

## **National Aeronautics and Space Administration (NASA) Fiscal Year 2021 Agency Report**

**1. Please provide a summary of your agency's activities undertaken to carry out the provisions of OMB Circular A-119, "Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities" and the National Technology Transfer and Advance Act (NTTAA). The summary should contain a link to the agency's standards-specific website(s) where information about your agency's standards and conformity assessment related activities are available.**

NASA directly cites Office of Management and Budget (OMB) Circular No. A-119 and the preference for use of voluntary consensus standards (VCS) and participation in VCS bodies' activities in NASA directives (NASA Policy Directive (NPD) 7120.4, NASA Engineering and Program/Project Management Policy, and NASA Procedural Requirements (NPR) 7120.10, Technical Standards for NASA Programs and Projects, which is currently in revision and continues to promote use of VCS). NASA requires, prior to proposing development, revision, or revalidation of a NASA technical standard, a determination be made whether a VCS exists or is in development that meets or can be tailored to meet NASA's needs. NASA technical discipline experts also evaluate the opportunity to replace an existing NASA technical standard with a VCS or propose conversion to a VCS, thereby reducing duplicate standards. NASA promotes the use of VCS by identifying and approving NASA-endorsed technical standards, a "pick list" of technical standards to consider first when selecting program and project requirements. These activities facilitate selection and use of VCS in lieu of NASA technical standards or other government agency standards in compliance with OMB Circular No. A-119.

NASA encourages participation in VCS developing bodies and collects data on participation in development and revision of VCS. During this reporting period, 112 NASA representatives participated in 257 VCS development/revision activities in 35 Standards Developing Bodies. NASA's participation in VCS development/revision activities increased from 81 participants in FY2020 to 112 in FY2021, an increase of over 38 percent. Some increase in the number of VCS development/revision activities and participation in Standards Developing Bodies was realized.

NASA is well represented on AIAA committees to promote development/revision and use of VCS, as these standards are applied on many NASA program and projects in lieu of NASA standards. Some examples are the AIAA Aerospace Pressure Vessels Committee; AIAA S-080, Space Systems - Metallic Pressure Vessels, Pressurized Structures, and Pressure Components; AIAA S-081, Space Systems - Composite Overwrapped Pressure Vessels (COPVs); AIAA S-110, Space Systems Structures, Structural Components, and Structural Assemblies; AIAA-S-113, Criteria for Explosive Systems and Devices on Space and Launch Vehicles; AIAA S-114, Moving Mechanical Assemblies for Space and Launch Vehicles; AIAA-S-136 -202x, Safety Standard for Space Lithium Batteries; and AIAA-S-144 -201X, Qualification and Acceptance Tests for Commoditized Space Battery Cells.

A NASA representative chairs the ISO TC20/SC14 Subcommittee for Space Systems and Operations in support of promoting use of VCS. The committee's scope of work is the standardization for manned and unmanned space vehicles, their design, production, maintenance, operation, and disposal, and the environment in which they operate. Six working groups provide an international forum for addressing the standardization needs and concerns of organizations and personnel involved with the development

and operation of space systems. NASA currently supports the development/revision of over 50 international consensus standards.

NASA serves as the secretariat for Consultative Committee for Space Data Systems (CCSDS) leading the Spacecraft Onboard Interface Services (SOIS) committee with multiple standards development activities. The SOIS approach is to standardize the interfaces between items of spacecraft equipment by specifying well-defined standard service interfaces and protocols which allow standardized access to sensors, actuators, and generic spacecraft functions, allowing spacecraft applications to be developed independently of the mechanisms that provide these services.

NASA is serving on SAE and ASTM International Committees in support of developing additive manufacturing metals and non-metallic standards. In a recent development of NASA-STD-6030, Additive Manufacturing Requirements for Spaceflight Systems, NASA leveraged use of many VCS from Standards Developing Organizations, e.g., ASTM D7028, Standard Test Method for Glass Transition Temperature (DMA Tg) of Polymer Matrix Composites by Dynamic Mechanical Analysis (DMA); ASTM E8/E8M, Standard Test Methods for Tension Testing of Metallic Materials; ASTM E21, Standard Test Methods for Elevated Temperature Tension Tests of Metallic Materials; ASTM E399, Standard Test Method for Linear-Elastic Plane-Strain Fracture Toughness of Metallic; ASTM E466, Standard Practice for Conducting Force Controlled Constant Amplitude Axial Fatigue Tests of Metallic Materials; ASTM E606/E606M, Standard Test Method for Strain-Controlled Fatigue Testing; ASTM E1450, Standard Test Method for Tension Testing of Structural Alloys in Liquid Helium; SAE AS9100, Quality Management Systems – Requirements for Aviation, Space, and Defense Organizations; and SAE AS9120, Quality Management Systems – Requirements for Aviation, Space, and Defense Distributors. Similarly, NASA-STD-6016C, Standard Materials and Processes Requirements for Spacecraft, cites as requirements four ASTM standards, ten American Welding Society (AWS) standards, twenty-six SAE International (SAE) standards, two Government Electronics and Information Technology Association (GEIA) (SAE International) standards, two National Aerospace Standards (NAS) standards, and one Battelle Memorial Institute standard.

Standards are critical in defining engineering, safety and mission assurance, and health and medical requirements for NASA missions. These technical standards include, but are not limited to, VCS cited in NASA directives and technical standards, other government agency standards, NASA technical standards, NASA-endorsed standards, and related standards information such as lessons learned and application notes relative to specific standards. Access to authorized personnel Agency-wide is provided to over 61 VCS Standards Developing Bodies via subscription and on a pay-per-document basis with the capability to order additional standards as the need arises. As new revisions are developed, more VCS are incorporated where appropriate. Many more examples of NASA Technical Standards citing use of VCS can be found on the NASA Technical Standards System Web site at <https://standards.nasa.gov> [under the NASA Technical Standards link.](#)

**2. Please list the government-unique standards (GUS) your agency began using in lieu of voluntary consensus standards during FY 2021. Please note that GUS which are still in effect from previous years should continue to be listed, thus the total number in your agency's report will include all GUS currently in use (previous years and new as of this FY):**

This agency reports voluntary consensus standards usage on a categorical basis.