



2014 Verification and Validation Summit Event Record

The 9th Annual Verification & Validation (V&V) Summit was held at the Resorts Hotel in Atlantic City NJ on September 17-18, 2014. Over 160 participants attended the annual summit. There were 15 speakers from FAA, NASA, Department of Defense (DOD), Software Engineering Institute (SEI) and Industry who addressed and promoted this year's theme: "*Innovating and Embracing V&V*".

To provide additional perspectives on how to address future V&V challenges, the following four videos were presented: "*System of Systems*"; "*From Mach-20 Glider to Hummingbird Drone*"; "*No Roads? There's a Drone for That*"; and "*Hackers: The Internet's Immune System*".

The V&V Summit was planned and conducted by the V&V Strategies and Practices Branch, under the direction of the Branch Manager, John Frederick. The V&V Summit coordinator was Test Standards Board member, Wanda Lopez-Labarbera. Paula Nouragas, Manager, Air Traffic Systems Test and Evaluation Services Division, Federal Aviation Administration (FAA), facilitated the event. The 15 expert speakers at the summit addressed the following topics:

- **Natesh Manikoth** – Chief Scientist for Software, FAA: Discussed the consequences of not having a wind tunnel to explore the notion of technical debt and social debt. Technical debt refers to delayed technical work that is incurred when technical short cuts are taken. Social debt refers to unforeseen project costs connected to a “suboptimal” development community. He also discussed the importance of a Live, Virtual and Constructive (LVC) environment to V&V NextGen capabilities.
- **Dennis L. Filler** – Director, FAA WJHTC Technical Center: Discussed the four goals of V&V for the Technical Center: (1) support/sustain/modernize the National Airspace System (NAS), (2) develop our human capital, (3) prepare for tomorrow's challenges today, and (4) effective strategic outreach.
- **Edward L. Bolton Jr.** – Assistant Administrator for NextGen: Discussed the number one challenge for a Next Generation (NextGen) capability: to integrate a capability into the NAS to ensure it's working correctly. He briefed that a V&V failure in the Air Force was the genesis of a mission assurance process which resulted in a perfect record of launches for the Air Force. He also emphasized the NextGen strategic priorities for delivering NextGen: execute programs, deliver capabilities, advance collaboration and examine and renew.
- **Mike Paglione** – Manager, Concept Analysis Branch: Discussed the role of simulation in V&V, in particular, the left side of the VEE diagram. He stated that simulation should be conducted early in the V&V process.
- **Sharon Graves** – Deputy Project Manager, Vehicle Systems Safety Technologies, National Aeronautics and Space Administration (NASA): Discussed the degrees of autonomy for unmanned aircraft systems (UAS): human, supervisory control, fully automatic and autonomous. She also discussed the challenges in building trust of autonomous systems envisioned for aviation: how do you build trust, could V&V provide the strategy to start building trust. During the Q&A, she also addressed the “human on the loop” concept where humans need to intervene when an autonomous system doesn't perform as expected.
- **Bill Keegan** – Vice President and Director, Test, Evaluation & Analysis, American Systems Corporation: Discussed the importance of having a Test and Evaluation Master Plan (TEMP).

He also stated that requirements need to be testable and need to be tested earlier in the lifecycle of a program.

- **Eric Neiderman Ph.D.** – Manager, Aviation Research Division, FAA and
- **Tanya Yuditsky, Ph.D.** – Engineering Research Psychologist, FAA: Discussed the history of aviation. They also emphasized the three Human Factors requirements that apply to a system, systems, and system of systems (SoS): usability, trainability, and maintainability. They provided an interesting fact that the word “airport” was coined in Atlantic City in 1919.
- **James Daum** – Manager, Safety and Information Security Division, FAA: Discussed the “horizontal traceability view” which identifies where the gaps and hazards of a system exist. He provided an overview of the security process steps: identify, protect, detect, respond and recover. He also mentioned the cyber test facility located at the Technical Center which is used to conduct security assessments and evaluations and test security capability prototypes.
- **Nazzareno Spurio** – Acting Deputy Vice President, Program Management Organization, FAA: Discussed being a “futurist” and indicated that there is a “gene for test”. In his opening remarks the importance of collaboration was discussed, although in his position it was mostly with the unions, he expressed it needs to be expanded to the entire FAA workforce. He addressed questions on how UAS will be integrated into the NAS and how to deal with unrealistic requirements.
- **Rose Karolenko Mooney** – Executive Director, Mid Atlantic Aviation Partnership: Discussed the Mid-Atlantic Aviation Partnership (MAAP) with academia, industry and federal research and development centers, including the Technical Center and NASA. Their mission is to provide safe and efficient integration of UAS in the NAS.
- **William E. Van Valkenberg** – President and Chief Operating Officer, NextGen AeroSciences LLC: Discussed the CR5DT technology which is based on a “theory of airspace” to generically represent flight paths for multi-objective purposes. The CR5DT also enables testing of broad hypotheses of value to the Air Navigation Service Provider (ANSP) and users of airspace.
- **Jesse Wijntjes** – Manager, Data Communications Program, FAA: Provided an overview of the Data Communications (Data Comm) program and the V&V complexities for integrating Data Comm services into the NAS. He emphasized the challenges and organizational barriers that exist when implementing a NextGen capability such as Data Comm.
- **Nicholas D. Bartlow, Ph.D.** – Director, Center of Digital Excellence, Noblis: Discussed three different development models: predictive, iterative and agile/adaptive and the V&V opportunities for each model.
- **Kenneth E. Nidiffer, Ph.D.** – Director, Strategic Plans for Government Programs, Carnegie Mellon University, Software Engineering Institute: Discussed the struggles with software V&V and the challenges presented with software development. He suggested one of the difficulties for V&V at the enterprise level was due to the number of moving parts typical of an enterprise. He also discussed why software V&V is important for program protection.

This V&V Summit explored how V&V can be innovated to address the FAA’s current and future challenges. It focused on fostering commitments to embracing V&V methods and capabilities into FAA common practices to help bring concepts to life and more importantly support the operational implementation of needed FAA capabilities.

All FAA participants at this year’s V&V Summit received 14 hours of FAA eLearning Management System (eLMS) credits (course # FAA3002000). V&V Summit feedback forms were collected at the end of each day and will be assessed to improve future summits. The 2014 V&V Summit presentations, final agenda, video links, and pictures can be found on the internet at: <http://actlibrary.tc.faa.gov>.