NASA TECHNICAL STANDARDS PROGRAM

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ABSTRACT

The NASA Technical Standards Program was officially established in 1997 as result of a directive issued by the Administrator. It is responsible for Agency wide technical standards development, adoption (endorsement), and conversion of Center-unique standards for Agency wide use. One major element of the Program is the review of NSA technical standards products and replacement with non-Government Voluntary Consensus Standards in accordance with directions issued by the Office of Management and Budget. As part of the Program's function, it developed a NASA Integrated Technical Standards Initiative that consists of and Agency wide full-text system, standards update notification system, and lessons learned—standards integration system. The Program maintains a "one stop-shop" Website for technical standards ad related information on aerospace materials, etc. This paper provides information on the development, current status, and plans for the NAS Technical Standards Program along with metrics on the utility of the products provided to both users within the nasa.gov Domain and the Public Domain.

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The NASA Technical Standards Program (http://standards.nasa.gov) was formally established in 1997 as an Agencywide effort by direction of the Administrator. It has the following principal elements:

***Increase NASA Use of Voluntary Consensus (non-Government) Technical Standards.
***Selective Development of NASA-Unique Technical Standards.
***Develop and Promote the Use of an Integrated Technical Standards Initiative (Full-Text Standards Access, Standards Update Notifications, and Lessons Learned—Standards Integration).
***Exploit the Potential of Web-based Standardization Information.

Technical Standards are an integral part of all engineering development efforts, especially those in the aerospace industry. Designers and engineers should be among the most aggressive supporters of a strong Technical Standards program. Standardization activities establish engineering and technical applications for processes and practices and, in doing

so, enhance engineering capabilities. Thus, they enable designers to not dissipate their energies on the costly exercise of "reinventing the wheel."

Like their colleagues in the private sector, NASA has also depended upon the active application of Technical Standards developed by the Agency through its various Centers, as well as Department of Defense (DoD) Technical Standards (i.e., Military Standards, Specifications, Handbooks, etc.) and those produced by non-Government Standards Developing Organizations (SDOs). Since the late 1990s, NASA has been engaged in a major Agencywide effort to review the Technical Standards produced by its Centers and, to the degree practical, utilizes a systematic consensus driven approach resulting in the adoption (endorsement) of relevant non-Government Technical Standards to replace its Center-developed Technical Standards. The adopted Technical Standards are known as "NASA Preferred Technical Standards." In areas where adoption is not practical, efforts have been made to consolidate similar Center-developed Technical Standards and produce replacement Technical Standards endorsed for Agencywide use. This substantial endeavor was undertaken and subsequently increased in response to the Office of Management and Budget (OMB) Circular A-119 "Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities", February 1998.

In the process of responding to the directives contained in OMB Circular A-119, it was discovered that the Agency's Programs/Projects and engineering staff were in need of a consolidated Web-based Technical Standards database accessible from a single source with engineering oversight. The information requested included full-text Technical Standards products issued by the Agency and its Centers, Department of Defense, and non-Government SDOs. In addition, requirements for timely information on changes in Technical Standards products were also noted.

The need for improving the process to address customer needs for efficiency in the acquisition of Technical Standards products is one of the Strategic Initiatives identified in the American National Standards Institute's (ANSI) National Standards Strategy For The United States (http://web.ansi.org/public/nss.html). In particular the document identified the need for cost-effective mechanisms such as update notification and electronic accessibility of Technical Standards products from SDOs. The NASA Integrated Technical Standards Initiative, while not developed to solve this problem for the United States, is a step toward solving the problem of Technical Standards distribution and, thus, enhancement of engineering capabilities within one Government Agency that has potential for use by others.

After several reviews and pilot exercises, additional dialog with several Program/Project Managers and engineering groups, the concept of a "One Stop Shop" web-based NASA Integrated Technical Standards Initiative began to materialize. The two main advantages that became immediately apparent were: (1) The Agency's engineering capabilities will be considerably enhanced by providing NASA's technical and engineering communities with immediate on-line access to Technical Standards products and (2) Significant cost savings could be realized by having one unified Agencywide Full-Text Technical

Standards System versus having fourteen or more individual groups within the Agency acquiring Technical Standard products independent of each other. Standards updates and lessons learned were also indicated as important information to enhance the engineering usage of Technical Standards. Thus, the unique "NASA Integrated Technical Standards Initiative" was born. The Initiative consists of the following three Systems:

(1) Agencywide Full-Text Technical Standards System

(2) Standards Update Notification System

(3) Lessons Learned/Best Practices/Application Notes—Standards Integration System.

The primary goal of the NASA Technical Standards Initiative is to develop a suite of collaborative tools to: (1) Augment NASA's use and support the adoption of non-Government Voluntary Consensus Standards by making them available from a single source, (2) Provide notifications on changes, updates, and revisions to existing Technical Standards, (3) Provide information on engineering lessons learned, best practices, and experiences related to specific Technical Standards products, and (4) Enhance the engineering capabilities of the Agency. Technical Standards provide a major opportunity to achieve the goal of enhancing engineering capabilities, especially when a process such as the NASA Integrated Technical Standards Initiative is implemented. This Initiative consists of the following Systems.

Agencywide Full-Text Technical Standards System

This System provides access to full-text on-line Technical Standards products and distribution for NASA use. Technical Standards products are currently available from 108 Standards Developing Organizations, including those of NASA, DoD, and other Agencies. For those Technical Standards not available electronically, a hardcopy is made available to the requester within 24-36 hours. A pilot version of the System was implemented in 2000 with favorable feedback leading to the Agencywide implementation of the System in June 2001. Currently their are over 5,500 registered NASA and supporting contractor users within the <nasa.gov> Domain.

Standards Update Notification System

This System provides NASA and its supporting contractors with notice of updates (revisions, cancellations, superseded documents, etc.) to Technical Standards products that they have identified for use on their Programs/Projects or research activities. This information is provided so that update notices of technical changes on a Technical Standards product can be evaluated by the Program/Project Manager for impact on the Program/Project requirements. This System is linked with the Agencywide Full-Text Technical Standards System to provide the latest full-text versions of the Technical Standards on demand. Documents identified by the user and accepted for update notification are screened relative to adoption as NASA Preferred Technical Standards.

The System was made available Agencywide in October 2001. There are now over 4,000 standards documents registered by users for update notifications.

Lessons Learned/Best Practices/Application Notes—Standards Integration System

This System provides links to Lessons Learned/Best Practices/Application Notes that have applicability to use of individual Technical Standards products. As of this date, 225 Lessons Learned from NASA's Lessons Learned Information System have been linked to 125 NASA Preferred Technical Standards listed on the NASA Technical Standards Program Website. Also, 140 Application Notes have been related to 95 NASA Preferred Technical Standards. Identifying other Application Notes and Lessons Learned to link with specific NASA Preferred Technical Standards is a continuing effort. These Lessons Learned, Best Practices, and Application Notes will also be of great benefit in identifying non-Government Voluntary Consensus Standards to adopt/endorse for NASA use. Over 150 links to engineering Lessons Learned/Best Practices Websites and documents have been identified and provided on the Program's Website. These additional sites are not only from NASA Facilities, but other Government and non-Government bodies. They provide users with technical information on a variety of aerospace engineering related lessons learned topics. The NASA Technical Standards Program Office prepared a paper entitled "Lessons Learned and Technical Standards—A Logical Marriage" that was published in the November 2001 issue of ASTM Standardization News and subsequently reprinted in DOD Standardization Journal and The Standards Forum of DOE. It focuses on the importance of the relationship between Lessons Learned and Technical Standards, and, thus, the enhancement of engineering capabilities.

An example is provided of what a NASA staff member or supporting contractor user of the NASA Technical Standards Program Website has available. It is shown on the figure of the document Summary Page. When the user calls up a NASA Preferred Technical Standard under the Agencywide Full-Text Technical Standards System, a document Summary Page will appear that provides summary information on the Technical Standard. When available, information on applicable Application Notes, Lessons Learned and Best Practices is provided along with link to the Standards Update Notification System to receive notice of any revisions, updates, cancellations, etc. on a given Technical Standard.

Conclusion

The first figure provides a view of the NASA Technical Standards Program Website Homepage. On it the NASA ACCESS and PUBLIC ACCESS menu items are noted along with some allied menu topics. To date, the usage of the three Systems in the NASA Technical Standard Initiative has been outstanding in terms of user interests and value to their work on NASA Programs/Projects and research activities. The metrics associated with each of these Systems continue to show increased usage. This is due to the ready availability of the NASA Technical Standards Program products and related information on-line, and reinforces the validity of the "One Stop-Shop" concept.

The integration of Technical Standards, update notifications, and lessons learned information is one step toward the goal of significantly enhancing engineering capabilities necessary to meet the future demands of the Agency for timely, productive, and reliable space systems and contributing to improved cost.

The last two figures provide an overview on the current focus and future thrusts of the NASA Technical Standards Program. The conversion of Center-developed standards to NASA Preferred Technical Standards and adoption of non-Government standards remains a key focus of the Program. Improving the awareness of the Program and its products among the Agency's staff and supporting contractors continues to be a challenge. Promoting the development of new standards that will serve the Agency is a current initiative, capitalizing on new technology and experiences. Future thrusts will include additional efforts on the integration of lessons learned with technical standards. New venues will be explored relative to how the Program's products can better contribute to the Agency's engineering capabilities and the Administrator's "One NASA" initiative.

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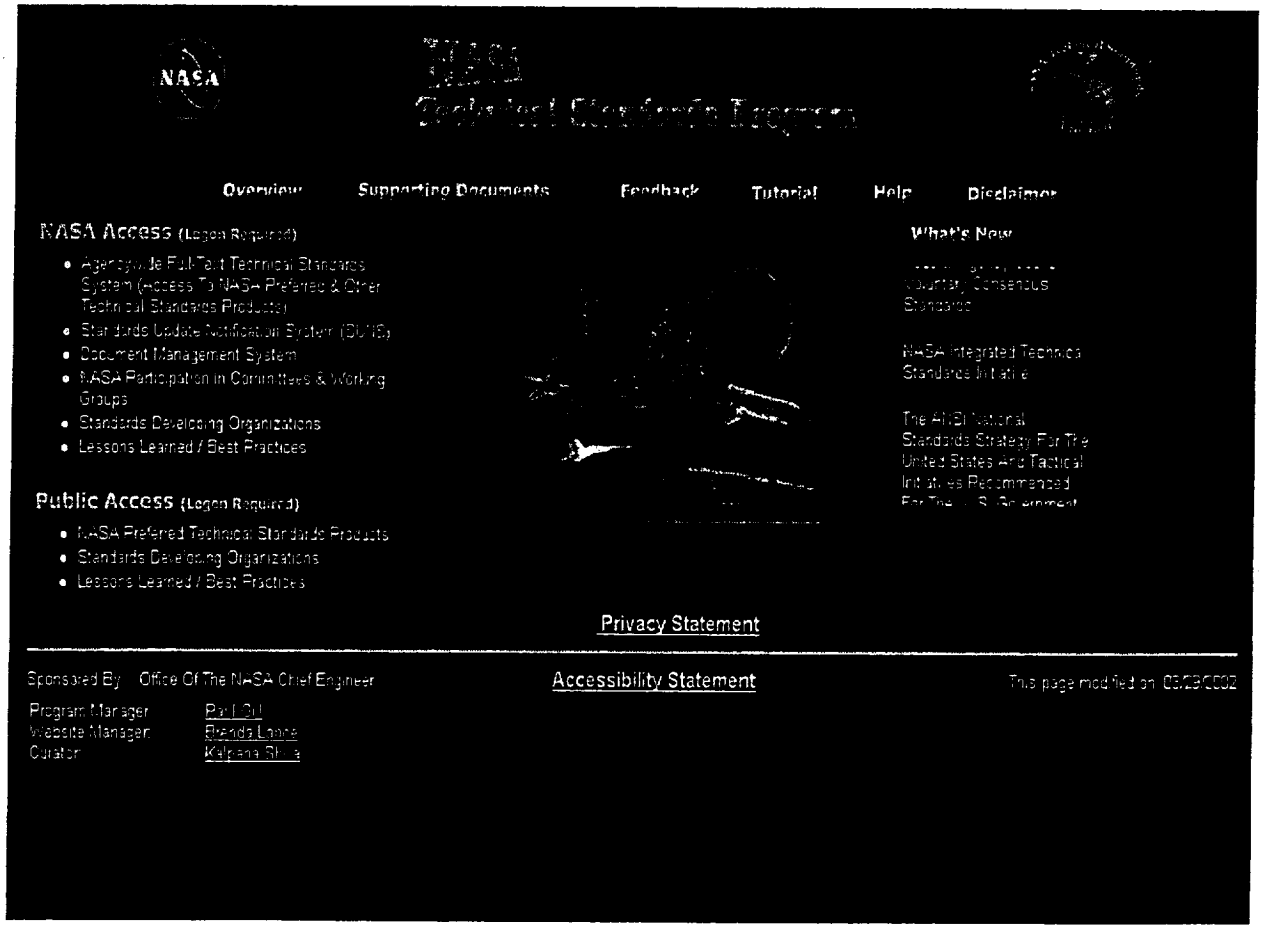
Prepared For Presentation at:
5th Aerospace Materials, Processes, and Environment Technology Conference
Von Braun Center
Huntsville, Alabama

September 16-17, 2002

Figure 1. NASA Technical Standards Program Homepage



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PROGRAM STRATEGY OVERVIEW

- **CURRENT FOCUS**
  - Conversion of Center-developed Standards Into NASA Preferred Technical Standards
  - Adoption/endorsement of Non-government VCS Products
  - Maintaining And Enhancing Program Website Contents
  - Trying To Make All Agency Employees And Support Contractors Aware of The Program's Website And Contents
  - Explore New Or Candidate Program Thrusts That Support The Enhancement Of Agency Engineering Capabilities, I.E., Alert/suns Utility, Lessons Learned Integration, Collaboration With Knowledge Management, Information Technology, Etc.
  - Promote New Standards Development, Both NASA And VCS, That Serve Agency Needs

Figure 2

NASA TECHNICAL STANDARDS PROGRAM

PROGRAM STRATEGY OVERVIEW (Cont'd)

- **Future Thrusts:**
  - Assessment Of Program Products Impact On Agency Engineering And Program/project Management Activities
  - Increase Effort On Lessons Learned – Standards Integration Initiative. Currently Resource Constrained
  - Increase Activities Within Agency For Both NASA Developed Standards Proposals And VCS Development Participation.
  - Explore New Venues The Technical Standards Program Products And Operational Format Can Contribute Relative To Better Contributing To Agency's Engineering Capabilities And NASA Administrator's "One NASA Initiative.

Figure 3