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MEMORANDUM FOR THE RECORD

SUBJECT : BLACK SHIELD Meeting at [Redacted] 7 October 1965

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This summary report constitutes:

- Part I - General Aircraft Items
- Part II - ECM and Communications
- Part III - Propulsion Items
- Attachment I - Agenda
- Attachment II - Decisions and Actions
- Attachment III - Significant Charts

Part I - General Aircraft Items

1. Copies of charts used in presentations are available in D/TECH.

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2. [Redacted] opened the meeting with the statement that we have an operational capability today.

3. A weather briefing was given by the Detachment which indicated measured variations around the standard day and temperature gradients to be expected at the cruise altitudes in the operational latitudes. The significance was expressed as the effect of temperature variations and gradients on vehicle performance and a coordinating body (see Attachment II) was established to incorporate these effects in mission planning. (Recognition of these effects on performance is not new and was in fact the subject of a Development Branch memorandum in 1960.)

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4. [] indicated his biggest problem as ARC-50 erratic operation. Four other problems were listed as:

SIP/Type I Camera-Physical Interference
EWS - Antenna/Wiring
Instrument Reliability
Schedule Effectiveness

The ARC-50 and EWS antenna/wiring are covered in Part II. SIP/Type I camera interference occurred once and is now in hand. Instrument reliability which has resulted in several false indications such as inadequate oil pressure, inadequate oil quantity, and a firewarning to mention a few is under attack by Lockheed. Scheduling effectiveness while not affecting a sortie once airborne has resulted in numerous cancellations prior to flight for various maintenance reasons. The various contractors and the Detachment must work toward better system reliability, better maintenance/inspection procedures, and better coordination between groups.

5. A rundown on results of thirteen Detachment flights since acceptance after the debug mod program on BLACK SHIELD aircraft 126, 127, and 128 substantiated the ARC-50 and instrument reliability problems covered in paragraph 4. (Also reflected but not designated as such were several problems associated with procedural inadequacy.) The larger pre-modification basic vehicle problems which in the past have prevented sustained flights at Mach 3 such as repetitive inlet shock expulsions were noted by their absence. (It is felt that improvement in these major basic problem areas has now put more focus on a different set of equipment and instrument problems as described above and also tends to surface procedural problems heretofore obscured.)

6. Modifications proposed by the Detachment were discussed. Applicable decisions made by General Ledford are indicated on Attachment II.

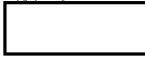
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7. [] was asked by Dr. Wheelon how he reconciles his opening statement of having an operational capability today

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with his apparent lack of confidence in the ARC-50 reliability/tanker rendezvous situation over water. The answer while obscure seemed to center around improving the ARC-50 and providing either surface or airborne tanker TACAN capability for a backup. The latter is reflected as an action item in Attachment II.

8. Kelly Johnson recounted actions taken to improve maintenance/inspection activities such as the addition of electrical supervisors and inspectors, and to improve component and instrument reliability by improved failure/malfunction feedback to the project. He made the plea for no more electrical changes to the aircraft.

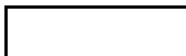
9. Follow-on BLACK SHIELD aircraft 125, 130, 131, and 132 are on schedule in the modification program. Scheduling is indicated in Attachment III.

10. The three camera contractors reported generally satisfactory results to date with no major problems anticipated.



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2. Installation of a TACAN system in selected KC-135 tankers would provide another method of rendezvous. Arrangements are being attempted via General Geary's office to provide this capability in the tankers; commencement and completion dates will be determined in the immediate future.

3. Effectiveness of HF/SSB system in BLACK SHIELD articles at the lower frequencies has not been determined. Night time operations normally require that lower frequencies be utilized; therefore, this evaluation must be accomplished if night missions are envisioned during BLACK SHIELD.



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Part III - Propulsion Items

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2. Of the additional items discussed, the following significant facts are noted:

a. Of three cases of reported nozzle fluctuation in aircraft 126, one has been isolated to fuel system contamination, one to the main fuel control now under investigation, and one could not be confirmed on ground run or four additional flights with the same engine.

b. Reduction gearbox vibration recently experienced with engine 213 in aircraft 126 is under investigation and appears so far to be associated with the combination of gearbox, shafting, and gearbox mounting rather than the gearbox itself.

c. Flight test results to evaluate number 3 bearing compartment distress fixes indicates correction of wind-milling oil consumption. Evaluation of the increased clearance fix to eliminate rotating to stationary parts thermal interference after rapid vehicle descent has been reported as complete and satisfactory (subsequent to the meeting) on 13 October. The other fix also proven satisfactory in flight tests, involves a bleed orifice in the engine breather pressurizing valve which prevents pressure

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reversals across the number 3 seal during engine windmilling operation. The heretofore imposed restriction on engine windmilling (impeding single engine aircraft performance) will be lifted with the incorporation of these two engineering changes. Both changes are now being incorporated in new and overhauled engines and are being incorporated in field engines [REDACTED] as rapidly as the engines become available for this rework. Engines already incorporating these changes are indicated in Attachment III "Urgent Changes."

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3. The following two additional non-agenda items were also covered:

a. 34K engine status and results of efforts to date to establish proper bypass bleed schedule to improve surge margin in the Mach 2 area.

b. An additional chart reviewed the service problems and solutions being investigated on development engines which indicates that a total of 233 items are being investigated on nine development engines which represents 99 different designs or investigations.

4. Copies of all significant P&W charts specifically related to BLACK SHIELD are attached hereto. The development time schedule for the auto trimmer is also included. Copies of all other P&W charts are available in D/TECH/OSA.

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