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| **Name of Group** | 3.03 Cross Support Service Management Working Group |
| **Area** | Cross Support Services Area (CSS) |
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| **Chairperson Agency** | NASA |
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| **Scope of Activity** | The scope is the standardization of the managerial interfaces related to the management of Tracking, Telemetry and Command (TTC) services provided to spacecraft mission operations centers by ground domain TTC networks.  The scope also includes maintenance of CCSDS' current service management recommendation, 910.11x-B-1, taking into account information from member agency implementations. |
| **Rationale for Activity** | CCSDS member agencies operate TTC networks that provide telecommunications and radiometric services between mission operation centers and mission spacecraft. CCSDS has produced recommendations for both spacelink and terrestrial data transfer services. The coordination and management of these spacelink and terrestrial data transfer services, generally termed "service management" also benefits from standardization as individual missions and TTC network providers can, upon deployment of standards, reduce the need for mission/network unique pairing adaptations -- this in turn fosters cross support which is a primary driver for CCSDS in general. This cross support has applicability both in planned, routine day-to-day operations and also in emergency situations where communications services are requested with very short notice. CCSDS published its first blue book with regard to service management in August 2009 . This existing recommended standard is scoped to address management of a restricted subset of the typical CCSDS member agency telemetry and command services involving the CCSDS 401 compliant space links and the RAF, RCF, and FCLTU space link extension (SLE) services. However, the need for a variety of improvements to that initial version has been identified, as described in the following paragraphs. During its development it was noted that the recommended standard would not scale well when new services to be managed were defined. This was recognized but held as a lower priority in deference to defining the hundreds of parameters, their inter-relationships, and concise definition and statement of the behavior needed for service management. The current recommended standard does not adequately treat "upstream" processes involved in arriving at communications support planning or concepts such as "standing orders" which are used in placing several related service packages on a schedule of communication services. It is also been recognized that the "downstream" processes to account for delivery of services are also not addressed. This lack for full lifecycle support has been indicated via member agency inputs. Since the publication of the service management blue book, the Cross Support Services Area has made significant progress in developing a generic Cross Support Transfer Services (CSTS) framework that goes beyond SLE to address additional terrestrial data transfer services as well as observational data about the space link that are needed for a complete set of cross support functions. New services based on the CSTS framework include provision of radiometric observables (for example Doppler and ranging) and delivery of monitor data. CCSDS has published recommended standards for Pseudo-Noise (PN) Ranging Systems and Code Division Multiple Access (CDMA)-based communications and ranging , both of which require management. The System Engineering Area of CCSDS is currently advancing a recommendation for Delta Differential One-Way Ranging (DDOR) that requires coordination and management of two ground stations which may be operated in an inter-agency context. The Mission Operations and Information Management (MOIMS) area is currently planning to develop a mission planning service recommendation that will ultimately interface with the communications planning aspect of the service management life-cycle. The MOIMS area has also chartered work that is aimed at event definitions in general which is complimentary to the communication planning aspect of service management with regard to orbital events/communications geometry. The Space Networking Services area is currently developing recommendations for the Solar System Internet (SSI), based on Delay Tolerant Networking (DTN). SSI planning will ultimately interface with the communications planning aspect of the service management lifecycle, especially with regard to spacelink communications geometry. The Inter-Operations Advisory Group (IOAG) has identified that there are several instances where data are exchanged via file transfer mechanisms utilizing different schemes, security profiles, metadata/terminology, and packaging mechanisms making it more difficult and costly to achieve inter-operations. The significant use of data exchange via file transfer mechanisms has also been noted by working group members from multiple agencies within CCSDS.In summary, because of the need for management of new services being defined by CCSDS, the lack of complete service management process coverage, significant exchange of data via file transfer, the complementary nature of mission operations and TTC network operations, the complementary nature of (space) link level and (SSI inter-)network level operations, and the difficulty with regard to scaling the current service management recommendation, a new approach that leads to a more capable service management recommendation or set of recommendations is required thereby necessitating chartering a new working group. |
| **Goals** | The goals include: 1) Identification of CCSDS Member Agency Use Cases (CMAUCs) with regard to management of typical member agency TTC network services 2) A Recommended standard or set of standards for management of spacelink and terrestrial data transfer services.  The recommended standard or standards should address the following Formal definition of the service management life-cycle in accordance with CMAUCs Identification of the management services or functions needed to support the CMAUCs An ability to accommodate management of services yet-to-be defined by CCSDS. In general the set of services are those defined in IOAG Service Catalog 1.   An initial sub-set includes the following (CCSDS terms used for the equivalent items in the IOAG catalog): RAF RCF ROCF FCLTU FSP Delta-DOR TD-CSTS (Tracking Data via CSTS) MD-CSTS (Monitor Data) Generic File Transfer (GFT) The recommended standard or standards shall also address standardization of commonly identified information artifacts that are exchanged between service providers and service users.  Examples of such information include publication of TTC Network capabilities (service catalog) publication of TTC Network Schedules service agreement parameters calculation of communications geometry (from trajectory predictions) spacelink signal strength and capacity estimates (link budget, estimated return data volume) service requests service level events and service execution configuration change requests service delivery accounting 3) Support of the management of space inter-networking and the IOAG Catalog 2 services. Note that this is considered to be a lower priority. It is assumed that the SIS Area of CCSDS has the lead in defining space inter-networking management. 4) Definition of on-the-wire precise interoperable data formats (for example, eXtensible Markup Language (XML)).4) A recommended standard profile on existing industry file transfer mechanisms to facility inter-agency inter-operation terrestrial file exchanges. |
| **Survey of Similar Standards Efforts Undertaken in Other Bodies and elsewhere in CCSDS** | The IOAG has conducted a survey of service management needs which has been delivered to CCSDS as an official communiqué.  The IOAG has also performed detailed conceptual studies with regard to Solar System Inter-networking which includes management considerations of such an inter-networking capability. CCSDS has already published a recommendation for management of telemetry and command services (910.11xB1) and found that the prototypes developed by ESA, JAXA, and NASA-JPL inter-operated well via the exchange of XML formatted messages, but the recommendation was insufficiently scoped to meet the full needs of member agencies (see rationale above). |
| **Patent Licensing Applicability for Future Standards** | <div>None.</div>  |
| **Technical Risk Mitigation Strategy** | Technical risk is not seen as a significant issue for standardization of service management; it does not involve new and/or exotic algorithms but rather is technically well within the state of modern day industry IT practices. XML technology was proven to be adequate and workable via earlier CCSDS prototyping effort in support of the current Blue Book on service management. Technical risk is alleviated by the fact that CCSDS has already produced a recommendation for the management of telemetry and command services. The earlier recommendation will provide a significant reference against which to check the new recommendation or recommendations to be developed. The relatively small technical risk associated with development of data-only format type recommendations (see below for management risk mitigation) without the benefit of the full service definition as a cross-check will be mitigated by first developing a complete concept prior to embarking on the definition of the data-only format recommendations. |
| **Management Risk Mitigation Strategy** | The main managerial risk is that the set of recommendations will run over schedule with regard to production resources available. The mitigation is a near-term prioritization with regard to data-only format standards for those items identified as being useful for agencies and judged technically to not require as much, if anything, in the way of extensibility. Such examples include the definition for publication of a schedule of services, and planning information associated with communications link geometry. This will help to ensure that pragmatic recommendations are produced in the near term while allowing the extensibility/scaling capabilities to be developed in a deliberative and technically-sound fashion. |
| **Description of Change** |  |
| **Disable Alert** | No |
| **Area Director E-Mail Address** | Erik.Barkley@jpl.nasa.gov |
| **Create Poll** | Yes |
| **CC Yourself** | No |