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**NVLAP**  
**Federal Warfare System(s)**

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## NVLAP AND THE NVLAP LOGO

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## Evidence this is Real

The ACC Federal Laboratory-Beale developed the Advanced Virtualized Enterprise Reconfigurable Architecture (AVERA+; First Flight: 2019NOV13) as a 100% government-owned Open Software Architecture to enable rapid edge development and the delivery of advanced capabilities to fielded Major Weapon Systems (MWS). The Lab went from first line of code to first flight in six months. With this locally-developed capability, a team of six achieved:

- **First in DoD<sup>4</sup>:** In-flight utilization of Kubernetes on a fielded Major Weapon System (First Flight: 2020SEP22). Container orchestration & processing distribution across four single-board computers onboard a U-2 in-flight. Allows non-materiel aggregation of legacy computers onboard fielded MWS to run advanced AI/ML algorithms with higher-performance processing requirements. Work start to first-flight: 24 days.
- **First in DoD<sup>5,6</sup>:** In-flight Software Update (First Flight: 2020OCT16). Uploaded and deployed Auto Target Recognition algorithms to a U-2 in-flight. End-end data transfer leveraged operationally-representative U-2 ground-air link architecture. Dr. Roper challenged the Lab in-person (13 OCT 20) to achieve this milestone. Challenge to response: 2 days, 22 hours.
- **First in DoD<sup>7,8</sup>:** In-flight Pilot-AI teaming (First Flight: 2020DEC15). The Lab deconstructed/modified a learning algorithm to demonstrate two onboard workers (Pilot & artificial intelligence identified as ‘ARTUμ’) – each with individual, competing missions, a shared common resource, and with human actions unknown to the AI. Dr. Roper challenged the Lab on 10 NOV 20. Challenge to response: 35 days.
- **First in DoD<sup>9</sup>:** In-flight Utilization of PlatformONE on a fielded Major Weapon System (First Flight: 2021MAR23). Partnered with PlatformONE engineering staff to integrate relevant selections from the “BigBang” product line (a portion of PlatformONE’s cybersecurity and Zero Trust offerings) to enhance the security posture of laboratory software in alignment with DoD Chief Information Officer direction. Work start to first-flight: 13 days.

## Pathway to the FWS LAP Development

### Types of Laboratories

There are several types of laboratories in the U.S. Government – all derive from different statutory authorities. First are Federally Funded Research & Development Centers (FFRDCs) – also called National Laboratories (48 U.S.C. § 35.017). These are Public-Private Partnerships with the U.S. Government. The second are University Affiliated Research Centers (UARCs; 10 U.S.C. § 2304). These are established by the Under Secretary of Defense (R&E) and are DoD research centers affiliated with universities. Finally, there are Federal Research Laboratories (Title 15 U.S.C. § 3710 & 10 U.S.C § 2500). These are established by Federal Agencies, and must be “a facility or group of facilities owned, leased, or otherwise used by a Federal agency, a substantial purpose of which is the performance of research, development, or engineering

<sup>4</sup> <https://www.af.mil/News/Article-Display/Article/2375297/u-2-federal-lab-achieves-flight-with-kubernetes>

<sup>5</sup> <https://www.thedrive.com/the-war-zone/37131/u-2-spy-plane-got-new-target-recognition-capabilities-in-first-ever-in-flight-software-update>

<sup>6</sup> <https://www.c4isrnet.com/air/2020/10/09/the-air-force-updated-the-software-on-one-of-its-oldest-aircraft-while-it-was-in-the-air/>

<sup>7</sup> <https://www.washingtonpost.com/business/2020/12/16/air-force-artificial-intelligence/>

<sup>8</sup> <https://www.popularmechanics.com/military/aviation/a34978872/artificial-intelligence-controls-u2-spy-plane-air-force-exclusive>

<sup>9</sup> <https://www.acc.af.mil/News/Article-Display/Article/2557413/accs-u-2-federal-laboratory-rapidly-integrates-platform-one-in-first-weapons-sy/>































