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WASHINGTON, D.C.

NRD STAFF

~~HEXAGON~~

13 January 1967

10.7 8.2

TO:

SUBJECT: Minutes of 5 January 1967 Meeting of the
HEXAGON System Operational Characteristics
Study GroupMinutes of the 5 January 1967 Meeting are forwarded
herewith.
ALBERT W. JOHNSON
Major, USAFAttachment
Memo for Record
with TABS A, B, & CHANDLE VIA
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WASHINGTON, D.C.

THE NRO STAFF

13 January 1967

MEMORANDUM FOR THE RECORD

SUBJECT: Minutes of 5 January 1967 Meeting with the
HEXAGON System Operational Characteristics
Study Group

The third meeting of subject group took place at the
Satellite Operations Center (SOC) at 1930 hours, 5 January
1967. The group consisted of:

Colonel H. C. Howard, SOC, Chairman
Colonel F. S. Buzard, SAFSP Member
Mr. L. C. Dirks, CIA Member
Major A. W. Johnson, SAFSS, Acting Secretary
[REDACTED], SOC Advisor
[REDACTED], SOC Advisor
[REDACTED], SOC Advisor

The Agenda is attached as TAB A.

The following significant points were agreed:

1. The draft report which had been distributed as TAB C of the 14 December 1966 minutes should be considered as for information only.
2. The SPO confirmed the requirement for 18 revolutions of tumbling life. The SPO is to determine the differences in expendables and other characteristics of the 82 x 144 NM orbit as compared to the reference orbit.

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3. The TITAN has no satellite system limitation with regard to standby period; however, the SBA capabilities have not been determined. The SSSPO identified film shelf life and film characteristics deep in the spool as a function of standby periods as a possible limiting condition. An R-9 quick turn-around appears to be the most technically feasible description of the standby capability.

4. Reference orbit. The SSSPO memorandum concerning the reference orbit is attached as TAB B. It was agreed that a basic launch window of 0900 to 1500 local time adequately describes the nominal launch window. Beta angle description should remain as specified in the RFP.

5. Film Load. The SOC review of the EEI indicated that 4.8% of the EEI's could be satisfied if the resolution of the system was improved from three to two feet and that approximately 5% of the EEI's require better than two feet resolution. The SOC film calculation based on the 82 x 144 orbit (Pending confirmation that this is a flyable orbit by the SPO) results in film load of 20 million square nautical miles and 750 camera on-off cycles based on 45 days life. The SPO is to provide any comments with regard to SBA or recovery system effects of this film load.

6. Stereo Angle. In order to eliminate the mono coverage at the beginning and ending of each camera operation, a change in the stereo angle to 17 degrees is proposed. This results in some loss in vertical resolution. It will be included in the final report that 17 degrees should be the stereo angle.

(a) Vari Scan. In order to determine the camera running time, power requirements and other payload characteristics, it was necessary to estimate the amount of film that would be expended in each of the available camera modes.

<u>% of Operations</u>	<u>Scan Angle Mode</u>
40	30°
20	60°
20	90°
20	120°

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Mr. Dirks expects to have completed the simulation study of these various operational characteristics and the determination of these on reliability by 16 January 1967.

Final Report Format. The outline of the final format (TAB C) was reviewed and agreed to in principle. Chairman will draft final report by approximately 16 January 1967. The report is to be written in a form which, if approved, will then be a working document.

Albert W. Johnson
ALBERT W. JOHNSON
Major, USAF

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HEXAGON STUDY GROUP

AGENDA
5 January 1967

1. Review of last positions
2. Unresolved problems
 - a. Reference orbit
 - b. Film load
 - c. Camera operations/mission
3. Discussion of proposed format

Cy 7A



5 January 1967

MEMORANDUM FOR: Chairman, HEXAGON Operational
Requirements Team

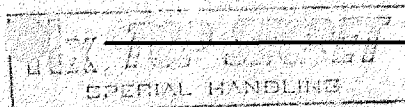
SUBJECT : HEXAGON Operational Requirements

On several occasions the HEXAGON Operational Requirements Team has discussed the question of the reference orbit to be used in sizing the total HEXAGON system and, also, the question of providing supplemental information to the developers which will be of assistance in optimizing the system for its most probable operating condition. In addition, the question of system resolution requirement has been raised. Attached to this memorandum is the gist of what I think should be included in the Team's final recommendation on these subjects.

Original signed by:
Leslie C. Dirks

LESLIE C. DIRKS

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ATTACHMENT TO:
EYE-69263-67

I. SYSTEM RESOLUTION

It is required that the probability be at least 95% the system resolution at photographic nadir and over the entire Sino-Soviet Bloc be better than 2.7' for the following conditions:

Sun Angle - 30°

Target Contrast at Entrance Pupil - 2:1

Scene Brightness - 600 ft-lamberts

Beta Angle - normal distribution with a 2 sigma of 35°

Orbit - reference orbit

Mode of Operation - stored

As specified in the current SOR, the system must be capable of operating over a beta angle of $\pm 60^{\circ}$. At beta angles between 30° and 60° , the resolution degradation may be no greater than 25%.

II. REFERENCE ORBIT

By definition, the reference orbit is that orbit for which all operational requirements must be satisfied. In particular, the system must be designed to have sufficient expendables to operate for 45 days in the reference orbit and must meet all resolution objectives.

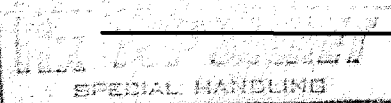
The reference orbit is characterized by the following parameters:

Perigee Altitude - 82 nm

Apogee Altitude - 144 nm



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ATTACHMENT TO:
EYE-69266-67
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Inclination - 96.3°

Perigee Location - $55-70^{\circ}$ N. Latd. (all values in
this latitude range are equally probable)

III. DISTRIBUTION OF OPERATING CONDITIONS

The system must be capable of operating over the range of altitudes, beta angles, sun angles, and inclinations specified in the current SOR. However, all points in this range of operating conditions are not equally probable. It is expected that approximately 80% of the mission time will be flown in the reference orbit. The majority of the cases contained in the remaining 20% will be flown within $\pm 10^{\circ}$ of the reference inclination. At least 90% of the missions will be flown between $\pm 30^{\circ}$ beta angle.



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PROPOSED OUTLINE OF FINAL REPORT

- I. REFERENCES
- II. HEXAGON OPERATIONAL CONCEPTS
- III. GENERAL CHARACTERISTICS
- IV. SENSOR SUBSYSTEM REQUIREMENTS
- V. VEHICLE CHARACTERISTICS

APPROPRIATE TABS

Cy # 7A