PROPAGATION ANALYSIS PROGRAM™

ANALYZE PROPAGATION IMPAIRMENTS IN AN EARTH-SATELLITE LINK AT C, X, KU, OR KA-BAND

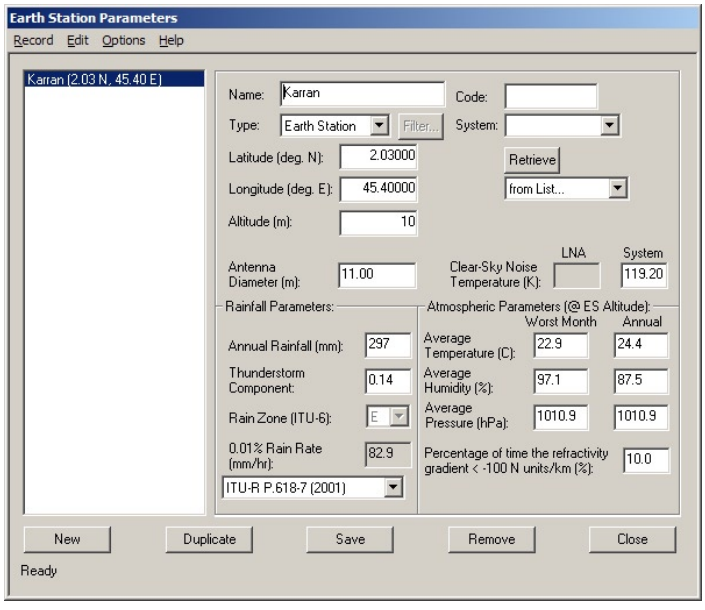
The Propagation Analysis Program (PAP) is a state-of-the-art software tool for computing propagation impairments in an earth-satellite link for fixed satellite service. The user can select any one of six built-in models for calculating propagation impairments. The program computes the individual propagation impairments, their combined effect, and the cross-polarization discrimination, for both the uplink and the downlink. The models are valid for C, X, Ku, and Ka-bands.

The COMSAT® DAH (Dissanayake, Allnutt, Haidara) model is a superior engineering tool for the most accurate results at C, X, Ku, or Ka-band. Independent studies compared the output of several propagation models with ITU and ACTS measured propagation data, and concluded that the COMSAT DAH model provided the best performance. The ITU-R model (based on the most recent recommendation ITU-R Rec. P.618-8) is recommended by ITU and can be used for regulatory issues and inter-system coordination. Previous versions of the ITU-R model (ITU-R P.618-6, and P.618-7) have also been retained for comparison and backwards compatibility. The COMSAT PAP model was originally used by Intelsat®, but has since been replaced by the DAH model. The Crane Two-Component model has traditionally been more popular within the USA, especially for US government applications.

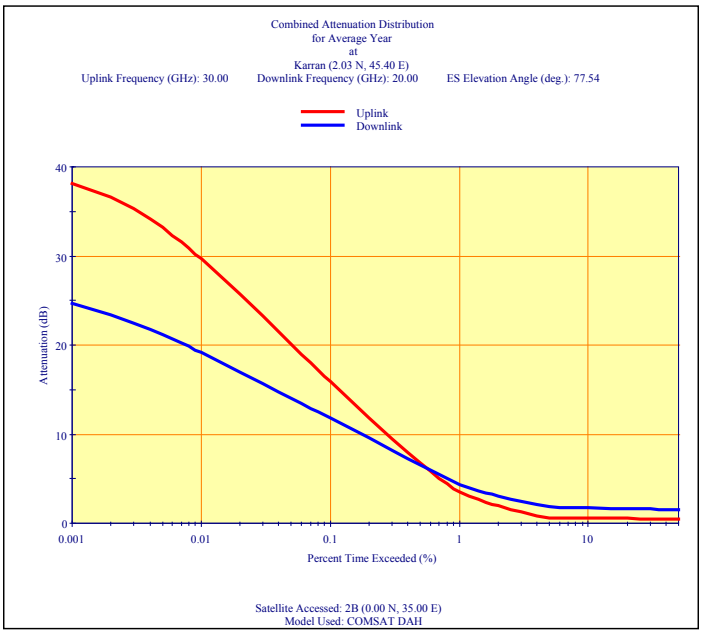
All results are presented in the form of annual or worst-month cumulative statistics. They therefore represent the total time that a given impairment level is expected to be exceeded, after the impairment levels for all events in a year (or worst month) have been accumulated statistically.

FEATURES

- COMSAT DAH model predicts attenuation due to rain, cloud, melting layer, gaseous absorption, tropospheric scintillation, and low-angle fading.
- ITU-R Rec. P.618-6 model predicts attenuation due to rain, gaseous absorption, tropospheric scintillation, and low-angle fading.
- ITU-R Rec. P.618-7 and P.618-8 models predicts attenuation due to rain, gaseous absorption, cloud attenuation, tropospheric scintillation, and low-angle fading.
- COMSAT PAP model predicts attenuation due to rain and tropospheric scintillation.
- Crane Two-Component model predicts attenuation due to rain.
- All models predict cross-polarization discrimination and downlink degradation due to increased noise temperature caused by the absorptive propagation impairments.
- Models Faraday rotation effects for linear polarization.



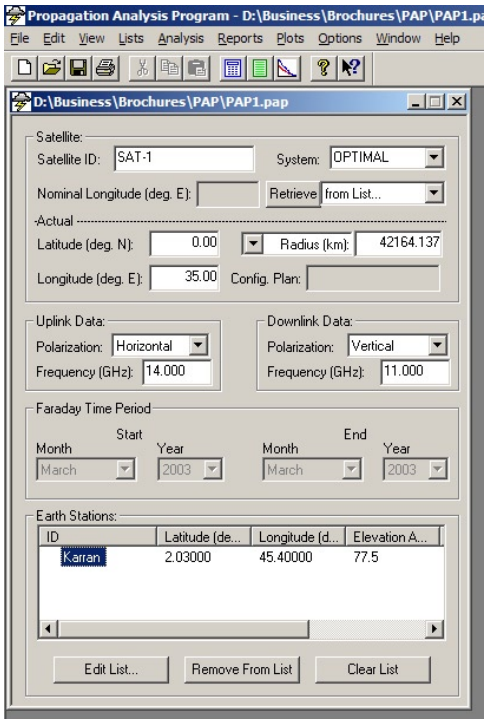
DATA ENTRY SCREEN: EARTH STATION INFORMATION



OUTPUT PLOT: COMBINED ATTENUATION DISTRIBUTION DUE TO UPLINK AND DOWNLINK IMPAIRMENTS

ADDITIONAL FEATURES

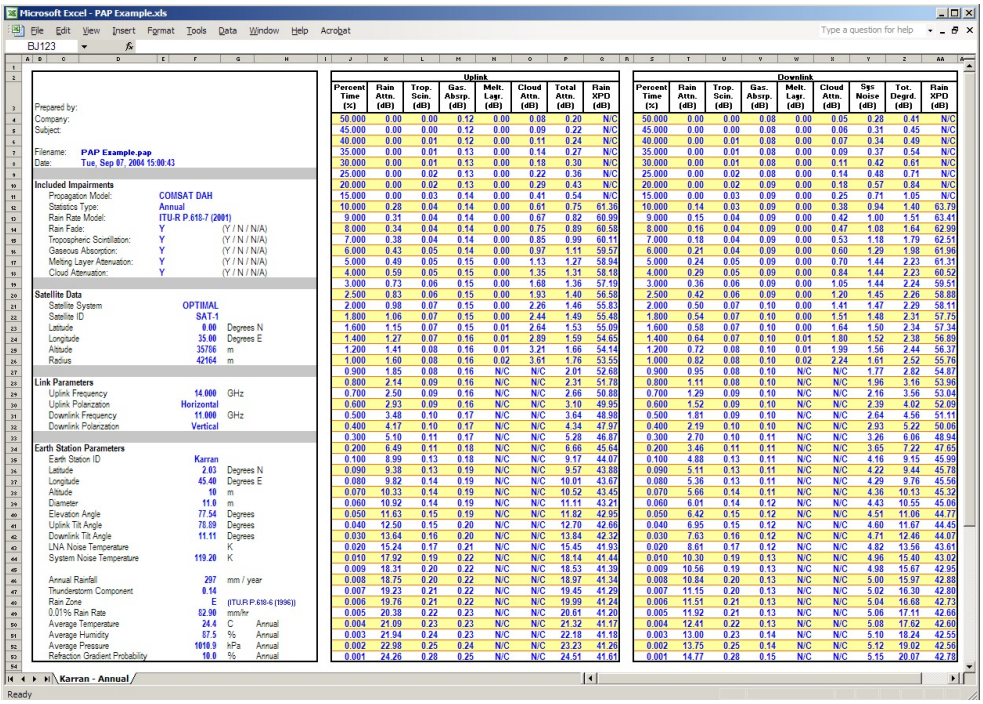
- Includes comprehensive precipitation and climate databases and digitized rain maps for all models – PAP can automatically look up climate statistics from Rice-Holmberg, ITU or Crane rain zone maps, or the user may specify climatic data.
- Easy-to-use graphical user interface for defining satellites, and earth stations.
- Detailed plots and reports showing individual component contributions to link impairments, and their combined effect.
- Propagation impairments automatically computed at 50 different percentage availability values, ranging from 50% to 99.999%.
- List Manager application to enable sharing data with other Optimal Satcom™ software products such as Antenna Coverage Program (ACP) and Link Budget Calculator (LINK).
- Can operate in two modes - either as a stand-alone application, or integrated as a component of the COMSAT STAR® Suite.
- When used as part of COMSAT STAR Suite, PAP can retrieve satellite and earth-station data directly from the Satellite System Database (SSDB) making it even easier to use. The SSDB is a part of COMSAT STAR and supports both Oracle® and Sybase® databases.



DATA ENTRY SCREEN: SATELLITE AND LINK INFORMATION

INPUT PARAMETERS

- Earth station location in latitude (°N), longitude (°E), altitude (m) and technical parameters.
- Satellite location in latitude (°N), longitude (°E), and altitude or radius (km).
- Annual rainfall (mm) and ratio of thunderstorm to total rainfall, or 0.01% Rain Rate (mm/hr) – default values from rain databases are available corresponding to the earth station location.
- Atmospheric parameters – default values from climate databases are available corresponding to the earth station location.
- Clear-weather earth station equivalent noise temperature (°K).
- Uplink and downlink frequencies and polarization.



OUTPUT REPORT: UPLINK ATTENUATION AND DOWNLINK DEGRADATION – INDIVIDUAL IMPAIRMENTS AND COMBINED DEGRADATION (EXCEL)

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