

DKF Handling in the SPS Operations Environment

General Background:

The SPS has many new characteristics related to DKF validation and support product generation.

1. The SPS will replace the NSS, ECC NSS, NIS (Lilypad), 26m NIS, NOCC SPPA, DSCC SPPA, and the CSDL. All NSS application software will be decommissioned along with its associated hardware systems.
2. The SPS will provide a new, single User Interface Portal (UIP) input mechanism to the SPS system. Mission users will submit all required support product generation inputs through the SPS Portal. The new interface is documented in the 820-13, 0168-Service Mgmt interface document. Note that the most recent release is Rev D (Rev C1 applies only to legacy missions).
3. The SPS Portal will automatically validate input data from mission users. The SPS will provide users an automatic email notification of the acceptance or rejection of input files on submission. The current system is not configured to notify mission users of the ongoing status of the downstream support data preparation and generation, but the information is available to the DSN SPS operators.
4. The SPS uses the same pass number algorithm as the NSS, but there are some differences in pass numbers due to new functionality and the SPS fixing some anomalies that were in the NSS. Missions should not assume that pass numbers will be the same between NSS and SPS.

Mission DKF Submission to the SPS Portal

For those projects utilizing the DKF, the project sequence users will need to submit a complete, accurate, and valid DKF file through the SPS UIP (Portal) interface. This is key to the entire SPS support product generation process. At the time of DKF submission to the Portal, the SPS will perform a validation on the DKF, including checks on syntax and semantics (including BOT/EOT schedule checks). If the DKF does not conform to the documented interface, the DKF will be rejected by the SPS. An e-mail notifying mission users of the rejection will be automatically sent. The mission user responsible for DKF submission will need to correct the DKF and then resubmit to the Portal.

SPS 'Rules' Governing DKF Validation at Submission Time

There are SPS 'Rules' settings which govern the predicts generation and DKF validation at the time of submission. The user can specify applicable start and end times at submission to control the portion of the DKF file that is to be used and validated (in this case, SPS will not recognize or validate data from other times in the DKF). The user will need to re-submit the DKF with new start-end times to validate records for a later timespan.

- 1) Keyword Rules (Syntax Rules) which check the DKF syntax and format per 820-13 Ops 6-13 (Rev C1 only for legacy missions)
- 2) DKF VM Rules (Semantic Rules). These semantic checks include a search of the DSN 7-Day schedule for matching items in the DKF, including the BOT/EOT times and Configuration Codes.

Background: DKF in SPS Predicts Generation Process:

The SPS software, Unified Telecommunications Predictor (UTP), will automatically generate telemetry (TLM) Predicts. This replaces the NSS-TPAP TLM Predicts generation software. The TLM Predicts are generated only if a mission has subscribed to telemetry predicts in their support agreement with DSMS. The TLM predicts for a pass will be generated if the schedule indicates that either a DKF or a Nominal SOE is to be used. If a DKF is indicated in the schedule, but no file exists on the server, then the Support Products Analyst (SPA) can also generate predicts manually, as necessary, to support DSN tracking. Note that a DKF is also used to generate the DSN Pass SOE for use by DSN tracking stations.

Mission-Specific Settings in SPS Rules File for DKF BOT/EOT Validation Processing:

1. DKF Validation at time of submission (Default == BOT/EOT VALIDATION ON)

At the time of DKF submission to the SPS Portal, the SPS semantic rules are checked. The semantic rules include a check against 8 weeks of the DSN 7-day Schedule which are resident on the SPS server. If the DKF BOT/EOT times do not match those in the SPS schedules, the SPS will reject the DKF and send an error message to the responsible mission user. The user must correct the DKF and re-submit at this time. The DKF semantic validation will occur again when the SPS generates the predicts for the pass, but the user will not be notified of errors at this time. If the SPA observes an error and the user is not available in real-time to fix any DKF errors, then the pass will fail without manual intervention as there will be no telemetry predicts and no support data package.

DKF Validation at Timer Settings

The DKF is again validated for syntax and semantic errors prior to the predicts generation. The SPS uses a predict generation timer to begin a semantic validation of all inputs (including DKF files) prior to the initiation of support product generation..

2. Predict Generation Timer: (Default == TBD days prior to BOT)

The default value will be ~3 days prior to BOT. However under special circumstances for predict generation, this value may be modified. The Support Preparation Analyst (SPA) will control and set the value per project direction to the NOPE when approved.

3. Support Data Package (SDP) Transmission Timer: (Default == TBD hours prior to BOT)

The transmission of the SDP is under the control of DSN operations and will be transmitted to the DSCC complex approximately 24-hours prior to BOT. The Support Preparation Analyst (SPA) will control and set the value.

Timer Settings, DKF Validation, and Impact on Support Product Generation:

When the SPS reaches the timer default settings, the SPS will automatically begin the process of generating predicts and support data packages (SDP).

- a. The SPS will verify that it has all the necessary DKF input files that it needs to begin generating predicts and an SDP.
- b. The SPS will again perform a syntax and semantic validation on the DKF, including a check of the DKF's BOT/EOT times against the schedule. The DKF is "rejected" only for the affected pass. In reality, the DKF does not change status to invalid so it will continued to be used for any other passes covered by the DKF time span.
- c. If the DKF is invalid, then there will be no generation of support products and the tracking pass will fail unless corrected. It is important to note that validation errors discovered after the initial submission (i.e., at predicts generation time) do not result in notification messages to the user. This means that the projects would have no automated way of knowing that the DKF was found invalid. This is the reason that it is important that the user to submit a DKF with the appropriate start-end times so that it is validated for the time of the desired pass.
- d. The project sequence user will need to correct the DKF for any errors and resubmit to the Portal. The SDP will not be generated until a valid DKF is submitted and the tracking pass will fail as a result.