Strategic Plan of the Consultative Committee for Space Data Systems

STRATEGIC PLAN
OF THE
CONSULTATIVE COMMITTEE FOR
SPACE DATA SYSTEMS

December 1999

DOCUMENT CONTROL

Document	Title	Date	Status
CCSDS A01.1-Y-1	Strategic Plan of the Consultative Committee for Space Data Systems	December 1999	Current issue

This document is published and maintained by:

CCSDS Secretariat
Program Integration Division (Code MT)
National Aeronautics and Space Administration
Washington, DC 20546, USA

CCSDS CHARTER[1]

PREAMBLE

The major space agencies of the world recognize that there are benefits in using standard techniques for handling space data and that, by cooperatively developing these techniques, future data system interoperability will be enhanced. In order to assure that work towards standardization of space-related information technologies provides the maximum benefit for the interested agencies, both individually and collectively, an international Consultative Committee for Space Data Systems (CCSDS) is established as a forum for international cooperation in the development of data handling techniques supporting space research, including space science and applications, for exclusively peaceful purposes.

PURPOSES

The purposes of the CCSDS are as follows:

1) to provide a forum whereby interested agencies may exchange technical information relative to the development or application of standards for space-related information technologies;

2) to identify those common elements of space data systems which, if implemented in a standardized way, will result in significant enhancements in the operation of future cooperative space missions, or in the sharing of mission products;

3) to develop through consensus appropriate Recommendations that will guide the development of agency infrastructure so that interoperability is maximized;

4) to facilitate and promote the use of software and hardware developed under the CCSDS program by all participating agencies;

5) to promote the application of the Recommendations within the space mission community; and

6) to maintain cognizance of other international standardization activities that may have direct impact on the design or operation of space mission data systems.

[1] The CCSDS Charter was originally approved in 1982. It was updated in May 1999.

This Strategic Plan of the Consultative Committee for Space Data Systems (CCSDS) has been reviewed and approved by the undersigned CCSDS Member Agency Heads of Delegation.

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Contents

Section *Page*

Introduction *1*

Vision *2*

Mission *2*

Strategic Goals *3*

Domains for Standardization *4*

Annex A Definitions *6*

Figure

Space Mission Service Domains *4*

Introduction

The Consultative Committee for Space Data Systems (CCSDS) was formed in 1982 by letter of agreement, signed by responsible officials of the participating national and international space agencies. In 1990, Technical Committee 20 (TC 20) of the International Organization for Standardization (ISO) formed Subcommittee 13 (SC 13), Space Data and Information Transfer Systems. Recognizing CCSDS as a leading international authority in standards for space-related information technologies, ISO agreed that CCSDS has the primary responsibility for technical development of ISO TC 20/SC 13 standards.

Since its formation in 1982, the CCSDS has developed and published in excess of two dozen Recommendations for Space Data System Standards, the majority of which have become full international standards and are currently in widespread use across the international space community.

The purposes of the CCSDS are contained in the Charter (above). Essentially, they are to provide a forum in which the CCSDS Agencies can discuss common space data communications problems and arrive through consensus at standard solutions to those problems, thereby increasing interoperability among agencies and decreasing costs. This strategic plan defines the vision, mission, strategic goals, and domains for standardization for the CCSDS as a whole and for its technical panels. It also reaffirms the agreement entered into by the founding agencies of the CCSDS.

This Strategic Plan is supplemented by a separate Operating Plan that provides organizational details and contains the CCSDS Technical Panel Plans of Work based on the contents of this Strategic Plan. The Strategic Plan has been approved by the CCSDS Member Agency Heads of Delegations to the CCSDS. The Operating Plan has been established and will be maintained by the CCSDS Management Council.

Vision

The vision of the CCSDS is to promote the interoperability of space mission information systems by leading the international standardization activities that integrate these systems with the Global Information Infrastructure.

The CCSDS thus promotes the enhancement of the international exploration and utilization of space while simultaneously realizing significant savings in cost and development time for all participants and increasing the use and value of the information gathered.

Mission

The mission of CCSDS is to provide the means whereby space agencies can reach voluntary consensus on standardized solutions to common problems associated with the design of interoperable space mission information systems. The fruits of that consensus are made available across the space community in the form of new international standards along with hardware and software that facilitate their adoption.

The CCSDS is therefore committed to providing the environment and infrastructure whereby:

- The international space community—space agencies and their partners—will openly discuss common problems associated with implementing space mission information systems so as to identify where standard solutions will be beneficial.
- Technical experts within the community will adopt, adapt, or develop the necessary Recommendations. The resources needed for these activities will be provided primarily by the participating agencies at levels commensurate with their individual requirements. Where mutual interests exist, the CCSDS will develop alliances with other organizations as appropriate.
- The community will formally review and comment on those Recommendations as their development progresses.
- The CCSDS Agencies will approve the publication of Recommendations when their review is complete and consensus is achieved.
- The Recommendations will be available for adoption and use across the community.

In executing this mission, the CCSDS is determined to:

- adopt or adapt current Global Information Infrastructure standards where advantageous;
- develop new Recommendations for critical space-related information technologies where current standards are considered to be inadequate;

- allow the agencies (at their individual discretion) to open the standardization process, on a voluntary basis, to all interested parties across their government, private sector, and academic space communities;

- use experimentation and demonstration as integral components of Recommendation development;

- encourage partnerships between space agencies and the commercial sector to produce off-the-shelf hardware and software so that the Recommendations can be used to build space mission information systems that are scaleable, fast to integrate, low in cost, and interoperable among different users.

Strategic Goals

The Strategic Goals of the CCSDS are:

- to maintain and propagate the existing set of CCSDS space mission information system interchange techniques that currently support the needs of virtually all spacecraft in the vicinity of Earth and deep space;

- to extend these existing capabilities to meet the new requirements of international missions to be flown in the first decade of the new millennium, including:

  – constellations of spacecraft in the vicinity of Earth,
  – constellations of spacecraft in deep space, and
  – orbiting and in-situ landed vehicles deployed around and on other Solar System bodies;

- to use these aggregate capabilities to stimulate the buildup of an internationally interoperable space data communications and navigation infrastructure throughout the Solar System, to support a mix of both robotic and eventual human exploration;

- to play a leading role in the development of standardized communications and navigation capabilities to support international planetary exploration;

- to exploit the power of standardization to achieve significant reductions in mission costs and integration time, while supporting increased performance, safety, and reliability;

- to accomplish these advancements by encouraging the adoption of standardized, interoperable data and information transfer systems across the international space community and by encouraging the development of space as a commercial marketplace;

- to increase the value of the information gathered by space missions by enabling its long-term preservation and by making the data interpretable and accessible by the widest contemporaneous audience and by future generations;

- to define profiles from new and existing standards to be used to facilitate interoperability among agencies.

Domains for Standardization

The CCSDS will promote standardization across the three space mission information system service domains illustrated in figure 1 and described in the text that follows.

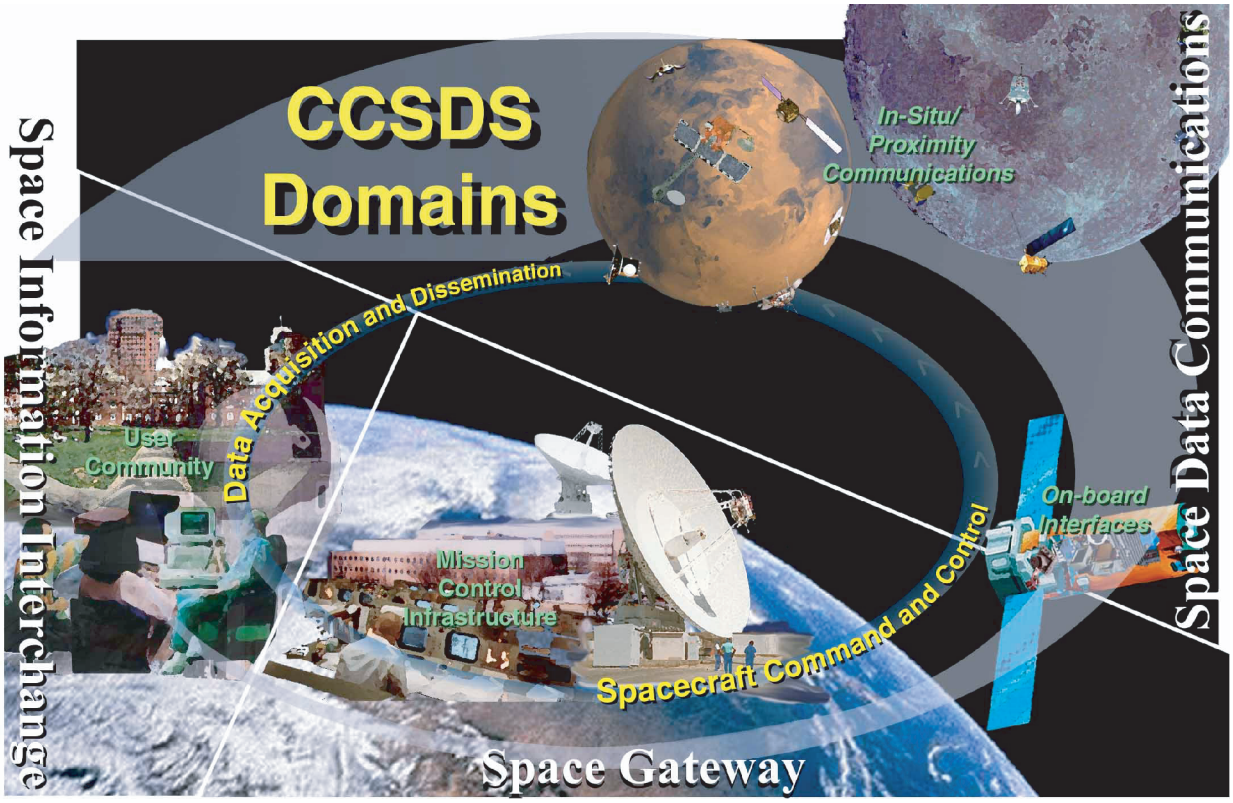

Figure 1: Space Mission Information System Service Domains

- ***Space Data Communications Services*** that allow user applications to exchange information through the data networks that interconnect the space and ground segments of the mission operations system—these services will allow in-space deployment of applications that are functionally equivalent to their counterparts in the Global Information Infrastructure, so that "space uniqueness" will be confined to the space segment.

- ***Space Gateway Services*** that are needed to interface the space data communications services with the ground segment of the operations system—these services are required because, for reasons of protocol compactness and efficiency, the raw space communications services are often not designed to traverse the ground segment independently.

- ***Space Information Interchange Services*** that enable the long-term preservation of space mission-related information and facilitate access to and exchange of that information across the Global Information Infrastructure and the space mission information systems infrastructure—these services will increase the value of information gathered from space by enabling it to be transparently used by current and future users of the information infrastructure.

Annex A

Definitions

Global Information Infrastructure (GII): a conceptual worldwide assembly of systems that integrates five essential components:

- communications networks, such as telephone, cellular, cable, and satellite networks;
- information equipment/appliances, including computers, televisions, and telephones;
- information resources, including educational materials, medical databases, and entertainment and commercial programs;
- applications, such as telemedicine, electronic commerce, and digital libraries; and
- people of all skill levels and backgrounds.

The GII will continually evolve as it incorporates more advanced technologies, new information, new consumers, and different ways to use its resources.

profile: a selection of standards or options that can be used together to provide a certain level of interoperability.

Recommendations for Space Data System Standards (Recommendations): technical specifications for space-related information technologies, developed by the CCSDS technical panels and recommended by the CCSDS as the basis for agency standardization. CCSDS Recommendations are often simply adopted as agency standards. They are routinely submitted to ISO for adoption as international standards.

spacecraft: in the context of this Plan, any spaceborne satellite, vehicle, or installation, including launch vehicles, orbiting observatories, science and technology vehicles, space stations and their supply vehicles, planetary rovers and landers, etc.

space mission information systems: information systems involved in the command and control of spacecraft and in the acquisition and dissemination of data from those spacecraft. These systems do not include systems that provide communications services to the users of commercial communications satellites.

space-related information technologies: technologies that enable space mission information systems.