WRSM Operations Concept

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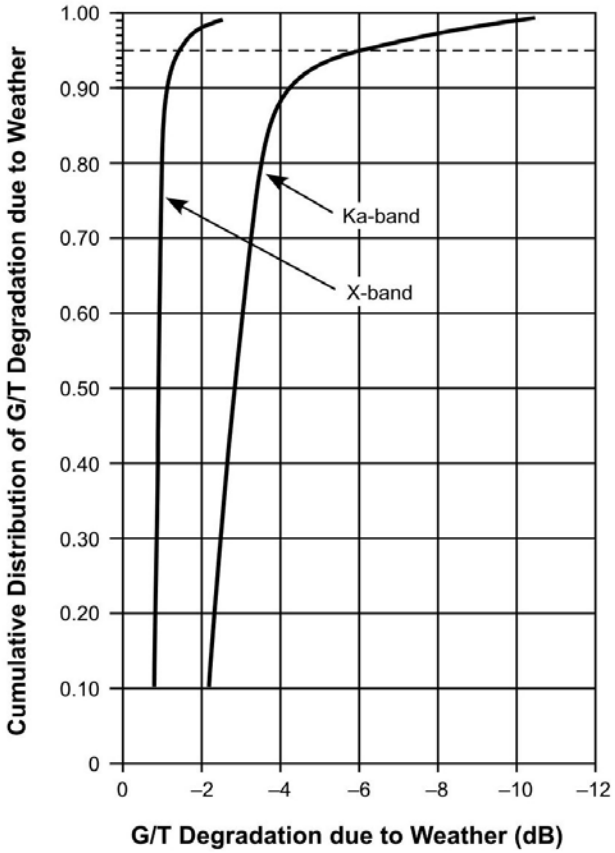
X & Ka-band Link Comparison



- An X-band link designed for a 95% confidence level must assume a 1.25 dB weather loss
  - On the best possible day, the link will be 0.5 dB better than this
- A Ka-band link designed for a 95% confidence level must assume a 6 dB weather loss
  - At least half the time, the link will be 3 dB better than this
- Adjusting the link based on anticipated weather enables much of this difference to be recovered for data transmission

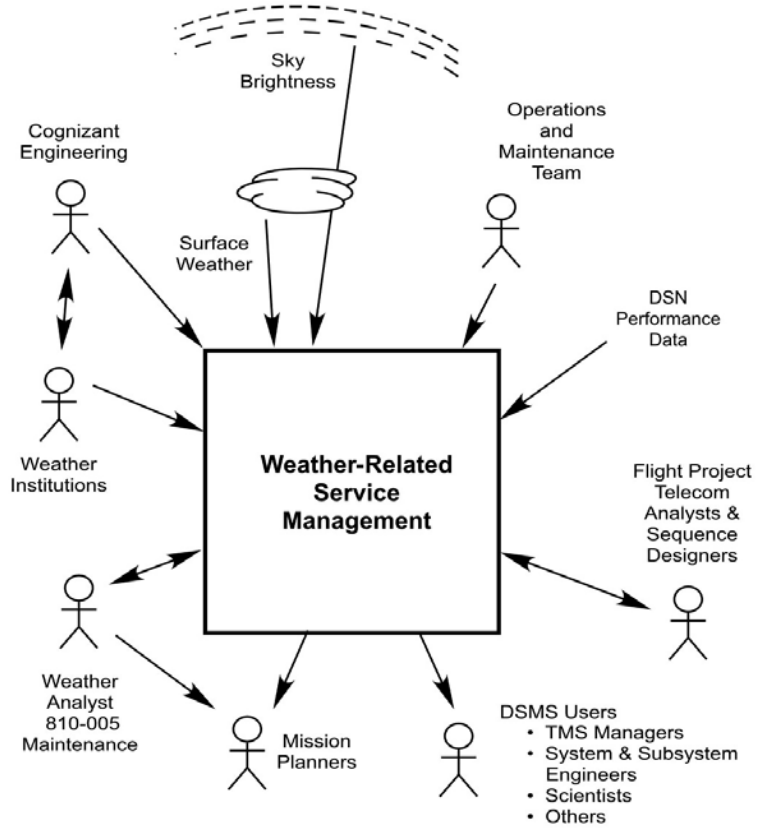
Justification for WRSM

- The existing method of delivering weather statistics to users (via 810-005) is limited to monthly models for each complex based on long-term observations
  - This process creates artificial discontinuities at month boundaries
  - This process cannot consider easily recognizable weather cycles such as dry or wet years
- On-line delivery enables many more models to be supplied
  - Models for every day in the year at every complex based on a moving average
- Atmospheric attenuation can be forecast based on surface weather forecasts from external agencies
  - The forecasts get better the closer it is to an event
  - Providing this information to Projects will enable them to adjust their data delivery and avoid excessive link margins

Operations Concept

- Obtain short-term weather forecast data for all three DSN Complexes from appropriate weather institutions
- Provide automated production of atmospheric noise temperature models based on the forecasts received from these institutions.
- Make these models available to available to DSN users for estimating link capacity
- Provide Atmospheric Temperature Event Notification Service
- Maintain an archive of models and make this archive available to DSS users so forecast performance can be compared with actual performance

External Interactions



- DSMS Personnel
  - Cognizant Engineering
  - Weather Analyst
  - Operations & Maintenance
  - Managers, Engineers, Scientists, others
- Weather Institutions
- Beneficiaries
  - Project Telecom Analysts and Sequence Designers
  - Mission Planners