May 10 *Ricky Butler*

35 Years of LaRC Formal Methods Research

This talk highlights 35 years of NASA Langley Formal Methods research beginning in the mid 1980s. It covers early challenges faced by our NASA team & eventual successes that led to program growth. The Formal Methods application domains were broad: computer fault-tolerance, clock synchronization, numerical software, flight guidance system software, air traffic mgmt algorithms & procedures. The talk ends with comments on govt-sponsored software research & future NASA formal methods research.

Ricky W. Butler, a senior NASA research engineer, led Langley's formal methods program since 1989. "Formal Methods" are mathematically rigorous techniques & tools to specify, design and verify software & hardware systems. He developed advanced algorithms and software implementations for future Air Traffic Management concepts. His research includes formal methods, fault-tolerance and air traffic mgmt & AI planning with 95+ publications including trajectory-based operations, conflict detection & resolution, urban air mobility, parallel runway alerting systems, formal mathematical libraries, AI planning, reliability analysis, software verification & fault-tolerant clock synchronization. He received his BS in Math & Physics & MS in Computer Science from UVA.