that APR software, capable of simulating variable speeds, could be a solution to this issue.

Looking to the future, Mr. Brynick discussed the potential for Phase 3 of the research. The aim is to add simulated takeoff and landing operations into the ProFAA software, requiring a new simulation button for users to select between different operations and aircraft types. He emphasized that to move forward, they would need specific information from airplane manufacturers. Mr. Brynick concluded by noting the global nature of the roughness issue, citing Hong Kong's airport as a particularly challenging case due to its construction on a fill site, leading to significant settling issues.

Presentation 8 CC-8 Update**| Presenter** Dr. Dan Offenbacker

Dr. Dan Offenbacker provided an update on Construction Cycle 8 (CC8), a long-running project focused on rigid pavement. Since joining the FAA in May, he has been actively involved in this research effort, which has three primary objectives. Firstly, the project examines the

performance of rigid overlays on deteriorated pavement. Secondly, it assesses joint performance comparatively. Lastly, it delves into the FAARFIELD design model, investigating the relationship between concrete strength and pavement thickness.

The project has reached significant milestones, including the completion of the overload tests, overlay tests and the joint comparison and strength/fatigue tests. The strength fatigue tests involved 12-inch slabs with a 650-psi flexural strength and 9-inch slabs with a 900-psi flexural strength. To induce cracks in some of the slabs, triangular wooden notches were incorporated at the base of the slabs, allowing the research team to monitor the time it took for the cracks to reach the surface.

An important discovery in this research is the trade-off between PCC (Portland Cement Concrete) thickness and PCC flexural strength. The team is now working on integrating this finding into the FAARFIELD model, which was originally designed with data that did not exceed 20,000 coverages. Their current focus is on understanding how PCC flexural strength can influence the overall design thickness. It was observed that subgrade strength significantly impacts the time it takes for the first PCC crack to appear. Interestingly, there was no significant time difference between 9-inch and 12-inch slabs to observe initial cracking, however the 12-inch slabs progressed across the entire slab almost immediately. Further analysis is needed to determine the factors contributing to this unexpected result.

The next phase of the project involves compiling post-traffic data and preparing a report. The team's goal is to share this data with universities for further research through the FAA ATR website, mirroring the approach taken in phases 1-3 of the project.

Presentation 9 Trapezoidal Grooving & Friction Program Update**| Presenter Dr.** Richard Ji

Dr. Richard Ji provided an update on two projects: the Trapezoidal Grooving Study and Continuous Friction Measurement.

The Trapezoidal Grooving Study aims to assess the viability of trapezoidal-shaped runways as an alternative to standard grooving. This research has been ongoing for a decade, motivated in part by the importance of wheel brake performance, especially in critical wet conditions. The FAA approved research into runway grooves in 2012, revealing the potential benefits of trapezoidal grooves, including improved water drainage, longevity, and integrity. To test these concepts, the project involves both laboratory testing, conducted through a collaboration with Rutgers University, and finite element modeling for pavement response simulation. The research is progressing through three phases, with the final phase focusing on wet condition testing on the simulated pavement surfaces with grooves in the laboratory platform, providing a final comparison between standard and trapezoidal grooves.

The Continuous Friction Measuring Equipment (CFME) and Smart Tire Sensors project seeks to objectively measure the friction coefficient to enhance airport authorities' confidence in friction measurements. Currently each CFME can report different friction values for the same surface. Friction measurements can be influenced by various factors, including tire rubber deformation,

slip ratio, pavement surface texture, water depth, surface contaminants, temperature, and speed. The project involves two phases: the first phase includes designing and fabricating a friction test platform and developing a physics-based contact model to predict friction from sensor readings. The second phase explores the feasibility and accuracy of pressure-based tire sensors for friction prediction under different surface conditions.

Additionally, Dr. Ji mentioned the Friction Program, which was interrupted by the pandemic but resumed in July. The primary goal is to make all equipment functional, certified, and calibrated. The program aims to collect data on friction and texture properties at Atlantic City International Airport (ACY) and Cape May Airport on a quarterly basis to maintain CFME operating expertise and equipment functionality. The Friction program will make use of the CFMEs and laboratory tests to gather friction data, contributing to the advancement of understanding and improving runway surface friction for safer landings and takeoffs.

Presentation 10 Subcommittee Findings & Recommendations **|**
Presenters Subcommittee Members

During the Subcommittee Findings & Recommendations session, the members discussed their recent approvals, including research related to "wheels on the ground" and autonomous vehicles. They expressed gratitude for the engagement with airports and subject matter experts, particularly those involved in ARFF and counter-UAS initiatives. The subcommittee hinted at potential connections between their work and sustainable systems, which they planned to explore further in the next meeting.

Additionally, they acknowledged the challenge and significance of sensor integration, although specific details were not provided during the session. The subcommittee also discussed the External Pavement Research Program, suggesting the need to summarize its key projects and historical context during an upcoming presentation in October. They emphasized the program's value and its reach beyond the FAA's own efforts. Finally, they mentioned strong congressional support, with 14 congressional sponsors expected to back their initiatives in an upcoming congress, highlighting the program's importance and impact.

Next Meetings – Location & Agenda Items TBD

- February 27 – 28, 2024
- July 30 – 31, 2024

Adjourned at 11:45 am on Thursday, September 7, 2023

Attachments (include meeting agenda and list of participants)

Minutes Attachment 1 – Meeting Agenda
Minutes Attachment 2 – Meeting Attendees
Minutes Attachment 3 – Definitions of Acronyms and Technical Terms

Hybrid Meeting: *The REDAC Meeting will be held in person at the William J. Hughes Technical Center in New Jersey. Attendees can also join virtually via Zoom.*

Day 1: September 6, 2023

Time	Session	Presenter
Introduction & Overview		
8:00 am - Arrive at Security Operations Center (SOC) + Transport to Building 296		
8:30 am	**1. Introduction**	Christopher Oswald ACI-NA, Subcommittee Chairperson
8:45 am	**2. Opening Remarks**	Shelly Yak Director, WJHTC
9:00 am	**3. HQ ARP Update**	John Dermody Director, FAA Airport Safety & Standards
9:15 am	**4. Airport Technology Program Update** ○ SOR Chart ○ Personnel Recruiting	Jim Layton Branch Manager, FAA Airport Technology Research
9:30 am	**5. Review of Outstanding REDAC Recommendations**	Subcommittee Members and FAA
10:00 am	**Break - 15 mins**	
10:15 am	**6. REDAC Membership/Subcommittee Representation & Emerging Research Needs Discussion**	Chris Oswald
11:00 am	**7. Airport Cooperative Research Program (ACRP) Update**	Matt Griffin Senior Program Officer, ACRP
Program Focus: Safety and Equity		
11:15 am	**8. Overview of Safety Projects Underway**	Ryan King Acting Manager, Airport Safety Research Section
11:30 am	**9. Light Tower, Lighted X, and Solar Lighting Research Update**	Darian Byrd & Jeremy Casey
12:00 pm	**10. Alternative Aircraft Fire-Fighting Agent Research Update**	Keith Bagot
12:15 pm	**11. F3 Transition Q&A**	Subcommittee & AAS Personnel
12:45 pm	**Lunch Break - 30 mins**	
1:15 pm	**12. Emerging Entrant Update**	Keri Lyons Emerging Entrants Division (AAS-200)
1:35 pm	**13. Vertiport Design Standards Research**	Russ Gorman
2:00 pm	**14. UAS Applications & Drone Ports**	Mike DiPilato
2:30 pm	**15. UAS Detection & Mitigation Research Update**	Jim Patterson
3:00 pm	**Break – 10 mins**	
Program Focus: Climate and Sustainability		
3:10 pm	**16. Airport Planning Update**	Lauren Vitagliano & Kent Duffy
3:55 pm	**Adjourn**	
5:45-7:00pm No Host Subcommittee Dinner (Location TBD)		

Day 2: September 7, 2023

Time	Session	Presenter
Program Focus: Infrastructure Transformation		
8:00 am - Arrive at Security Operations Center (SOC) + Transport to Building 296		
8:30 am	**1. Airport Pavement R&D Program Update**	Murphy Flynn Manager, Airport Pavement Research Section
9:00 am	**2. Section 744 Update – Airport Concrete Pavement Technology Program (ACPTP)**	Peter Taylor Director, National Concrete Pavement Technology Center
9:15 am	**3. Section 744 Update – Airport Asphalt Pavement Technology Program (AAPTP)**	Brett Williams Director, Engineering & Technical Support, National Asphalt Pavement Association
9:30 am	**4. Sustainable Pavement Update**	Murphy Flynn
10:00 am	**5. Software Integration**	Qingge Jia
10:15 am	**Break – 15 mins**	
10:30 am	**6. Pavement Sensors - Advancements & Challenges**	Wilfredo Villafane
10:50 am	**7. Pavement Roughness Research Update**	Mat Brynick
11:15 am	**8. CC-8 Update**	Dr. Dan Offenbacker
11:30 am	**9. National Airport Pavement Test Vehicle (NAPTV) Update** [Session postponed to the Spring 2024 SubCommittee meeting.]	Ryan Rutter
11:40 am	**10. Trapezoidal Grooving & Friction Program Update**	Dr. Richard Ji
11:55 pm	**Break – 5 mins**	
Program Focus: Conclusions		
12:00 pm	**11. Subcommittee Findings & Recommendations**	Subcommittee Members
12:30 pm	**Adjourn – Subcommittee Working Lunch**	

REDAC Subcommittee on Airports | Attendees

Meeting date & time: September 6-7, 2023

Meeting location: Hybrid meeting (FAA William J. Hughes Technical Center & Zoom)

DAY 1 – September 6, 2023

Name	Organization	Location
Alan Strasser	FAA	Zoom
Alex Tsalyuk	Avyance	Both
Alexandra Papantoniou	FAA	Zoom
Andrea Stevenson	ARA	Zoom
Andrew Sousa	ALPA	Tech Center
Aseem Anand		Zoom
Brett Williams	National Asphalt Pavement Association	Tech Center
Brian Hilburn		Zoom
Chinita Roundtree-Coleman	FAA	Tech Center
Chris Oswald	Airports Council International - NA	Both
Chris Sohov	ARA/NARTP	Tech Center
Dan Offenbacker	FAA	Zoom
Darian Byrd	FAA	Tech Center
Dave Perry	FAA	Zoom
Dominique Khan	Avyance	Both
Drew Goldsmith	FAA	Zoom
Elliott Black	FAA	Zoom
Eric Plyer	ARA	Tech Center
Garrison Canter	FAA	Both
Gary L. Mitchell	ACPA	Tech Center
Hua Shen	EIT	Zoom
Janine Abyad		Zoom
Jean Wolfers-Lawrence	FAA	Zoom

Name	Organization	Location
Jeff Crislip	FAA	Zoom
Jeff Dombrowski		Zoom
Jeff Sedin	ALPA	Tech Center
Jeremy Casey	FAA	Tech Center
Jim Layton	FAA	Tech Center
Jim Patterson	FAA	Tech Center
John Dermody	FAA	Both
John McGrath		Zoom
John Tye		Zoom
John Weller	FAA	Zoom
Jon Schleifer	FAA	Zoom
Jonathan Torres	FAA	Both
Justin Barkowski	AAAE	Tech Center
Keith Bagot	FAA	Tech Center
Kelvin Ampofo	FAA	Zoom
Kent Duffy	FAA	Zoom
Kent Thompson	ARA	Tech Center
Keri Lyons	FAA	Tech Center
Khalil Kodsi	FAA	Zoom
L. Bernard Green		Zoom
Lara Van Nostrand	Avyance	Zoom
Lauren Vitagliano	FAA	Tech Center
Lawrence MacDonald		Zoom
Linda Bruce	FAA	Zoom
Marc Tonnacliff		Zoom
Mark Hale	DIAKON	Tech Center
Marvin Woods	FAA	Zoom
Mat Brynick	FAA	Zoom

Name	Organization	Location
Matt Griffin	ACRP	Zoom
Mike Dipilato	FAA	Tech Center
Mike Paglione	FAA	Zoom
Monique Moore	FAA	Zoom
Murphy Flynn	FAA	Tech Center
Nick Subbotin	FAA	Zoom
Patrick Forrester	FAA	Zoom
Qingge Jia	FAA	Zoom
Raymond Zee	FAA	Zoom
Rich Speir		Zoom
Richard Ji	FAA	Zoom
Robert Bassey	FAA	Zoom
Ron Corun	Asphalt Institute	Tech Center
Russ Gorman	FAA	Tech Center
Ryan King	FAA	Tech Center
Ryan Rutter	FAA	Zoom
Sarah Hubbard	Purdue University	Zoom
Scott Marsh	Port Authority of NY/NJ	Tech Center
Sean Van Dongen	FAA	Tech Center
Shailesh Gongal	Massport	Zoom
Tom Mize		Zoom
Tribhuvan Singh	EIT	Zoom
Trish Young	RIVA Solutions	Zoom
Verned Jackson		Zoom
Warren Sloop	Avyance	Zoom
Wes Mittlesteadt		Zoom
Wilfredo Villafane	FAA / ATR	Zoom
Zachary Shuman	Woolpert	Zoom

DAY 2 – September 7, 2023

Name	Organization	Location
Alex Tsalyuk	Avyance	Both
Brett Williams	National Asphalt Pavement Association	Tech Center
Chinita Roundtree-Coleman	FAA	Tech Center
Chris Oswald	Airports Council International - NA	Both
Dale Williams		Zoom
Dan Offenbacker	FAA	Tech Center
Darian Byrd	FAA	Tech Center
Dominique Khan	Avyance	Both
Eric Plyer	ARA	Tech Center
Gary L. Mitchell	ACPA	Tech Center
Harold Muniz-Ruiz		Zoom
Hua Shen	EIT	Zoom
Janine Abyad		Zoom
Jason Alcoba		Zoom
Jeff Crislip	FAA	Zoom
Jeff Sedin	ALPA	Tech Center
Jeremy Casey	FAA	Tech Center
Jessica Harbin	Avyance	Zoom
Jim Layton	FAA	Tech Center
Jim Patterson	FAA	Tech Center
John Daniels		Zoom
John Dermody	FAA	Zoom
John McGrath		Zoom
Justin Barkowski		Zoom
Keith Bagot	FAA	Tech Center
Kent Thompson	ARA	Tech Center
Khalil Kodsi	FAA	Zoom

Name	Organization	Location
Lauren Vitagliano	FAA	Tech Center
Linda Bruce	FAA	Zoom
Mark Hale		Zoom
Mat Brynick	FAA	Tech Center
Matthew Wilson	CTR	Zoom
Mike Dipilato	FAA	Tech Center
Monique Moore	FAA	Zoom
Murphy Flynn	FAA	Tech Center
Patrick Forrester	FAA	Zoom
Peter Taylor	NCPTC	Zoom
Qingge Jia	FAA	Tech Center
Raymond Zee	FAA	Zoom
Richard Ji	FAA	Tech Center
Ron Corun	Asphalt Institute	Tech Center
Russ Gorman	FAA	Tech Center
Ryan King	FAA	Tech Center
Ryan Rutter	FAA	Tech Center
S Murrell		Zoom
Sarah Hubbard		Zoom
Scott Marsh	Port Authority of NY/NJ	Tech Center
Shailesh Gongal	Massport	Zoom
Trish Young	RIVA Solutions	Zoom
Verned Jackson		Zoom
Warren Sloop	Avyance	Zoom
Wes Mittlesteadt		Zoom
Wilfredo Villafane	FAA	Tech Center

Acronym	Description
AAM	Advanced Air Mobility
AAS	Office of Airport Safety and Standards
AAPTP	Airport Asphalt Pavement Technology Program
ACPTP	Airport Concrete Pavement Technology Program
ACRP	Airport Cooperative Research Program
ACY	Atlantic City International Airport
ADS-B	Automatic Dependent Surveillance-Broadcast
AFFF	Aqueous Film Forming Foam
ANG	Office of Next Gen
ARAF	Airport Resilience Analysis Framework
ARFF	Aircraft Rescue and Firefighting
ARP	Office of Airports
ASR	Alkali-silica reaction
ATO	Air Traffic Organization
BADA	Base of Aircraft Data
BAKFAA	An analysis software developed by the FAA for the purpose of quickly obtaining results from falling/heavy weight deflectometer. Its name is a combination of “FAA” and “backcalculation”, the main analysis process it uses
BLOS	Beyond Line of Sight
CAFS	Compressed Air Foam Systems
CC	Construction Cycle
CCPR	Cold Central Plant Recycling
CFME	Continuous Friction Measuring Equipment
CRDAs	Cooperative Research Development Agreements
DEIA	Diversity, Equity, Inclusion, and Accessibility
DoE	Department of Energy

Acronym	Description
DoT	Department of Transportation
EMAS	Engineered Material Arrestor System
EVTOL	Electric Vertical Takeoff and Landing
FAARFIELD	FAA Rigid and Flexible Iterative Elastic Layered Design software
FFF/F3	Fluorine Free Foam
FHWA	Federal Highway Administration
FOD	Foreign Object Debris
FWD	Falling Weight Deflectometer
GA	General Aviation
HMA	Hot mix asphalt
KPI	Key Performance Indicator
M&R	Maintenance & Rehabilitation
MILSPEC	Military Specification
NAPA	National Asphalt Pavement Association
NAPMRC	National Airport Pavement and Materials Research Center
NRL	Naval Research Laboratory
OST	Office of the Secretary of Transportation
PANDA-AP	Pavement Analysis tool for Non-linear Damage Assessment
PAVEAIR	A FAA web-based airport pavement management system that provides users with historic and current information about airport pavement construction, maintenance, and management
PCG	Program Coordination Group
PCC	Portland Cement Concrete
PFAS	Per- and Polyfluorinated Substances
ProFAA	An FAA software used to evaluate airport pavement roughness and smoothness from airport pavement profiles
RAP	Recycled Asphalt Pavement (RAP)

Acronym	Description
REDAC	Research Engineering and Development Advisory Committee
RF	Radio Frequency
RFPs	Request for Proposals
RWLSET	Runway Length Statistical Evaluation Tool
SOAR	Strategic Outlook for Aviation Research
SOR	Strategic Outlook for Research
SOW	Statement of Work
UAS	Unmanned Aircraft Systems
USDA	United States Department of Agriculture