

NASA'S Independent Verification & Validation Program

IV&V

FY22 PROGRAM HIGHLIGHTS

Fortifying the Foundation of Mission Success.

RELIABLE, SAFE, SECURE SOFTWARE

Year after year, the IV&V Program continues to focus on ensuring safety- and mission-critical systems and software will operate reliably, safely and securely. In Fiscal Year (FY) 2022 we supported 16 missions across seven NASA Centers. Below are a few of our focus projects, including missions that we proudly supported up through successful launches last year.

NASA IV&V successfully identified, mitigated and closed 26 high priority internal and external risks having impacts on 15 projects. Twenty-one of these risks related directly to software assurance. Every closed risk contributes to safety and mission success goals for the agency.

Lucy

Launched October 2021
Over three years of support.

Identified 936 software defects, which were accepted and corrected by the development teams and resulted in improved safety and reliability of the Lucy mission software.

OFT - 2

Launched May 2022
2 years of support on
Orbital Flight Test 2.

Boeing and NASA leadership acknowledged the tremendous amount of work completed and thanked the IV&V teams for their dedication and the apparent improvements made.

JWST

Launched December 2021

With nearly 20 years of support and resolution of over 3,400 software defects, IV&V made significant contributions to the successful launch and commissioning of the James Webb Space Telescope (JWST), which continues to awe us with new discoveries and insight into the formation of our universe.



Artemis

Over 10 years of support, beginning with EM-1 in 2012.

There were 18,500 issues identified that, if not found, may have negatively impacted software execution in Artemis operations.

More than half of the IV&V workforce is providing support to the Artemis missions with team members dedicated to providing software assurance for the multiple systems involved.



The Roman Space Telescope Digital Twin (WISP) for spacecraft and instrument flight software testing capabilities now includes a hardware emulation of the Roman Science Data Recorder (SDR), enabling IV&V to perform risk reduction tests on the

SDR flight software. There were 1,218 tests executed to provide assurance that the operating system works as designed on Roman's custom flight computer.

The NASA IV&V Safety and Mission Assurance Support Office (SSO) set the stage for NASA's advancement of cybersecurity with our Mission Protection Services (MPS) IV&V initiative.

MPS



ADVANCING INFRASTRUCTURE



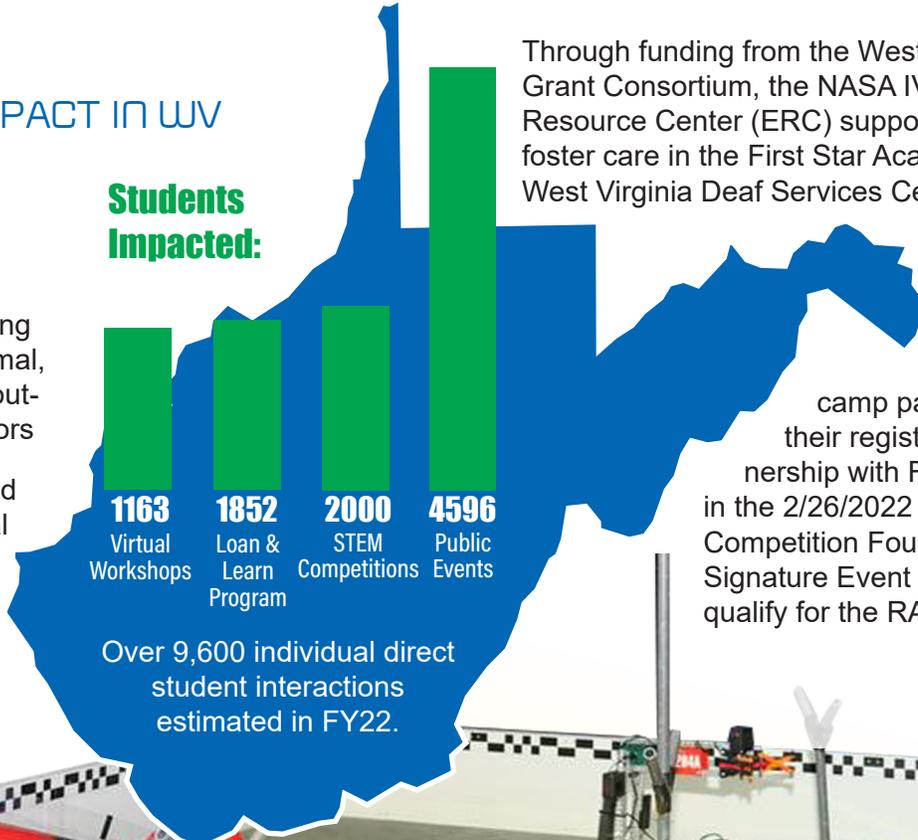
IV&V Advisory Board (IAB) – A new partnership model was created to drive awareness, visibility and engagement for IV&V involvement across the agency.



Future of Work (FOW) – As part of the IV&V FOW initiative, we successfully eliminated 27,000 square feet in office space in Fairmont, WV, to save \$600K per year. Elimination of other office spaces across the country saved another \$600K per year.

LASTING IMPACT IN WV

- 22 internships
- 23 educator workshops, training 541 formal, informal, pre-service and out-of-school educators
- 32 hands-on and web-based virtual workshops
- 29 STEM competitions across the state



Over 9,600 individual direct student interactions estimated in FY22.

Through funding from the West Virginia Space Grant Consortium, the NASA IV&V Education Resource Center (ERC) supported students in foster care in the First Star Academy and from the West Virginia Deaf Services Center. The ERC team trained and worked with these students by providing them access to drones, supporting robotics camp participation, and funding their registration, through our partnership with Fairmont State University, in the 2/26/2022 Robotics Education & Competition Foundation Aerial Drones Signature Event (RAD). They went on to qualify for the RAD World Championship.



Economic impact in WV can be attributed to labor income and tax revenue. Results from these activities, when multipliers are applied, is estimated to account for \$47.8M in labor income and \$139.2M in economic output.

261 Contractors
50 Civil Servants

IV&V SUPPORT SPANNING THE U.S.

- Our national footprint supports an agency-wide scope.
- We provide subject matter experts in a variety of disciplines, domains, processes and tools.

