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DEPARTMENT OF THE AIR FORCE
DIRECTORATE OF SPECIAL PROJECTS (OSAF)
AF UNIT POST OFFICE, LOS ANGELES, CALIFORNIA 90045

(BYE-16329-63)



18 OCT 1968

REPLY TO:
ATTN: SP-1

SUBJECT: General Systems Engineering Review of the HEXAGON Project

TO: Dr. A. F. Donovan
Senior Vice President, Technical
Aerospace Corporation

1. Confirming our 11 October and subsequent discussions, I request that you personally undertake direction of a comprehensive general systems engineering review of the HEXAGON project. As you know, management responsibility for this project is divided between SAFSP and another government agency. Although Aerospace provides general systems engineering support to SAFSP on this project, this support is constrained by the directed division of management responsibilities and is unlike the general systems engineering on any other SAFSP project. In view of the difficult working relationships imposed by the divided management responsibilities which were determined prior to the accomplishment of any overall systems engineering, the fact that considerable time elapsed between separate initiations of development of major subsystems, the wide differences that have characterized initial efforts to establish several complex technical interfaces between subsystems, the extended time that has been required to reach working agreements, and the overall complexity of the HEXAGON project, there is considerable potential for inadvertent error in our collective efforts. I believe that an independent review should be made at this time to assure, to the best of your ability to determine at this point in the system development, that the general systems engineering which has been done or is under way is adequate, and that these circumstances have not caused anything important to be overlooked.

2. The purpose of the review is to determine the adequacy of the general systems engineering that has been accomplished or is under way, with particular emphasis on definitions of interfaces between all subsystems, analyses of interactions between subsystems, including interactions caused by reasonably predictable non-nominal performance of the subsystems, overall system integration, and overall system testing. The degree to which the overall system has been optimized by design compromises between subsystems also should be examined.

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3. In conducting this review you should interpret general systems engineering in the light of the following explicit managerial responsibilities and constraints:

a. SAFSP is responsible for overall systems engineering (including master system specifications) and system integration (including subsystem interface specifications), overall system master planning, assembly and checkout of the system at the launch pad, launch and mission operations. SAFSP also is responsible for development and production of the spacecraft, the RV subsystem, the stellar-index camera subsystems, the booster, the acquisition and operation of system assembly/launch facilities and on-orbit command and control facilities.

b. The Sensor Subsystem Project Office (SSSPO), a unit of another government agency, is responsible for the total reconnaissance sensor subsystem development and production, which is defined as the complete primary camera assemblies, close-in and fine camera environmental control, and close-in and camera-peculiar electronics or pneumatics, reconnaissance film supply spools, film transport mechanism, film cut and wrap or film-splice mechanisms, and reconnaissance film take-up spools in the RVs. The SSSPO also is responsible for the physical installation, integration and checkout of the reconnaissance sensor subsystem in the spacecraft.

c. While SAFSP responsibilities for overall systems engineering and integration include the interfaces with the sensor subsystem, they do not include systems engineering or technical direction for the sensor subsystem.

d. SAFSP, in the exercise of assigned overall systems engineering, integration, and interface responsibilities, is expected to meet the basic structural, dynamic, thermal, power, etc. requirements of the sensor subsystem. The objective in the HEXAGON project is to acquire the overall most effective photographic search and surveillance satellite system possible within the constraints of time, technology, and available resources. However, when the

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necessity arises for a trade-off between the sensor subsystem and another subsystem in terms of total system performance, SAFSP has been instructed to always attempt first to resolve the problem in such a way as to minimize the effect on the sensor, and then always to test such resolutions to assure that overall system performance is not seriously degraded.

4. I will arrange for you and your group to receive full and complete access to any information or data pertaining to any aspect of the HEXAGON system, in full technical depth and complete detail. This includes any and all information, data, and analyses concerning all details of the sensor subsystem as well as all other aspects of the project. However, your entire group must understand that your analysis of the sensor subsystem is solely for the purpose of examining the adequacy of overall systems engineering and integration and is not for the purpose of determining or advising on the adequacy or optimization of the sensor subsystem design or on any other matters internal to the sensor subsystem.

5. The following ground rules apply to this review:

- a. All personnel are to be Aerospace employees.
- b. No personnel are to have had any substantial involvement in work on HEXAGON since hardware contracts for this project were initiated.
- c. All personnel must have some BYEMAN security clearance or other clearance of equivalent standards, or favorable background investigation of sufficient currency to enable prompt clearance on HEXAGON.
- d. Your group should be composed of the most experienced and competent personnel that can possibly be borrowed from other work for this review. The group should be the minimum necessary to do a thorough job but specifically should include appropriate specialists in all areas of technology involved in the HEXAGON project to insure a thorough and complete understanding of all aspects of the system.

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6. I want a written report together with a verbal briefing on the review and discussion of your findings and recommendations by 15 January 1969.

7. Please prepare an outline of your proposed organization and personnel for this review together with a proposed work schedule, and discuss with me when you are ready to proceed. I have designated Col James Fitzpatrick (SP-3) as your SAFSP point of contact for any help you need to get this job done. He will check out security matters, arrange for plant visits, briefings, and provision of data, and necessary coordination with other agencies involved. Col Fitzpatrick or one of his officers will accompany your group on all visits to contractors or other agencies.



JOHN L. MARTIN, JR.
Major General, USAF
Director

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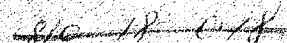
SUBJECT: General Systems Engineering Review

To: Mr. Don Patterson, SSSPO

1. As discussed with you in my office on 11 October, I inclose herewith a copy of the charter I have given Dr. Donovan for a thorough review of the general systems engineering status of the HEXAGON project.
2. Col Fitzpatrick, of my security staff (SP-3), will be in touch with you to coordinate all details of visits, briefings, data, etc and either he or one of his officers will accompany Dr. Donovan's group on all visits.
3. I have written a somewhat lengthy charter in order to insure that Dr. Donovan and his group comply fully with the applicable provisions of the 30 April HEXAGON management directive (BYE-52316-66). The work I have asked him to do is completely within the responsibilities assigned to SAFSP. In accordance with the provisions of this management directive that Aerospace Corporation employees supporting the SPO shall have free access to information and data from the SSSPO and the sensor subsystem contractor(s), and that the SPD and SSSPO shall each honor, without question, a need-to-know determination on the part of the other that a properly cleared person requires access to project information and/or data, I request your cooperation and assistance in providing to Dr. Donovan and his group all briefings, visits, analyses, data and information he requests in the course of this review, in full technical depth and complete detail.
4. When the review is completed I will be pleased to have you and Col Buzard sit with me to hear the results and consider the findings and any recommendations.


JOHN L. MARTIN, JR.
Major General, USAF
Director

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