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| CCSDS REGISTRY MANAGEMENT Policy |

DRAFT CCSDS Record

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FOREWORD

This document describes the CCSDS Registry Management Policy and structure. This document is a product of the CCSDS Engineering Steering Group (CESG), developed by the System Engineering Area, System Architecture Working Group. The purpose of this document is to define a consistent set of procedures and policies that can be applied to the creation and management of CCSDS-wide, global and local SANA registries.

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http://www.ccsds.org/

Questions relating to the contents or status of this document should be addressed to the CCSDS Secretariat at the address indicated on page i.

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* Canadian Space Agency (CSA)/Canada.
* Centre National d’Etudes Spatiales (CNES)/France.
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# Introduction

## PURPOSE

This document describes the CCSDS Registry Management Policy and structure. This document is a product of the CCSDS Engineering Steering Group (CESG), developed by the System Engineering Area, System Architecture Working Group. The purpose of this document is to define a consistent set of procedures and policies that can be applied to the creation and management of CCSDS-wide, global and local SANA registries.

A number of different CCSDS standards make reference to common elements, such as the CCSDS agencies, members of those agencies who have particular roles regarding standards or their deployment and use, or common terminology. The purpose of this document is to clearly define a set of common registries for such elements that may be re-used and extended as needed to provide a central and accessible location for such information.

Three different types of registries are identified:

1. Registries containing agency, and other CCSDS affiliated organization, information that are managed by the agencies or organizations and their representatives;
2. Registries containing information that is global or crosses more than one CCSDS area that are managed at the CCSDS Engineering Steering Group (CESG) level; and
3. Registries that are created and managed at Area level that are managed at an Area level or delegated to a Working Group.

This document provides policies and procedures for the SANA, for agencies managing data in the SANA, for the CESG, and for the CCSDS Areas and Working Groups, for each of these three types of registries. CCSDS Areas and Working Groups are required to use these common registries in preference to creating new local versions. They may extend these common registries, following the defined procedures, where that is needed.

## APPLICABILITY

This CCSDS Registry Management Policy applies to the SANA and to all requests to the SANA made in any CCSDS documents to create and manage registries. It shall be binding on the work of CCSDS as a whole and on all CCSDS member, affiliate, and service provider organizations that supply and manage information for these registries.

## NOMENCLATURE

### Normative Text

The following conventions apply for the normative specifications in this CCSDS Policy:

1. the words ‘shall’ and ‘must’ imply a binding and verifiable specification;
2. the word ‘should’ implies an optional, but desirable, specification;
3. the word ‘may’ implies an optional specification;
4. the words ‘is’, ‘are’, and ‘will’ imply statements of fact.

NOTE – These conventions do not imply constraints on diction in text that is clearly informative in nature.

### Informative Text

In the normative sections of this document, informative text is set off from the normative specifications either in notes or under one of the following subsection headings:

* Overview;
* Background;
* Rationale;
* Discussion.

## DEFINITIONS

### The following definitions are adopted from Reference [313x0y]

**delegation**: the act of assigning responsibility for a registry to an organization.

**registration rules**: the specified rules used to manage the creation and update of a registry.

**registry**: “an information system that securely manages any content type and the standardized metadata that describes it.” The registry manages the registration of the content. The associated repository is a store for the content.

**SANA**: the on-line registry of CCSDS protocol numbers and other CCSDS information that must be publically accessible in an on-line, easily located form.

**SANA Operator**: the organization that manages and operates the SANA.

**SANA Steering Group (SSG)**: group that provides operational oversight of SANA, validation and confirmation SANA activities, and the first level of appeal for issues.

### The following definitions are adopted or adapted from Reference [a02x1y]

**CCSDS Associates:** CCSDS [Associates](http://public.ccsds.org/participation/associates.aspx) are scientific and industrial entities who create a formal tie with the CCSDS, which allows them to more closely monitor and possibly influence the technical document development process.

Associates may participate in CCSDS with the explicit approval of a sponsoring [CCSDS Member](http://public.ccsds.org/participation/member_agencies.aspx) or [Observer Agency](http://public.ccsds.org/participation/observer_agencies.aspx).

**CCSDS Liaison organizations:** [Liaison organizations](http://public.ccsds.org/participation/liaisons.aspx) are governmental or private enterprises with developmental programs in the areas of space-related data and information systems.

Liaison Organizations may participate in CCSDS with the sponsorship of a CCSDS Member Agency and approval of the CCSDS Secretariat.

**CCSDS Member Agency:** A CCSDS [Member Agency](http://public.ccsds.org/participation/member_agencies.aspx) is a governmental or quasi-governmental organization that fully participates in all CCSDS activities and provides a commensurate level of support.  Only one agency representing a given country or multinational organization may participate as a Member Agency of the CCSDS.

Only Member Agencies have CCSDS voting rights, which are exercised through Member Agency Head’s of Delegation.  Member Agency Head’s of Delegation make up the CCSDS Management Council (CMC), and meet twice a year to decide on the business and direction of the CCSDS.

**CCSDS Observer Agency:** A CCSDS [Observer Agency](http://public.ccsds.org/participation/observer_agencies.aspx) is a governmental or quasi-governmental organization that participates in CCSDS activities at a reduced level of support.

Observer Agencies may participate in CCSDS with the explicit approval of a sponsoring CCSDS Member Agency or the CCSDS Secretariat.

### The following definitions are adopted or adapted from Reference [320x0b]

**Affiliate Organization Representative (AOR)**: An individual designated by a CCSDS CCSDS Affiliate Organization PoC as the person authorized to request registry additions, changes, or deletions on behalf of the respective organization.

Each AO may have more than one AOR, and each AOR may have more than one role relative to different registries.

**Agency Representative (AR)**: An individual designated by a CCSDS Agency Head of Delegation as the person authorized to request registry additions, changes, or deletions on behalf of the respective agency.

Each CCSDS Agency may have more than one AR and each AR may have more than one role relative to different registries.

**Affiliate Organization (AO):** A CCSDS Associate or Liaison organization.

**Affiliate Organization Point of Contact (AO-PoC):** The individual who serves as principal representative of a CCSDS Affiliate Organization in dealings with the CCSDS.

**CCSDS Agency**: A CCSDS Member or Observer Agency.

**CCSDS Agency Head of Delegation (CA-HoD)**: The individual who serves as principal representative of a CCSDS Agency in dealings with the CCSDS.

**Global Spacecraft Identifier, GSCID**: The concatenation of the 2-bit Version Number (VN) and the SCID. Thus, GSCID = VN . SCID Where ‘.’ refers to the concatenation operator.

**Spacecraft Identifier, SCID**: A value used in specified fields of CCSDS-defined space data link data structures.

**space link:** a communications link between a spacecraft and its associated ground system, or between two spacecraft.

**space link protocol:** a communications protocol designed to be used over a space link (see above).

**Version Number, VN**: A field value used to differentiate CCSDS-defined transfer frames. The valid range of the currently defined VN field is shown in table 1-1 of [320x0b].

### The following definitions are adopted or adapted from Reference [630x0b]

**Control Authority Identifier (CAID)**:  A four-character restricted-domain ASCII string, which identifies an individual CA office or the SCA Agent.

**Member Agency Control Authority Office (MACAO)**: An individual CCSDS-participating Agency organization that has accepted the operational responsibilities and constraints specified within CCSDS Recommendations on SCA operations.

**Primary MACAO**: The entity in the SCA organization that has overall responsibility for ensuring SCA services for its Agency and any of its Descendant MACAOs.

**SFDU Control Authority (CA)**:  An organization under the auspices of CCSDS which supports the transfer and usage of SFDUs by providing operational services of registration, archiving, and dissemination of data descriptions. It comprises:

• The SANA, acting for the CCSDS as the CA Agent

• Member Agency Control Authority Offices (MACAOs)

**SFDU Control Authority Agent (CA Agent)**:  An organizational entity that has agreed to discharge the SCA responsibilities of the CCSDS Secretariat.  The SANA acts as this agent.  Overall SCA responsibility rests with the SANA.

**Standard Formatted Data Unit (SFDU)**:  Data that conform to CCSDS SFDU Recommendations for structure, construction rules, and field specification definition.

### The following definitions are adopted or adapted from the SLE Reference Model [910x4b]

**service provider (provider):** An entity that offers a service to another by means of one or more of its ports is called a service provider (provider). The other entity is called a service user (user). An entity may be a provider of some services and a user of others.

**service user (user):** An entity that uses a service offered by a service provider. An entity may be a provider of some services and a user of others.

### The following definitions are adopted or adapted from Reference [X.660] and [X.680]

**ASN.1:** Abstract Syntax Notation One

**administrative role (of a Registration Authority)**: Assigning and making available unambiguous names according to the ITU-T Recommendation and/or this SANA Registry Management Policy defining the procedures for the Registration Authority.

**international object identifier tree:** A tree whose root corresponds to this X.660 and whose nodes correspond to Registration Authorities responsible for allocating arcs from a parent node.

**object (of interest):** Anything in some world, generally the world of telecommunications and information processing or some part thereof,

a)  which is identifiable (can be named); and

b)  which may be registered.

**object identifier (OID):** An ordered list of primary integer values from the root of the international object identifier tree to a node, which unambiguously identifies that node.

**registration:** The assignment of an unambiguous name to an object in a way which makes the assignment available to interested parties.

**Registration Authority:** An entity such as an organization, a standard or an automated facility that performs registration of one or more types of objects.

NOTE – For this CCSDS Registry Management Policy, the above definition of Registration Authority extends the term to cover registration by the SANA and other CCSDS organizations acting at agency, CCSDS, and Area or WG levels, and by other means.

**registration procedures:** The specified procedures for performing registration and amending (or deleting) existing registrations.

### The following definitions are adopted or adapted from Reference [X.690]

**BER:** Basic Encoding Rules of ASN.1

**encoding (of a data value):** The complete sequence of octets used to represent the data value.

### The following definitions are specified in this document:

**Affiliate Organization Registry:** the registry of CCSDS associates and liaison organizations that is part of the CCSDS Organization registry.

**Agency Registry:** the registry of CCSDS member and observer agencies that is part of the CCSDS Organization registry.

**Assigned by CCSDS:** values of the identifiers are assigned by CCSDS (SANA) upon request by Agencies or Affiliates.

**Defined by CCSDS**: registry design and values of the identifiers are defined by CCSDS as part of the specification of the registry.

**Ground Station Site / Antenna Registry:** the registry of ground station sites and associated antennas (ground stations) that is one of the SANA Organization registries.

**Managed by Agencies**: values of the identifiers are specified independently by the CCSDS Agency or Affiliate that controls their contents of the registry.

**Managed by CCSDS Area**: values of the identifiers are specified independently by the CCSDS Area that controls the registry. Areas may delegate the registry design and management responsibility to a Working Group while that WG is in operation.

**Managed by CCSDS Engineering Steering Group (CESG)**: values of the identifiers are specified independently by the CESG which controls the contents of the registry. The CESG may delegate the registry design and management responsibility to a CCSDS Expert Group.

**Managed by projects**: values of the identifier are specified independently by the projects that control their contents of the registry.

**Member Agency Registry:** the registry of CCSDS member agencies that is part of the CCSDS Agency registry.

**Observer Agency Registry:** the registry of CCSDS observer agencies that is part of the CCSDS Agency registry.

**OID Registry:** the registry of ISO compliant Object Identifiers (OID) that are used to unambiguously identify CCSDS protocol elements, data types, organizations, persons, resources, and spacecraft.

**Organization Registry:** the registry of all Organizations that participate in CCSDS activities. It includes the Agency and Affiliate Organization Registries.

**Person Registry:** the registry of CCSDS individuals with actives roles in SANA management and operations that is one of the SANA Organization registries.

**Roles Registry:** the registry of organization and person roles used in the SANA Organization registries.

**Service Provider Registry:** the registry of organizations that provide services communications, data, or operations services that is one of the SANA Organization registries.

**Spacecraft Registry:** the registry of spacecraft, spacecraft identifiers, names and aliases provided in the SANA Organization registries.

**Terminology Registry:** the registry of terms, glossary entries, and abbreviations that is one of the SANA Organization registries.

**XML Schema Registry:** any of the registries of XML schema that are stored in the SANA.

## References

The following publications are referenced in this document. At the time of publication, the editions indicated were valid. All publications are subject to revision, and users of this document are encouraged to investigate the possibility of applying the most recent editions of the publications indicated below. The CCSDS Secretariat maintains a register of currently valid CCSDS publications.

 [IANAURN] Formal URN Namespaces, Internet Assigned Numbers Authority (IANA), <http://www.iana.org/assignments/urn-namespaces/urn-namespaces.xhtml>

[SANAURN] CCSDS URN Namespace, Space Assigned Number Authority (SANA), <http://sanaregistry.org/r/urn>.

[A20x0y] CCSDS Publications Manual, CCSDS A20.0-Y-4, April 2014

[A02x1y] Organization and Processes for the Consultative Committee for Space Data Systems, CCSDS A02.1-Y-4, April 2014

[SANA] Space Assigned Numbers Authority (SANA)--Role, Responsibilities, Policies, and Procedures, CCSDS 313.0-Y-1, July 2011

[315x1y] CCSDS URN Namespace Policy, CCSDS 315x1y0, November 2014, to be revised

 [320x0b] CCSDS Global Spacecraft Identifier Field: Code Assignment Control Procedures, CCSDS 320x0b6c1, October 2013

[630x0b] Standard Formatted Data Units – Control Authority Procedures, CCSDS 630x0b1, June 1993, to be revised

[910x4b] Cross Support Reference Model – Part 1: Space Link Extension Services, CCSDS 910x4b2e1, October 2005

[921x1r] Cross Support Transfer Service - Specification Framework, Issue 2, CCSDS 921.1-R-2, May 2014

[X.660] ITU-T, X.660, Information technology – Procedures for the operation of object identifier registration authorities, July 2011

[X.680] ITU-T, X.680, Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation, November 2008

[X.690] ITU-T, X.690, Information technology – ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER), November 2008

[RFC2141] URN Syntax, IETF RFC 2141, May 1997

[RFC2276] Architectural Principles of Uniform Resource Name Resolution, IETF RFC 2276, January 1998

[RFC3061] A URN Namespace of Object Identifiers, IETF RFC 3061, February 2001

[RFC3401] Dynamic Delegation Discovery System (DDDS) Part One: The Comprehensive DDDS, IETF RFC 3401, October 2002

[RFC3406] Uniform Resource Names (URN) Namespace Definition Mechanisms, IETF RFC 3406, October 2002

# CCSDS Registry Management DESCRIPTION

## Space Assigned Numbers Authority OVERVIEW

The CCSDS has defined the Space Assigned Numbers Authority (SANA) as the core registrar for CCSDS activities. 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 CCSDS also registers other standards related information, such as agencies, service and data providers, XML schema, a Glossary of terms, and other information that is used across CCSDS. The SANA provides these key configuration management services for CCSDS in a web browser accessible form at <http://www.sanaregistry.org> that may also be accessed via programmatic interfaces using HTTP/REST.

## SANA USE CASES

The SANA may be used in both static and dynamic modes. It can be used by mission, operations, or CCSDS staff to look up information using a web browser. Because it is hosted in an on-line service with a programmatic interface it may also be queried dynamically as an interactive service. Here are several possible use cases for the SANA. This list make no pretense at being either exhaustive or complete:

1. Look up agency, service provider, or other organization point of contact
2. Identify potential service providers
3. Identify PoC to request new spacecraft identifier spacecraft identifier (SCID), Object Identifier (OID), or assigned protocol number.
4. Determine existing protocol identifiers
5. Register new XML schema, validate XML documents against existing schema validators
6. Lookup existing SCID or OID to determine type or owner
7. Translate URN or OID name into an on-line reference URL
8. Lookup CCSDS terms to identify meaning, relationships, and sources
9. Support CCSDS working groups with single point, on-line, access to terminology and other registries
10. Find links to service providers, their service catalogs, and service commitment organizations
11. Update organization and Point of Contact information to keep it up to date

## SANA REGISTRY OVERVIEW

The SANA YB [SANA] defines the roles of the SANA and the SANA Operator. The SANA Operator creates new registries based on a CCSDS-approved document where the instructions to create the registry and the registration rules to add new registrations are documented. The SANA Operator is to review any requests for new registries and notify the CESG of any issues such as similar registries or objects being registered more than once.

A 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:

1. Change requires a CCSDS approved document.
2. Change requires an engineering review by a designated expert or group. The expert for that registry is assigned by the CESG based on the WG recommendation.
3. 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.
4. 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 must be defined either within the above set of rules or by another rule. These rules provide guidance to the SANA operator on how to make assignments of new parameters for that registry. The CCSDS document that defines the registry must define the rules to be followed for update, modification, or removal of entries.

This document provides specific guidance for the creation, management, and use of registries containing agency, organization, or other cross-cutting information. These registries are usually of type b) “change requires an engineering review” and type c) “change requires a request from an official representative of a space agency”. It also defines a registry management approach that will support re-use of existing registries of information instead of creating new ones at a WG level, which has been the practice to date.

The rationale for this added guidance is to encourage management and re-use of common types of registry information that cross cut CCSDS information objects and that may be referenced by more than one Area, Working Group, or group of related standards. It is intended to define a level of consistency across all of the SANA registries.

To organize the set of SANA registries this document defines three classes of registries:

1. Registries for agencies, affiliated organizations, points of contact, and information owned and provided by these organizations;
2. Registries that hold global or cross cutting information that, for consistency, must be managed at the top engineering level in CCSDS, the CESG;
3. Registries that hold information local to an Area or Working group and that may be managed locally.

The next sections describe these different registry classes in more detail.

## CCSDS ORGANIZATION REGISTRIES

The following sections describe a registry structure for managing the information related to CCSDS member & observer agencies, affiliated organizations such as CCSDS associates and liaisons, and the persons who are points of contact or who otherwise have roles in CCSDS and in SANA. Figure 1-1 shows graphically the relationships among these elements and the registries that they manage.



**Figure 1-1: Agency / Representative & Registry Model**

The following sections describe each of these registries and their relationships. These reflect CCSDS policies for organizations and sponsorship, as documented in the CCSDS Organization and Processes document [A02x1y]. These registries are all managed in the SANA, by the SANA Operator, but the various agencies and other organizations are responsible for the content. The greyed out items, service catalog, service access points, and credentials are potential future registries that reflect work in development in CCSDS at the time of publication of this version of the document.

### CCSDS ORGANIZATION REGISTRY TYPES

CCSDS maintains registries for all of the CCSDS Agencies and CCSDS Affiliates. The registries include the organization information, country, affiliations, and sponsorship where appropriate. For each CCSDS Agency there is a CCSDS Agency Head of Delegation (CA-HoD) who is the primary point of contact for that agency. For each CCSDS Affiliate there is a CCSDS Affiliate Organization Point of Contact (AO-PoC). There is only one CA-HoD or AO-PoC for each organization and the entries include name, address, phone and email information and nominal period of service.

It is the responsibility of the CA-HoD to assign one or more Agency Representative (AR) and for the AO-PoC to assign one or more Affiliate Organization Representative (AOR). Each AR or AOR may have one or more roles and may be assigned responsibility for managing the contents of any registry that contains CA or AO data.

In addition to the registries for organizations, CCSDS provides registries that hold information that is requested by, or provided by, an agency or affiliate. Examples of such registries are the spacecraft identifiers (SCID), SFDU control authorities, ground stations and antennas, and service provider information (pointers to service catalogs and commitment offices). These registries types may be extended as needed.

### Organization REGISTRY Custody

All CCSDS assignments in the Organization Registries are managed by the Space Assigned Numbers Authority (SANA) [SANA]. These registries are the current normative references for all CCSDS organizations and points of contact. Other organization information may also kept in registries managed by the SANA. Each registry type may have its own registration rules, but changes to these organization registries require requests and approvals from the appropriate CA-HoD or AO-PoC, or from an AR or AOR who has been delegated responsibility for the agency entries in a registry.

## CCSDS GLOBAL REGISTRIES

### CCSDS GLOBAL REGISTRY TYPES

CCSDS maintains registries containing information that is global or crosses more than one CCSDS area that are managed at the CCSDS Engineering Steering Group (CESG) level. These registries may originate in an Area or Working Group, but they specify information that must be managed in a global forum because it is either cross cutting, affecting more than one working group, or it is global in nature, potentially affecting all working groups that reference those types of information.

Examples of registries of this type include: XML schema registries, URN namespace registry, CCSDS registry of ISO Object Identifiers (OID), the CCSDS Terminology, Terms, and Abbreviations, and the SANA itself.

Because of their global nature these registries are managed at the top engineering level of the CCSDS, the CESG. Responsibility for doing active management of the contents may be delegated by the CESG down to some working level in the organization. Typically this will be an Expert Group of some type, either assigned the responsibility or formed for the purpose, which will have members drawn from the Working Groups most involved with creating or otherwise affected by the registry.

### GLOBAL REGISTRY CUSTODY

All CCSDS assignments in the global registries are managed by the Space Assigned Numbers Authority (SANA) [SANA]. These registries are the current normative references for all CCSDS global information sets. Each registry will have its own registration rules, and changes to these global registries typically require requests from working groups and approvals from the appropriate Expert Group that has been delegated responsibility for the entries in one or more global registries. One Expert Group may be responsible for more than one global registry.

## CCSDS Identifier REGISTRIES

CCSDS maintains registries containing protocol identifiers or other standard or Working Group specific information that are created and managed at Area or Working Group level. These registries originate in a Working Group, and they specify information that typically affects only one Working Group or Area. Other Working Groups within an Area, or even other Areas, may reference these types of information, but they are essentially internal to an Area.

Examples of registries of this type include: protocol identifiers, extensions, and version numbers; data catalogs, source lists, or other locally managed information; Working Group specific data items; or any portion of the ISO OID registry that is delegated to a Working Group or Area.

Because of their local nature these registries are managed at the level of an Area. Responsibility for doing active management of the contents will typically be delegated by the Area down to some Working Group, but the Area is responsible and must identify means to manage such registries if the Working Group that created them has been retired. Typically the PoC for such registries will be a Working Group, but it may coordinate with other Working Groups within the Area most involved with creating or otherwise affected by the registry.

## SANA Registry MANAGEMENT Model

The set of registries described above can be considered as a whole. The SANA and the SANA Operator provide the framework and the machinery for registering, updating, and accessing these data. Figure 1-2 provides a view of all of the identified registries classes and how the data in these different classes of registries are managed by the CCSDS organizations.

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**Figure 1-2: Overall SANA Registry Management Model**

## CCSDS AREA AND WORKING GROUP Registry CONSIDERATIONS

The processes for the SANA are described in the SANA Yellow Book [SANA}. This document describes a generic process for CCSDS Areas or Working Groups who wish to develop new registries or extend existing registries. Areas may delegate responsibility down to a Working Group. Areas may also hold responsibility for a Area level registry at the Area executive level.

Before a new registry is proposed, or before changes to an existing registry are made, a Working Group must review the existing registries to determine if re-use or extension of existing capabilities would be acceptable. If extension of an existing registry, of any class, seems most appropriate then the proposer must contact the Registration Authority for the existing registry to explore the possible options. Every effort should be made to re-use, or make simple, conformant, extensions to existing capabilities wherever possible.

The existing registries, grouped by class, are to be found at <http://sanaregistry.org>. Each SANA registry also includes a pointer to the registration policy and the Registration Authority for the registry, as well as a pointer to the source document.

# REGISTRY MANAGEMENT POLICIES

## REGISTRY MANAGEMENT OVERVIEW

This section provides specific policies and procedures for the management and updating for the three identified classes of registries. The primary focus in this document is upon registries that are of type organization or global because of their cross cutting nature and the value of re-use of the information that they hold. The other class of registries, the identifier registries that tend to be local to an Area, may continue to be managed under whatever registration rules that the Working Group or Area deems appropriate.

All of the registries managed in the SANA must have an associated registration rule. Registries of class Organization use registration rules of type 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”. Registries of class Global use registration rules of type b) “Change requires an engineering review by a designated expert or group.”

Any new proposed registries are subject to engineering review, initially at the SANA and potentially at the SANA Steering Group (SSG) or even the CESG level. During these reviews it is possible that a proposed new registry may be identified as having consequences that merit re-assigning it from the local to the global level, or may prompt changes to the organization registry structures, such as adding new roles.

This section defines registry policies for each of the specific types of registries within each class. It also provides guidelines to be used in considering whether any new registry should be reassigned to a different class.

## CCSDS AREA AND WORKING GROUP Registry PROCESSES

This section describes a generic process for CCSDS Areas or Working Groups who wish to develop new registries or extend existing registries

1. Every CCSDS Area or Working Group that identifies a potential requirement for a new registry shall first evaluate the existing registries in the SANA.
2. Any requirement for a registry referencing agencies, organizations, persons, or agency or other service providers shall evaluate use or extension of an existing organization class registry.
3. If direct use of an organization class is possible the standard shall point to the existing registries.
4. Any requirement for a registry referencing global data, SANA, Terminology/Glossary, XML, URN, or OID shall evaluate use or extension of an existing global class registry.
5. If direct use of a global class is possible the standard shall point to the existing registries.
6. If extension to an organization or global class registry appears to be required the Area or Working group shall contact the appropriate Registration Authority.
7. Any requirement for an Area or Working Group registry shall evaluate use or extension of an existing local class registry, either within the Area or in another Area.
8. If extension to an existing local class registry appears to be required the Area or Working group shall contact the Registration Authority.
9. In some cases it may be appropriate to adapt and promote a local registry to a global class registry.
10. All new registries or extensions to existing registries shall be defined in a CCSDS Blue or Magenta Book.
11. The registry definition shall include the registry specification and the registration rules.
12. At each working meeting of any CCSDS group that acts a Registration Authority shall review and disposition proposed changes, additions, or deletions to any existing registries and contact points under their purview.

## CCSDS ORGANIZATION REGISTRIES

This section describes the policies and procedures for CCSDS registries of class Organization.

### CCSDS Agency AND REPRESENTATIVE REGISTRIES

#### CCSDS Member Agencies

1. The SANA shall implement a CCSDS Agency Registry as part of the CCSDS Organization Registry.
2. The Registration Authority for the CCSDS Agency Registry shall be the SANA Steering Group (SSG).
3. The Registration Policy for the CCSDS Agency Registry shall be c) Change requires no engineering review, but the request must come from the CCSDS Secretariat.
4. Each CCSDS Member Agency shall be registered in the CCSDS Agency registry.
5. The Member Agency entry in the CCSDS Agency registry shall have the role “Member Agency”.
6. Each CCSDS Member Agency entry shall include agency name, abbreviation, logo, address, country, type=”member”, Head of Delegation (HoD) name, and a unique OID for the agency.
7. Each country shall have only one CCSDS Member Agency.
8. The SANA shall update Member Agency entries in the CCSDS Agency registry only after approval by the CCSDS Secretariat.
9. A CCSDS Member Agency may act as the sponsor for one or more Observer Agency or Affiliate Organization in it’s country.
10. Each CCSDS Member Agency Head of Delegation (HoD) shall act as the CCSDS Management Council (CMC) member for that Member Agency.
11. Only persons from CCSDS Member Agencies may be CMC members.

#### CCSDS Observer Agencies

1. The SANA shall implement a CCSDS Observer Agency Registry as part of the CCSDS Organization Registry.
2. The Registration Authority for the CCSDS Observer Agency Registry shall be the SANA Steering Group (SSG).
3. The Registration Policy for the CCSDS Observer Agency Registry shall be c) Change requires no engineering review, but the request must come from the the CCSDS Secretariat.
4. Each CCSDS Observer Agency must be sponsored by the CCSDS Member Agency for its country.
5. If there is no CCSDS Member Agency for its country a CCSDS Observer Agency may be sponsored by the Secretariat.
6. Each country may have zero or more CCSDS Observer Agency.
7. The SANA shall update the Observer Agency entries in the CCSDS Agency registry only after approval by the CCSDS Secretariat.
8. Each CCSDS Observer Agency shall be registered in the CCSDS Agency registry.
9. The Observer Agency entry in the CCSDS Agency registry shall have the role “Observer Agency”.
10. Each CCSDS Observer Agency entry shall include agency name, abbreviation, logo, address, country, type=”observer”, Head of Delegation (HoD) name, and a unique OID for the agency.
11. A CCSDS Observer Agency may act as the sponsor for any CCSDS Affiliate Organization in it’s country.

#### CCSDS Persons Registry

1. The SANA shall implement a CCSDS Persons Registry.
2. The Registration Authority for the CCSDS Persons Registry shall be the SANA Steering Group (SSG).
3. The Registration Policy for the CCSDS Persons Registry shall be c) Change requires no engineering review, but the request must come from the Secretariat or an official representative of a space agency that is a member of the CCSDS.
4. Each CCSDS person who has a role in managing or updating any of the SANA Registries shall be registered in the CCSDS Persons registry.
5. Each CCSDS Persons entry shall include organization name, an organization reference, representative name, address, phone number, email address and a unique OID for the person.
6. Each CCSDS Person may have one or more roles assigned.
7. Valid CCSDS Roles shall be stored in a Roles Registry.
8. The Roles Registry is managed by the SANA Steering Group (SSG).
9. In alignment with the policies stated elsewhere in this document, Person Roles may be any of:
	1. CA-HoD (one per CCSDS Agency)
	2. AO-PoC (one per CCSDS Affiliate Organization)
	3. AR (one or more per CCSDS Agency)
	4. AOR (one or more per CCSDS Affiliate Organization)
	5. Credential PoC (one per agency, provider, or user organization)
	6. SCID PoC (one per agency or center, see CCSDS 320x0b)
	7. MACAO PoC (one or more per agency, see CCSDS 620x0b)
	8. Service Provider PoC (one per agency or provider)
	9. GSS/GS PoC (one per agency or provider)
	10. SANA PoC (one for CCSDS, see CCSDS 313x0y)
	11. SSG PoC
	12. SSG Member
	13. Expert Group PoC
	14. Expert Group Member
	15. Area PoC (one or more per Area)
	16. WG PoC (one or more per WG)
10. In alignment with the policies stated elsewhere in this document, Organization Roles may be any of:
	1. CCSDS Agency (Member or Observer)
	2. Affiliate Organization (Associate or Liaison)
	3. Service Provider (cross support, data, operations, relay, internetworking)
	4. Service User (cross support, data, operations, relay, internetworking)
	5. MACAO
	6. SANA Operator
11. New standards may request creation of additional Persons or Organization Roles.

#### CCSDS Agency Head of Delegation (CA-HoD)

1. The SANA shall implement a CCSDS Agency Head of Delegation Registry using the CCSDS Persons Registry.
2. The Registration Authority for the CCSDS Agency Head of Delegation Registry shall be the SANA Steering Group (SSG).
3. The Registration Policy for the CCSDS Agency Head of Delegation Registry shall be c) Change requires no engineering review, but the request must come from the Secretariat or an official representative of a space agency that is a member of the CCSDS.
4. Each CCSDS Agency Head of Delegation (CA-HoD) shall be registered in the CCSDS Persons registry.
5. The CA-HoD entry in the CCSDS Persons registry shall include the role “CA-HoD”.
6. The CA-HoD shall be responsible for ensuring the accuracy of their agency and persons information in the CCSDS Organization registry.
7. Only the CA-HoD shall be permitted to request changes to the CCSDS Organization registry information for their agency.
8. Each CA-HoD may nominate one or more Agency Representatives (AR).
9. Each AR shall be registered in the Persons registry.
10. Each CA-HoD may assign one or more roles to their ARs.
11. Each AR entry in the CCSDS Persons registry shall include the assigned role(s).

#### CCSDS Affiliate Organizations (AO)

1. The SANA shall implement an Affiliate Organization Registry using the CCSDS Organization Registry.
2. The Registration Authority for the Affiliate Organization Registry shall be the SANA Steering Group (SSG).
3. The Registration Policy for the Affiliate Organization Registry shall be c) Change requires no engineering review, but the request must come from the Secretariat or an official representative of a space agency that is a member of the CCSDS.
4. A CCSDS Affiliate Organization may be a CCSDS Associate or a Liaison Organization.
5. Each CCSDS Affiliate Organization shall be sponsored by the CCSDS Agency (Member Agency or Observer Agency) for its country.
6. If there is no CCSDS Agency for its country a CCSDS Affiliate Organization may be sponsored by the Secretariat.
7. Each country may have zero or more CCSDS Affiliate Organizations.
8. The SANA shall update the Affiliate Organization entries in the CCSDS Affiliate registry only after approval by the CCSDS Secretariat.
9. Each CCSDS Affiliate Organization shall be registered in the CCSDS Affiliate registry.
10. The Affiliate entry in the CCSDS Affiliate Organization registry shall have the role “Associate” or “Liaison” as appropriate.
11. Each CCSDS Affiliate Organization entry shall include organization name, abbreviation, address, country, type=”liaison” or “associate”, organization Point of Contact (PoC) name, and a unique OID for the organization.

#### CCSDS Affiliate Organization Point of Contact (AO-PoC)

1. The SANA shall implement a Affiliate Organization Point of Contact Registry capability using the CCSDS Persons Registry.
2. The Registration Authority for the Affiliate Organization Point of Contact Registry shall be the SANA Steering Group (SSG).
3. The Registration Policy for the Affiliate Organization Point of Contact Registry shall be c) Change requires no engineering review, but the request must come from the Secretariat or an official representative of a space agency that is a member of the CCSDS.
4. Each CCSDS Affiliate Organization Point of Contact (AO-PoC) shall be registered in the CCSDS Persons registry.
5. Each AO-PoC entry in the CCSDS Persons registry shall include the role “AO-PoC”.
6. The AO-PoC shall be responsible for ensuring the accuracy of all of their organization and representative information in the CCSDS Affiliate registry.
7. Only the AO-PoC shall be permitted to request changes to the CCSDS Affiliate registry information for their organization.
8. Each AO-PoC may nominate one or more Affiliate Organization Representatives (AOR).
9. Each AOR shall be registered in the Persons registry.
10. Each AO-PoC may assign one or more roles to each AOR.
11. Each AOR entry in the CCSDS Persons registry shall include the assigned role(s).

#### Policy on References to CCSDS Organization Registries

1. All SANA registries requiring a reference to a CCSDS Agency shall directly reference the CCSDS Agency Registry.
2. All SANA registries requiring a reference to a CCSDS Agency Head of Delegation (CA-HoD) shall directly reference the CCSDS Persons registry.
3. All SANA registries requiring a reference to a CCSDS Agency Representative (AR) shall directly reference the CCSDS Persons registry.
4. All SANA registries requiring reference to a CCSDS Affiliate Organization shall directly reference the CCSDS Affiliate Organization Registry.
5. All SANA registries requiring a reference to a CCSDS Affiliate Organization Point of Contact (AO-PoC) shall directly reference the CCSDS Persons registry.
6. All SANA registries requiring a reference to a CCSDS Affiliate Organization Representative (AOR) shall directly reference the CCSDS Persons registry.
7. Any CCSDS standard requiring a new Role in the Role Registry shall document it in a CCSDS standard and review it with the SSG.

### CCSDS PROVIDER & DATA REGISTRIES

#### Spacecraft Identifier Registry

1. The SANA shall implement a Spacecraft Identifier Registry.
2. The Registration Authority for the Spacecraft Identifier Registry shall be the SANA Steering Group (SSG).
3. The Registration Policy for the Spacecraft Identifier Registry shall be 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.
4. Each organization using CCSDS space link protocols shall request a Space Craft Identifier (SCID).
5. SCIDs shall be requested following procedures specified in CCSDS 320x0b ***(as modified)***.
6. Only an Agency Representative who has the SCID PoC Role shall be permitted to request SCIDs assignment or relinquishment.
7. The AR shall provide the spacecraft unique name, space link type(s), frequency bands, nominal launch date, and nominal end of mission which may be extended.
8. The AR may provide other information, such as spacecraft name abbreviation (3-4 letters) and other alias names for the spacecraft.
9. Only one SCID of a given type shall be assigned per spacecraft.
10. The SCID shall only be valid during the period that the spacecraft is being actively operated and tracked.
11. SCIDs shall be relinquished when they are no longer in use for operations.
12. The request for SCID assignment shall also assign and provide a unique ISO OID for the spacecraft.
13. The OID assigned to the spacecraft shall be used as the permanent, unique, identifier for the spacecraft.

#### Standard Formatted Data Unit (SFDU) Control Authority Registry

1. The SANA shall implement an SFDU Control Authority (SCA) Registry.
2. The Registration Authority for the SCA shall be the MOIMS Area.
3. The Registration Policy for the SCA Registry shall be 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.
4. The SANA shall act as the SFDU Control Authority (SCA) Agent, as defined in CCSDS 630x0b ***(as modified)***.
5. The SANA shall be the Primary SCA for CCSDS.
6. The SANA shall be assigned the Control Authority Identifier (CAID) “CCSD”.
7. Only an Agency Representative who has the Member Agency Control Authority Office (MACAO) PoC Role shall be permitted to request a CAID or changes to the MACAO registries for that organization.
8. Each CCSDS Agency that uses CCSDS standard formatted data units (SFDU), as defined in CCSDS 620x0b ***(as modified)***, should register with the SANA.
9. Each CCSDS Agency that uses SFDU shall identify an organizational element to act as the primary Member Agency Control Authority Office (MACAO).
10. Each organization that has a MACAO shall have the MACAO Role assigned.
11. Each CCSDS Agency using SFDU shall request a unique CAID.
12. The CCSDS Agency organizational element that establishes the agency CAID shall be called the Primary MACAO.
13. The AR for a CCSDS Agency may request creation of one or more descendent MACAO.
14. The SFDU namespace shall be hierarchical, with one or more sub-trees at each level.
15. Each MACAO shall have responsibility for the management and distribution of data descriptions in its namespace, as defined in CCSDS 620x0b ***(as modified)***.

NOTE – This policy only requires that the CA and MACAO organization top level elements align with the rest of the SANA organization and person structures. The MACAOs are free to use their own internal data storage and access mechanisms as in the past.

NOTE - As a future consideration the entire MACAO, including the data descriptions, could be brought into the SANA and made accessible on-line using the SANA mechanisms. ***As a further consideration, the MACAO procedures themselves could be adapted and generalized to define any of the CCSDS organization registry and sponsorship processes.***

#### Service Provider Registry

1. The SANA shall implement a Service Provider Registry using the CCSDS Organization Registry.
2. The Registration Authority for the Service Provider Registry shall be the SANA Steering Group (SSG).
3. The Registration Policy for the Service Provider Registry shall be c) Change requires no engineering review, but the request must come from the Secretariat or an official representative of a space agency that is a member of the CCSDS.
4. Only an AR or AOR with the Service Provider PoC role shall be permitted to create, update, or delete Service Provider Registry entries for that organization.
5. Each CCSDS Agency or CCSDS Associate organization that provides services should register with the SANA.
6. Each registered CCSDS Agency or CCSDS Affiliate organization that provides services shall register in the CCSDS Organization Registry.
7. Each Service Provider organization will have a unique ISO OID assigned by the Organization registration process.
8. Each Service Provider organization shall have the Service Provider Role assigned in the Organization Registry.
9. Each Service Provider organization may have one or more Service provider locations.
10. Each Service Provider location shall have a unique ISO OID assigned in the Service Provider Registry.
11. The Service Provider location OID shall be used as the permanent, unique, identifier for that location.
12. Each Service Provider location shall reference the Organization that owns and operates it (using the OID).
13. Each Service Provider organization should register the types of services that it provides.
14. The Service Types may be one of: cross support, data, operations, relay, internetworking.
15. Each Service Type shall have a unique ISO OID that is defined in a service standard.
16. Each service instance for the Service Provider and location shall have a unique ISO OID assigned referencing the appropriate Service type OID.
17. Each Service Provider should provide a pointer (URN) to their Service Catalog.
18. Each Service Provider should provide a reference to their organizational PoC (OID) that can provide information and commit to services.
19. The organizational PoC shall be registered in the Persons Registry.
20. Any CCSDS standard requiring a new Service Type shall document it in a CCSDS standard and review it with the SSG.

#### Ground Station Site (GSS) / Ground Station (GS, Antenna) Registry

1. The SANA shall implement a Ground Station Site (GSS) and Ground Station (GS) Registry.
2. The Registration Authority for the Ground Station Site (GSS) and Ground Station (GS) Registry shall be the SANA Steering Group (SSG).
3. The Registration Policy for the Ground Station Site (GSS) and Ground Station (GS) Registry shall be 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.
4. Only an AR or AOR with the GSS/GS PoC role shall be permitted to create, update, or delete GSS/GS Registry entries for that organization.
5. Each CCSDS Agency or CCSDS Associate organization that provides space communication cross support services shall register in the CCSDS Organization Registry.
6. Each Service Provider organization will have a unique ISO OID assigned by the Organization registration process.
7. Each CCSDS Agency that provides space communication cross support services shall register each GSS, and the GS it contains, with the SANA.
8. Each CCSDS Associate organization that provides space communication cross support services should register each GSS, and the GS it contains, with the SANA.
9. Each GSS location shall reference the Organization that owns and operates it (using the OID).
10. Each registered GSS shall provide information about the site, site name, location, PoC, and the GS at the site.
11. Each GSS shall have a unique ISO OID assigned.
12. Each GS shall provide information about the antenna name, antenna type, antenna diameter, supported frequency bands, location, performance (EIRP, G/T, pointing accuracy).
13. Each GS shall have a unique ISO OID assigned.

NOTE – The IOAG agencies are providing a database which contains some or all of these data. This policy recommends that this registry be provided as one of the SANA registries and that access to the registry be offered to any other service providers who wish to register their services. The information in this database is similar to that recorded in the earlier CCSDS 411x0g3s document.

#### Additional Organization & Data Registries

CCSDS working groups may identify additional registries, or sub-registries, that are most appropriately managed at a CCSDS agency level. Some types of registries that might meet this criteria are: public credential registry (for providers and users), pointers to provider and user PKI authorities (a current SEA Sec WG work item), service catalogs (a current CSS SM WG work item), or service access points (derived from CSS CSTS work items).

Some of the existing CCSDS protocols have defined what are essentially flat namespaces, with a first come / first served registry policy. Examples of these are BP agents, LTP Engines, SM&C services, AMS Nodes, etc. A more effective namespace policy might be to create a CCSDS wide set of registries for such protocol entities allowing association of the protocol entities with the organizations that own and operate them. This would also allow identification of the physical nodes, such as spacecraft, GSS/GS, relay/routing spacecraft, or operational nodes, that have well defined ownership and identities and that also operate, in many cases, as service providers.

Adoption of even a limited hierarchical namespace rooted at an agency level, and association of these protocol entities and physical nodes with organizations, would align well with present Internet practices. It could also utilize these Organization Data Registries to permit CCSDS Agencies and other service provider organizations to manage namespace assignments within their organizations.

Any changes to these CCSDS Organization Data Registries will require documenting it in a CCSDS standard and reviewing it with the SSG.

## CCSDS GLOBAL REGISTRIES

This section describes the policies and procedures for CCSDS registries of class Global. Registries of class Global cross-cut more than one Working Group or Area. Responsibility for managing these Global registries is assigned to the CCSDS Engineering Steering Group (CESG). These registries may originate in an Area or a Working Group, but they specify information that must be managed in a global forum because it is either cross cutting, affecting more than one Area and Working Group, or it is global in nature, potentially affecting all Working Groups that reference these types of information.

Responsibility for doing active management of the contents of these global registries will be delegated by the CESG down to some working level in the organization. Typically this will be an Expert Group of some type, either assigned the responsibility or formed for the purpose, which will have members drawn from the working groups most involved with creating or otherwise affected by the registry. See Sec 4 for a discussion of Expert Groups and related policies.

Examples of registries of this type include: XML schema registries, URN namespace registry, CCSDS registry of ISO Object Identifiers (OID), the CCSDS Terminology, Terms, and Abbreviations, and the SANA itself.

### Space Assigned Numbers Authority (SANA)

1. The SANA shall implement a set of Registries for the CCSDS, as documented in CCSDS 313x0y and those specified in this document.
2. The SANA Operator shall take operational guidance from the SANA Steering Group (SSG).
3. The SANA shall operate according to the policies specified in CCSDS 313x0y and those specified in this document.
4. This document shall take precedence over all other documents relating to the SANA and registries operations and policies.
5. The organization that operates the SANA shall be appointed by the CMC.
6. The organization that operates the SANA shall be registered in the SANA Organization Registry.
7. The organization that operates the SANA shall have the SANA Operator role assigned.
8. The SANA shall provide an OID assignment function that may be globally accessed.
9. The SANA shall provide an OID resolver function that returns distinguished names and locations, where applicable.
10. The SANA shall provide a URN assignment function that may be globally accessed.
11. The SANA shall provide a URN resolver function that returns URL addresses, where applicable.
12. The SANA shall provide a bi-directional URN to OID mapping function.
13. All SANA Registries shall be accessible on-line via web browser interfaces.
14. All SANA Registries shall be accessible programmatically on-line via HTTP/REST interfaces.
15. The SSG members shall be selected from the CCSDS Areas that are most affected by SANA operations.
16. The SSG members shall be registered in the Persons Registry.
17. The SSG members shall have the Role SSG Member.

### SANA Point of Contact POLICIES (SANA-PoC)

1. Only a CCSDS Persons with the SANA Registry PoC role shall be permitted to create, update, or delete Registry entries for that organization.
2. Each CCSDS Area shall identify a SANA Registry PoC.
3. A CCSDS Area may delegate the SANA Registry PoC to one or more members of a Working Group.
4. The CCSDS Secretariat shall identify a SANA Registry PoC.
5. The CCSDS Secretariat SANA Registry PoC shall be the CCSDS Chief Technical Editor or someone delegated that responsibility.
6. Every SANA Registry PoC shall be registered in the Persons Registry with Role SANA Registry PoC.
7. Any CCSDS Area may request creation of a new SANA Registry in a new or updated and approved CCSDS document.
8. Each CCSDS Area may delegate responsibility for a Registry it creates and manages to a Working Group or assigned Expert Group.

### CCSDS Terminology (GLOSSARY, TERMS, AND ABBREVIATIONS) (TERMINOLOGY)

1. The SANA shall implement a Terminology Registry, with Glossary, Terms and Abbreviations, for the CCSDS.
2. The Registration Authority for the Terminology Registry shall be the Terminology Expert Group (TEG).
3. The Registration Policy for the Terminology Registry shall be b) Change requires an engineering review by a designated expert or group.
4. A SANA Registry PoC may only request changes to the parts of these registries that they are responsible for.
5. Each CCSDS Working Group shall review the Terminology Registry, for relevant terms and abbreviations, before defining any new ones.
6. Each CCSDS Working Group shall determine whether existing terms are sufficiently broad as to cover their subject matter or if the existing terms can be specialized or generalized.
7. A CCSDS Area or delegated SANA Registry PoC shall request update of the Terminology Registry when a document containing such terms is published, updated, or retired.
8. Terminology Registry definitions shall be clear and unambiguous.
9. Terminology Registry definitions shall include metadata documenting the source of the definition.
10. Terminology Registry definitions shall include metadata documenting the relationships among definitions, such as “part of”, “owned by”, “implemented by”, or “derived from”.
11. Terminology Registry definitions shall be sortable, searchable, and hyperlinked for convenient cross reference.
12. Existing terms from authoritative sources, i.e. ITU, ISO, IETF, W3C, OMG, shall be preferred over local definitions as long as they are suitable for CCSDS.
13. The Terminology Expert Group (TEG) shall take an active role in the coordination of terminology across all CCSDS Working groups.

### CCSDS URN NAMESPACE REGISTRY (URN)

1. The SANA shall implement a URN Registry for the CCSDS, as documented in CCSDS 315x1y.
2. The Registration Authority for the URN Registry shall be the XML Expert Group (XEG).
3. The Registration Policy for the URN Registry shall be b) Change requires an engineering review by a designated expert or group.
4. The SANA Operator shall use the XEG to review requests for new URNs and to resolve any issues that arise.
5. Each CCSDS Area shall register the types of URNs that it provides.
6. A SANA Registry PoC may only request changes to the part of the sub-tree that they are allocated.
7. The URN Types shall be one of: document, schema, or registry.
8. The CCSDS Secretariat SANA Registry PoC shall update the document URN when a new document is published, updated, or retired.
9. Documents shall be identified under the urn:ccsds:document:<document number> sub-tree.
10. A CCSDS Area or delegated SANA Registry PoC shall request update of the schema URN when a new schema is published, updated, or retired.
11. Schema shall be identified under the urn:ccsds:schema:<keyword> sub-tree.
12. Any CCSDS Agency may request creation of a schema sub-tree for an agency.
13. Agency schema shall be identified under the urn:ccsds:schema: agency:<agencyid>:<keyword> sub-tree.
14. A CCSDS Agency shall identify a SANA Registry PoC to manage agency schema.
15. A CCSDS Area or delegated SANA Registry PoC shall request update of the registry URN when a new registry is created, changed, or retired.
16. Registries shall be identified under the urn:ccsds:sana:<registry\_name> sub-tree.

NOTE: A URN resolver is responsible for initiating and sequencing the queries that ultimately lead to a full resolution (translation) of a URN name or a "resolution request", e.g., a request for translation of a URN name into a URL.

### CCSDS XML REGISTRIES (XML)

1. The SANA shall implement a set of XML Registries for the CCSDS, as documented in CCSDS 315x1y.
2. The Registration Authority for all the XML Registries shall be the XML Expert Group (XEG).
3. The Registration Policy for the XML Registries shall be b) Change requires an engineering review by a designated expert or group.
4. The SANA Operator shall use the XEG to review requests for new schema registries and to resolve any issues that arise.
5. The SANA shall provide one or more CCSDS Common Schema registries that define terms that cross cut multiple CCSDS Areas.

NOTE: The MOIMS Nav GW, the CSS SM WG, the SOIS APP WG, and the OMG (QUDT) all have existing or in work XML Schemas that are suitable for this purpose. This proposes doing the work to make these available in a global sense.

1. Each CCSDS Area shall register the XML schema that it provides.
2. A SANA Registry PoC may only request changes to the schema registries that they create.
3. The CCSDS Secretariat SANA Registry PoC shall update the XML schema registries when a new document is published, updated, or retired.
4. XML schema shall comply with the CCSDS XML Schema Guidelines (TBS).
5. All XML schema shall utilize terms that are defined in the CCSDS Terminology Registry.
6. Any new, unique, terms or abbreviations that are required for XML schema shall be added to the Terminology Registry.
7. Any Area producing XML schema shall ensure that the Terms and abbreviations used are self-consistent across all the WG in the Area.

### ISO Object Identifier (ISO OID) Registry

1. The SANA shall implement an ISO conformant Object Identifier (OID) Registry for the CCSDS, as described in CCSDS 921.1-R-2 [921x1r] and extended in Annex A of this document.
2. The Registration Authority for the top level CCSDS OID tree shall be the SANA Steering Group (SSG).
3. The Registration Policy for the ISO Object Identifier (OID) Registry shall be b) Change requires an engineering review by a designated expert or group.
4. The SANA Operator shall use the SSG to review requests for new OID sub-trees and to resolve any issues that arise.
5. CCSDS shall use the ISO OID Registry to assign unique identifiers to protocol elements, data types, organizations, persons, resources, and spacecraft.
6. OIDs may be displayed in ASN.1 notation “{iso(1) identified-organization(3) standards-producing-organization(112) ccsds(4)}” form [X.680] or in IETF dot notation “1.3.112.4” [RFC3061].
7. OIDs may be encoded as an ASCII string or in one of the ASN.1 encodings specified in ITU-T, X.690, ASN.1 BER encoding rules [X.690].
8. Any CCSDS standard requiring a new OID type in the OID Registry shall document it in a CCSDS standard and review it with the SSG.
9. The CCSDS OID tree shall be rooted at {iso(1) identified-organization(3) standards-producing-organization(112) ccsds(4)}, or 1.3.112.4.
10. New OIDs shall be registered under the appropriate sub-tree.
11. Each organization registered with CCSDS shall have a unique OID assigned when the entry is created.
12. Each person registered with CCSDS shall have a unique OID assigned when the entry is created.
13. Each spacecraft registered with CCSDS shall have a unique OID assigned when the spacecraft SCID is registered.
14. Each resource (site, antenna, service provider, service component) registered with CCSDS shall have a unique OID assigned when the entry is created.

NOTE: OIDs may designate a variety of different things, including: objects, types, instances, organizations, persons, or concepts. See Annex A for the current CCSDS ISO OID structure assignments. Further open source information on OIDs may be found at: <http://www.oid-info.com>. OIDs, in either ASN.1 BER or IETF dot form tend to be opaque to humans, but they are convenient for computers.

### ISO OID Sub-Tree POLICIES

1. Each CCSDS Area shall register the types of OID that it provides.
2. A CCSDS Area or delegated SANA Registry PoC shall request update of the OID sub-trees when a new registry is created, changed, or retired.
3. The OID sub-tree for CCSDS Organizations (control-authority-registration-authority) shall be rooted at 1.3.112.4.1.
4. The OID sub-tree for CCSDS Persons (control-authority-description) shall be rooted at 1.3.112.4.2.
5. The OID sub-tree for Space Link Extension (space-link-extension) shall be rooted at 1.3.112.4.3.
6. The OID sub-tree for Cross Support Transfer Services (csts) shall be rooted at 1.3.112.4.4.
7. The OID sub-tree for Service Providers (service-providers) shall be rooted at 1.3.112.4.5.
8. The OID sub-tree for Ground Station Sites / Ground Stations (GSS/GS) shall be rooted at 1.3.112.4.6.
9. The OID sub-tree for Spacecraft (s/c) shall be rooted at 1.3.112.4.7.
10. A SANA Registry PoC may only request changes to the part of the sub-tree that they are allocated.
11. A CCSDS Area or delegated SANA Registry PoC shall request update of the OID tree when a new OID sub-tree is published, updated, or retired.
12. Any CCSDS Agency may request creation of a OID sub-tree for an agency.
13. The OID sub-tree for Agency assigned sub-trees shall be rooted at 1.3.112.4.8.
14. A CCSDS Agency must identify a SANA Registry PoC to manage agency assigned OIDs.

NOTE: There is a mapping from OIDs to URNs and reverse. It is documented in [RFC3061]. There is an on-line service that provides a mapping to be found at: <http://www.oid-info.com/get/1.3.112.4>. It also responds to ASN.1 and the OID-IRI notation that uses slashes “/” instead of dots “.”.

## CCSDS IDENTIFIER REGISTRIES

This section describes general guidelines for the CCSDS registries containing protocol identifiers or other standard or Working Group specific information that are created and managed at Area or Working Group level. These registries originate in a Working Group, and they specify information that typically affects only one Working Group or Area. Other Working Groups within an Area, or even other Areas, may reference these types of information, but they are essentially internal to an Area.

These registries are managed at the level of an Area. Responsibility for doing active management of the contents will typically be delegated by the Area down to some Working Group, but the Area is responsible and must identify means to manage such registries if the Working Group that created them has been retired.

Examples of registries of this type include: protocol identifiers, extensions, and version numbers; data catalogs, source lists, or other locally managed information; Working Group specific data items; or any portion of the ISO OID registry that is delegated to a Working Group or Area.

### Protocol IDENTIFIER REGISTRIES

1. Any CCSDS Area may define a new registry for protocol identifiers, protocol extensions, or version numbers, as described in CCSDS 313x0y.
2. The Registration Authority for such registries shall be the Area Director or their delegate.
3. Responsibility for the registry definition and updates may be delegated down to a CCSDS Working Group, but the Area Director retains overall responsibility for any registry.
4. The registry shall be defined in a CCSDS Blue or Magenta Book.
5. The registry definition shall include the registry specification and the registration rules.
6. The registration rules for protocol identifiers will typically be either type a) change requires a CCSDS approved document, or type d) Change requires no review; assignments are done on a first-come, first-served basis.
7. Upon request to the SANA the initial registry may be created based on the DRAFT Standard and placed in the Candidate Registry section of the SANA.
8. After approval of the defining document the Area Director may request that the registry be promoted to Approved Registry status.

### DATA CATALOG OR SOURCE LIST REGISTRIES

1. Any CCSDS Area may define a new registry that is a catalog or source list, as described in CCSDS 313x0y.
2. The Registration Authority for such registries shall be the Area Director or their delegate.
3. Responsibility for the registry definition and updates may be delegated down to a CCSDS Working Group, but the Area retains overall responsibility for any registry.
4. The registry shall be defined in a CCSDS Blue or Magenta Book.
5. The registry definition shall include the registry specification and the registration rules.
6. The registration rules for source catalogs will typically be type b) Change requires an engineering review by a designated expert, but may be of type 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.
7. Upon request to the SANA an initial registry may be created based on the DRAFT Standard and placed in the Candidate Registry section of the SANA.
8. After approval of the defining document the Area Director may request that the registry be promoted to Approved Registry status.

### OID REGISTRIES DELEGATED TO AN AREA

1. Within the ISO conformant Object Identifier (OID) Registry a CCSDS Area may request creation of a new OID sub-tree.
2. The Registration Authority for such registries shall be the Area Director or their delegate.
3. OIDs shall be identified under the appropriate sub-tree.
4. Responsibility for the registry definition and updates may be delegated down to a CCSDS Working Group, but the Area shall retain overall responsibility for any registry.
5. The OID sub-tree shall be defined in a CCSDS Blue or Magenta Book.
6. A SANA Registry PoC may only request changes to the parts of the sub-tree that they are allocated.
7. The registry definition shall include the OID sub-tree specification and the registration rules.
8. The registration rules for OID sub-trees will typically be type b) Change requires an engineering review by a designated expert, but may be of type 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.
9. Upon request to the SANA the initial OID sub-tree may be created based on the DRAFT Standard and placed in the Candidate Registry section of the SANA.
10. After approval of the defining document the Area Director may request that the OID sub-tree be promoted to Approved Registry status.

New registries, or changes to existing registries, must be specified in a CCSDS Blue Book or Magenta Book. Some registries and policies may be specified a CCSDS policies Yellow Book, such as this one. The Area responsible for establishing a registry shall also define the policy for its update and use, which is normally defined as part of the document establishing the registry. See Space Assigned Numbers Authority (SANA)--Role, Responsibilities, Policies, and Procedures [SANA] for specifics.

CCSDS Orange Books may not create new registries in SANA nor modify existing registries. If a registry is required as a part of an Orange Book it shall follow the procedures documented in SANAURN Sec 3.4, Work in Progress.

## LIMITATIONS

None identified (yet).

# Expert Group

This document uses the term CCSDS Expert Group as a light-weight organizational element to performs engineering review for SANA requests that are of type b) Change requires an engineering review by a designated expert,. This group is composed of experts nominated by the CESG with no pre-determined terms. The CESG may choose to change the group as it see fits.

## EXPERT GROUP POLICY

Each Expert Group will have a chairperson who will serve as the SANA operator PoC for engineering review. As with all other CCSDS processes an Expert Group makes decisions based on consensus, as defined in Organization and Processes for the Consultative Committee for Space Data Systems [A02x1y].

A "CCSDS Expert Group” shall have the following characteristics:

1. An Expert Group shall be created at request of a Area, SIG, or the CESG itself.
2. Expert Group formation shall be approved by the CESG and concurrence of the CMC.
3. The Expert group role shall be to provide long term curation or management for one or more registries.
4. Registries shall be managed in the SANA, the Expert Group supports SANA operations of type b) registries as stated in CCSSDS 315x1y0.
5. Membership and chair shall be proposed by the group that requests creation of the registry and approved by the CESG
6. Membership shall have expertise in the technical topic that is the subject of the registry.
7. Membership should have Area and Agency balance consistent with the parts of the CCSDS community affected by the registry.
8. The Expert Group may be disbanded by consensus of the CESG and concurrence of the CMC.

This definition of Expert Group is specific to the SANA. It is not expected that there will be a lot of these Expert Groups and they will be regulated by the CESG. Any Expert Group will operate using electronic communications such as email or the occasional telecons, as needed.  Expert Groups are not intended to require significant resources nor meeting rooms at bi-annual meetings.

## INITIAL SET OF CCSDS EXPERT GROUPS

This document refers to three different expert groups. They are described here.

### SANA STeering Group (SSG)

The SANA Steering Group is defined in the Space Assigned Numbers Authority (SANA) – Role, Responsibilities, Policies and Procedures Yellow Book, CCSDS 313x0y1:

A SANA Steering Group (SSG) is appointed by the CMC to provide to the SANA operator technical and programmatic guidance related to ongoing operational and policy matters. The SSG is delegated responsibility for oversight of SANA operations, validation and confirmation of SANA operations, and acting as the first level of appeal for issues. In the event of issues with registries, policies, or practices, the SANA operator may ask the SSG for guidance. SANA issues to be resolved by the SSG should be sent to ssg@sanaregistry.org. The Membership of the SANA Steering Group is determined and approved by the CMC.

As needed, the SSG will meet with the SANA operator during CCSDS working meetings. Otherwise the SSG will work electronically or by teleconference as issues arise.

The membership of the SANA Steering Group consists of individuals with the following responsibilities:

 SEA AD, chair

 SANA Operator (ex officio)

 Secretariat (ex officio)

 CMC member

 SLS area member

 CSS area member

 SIS area member

Members are also chosen to ensure agency balance.

### XML Expert Group (XEG)

An XML Expert Group is defined in the CCSDS URN Namespace Policy Yellow Book, CCSDS 315x1y0:

This document defines a CCSDS XML Expert Group to review the requests. This group is composed of XML experts nominated by the CESG with no pre-determined terms. CESG may choose to change the group as it see fits. As with all other CCSDS processes the XML Expert Group makes decisions based on consensus, as defined in Organization and Processes for the Consultative Committee for Space Data Systems [A02x1]. Requests to the XML Expert Group may be sent to XEG@mailman.ccsds.org.

The membership of the XML Expert Group consists of individuals with the following responsibilities:

CESG Chair and SEA AD, co-chairs

CSS SM WG member

MOIMS DAI WG member

MOIMS Nav WG member

MOIMS SM&C WG member

SEA SA WG member

SOIS APP WG member

Members are drawn from the CCSDS WGs that develop or make heavy use of XML schema. Members are also chosen to ensure agency balance. The Membership of the XML Expert Group is determined and approved by the CESG and concurred by the CMC.

### Terminology Expert Group (TEG)

This document defines a Terminology Expert Group to review the requests for registration of new terms, definitions, terminology relationships, and abbreviations. This group is composed of terminology experts nominated by the CESG with no pre-determined terms. CESG may choose to change the group as it see fits. As with all other CCSDS processes the Terminology Expert Group makes decisions based on consensus, as defined in Organization and Processes for the Consultative Committee for Space Data Systems [A02x1]. Requests to the Terminology Expert Group may be sent to TEG@mailman.ccsds.org.

The membership of the Terminology Expert Group consists of individuals with the following responsibilities:

SEA SA WG, chair

SANA Operator (ex officio)

CSS Area member

MOIMS Area member

SEA Area member

SIS Area member

SLS Area member

SOIS Area member

Members are drawn from all of the CCSDS Areas. Members should be chosen from individuals with a broad understanding of the terminology in use in their area and in space data systems in general. Members are also chosen to ensure agency balance. The Membership of the Terminology Expert Group is determined and approved by the CESG and concurred by the CMC.

**(Normative)**

This Annex includes a high level view of the current ISO OID tree. The CCSDS OID tree was initially defined in the SLE Transfer Service API Core Specification, CCSDS 914.0-M-0.1, and then further refined in the CSTS Specification Framework, CCSDS 921.1-R-2, and in the Cross Support Transfer Services – Monitored Data Service, CCSDS 922.1-R-1.

OIDs are defined in the [Recommendation ITU-T X.660 | ISO/IEC 9834 series](http://www.oid-info.com/standards.htm). A new release of the whole series has been published in 2008; a new release of [Recommendation ITU-T X.660 | ISO/IEC 9834-1](http://www.itu.int/ITU-T/X.660) is planned for 2014. Binary encodings of OIDs are specified in [Rec. ITU-T X.690 | ISO/IEC 8825-1](http://www.itu.int/rec/T-REC-X.690/en) for the Binary (BER) and Distinguished (DER) Encoding rules, in [Rec. ITU-T X.691 | ISO/IEC 8825-2](http://www.itu.int/rec/T-REC-X.691/en) for the Packed Encoding rules (PER). An XML encoding of OIDs is specified in [Rec. ITU-T X.693 | ISO/IEC 8825-3](http://www.itu.int/rec/T-REC-X.693/en).

The dot notation for OIDs is an IETF invention. The ASN.1 group thought it better to have a notation using spaces and braces, with optional text labels, so that 1.3.6.1 would become something like {iso(1) identified-organization(3) dod(6) internet(1)} or {1 3 6 1} or variants thereof. The IETF folks thought this was somewhat inconvenient, and decided to use a space-free notation. This is, among other things, spelled out in IETF [RFC 1778, section 2.15](http://www.ietf.org/rfc/rfc1778.txt), but was in use long before that time.

This document adopts the core of the CCSDS ISO OID tree, as specified, and defines a set of extensions to provide unambiguous identifiers for a variety of other information object types.

**Object Identifier Label**

**1 iso**

**1.3 identified-organization**

**1.3.112 standards-producing-organization**

**1.3.112.4 ccsds**

**1.3.112.4.1 organizations (was control-authority-registration-authority)**

**1.3.112.4.2 persons (was control-authority-authority-description)**

**1.3.112.4.3 space-link-extension**

**1.3.112.4.3.1 sle-transfer-services**

**1.3.112.4.4 css**

**1.3.112.4.4.1 csts**

**1.3.112.4.4.1.1 framework (modules, attributes, operations, proceduresExtensions, ` fwProceduresFunctionalities, serviceGenericIdentifiers)**

**1.3.112.4.4.1.2 services**

**1.3.112.4.4.1.2.2 serviceIdentifiers**

**1.3.112.4.4.1.3 externallyDefinedTypeAndValueExtension**

**1.3.112.4.4.2 crossSupportResources**

**1.3.112.4.4.2.1 crossSupportFunctionalities**

**1.3.112.4.4.2.2 agencyFunctionalities**

**1.3.112.4.5 serviceProviders**

**1.3.112.4.5.1 organizationReference**

**1.3.112.4.5.1.1 serviceProviderName**

**1.3.112.4.5.1.2 serviceProviderLocation**

**1.3.112.4.5.1.3 serviceProviderCatalog**

**1.3.112.4.5.1.4 serviceProviderServiceList**

**1.3.112.4.6 serviceProvidersAndAntennas**

**1.3.112.4.6.1 organizationReference**

**1.3.112.4.6.1.1 groundStationSite**

**1.3.112.4.6.1.1.1 groundStationSiteName**

**1.3.112.4.6.1.1.2 groundStationSiteLocation**

**1.3.112.4.6.1.1.3 groundStationSiteAntenna1**

**1.3.112.4.7 spacecraft**

**1.3.112.4.7.1 organizationReference**

**1.3.112.4.7.1.1 spacecraftName**

**1.3.112.4.7.1.2 spaceCraftAbbreviation**

**1.3.112.4.7.1.3 spacecraftAliasList**

**1.3.112.4.8 agencyAssigned**

**1.3.112.4.8.1 agencyReference**

**1.3.112.4.8.1.1 agencyUnique**