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16 October 1963

SUBJECT: Proposed Combination Satellite System

TO: Assistant Director for Mapping, Charting and Geodesy
Defense Intelligence Agency
Washington 25, D. C.

Attached hereto is a report to Assistant Secretary of the Army (R&D) of a brief analysis conducted by this office of a concept for a combination satellite system. On the basis of this favorable analysis, Secretary Hawkins directed that the report be provided your office for your consideration as an appropriate cartographic satellite system that will meet current DOD requirement for direct production of base maps at medium scale.

Concurrently with this transmittal to your office, Secretary Hawkins indicated his intent to proceed to discuss this combination satellite system with [redacted] and Dr. Fubini, DDR&E.

FOR THE CHIEF OF ENGINEERS:

1 Incl
as

GEO. H. WALKER
Brigadier General, USA
Director of Topography and
Military Engineering

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HEADQUARTERS
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON 25, D.C.

IN REPLY REFER TO

SUBJECT: Proposed Combination Satellite System

TO: Assistant Secretary of the Army (R&D)
Washington, D. C.

1. As per your request during the conference held in your office on 9 October, this office has conducted an analysis of your concept for a cartographic satellite utilizing a 12 inch focal length frame camera and a companion 6 inch stellar frame camera with a single 24 inch panoramic camera. The attached table lists the capability of the proposed system.

2. The following comments are considered to be pertinent:

a. The proposed system would be suitable for medium scale mapping purposes because the 12 inch focal length frame camera would directly provide the control and approximately 90% of the planimetry required for mapping purposes. The 24 inch panoramic cameras would provide the additional planimetric detail required for complete military medium scale mapping purposes.

b. The proposed system will meet the control and planimetric requirements for 1/250,000 scale mapping provided that a sound geodetic net is available in accessible areas. Such a net is currently scheduled to be established in a separate conventional program utilizing optical angle measuring techniques, BC-4 cameras, and electronic distance measuring techniques (SECOR) to produce a world-wide 50 station primary net and a 460 station secondary net. The accuracy of these nets will be 16 meters absolute horizontal position with reference to the World Geodetic system while the vertical positions will be better than 16 meters absolute. Development of the proposed system cannot and should not await the completion of the ground control net.

c. Based on limited information available to the Army, the weight and volume of the proposed combination appears to be well within the limitations for current vehicle systems, however, final determinations of this should be made at an early date by NRO.

SUBJECT: Proposed Combination Satellite System

d. Substitution of a single (mono) panoramic camera for the double (stereo) panoramic cameras has certain disadvantages, ie, stereo can provide more ready and accurate identification of detail, easier placement of contour lines and probably somewhat more detail under cloud fringes due to angular view. Stereo can also provide mensuration data on vertical dimensions of structures, etc. These advantages are primarily of interest to the targetter and photo-interpreter for intelligence purposes. From the standpoint of the cartographer and geodesist they fall more in the "nice-to-have" than the "must have" category when considering medium-scale mapping rather than larger scales. The obvious advantage of this combination over the hither-to considered separate stereo pan and longer focal length frame is the tremendous savings in the number of launch vehicles and the fact that this system can be programmed to maximize its output for cartographic requirements, rather than to accept mapping data as an outfall from primary reconnaissance missions.

3. In summary, the proposed cartographic satellite system will meet current DOD requirement for production of base maps at medium scale. However, Air Force opposition might develop since the system would not concurrently fulfill the Air Force requirement for large scale stereo panoramic coverage. Nevertheless, whereas it might not satisfy all desires, this proposed system will most economically provide a base topographic map that will fulfill stated DOD medium scale mapping requirements. Therefore, it is recommended that approval be vigorously pursued on this basis.

FOR THE CHIEF OF ENGINEERS:

1 Incl
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GEO. H. WALKER
Brigadier General, USA
Director of Topography and
Military Engineering

Incl #1

A. Number of missions required

(1) 100 pounds of film recovered (M or single casset system) 16

(2) 200 pounds of film recovered (J or double casset system) 8

B. Film length frame only - 8000 foot (J system)

C. Normal orbital alt (NM) 200+

D. No. of models per 10^6 square miles - frame 150

E. Production Accuracy

Horizontal - 130 ft to 260 ft

Vertical - 56 ft to 112 ft

F. Production contour Interval 140 ft to 280 ft

G. World-wide Geodetic position (Absolute) 420 ft

H. Man-hours required for compilation of manuscript per 10^6 square miles - 170,000

I. Man-hours required for Technical support per 10^6 square miles - 170,000

J. [redacted]

K. [redacted]

L. [redacted]

M. Earliest operational data - April 1966