CCSDS Registry Re-Engineering Organizations & Contacts SCIDs, Assets, & OID Tree

Peter Shames, Erik Barkley

Marc Blanchet, Brian Oliver, Tom Gannett

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CCSDS Registry Re-engineering

- Several issues were identified with the current CCSDS registries and how they were being extended.

- A study was performed by the SANA Steering Group (SSG) to develop an approach to remove issues and to clarify the common / core registries for re-use.

- The following pages describe the adopted approach, registry contents, and relationships.

- It introduces topics like: WG procedures to be followed, common organization and contact registries, and unique identifiers for all objects.

New CCSDS Registry Policies

- The CESG has approved a new policy requiring WGs to re-use existing well specified registries instead of inventing new, weakly specified, ones:
  - Define policies for using defined registries and extending them as needed
  - Add new organizations and contacts as needed to re-engineered registries
  - Add new roles, OID types, and other attributes as needed
- New documents have been approved by CESG
  - Registry Management Policy (registry design & policies), CCSDS 313.1-Y-1
  - Procedures for SANA Registry Specification (WG handbook), CCSDS 313.2-Y-1
  - SANA Roles & Responsibilities (updated SANA doc), CCSDS 313.0-Y-1.1
- Following charts describe the the Working group overall workflow, and the key registries and categories in more detail along with their relationships

SANA Use Cases

- Look up agency, service provider, or other organization point of contact.;
- Identify potential service providers.;
- Request new SpaceCraft IDentifier (SCID), Object Identifier (OID), or assigned protocol number by authorized persons.;
- Determine existing protocol identifiers.;
- Register new XML schema, fetch updated schema, validate XML documents against existing schema validators (future).;
- Lookup existing SCID or OID to determine spacecraft identifiers or owner.;
- Translate URN or OID name into an on-line reference URL.;
- Lookup CCSDS terms to identify meaning, relationships, and sources.;
- Support CCSDS working groups (WG) with single point, on-line, access to terminology and other registries.;
- Locate links to service providers, their service catalogs, and service commitment organizations.;
- Update Organization and Contact information to keep it up to date.

CCSDS WG Registry Procedure
(From CCSDS 313.2-Y-1, provides WG process)

- Summary WG workflow for a new registry:
  - Identify a need for a registry related to a new standard.
  - Discuss the proposed registry requirements and design with the SANA Operator (info@sanaregistry.org) or the SANA Steering Group (ssg@mailmain.ccsds.org).
  - Explore the SANA looking for an existing registry that meets the need or that can be adapted:
    - Define registry use, adaptation, or extension, and discuss with the affected organization; or …
    - Develop a new registry design.
  - Prior to initial Red Book finalization describe the selected registry approach and design in the draft SANA Considerations section.
  - Work with the SANA Operator to create the prototype registry prior to the start of interoperability testing, and exercise the registry during testing.
  - Document the registry policies, registration rules, and registration authority, and if necessary the Review Authority.
  - Update the completed SANA Considerations section in the final document, pointing to the new registry and describing any other related registry extensions such as new roles added to Organization or Contacts Registries.
  - Work with the SANA Operator to document the final registry design prior to Red Book agency review.
  - Work with the SANA Operator to promote the registry from Candidate to Approved status prior to Blue Book publication.
  - Participate, as needed, in any registry review or request for extensions after it has been published.
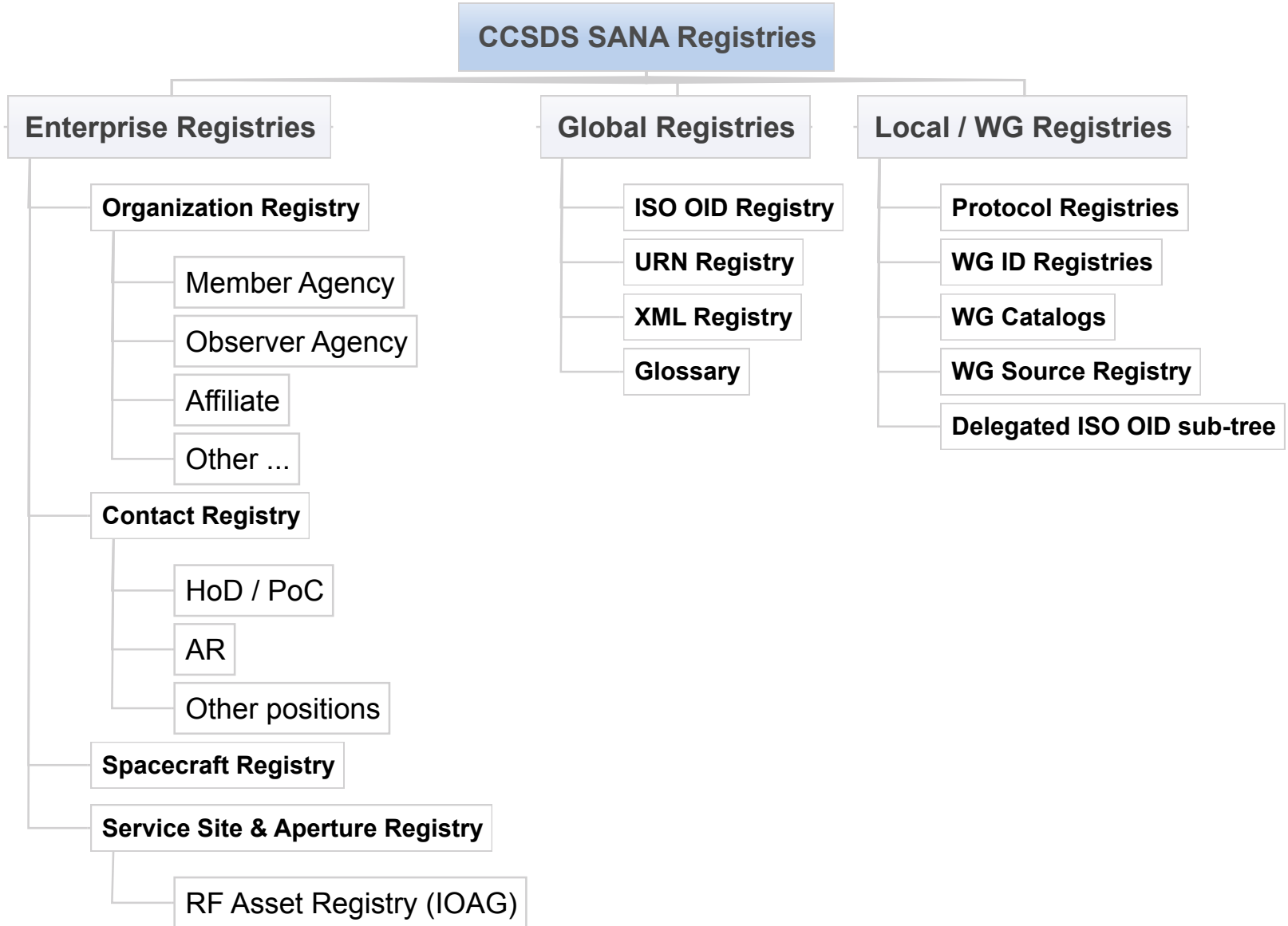
SANA Registry Categories
(From CCSDS 313.1-Y-1)

Three different categories of registries are identified:

- **Enterprise**: Registries containing CCSDS Agency, other Affiliated Organizationd, contact, and the asset information that are managed by these organizations and their representatives;

- **Global**: Registries containing information that is global or cross-cuts more than one CCSDS area and that are managed at the CCSDS Engineering Steering Group (CESG) level; and

- **Local**: Registries that are created and managed at Area level or delegated to a Working Group.

- **All types of registries are public and accessible on the SANA website**

CCSDS SANA Registries

CCSDS SANA Registries

Enterprise Registries

- **Organization Registry**
  - Member Agency
  - Observer Agency
  - Affiliate
  - Other ...
- **Contact Registry**
  - HoD / PoC
  - AR
  - Other positions
- **Spacecraft Registry**
- **Service Site & Aperture Registry**
  - RF Asset Registry (IOAG)

Global Registries

- **ISO OID Registry**
- **URN Registry**
- **XML Registry**
- **Glossary**

Local / WG Registries

- **Protocol Registries**
- **WG ID Registries**
- **WG Catalogs**
- **WG Source Registry**
- **Delegated ISO OID sub-tree**
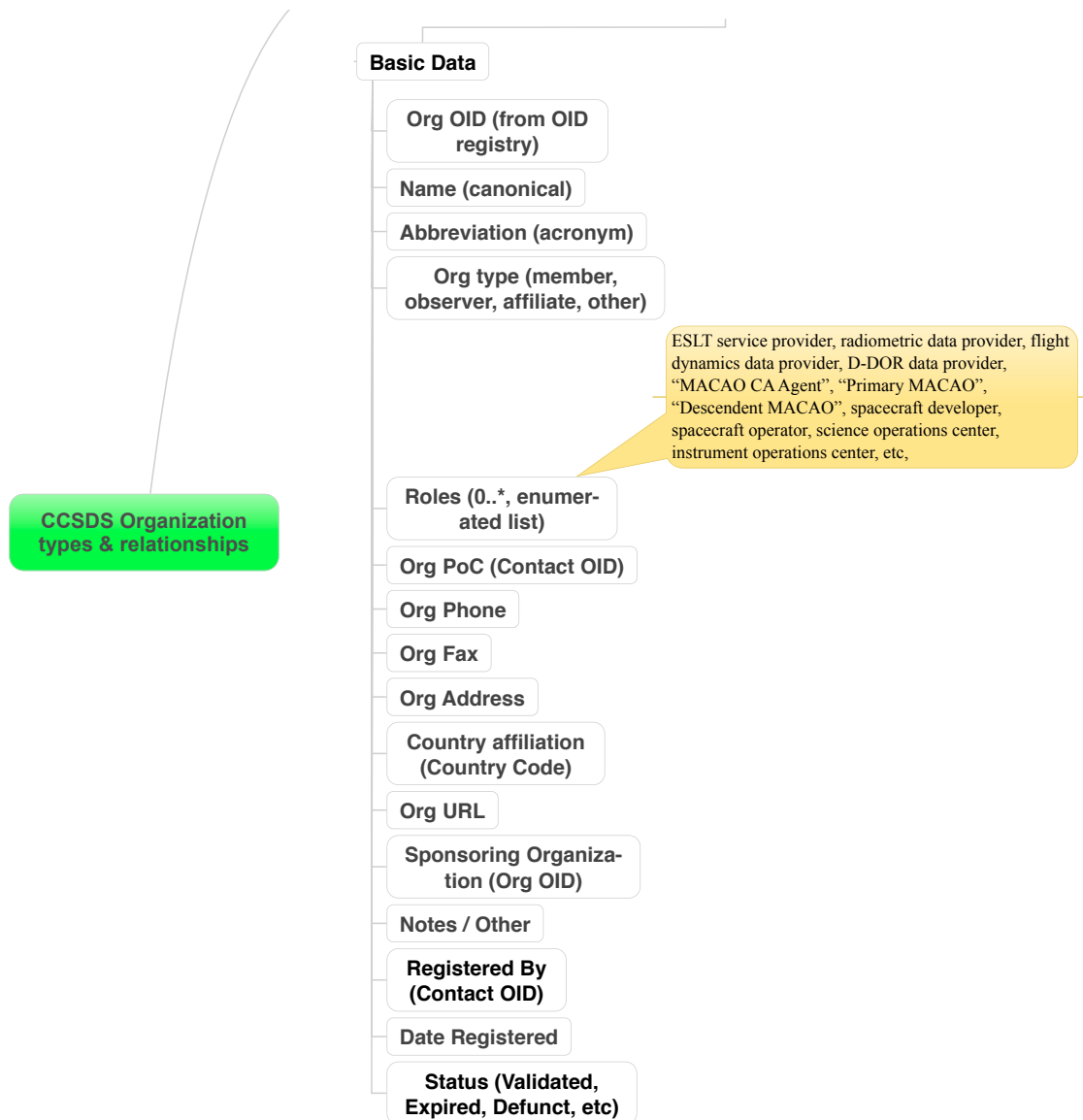
Design of Key SANA Registries
(From CCSDS 313.1-Y-1)

- The following materials are taken from the Registry Management Policy (RMP).

- Each of the key Enterprise and Global registries is described with:
  - Registry design and data structures (showing extensions from current, if applicable)
  - Registry relationships to other information (both internal and to other registries)
  - Definition and use of OIDs to provide unique identifiers for all registered objects

- The RMP contains more information as well as the policies and procedures for managing this information.
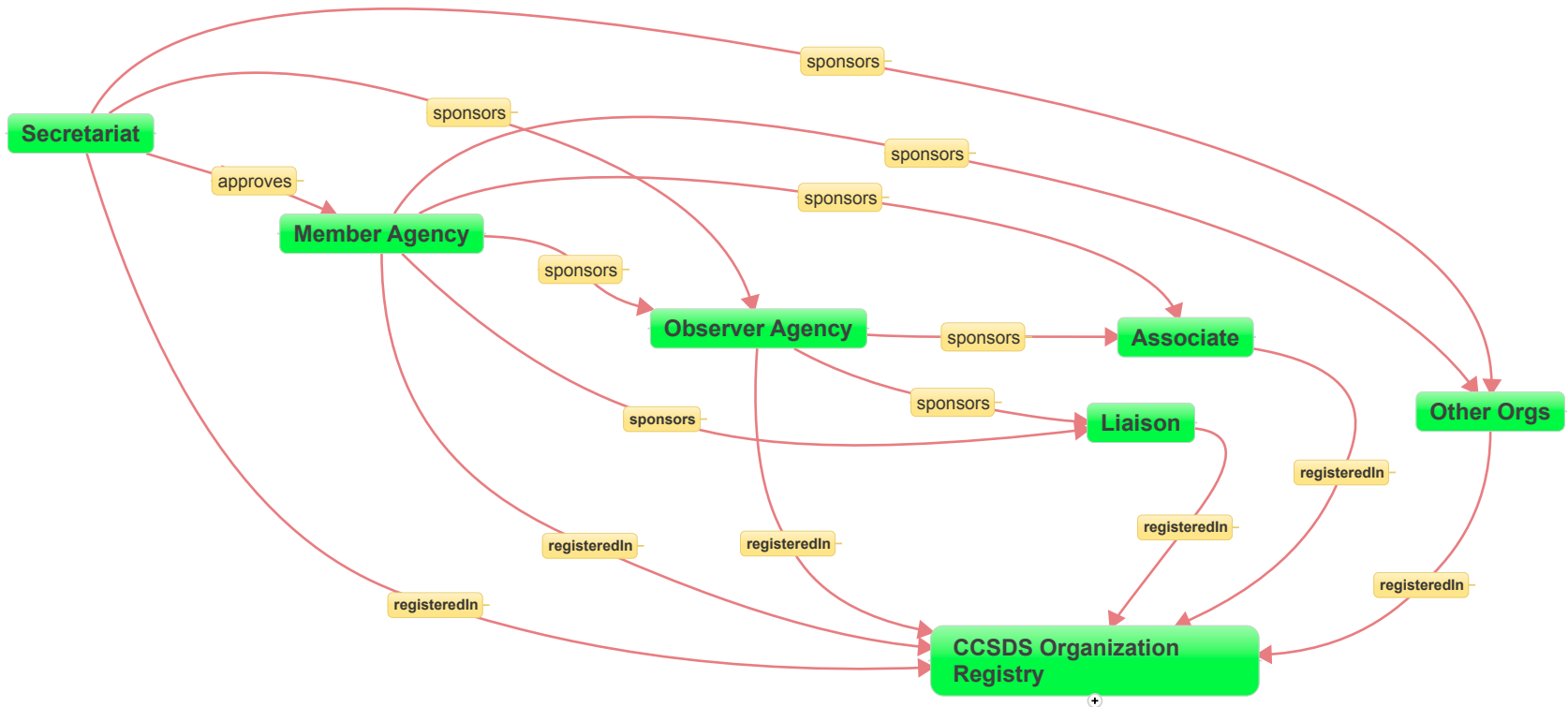
CCSDS Enterprise (Org & Contact) Registries

- Patterned after the existing SCID and MACAO registries
- Use the same pattern of requiring:
  - An agency to identify a Head of Delegation (HoD, also the CMC member)
  - The Agency HoD to appoint one or more Agency Representatives (AR) to request changes to the different kinds of agency data
  - One AR may handle one or more different kinds of data
  - Member Agencies to sponsor Observer agencies in their country
  - Member or observer agencies to sponsor affiliates or data providers in their country
- Adds:
  - Unique OIDs for all organizations, contacts, or objects that are registered
  - Requires tagging all data, uniformly, with the date of any changes and the ID of the persons requesting and performing the change

Organization Type Registry Structures

Basic Data

- **Org OID (from OID registry)**
- **Name (canonical)**
- **Abbreviation (acronym)**
- **Org type (member, observer, affiliate, other)**
- **Roles (0..*, enumerated list)**

> ESLT service provider, radiometric data provider, flight dynamics data provider, D-DOR data provider, "MACAO CA Agent", "Primary MACAO", "Descendent MACAO", spacecraft developer, spacecraft operator, science operations center, instrument operations center, etc,

- **Org PoC (Contact OID)**
- **Org Phone**
- **Org Fax**
- **Org Address**
- **Country affiliation (Country Code)**
- **Org URL**
- **Sponsoring Organization (Org OID)**
- **Notes / Other**
- **Registered By (Contact OID)**
- **Date Registered**
- **Status (Validated, Expired, Defunct, etc)**

CCSDS Organization types & relationships

Organization Registry Relationships

Contact Type Registry Structures

Basic Data

- **Contact OID (from OID registry)**
- **Name**
- **Position**
- **Roles (0..*, enumerated list)**

  > CMC member (Agency HoD), CESG Member, WG Chair, Agency Rep for SCID, Agency Rep for MACAO, MACAO RP submitter, MACAO RP reviser, Agency Rep for Assets, etc

- **Email**
- **Phone**
  - **Work Phone**
  - **Mobile Phone**
  - **Fax**
- **Address**
- **Sponsoring Organization (from Org OID registry)**
- **Country Affiliation (country OID)**
- **Registered by (Contact OID)**
- **Date registered**
- **Status (Validated, Retired, Expired, etc)**

CCSDS Contact info & roles
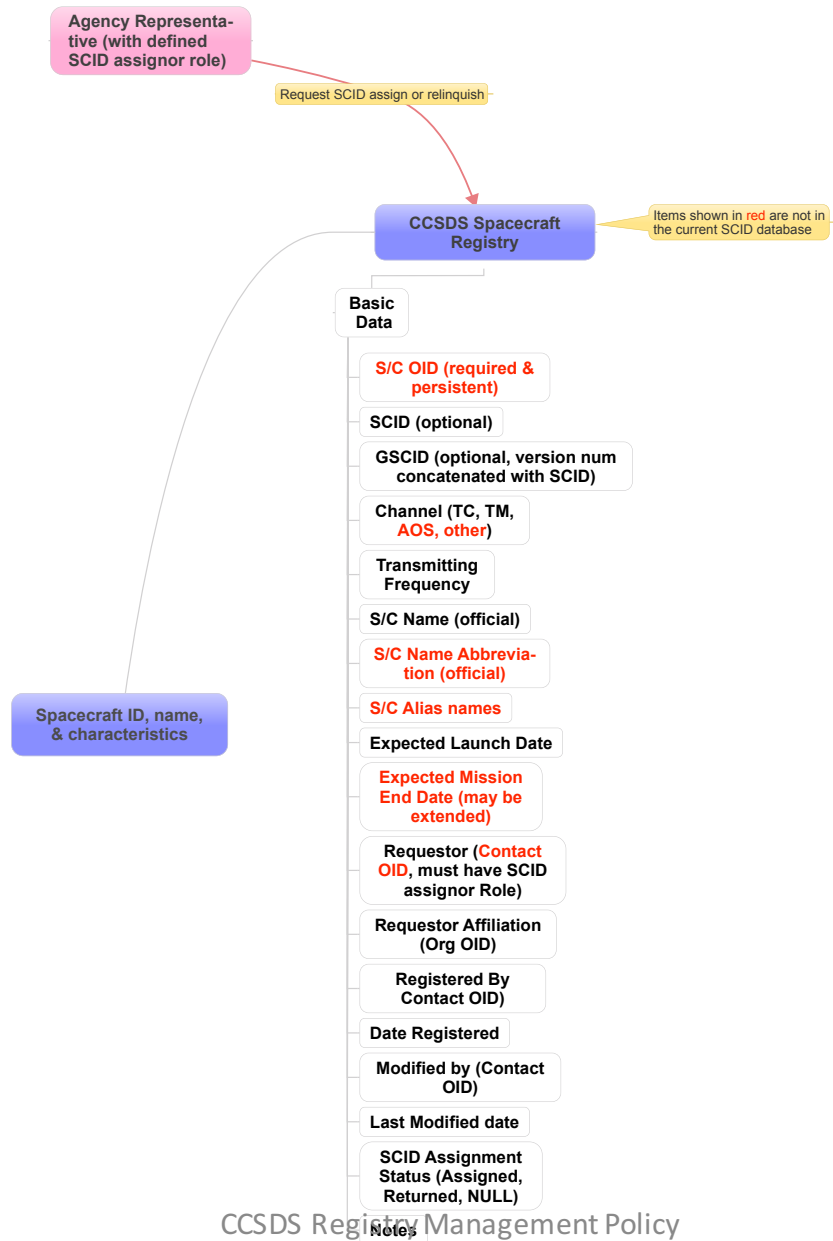
Contact Relationships
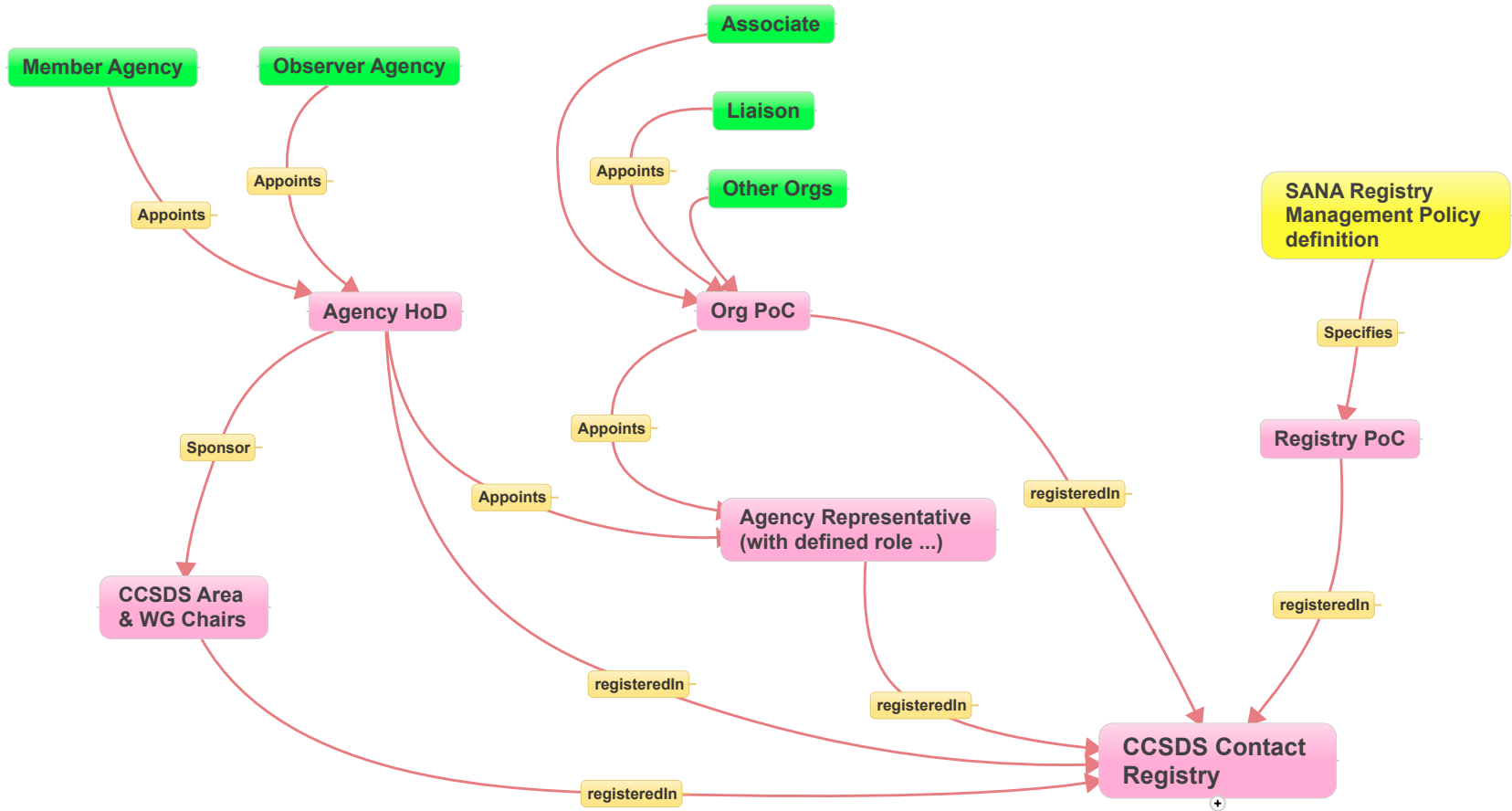
CCSDS Org & Contact Registry Management Approach

- CCSDS Website (Secretariat)
  - Retain curation of existing CCSDS organization and contact registries
  - Use assigned OID (from SANA) as unique tags for organizations and contacts
  - Provide updated organization and contact data to SANA via programmatic interface

- SANA (SANA Operator)
  - Retain curation of all other registries
  - Provide unique OIDs for organizations, contacts, RF Assets, and other objects, as needed
  - Acquire organizations and contacts data from CCSDS Website whenever it is updated
  - Merge into operational & extensible SANA registries that have programmatic interfaces, using the unique OID "handle"
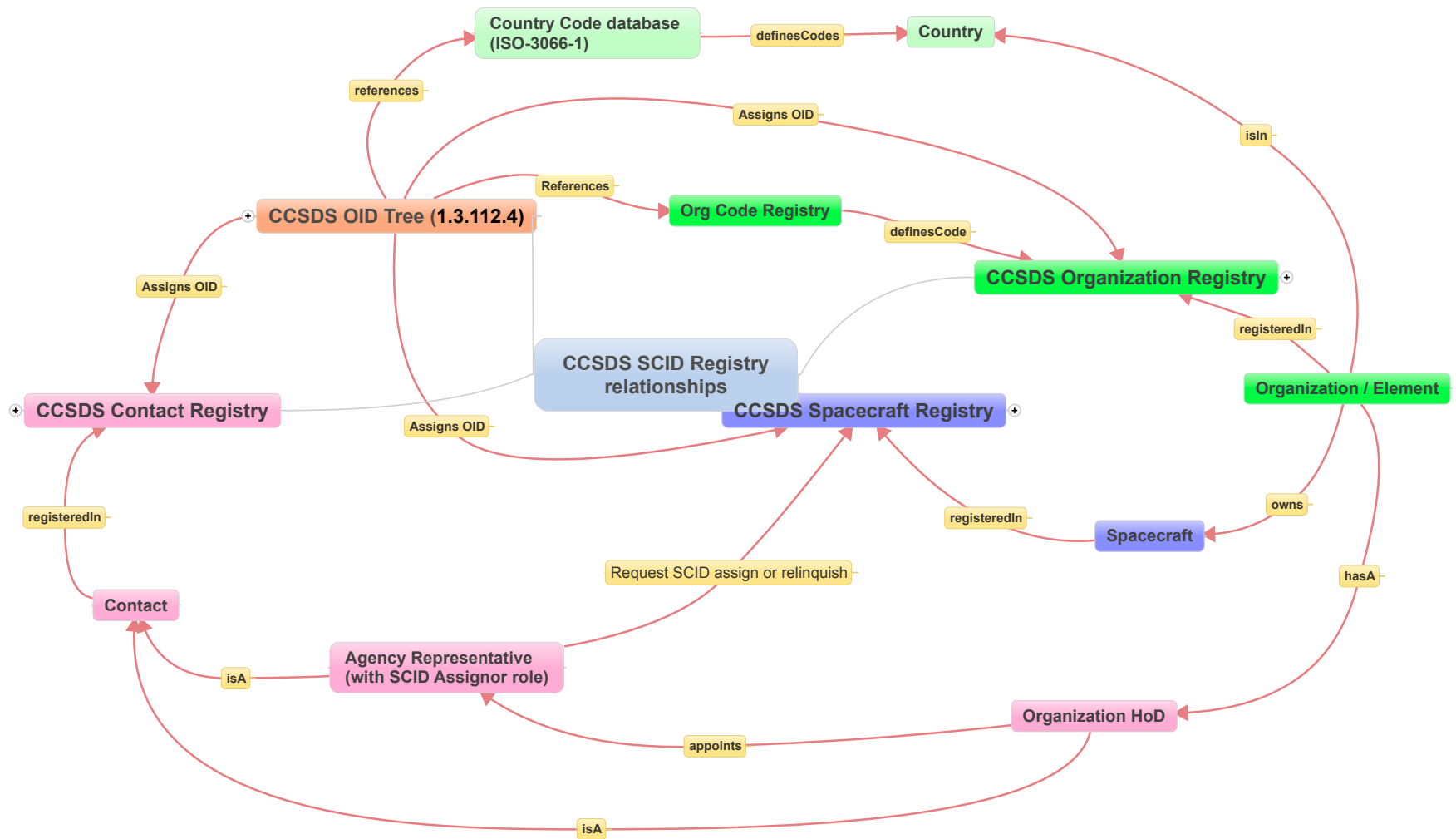
CCSDS SCID Registry

- Extends the existing SCID registry
- Uses the same pattern of requiring:
  - A designated AR from a Member or observer agency, or from an affiliate, to request SCID assignment or relinquishment
- Adds:
  - Unique OIDs for all Spacecraft that are registered, in addition to the SCID
  - Requires tagging all data, uniformly, with the date of any changes and the ID of the persons requesting and performing the change
  - Adds spacecraft name, abbreviation, and alias attributes
  - Permits assignment of an OID without a SCID and makes OIDs permanent tags for the spacecraft
- The SCID registry is managed by the SANA Operator

Spacecraft Registry Structure

Agency Representa-tive (with defined SCID assignor role)

Request SCID assign or relinquish

CCSDS Spacecraft Registry

Items shown in red are not in the current SCID database

Basic Data

- **S/C OID (required & persistent)**
- SCID (optional)
- GSCID (optional, version num concatenated with SCID)
- Channel (TC, TM, **AOS, other**)
- Transmitting Frequency
- S/C Name (official)
- **S/C Name Abbrevia-tion (official)**
- **S/C Alias names**
- Expected Launch Date
- **Expected Mission End Date (may be extended)**
- Requestor (**Contact OID**, must have SCID assignor Role)
- Requestor Affiliation (Org OID)
- Registered By Contact OID)
- Date Registered
- Modified by (Contact OID)
- Last Modified date
- SCID Assignment Status (Assigned, Returned, NULL)
- **Notes**

Spacecraft ID, name, & characteristics
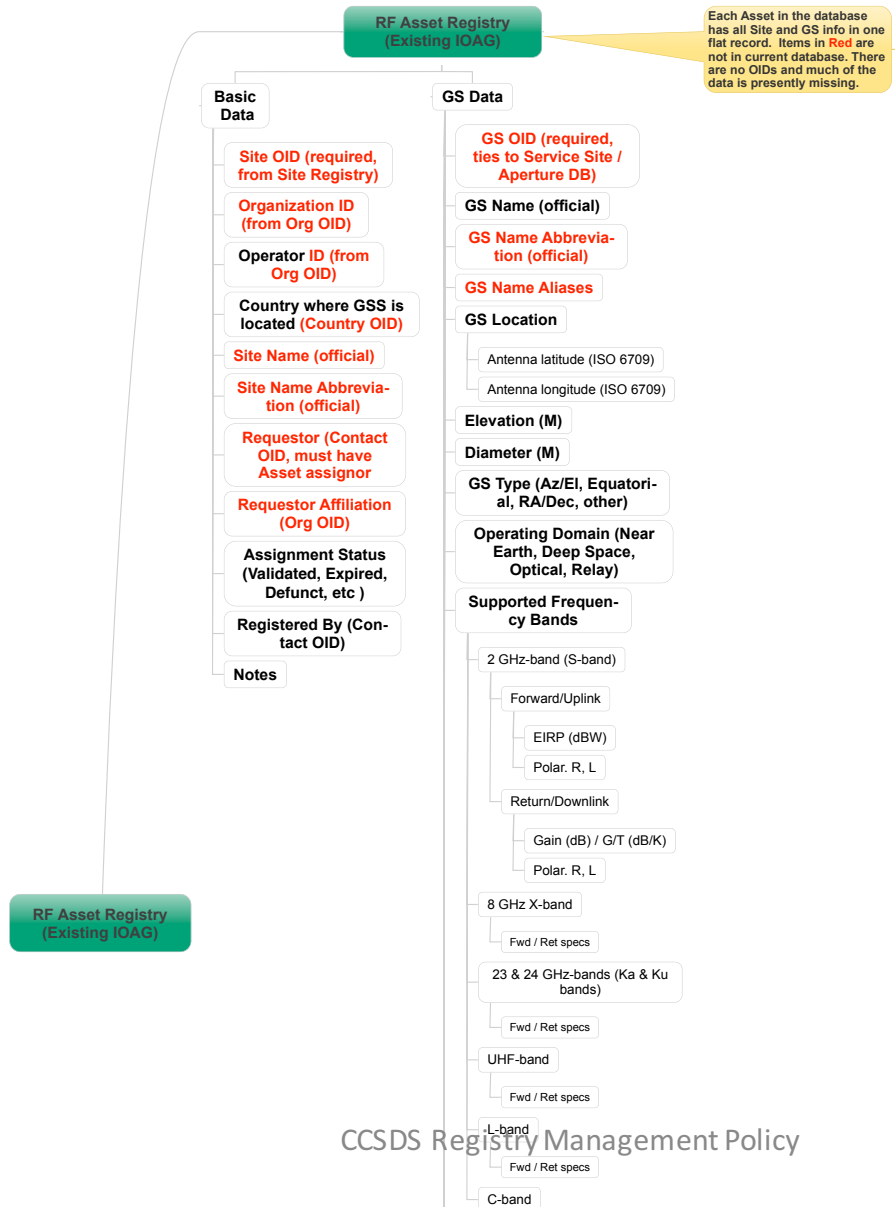
Items in red are new or modified fields

SCID Registry Relationships

RF Asset Registry

- Extends the existing IOAG RF Asset registry to suit it for reference in association with the Service Site & Aperture Registry
- Adopts the same pattern as the SCID and MACAO of requiring:
  - A designated AR from a Member or observer agency, or from an affiliate, to request RF Asset registry changes
  - Requires that site and asset names be unique
- Adds:
  - Unique OIDs for all RF Assets that are registered and assigns a unique OID for the site as well
  - Requires tagging all data, uniformly, with the date of any changes and the ID of the persons requesting and performing the change
  - Adds Asset name abbreviation and alias attributes
- The IOAG RF Asset registry is managed by the SANA Operator for the IOAG

Existing IOAG RF Asset Registry

Each Asset in the database has all Site and GS info in one flat record. Items in Red are not in current database. There are no OIDs and much of the data is presently missing.

RF Asset Registry (Existing IOAG)

Basic Data
- Site OID (required, from Site Registry)
- Organization ID (from Org OID)
- Operator ID (from Org OID)
- Country where GSS is located (Country OID)
- Site Name (official)
- Site Name Abbreviation (official)
- Requestor (Contact OID, must have Asset assignor
- Requestor Affiliation (Org OID)
- Assignment Status (Validated, Expired, Defunct, etc)
- Registered By (Contact OID)
- Notes

GS Data
- GS OID (required, ties to Service Site / Aperture DB)
- GS Name (official)
- GS Name Abbreviation (official)
- GS Name Aliases
- GS Location
  - Antenna latitude (ISO 6709)
  - Antenna longitude (ISO 6709)
- Elevation (M)
- Diameter (M)
- GS Type (Az/El, Equatorial, RA/Dec, other)
- Operating Domain (Near Earth, Deep Space, Optical, Relay)
- Supported Frequency Bands
  - 2 GHz-band (S-band)
    - Forward/Uplink
      - EIRP (dBW)
      - Polar. R, L
    - Return/Downlink
      - Gain (dB) / G/T (dB/K)
      - Polar. R, L
  - 8 GHz X-band
    - Fwd / Ret specs
  - 23 & 24 GHz-bands (Ka & Ku bands)
    - Fwd / Ret specs
  - UHF-band
    - Fwd / Ret specs
  - L-band
    - Fwd / Ret specs
  - C-band

RF Asset Registry (Existing IOAG)

Items in red are new or modified fields

CCSDS Service Site & Aperture Registry

- Defines a new Service Site and Aperture registry
  - Tied to the IOAG RF Asset Registry using the Aperture OIDs as the unique ID
  - A spacecraft (that does relay or PSLT) may be treated as a Site too
- Uses the same pattern of requiring:
  - A designated AR from a Member or observer agency, or from an affiliate, to request registry changes
- Adds:
  - Unique OIDs for all Sites that are registered, in addition to the Apertures at a Site
  - A Site may have zero or more Apertures and zero or more Services
  - A Site may be a static place on the Earth's surface, or on another planetary body (PSLT), or in orbit (relay spacecraft)
  - Requires tagging all data, uniformly, with the date of any changes and the ID of the persons requesting and performing the change
  - Adds Site name, abbreviation, and alias attributes
- The Service Site and Aperture registry is managed by the SANA Operator

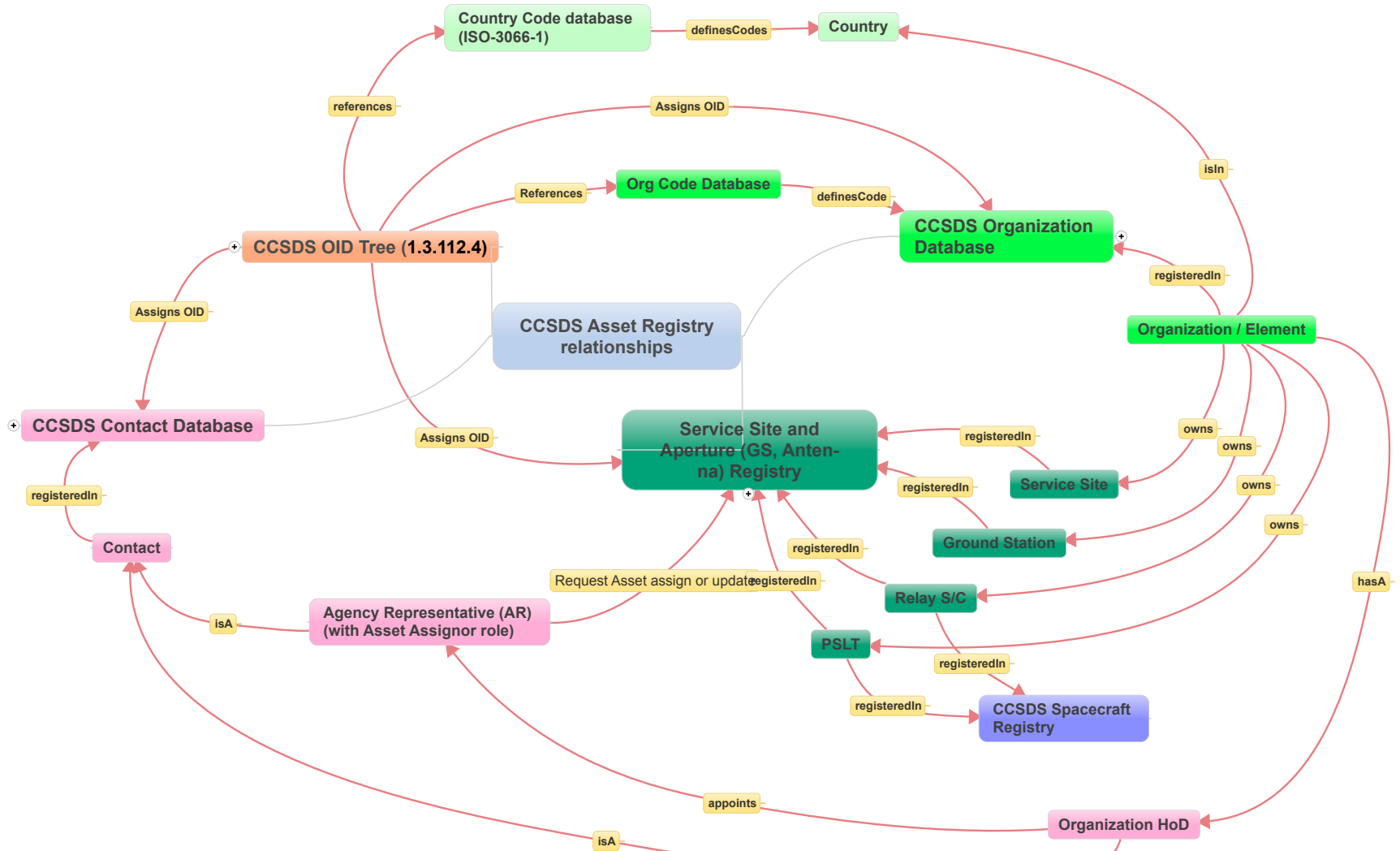# Service Site & Asset Registry
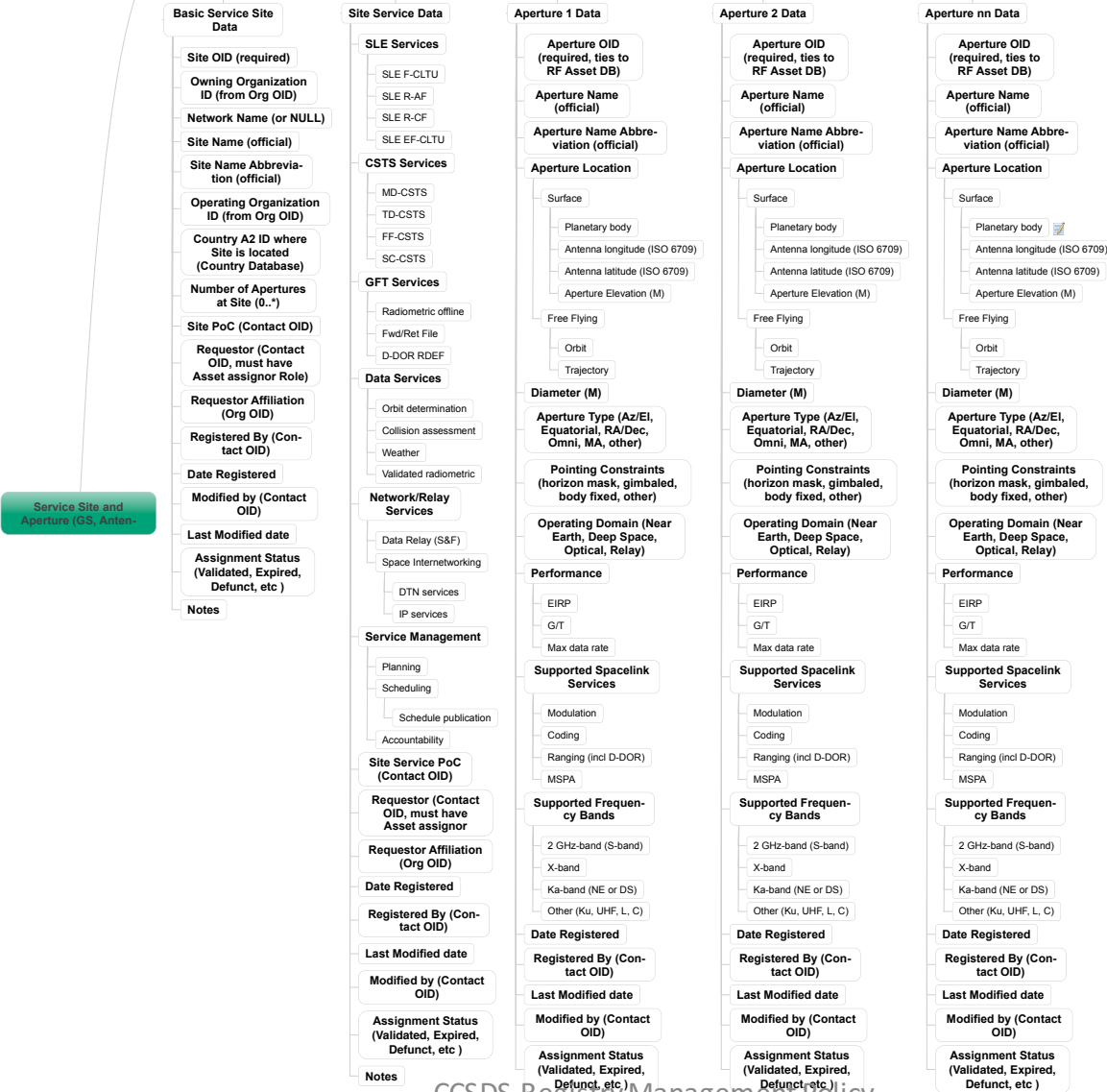
Service Site & Aperture Internal Relationships
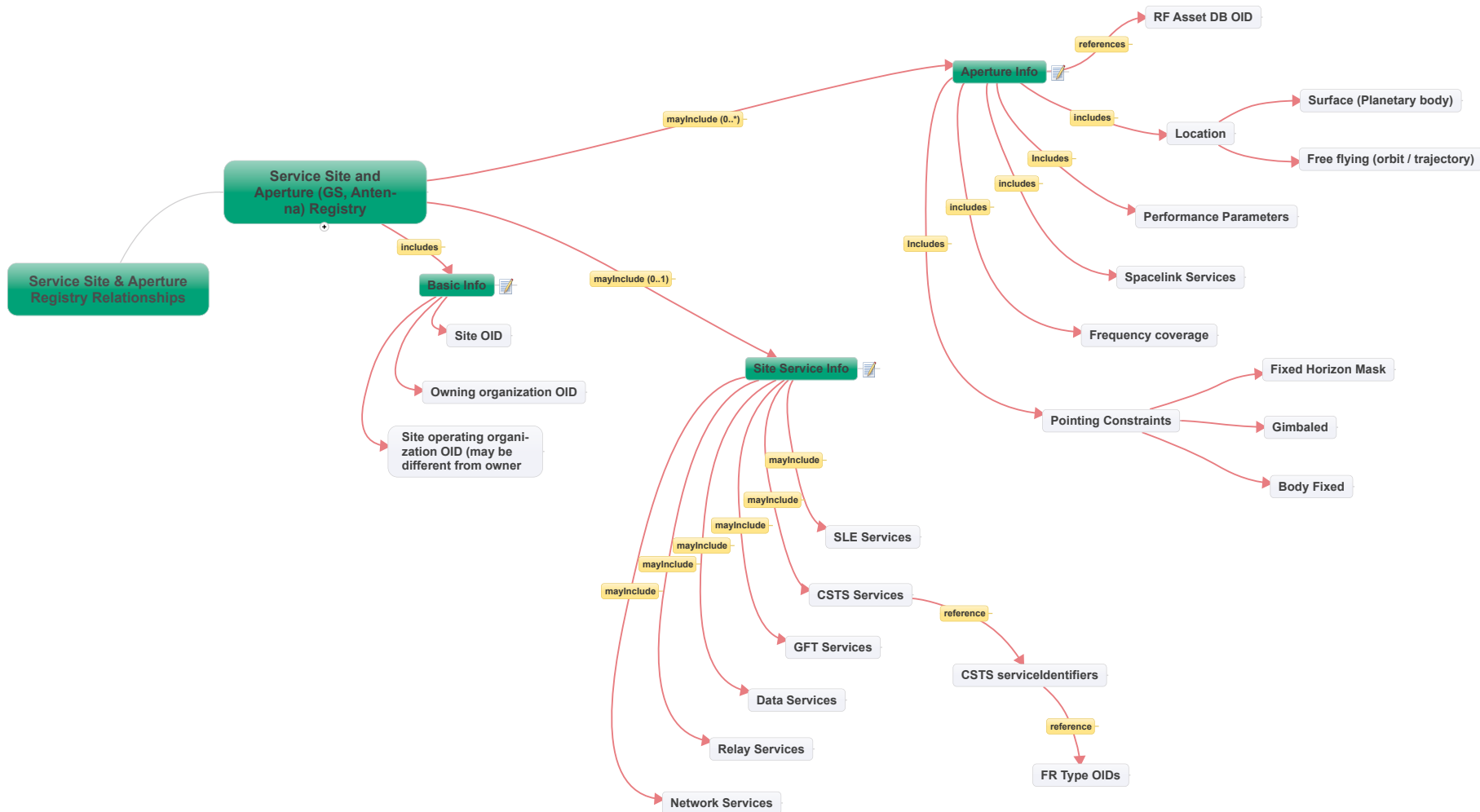
# Service Site & Aperture Registry Relationships

Objects that need unique OIDs

- Organizations (and sub-elements)
- Contacts (persons)
- Spacecraft
- Sites (including spacecraft) & Apertures (Antennas)
- Service Provider Sites
- All CSS assigned identifiers
- Roles (both org & contact role types)

- Countries (use ISO-3166-1 code)

- The OID registry is managed by the SANA Operator

CCSDS OID Tree
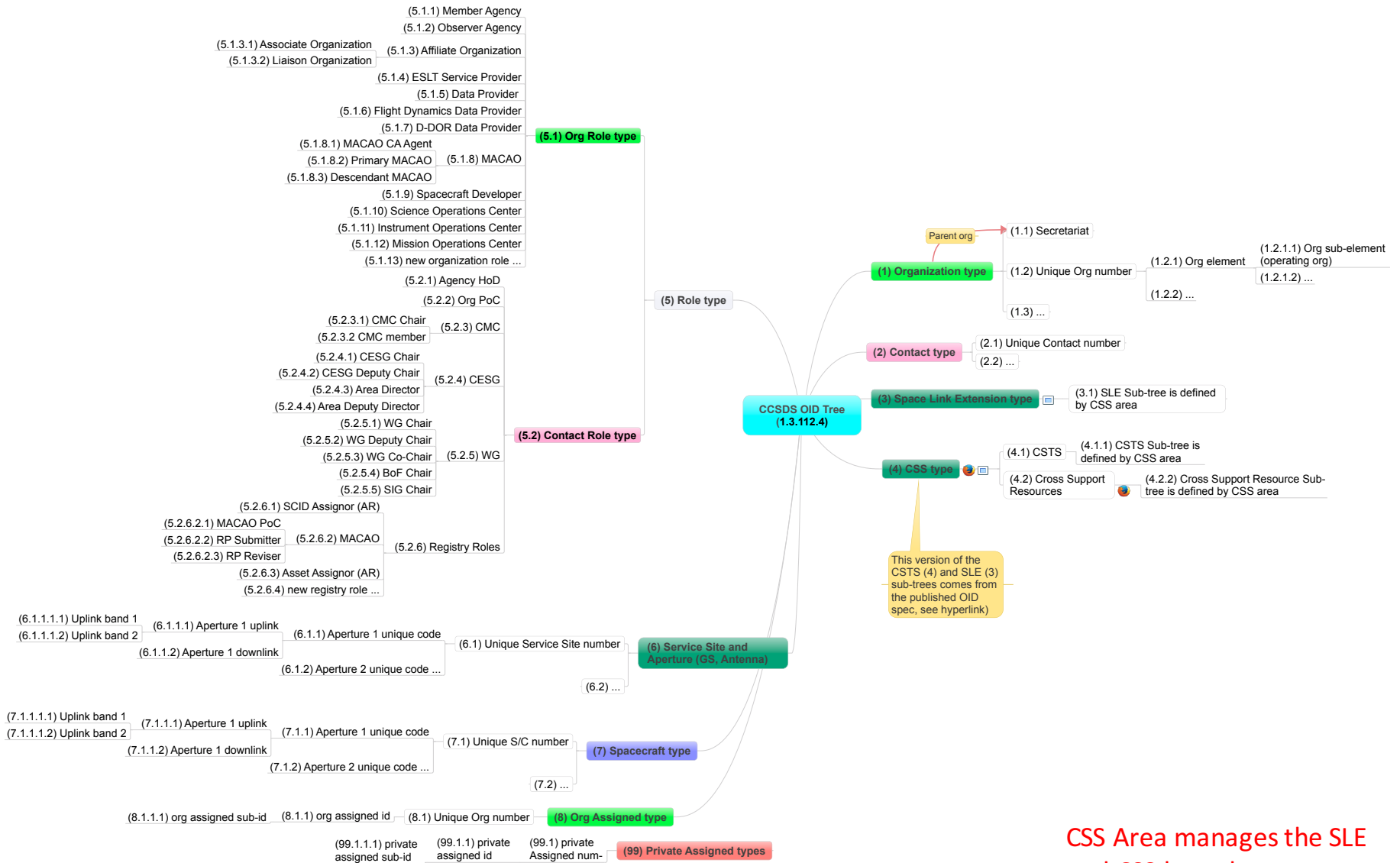
CSS Area manages the SLE and CSS branches

CCSDS Registry Update Summary

- Fully aligned with CCSDS Organization and Processes (CCSDS A02.1-Y-4) and with policies stated in the CCSDS website

- Requires Working Groups to evaluate use or adaptation of existing registries before creating new ones

- Where possible uses patterns from the existing SCID and MACAO registries

- All organizations have responsibility for managing updates to their own data
    - The Agency HoD (or Org PoC) must appoint one or more Agency Representatives (AR) to request changes to their data
    - Only the appointed AR(s) can request changes
    - A member of the SANA staff will make the actual changes

- Adds:
    - Unique OIDs for all organizations, contacts, or objects that are registered
    - Requires tagging all data, uniformly, with the date of any changes and the ID of the persons requesting and performing the change