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Code 5430

5170-13:MJV:js
1 February 1960

Code 5170

Orbital Data Requirements

Encl : (1) Solid Angle Version of the WMAP Binary Output Format
(2) Magnetic Tape WMAP

1. The orbital data requirements for automatic data reduction have been evaluated to determine the program needs and the standard format in which the data should be obtained. It has been concluded that the parameters required are latitude, longitude, altitude and time. The usual format for this data is the World Map which may be obtained in printed form and also as binary data on magnetic tape.

2. In order to satisfy these requirements, Code 5100 will furnish Code 5430 with the following data:

a. Orbital Constants

Two copies of daily or weekly bulletins giving orbital constants such as orbital period, apogee and perigee will be delivered to Code 5430.

b. Predictions

Predictions will be given in terms of northbound equator crossing times, longitude and orbit number. These will be delivered at least one month in advance. For example, the predictions for the month in advance. For example, the predictions for the month of July will be made available by 1 June 1960. The agency providing the data will indicate the expected time accuracy of the predictions.

c. Printed World Map

For manual data reduction purposes two copies of the Printed World Map will be delivered to Code 5430. These will consist of weekly books containing latitude, longitude, altitude and orbit number for every minute of time. This data will be prepared from the post-flight analysis and it will arrive at NRL no later than one week after the last day of the book.

d. World Map on magnetic tape

For automatic data reduction purposes the World Map will be obtained in binary form on magnetic tape suitable for direct input to an

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IBM 704 computer. The format for this is described in enclosure (1). Enclosure (2) is a sample tape. The tape will be prepared from post-flight data and it will be available at NRL one week after the last day of the data period.

3. Samples of each form of the data will be supplied by 15 March for your inspection and comments.

Martin J. Votaw
Code 5170

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SOLID ANGLE VERSION OF WARP
BINARY OUTPUT FORMAT

First Record CONFIDENTIAL

Word Number	Quantity	Type of Binary Word *	Explanation
1	Dref	Fixed	Dref is the number of days between zero hour, September 1, 1957 and zero hour of launching day.
2	Tau	Floating	Tau (T_0) is the true longitude of the sun at zero hour of launching day. Tau is in radians.
3	Lambda	Floating	Lambda (γ_0) defines the right ascension of Greenwich meridian at zero hour of launching day. Lambda is in radians.
4	X	Floating	Position vector data at starting time.
5	Y	Floating	
6	Z	Floating	
7	Day	Fixed	Julian** starting time is the time of the first minute of output data.
8	Hour	Fixed	
9	Minute	Fixed	
10	Day	Fixed	Julian ending time is the time of the last minute of output data plus one minute.
11	Hour	Fixed	
12	Minute	Fixed	
13	Pass Number	Fixed	This pass number is equal to the first pass number that occurs in the regular data records to follow.
14 - 15	Zeros	Fixed	Not used now.

* Type of 704 binary words listed in the format are either fixed point integers or floating point numbers listed as fixed or floating respectively.

** Julian time counts zero time as zero hour at Greenwich on the day of launch. See Dref. For a starting time of 001 10 05 and an end time of $002^d\ 10^h\ 05^m$. The data is for the interval $001^d\ 10^h\ 05^m$ through $002^d\ 10^h\ 04^m$.

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Nth Record (N + 1), Regular Data Record:

Word Number	Quantity	Binary Word	Explanation
1	Day	Fixed	Julian time of the first minute
2	Hour	Fixed	of data in the Nth record - i.e.,
3	Minute	Fixed	the time associated with the data in words 4-7.
4	Longitude	Floating	Longitude and latitude of the sub-
5	Latitude	Floating	satellite point in radians. Negative longitude is west, positive longitude is east. Negative latitude is south, positive latitude is north. This is the sub-satellite position at the time given in words 1-3.
6	Height	Floating	Satellite height above the position on the earth given in words 4-5. The height is in kilometers.
7	Solid angle	Floating	This solid angle about the satellite subtended by the earth's surface is in steradians.
4P	Longitude		This group of data occurs for each minute of data in the 60 minute binary record, where P = the number of the minute in the record. The units are the same as those described in words 4 - 7 and the explanation differs only in the time associated with the data. For example: If the time in words 1-3 is for 000 day, 12th hour, and 19th minute, then the group of data for the 10th minute of the record is in words 40-43. This data corresponds to the time 000 day 12th hour 29th minute.
4P + 1	Latitude		
4P + 2	Height		
4P + 3	Solid angle		
244	Day	Fixed	Word numbers 244-251 of each binary record are reserved for pass data. If a pass does not occur during the time covered by the binary record zeros (fixed) occur in words 244-251. The Julian time in 244-247 is when the satellite crosses the equator in a northern direction. Each time this occurs, the satellite is said to have completed a pass. The longitude, height, and solid angle are given in the same units as regular data for the time of the pass. The pass no. in 251 is a count of the number of passes starting with 1 for the first such equator crossing.
245	Hour	Fixed	
246	Minute	Fixed	
247	Second	Fixed	
248	Longitude	Floating	
249	Height	Floating	
250	Solid angle	Floating	
251	Pass number	Fixed	

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Code 5170

Orbital Data Requirements

Encl : (1) Solid Angle Version of the WMP Binary Output Format
(2) Magnetic Tape WMP

1. The orbital data requirements for automatic data reduction have been evaluated to determine the program needs and the standard format in which the data should be obtained. It has been concluded that the parameters required are latitude, longitude, altitude and time. The usual format for this data is the World Map which may be obtained in printed form and also as binary data on magnetic tape.

2. In order to satisfy these requirements, Code 5160 will furnish Code 5430 with the following data:

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Two copies of daily or weekly bulletins giving orbital constants such as orbital period, apogee and perigee will be delivered to Code 5430.

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IBM 704 computer. The format for this is described in enclosure (1). Enclosure (2) is a sample tape. The tape will be prepared from post-flight data and it will be available at NRL one week after the last day of the data period.

3. Samples of each form of the data will be supplied by 15 March for your inspection and comments.

Martin J. Vetter
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