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Annex 2

26 Pages

SAFSP

RESULTS OF THE "MORGAN BOARD"

REVIEW OF SAFSP

(MARCH 1972)

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SCOPE

1. BACKGROUND
2. BOARD COMPOSITION
3. ITINERARY
4. DEVELOPMENT PROBLEMS
5. PROCUREMENT PROCEDURES
6. MANAGEMENT STYLES
7. RECOMMENDATIONS

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BACKGROUND

AUTHORITY

DIRECTION FROM

- OFFICE OF THE SECRETARY OF THE AIR FORCE
- COMMANDER, SAMSO

PURPOSE

REVIEW OF SAFSP

- FLIGHT FAILURES
- TESTING
- PROCUREMENT
- MANAGEMENT
- ORGANIZATION

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BOARD COMPOSITION

BRIG GEN T. W. MORGAN, SAMSO, CHAIRMAN

COLONEL F. S. BUZARD, SAFSP

[REDACTED] SAMTEC

[REDACTED], AFSC

[REDACTED] SAFRD

DR. A. F. DONOVAN, AEROSPACE

[REDACTED], AEROSPACE

CAPTAIN R. J. RANDAZZO, SAFSP, RECORDER

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ITINERARY

<u>DATE(S)</u>	<u>PRESENTATION BY:</u>	<u>TOPIC</u>	<u>LOCATION</u>
28 FEB 1 MAR	DEPUTY DIRECTORS, SAFSP	- SECURITY - PROCUREMENT - EARPOP PROGRAMS - GAMBIT - HEXAGON - [REDACTED]	LOS ANGELES
2 MAR	HUGHES AIRCRAFT CO.	+ [REDACTED] - MANAGEMENT - DEVELOPMENT - TESTING - PROBLEMS - SPECIALLY DESIGNATED TOPICS	LOS ANGELES

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ITINERARY (Cont'd)

<u>DATE(S)</u>	<u>PRESENTATION BY:</u>	<u>TOPIC</u>	<u>LOCATION</u>
16 MAR	LMSC	- ALL PROGRAMS - MANAGEMENT - DEVELOPMENT - TESTING - PROBLEMS - SPECIALLY DESIGNATED TOPICS	SUNNYVALE
17 MAR	6595 S.T.G.	- LAUNCH ACTIVITIES - THOR FAILURE - PROBLEMS	VANDENBERG AFB
18 MAR	AFSCF / SAMSO	- ATLAS FAILURE - EXECUTIVE SESSION	LOS ANGELES
18 MAR 4 APR	BOARD MEMBERS	- DATA REVIEW - REPORT PREPARATION	LOS ANGELES

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SAFSP LAUNCH HISTORY

	Actual Launches Per Calendar Year													Total 59-71	Planned Launches			
	59	60	61	62	63	64	65	66	67	68	69	70	71		72	73	74	75
Electronic Reconnaissance																		
Successes				2	5	10	5	4	5	7	6	5	4	53				
Launches				3	7	11	6	5	5	7	6	5	5	60	4	5	3	3
Imaging Reconnaissance																		
Successes	0	4	8	8	15	17	20	21	18	16	12	9	7	168				
Launches	8	12	21	28	21	25	22	24	19	16	12	9	8	225	10	7	6	6
Total																		
Successes	0	4	8	10	20	27	25	25	23	23	18	14	11	221				
Launches	8	12	21	31	28	36	28	29	24	23	18	14	13	285	14	12	9	9

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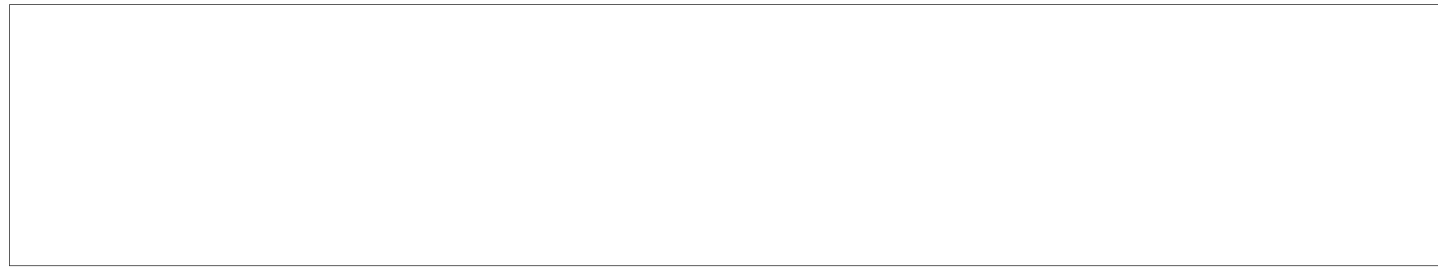
SAFSP

DEVELOPMENT

FAILURES: JUL'70 - FEB'72

1. CATASTROPHIC FAILURES

- THORAD / AGENA	17 FEB '71	THOR TURBOPUMP SYSTEM FAILURE
846 (CORONA)		



2. PARTIAL FAILURES

- 110 (GAMBIT)	JUL '70	FAILURE TO RECOVER BUCKET #2
- 467 (HEXAGON)	JUL '71	FAILURE TO RECOVER BUCKET #3
- 989 (ARROYO)	OCT '71	FAILURE OF VOLTAGE CONTROL OSCILLATOR OR SYNTHESIZER ATTEN.
- 467 (HEXAGON)	FEB '72	FILM BREAK (MONO ONLY)

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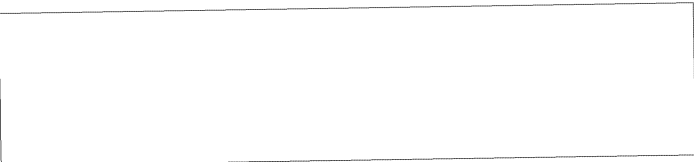
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DEVELOPMENT

PROBLEM AREAS:

- * SGLS TRANSPONDERS (ALL)
- * LAUNCH VEHICLES (ALL)
- * COMMAND SYSTEMS (110, 467)
- * 
- * SWITCH-OVER ELECTRONICS (110)
- * TAPE RECORDERS (110, 467, 989)
- * ELECTRONIC PIECE PARTS (ALL)
- * TESTING PROGRAMS (ALL)
- * RV PARACHUTES (467)
- * ATTITUDE CONTROL THRUSTERS (467)
- * CONTAMINATION (467)
- * FILM BREAK (467)
- * 
- * INADEQUATE CORRECTIVE ACTIONS (ALL)

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DEVELOPMENT

SGLS TRANSPONDERS**FAILURE****IDENTIFICATION:**

- IN PROGRAMS 110, 467 AND OTHERS

DISCUSSION:

- FAILURES ABOUT EQUALLY DIVIDED BETWEEN WORKMANSHIP AND PIECE PARTS
- SMALL BUYS FROM MANY DIFFERENT VENDORS

ANALYSIS:

- UNIT IS COMPLEX
- EXCEPTIONAL CARE REQUIRED TO OBTAIN A RELIABLE UNIT

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DEVELOPMENT

SGLS TRANSPONDERS (Cont'd)CORRECTIVE
ACTIONS:

- CHOOSE SUPPLIER WITH CARE, FOLLOW-UP
- INSIST ON USE OF HI-REL PIECE PARTS
- CONSIDER SINGLE SUPPLIER

COMMENTS:

- WITH REDUNDANT UNITS THERE HAVE BEEN NO MISSIONS LOST
- THERE HAS BEEN MISSION DEGRADATION

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ORBITAL EXPERIENCE OF 2.2 TO 2.3 GHz SOLID-STATE TRANSMITTERS
WITH A POWER OUTPUT OF APPROXIMATELY 2 WATTS

MANUFACTURER	PROGRAM	OUTPUT POWER (Watts)	APPROX. NO. MANUFACTURED	NO. OF SATELLITE FLIGHTS
General Dynamics Electronics Div.	110	2.0	-	Many
GD / E - Cubic	467	2.0	-	Few
TRW	647	1.6	11	3
	777	0.8	13	2
Tele-Dynamics (Div. of American Bosch Arma)	Atlas "F" Booster	3.5	20	5
Conic	989	2.0	-	Few
	Atlas SLV-3C	5.0	-	3
Motorola	STP 71-2	2.0	-	1

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DEVELOPMENT

LAUNCH VEHICLESFAILURE
IDENTIFICATION:

- PRIMARY SOURCE OF CATASTROPHIC FAILURES

DISCUSSION:

- LAUNCH VEHICLES LACK REDUNDANCY OF CRITICAL COMPONENTS
- HI-REL PARTS NOT GENERALLY USED

ANALYSIS:

- DECREASED LAUNCH RATES
- LARGE STABLE OF LAUNCH VEHICLES MAINTAINED
- USAGE OF SOME VEHICLES ONLY AT LONG INTERVALS
- FREQUENT CHANGES TO OBTAIN SMALL GAINS
- TEST FACILITIES AND ENGINEERING SUPPORT HAVE BEEN DRASTICALLY CURTAILED
- GERIATRIC PROBLEMS RESULT FROM LONG STORAGE

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DEVELOPMENT

LAUNCH VEHICLES (Cont'd)CORRECTIVE
ACTION:

- DEVELOPING REPLACEMENTS FOR FAILURE PRONE COMPONENTS
- QUALIFYING NEW SUPPLIERS
- INTRODUCING REDUNDANCY AT CRITICAL POINTS

COMMENTS:

- RELIABILITY OF LAUNCH VEHICLES LESS THAN PAYLOADS
- LINE ITEM FUNDING HIGHLY DESIRABLE

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DEVELOPMENT

ELECTRONIC PIECE PARTS

FAILURE
IDENTIFICATION:

- SHOWS UP IN LAUNCH VEHICLES, SPACECRAFT, PAYLOADS, AGE, GROUND STATIONS, ETC.

DISCUSSION:

- USE OF "HIGH REL" PARTS HAS BEEN SPECIFIED IN MANY PROGRAMS
- NO CONSISTENT DEFINITION OR SPECIFICATION OF HI REL PARTS

ANALYSIS:

- INADEQUATE ATTENTION : PRIMES AND SUBS
- SMALL LOT PROCUREMENT
- FALSE ECONOMY

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DEVELOPMENT

ELECTRONIC PIECE PARTS

CORRECTIVE
ACTIONS:

- ESTABLISH AND IMPLEMENT HI REL SPECS
- FOLLOW UP ON PERFORMANCE

COMMENTS:

- USE OF LOW-RELIABILITY PARTS RESULTS IN INCREASED TESTING, HIGHER COST

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DEVELOPMENT

TESTING

PROBLEM IDENTIFICATION:

- * SOME ACCEPTANCE TESTING DONE TO LESS THAN FLIGHT LEVELS

DISCUSSION:

- * TEST SPECIFICATION LEVELS VARY FROM PROGRAM TO PROGRAM AND AMONG CONTRACTORS WITHIN A PROGRAM

ANALYSIS:

- * CONTRACTUAL LEVELS ESTABLISHED BASED ON EARLY DESIGN PHASE ESTIMATES
- * TEST LEVELS USUALLY INCREASE BEYOND ORIGINAL ESTIMATES
- * CORRECTION IMPACTS COST AND SCHEDULE
- * CONTRACTORS CONCERNED ABOUT WEAROUT / FATIGUE

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DEVELOPMENT (Cont'd)

TESTING

CORRECTIVE
ACTION:

- * ESTABLISH CONSISTENT TEST PROGRAMS
- * ACCEPTANCE TEST TO FLIGHT LEVELS

COMMENTS:

- * QUALIFICATION TESTING IS GENERALLY GOOD
- * SP PRACTICE OF REQUIRING A VIBRATION TEST
(POWER ON AND INSTRUMENTED) TO DETECT
TRANSIENT DEFECTS IS EXCELLENT

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PROCUREMENT

SAFSP CONTRACTS

- CPIF
- MARTIN INCENTIVE PLAN (15%)
 - EMPHASIS ON FLIGHT PERFORMANCE
 - FEE INCLUDED IN PROGRESS PAYMENTS
 - CASH REFUND TO GOVERNMENT FOR POOR PERFORMANCE
 - DRAWS TOP MANAGEMENT ATTENTION

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PROCUREMENT (CONT'D)

SUB-CONTRACTS BY PRIMES:

- TYPES OF CONTRACTS VARY (CPIF, FPI, FFP)
 - BASED UPON ASSESSMENT BY PRIME CONTRACTOR REVIEW BOARD
- MOST PROBLEM AREAS ARE UNDER FIXED PRICE CONTRACTS
 - TRANSPONDERS (110, 467) - GDE (FPI) - CUBIC (FFP)
 - TAPE RECORDERS (110, 467) - KINELOGIC (FPI)
 - GYRO REFERENCE ASSEMBLY (110) - KEARFOTT (FPI)
 -
 - PARACHUTE (467) - GOODYEAR (FPI, FFP)
 -

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PROCUREMENT (CONT'D)

SUB CONTRACT MANAGEMENT BY PRIMES

- INCONSISTENT
 - HUGHES AIRCRAFT
 - CLASS I - THROUGH MANAGEMENT
 - CLASS II - MANAGER SITS ON SUB'S CCB
 - LMSC
 - CLASS I - THROUGH MANAGEMENT
 - CLASS II - REVIEWED BY RESPONSIBLE ENGINEER
- INSUFFICIENT ATTENTION APPLIED TO CLASS II CHANGES
 - BY PRIME
 - BY AIR FORCE

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MANAGEMENT

MANAGEMENT STYLES

- MANAGEMENT QUALITY - GOOD
 - DAY-TO-DAY CONTACT BETWEEN DIRECTOR AND SPO'S
 - DAY-TO-DAY CONTACT BETWEEN SPO'S AND CONTRACTORS
 - STREAMLINED ORGANIZATION
- REVIEW BOARDS
 - PROGRAMS IN NEW DEVELOPMENT SUBJECT TO CRITICAL REVIEW
 - LACK OF PERIODIC CRITICAL REVIEW BY OUTSIDE BOARD
- SAFSP HEAVILY DEPENDENT UPON AEROSPACE AND SAMSO SUPPORT

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MANAGEMENT

SUPPORT ORGANIZATION MANNING LEVELS :

Organization	Air Force					(Percent Reduction 69-72)	Aerospace MTS					(Percent Reduction 69-72)
	FY 69	70	71	72	FY 69		70	71	72			
Launch Vehicles*	315	274	244	209	(-34%)	209	175	147	117	(-44%)		
AFSCF	2085	2007	1983	1765	(-15%)	69	67	59	58	(-16%)		
SAMTEC	N/A	1117	1078	843	(-25%)							
SAFSP	269	254	248	233	(-13%)	225	232	211	186	(-17%)		

* FY'69 FIGURES INCLUDE MANNING FOR TITAN-IIIM

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RECOMMENDATIONS

ACTION
SAMSO/SAFSP

1. INVESTIGATE METHODS AND DEVELOP A PROGRAM
FOR IMPROVING LAUNCH VEHICLE RELIABILITY
 - A. STRONGLY RECOMMEND LINE ITEM FUNDING
OF LV AS PART OF PROGRAM DEVELOPMENT
 - B. TIGHTEN CONTROL ON CHANGES TO LAUNCH
VEHICLES
2. IMPROVE THE QUALITY OF ELECTRONICS PIECE PARTS SAMSO/SAFSP
 - A. STANDARDIZE THE DEFINITION OF "HI-REL" PARTS
 - B. ESTABLISH A POLICY FOR USE OF "HI-REL" PARTS
 - C. IMPROVE THE MEANS FOR OBTAINING "HI-REL" PARTS

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RECOMMENDATIONS (CONT'D)

- 3. EXAMINE SUBCONTRACTOR MANAGEMENT WITH RESPECT TO:
 - A. AIR FORCE AND PRIME CONTRACTOR VISIBILITY
 - B. CONTROL OF CHANGES
 - C. TYPES OF CONTRACTS EMPLOYED

ACTION
SAFSP

- 4. REVIEW ADEQUACY AND ESTABLISH CONSISTENT TEST PROGRAMS:
 - A. QUALIFICATION LEVELS
 - B. ACCEPTANCE LEVELS
 - C. CORRELATION OF TEST ENVIRONMENT TO FLIGHT ENVIRONMENT

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RECOMMENDATIONS (CONT'D)

	<u>ACTION</u>
5. ESTABLISH A POLICY TO REDUCE THE NUMBER OF DIFFERENT TYPES OF LAUNCH VEHICLES	SAMSO/SAFSP
A. NEW PROGRAMS	
B. EXISTING PROGRAMS	
6. EVALUATE THE USE OF STANDARDIZED SGLS TRANSPONDERS	SAMSO/SAFSP
7. CONSIDER THE USE OF PERIODIC, INDEPENDENT, CRITICAL REVIEWS OF ALL PROGRAMS	SAFSP

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