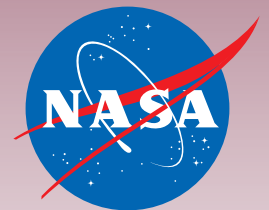


FY24 PROGRAM HIGHLIGHTS



IV&V

Unparalleled Support for Safer Missions

In FY24, NASA's IV&V program supported 16 of the agency's most essential programs and projects and was proud to see the successful launch of Psyche – a project that IV&V has contributed to since 2015. Across the full breadth of work for NASA this year, IV&V identified, and collaborated to resolve 1,242 significant software-related issues, including 43 issues with the potential to cause loss of mission or degradation of an essential mission capability.

In addition to mission support, we are proud that IV&V's collaborative partnerships across the agency, the state of West Virginia, and the U.S. Government have grown in the past year.



Following a one-year launch slip, Psyche launched successfully on October 13, 2023. There were over 700 IV&V technical issue memorandums (TIMS) resolved, with none open at launch. IV&V support ended following completion of post-launch analyses, which fixed defects that had the potential to impact an ongoing cruise operations. No new TIMS were identified by IV&V, and all prior assurance conclusions were upheld.



NASA's IV&V Program provided Software Safety and Mission Assurance (SMA) services to NASA's Commercial Crew Program (CCP), contributing to the safe and successful flights for SpaceX Crew-7 return and the launch and docking of Crew-8 and Crew-9 to the International Space Station (ISS). The team also supported the safe and successful launch of Boeing Crewed Flight Test (CFT) to the ISS and supported the on-orbit testing, troubleshooting, and decision process leading to CFT's uncrewed return.



The Artemis IV&V Program has continued to support the agency's Moon2Mars vision for deep space exploration.

Artemis IV&V is comprised of multiple IV&V teams directly supporting Orion, SLS, EGS, HLS, Gateway, and EHP-xEVAS across Artemis II and beyond.

Providing system and software expertise, the IV&V teams have collaborated with the Artemis Programs to identify over 2000 high severity defects that, once resolved, will improve the overall development effort and reduce the risk to NASA crew members, assets, and the mission to extend humankind's reach to the Moon and beyond.



The JSTAR team has been successfully providing digital twins, a unique technology which condenses the entire flight system to run on a laptop or cloud-based system and permits testing of mission software that would not otherwise be possible.

The digital twin user interface for Artemis (ARRISTOTLE) has matured to the point of being able to execute and script an entire

run without any intervention. It now includes new visualization capability with real-time and data-processed playback ability, which allows for data plotting, performing aborts, and reversing time.

JSTAR also released the initial digital twin of Autonomous Flight Termination Unit (AFTU) for the NASA IV&V Team, which includes two flight units, multiple trajectory files, a GPS simulator for trajectory file playback, and a user interface to control

all components.

Additionally, high-profile findings have been identified for the Nancy Grace Roman Space Telescope. Testing using our in-house software, WISP, discovered a significant issue with time synchronization between two elements critical to the spacecraft.

Europa Clipper testing discovered a significant issue with startup software and the fix was confirmed using ECHOES, a JSTAR- built digital twin.



Contributions to NASA, West Virginia, the U.S.A...

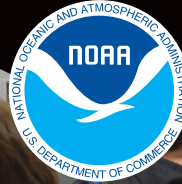
The SSO Outreach Team provided Software Assurance (SA) expertise to the SA Technical Fellow, Ames Research Center, and Wallops Flight Facility (WFF) to advance agency initiatives and safety-critical development projects. Throughout the year the team developed more efficient processes to improve project risk identification, train the agency's software workforce, and highlight the value of SA activities. Outreach provided much needed SA staff augmentation for WFF's Advanced Command Destruct System (ACDS), Ames's Vertical Motion Simulator, and Ames's HelioSwarm project.



Working closely with Agency leadership and Mission Directorate stakeholders, the IV&V Mission Protection Services (MPS) initiative continued to advance its complementary approach to NASA mission security. MPS provides a mission-focused view of cybersecurity that leverages and builds on IV&V's existing capabilities to improve NASA's understanding of software security risks and potential mitigations. This past year, the MPS team worked collaboratively with the Orion project to bolster the mission's overall security posture.

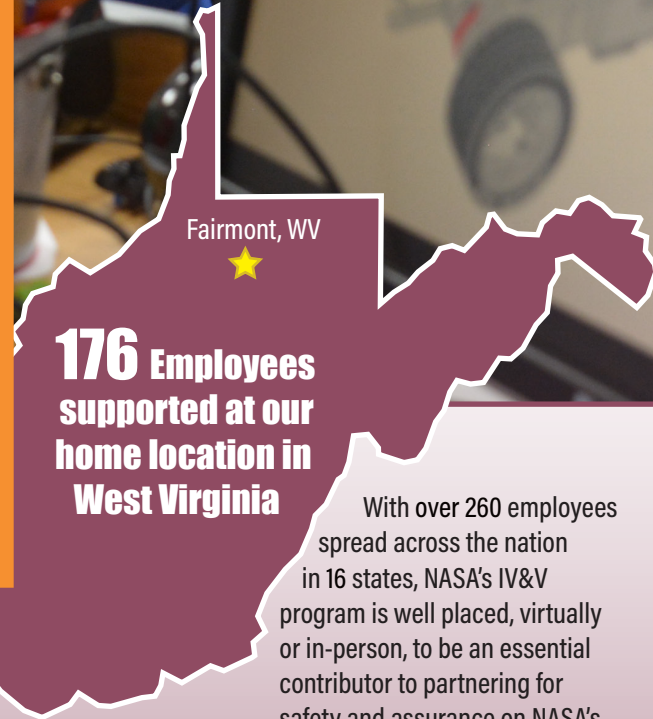


The IV&V Program continued its history of collaboration with other government organizations and leadership in the software assurance industry, advancing our partnerships with the Missile Defense Agency and the National Oceanic and Atmospheric Administration (NOAA).



... and the FUTURE!

During FY24, the IV&V Program's focus on furthering STEM access and engagement continued to flourish. IV&V hosted four summer high school, five summer college, and seven yearlong college interns, whose projects covered software assurance and educational outreach. Many of these interns were able to work onsite in Fairmont, West Virginia and take tour of the Goddard Space Flight Center in Greenbelt, Maryland. In successful efforts to reach teachers, the Education Resource Center (ERC) hosted 40 workshops, equipping 700 educators with NASA skillsets and activities. STEM engagement activities including workshops, residential SPACE camps, the Loan and Learn classroom kit program, and virtual training videos allowed ERC professionals to reach students and teachers throughout the state. Competitive Robotics reached an all-time high in West Virginia in FY24, with the ERC's support of the WV Robotics Alliance promoting growth of these activities across the state. The ERC also advanced its partnership with West Virginia Schools for the Deaf and the Blind (WVSDB), hosting a series of hands-on workshops where students built and launched model rockets, assembled and programmed robots, and learned to pilot and program aerial drones, and providing STEM coach training for WVSDB staff.



Fairmont, WV

176 Employees supported at our home location in West Virginia

With over 260 employees spread across the nation in 16 states, NASA's IV&V program is well placed, virtually or in-person, to be an essential contributor to partnering for safety and assurance on NASA's most important missions.



Find us online for more details:
www.nasa.gov/katherine-johnson-ivv-facility

100 University Drive, Fairmont, WV 26554
(304) 367-8200 • ivv-dl-info@mail.nasa.gov