NASA TECH BRIEF

LM Lookangle Program

The problem:

To develop a program to reduce data from the Lunar Module (LM) Missions and to output desired information.

The solution:

A program to compute the spacecraft look (ASPECT) angles θ and ϕ and the slant range, which define a spherical coordinate system located in the spacecraft body.

How it's done:

In addition to defining the spherical coordinate system located in the spacecraft body, the azimuth and elevation angles from the radar site to the spacecraft are computed.

The program contains two major modes of operation. In the first mode, it obtains data simultaneously from either two input tapes (if from an unmanned flight). The program makes all necessary calculations and outputs the desired information. At the same time, it merges all the input tapes onto an output tape. In the second mode, the program obtains the data from the previously merged tape and performs exactly the same operation as in the first mode. This option is available so that if there is an error on a lead card input (on a given run), the program can be resubmitted after corrections, using this tape as its only source of input. Under both modes, calculations are performed according to either one of two options: (1) the unmanned option, in which the platform-coordinate orientation is fixed at launch and specified by latitude, longitude, and azimuth inputs; and (2) the manned option, where the platform orientation can be realigned during flight.

The program will, in all cases, output a binary tape to be used for input to the Antenna Pattern Intensity Program. If desired, a blocked tape containing all tape input values used, output values computed, and several pertinent intermediate values will be output. There is also an option within the program to produce a field data output which contains a report of all values computed.

It should be noted that the calculations which are performed and output are carried out only every ΔT seconds, where ΔT is a lead card input. The calculations are performed only over a specific time interval as defined by the START-STOP times which are input to the program. The merge, on the other hand, is performed as soon as matching times can be found on the input tapes, and until an end-of-file mark is reached on any of the input tapes. The data is output on the merged tape at the highest sample rate.

Notes:

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

2. Inquiries concerning this innovation may be directed to:

>COSMIC
>Computer Center
>University of Georgia
>Athens, Georgia 30601
>Reference: B69-10370

Patent status:

No patent action is contemplated by NASA.

Source: W. E. Agee of
Lockheed Electronics Company
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Category 06