**Service Agreement and Configuration Profile Blue Book**

**Concept Description**

Use of the configuration profile approach is the de facto method that TT&C networks employ for configuring space link sessions (a.k.a. contacts, passes, tracks, Events). However, the term “configuration profile” is itself the CCSDS name for this entity – actual Provider TT&C networks currently have their own network-dependent names (e.g., SN service specification codes (SSCs), NEN Support Activity Codes).

The service agreement does not have similar counterpart in the real life, as to now. The missions and network providers agree many aspects of the support in form of custom formatted documents or contracts. This lays the ground for further operational support, however is a tedious task and does not allow for real automation.

The Space Communication Cross Support Service Management (SCCS-SM) Service Specification, published in 2009, included standard XML-formatted Configuration Profile and Service Agreement specifications. The Silver-1 Configuration Profile was designed as part of a Configuration Profile Service, in which new configuration profiles could be generated dynamically by a Mission and submitted to the Provider CSSS shortly (minutes to hours) before the submission of a Service Package Request that referenced this Configuration Profile. The need for a Provider CSSS to be able to quickly validate a Configuration Profile led to a highly-formalized Service Agreement standard against which the individual parameter values in the dynamically-generated Configuration Profiles could be automatically and quickly validated. This, and few other shortcomings (monolithic structure, rudimentary timing offsets, all CCSDS or nothing nature) inhibited the implementation. Therefore, in the frame of new approach to the Extensible Service Management, the new structure of Configuration Profiles has been decided.

The recommended standard will be composed of a Service Agreement and Configuration Profile definitions, moving the service agreement away from previous setting together with Service Catalogue. Service Agreement wins with that more on actual technical importance for the complete lifecycle, and is recognized as integral part of the mission establishment and execution process.

Generally the Blue Book will follow concepts as defined in tech note *Requirements for Simple Configuration Profiles and Service Agreements*. This tech note is required for the deeper understanding of all dependencies and especially the coupling with the Functional Resource world, as the Blue Book won’t go into so much detail. Due to the fact, that only official Green or Magenta Books may be referenced, the working group may consider converting either whole Tech note or parts of it into respective Green/Magenta book.

The Blue Book is a one consolidated recommended standard for two actual information entities: the Service Agreement and the Configuration Profile. They will be treated in separate sections, showing however the dependencies between these two, as required.

The Service Agreement chapter will include beside the main definition of the data format (with UML diagram), the sections related to the Configuration Profiles themselves (or actually their containment), as well as so called Persistent Information.

The Configuration Profiles (itself defined in detail in Configuration Profile chapter) are solely either referenced or contained in a scope of Service Agreement. In other words, all Configuration Profiles will be created as part of the Service Agreements, eliminating requirements for dynamic creation of configuration profiles and therefore eliminating the need to dynamically validate configuration profiles. The Configuration Profiles will each contain the ranges and sets of allowed values that their configuration parameters can take on, these allowing specified parameters in SMURF Service Package Requests to be validated against information that is contained in the Configuration Profiles themselves.

Another advantage is that when requesting a space link session be scheduled, instead of asking for an explicitly-detailed set of resources and associated configuration parameter values, the Mission simply references one or more configuration profiles that have been previously negotiated between the Mission and the Provider CSSS and have been defined within the Service Agreement.

In summary, this section will focus on showing the dependency between actual Configuration Profiles and the Service Agreement, and how the containment shall be performed and understood, also in terms of lifecycle. Also, the considerations related to parameter value ranges or lists may take (some) place here.

The Service Agreement shall include the list of bilaterally agreed apertures, data storage policies or general booking constraints (like maximum number of scheduled Service Packages in a time period).

The Configuration Profile section will focus on three aspects: general data format definition (and its dependencies with respect to Service Agreement), the pre-defined service profiles for most common services and finally some considerations for user definitions of configuration profiles.

The general part of Configuration Profile contains description of the main classes and the dependencies of their combinations in form of Functional Resource Sets (like *RF Aperture*, *CCSDS 401 Return Physical Channel Reception*, *TM Sync and Channel Decoding*, etc.). Additionally, for the use at the level of Service Agreement, the possibility to define parameter value ranges or lists is described. Another aspect is the difference in definition and usage, between user defined Configuration Profile parameters and SANA registered Functional Resource Sets, which constitute consolidated functional resource definitions (and shall bridge the identification and usage of functional resources between Service Management and Cross Support Transfer Services ie. for Monitoring Data). These different usage scenarios will be described and discussed. This section shall allow for basic understanding and implementation of the CSS Service Management compliant Configuration Profile (as a part of Service Agreement or an entity being referenced out of Service Package) without actually tackling on any deeper Functional Resource aspects (like individual parameters, etc.).

Second section shall cover for so called cookie-cutter concept and its handling. The cookie-cutters defined in the Blue Book will therefore walk through number of identified services, which will be explained in some detail and especially their definition in terms of combination of the Functional Resources required configuring specific service. The cookie-cutter config profiles are created from pre-defined Space Link Service Profiles, which in turn are defined from the FRs in FR Sets. The basic Configuration Profile template, the main Common Class Schema and Abstract Strata Definitions will be delivered as integral part of the Blue Book, whereas schemas for FR Sets will be stored at SANA registry, and thus being available for including in own configuration profile schemas. This way, the Blue Book will not focus at all on definition of functional resource parameters (redundant to the actual FR definition also located in SANA registry), but will only mention them as required for fully CCSDS conform usage and focus only on Functional Resource Sets and their required combinations for each specific Service Profile type. SANA would contain the FR sets schemas generated automatically out of the Functional Resource Model.

The actual content of each Functional Resource – their detailed parameters – are treated in two ways. First the general definition of freely defined parameters or parameter sets (which may be bilaterally agreed between parties) and secondly the reference to the respective fully CCSDS conform (in terms of Functional Resource definition) XML schema located at the SANA registry.

That way the implementing organizations may choose if they freely decide on contents of the Configuration Profile, still conforming in total to the Functional Resource dependencies within specific Service or completely support the existing set of Functional Resource parameters already existing at SANA. The way of treating that this way in Blue Book, is a tradeoff between keeping the book development in reasonable time and on the other hand do not completely loose the Functional Resource concept out of sight. This consideration is also of an importance with respect to the extent of the book, which already just covering simple FR combinations for selected Services is going to be very extensive. Additional definition of each single parameter would inevitably lead to huge incomprehensive recommended standard. Another issue is in that case the synchronization between actual SANA registry of FR and their definition in the SACP book.

As already mentioned before, in order to validate specification and reconfiguration, the allowed range/set of parameter values for each parameter may be included as part of the Configuration Profile itself. This gives in general the Service Agreement boundaries during mission establishment process, and later on allows in elegant way for each Configuration Profile to be self-verifiable.

Finally the book will discuss some topics related to multi-service Configuration Profiles and their interactions.

Appendix sections may include example XML configuration profiles, constituting actual pre-baked versions which could be immediately being used by missions. Using these examples, missions would need to fill only the parameter values and thus use directly as for instance telemetry and telecommand combined configuration profile with FCLTU and RCF SLE.

**Summary**

SACP Book will:

* Include definitions for two CSS SM information entities: Service Agreement and Configuration Profile
* Follow concepts of the which will possibly be explained in a Green or Magenta Book (to be defined) which may be officially referenced
* Service Agreement will be essentially a collection of Configuration Profiles augmented with allowed value ranges or lists
* Service Agreement will contain also additional information (Persistent Information) which will apply for all of the Configuration Profiles and Service Packages within the Service Agreement period.
* Configuration Profile will define (based on so called cookie-cutters) the configuration for the mission,
* Cookie-cutters represent pre-prepared combinations of Functional Resources and Sets, which follow the FR concepts for typical services (i.e. Forward CLTU Space Link Service).
* The schemas for FR Sets will be stored in SANA
* The configuration profiles may contain actual Functional Resource parameters (from SANA) and ones with freely definable (bilaterally agreed) parameters. The selection on use of these can be done on mission to mission basis.
* Each mission / user shall be able to construct its own configuration profile cookie-cutter schema, based on provided template, common classes and abstract strata sets, and optionally, FR Set Schemas from SANA.
* Bilaterally agreed parameters – in case the agencies intend to also take advantage of monitoring and control – need to follow the FR structures, especially with respect to FR Types and Parameter Identifiers (OIDs). This would possibly require agencies to register their own FRs on the SANA registry subtree that is already set aside for that purpose. This will be provided in form of best practice or even normative appendix (tbd).

