The Consultative Committee for Space Data Systems

SPACE ASSIGNED NUMBERS AUTHORITY (SANA)— ROLE, RESPONSIBILITIES, POLICIES, AND PROCEDURES

DRAFT CCSDS RECORD

CCSDS 313.0-Y-0.2

DRAFT YELLOW BOOKMAY 2009FOREWORD

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DOCUMENT CONTROL

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CONTENTS

1 INTRODUCTION

1.1 PURPOSE

The purpose of this document is to define the Space Assigned Numbers Authority (SANA), its role, responsibilities, policies, and procedures within the Consultative Committee for Space Data Systems (CCSDS).

1.2 DOCUMENT SCOPE

This document defines the SANA realm of responsibilities. The assignment of the SANA operator and the liaison roles to other standards organizations or space-related organizations is the responsibilities of the CCSDS Management Council (CMC).

1.3 APPLICABILITY

This document is applicable to the CCSDS process of defining specifications of protocols. It defines an entity and a process that would constitute a registry of objects that will be used by protocol designers and implementers. However, this document, like the SANA entity, is administrative in nature and does not contain any protocol specification.

1.4 RATIONALE

As in many protocol engineering standards organizations such as the Internet Engineering Task Force (IETF), the Institute of Electrical and Electronics Engineers (IEEE), or the Third-Generation Project (3GPP), there is a need to separate immutable and slowly changing objects from the protocol specification. These objects are put into registries and managed by the operator of the registries on behalf of the engineering community. Separating the objects from the protocol specification enables the updating of the objects without modifying the protocol specification, which is a much longer and more tedious process than modifying the corresponding registry.

It is important to note that SANA is running as a service to the CCSDS Working Groups (WGs) and to the space engineering and operations community.

1.5 DOCUMENT STRUCTURE

After providing an overview, the document describes the scope and the role of the to-be-created SANA. Then the requirements for running SANA are listed. The registration rules that govern how SANA will accomplish its duties are defined.

The document then describes the relationship between SANA and the other stakeholders within CCSDS, such as the CCSDS Engineering Steering Group (CESG), the CMC, and WGs.

The work on registries is then described along with the required SANA infrastructure to provide its services.

An appeal process is described in case of issues regarding the work of SANA.

Finally, a process is described for the few pre-SANA registries that existed before the creation of SANA.

1.6 REFERENCES

The following documents contain provisions which, through reference in this text, constitute provisions of this Manual. At the time of publication, the editions indicated were valid. All documents are subject to revision, and users of this Manual are encouraged to investigate the possibility of applying the most recent editions of the documents indicated below. The CCSDS Secretariat maintains a register of currently valid CCSDS Publications.

[1] *Restructured Organization and Processes for the Consultative Committee for Space Data Systems*. Space Data System Standards, CCSDS A02.1-Y-2. Yellow Book. Issue 2. Washington, D.C.: CCSDS, April 2004.

2 OVERVIEW

The “Restructured Organization and Processes for the Consultative Committee for Space Data Systems” Yellow Book (reference Error: Reference source not found) published in April 2004 defines SANA as the following:

> ### 1.4.6 SPACE ASSIGNED NUMBERS AUTHORITY (SANA)
>
> The core registrar for the CMC’s activities is the SANA. Many space mission protocols require that someone keep track of key protocol numbering assignments that were added after the protocol came out. Typical examples of the kinds of registries needed are for Spacecraft IDs, protocol version numbers, reserved APIDs and SFDU Control Authorities. The SANA provides this key configuration management service for CCSDS. The CMC approves the organization that will act as the SANA. Its public interface is focused through web-based services provided by the Secretariat.

This document defines the roles, responsibilities, policies, and procedures that will be used to implement and guide the work of the SANA implementation and services.

3 SANA SCOPE AND ROLE

3.1 SCOPE

SANA assigns and registers CCSDS protocol parameters and other CCSDS objects as directed by the criteria and procedures specified in CCSDS documents. SANA is the core registrar and first-level authority for CCSDS registries.

SANA manages only the protocol registries of the CCSDS, which owns the corresponding protocol space. Whenever a protocol space is not owned by CCSDS but its registry is of use to the CCSDS community, SANA may make reference to that external registry. For example, if CCSDS is using IP port numbers, SANA may reference the Internet Assigned Numbers Authority (IANA) port numbers registry within the SANA site, for convenience to the CCSDS community. However, SANA shall not make any assignments of that protocol space, since it is not owned by CCSDS.

Any liaison role to other standards bodies is defined and managed by the CMC.

3.2 ROLE

SANA is a service that provides technical configuration management and public access to registries of the CCSDS engineering community. The engineering design of CCSDS standards track and other documents is done within CCSDS WGs. SANA does not do such engineering. However, SANA staff will have to do some technical interpretation of CCSDS WGs' requirements, so SANA should be staffed appropriately.

It is expected that the vast majority of SANA registries will be publicly available, but some provisions are made for restricted access to some registries.

From time to time, the work and services that SANA provides will evolve as the engineering needs change.

3.3 CREATION AND TERMINATION

The existence and role of SANA are defined in this document and approved by the CMC. SANA is created by the CMC and reports administratively to the CMC and technically to the CESG. The CMC may terminate SANA at any time but should determine what alternative approach is to be used to maintain the registries after SANA termination.

3.4 REQUIREMENTS

The SANA role and function must adhere to the following requirements:

- Accountability: requests to create or modify registries are tracked and managed.

- Traceability: all requests and changes can be viewed or audited by the community, to the extent permitted by the CCSDS standards track document that specified the particular registry, and to the extent permitted by security concerns.
- Security: Registries shall be verifiable for their content in a secure manner based on best practices. Registry files shall be copied and used by the CCSDS community, the space agencies, and industry. Some registries might also be embedded into products. Therefore, a digital signature is required to provide a way of verifying the consistency of the registry by the community at any time. The digital signature provides both the integrity validation and the source validation. SANA will provide registry support to all CCSDS members in a non-discriminatory manner. However, there may be security processes that could restrict access to certain entries or to distributed sections of the registry as specified in the defining document.

3.5 SANA OPERATOR

The CMC appoints an organization or individual(s) to carry the task of creating, managing, modifying, and publishing the CCSDS registries. This organization is defined as the SANA operator. The process of choosing and designating the SANA operator is carried out by the CMC.

3.6 CESG RELATIONSHIP

The CESG shall notify SANA when a document is being considered for approval. SANA shall then provide to the CESG an assessment of whether a new registry, a new entry in an existing registry, or a modification to an existing registry is required and whether SANA has all the information it needs to execute such a task. When clarifications are needed, they should be handled prior to final approval of the document.

3.7 SANA CONSIDERATIONS SECTION

A SANA Considerations section shall be included in all CCSDS standards track documents. That SANA considerations section shall give sufficient information for SANA to make assignments, changes, or new registries. Even if the CCSDS standards track document does not add requirements to registries managed by SANA, the standard SANA section shall indicate that.

3.8 CCSDS WORKING GROUP RELATIONSHIP

SANA shall work with CCSDS WGs to develop any missing criteria and procedures, which the SANA shall adopt when so instructed by the CESG or when a new issue of this document with the new procedures is approved.

SANA shall provide guidelines to help protocol authors to write their SANA Considerations sections with the appropriate information. These guidelines should include the various ways to handle registration and shall include a template for the SANA Considerations section. The template should be incorporated in the CCSDS Publication Manual.

3.9 NEW REGISTRIES

Starting at SANA creation, all new protocol registries required by CCSDS documents.A new registry shall be created by SANA based on a CCSDS-approved document where the instructions to create the registry and the registration rules to add new registrations are documented.

SANA shall notify the CESG and the related WG chairs when a new registry is ready for a preliminary or final review. The Area Director of that WG or the CESG chair shall approve the registry. SANA shall publish the approved registry.

3.10 REGISTRATION RULES

SANA is the registration clerk, and it does not define the registration rules. Its role is to apply the rules defined in CCSDS protocol documents approved by the CMC to any new registration requests or changes to the registries.

The CCSDS document requesting the creation of a new registry must define which one of the following registration rules is to be used for adding new entries or for making changes to the registry:

a) Change requires a CCSDS approved document.

b) Change requires an engineering review by a designated expert. The expert for that registry is assigned assigned by the CESG based on the WG recommendation.

c) Change requires no engineering review, but the request must come from the official representative of a space agency that is a member of the CCSDS. The official representative of an agency may differ for each registry.

d) Change requires no review; assignments are done on a first-come, first-served basis.

In the CCSDS document that defines the creation of a registry, the registration rule for that registry must be defined either within the above set of rules or by another rule. This restriction provides guidance to SANA on how to make assignments of new parameters for that registry. The identification of this rule is part of the template included in the SANA Considerations section of the document.

3.11 DELEGATION

Sub-registries, such as ranges of codepoints or sub-namespaces within a registry, may be delegated to other organizations, such as CCSDS member agencies or other organizations. In these cases, the delegated space within the SANA registry points to the delegated registry.

For registries that existed before SANA was created, the whole registry is grandfathered and delegated to the organization already handling the registry. SANA will create a link to the registry.

3.12 MODIFICATION TO THE STRUCTURE OF REGISTRIES

SANA must not change the structure of any CCSDS registry without prior consent of the CESG or without a change in the CCSDS specification that created the registry. An example of a structure change is a change to the data model, such as the addition of a field or a change to the length or characteristics of a field. If a registry space is full and cannot accommodate more registrations, SANA cannot change the field length to accommodate more registrations until such a change is documented appropriately (such as in a CCSDS standards track document) and approved. This structure change requires an engineering review and should be done through the CCSDS engineering process, such as through review by the appropriate WG.

SANA shall advise the CESG about other considerations related to system engineering of the CCSDS protocol parameters registries. For example, SANA shall notify CESG when a registry space is nearing its full capacity, based on the rate of registration requests.

3.13 ASSIGNMENT REQUESTS TO AN EXISTING REGISTRY

Upon receiving assignment requests, SANA shall, in a timely manner, either execute such assignments under the registration rule specified in the CCSDS standards track document that created the registry, or deny them for non-conformance with applicable technical requirements, based on the instructions to SANA given in the related protocol documents.

3.14 SOURCE REGISTRY FILES

The SANA operator is responsible for maintaining the source of the CCSDS registry files. The SANA operator shall publish the CCSDS registries as well as related documents and objects to the appropriate places and services defined by the CESG, nominally by a web interface.

While the SANA will follow the instructions in the CCSDS documents on how to structure a registry, a registry should normally have strong data typing. Currently, it is envisioned that the native format of the SANA source registries will be XML. However, presentation formats such as XHTML might also be provided by SANA. Related files such as schemas and style sheets are to be designed and provided by SANA.

3.15 SANA INFRASTRUCTURE

In order to carry its custodianship of the CCSDS registries, the SANA operator should have the following infrastructure in place for its operations.

- **File or database system to hold the registries and related files**.

- **A ticket tracking system, to track all requests for registrations, as well as requests from WGs for new registries or modifications to registries**. All electronic communications with a registrant or other CCSDS members regarding a specific request should go through the ticket tracking system. Any other communications means, such as fax, voice or video call, or paper shall be referenced in the relevant ticket. The ticket tracking system may be viewed or audited by the CCSDS management (CMC and CESG). Whenever feasible, SANA customers should be able to check the status of their requests online.

- **A versioning and archiving system, to enable the viewing of the history of a registry**. Any modification to a registry should contain a note referring to the ticket number of the tracking system for that modification. This system should be viewable by the CCSDS community, by means proposed by the SANA operator and agreed to by the CESG. For a given registry, the CESG or the CCSDS document might request disabling this feature.

- **Digital signature system, for digitally signing registries**.

The SANA operator shall make available to the CCSDS community, on-line and free of charge, information about each current assignment, according to the specified security requirements, whenever appropriate.

SANA shall provide on-line facilities for the interested parties to request CCSDS protocol parameter assignments.

3.16 PROCESS AND APPEAL

If in doubt or in case of a technical dispute, SANA shall seek and follow technical guidance exclusively from the CESG. Where appropriate the CESG shall appoint an expert to advise SANA.

In the event of technical dispute between the SANA and the CESG, both shall seek guidance from the CMC, whose decision shall be final.

A.1.1.1.1.1.1.1

REGISTRY CANDIDATES

This annex contains a set of registries identified as candidates for initial registries when SANA is created. This list is made of formally or informally requested registries from CCSDS WGs. This list is for information purposes only. Before these registries are created or maintained by SANA, the process described in this document must be followed, including inclusion in the appropriate CCSDS documents.

Registry candidates:

- To be completed

A.1.1.1.1.1.1.2

DRAFT SANA CONSIDERATIONS SECTIONS

This annex lists the suggested SANA Considerations section proposed for inclusion in CCSDS standards track documents.

NO SANA ACTION

When there are no SANA action, the following text is suggested to be included into the CCSDS standards track document.

SANA Considerations

The recommendations of this document do not require any action from SANA.

NEW REGISTRY TO BE CREATED

When a new registry is requested to be created by SANA, the following information should be included into the CCSDS standards track document.

A SANA Considerations section for each new registry should contain:

- the name of the registry
- the structure of the registry (column names, …)
- a precise data type for each data, including boundaries
- registration rule governing how SANA will assign new parameters to that registry.

This text below is an example and should be adapted to the appropriate context.

SANA Considerations

The recommendations of this document request SANA to create the following registry(ies).

The registry named FrameID consists of a table of parameters:

FrameID: an integer between 0 and 256

Description: a string of text describing the parameter

The initial registry should be filled with the following values:

FrameID	*Description*
0	*Reserved*

1 *Basic Frame*

2 *Extended Frame*

The registration rule for new values of this registry requires no engineering review, but the request must come from the official representative of a space agency, member of the CCSDS.

CHANGES TO AN EXISTING REGISTRY

When a change to an existing registry is requested to SANA, the following information should be included into the CCSDS standards track document. The change may be adding new entries in the registry or a change in the structure of the registry. If a change in the structure of the registry is required, the SANA Considerations section should contain the same information needed to create a new registry, such as data types, boundaries, registration rule, etc.

The text below provides examples and should be adapted to the appropriate context. The first example shows the addition of new records to an existing registry. The second example shows a structural change of an existing registry.

SANA Considerations

The recommendations of this document request SANA to update the FrameID registry by adding the following two new records.

FrameID	*Description*
3	*Compatibility Frame*
4	*IPv4 packet payload*

SANA Considerations

The recommendations of this document request SANA to update the FrameID registry by adding the new name column.

The registry named FrameID consists of a table of parameters:

FrameID: an integer between 0 and 256

Name: a string of [a-zA-Z0-9] characters, limited to 256 chars maximum

Description: a string of text describing the parameter

The current registered entries will have the value as empty in their respective Name column.

The registration rule is not changed.