NASA TECH BRIEF

NASA Pasadena Office

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Battery Simulation Program

The problem:

To devise a means of simulating spacecraft power subsystem batteries.

The solution:

A computer program which calculates battery energy at specific times dictated by an input sequence of recharge/discharge/no activity phases. Recharge phases are assumed during times not specified, unless the batteries are fully charged. Warnings are printed whenever battery energy falls below a specified level. The program assumes there are two identical batteries.

How it's done:

The battery simulation program accepts time and sequence data and forms a sequence of charge/discharge/no activity phases which uses up all the time between specified start and stop times. All time is kept relative to the nearest periapsis passage. Hence, the program uses as parameters the orbital period and the number of the first periapsis passage. The charge states of the batteries are calculated at the end of each phase.

The sequence of program computations can be summarized as follows:

1. Input miscellaneous data, occultation data, phase sequence data.

2. Interpolate occultation data to form a complete set of occultation phases over the period of interest.

3. Merge phases, inserting recharge phases.

4. Execute phases.

The program has built-in recharge algorithms for various charge rates and temperatures. The utilization of the two batteries in parallel is handled by a discharge algorithm, also built into the program.

Notes:

1. This program is written in FORTRAN V for use on the UNIVAC-1108 computer.

2. Requests for further information may be directed to:

   COSMIC
   Barrow Hall
   University of Georgia
   Athens, Georgia 30601
   Reference: B71-10250

Patent status:

No patent action is contemplated by NASA.

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Jet Propulsion Laboratory
under contract to
NASA Pasadena Office
(NPO-11580)

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