

Degra accounts for the gradual deterioration of performance attributable primarily to decay of the radioactive source and secondarily to gradual deterioration of the thermoelectric material. To provide guidance to an RTG designer, given a minimum of input,

Degra computes the dimensions, masses, and thermal conductances of important internal structures as well as the overall external dimensions and total mass.

This program was written by Eric G. Wood, Richard C. Ewell, Jagdish Patel, David R.

Hanks, Juan A. Lozano, G. Jeffrey Snyder, and Larry Noon of Caltech for NASA's Jet Propulsion Laboratory.

This software is available for commercial licensing. Please contact Karina Edmonds of the California Institute of Technology at (626) 395-2322. Refer to NPO-45252.

Calculations for Calibration of a Mass Spectrometer

NASA's Jet Propulsion Laboratory, Pasadena, California

A computer program performs calculations to calibrate a quadrupole mass spectrometer in an instrumentation system for identifying trace amounts of organic chemicals in air. In the operation of the mass spectrometer, the mass-to-charge ratio (m/z) of ions being counted at a given instant of time is a function of the instantaneous value of a repeating ramp voltage waveform applied to electrodes. The count rate as a function of time can be converted to an m/z spectrum (equivalent to a mass spectrum for singly

charged ions), provided that a calibration of m/z is available.

The present computer program can perform the calibration in either or both of two ways: (1) Following a data-based approach, it can utilize the count-rate peaks and the times thereof measured when fed with air containing known organic compounds. (2) It can utilize a theoretical proportionality between the instantaneous m/z and the instantaneous value of an oscillating applied voltage. The program can also

estimate the error of the calibration performed by the data-based approach. If calibrations are performed in both ways, then the results can be compared to obtain further estimates of errors.

This program was written by Seungwon Lee of Caltech for NASA's Jet Propulsion Laboratory. Further information is contained in a TSP (see page 1).

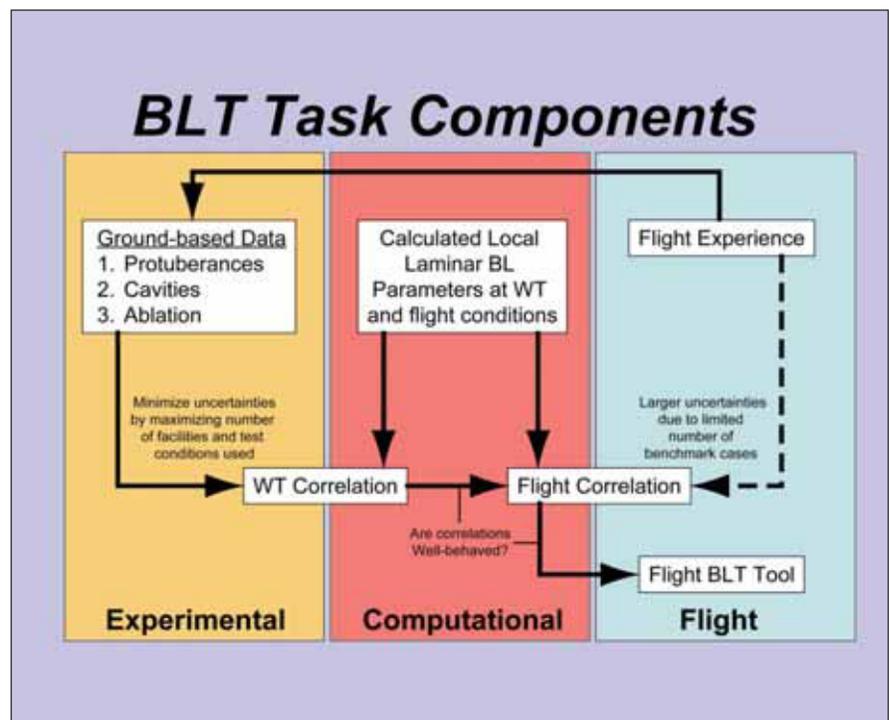
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Predicting Boundary-Layer Transition on Space-Shuttle Re-Entry

Langley Research Center, Hampton, Virginia

The BLT Prediction Tool ("BLT" signifies "Boundary Layer Transition") is provided as part of the Damage Assessment Team analysis package, which is utilized for analyzing local aerothermodynamics environments of damaged or repaired space-shuttle thermal protection tiles. Such analyses are helpful in deciding whether to repair launch-induced damage before re-entering the terrestrial atmosphere. Given inputs that include re-entry trajectory and attitude parameters, air density, air temperature, and details of each damage or repair site, the BLT Prediction Tool calculates expected times of laminar-to-turbulent transition onset of the boundary-layer flow during re-entry. (These times help to define the proper aerothermodynamic environment to use in subsequent thermal and stress analyses of local structural components.)

The BLT Prediction Tool includes a database of computed boundary-layer parameters that cover a range of nominal re-entry trajectories and uses an interpolation program for estimating local boundary-layer properties during flight



Critical Elements for development of new BLT tool for on-orbit assessments.