* + 1. SSM Functional Specification
       1. SSM Association

SSMs receive and manage association requests from SSDs. SSMs shall have a FQDN or IP address, and listen on a port chosen by the system operator. The SSM will start an association hand-shake if they receive an association request in the form of:

SSD associate {

Association [request new, request refresh, request disassociate]

SSD Device ID

Public Key}

To ensure that the SSD is authorised to operate with a particular SSM in a SCOS network, it would need to authenticate using TLS-PSK. The Pre-Shared Key would be configured on the SSDs by the system administrator. Each SSM would have a copy of each SSD’s Public Key, using it as a device identity verifier.

Configuration of Public and Pre-Shared Keys and the chosen way of representing SSD Device ID is implementation specific, and out of scope of this standard.

The association can be “new” (i.e. no previous state exists in SSM), “refresh” (SSD sends a refresh-association request after a chosen timeout period if it has not received any scan requests from the SSM), or “disassociation” (SSD is expecting to lose connectivity for a period – active disassociation by SSDs ensures that SSMs keep inventory of available scan resources current).

SSM replies with:

SSM associate {

SSD Device ID

Association state granted [new, refresh, disassociate]

SSD association max TTL

SSD association remaining TTL}

The Time To Live is a parameter set by the SCOS system operator, and indicates how long the SSM will wait before assuming an SSD has gone offline and remove it from its scan resources inventory. If an SSD is still associated to the SSM, the SSM will also return the current remaining TTL for validating behaviour.

* + - 1. SSM Task Scheduling

Scheduling is defined in terms of scan intervals that take up slots in a calendar schedule. These slots will include slots for long scans; and slots for very short scans to ensure fair allocation of scan resources.

Scheduling requests from an Actor is be defined in terms of duration, time, repetition, etc, as well as a flag to indicate whether the desired scan slots are “Exact Time” slots or “Nearest Time” slots. The scheduler on the SSM will use this to try meet the Actor request (and either confirm the scan schedule is accepted or refused).

The SSD advertises its capabilities using the metadata fields defined in Section 7.1 SSD metadata specification, in particular the following metadata items:

7.1.1 Top level hardware metadata

7.1.2 Antenna Metadata

7.1.3 RF Front-end metadata

7.1.4 Calibration Metadata

7.1.5 SDR Metadata

7.1.6 SSD Host Metadata

1.1.1 Environmental Metadata

SSM copies each associated SSD’s configuration, situation and capability metadata along with that SSD’s current scan schedule to an Actor when requested (see Actor/SSM messaging in Section 6.1).

A new scan request is added to the schedule as a time slot with the desired parameters echoed back (for housekeeping if there is an error, you can see what the Actor was expecting, what the SSD had at the time it was performing scan)

Scan slots are minimum one minute long, and can be multiple minutes up to all the minutes in a calendar week (10,080). The maximum number of minutes that can be blocked off for a scan by an Actor is determined either by local configuration by the SCOS system operator, or as a parameter passed to it by the policy manager.

It is a requirement of the scheduler manager implemented on the SSM that it handles for calendar weeks, and ensures that scheduling is done using Universal Coordinate Time (UTC).

The scheduler on the SSM will handle repeated scans within that one week time window. Scheduling repeated scans over multiple weeks, months or years will be managed by the application (Actor).

The scheduling will be stored as a set of scan recipes that identify the start time, finish time and scan parameters. The length of time a scan needs to be completed in is defined by the Actor in the scan request, and the SSM and SSD will no attempt to validate this. If a scan is not complete in the given time, the SSD will return an error code, and the Actor that requested the scan would need to modify their scan request parameters.

SSD will attempt scan in given slot. It responds with a report to the SSM, and from SSM back to the requesting Actor that a particular scan was complete, incomplete (ie. not finished in time given) or rejected (i.e. something happened at SSD that caused it to not perform scan). The SSD also returns “Time to Complete”, which allows system managers to identify Actor’s requesting excess time slots for the scans they request.

The scan request gives the schedule information (time slot, duration, number of repeats, repeat offset time), and scan and system configuration parameters, as specified by the Class B and C metadata items in Section 7.

The primitives for these are described in 8.7.1.2 SSD-SSM Scheduling Primitives.