Dear Sir;

This is a non-commercial Freedom of Information Act request 5 U.S.C. § 552. My fee status category is "All Other", and I agree to pay only up to fifteen dollars for the requested material.

- All documents pertaining to a March 16, 1967 incident, in which there was a malfunction of missile silos at your installation. Please include all documentation of procedures after this incident occurred, the possible cause, procedures on how to handle the situation etc.
- Please include documents, letters, tapes, audio and video tapes, memos, and all other forms of written and visual media.
- Also include all documents on one of the personnel there getting injured that same day, or around this date.

Thank you very much for your time, and I look forward to your response.

Sincerely,

John Greenewald, Jr.

Enclosures:
None
Dear Greenewald

On 18 May 2001, we received your Freedom of Information Act (FOIA) request dated 9 May 2001, for records pertaining to a March 16, 1967 incident, in which there was a malfunction of missile silos. Copies of excerpts, as well as supporting documents, of the below listed documents are releasable and are attached:

a. 341st Strategic Missile Wing History (1 Jan – 31 Mar 1967)
b. 341st Strategic Missile Wing History (1 Apr – 30 Jun 1967)
c. 341st Strategic Missile Wing History (1 Jul – 30 Sep 1967)
d. 341st Strategic Missile Wing History (1 Oct – 31 Dec 1967)
e. 341st Strategic Missile Wing History (1 Jan – 31 Mar 1968)

We do not have any audio or video tapes, or documents of any personnel injured. If you are pursuing your inquiry further, you may wish to contact the National Archives and Records Administration (NARA) at:

NARA FOIA Officer
National Archives at College Park
8601 Adelphi Road, Room 4400
College Park MD 20740-6001
Web Site: www.nara.gov/foia
The FOIA provides for the collection of fees based on the costs of processing a FOIA request and your fee category. We have placed you in the "other category"; however, in this case, we have waived collecting fees.

Sincerely

MARTY S. STEPHENS
Freedom of Information Act Manager

Attachments
1. 341SMW History Excerpts, 1 Jan – 31 Mar 67 (25 pgs)
2. 341SMW History Excerpts, 1 Apr – 30 Jun 67 (15 pgs)
3. 341SMW History Excerpts, 1 Jul – 30 Sep 67 (29 pgs)
4. 341SMW History Excerpts, 1 Oct – 31 Dec 67 (8 pgs)
5. 341SMW History Excerpts, 1 Jan – 31 Mar 68 (7 pgs)
341st STRATEGIC MISSILE WING
AND 341st COMBAT SUPPORT GROUP
HQ SAC D Zh 67-1865
P R G

Assigned to the
FIFTEENTH AIR FORCE, STRATEGIC AIR COMMAND
Permanently Stationed at
MALSTROM AIR FORCE BASE, GREAT FALLS, MONTANA

This document was prepared by A2C David B. Gamble, Wing Historian under the supervision of the Wing Information Officer. It is prepared in compliance with SACR 210-1, 29 June 1964, and is classified SECRET under the provision of APR 205-1 as amended. The classification is required for the protection of information that reveals the military capability and operational status of the Wing. (U)

APPROVED:

HERMAN T. DeHAAS, Capt, USAF
Chief, Information Division

COPY (1) OF

2 Aug 1973
This volume is classified SECRET to conform to the classification of the information in the source documents. It will be handled in accordance with the provisions of AFR 605-1, as amended.

This volume contains information effecting the national defense of the United States within the meaning of the Espionage Laws (Title 18, U.S.C. sections 793 and 794), the transmission or revelation of which in any manner to any unauthorized person is prohibited by law.

This volume has been placed in downgrading Group 3, which is the highest downgrading group assigned to the information in the source documents. The historian's analysis and consolidation of information from many sources, which individually may have lower downgrade provisions, results in a synthesis which may have wider implications than the material on which it is based. Therefore, individual downgrade instructions for each paragraph are not indicated, and all portions of this volume will be handled under the overall downgrading group.
Project How Now (Service Star), the testing of Mark 5 re-entry vehicles by higher headquarters for effectiveness. Malmstrom sent the last vehicle in the program for the base during the quarter. This ended the program at Malmstrom. (U)

A walk-thru inspection of the HF Hardened Antennas at Malmstrom was conducted during February by Boeing and SATAF personnel. The antennas were already equipped in the IFs but were not in working order. The walk-thru inspection had an average of 40 discrepancies per site. Boeing Company has not set any official date for an operational antenna to be demonstrated. The estimated date for the operational antennas was set for early July 67. At that time, maintenance will begin on correcting the discrepancies at the sites. (U)

The following is the investigation of Echo Flight incident and the results. (U)

On 16 March 1967 at 0845, all sites in Echo (E) Flight, Malmstrom AFB, shutdown with No-Go indication of Channels 9 and 12 on Voice Reporting Signal Assembly (VRSA). All IF's in E Flight lost strategic alert nearly simultaneously. No other Wing I configuration lost strategic alert at that time. (U)

Guidance & Control channel 50 dump data was collected from E-7 facility and E-8 Facility and all 10 sites were then returned to strategic alert without any LF equipment replacement. All 10

58. Taken from Messages on file at Job Control, by A2C David B. Gamble, Wing Historian, on 23 Apr 67.


60. Msg, (S) DM 02752, SAC to 341 SW, Subj: Loss of Strategic Alert Echo Flight, Malmstrom AFB, 17 Mar 67, Ex 43.
sites were reported to have been subject to a normal controlled shutdown. (U)

The only unusual LF events noted were the failure of the secondary door actuator motor at LF, E-2 and the intermittent operation of the diesel generator at LF, E-8. (U)

Technical Analysis Division (TAD) personnel inspected LCC, E-1 for loose cable connections and the Electric Surge Arrester (ESA) room for any faults and noted no unusual discrepancies. (U)

LCF, E-1 experienced commercial power problems in the early afternoon of 16 Mar 67 which resulted in a burn out of the 10 Hp Environmental Control System (ECS) chiller compressor motor. (U)

At approximately 1400 hrs on 16 Mar 67, the 341st SMW was advised that SAC Headquarters had called in OOAHA support for a complete engineering analysis of this problem. (U)

OOAMA decided to send a task group to Malmstrom for study of the incident at Echo Flight because the problem pertained peculiarly to Wing I. It was also decided to make the studies and tests there because OOAMA was not equipped with Wing I equipment. The task group included personnel from OOAMA, Boeing Company, Autonetics, and 15th AF; they were to arrive on 17 or 18


62. Ibid.

63. Ibid.

64. Ibid.

65. Ibid.
sites were reported to have been subject to a normal controlled shutdown. (U)

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LCF, E-1 experienced commercial power problems in the early afternoon of 16 Mar 67 which resulted in a burn out of the 10 HP Environmental Control System (ECS) chiller compressor motor. (U)

At approximately 1100 hrs on 16 Mar 67, the 341st SMW was advised that SAC Headquarters had called in OOAMA support for a complete engineering analysis of this problem. (U)

OOAMA decided to send a task group to Malstrom for study of the incident at Echo Flight because the problem pertained peculiarly to Wing I. It was also decided to make the studies and tests there because OOAMA was not equipped with Wing I equipment. The task group included personnel from OOAMA, Boeing Company, Autonetics, and 15th AF; they were to arrive on 17 or 18

62. Ibid.
63. Ibid.
64. Ibid.
65. Ibid.
A preliminary analysis was made of the Fault Isolator Test Tape (FITT) from LF, D-7 and E-8. Targeting support was scheduled for a G&C Channel 50 data dump at LF's E-2 and E-9 which, although returned to alert, were still felt to possess useful data. The investigation was held in suspense until the arrival of the COAMA team on 18 March 67.

Echo Flight incident was approached in four ways in the investigation:

a. Review of events on or near 16 March 67 and of flight configuration.

b. Investigation, and where possible elimination, of circumstances which may have been responsible for the incident.

c. Investigation of means of causing the results which were noted at the time of shutdown.

d. Investigation of similar events.

In reviewing the events of the incident, the LCC crew was questioned by Wing Maintenance Evaluation Team (DCMET), COAMA, and Boeing Company personnel on 16 March 67.

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66. Msg, (c) OONE 01012, COAMA to SAC, Subj: Wing I, E Flight Incident, 3 Mar 67, Ex 14.


68. Ibid., p 3.

69. Ibid., p 6.
In screening the crew it was determined that loss of strategic alert and fault indication occurred in an extremely short period of time. The exact time estimates could not be obtained but the time interval was estimated to be between 10 to 40 seconds.

The standby light was not observed to illuminate for any of the ten launch facilities. None of the command and status line monitor fault lights were illuminated. There was no pattern or sequence noted as to the illumination of fault and loss of strategic alert. No flickering or ripple was noted on any of the other status displays. The emergency lights were on (all other lights off) and these lights did not appear to dim.

The initial time of the incident, decided by the crew, could be no more than two or three minutes earlier than the official log time of 08h5 hours (local). The crew also stated; the LF, E-8 had a channel 26 which indicated it was operating on diesel at the time of fault. The 

65L (SAC Communications & Control System) and communications equipment was not processing traffic at the time of the incident.

Neither of the crew members were using any electrical equipment. Such as electric razor... etc. At the time of fault

71. Ibid.
72. Ibid.
73. Ibid., p 7.
the deputy commander was turned away from the console to brief the commander who had just been awakened from sleep. The commander was the first to see the faults. (74)

Channel 50 data was extracted from sites E-7 and E-8 immediately after the shutdown of the entire flight. Analysis of this data determined that both sites were shutdown as a result of external influence to the G&C, no No-Go's were detected by the G&C. Although E-8 had indications of a previous Monitor check No-Go it was not the cause of shutdown at this time. This was determined by information contained in sector 54 which said that subsequent to the last No-Go the G&C had completed an iteration routine which is performed approximately 2 hours and 30 minutes into a restart. Had a G&C No-Go caused this shutdown, the Discrete Input "A" (DIA) word would have been placed in this sector. (U)

On Sunday, 19 March 67, a team was dispatched to sites E-2 and E-9 to dump channel 50 data. These two sites were in strategic alert at this time but were selected because they had never experienced a restart since the last time that a maintenance tape had been used. Information from the No-Go sectors of channel 50 indicated that these G&C's had never entered a No-Go loop at any time. This hardens the case against a No-Go causing a shutdown of the flight. If a No-Go had shutdown the flight, it would have


75. Ibid., p 8.
been recorded in channel 50 data. (U)

The only non-detectable fault from the G&C section which could have caused a No-Go would have been loss of confirm codes. This type of fault would not have produced a VRSA channel 9 and 12, but only a channel 9. This information eliminated the No-Go theory as the cause of the incident. (U)

As stated earlier, all 10 launch facilities shutdown with a VRSA channel 9 and 12 (G&C No-Go and Logic Coupler No-Go) recordings. Because of this consistency considerable investigation was expended in the Logic Coupler area. In the channel 50 analysis it was shown that the guidance section did not experience a No-Go and therefore, it was felt that the VRSA channel 9 report was not valid. It is possible, however, for the Logic Coupler to generate both of these No-Go indications. (U)

The logic of the coupler was studied by the investigating team in an effort to identify a method by which both VRSA 9 and 12 could be activated. The opinion of the team was that external generated signals caused the generation of these two channels and shutdown of the launch facilities. The possibility of this is very remote due to the fact that all 10 couplers would have to fail in the flight within a few seconds of each other. (U)

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77. Ibid., p 30.
78. Ibid., p 30.
79. Ibid., p 30.
The only possible means that could be identified by the team involved a situation in which a coupler self-test command occurred along with a partial reset within the coupler. This could feasibly cause a VRSA 9 and 12 indication. This was also quite remote for all 10 couplers would have to have been partially reset in the same manner. 

Further studies of this problem will be accomplished at the contractors facility since a full engineering investigation is not feasible at this level. (U)

In the researching of other possibilities, weather was ruled out as a contributing factor in the incident. (U)

A check with Communication maintenance verified that there was no unusual activity with EWO-1 or EWO-2 at the time of the incident. (U)

Rumors of Unidentified Flying Objects (UFO) around the area of Echo Flight during the time of fault were disproven. A Mobile Strike Team, which had checked all November Flight's LPs on the morning of 16 March 67, were questioned and stated that no unusual activity or sightings were observed. (U)

The 801st Radar Squadron, Malmstrom AFB, gave a negative report on any radar or atmospheric interference problems related to Echo Flight. (U)

81. Ibid., p 28.
82. Ibid., p 25.
83. Ibid., p 27.
84. Ibid., p 26.
Capt. Bradshaw in the command post at the time of Echo Flight incident, verified that there was no activity on the Primary Alerting System (PAS) at Echo Flight. (U)

During the investigation it was discovered that Boeing modification teams were at sites B-1, K-1 and G-1 on 16 March 67; but this could not have affected anything in relationship to Echo Flight because they arrived at the sites after the incident occurred. (U)

As mentioned before, a power problem affected E-1 at 1453 on 16 March 67 according to LCC log. The Brine Chiller (CH-1) shutdown due to power fluctuation. This was not considered unusual for power failures or fluctuations often cause CH shutdowns. Between 1510 and 1600 hours, E-1 experienced another power fluctuation. The capsule crew heard the Motor Generator brushes chatter. At this time the site manager indicated that one phase had low voltage, but LCF power was not appreciably affected since capsule fluorescent lights were still on. The diesel generator started but could not be put on the line due to broken lead. Commercial power was restored at 1921 hours on 16 March 67. (U)

In reviewing the maintenance history of the Wing, it was discovered a similar incident occurred at Alpha Flight in


86. Ibid., p 23.

87. Ibid., p 12.
December 1966. On 19 December 66, A Flight had some of it's LFs shutdown (A-6, A-7, and A-10). The similarity between the two flights was: The same Capsule crew, adverse weather conditions, and commercial power failure after the facilities shutdown.

Since weather condition and Capsule crew have been eliminated as causes of the incident, investigation of electrical failure was started. (U)

The power outage that affected E-1 at 1453 on 16 March 67, occurred on the 7.2/12.5 kilo volts (KV) transmission line from the Winifred Substation. Fergus Electric Co. (Mr. D. Young, Lewistown) advised Mr. H. Jackson that a transformer shorted one phase of the three south of Winifred. (U)

Sites Echo 1-6 and E-9, E-10, and E-11 are supplied by 7.2 KV line from the Winifred substation. No sites in other flights are supplied power from Winifred. Sites E-7, E-8, D-6, D-7, M-2, M-3, and M-8 are supplied power by 7.2 KV lines from the Hilger substation. (U) (SEE DIAGRAMS)

The source of power comes from the Rainbow generating plant in Great Falls and is fed through the Rainbow switchboard on 100 KV power lines to the Stanford substation. The 100 KV lines continue to Benchland where it feeds two 50 KV lines. One goes

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89. Ibid., p 12.

90. Ibid., p 14.
Figure 2: Montana Power Rainbow Generator Plant

Legend:
- X Power switch at Glenarry
- V Power switch at Nihill
- □ Substation

Winifred 50 KV
Hilger 50 KV

Glenarry (Lewisott) N.O.

Judith Gap N.C.

Nihill N.C.

Harlowton

Commercial P. & Electric Co.
Montana Power Rainbow Generator Plant

A Flight Power Distribution

Figure 3.
to the Glengarry substation at Lewistown and the other to the Harlowton substation. The Glengarry substation feeds the Hilger substation with 50 KV lines and Hilger feeds the Winifred substation with 50 KV lines. The sites are fed by 7.2 KV lines. (U)

A 7.2 KV transformer shorted in the line to site E-3 at 1450, 16 March 67. This transformer is located on a farm two miles south of the Winifred substation. Automatic reclosure switches at Winifred substation opened, and were reclosed manually after transformer replacement later in the day. This caused the Brine Chiller problem at E-1. The transformer was in the West phase. It was not determined which phase this corresponds to at the sites. Sites E-3, E-5, E-6, E-9, and E-10 transferred to Standby Power. Sites E-1 transferred to Direct Current (DC) operation. (U)

On 28 March 67, the 31st SMW in conjunction with the Montana Power Company conducted a switching test on the 50 KV high voltage line between the Harlowton and Glengarry substations. The test was performed at the request of OAM/OONE as a part of the initial Echo Flight incident investigation performed at Malmstrom. The intent of the test was to verify correlation, if possible, between high voltage switching and launch facility shutdown or other launch facility faults. (U)


92. Ibid., p 15.

93. Msg, (C) DTY 02998, SAC to OAM, Subj: Proposed Power Switching Test for Echo Flight, 24 Mar 67, Ex 45.
After performing the tests, it was decided that commercial power switching operations were not the cause of the E Flight shutdown. This was based on the following reasons. Other flights fed by the Hilger substation were not affected. Similar shutdowns occurred in A Flight LF's which were supplied by power not only from separated substations, but also, from separate feed lines from the generation station. Shutdown in 1965 or 1966 of missiles do not correlate to any power line switching in the Montana Power System. (U)

Since the only common item determined in this investigation was the LCC. The LCC power fault transmitted to the LF's on the hardened cable was considered the only power fault capable of causing the Echo Flight incident. (U)

The investigation teams at Malmstrom, were unable to determine a logical cause for the incident. Further investigation in the area of shutdown results will be conducted in an effort to determine a possible cause of this incident. These studies will be conducted at the contractors facility and will be included in the next history. (U)

On 12 January 1967, at 0905 hours, a potential disaster

95. Ibid., p 17.
96. Ibid., p 3.
situation occurred while the 341st MINS Re-entry Vehicle Branch team was being evaluated by the 3901st SMES in performance of a Dash 1 A maintenance on a W-56-Mod 1 warhead. (U)

During the operation a T-290A (instrument to register gaseous air contamination) gave an alarm. The area was immediately evacuated and those present were sent to the Hospital, Decontamination station, for observation of possible contamination. (U)

A Explosive Ordinance Disposal (EOD) team entered the area wearing protective clothing and equipped with a T-290A, plastic bags, and cotton swabs. The warhead was checked with swipe tests for radiation with all results showing negative. (U)

A check was made on the T-290A which gave the alarm and was determined to be faulty. The area was again checked by the team for radiation with no results. The alert was then ended at 1150 hours on 12 January 67. (U)


98. Ibid.

99. Ibid.

100. Ibid.
DCA

28 February 1967

Monthly Report HF/SSB Hardened Antenna

15AF (DMAC)

This monthly report for February is submitted through your headquarters for Hq SAC (DMVB) in accordance with paragraph 41, Chapter 7, SACM 46-8. The following paragraphs where applicable correspond to subparagraphs of paragraph 41, SACM 46-8.

a. Known Problem Areas: All known problem areas have been thoroughly identified as a result of the Walk-Thru Inspections conducted at Wing I facilities during period 1 February 1967 through 24 February 1967. A message report on each walk-thru has been sent to Hq SAC, 15AF and 10 SAD.

b. Formal Demonstration Schedule: No forecast of formal demonstrations can be made until the discrepancies identified during current walk-thru inspections are corrected.

d. Summary of Technical Orders: No change from those previously reported on the status of Technical Orders and SAC CEN's.

e. Significant Matters: HF/Walk-Thru Inspections have been conducted on 564th SWS flights P, Q and R. Tentative walk-thru of flights S and T HF/SSB facilities have been set for period 5 - 10 March 1967. Copies of these inspections will be forwarded in the same manner as Wing I facility inspections.

JOHN W CARROLL, Colonel, USAF
Commander

Cy to:
16SAD, WC, COMS, DCO, DCMQ, BCE, SAFE, DCGS, SATAF(ESG-29), 10SMS, 12SMS, 420SMS
CONFIDENTIAL

VZCZA6848
PITCH: JAW RUCSAAA0439 68319 04-06-1967
ZNY
P: 24195 MAR 67
F: SAC
TO: RWMBOA/GOAMA HILL AFB UTAH
INFO: RWMBOA/15AP
RWMBOA/341SMW MALMSTROM AFB MONT
RWMBOA/BOEING CO SEATTLE WASH
ET

CIAON: GOAMA (ONE) INFO: 15AP (DH) 341SMW (C) TBC
APPROVATIN: DAN DONOY MINUTEMAN ENGINEERING
SUBJECT: PROPOSED POWER SWITCHING TEST FOR ECHO FLIGHT (U).
REF: CONFIDENTIAL: ONE 20321 MARCH AND MALMSTROM CONFIDENTIAL:
ZIPPO NSG GX 2296 MARCH.

1. FOR ALL THIS IS AUTHORITY TO CONDUCT THE POWER SWITCHING TEST
2. TO AID IN DETERMINING THE CAUSE OF THE ECHO FLIGHT SHUTDOWN.
3. PROCEDURES OUTLINED IN REFERENCED ZIPPO MESSAGE WILL APPLY. SYSTEM
4. SHOULD BE IN CLOSET CONFIGURATION POSSIBLE TO CONDITIONS THAT
5. EXISTED AT TIME OF INCIDENT.

6. FOR ALL ONE AS TEAM CHIEF WILL DETERMINE CONDITIONS.
7. TIME OF TEST AND COMPOSITION OF INVESTIGATION TEAM. INSTRUCTIONS
8. CONTAINED IN ONE 20321 WILL BE RECONFIRMED AS POWER SWITCHING
9. TEST MAY CONFLICT WITH PROCEED MEETING.
10. FOR ALL SHOULD SHUTDOWN OCCUR, ANALYSIS SHOULD BE CONDUCTED
11. PRIOR TO RETURNING SITES TO ALERT. 51 STRAT HSL AVG PROPOSAL OF FOUR
12. SITES RETURNED TO ALERT PER DAY SHOULD BE ADHERED TO IN ORDER TO
13. AVOID PROLONGED OFF ALERT TIME.
14. FOR 15AP AND 341SMW THIS HEADQUARTERS (DOF L AND DN78)
15. WILL BE NOTIFIED OF THE TIME OF TEST. IF SHUTDOWNS OCCUR AS A RESULT
16. OF THIS TEST A SCHEDULE OF PROPOSED RETURN TO ALERT IS ALSO REQUIRED.

ET

NNNN
(2) No support teams were utilized.

(3) There are no recommendations for improvement of local or higher headquarters procedures or directives.

ROSS E. MARSHALL, T3gt, USAF
Team Chief Explosive Ordnance Disposal
TO RESOLVE THIS PROBLEM, OR TO DEFINITELY ADEQUATE ENGINEERING ANALYSIS.
TASKS WITHOUT ADDITIONAL TESTING, A REVIEW OF AVAILABLE DATA STRONGLY
SUGGESTS THIS TO BE A WING I FACILITY PROBLEM. THE OAMAE ETF IS NOT A
WING I FACILITY. IT IS, THEREFORE, NECESSARY TO RUN THE PROPOSED TESTS
AT RAFISTON, PREFERABLY AT ECON 1. IT IS CURRENTLY BELIEVED THAT
FRUITFUL DATA WILL NOT EXIST UNTIL SUCH TIME AS THE NO-GO MODE CAN BE
REPRODUCED AT LEAST AT THE LF LEVEL.

3. THE FOLLOWING PLAN OF ACTION WAS AGREED UPON BY ALL REPRESENTATIVES.
DEVELOP A TEST PLAN WHICH, AFTER ISOLATING AN LF FROM THE SYSTEM, ALLOWS
FOR THE APPLICATION OF STIMULI WHICH WILL REPRODUCE THE NO-GO AT THE LF
LEVEL. AFTER ANALYSIS OF SUCH TEST DATA, PROCEEDING AS REQUIRED TO TEST,
OR ANALYZE AT THE LCF LEVEL. THE TASK GROUP WILL CONVENE AT SEATTLE ON 4
APRIL TO DEVELOP A TEST PLAN AND PROCEDURES. SUCH PLAN
WILL INCLUDE EQUIPMENT REQUIREMENTS, LF ISOLATION PROCEDURES, DEFINE
TESTS TO BE PERFORMED, AND BE REVIEWED FOR SAFETY. THE PLAN WILL RECEIVE
SAFETY CLEARANCE THROUGH DONE, AND WILL BE COORDINATED WITH SAC AS
REQUIRED. COMPLETION DATE FOR THE PLAN IS AIMED AT 5 MAY 1967. THE
PLAN WILL BE DEVELOPED AND PROTOTYPEED, AT THE ERA FACILITY AT BOEING.

4. ADDITIONAL INVESTIGATIVE ENGINEERING STUDIES ARE IN PROGRESS, AND
WILL CONTINUE. BOEING IS ATTEMPTING TO OBTAIN AN EXHIBIT 7KVA TRANS-
FORMER WHICH WAS REPORTED TO HAVE SHORTED A FEW HOURS AFTER THE
INCIDENT. A TRADOC REPORT ON THE TRANSFORMER WILL BE DEVELOPED BY
BOEING ENGINEERING. DEPENDING UPON THE ANALYSIS OF THIS TRANSFORMER,
AND ITS FAILURE MODE, ADDITIONAL TESTS MAY BE REQUESTED SIMILAR TO
THE POWER TESTS RUN ON 23 MARCH 1967, AT RAFISTON WITH THE ADDED
TRANSFORMER FAILURE MODE SIMULATION. YOU WILL BE FURTHER ADVISED
WITH RESPECT TO THIS ACTIVITY.

5. CONCURRENCE IN THE USE OF ECHO 5 FOR TESTING OUTLINED IN PARA
THREE (3) IS REQUESTED. PLANNING FACTORS AT THIS TIME ARE FOR A
PERIOD OF SIX WEEKS BEGINNING 15 MARCH 1967. YOU WILL BE ADVISED OF
ANY SHIFT IN THESE TARGET DATES. 31-4.

ST PAGE 2 OF 2
1. Reference: MAC Form 696, para U.

2. Date of Disaster: 12 January 1967

3. Time of Disaster: Approximately 0910 local

4. Location of Disaster: 341st TRS Munitions Storage Area, building 1840, HK-11 Bay.

5. OIR Submitting Report: 341st TRS Explosive Ordnance Disposal Section

6. Report is complete.

7. Report as follows: Explosive Ordnance Disposal Team Chief - Ross E. Hersman, TSgt, AF 19433161, 609IC Explosive Ordnance Disposal Section,

   (1) On 12 January 1967 at approximately 0910 local, the 341st TRS RV Evaluation Team consisting of TSgt Roy E. Aldridge, AF 19435530 - Team Chief, SSgt William R. Shoemaker, AF 19533767 - Team Member, and SSgt Frank A. Hartin, AF 28718138 - Team Member, was being evaluated by the 3901st while performing maintenance on a T-56, Hod 1 Warhead IAW T.O. 11N-561A. During removal of HC1508, the T-290A, serial No. RF-2450-B9, gave an audible alarm, indicating the presence of a hazardous environment.

   This maintenance was being performed in the 341st TRS Munitions Storage area, building 1840, HK-11 Maintenance Bay. The RV maintenance team chief TSgt Aldridge sounded the alarm and the entire area was evacuated. The E.O.D. team consisting of TSgt Hersman, A/O Jackie L. Shreves, AF 19681063 and TSgt Robert A. Steele, AF 1119215 (3901st BOD) re-entered the area with full protective clothing, a second T-290A, serial No. RF-2132-K2, plastic bags and cotton smoke. The T-56, Hod 1 Warhead and the HC1508 was monitored with negative results. Swipe tests were taken from the T-56, Hod 1 Warhead and HC1508 IAW T.O. 11N-35-29, para 3-2-2, dtd 18 Feb 65, Chg 10 Oct 66. This information was given to the Wing Command Post. At approximately 1105 local TSgt Hersman, A/O Coyle R. Turner, AF 19724121 and Capt. Robert J. Huntsman, AF 3112241 (3901st BOD - Observer) re-entered the area with both T-290A's and two TAC-15's serial No. 4612 and 5518 and remanirned the area. The T2-0A, serial No. RF-2450-B9 which had been used by the RV maintenance team would not setup IAW T.O. 11N-35-15 and was determined to be inoperative. TSgt Hersman and Capt. Huntsman monitored the HK-11 maintenance bay for alpha contamination with negative results. The second T-290A, serial No. RF-2132-K2 was again used, and again a negative indication was received. These actions were reported to the Wing Command Post. All protective clothing was checked for contamination with negative results. The swipe test samples were given to the Bio-environmental Engineer Section to be forwarded to Wright-Patterson AFB for complete evaluation & analysis. Information received from Wright-Patterson indicated that these swipe tests were also negative.
PAGE 2 RUCSAAA0196

ALERT WITH NO APPARENT DIFFICULTY. INVESTIGATION AS TO THE CAUSE OF THE INCIDENT IS BEING CONDUCTED BY MALMSTROM TEAM. TWO FITTS HAVE BEEN RUN THROUGH TWO MISSILES THIS FAR. NO CONCLUSIONS HAVE BEEN DRAWN. THERE ARE INDICATIONS THAT BOTH COMPUTERS IN BOTH G & C'S WERE UPSET MOMENTARILY. CAUSE OF THE UPSET IS NOT KNOWN AT THIS TIME. ALL OTHER SIGNIFICANT INFORMATION AT THIS TIME IS CONTAINED IN ABOVE REFERENCED MESSAGE.

FOR OAHU. THE FACT THAT NO APPARENT REASON FOR THE LOSS OF TEN MISSILES CAN BE READILY IDENTIFIED IS CAUSE FOR GRAVE CONCERN TO THIS HEADQUARTERS. WE MUST HAVE AN IN-DEPTH ANALYSIS TO DETERMINE CAUSE AND CORRECTIVE ACTION AND WE MUST KNOW AS QUICKLY AS POSSIBLE WHAT THE IMPACT IS TO THE FLEET. IF ANY. REQUEST YOUR RESPONSE BE IN KEEPING WITH THE URGENCY OF THE PROBLEM. WE IN TURN WILL PROVIDE OUR FULL COOPERATION AND SUPPORT.

FOR OAHU AND 15AF WE HAVE CONCURRED IN A BOEING REQUEST TO SEND TWO ENGINEERS, MR. R. E. RIGGERT AND MR. V. M. DUTCH TO MALMSTROM TO COLLECT FIRST HAND KNOWLEDGE OF THE PROBLEM FOR POSSIBLE ASSISTANCE IN LATER ANALYSIS. REQUEST COOPERATION OF ALL CONCERNED TO PROVIDE THEM ACCESS TO AVAILABLE INFORMATION, I.E., CREW COMMANDERS LOG ENTRIES, MAINTENANCE FORMS, INTERROGATION OF KNOWLEDGEABLE PEOPLE, ETC.

PAGE 3 RUCSAAA0196

SECURITY CLEARANCES AND DATE AND TIME OF ARRIVAL WILL BE SENT FROM THE AFFRO BY SEPARATE MESSAGE.

FOR 15AF. OAHU HAS INDICATED BY TELECON THAT THEY ARE SENDING ADDITIONAL ENGINEERING SUPPORT. REQUEST YOUR COOPERATION TO INSURE MAXIMUM RESULTS ARE OBTAINED FROM THIS EFFORT. GP74.

BCSA - SMCE-67-437
VZCZCZIA76C
PTC JAZ: RUMMBA0034 239 WHT - CCCC - RUMMBA
ZNY

7 32065 EJ MAR 67
FM OCMIA/HILL AFB UTAH
TO RUCSANA/SAC
RUMBA/15TH AF MARCH AFB CALIF
RUMMBA/341SM MALMSTROM AFB MONT
RUMMBA/APP SE THE BOEING CO SEATTLE WASH
RUMBA/NORTH AMERICAN AVIATION AUTOMATICS DIV ANAHEIM CALIF
INFO RUAEDA/HDRS AFLC WRIGHT-PATTERSON AFB OHIO
RUMBA/EDS NORTON AFB CALIF

CONF NO 01912 MAR 67
FOR: SAC/DMEC, DE: 154F/DEAC, DE 341 SW/DCA; BOEING (D.J.
DOMING-MINUTE WIN ENGINEERING); AUTOMATICS/MR ILR; HEATH,
INFO: HDRS AFLC WRIGHT PATTERTON AFB MONT (COL MORRISON); BSU/BSR,
BSQR, BSQX

SUBJECT: WING 1, E FLIGHT INCIDENT
1. A TASK GROUP MEETING CONVENED AT OCMIA ON 28 MARCH 1967, TO
REVIEW THE RESULTS OF INVESTIGATION TO DATE. REPRESENTATIVES FROM
BOEING COMPANY, AUTOMATICS, OCMIA, AND 15TH AF WERE REPRESENTED.
2. IT IS THE POSITION OF THE TASK GROUP THAT INSUFFICIENT DATA EXISTS

341st STRATEGIC MISSILE WING
AND 341st COMBAT SUPPORT GROUP
HQ SAC DXI., 67-3922

P.R.C. [Unclassified Title]
Apr Thru 30 Jun 1967

VOL I

Assigned to the
FIFTEENTH AIR FORCE, STRATEGIC AIR COMMAND

Permanently Stationed at
MALLSTROM AIR FORCE BASE, GREAT FALLS, MONTANA

This document was prepared by A2C David B. Gamble, Wing Historian under the supervision of the Wing Information Officer. It is prepared in compliance with SACR 210-1, 29 June 1964, and is classified SECRET under the provision of APR 205-1 as amended. The classification is required for the protection of information that reveals the military capability and operational status of the Wing (U).

APPROVED:

[Signature]
DAVID B. GAMBLE, A2C, USAF
Historian

[Signature]
JOHN W. CARROLL, Col, USAF
Wing Commander

COPY (1) OF FOUR COPIES

ASH-67-5-449
This volume is designed to conform to the classification of the information in the source documents. It will be handled in accordance with the provisions of AFR 205-1, as amended.

This volume contains information effecting the national defense of the United States within the meaning of the Espionage Laws (Title 18, U.S.C., sections 793 and 794), the transmission or revelation of which in any manner to any unauthorized person is prohibited by law.

This volume has been placed in downgrading Group 3, which is the highest downgrading group assigned to the information in the source documents. The historian's analysis and consolidation of information from many sources, which individually may have lower downgrade provisions, results in a synthesis which may have wider implications than the material on which it is based. Therefore, individual downgrade instructions for each paragraph are not indicated, and all portions of this volume will be handled under the overall downgrading group.
two different types have been introduced into the Squadron. The only major difference between the vehicles is the weight. This causes a problem in the operational data on the targeting tapes fed into the G&Cs. The present tapes have operational data for a lighter weighing G&C vehicle, therefore, they can not compensate for the additional weight of the heaver G&C vehicle in navigation. This means that the tapes now in use would not be able to correctly guide the missile equipped with a heavy G&C vehicle. Theoretically, a missile equipped with a heavier G&C and with the wrong type of computer tape would fall short of its target and therefore, be useless. SAC has started a schedule to replace the tapes of the heavy G&Cs with a corrected tape (MOTP-607) which would compensate for the weight difference. The SAC schedule for replacement is as follows: Papa flight, 18 Jul 67, Quebec flight, 21 July 67; Romeo flight, 25 July 67, and Tango flight, 31 July 67.

As stated in the last history, studies of the Echo flight incident were to be conducted at the contractors plant. (U)

A task group meeting convened at OAHU, Hill AFB, Utah on 28 March 67, to review the results of the investigation to date.

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42. Msg, (C) DTM 07160, SAC to Norton AFB, 6 Jul 67, Ex 41.
Representatives from the Boeing Company, Autonetics, COAMA, and 15th AF attended. (\textsuperscript{13})

The group decided that insufficient data on the incident existed to resolve the problem or for adequate engineering analysis without additional testing. The present data suggested that the problem was a Wing I peculiar problem. Since the COAMA Experimental Test Facility (ETF) was not a Wing I type, it was necessary for the experiments to be conducted at Malmstrom. Further analysis of the problem showed that experiments would be of no real value until a No-Go Mode could be reproduced at least at a LF level. (\textsuperscript{14})

It was decided by the group to first develop a way to reproduce a No-Go Mode at the LF level then at the Launch Control Facility (LCF) level before a test could be made at Malmstrom. The group was to reconvene at Boeing's Seattle plant on 4 April 67 for development of a way to safely reproduce a No-Go effect. The plan was to be developed at the Network Resolution Area (NRA) at Boeing, with a completion date for the plan set at 5 May 67. (\textsuperscript{15})

During testing at Boeing, a 30 micro sec Pulse (-10 to 0 volt square wave) was placed on the Self Test Command (STC) line at the C-53P Coupler Logic Drawer interface (STC). Seven out of

\textsuperscript{13} Msg, (C) OOME 01012, COAMA to SAC, "Wing I, E Flight Incident," 30 May 67, Ex 45.

\textsuperscript{14} Ibid.

\textsuperscript{15} Ibid.
10 separate applications of a single Pulse, would cause the system to shut down with a Channel 9 & 12 No-Go. (U)

Subsequent testing at Autonetics has resulted in the following explanation of what probably happens in the Coupler Logic Drawer. The Pulse inserted is long enough to initiate the Coupler Self test sequence within the C-33P. However, it is not of long enough duration to enable control lines to the computer to place the computer in a Coupler test loop Mode. This causes the Coupler to issue a sequence error due to lack of coincidence between G&C and Coupler Modes. This sequence error, together with the action of two other flip flop outputs (M-17 & M-20), is sufficient to initiate the Coupler and G&C No-Go shut down. (U)

The effort at Boeing NRA was to determine the source and most likely path of noise Pulse to the Logic Coupler. The results to the Electro Magnetic Pulse (EMP) testing at the IF and Wing IV indicated that the Sensitive Information Network (SIN) were susceptible to noise of the type that could have caused the problem. (U)

The SIN lines go only from the FCC to all of the IF's in the flight, which could explain the flight peculiar aspect of the problem. (U)

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46. Msg, (S) CONE 01204, OCC or SAC, "Halmstrom B Flight Problem Weekly Status," 17 Apr 67, Ex 46.

47. Ibid.

48. Ibid.

49. Ibid.
The best possible source of the noise Pulse, so far in the analysis, was the transformer failure which occurred at a stock watering through the Echo flight area. The shorting to ground of the single phase transformer may have unbalanced the three phase "Y" connected system enough to cause ground currents to flow back to the generator. The Hardened Intersite Cable (HIC) shields would provide a path for the ground current thus inducing voltage Pulses on the SIN lines to all LF's. \(50\) \((U)\)

Testing at NFA has proven that there is significant coupling between the shields of the SIN lines and the Self Test Command (STC) line into the C-53P Logic Coupler. \(51\) \((U)\)

A conference was held at Boeing on 18 April 67 for the task team to review the preliminary test plan for LF, E-78, at Malmstrom. Also, a test plan was reviewed to accomplish the transformer failure simulation tests at Malmstrom. Boeing had co-ordinated with the power company, and received their approval for the tests. \(52\) \((U)\)

It was the consensus of the task group that the transformer tests should be run as soon as possible so that the data would be available for the E-78 test plan development. The plan was to instrumently connect the HIC lines and power line into both one

\[\text{References:}\]

50. Msg, (S) OONE O1204, OOAIA to SAC, "Malmstrom E Flight Problem Weekly Status," 17 Apr 67, Ex 146.

51. Ibid.

52. Ibid.
The power tests were accomplished at Malmstrom AFB during the week of 15 May 67. The tests were in accordance with Test Plan D2-1846-1. No sites were shut down for the test.

Instrumentation on the Sensitive Information Network lines and on the commercial primary power lines showed no significant noise propagation as a result of simulating the transformer failure.

As part of the tests, one of the primary power lines at the LCO was opened and then shorted to natural. The test plan called for three operations of this sequence; however, the back-up Environmental Control System (ECS) failed to sequence properly and rather than jeopardize the equipment, only one sequence was performed.

During the transformer tests, a one volt peak to peak 60 cycle signal appeared on the SIN receiving line at E-3. Also, a high current spike was seen on the primary power neutral line to launch facility ground point. The 60 cycle signal on the SIN line was insignificant because tests have indicated that frequencies in the area of 100 Kilo Cycle (KC) propagated most readily.


55. Ibid.

56. Ibid.
within the LF. Also, known was that the C-53P Logic Coupler will cause Channel 9 & 12 No-Go shut down with Pulse width in the area of 10 to 100 micro sec (a 60 Cycle Per Second signal has a pulse width of approximately 16.7 milli sec). The current spike on the neutral power line did not appear to extend to the Logic Coupler interface therefore, it was not felt to be significant. 57

Each time a power Pulse was initiated, by shorting the transformer or opening one phase at the LCC, E-1 and E-3 were observed to switch to emergency power momentarily. The capsule area did not report any change in status from the 10 LF's in Echo Flight as a result of power tests. 58

The tests run at Boeing in the NRA have proved that the C-53P Logic Coupler was the receiver to the noise Pulse irregularly. The normal signal on the STC in the C-53P is (-10 to 0 volt Pulse of duration between two and 200 micro sec) was applied at this point. When the Pulse width was set at 30 micro sec, 12 Channel 9 & 12 No-Go's, one Channel 9 No-Go, and four Coupler Self Tests (CST), were experienced out of 20 separate applications of the Pulse. 59

In other words, 60 percent of the time the responses were the same as experienced at Echo Flight and 85 percent of the


58. Ibid.

59. Ibid.
time the response would have placed the system in a non EMO
status. (U)

A 30 micro sec Pulse is equivalent to a frequency of 3 KC,, and previous testing at the LF and HRA have indicated the Pulse coupling within the LF is present at frequencies in this general area. OONE has conducted tests at the Hill Experimental Launch Facility on the Wing II-V Logic Coupler to determine if it could be a receiver to this same type Pulse. This testing will indicate if the Wing II-V, Logic Coupler will respond to a random Pulse similar to the response observed on the C-53P Logic Coupler during test at the Boeing HRA. 61 (U)

The results of these tests will be included in the next history. (U)

Due to the fact that the power tests were essentially negative, it appears that the cause of the Echo Flight problem was of the EMP or electrostatic nature. 62 (U)

A Channel 9 & 12 No-Go shut down has never been reported at Wings II thru V. This fact is probably due to the significant difference between the Wing I and the Wing II thru V, Logic Couplers as well as differences in the inter site cable and LF

61. Ibid.
62. Ibid.
cabling. Therefore, Echo Flight problem still appears to be a Wing I peculiar problem. (63)

OONE recommended Ballistic System Division (BSD) accomplish additional testing of the EMP and electrostatic nature at a Wing I facility at the time of Force Modernization to determine the extent of vulnerability. After the testing has isolated all problems with the Wing I Force Modernization configuration, BSD could evaluate the need for testing of Wing II-V Force Mod silos. (64)

Air Force Systems Command (AFSC) has the primary responsibility for EMP testing, and has an active test program at the present time. Therefore, OJAMA recommended that BSD and Air Force Weapons Laboratory (AFWL) accomplish these tests at Malmstrom at the earliest possible date. (65)

The results of these tests will appear in the next history. (U)

In a previous history a problem of Movement Security Alarm System on the Wings' re-entry vehicles G&C Vans was described. The problem was the alarm system under the vans, was inoperative during winter weather conditions, due to the collection of mud, snow, and ice under the van. Because of the great deal of maintenance required to keep the alarm operational; the Wing suggested


64. Ibid.

65. Ibid.
VZCZCCHIA764

PT: JAZ KUMBA0934 283 0107 - - - -RUNOHO.


t: 308536 MAR 57
FM OOAKA HILL AFB UTAH
TO RUCHANA/SAC
RUL 3KMA/15TH AF MARSH AFB CALIF
RUNOHO/641SW MALMSTROM AFB MONT
RUKMA/AAPRO THE BOEING CO SEATTLE WASH
RUKMA/North American Aviation AUTONETICS AIV ANAHEIM CAMI
INFO/RUEDFIA/HDQS AFLC WRIGHT-PATTERSON AFB OHIO
RUKMA/BSD NORTON AFB CALIF

LT

GONE 01012 MAR 57
FOR: SAC/DM7B, DE: 15AF/DMAC, DE: 541 SW/WON; ROXING (D) J.
DOING: MINITENAN ENGINEERING; AUTONETICS/ER H.R. HEATH
INFO; HDROS-AFLC WRIGHT PATTERN AFB NCNC (COL. MORRISON); BSD/356
BSD, BSD

SUBJECT: WING 1, E FLIGHT INCIDENT

1. A TASK GROUP MEETING CONVENED AT OOAKA ON 28 MARCH 1957, TO
REVIEW THE RESULTS OF INVESTIGATION TO DATE, REPRESENTATIVES FROM
BOEING COMPANY, AUTONETICS, OOAKA, AND 15TH AF WERE REPRESENTED.

2. IT IS THE POSITION OF THE TASK GROUP THAT INSUFFICIENT DATA EXISTS.
TO RESOLVE THIS PROBLEM, OR TO DEFINITELY ADEQUATE ENGINEERING ANALYSIS, TASKS WITHOUT ADDITIONAL TESTING. A REVIEW OF AVAILABLE DATA STRONGLY SUGGESTS THIS TO BE A UNIQUE PECULIAR PROBLEM. THE OOMA ETF IS NOT A UNIQUE FACILITY. IT IS, THEREFORE, NECESSARY TO RUN THE PROPOSED TESTS AT MALSTROM, PREFERABLY AT ECHO 6. IT IS CURRENTLY BELIEVED THAT FRUITLESS DATA WILL NOT EXIST UNTIL SUCH TIME AS THE NO-GO MODE CAN BE REPRODUCED AT LEAST AT THE LF LEVEL.

3. THE FOLLOWING PLAN OF ACTION WAS AGREED UPON BY ALL REPRESENTATIVES:

DEVELOP A TEST PLAN WHICH, AFTER ISOLATING AN LF FROM THE SYSTEM, ALLOWS FOR THE APPLICATION OF STIMULI WHICH WILL REPRODUCE THE NO-GO AT THE LF LEVEL. AFTER ANALYSIS OF SUCH TEST DATA, PROCEEDING AS REQUIRED TO TEST AND ANALYZE AT THE LF LEVEL. THE TASK GROUP WILL CONVENE AT BOEING, SEATTLE, ON 4 APRIL TO DEVELOP A TEST PLAN AND PROTOCOLS. SUCH PLAN WILL INCLUDE EQUIPMENT REQUIREMENTS, LF ISOLATION PROCEDURES, DEFINE TESTS TO BE PERFORMED, AND BE REVIEWED FOR SAFETY. THE PLAN WILL RECEIVE CLEARANCE THROUGH CREEC, AND WILL BE COORDINATED WITH SAC AS REQUIRED. COMPLETION DATE FOR THE PLAN IS AIMED AT 5 MAY 1967. THE TESTS WILL BE DEVELOPED AND PROTOTYPED AT THE NFRA FACILITY AT BOEING.

4. ADDITIONAL INVESTIGATIVE ENGINEERING STUDIES ARE IN PROGRESS, AND WILL CONTINUE. BOEING IS ATTEMPTING TO OBTAIN AN EXHIBIT 7/KA TRANSFORMER WHICH WAS REPORTED TO HAVE SHORTED A FEW HOURS AFTER THE INCIDENT. A FACTORY REPORT ON THE TRANSFORMER WILL BE DEVELOPED BY BOEING ENGINEERING, DEPENDENT ON THE ANALYSIS OF THIS TRANSFORMER. AND ITS FAILURE MODE. ADDITIONAL TESTS MAY BE REQUESTED SIMILAR TO THE POWER TESTS RUN ON 23 MARCH 1967, AT MALSTROM WITH THE ADDED TRANSFORMER FAILING SOLUTION SIMULATION. YOU WILL BE FURTHER ADVISED WITH RESPECT TO THIS ACTIVITY.

5. CONCURRENCE IN THE USE OF ECHO B FOR TESTING OUTLINED IN PARA.

THREE (3) IS REQUESTED. PLANNING FACTORS AT THIS TIME ARE FOR A PERIOD OF SIX WEEKS BEGINNING 15 MAY 1967. YOU WILL BE ADVISED OF ANY SHIFT IN THESE TARGET DATES. ON 4.
V CZOMIAZ54
FTTS JAZ RUW MBA 0143 1072130 - - - RUW MBA.
ZNY-555555
P. 171322 APR 67
TM CONNA HILL AFB UTAH
TO RUCSAA SAC
RUWBKA/5AP MARCH AFB CALIF
RUW MBA/54 STRATHLAVE MALHSTROM AFB MONT
RUW MBA/2 AFB THE BOEING 50 SEATTLE WASH
RUW MBA/M HIL AM FAL AFB MONT

CONF: 0124 APR 67
FOR SAC/DM78 15AP/DMAC GSD/BSS BSGR BGM 41 SNW/DCM
BOEING CO: J. DOWNEY MANUFACTURING AUTONOMICS/MR 44 R.
HEATH AFB/COMC (COL. MORISON).
INFO: AFCC /WRIGHT-PATTERSON AFB GH0 83D JORTON AFB CALIF.
SUBJECT: MALHSTROM E PLANE: PROBLEM WEEKLY STATUS.
I. DURING TESTING AT BOEING, SEATTLE, A-30 MICRO SECOND PULSE.
2. 10 VOLTS QUANCO TEST WAS PLACED IN THE SELF TEST COMMAND.
4. AT THE CP3, COUPLER LOGIC DRIVER INTERFACE (SELF TEST COMMANDLINE):
FOR 7 OUT OF 10 SEPARATE APPLICATIONS OF A SINGLE PULSE THE SYSTEM.

PAGE 3 RUW MBA 0143 S E QD E T
SHUTDOWN WITH CHANNEL 9 & 12. SUBSEQUENT TESTING AT AUTONOMICS
HAS RESULTED IN THE FOLLOWING EXPLANATION OF WHAT PROBABLY HAPPENS IN
THE COUPLER LOGIC DRIVER: THE PULSE INSERTED IS LONG ENOUGH TO
INITIATE THE COUPLER SELF TEST SEQUENCE WITHIN THE 553, HOWEVER, IT
IS NOT LONG ENOUGH TO ENABLE CONTROL LINES TO THE COMPUTER
TO PLACE THE COMPUTER IN A COUPLER TEST LOOP MODE. THIS CAUSES THE
COUPLER TO ISSUE A SEQUENCE ERROR DUE TO LACK OF COINCIDENCE BETWEEN
COUPLER LOGIC MODES. THIS SEQUENCE ERROR, TOGETHER WITH THE
ACTION OF 2 OTHER FLIP FLOP OUTPUTS (M-3 M-29), IS SUFFICIENT TO
INITIATE THE COUPLER AND G6 NO GO SHUTDOWN EFFORT. NOW AT
BOEING 44 NAR IS TO DETERMINE THE SOURCE AND LIKELY PATCH OF THE
NOISE PULSE TO THE LOGIC COUPLER. THE RESULTS OF EMP TESTING AT
NIV AND VING 145, INDICATE THAT THE SIMULATED ARE SUSCEPTIBLE TO NOISE
OF THE TYPE THAT COULD HAVE CAUSED THE PROBLEM. THE SIMULATED Line
ONLY FROM THE LOGICAL TO ALL OF THE LF'S IN THE FLIGHT WHICH WOULD EXPLAIN
THE LACED ANALYSIS OF THE PROBLEM. THE MOST LIKELY SOURCE
OF THE NOISE PULSE, SO FAR IN OUR ANALYSIS, IS THE TRANSFORMER FAILURE
WHICH OCCURRED AT A STOCK CAVING THROUGH IN THE FLIGHT AREA. THE
SHORTING TO GROUND OF THE SINGLE PHASE TRANSFORMER MAY HAVE UNBALANCED
THE 3 PHASES BUT CONNECTED SYSTEM TO CAUSE GROUND CURRENT TO

1439 5 325
GROUP 53A56C 67 589
GROUP 53A56C 67 589
FLOWBACK TO THE GENERATOR: THE HARDENED INTERSITE CABLE (MIC) SHIELDS WOULD PROVIDE A PATH FOR THE GROUND CURRENT TO INDUCE VOLTAGE PULSES ON THE SIX LINES TO ALL LF'S. TESTING AT NAA HAS PROVEN THAT THERE IS SIGNIFICANT COUPLING BETWEEN THE SHIELDS OF THE SIX LINES AND THE STC LINE INTO THE CTG1P LOGIC COUPLER.

2. A CONFERENCE IS SCHEDULED AT BOEING ON 15 APRIL FOR THE TASK TEAM TO REVIEW THE PRELIMINARY TEST PLAN FOR LF E76 AT MALHSTM. ALSO, A TEST PLAN WILL BE REVIEWED TO ACCOMPLISH THE TRANSFORMER FAILURE SIMULATION TESTS AT MALHSTM. BOEING HAS COORDINATED WITH THE POWER COMPANY, AND HAS THEIR APPROVAL FOR THE TESTS.

THE FINAL TRANSFORMER TEST PLAN WILL BE SUBMITTED TO OOMA, AND SUBSEQUENTLY, SAC AND SATAF COORDINATION WILL BE ACCOMPLISHED.

IT IS THE CONSENSUS OF THE TASK GROUP THAT THE TRANSFORMER TESTS SHOULD BE RUN AS SOON AS POSSIBLE SO THAT THE DATA ARE AVAILABLE FOR THE E-6 TEST PLAN DEVELOPMENT. THE PLAN IS AT THIS TIME TO INSTRUMENT TO MIC LINES AND POWER LINE INTO BOTH ONE-E FLIGHT LE ND LCC. GP-4.
**ENGINEERING CHANGE PROPOSAL**

**FACILITY**

<table>
<thead>
<tr>
<th>MCL No.</th>
<th>Attachment A</th>
<th>WEG Code</th>
<th>System Designation</th>
<th>ECP No.</th>
<th>Type</th>
<th>Rev.</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>2827</td>
<td></td>
<td></td>
<td></td>
<td>528</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**CONTRACTOR'S RECOMMENDED PRIORITY**

- Emergency
- Urgent
- Routine
- Compatibility

**CONTRACT AND ITEM Nomenclature**

- Launch Facility

**NAME OF PART OR LOWEST ASSEMBLY AFFECTED**

- Launch Facility Support Building

**TITLE OF CHANGE**

- DC Supply for Isolation Relays - VRSA Channels 26 and 27 (LF)

**DESCRIPTION OF CHANGE**

Provide DC supply for the isolation relays being installed in VRSA channels 26 and 27 per ECP 1141. A typical DC supply circuit for these relays is shown on Attachment A Sketch 1.

**ADDITIONAL DESCRIPTION:**

Instructions for retest of VRSA Channels 26 and 27 and for personnel and weapon-system safety will be required.

**JUSTIFICATION FOR CHANGE**

The isolation relays are being installed in VRSA channels 26 and 27 per ECP 1141. The DC power required for these relays is to be supplied from the RPIE power system. This initiates the required RPIE change.

**DEVELOPMENTAL REQUIREMENTS**

- N/A

**ALTERNATIVE SOLUTIONS**

No alternate solutions are considered feasible.

**RECOMMENDED PRODUCTION EFFECTIVITY**

- N/A

**ESTIMATED COST FOR CHANGE IN PRODUCTION**

- N/A

**RECOMMENDATION FOR RETROFIT**

Retrofit required to provide wiring changes for isolation relays to be installed by ECP 1141.

**MATERIAL RECOMMENDED FOR RETROFIT**

- MAF, LF 02 - 09; EAFB, MAFB, WAFB, FEWAFB - All Flights

**MOCKUP AFFECTED**

- Yes [X] No
I. Air Force--Anniversary Celebrations.

HISTORY OF

341st STRATEGIC MISSILE WING

AND 341st COMBAT SUPPORT GROUP

HQ SAC DXTH 67E 5/22

(Unclassified Title)

1 Jul Thu 30 Sep 1967

Assigned to the

FIFTEENTH AIR FORCE, STRATEGIC AIR COMMAND

Permanently Stationed at

MALMSTROM AIR FORCE BASE, GREAT FALLS, MONTANA

SPECIAL HANDLING REQUIREMENT

The information herein is not to be released to the public or excluded from General Declassification Schedule.

APPROVED:

DAVID B. CAMELE, AIC, USAF
Historian

JOHN W. CARROLL, Col, USAF
Former Commanding General, 341st Strategic Missile Wing

WILLIAM D. RAPTON, Sgt, USAF
Historian

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23 AUG 1970

Privileged Document
This volume is classified to conform to the classification of the information in the source documents. It will be handled in accordance with the provisions of AFR 205-1, as amended. (U)

This volume contains information affecting the national defense of the United States within the meaning of the Espionage Laws (Title 18, U.S.C., Sections 793 and 794), the transmission or revelation of which in any manner to an unauthorized person is prohibited by law. (U)

Reproduction of this document in whole or in part is prohibited except with the permission of the office of origin. (U)

This volume has been placed in downgrading Group 1, because it contains Formerly Restricted Data material. The historian's analysis and consolidation of information from many sources, which individually may have lower downgrade provisions, results in a synthesis which may have wider implications than the material on which it is based. Therefore, paragraphs have been individually classified, but have not been marked with individual downgrade instructions, and all portions of this volume will be excluded from automatic regrading. (U)
but usually if the G&C is off power for any period of time, it will not restart when power is returned by a maintenance team.

The dash 9 and dash 20 missile problem in the 564th SMS had been alleviated this quarter. Since almost all the dash 9 and dash 20 missiles were removed prior to this quarter. (U)

MISSILE ACCIDENTS/INCIDENTS

There were no missile accidents or incidents during this quarter, but testing on the Echo Flight Incident was accomplished during this time interval. Testing on Echo Flight, because of it's relationship to this section will be included in this section. (U)

MISSILE INCIDENTS—Echo Flight Testing

Testing on the problems associated with Echo Flight are still be conducted by higher headquarters and the contractors. The results of all these tests are not known as yet. Next will be the presentation of test results that are known and their affects. (U)

As stated in the last history, a No-Go Mode effect had to be reproduced inorder to study the problem. This was achieved by the use of a 30 micro sec Pulse (-10 to 0 volt square wave) placed on Self Test Command (STC) line at the C-53P Coupler


Logic Drawer interface STC. This caused the system to shut down with a Channel 9 & 12 No-Go.  

Boeing studied the source and path of the noise Pulse to the Logic Coupler and suspected that the Sensitive Information Network (SIN) lines would cause the noise Pulse. Further studies at Malmstrom AFB by Boeing proved this analysis wrong.  

Tests at Boeing's Network Resolution Area (NRA) have proven that the G-53P Logic Coupler is the receiver of the noise Pulse irregularities. These tests had 60 percent of the time, the responses were the same as experienced at Echo Flight, and 85 percent of the time placing the system in a non EMW status.  

OCAMA thought that the cause of the incident was of the Electro Magnetic Pulse (EMP) noise or electrostatic nature. OCAMA, also thought that the problem was a Wing I peculiar problem; because Channel 9 & 12 No-Go shut downs have never been reported at Wing II thru V. This fact was due to the significant difference between the Logic Couplers, inter site cabling, and LF cabling of the Minuteman I and Minuteman II systems.  

OCOM conducted tests at the Hill Experimental Test Facility (HETF) on the Wing II-V Logic Coupler to determine if it could

136. Ibid., p 31 – 34.  
137. Ibid., p 34 – 35.  
138. Ibid., p 35 – 36
be a receiver to this same type of noise Pulse.

Results of these tests were directly determining C-53D Logic Coupler (Minuteman II system) to EMP type noise. The C-53D Logic Coupler was found to be susceptible to input noise injection which resulted in a non EWO system condition.  

This test was made in two phases; however the results of Phase II is not yet available to this office. (U)  

Phase I consisted of a correlation of noise inputs on the C-53D Coupler interface to system noise response. Preliminary conclusions of Phase I testing indicated that Minuteman II system was vulnerable to noise on the C-53D Logic Coupler input interface lines. Four input lines in the C-53D Logic Coupler were found to be susceptible to input noise injection which results in a non EWO status.  

Phase II test objectives were to determine the percentage of coupling from the input of the Electral Surge Arresstor (ESA) panel to the interface of the Logic Coupler.  

The probability of a non EWO accuracy due to a EMP noise pulse can not be defined until COAMA's Phase I and II test

140. Msg, (S) OONC O2525, COAMA to SAC, "Malmstrom Echo Flight Incident," 7 Aug 67, Ex 34.
141. Ibid., Ex 34.
142. Ibid., Ex 34.
programs analysis has been finalized and correlated with SAMSO's EMP tests results in a joint conference.

On 27 - 28 July 1967, OOMA conducted an engineering inspection at Malmstrom AFB of the interconnecting box, ESA panel, and missile away drawers at LCFs, Alpha 01 and Echo 01. The inspection found approximately 200 were checked. There were no set pattern of loose connections noted on SIN lines or Command lines. The interconnecting box was inspected for loose connections, arcing, burned areas, and tampering, with none discovered. Missiles away drawers involved in the incident were checked and found operation as designed. Thus no major problems were uncovered.

MISSILE INCIDENTS—Echo Flight Testing (EMP)

The direct relationship of EMP testing and Echo Flight Incident are intermixed, these EMP tests will be included in this section. (U)

SAMSO has been conducting EMP tests at Warren AFB, Wyo., but the results are unknown to this office. The tests made on Delta Flight were completed on all test objectives. SAMSO, with the completion of these tests, began EMP testing at the 564th

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1143. Msg, (S) CONG 02525, OOMA to SAC, "Malmstrom Echo Flight Incident," 7 Aug 67, Ex 34.

1144. Ibid., Ex 34.
SMS in October. (1)

These EMP tests by SAMSO and Boeing are to discover the weak spots in the different types of Minuteman configurations along the EMP field. When weak or faulty areas are found, ECPs are initiated to correct these discrepancies. (1)

On 28 September 1967, Sierra 39, 564th SMS, was depostured and turned over to Boeing for EMP tests. These tests will be conducted until about mid-January 1968. The primary reason for Boeing's EMP testing is to determine the effectiveness of the lightning protection equipment of the Real Property Installed Equipment (RPIE) at 564th SMS's IFS. Various voltages will be inserted into the site equipment from a test tie-in to simulate the effects of lightning strikes on the outside cable communications, ground electronics system and associated IF equipment. (2)

Later, on 22 October, SAMSO joined Boeing on these EMP tests at Sierra 39. (U)

A primary cause always associated with Echo Flight Incident has been connected with some type of adverse power affect. Tests have been conducted time and time again to determine this, but have always lead to a negative result. Boeing's testing at


146. Interview, ALC David B. Gamble, Wing Historian, with Lt. Col. Elliott Coldwater, Deputy Commander for Engineering, SAMSO, Det 29, on 7 Nov 67.

147. Ibid.
Sierra 39 is just another test to assure that the Wing VI configuration will not be affected by adverse electrical effects. (U)

A conference was held at Whiteman AFB, Kan., to review test data for a Force Mod EMP modification. The members of the conference agreed that the data indicated the proposed modification would be effective. A decision was made that additional testing would be required by Boeing to verify that specific frequencies were safe in Force Mod systems. These tests were completed in August 1967. (U)

Three major changes have resulted from EMP testing. Boeing has submitted ECPs, numbers 1221, 1141-1 and 1141-2, for the modification of EMP for Force Mod. Another change was a Facility Change Initiation Request (FCIR) Maintenance Change Letter (MCL) number 2827, not yet incorporated into the Force Mod systems. (U)

Presented next will be the changes to the EMP for Force Mod. Because of the complicated engineering terminology, a detailed explanation given by the Boeing Engineers will not be presented of the changes to the EMP. Changes will be presented in brief explanation given by the ECP. (U)

Boeing ECP 1221 will modify the interconnecting box by adding a major sub-assembly containing zener diodes, isolation


transformers, and common mode suppression transformers for each Sensitive Command Network (SCN) / Sensitive Information Network (SIN) circuit pair. (U)

Boeing ECP 114\(^1\) dash 1 modifies the cable assembly set (launcher) by revising wiring to provide protection to Voice Reporting Signal Assemble (VRSA) Channels 26 and 27. (U)

Boeing ECP 114\(^1\) dash 2 made another modification to the interconnecting box, by adding two isolation relays and reroutes wiring to connect relays into VRSA monitoring circuits. (U)

The FCIR, HCL will provide for alteration of sensing at RPIE and of monitor circuits to re-establish correlation of sensing and monitor reporting. (U)

**SUPPORT - Security**

Last quarter, the Wing's proposal for the removal of the Movement Security Alarm System of Re-entry vehicles G&C vans was agreed with by OOMA engineers. This proposal was sent to Headquarters, SAC for concurrence. (U)

Headquarters, SAC in a message to OOMA concurred with the Wing's proposal. It stated that the Movement Security System on

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VAZCCHNIAN761
PITSELUAN Runnmba 0011 2191538--- Runnmbca.
ZNY
P 07.15.072. AUG 67
FM OOANA HILL AFB UTAH
TO RUCSAA/SAC
INFO RUMBA/15AF MARCH AFB CALIF
RUNNBOA/54 STRAC SWG MALSTRON AFB MONT
RUNNBOA/STAF MALSTRON AFB MONT
RUNT KIA/AFL KIRTLAND AFB NMEX
SF 1-00 C0525 AUG 67
FG: DM7B INFO: SANSO (SMTG/SMTG/SMQ/SMTG/SMTG) 15AF (DM7B)
S41SMQ OSC FATAF (SACT) AND AFRL (MILR/CAT C/ICTOS)
SUBJECT: MALSTRON ECHO FLIGHT INCIDENT (U) REFERENCE SAC
DM7B 077999 25 JULY 1967 SAME SUBJECT
TESTS ARE BEING CONDUCTED AT HILL ENGINEERING TEST FACILITY (HETF)
TO DETERMINE C-53D LOGIC COUPLER VULNERABILITY TO EMP TYPE (NOISE)
PHASE I TESTS AT HETF HAVE BEEN COMPLETED. PHASE I TESTING CONSISTED OF A CORRELATION OF NOISE INPUTS ON THE C-53D COUPLER
INTERFACE TO SYSTEM NOISE RESPONSE. THE PRELIMINARY CONCLUSIONS OF PHASE I TESTING INDICATES THAT MINUTEMAN II -- V SYSTEM IS
VULNERABLE TO NOISE ON THE C-53D COUPLER INPUT INTERFACE LINES. FOUR
INPUT LINES IN THE C-53D ARE FOUND TO BE SUSCEPTIBLE TO INPUT NOISE
INJECION WHICH RESULTED IN A NON ECHO SYSTEM CONDITION. DETAILED
ANALYSIS HAS NOT BEEN FINALIZED TO DATE. COMPLETION EXPECTED WITHIN

PAGE 2 RUNNMBa 0011
30 DAYS
PHASE II TESTING AT THE HETF IS PRESENTLY BEING SCHEDULED TO BEGIN WITHIN
10 DAYS. THE PHASE II TESTING OBJECTIVE IS TO DETERMINE THE PERCENTAGE OF
COUPLING FROM THE INPUT OF THE ESA PANEL TO THE INTERFACE OF THE LOGIC
COUPLER.
THE PROBABILITY OF RECURRENCE OF THIS TYPE CANNOT BE DEFINED UNTIL SUCH
TIME AS OOANA PHASE I AND PHASE II TEST PROGRAM ANALYSIS HAVE BEEN
FALNNIZE AND CORRELATE WITH THE SANSO EMP TEST RESULTS IN A JOINT
CONFERENCE. REFERENCE PARAGRAPH 2 OF THE CHIEF'S CONFERENCE
REVIEWED THE TEST DATA FOR FORCE MOD EMP FIX. THE DATA INDICATED THAT THE
PROPOSED FIX WAS EFFECTIVE A DECISION WAS MADE THAT ADDITIONAL TESTING
WOULD BE REQUIRED BY BOEING (1 -- 1 WEEKS) TO VERIFY THAT SPECIFIC
FREQUENCIES WERE SAFE IN FORCE MOD SYSTEMS. THIS TEST SHOULD BE COMPLETED
BY 11 AUG 67. OOANA ENGINEERING INSPECTION AT MALSTRON AFB OF THE
INTERCONNECTING BOX AND ESA PANEL. MISSILE AWAY DRAWERS AT LCFS 4701 AND
E-01 ON 27-28 JULY 1967, ARE AS FOLLOWS: (1) INSPECTION INDICATED
APPROXIMATELY 5 PERCENT OF THE ESA TERMINALS CHECKED HAD LOOSE CONNECTIONS
A QUALITY CONTROL PROBLEM. APPROXIMATELY 200 WERE CHECKED. NO SET PATTERN
OF LOOSE CONNECTIONS NOTED ON SIN LINES OR COMMAND LINES. (2) INSPECTION
OF INTERCONNECTING BOX FOR LOOSE CONNECTIONS, ARCING, BURNED AREAS.
AND TAMPERING. NO ABNORMALITIES WERE NOTED. ( ) MISSILE AWAY.
DRAWERS INVOLVED IN THE INCIDENT WERE CHECKED AND FOUND OPERATING AS
DESIGNED. OCAMA ENGINEERING PERSONNEL ARE PARTICIPATING WITH SAMSO
PERSONNEL DURING THE EMP TEST PROGRAM PROVIDING TECHNICAL DIRECTION ON
WEAPON SYSTEM TYPE PROBLEMS AS REQUIRED.
EMP TESTS AT WARREN AFB ARE CONTINUING. TESTS AT "D" FLIGHT HAVE BEEN
COMPLETED AND THE TEST OBJECTIVES HAVE BEEN MET ADDITIONAL TESTS
ARE TO BE CONDUCTED AT A710 AND ARE SCHEDULED TO BE COMPLETED APPROX-
IMATELY 15 OCT 1967. SQUADRON 20 TESTS ARE SCHEDULED TO BEGIN APPROX-
IMATELY 12 OCT 1967 DEPENDING ON END DATE OF M74 TESTING.
THIS HEADQUARTERS WILL CONTINUE TO ADVISE YOU OF OCAMA'S TEST PROGRAM
AS TEST RESULTS AND FINDINGS ARE IDENTIFIED. OP74.
**ENGINEERING CHANGE PROPOSAL**

**MODEL OR TYPE DESIGNATION**

<table>
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<th>Model or Type Designation</th>
<th>Part No.</th>
<th>Part Description</th>
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<tr>
<td>Figure A 1377, 1377M</td>
<td>81205</td>
<td>Interconnecting Box</td>
<td>6225, 1221T</td>
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**CONTRACTOR'S RECOMMENDED PRIORITY**

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<tr>
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**NAME OF PART OR COMPLETE ASSEMBLY AFFECTED**

See Line 6

**PART NO. **

See Page 3

**PART NO. **

See Page 3

**TITLE OF CHANGE**

HIC EM Pulse Suppressor

**DESCRIPTION OF CHANGE**

This ECP will provide for Weapon System implementation of a cost-effective HIC EM Pulse Fix, a study of which was accomplished under CCP B170, the preliminary design of which was developed under CCP B123, and which will be tested at an operational site under CCP B1185.

This effort will include the following specific objectives:

A. Formalize Form B's, Form C's, and Figure A Technical Requirements based on the preliminary SPA and Design Requirements for HIC EM Pulse Suppressor.

**DEVELOPMENTAL REQUIREMENTS**

See Line 6

**ALTERNATIVE SOLUTIONS**

None

**PRODUCTION EFFECTIVITY**

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**RECOMMENDATIONS FOR REORDER**

To update delivered hardware.

**RETROACTIVE EFFECTIVITY**

X | YES | NO
**ANALYSIS REVISION NOTICE**

<table>
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<tr>
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<th>L. Proffitt</th>
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<tr>
<td>E. A. Melick</td>
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<td>Interconnecting Boxes, Fig. A 1377M</td>
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**ACTION AND REASON**

Approval of this ARN will not result in a change to the revision code letter.

**ACTION**

1. Revise the second sentence of paragraph I.F. to read:

   "Requirements shall be met when the input is a 0 to 2200 volt pulse with a rise time of from 1 to 225 microseconds and the volt-time integral is the integral of the pulse shape described in DZ-18148 -4(S) dated 22 August, 1967."

2. Revise paragraph II.H to read:

   "H.1 To limit voltage pulses at the output of the I-Box to values described in paragraphs I.F.1 and I.F.2, a suppression assembly containing an isolation type transformer, Zener diodes and common mode rejection coil will be connected in each Command, HVC, and 494L circuit. For each SIN circuit, a suppression assembly similar to the Command line assembly will be provided that contains an inductor wired between the primary and secondary winding center taps of the isolation transformer for the Missile Away signal path."

   "H.2 Degradation of operational message reliability on lines noted resulting from functioning of the noise suppression assembly will be prevented by selection of components to limit the additional circuit inductance to be compatible with existing communication specifications."

   "H.3 Introduction of unacceptable noise and signal degradation on other lines in the I-Box during functioning of the suppression assembly will be prevented by design of the input bundle assembly which assures that its shields are tied as closely as practicable to the outer shield of the input cable."

   "H.4 Components shall be selected to accept the energy specified in paragraph I.F.5-without degradation."

3. Revise Identification Spec. notation, sheet 3, to read:

   "See Identification Spec: S-133-111-1-100 (Wings I-V)
   S-133-111-1-145 (Wings IM-VM)"

**REASON**

To add revisions reviewed at ECP 1221/1141 In-Process Review dated 10/13/67. (See ARN MA-339 for ECP 1141 revisions.)

---

**Boeing**

Sh. 1 of 1
ACTION REVISION NOTICE

ORIGINATOR:
J. J. Wikert

SUBMITAL DATE:
10-24-57

EFFECTIVE:
VAFB LF's 02, 03, 06, 07 & 09

CONTRACTOR APPROVAL:
W. A. Shook

SSO, STL APPROVAL

REF. NO:
1221

VOLUME TITLE:
Operational Ground Equipment

Unmodernized VAFB Supplement D2-12130 Vol. II

FORM DWG. TITLE:
Figure A 1377.1 Rev. D 4-7-66

Interconnecting Boxes (Various)

ACTION AND REASON

Approval of this change will result in a change to the Figure A revision code.

ACTION

1. Revise first sentence I. B. to read as follows:

"I. B. A method of connecting signals transmitted between the Launcher Support Building and the launchers via the Cable Assembly Set, launcher (Figure A 1248.1)"

2. Revise Technical Requirement I. D. to read as follows:

"I. D. A method of mating the unique signals of the Cable System Pressurized, Hardened, SCN (Figure A 1339 or Figure A 5032M) to the site common signals of the Cable Assembly Set, Launcher (Figure A 1248.1)"

3. Add Technical Requirement I. E. as follows:

"I. E. Means shall be provided which shall meet the requirements listed below. Requirements shall be met when the input is a 0 to 2200 volt pulse with a rise time of from 1 to 225 microseconds and the voltage integral is the integral of the pulse shape described in D2-18148-4(S) dated 22 August, 1967."

The following HICS lines are referred to:
Command
SIN
HVC (where applicable)

Requirements:

1. The Common mode (line to equipment chassis) voltage envelope on any line (listed above) at the output of the Interconnecting Box shall have a peak value of 600 volts if no sharp discharge occurs at the input. If a sharp discharge occurs at the input the voltage output shall not have a sharp discharge which is greater than 50 volts amplitude, nor shall the voltage output exceed the envelope defined by:

\[ V(t) = \pm 100 \exp(-0.7t) \] volts

\[ f = \text{frequency (Hz)} \]

\[ t = \text{time (sec.)} \]
ANALYSIS REVISION NOTICE

ORIGINATOR: J. J. Wikert

SUBMITTAL DATE: 10-24-67

EFFECTIVITY: VAFB LF's 02, 03, 06, 07&09

CONTRACTOR APPROVAL: DSO, STL APPROVAL

W. A. Snook

ECP REF. NO: 1221

VOLUME TITLE: Operational Ground Equipment

Unmodernized VAFB Supplement D2-12130, Vol. II

FORM ORG. TITLE: Figure A 1377.1 Rev. D, 4-7-66

Interconnecting Boxes (Various)

No.: 1377.1

SHT. NO.: 1 & 2

ACTION AND REASON

3. Add Technical Requirement I.E. as follows: (Cont'd)

2. The signal mode (line to line) voltage envelope on any line pair (listed above) at the output of the Interconnecting Box shall have a peak value of 600 v maximum, and shall not exceed the limits defined by:

\[ V(t) = 600 e^{-7t} \text{ volts} \]

3. Degradation of operational message reliability on the lines noted resulting from functioning of the noise suppression means shall not exceed allowable tolerances in existing communication system specifications.

4. Functioning of the noise suppression means on the lines listed above shall not introduce unacceptable noise nor degrade signals on other lines through the I-Box that do not have noise suppression means.

5. The means shall be capable of accepting at least .25 watt-second of energy in from 1 to 1000 microseconds without degradation.

4. Add Recommended Solution II.G, as follows:

"G. 1, To limit voltage pulses at the output of the I-Box to values described in paragraphs I.E. 1 and I.E. 2, a suppression assembly containing an isolation type transformer, zener diodes and common mode rejection coil will be connected in each command and HVC, circuit. For each SIN circuit, a suppression assembly similar to the command line assembly will be provided that contains an inductor wired between the primary and secondary winding center taps of the isolation transformer for the Missile Away signal path."

"G. 2, Degradation of operational message reliability on lines noted resulting from functioning of the noise suppression assembly will be prevented by selection of components to limit the additional circuit inductance to be compatible with existing communication specifications."

"G. 3, Introduction of unacceptable noise and signal degradation on other lines in the I-Box during functioning of the suppression assembly will be prevented by design of the input bundle assembly which assures that its shields are tied as closely as practicable to the outer shield of the input cable."

"G. 4, Components shall be selected to accept the energy specified in paragraph I.E. 5 without degradation."

REASON

To add revisions reviewed at ECP 1221/1141 In-Process Review dated 10/13/67.
## ACTION AND REASON

Approval of this ARN will result in a change to the revision code letter.

### ACTION

1. Revise the second sentence of paragraph I.F. to read:

   "Requirements shall be met when the input is a 0 to 2200 volt pulse with a rise time of from 1 to 225 microseconds and the volt-time integral is the integral of the pulse shape described in D2-18148-4(S) dated 22 August, 1967."

2. Revise paragraph II.H to read:

   "H.1, To limit voltage pulses at the output of the I-Box to values described in paragraphs I.F.1 and I.F.2, a suppression assembly containing an isolation type transformer, zener diodes and common mode rejection coil will be connected in each command, HVC, and 494L circuit. For each SIN circuit, a suppression assembly similar to the command line assembly will be provided that contains an inductor wired between the primary and secondary winding center taps of the isolation transformer for the Missile Away signal path."

   "H.2, Degradation of operational message reliability on lines noted resulting from functioning of the noise suppression assembly will be prevented by selection of components to limit the additional circuit inductance to be compatible with existing communication specifications."

   "H.3, Introduction of unacceptable noise and signal degradation on other lines in the I-Box during functioning of the suppression assembly will be prevented by design of the input bundle assembly which assures that its shields are tied as closely as practicable to the outer shield of the input cable."

   "H.4, Components shall be selected to accept the energy specified in paragraph I.F.5 without degradation."

### REASON

To add revisions reviewed at ECP 1221/1141 In-Process Review dated 10/13/67.
B. Provide detail engineering design, specifications and documentation for modifying Figure A's 1377 and 1377M - Interconnecting (I) Box. This modification will consist of the addition of sub-assemblies within the existing I-Box. One sub-assembly will contain zener diodes, isolation transformers and common mode rejection coils for each SCN/SDN, LIPL and Status line CIRCUIT PAIRS mounted on a sheet metal bracket and electrically connected by means of a separate wire bundle. The existing wire bundle in the I-Box will also be modified. When a site has operational Hardened Voice Channel (HVC) circuits connected for use, a second sub-assembly using zener diodes, isolation transformer and common mode rejection coils will be added.

Note: This change for Figure A 1377 and 1377M is as follows:

- Figure A 1377 (Wings III, V, VAFA, HETF and CAFB) for inclusion of accommodation of EMP protection for SCN/SDN, Hardened Voice Channel (HVC) and Status lines.
- Figure A 1377M (Wings I, II, IV, VAFA, STP III, NFA and EDL) for SCN/SDN, HVC and IPL.

C. Provide special tools required for Figure A's 1377 and 1377M kit installation and checkout in the field.

D. This ECP will provide a Wing IV Type Figure A 1377M Interconnecting Box for STP III.

E. Fabricate production prototypes and provide kits and engineering for EDL and NFA/STP III evaluation. Additional Qualification Tests are not recommended.

F. Identify weight change to the Figure A's 1377 and 1377M Interconnecting Box.

G. Revise ACQ 6359 and ACQ 8302 documentation to allow physical and electrical connection with the revised Figure A's 1377 and 1377M Interconnecting Box.

H. This ECP 1221 change shall be incorporated concurrently with ECP 1141.

I. Analysis Revision Notices for Figure A's 1377M, 1377.1 and 1377MV are submitted herewith for approval.
Line 7 - JUSTIFICATION FOR CHANGE: (Continued from Page 1)

B. If this change is not incorporated, operational status of MS-137A-M is jeopardized under electrical disturbance environments.

C. Program Priority - Expedited handling to provide earliest possible incorporation at Wing I F/%.

D. Failure data is not applicable.

E. End Item Reliability:
   There are no Contractual Requirements for the Figure A's 1377 & 1377M; a reliability estimate will be prepared as part of the In-Process Review.

Line 12 - RECOMMENDATIONS FOR RETROFIT: (Continued from Page 1)

This ECP does not require Contractor installation of this change.
Notwithstanding this fact, it is recommended that Contractor accomplish the installation effort.

Kit validation for the Wing I version and the Wings II through V modernized version to be accomplished at STP III. TCTO Verification and Kit Proofing is not recommended.

Line 13 - TCTO REQUIRED: (Continued from Page 1)

Prepare Form 1183 and coordinate with affected Air Force Organization.
Prepare Record Type Time Compliance Technical Order No. 21X-L2030-503
for Figure A's 1377 and 1377M under contract AF14-0(04)-8% in accordance with MIL-T-9535A, dated 31 December 1964.

Lines 16, 17, 18, 19, 20:

All items that are not checked (x) are not affected.

Line 17 - TARGETING PARAMETERS: (Continued from Page 2)

Targeting Parameters are not affected.
Line 18 - MAINTENANCE PROCEDURES: (Continued from Page 2)

In accordance with the requirements of EOD 69-52 Maintenance Analysis Form C/C's will be revised for Figure A's 1377M, 1377.1 and 1377MV. Revision will be for organizational and field level and depot Form C/C's.

'Zero' Indenture Form C's will be revised to support in Process Design Review in lieu of CDR and PDR.

The revised Maintenance Analysis for Figure A 1377M, will be reviewed and Air Force Specialty Codes, Team Codes and Task Proficiency Level Codes will be established or revised as required for the Personnel Data and Personnel Information section's.

Develop maintainability criteria for the revised Figure A's 1377M, 1377.1 and 1377MV.

Prepare a maintainability presentation for Process Design Review.

Line 18 - OVERHAUL/REWORK METHODS: (Continued from Page 2)

Depot tooling is not affected.

Line 18 - NOMENCLATURE: (Continued from Page 2)

Revised Nomenclature will be requested for the Figure A's 1377 and 1377M.

Line 18 - SPARE PARTS EXHIBIT: (Continued from Page 2)

The priced Spare Parts Exhibit will be affected by this change.

Line 18 - INTERCHANGEABILITY: (Continued from Page 2)

Interchangeability is affected by this change.

Line 19 - TRAINERS: (Continued from Page 2)

For the T-11 Trainer see the attached Training Equipment Supplement.
### Line 19 - DATA/PUBLICATIONS: (Continued from Page 2)

**T.O.'s Affected:**

**Contract TED:**

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<td>LAUNCH FACILITY &amp; LAUNCH CONTROL FACILITY</td>
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<td>21M-LOM30A-4-1</td>
<td>LOM30A/B WEAPON SYSTEM ILLUSTRATED PARTS BREAKOUT</td>
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<td>LOM30A/B/F W.S. - CTL ILLUSTRATED PARTS BREAKOUT</td>
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### Line 20 - INTERFACE: (Continued from Page 2)

ICMGA 8420 records the interface effect on Boeing and Bendix equipment and interface documents. R

### Line 22 - DEVELOPMENT STATUS: (Continued from Page 2)

Conduct of In-Process Review in lieu of FDR, CDR or Data package submittal is recommended. Technical approval at the In-Process Review shall constitute approval for the contractor to proceed with subsequent effort.

First Article Configuration Inspection (FACI) and Team Acceptance Review (TAR) are not recommended.
ENGINEERING
CHANGE PROPOSAL

1. See Dash No's
2. CONSTRUCTION - THIS PROPOSAL IS
   NOT COVERED (Y) UNLESS INCLUDED IN
   COMPLIANCE WITH Ctrl Spec

3. NAME OF PARTY FURNISHING EFFORT
   DESCRIPTION OF EFFORT

4. See Dash No's
5. SEE CHART

6. BACKGROUNDS:
   1. In response to ORM direction Contractor conducted studies of
      Launch Facility vulnerability from the Aft Support Building (ORME Project
      Control Number 234-1-106, WIP #052-923-500). These studies led to
      ORM direction, via letter ORM20 dated 11 February 1968, that an ECF
      be submitted.

   2. Contractor's response, letter 2-1102-06-079, was submitted 16 May 1968.

   (Continued on Page 3)

7. To prevent equipment damage and/or
   failure from overvoltages below 3000
   volts. If this change is not
   incorporated the monitor lines for 2441
   channels 26 and 27 will not be protected
   against overvoltages below 3000 volts.

8. See Dash No's
9. See Dash No's
10. See Dash No's
11. See Dash No's
12. See Dash No's
ANALYSIS REVISION NOTICE

Approval of this change will result in a change to the Figure A revision code.

ACTION

1. Add the following technical requirement to paragraph 1.B.
   "VRSA monitor lines for equipment in the Launcher Support Building require a means to prevent equipment damage to the Programmer Group (Figure A 1201) from overvoltages up to 2000 volts:"

2. Add the following recommended solution to Part II:
   "Isolation relays will be provided in the monitor lines for VRSA channels 26 and 27 to prevent equipment damage to the Programmer Group (Figure A 1201) due to overvoltages below 2000 volts."

REASON

OONMA/OONEO letter dated Feb. 11, 1966, directed that an ECP be submitted. The ECP is to prevent Launch Facility vulnerability from the support building. VRSA channels 26 and 27 are used to monitor equipment in the support building and overvoltage protection is not presently provided for overvoltages under 2000 volts.
I. Publication Affected by this Change: (Continued)

T.O. Numbers:

**Contract 740**:

21M-LM308-2-31-3 LF & LCF INTRASITE CABLING (WING VI ONLY)
21M-LM308-2-31-4 LF & LCF INTRASITE CABLING (WING V ONLY)
21M-LM308-3-1 LM30A/B WEAPON SYSTEM ILLUSTRATED PARTS BREAKDOWN.

Pursuant to Part I, Item 8.3 of Contract AF34(624)-740, changes and/or revisions to the above Technical Orders to incorporate the effects of this SCP will be accomplished within the scope of basic Contract 740. Issuance of a CCB Directive for this SCP shall constitute authority for incorporation of effects of this change in the affected Technical Manuals.

J. This change can be implemented with no interface effect on Associate Contractor equipment, drawings or documentation.

K. Items in lines 16, 17, 18, 19 and 20 which are not checked (x) are not affected.

L. Neither hardware reliability nor the reliability contractual statement is affected by this change.

M. Contractor proposes to conduct a kit verification at ITP III. This will avoid a delay in the delivery of operational kits expected to result from a kit proofing.
Provide Protection for Monitor Lines for VAS Controls 26 and 27

DESCRIPTION OF CHANGE

A. This change will require the revision of the following schematic drawings to change the nomenclature on cabling affected:

- 21-52047
- 21-52057
- 21-52077
- 21-52087
- 21-53407
- 21-53417

B. Figure A 1248 hardware will not be affected.

C. Interchangeability: The functional interchangeability of the Figure A 1248 cabling will not be affected by this change.

D. Items in lines 16, 17, 18, 19 and 20 which are not checked (x) are not affected.

MATERIAL REQUIREMENTS

See ECP 11412:

DEVELOPMENTAL REQUIREMENTS

None, the development of Figure A 1248 has been completed.

ALTERNATIVE SOLUTIONS

None

PRODUCTION EFFECTIVITY

ESTIMATED EFFECTIVE CHANGE IN ITS & ITM:

See ECP 11412 page

RECOMMENDATIONS FOR IMTP:

N/A

REACTIVE EFFECTIVITY

N/A
Provide Protection for Monitor Lines for VASA Channels 26 and 27

**Description of Change**

A. This change will add (2) two isolation relays to the Interconnecting Box and reroute the wiring so as to connect these relays into the VASA-monitoring circuits.

B. The MCL for the "Phase Two" power fix will alter the sensing at the RTHE end of the monitoring circuits to re-establish the correlation of sensing and monitor reporting as defined under ECP 857 10.

C. Interchangeability: The configuration of the Figure A 1377 Interconnecting Box resulting from this change will not be interchangeable with prior configurations of the item.

D. Items in lines 16, 17, 18, 19, and 20 which are not checked (X) are not affected.
<table>
<thead>
<tr>
<th>MCI No.</th>
<th>ATTACHMENT A1</th>
<th>MFG Code</th>
<th>SYSTEM DESIGNATION</th>
<th>FCP No.</th>
<th>TYPE</th>
<th>REV.</th>
<th>CHANGE</th>
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</thead>
<tbody>
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<td></td>
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</tbody>
</table>

**CONTRACTOR'S RECOMMENDED PRIORITY**

<table>
<thead>
<tr>
<th>EMERGENCY</th>
<th>URGENT</th>
<th>ROUTINE</th>
<th>COMPATIBILITY</th>
</tr>
</thead>
</table>

**NAME OF PART OR LOWEST ASSEMBLY AFFECTED**

- Launch Facility
- Launch Facility Support Building

**TIME OF CHANGE**

- DC Supply for Isolation Relays - VRSA Channels 26 and 27 (LF)

**DESCRIPTION OF CHANGE**

Provide DC supply for the isolation relays being installed in VRSA channels 26 and 27 per ECP 1141. A typical DC supply circuit for these relays is shown on Attachment A Sketch 1.

**ADDITIONAL DESCRIPTION:**

Instructions for retest of VRSA Channels 26 and 27 and for personnel and weapon system safety will be required.

**JUSTIFICATION FOR CHANGE**

The isolation relays are being installed in VRSA channels 26 and 27 per ECP 1141. The DC power required for these relays is to be supplied from the RPIE power system. This FCIR initiates the required RPIE change.

**DEVELOPMENTAL REQUIREMENTS**

- N/A

**ALTERNATIVE SOLUTIONS**

No alternate solutions are considered feasible.

**RECOMMENDED PRODUCTION EFFECTIVITY**

- N/A

**ESTIMATED COST FOR CHANGE IN PRODUCTION**

- N/A

**RECOMMENDATIONS FOR RETROFIT**

Retrofit required to provide wiring changes for isolation relays to be installed by ECP 1141.

**AVAILABILITY AND SERVICEABILITY**

- VAFB, LF's 02-09; MAFB, EAFB, MTAFB, WAFB, FEMAFB - All Flights
- HETF, LFSB

**MOCUP AFFECTED**

- Yes [X] No
Item 16 - EFFECT ON OPERATIONAL EMPLOYMENT

Service Life

This change, together with the associated ECP 1141, will improve service life of the VHSA channels 26 and 27 by protecting them from damage by overvoltages below 2000 volts.

Item 19 - EFFECT ON LOGISTIC SUPPORT MATERIALS

Data/Publications

<table>
<thead>
<tr>
<th>SAC-CEM</th>
<th>VAFB (WG. I,II)</th>
<th>VAFB (WG III,IV)</th>
<th>MAFB</th>
<th>EAFB</th>
<th>MTAFB</th>
<th>WAFB</th>
<th>FEAFB</th>
</tr>
</thead>
<tbody>
<tr>
<td>21-SNJ30A-2-21</td>
<td>-1</td>
<td>-2</td>
<td></td>
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<td>Power Generation and Distribution</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>21-SNJ30B-2-21</td>
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<td>-1</td>
<td>-2</td>
<td>-3</td>
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</tbody>
</table>

Item 20 - OTHER CONSIDERATIONS

Interface

This is a companion facility change to Boeing ECP 1141. ICWGA 8026 records required action steps.
MINUTEMAN FACILITY CHANGE INITIATION REQUEST

MCL NO. 2827  DATE ____________  FECP NO. 528

<table>
<thead>
<tr>
<th>ORIGINATOR AND SERIAL NO.</th>
<th>DATE PREPARED</th>
<th>NEED DATE</th>
<th>INTERFACE AFFECTED</th>
</tr>
</thead>
</table>

SUBJECT
DC Supply for Isolation Relays - VRSA Channels 26 and 27 (LF)

DESCRIPTION OF CHANGE
Provide DC supply for the isolation relays being installed in VRSA channels 26 and 27 per ECP 1141. A typical DC supply circuit for these relays is shown on Sketch 1.

JUSTIFICATION
The isolation relays are being installed in VRSA channels 26 and 27 per ECP 1141. The DC power required for these relays is to be supplied from the RPIE power system. This FCIR initiates the required RPIE change.

ESTIMATED COST
4 % at $11 = $44
Mat' l = 1
TOTAL = $44

DOCUMENTS AFFECTED

<table>
<thead>
<tr>
<th>DRAWINGS</th>
<th>SPECIFICATIONS</th>
<th>MASTER EQUIPMENT LIST</th>
<th>MANUAls</th>
<th>FIG. A AND FORM C</th>
<th>OTHER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wing I</td>
<td>Wing II</td>
<td>Wing III</td>
<td>Wing V</td>
<td>Fig. A 1377 and 1329</td>
<td>ICHRA 8026</td>
</tr>
</tbody>
</table>

RECOMMENDED EFFECTIVITY

<table>
<thead>
<tr>
<th>BASE CONSTR. PHASE</th>
<th>A &amp; C PHASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wing I</td>
<td>All LFs</td>
</tr>
<tr>
<td>Wing II</td>
<td>All LFs</td>
</tr>
<tr>
<td>Wing III</td>
<td>All LFs</td>
</tr>
<tr>
<td>Wing V</td>
<td>All LFs</td>
</tr>
<tr>
<td>VAFB</td>
<td>All W133A LFs</td>
</tr>
<tr>
<td>HETF</td>
<td>W133A LF</td>
</tr>
<tr>
<td>Wing IV</td>
<td>All LFs</td>
</tr>
</tbody>
</table>
3. The proposed facility change as designated by the MCL number in Block I. above was reviewed at FWG meeting No. 90.

Action taken on this change was:

- [ ] Approved as written
- [x] Approved with following changes or comments

The FWG classified this FCIR for design action. A Routine priority FCIR 528 of November 1965 will be submitted to the CCB for final determination. Work with ECP 1141 and if approved accomplish concurrently.

- [ ] Sketches attached to change are adequate
- [x] Sketches will be provided by the A/E on TBD

4. Classification of change:
- [x] Class I
- [ ] Class II

6. Priority for change:
- [ ] Emergency
- [ ] Urgent
- [x] Routine

5. Interface affected:
- [x] Yes
- [ ] No

7. Estimated cost for change:
- Labor 4 man at $11 = $44
- Materials 1 FAC = $45/Fac

8. Facility area affected:
- [x] LF
- [ ] LCF

- [ ] SM/AB
- [ ] Other

9. Facility affected:
- LFSB

<table>
<thead>
<tr>
<th>Effectiveness for change</th>
<th>To be accomplished by</th>
<th>To be accomplished by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>Construction contractor</td>
<td>Assembly and checkout contractor</td>
</tr>
<tr>
<td>YAFB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WING I MAFB</td>
<td></td>
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<tr>
<td>WING II EAFB</td>
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<tr>
<td>WING III MAFB</td>
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<td></td>
</tr>
<tr>
<td>WING IV WAFB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WING V FEWAFB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WING VI GFAFB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SQDN 20 MAFB</td>
<td></td>
<td></td>
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<tr>
<td>ETF HAFB</td>
<td></td>
<td></td>
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<tr>
<td>YAFB</td>
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<tr>
<td>WING I MAFB</td>
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<td>WING III MAFB</td>
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<tr>
<td>WING IV WAFB</td>
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<td>WING V FEWAFB</td>
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<tr>
<td>WING VI GFAFB</td>
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<tr>
<td>ETF HAFB</td>
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</table>
HISTORY
OF
341ST STRATEGIC MISSILE WING
AND 341ST COMBAT SUPPORT GROUP
1 October 1967 to 31 December 1967
(Unclassified Title)
 Assigned to the
FIFTEENTH AIR FORCE, STRATEGIC AIR COMMAND
Permanently Stationed at
Malmstrom Air Force Base, Great Falls, Montana

William E. Napol
WILLIAM D. NAPTON, Sgt., USAF
Historian

John W. Carroll
JOHN W. CARROLL, Col., USAF
Wing Commander

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The remaining bank of batteries were removed from the LCF on 10 October and replaced with new batteries on 11 October. The LCF was examined and found to be in operational status and was brought back to alert status on 15 October. The investigation of the incident could not discover the cause of the incident, but it was believed to be a freak incident. 91

MISSILE INCIDENTS - Echo Flight Testing

In direct relation to the Echo Flight incident as covered in the April - June 1967 History of the 31st SW was the Electro Magnetic Pulse (EMP) testing conducted throughout the quarter. The EMP tests were conducted by SAMSO, later joined in the testing by the Boeing Company. The EMP tests by SAMSO and Boeing were to discover the weak spots in the different type of Minuteman configurations within the EMP field. Whenever a weak or faulty area was found, an ECP was to be initiated to correct the discrepancy, or eliminate it. 92

The EMP tests were conducted at IF Sierra-39 of the 56th SMS. The tests were scheduled to last until mid-January 1968, but could be extended if there were still apparent problem areas to investigate. The primary reason for the Boeing tests were to determine EMP affects on the Real Property Installed Equipment (RPIE) of the Minuteman sites. During the tests, various voltages of electricity were inserted into the equipment on the site to

91. Taken from the files of TAD, 2h Oct 67, by Sgt William D. Napton, Wing Historian.

92. Interview, Sgt William D. Napton, Wing Historia, with Lt. Col E. Coldwater, SATEE Engineer, 6 Feb 68.
simulate a lightening strike, and observe the effect of this situation on the various equipment.  

One of the primary theories of the Echo Flight incident was connected with some type of adverse power effect. All test conducted toward this end proved negative results. The EMP tests at Sierra-39 were considered to be the final series of tests in this area.

Personnel of the Air Force Special Weapons Command, Kirkland AFB, New Mexico, joined SAMSO and Boeing personnel in observing the EMP tests from 14 November through 15 December. The Sylvania Electronic Company also sent representatives to the site to discuss the field of lightening effects and EMP. Due to the interest generated by the EMP tests it was estimated they would be carried on into mid-1968.

SUPPORT - TRANSPORTATION

Kalmstrom had 696 vehicles authorized and 918 vehicles assigned during the quarter. Support of Force Modernization caused the overage in assigned vehicles. The average monthly mileage of the 310th TRNS alone was approximately 580,000 miles. Combined with the other units that were involved in vehicle transportation, the

---

93. Interview, Sgt William D. Napton, Wing Historian, with Lt. Col. E. Coldwater, SATAF Engineer, 6 Feb 68.
94. Ibid.
95. Ibid.
SUBJECT: WING 1 E FLIGHT INCIDENT

1. A TASK GROUP MEETING CONVENED AT OAKA ON 28 MARCH 1967, TO REVIEW THE RESULTS OF INVESTIGATION TO DATE. REPRESENTATIVES FROM BOEING COMPANY, AUTONETICS, OAKA, AND 15TH AF WERE REPRESENTED.

2. IT IS THE POSITION OF THE TASK GROUP THAT INSUFFICIENT DATA EXISTS.
TO RESOLVE THIS PROBLEM OR TO DEFINE THE PROPER ENGINEERING ANALYSIS TASKS WITHOUT ADDITIONAL TESTING A REVIEW OF AVAILABLE DATA STRONGLY SUGGESTS THIS TO BE A WING I MECHANICAL PROBLEM THE OOMA LF IS NOT A MECHANICAL FACILITY IT IS THEREFORE NECESSARY TO RUN THE PROPOSED TESTS AT MALSTROM PREFERABLY AT ECHO 6 IT IS CURRENTLY BELIEVED THAT FRUITFUL DATA WILL NOT EXIST UNTIL SUCH TIME AS THE NO-GO MODS CAN BE PRODUCED AT LEAST AT THE LF LEVEL.

3. THE FOLLOWING PLAN OF ACTION WAS AGREED UPON BY ALL REPRESENTATIVES DEVELOP A TEST PLAN WHICH, AFTER ISOLATING AN LF FROM THE SYSTEM, ALLOWS FOR THE APPLICATION OF STIMULUS WHICH WILL REPRODUCE THE NO-GO AT THE LF LEVEL AFTER ANALYSIS OF SUCH TEST DATA, PROCEEDING AS REQUIRED TO TEST FOR, ANALYZE AT THE LF LEVEL. THE TASK GROUP WILL CONVENE AT BOEING SEATTLE ON APRIL 4 TO DEVELOP A TEST PLAN AND PROCEDURES. SUCH PLAN WILL INCLUDE EQUIPMENT REQUIREMENTS, LF ISOLATION PROCEDURES, DEFINITE TESTS TO BE PERFORMED, AND BE REVIEWED FOR SAFETY. THE PLAN WILL RECEIVE CLEARANCE THROUGH CONE AND WILL BE COORDINATED WITH SAC AS REQUIRED COMPLETION DATE FOR THE PLAN IS AIMED AT MAY 5 1967 THE PLAN WILL BE DEVELOPED AND PROTOTYPED AT THE EMA FACILITY AT BOEING 4. ADDITIONAL INVESTIGATIVE ENGINEERING STUDIES ARE IN PROGRESS AND WILL CONTINUE. BOEING IS ATTEMPTING TO OBTAIN AN EXHIBIT 7KVA TRANSFORMER WHICH WAS REPORTED TO HAVE SHORTED A FEW HOURS AFTER THE INCIDENT A EARLY REPORT ON THE TRANSFORMER WILL BE DEVELOPED BY BOEING ENGINEERING DEPENDING UPON THE ANALYSIS OF THIS TRANSFORMER AND ITS FAIL MODE ADDITIONAL TESTS MAY BE REQUESTED SIMILAR TO THE POWER TESTS RUN ON MARCH 28 1967 AT MALSTROM WITH THE ADDED TRANSFORMER FAILURE ONE SIMULATION. YOU WILL BE FURTHER ADVISED WITH RESPECT TO THIS ACTIVITY.

5. CONCURRENCE IN THE USE OF ECHO 6 FOR TESTING OUTLINED IN PARA.
THREE (3) IS REQUESTED PLANNING FACTORS AT THIS TIME ARE FOR A PERIOD OF SIX WEEKS BEGINNING 15 MARY 1967 YOU WILL BE ADVISED ON ANY SHIFT IN THESE TARGET DATES GP 4.
VZC7ONIA76A
FTC 74JAZ1:5023 600-925-0-
ZNY 964-
7 996652 MAR 67
FN OCA/A KILL AFB UTAH
TO RUCSAAA/SAC
RUBKNA/15TH AF MARCH AFB CALIF
RUBKNA/341SMW MALMSTROM AFB MONT
RUBKNA/APP C THE BOEING CO SEATTLE WASH
RUBKNA/NORTH AMERICAN AVIATION AUTONETICS DIV ANAHEIM CALIF
INFO RUEFDIA/HDQRS AFLC WRIGHT-PATTERSON AFB OHIO
RUBABA/BSO NORTON AFB CALIF
6T
GONE 01012 MAR 67
FOR: SAC/DM75; DE: 15AF/DMAC; DE: 341 SH/DMC; BOEING (D.J.
DOWING-MINUTEMAN ENGINEERING); AUTONETICS/MR W.R. HEATH,
INFO: HDQRS AFLC WRIGHT-PATTERSON AFB OHIO (COL MORRISON); BSO/BSO,
BSGR; BSGM
SUBJECT: WING I, E FLIGHT INCIDENT
1. A TASK GROUP MEETING CONVENED AT OCA/A ON 23 MARCH 1967, TO
REVIEW THE RESULTS OF INVESTIGATION TO DATE. REPRESENTATIVES FROM
BOEING COMPANY, AUTONETICS, OCA/A, AND 15TH AF WERE REPRESENTED.
2. IT IS THE POSITION OF THE TASK GROUP THAT INSUFFICIENT DATA EXISTS

Page 1 of 2
TO RESOLVE THIS PROBLEM, OR TO DEFINITELY ADEQUATE ENGINEERING ANALYSIS
TASKS WITHOUT ADDITIONAL TESTING, A REVIEW OF AVAILABLE DATA STRONGLY
SUGGESTS THIS TO BE A WING I SPECULAR PROBLEM, THE OMAHA ETF IS NOT A
WING I FACILITY. IT IS, THEREFORE, NECESSARY TO RUN THE PROPOSED TESTS
AT MALSTROM, PREFERABLY AT ECHO 6. IT IS CURRENTLY BELIEVED THAT
FRUITFUL DATA WILL NOT EXIST UNTIL SUCH TIME AS THE NO-GO MODE CAN BE
REPRODUCED AT LEAST AT THE LP LEVEL.

3. THE FOLLOWING PLAN OF ACTION WAS AGREED UPON BY ALL REPRESENTATIVES.
DEVELOP A TEST PLAN WHICH, AFTER ISOLATING AN LF FROM THE SYSTEM, ALLOWS
FOR THE APPLICATION OF STICKY WHICH WILL REPRODUCE THE NO-GO AT THE LF
LEVEL. AFTER ANALYSIS OF SUCH TEST DATA, PROCEEDING AS REQUIRED TO TEST
OR ANALYZE AT THE LF LEVEL. THE TASK GROUP WILL CONVENE AT BOEING,
SEATTLE ON 4 APRIL TO DEVELOP A TEST PLAN AND PROCEDURES. SUCH PLAN
WILL INCLUDE EQUIPMENT REQUIREMENTS, LF ISOLATION PROCEDURES, DEFINE
TESTS TO BE PERFORMED, AND BE REVIEWED FOR SAFETY. THE PLAN WILL RECEIVE
SAFETY CLEARANCE THROUGH OCON, AND WILL BE COORDINATED WITH SAC AS
REQUIRED. COMPLETION DATE FOR THE PLAN IS AIMED AT 5 MAY 1967. THE
PLAN WILL BE DEVELOPED AND PROTOTYPED AT THE KRA FACILITY AT BOEING.

4. ADDITIONAL INVESTIGATIVE ENGINEERING STUDIES ARE IN PROCESS, AND
WILL CONTINUE. BORINS IS ATTEMPTING TO OBTAIN AN EXHIBIT 7KVA TRANS-
FORMER WHICH WAS REPORTED TO HAVE SHORTED A FEW HOURS AFTER THE
INCIDENT. A TRAVERSE REPORT ON THE TRANSFORMER WILL BE DEVELOPED BY
BORINS, BASED UPON THE ANALYSIS OF THIS TRANSFORMER,
AND ITS FAILURE MODE. ADDITIONAL TESTS MAY BE REQUESTED SIMILAR TO
THE POWER TESTS RUN ON 23 MARCH 1967, AT MALSTROM WITH THE ADDED
TRANSFORMER FAILURE CODE SIMULATOR. YOU WILL BE FURTHER ADVISED
WITH RESPECT TO THIS ACTIVITY.

5. CONCURRENCE. IN THE USE OF ECHO 6 FOR TESTING OUTLINED IN PARA
4.7 IS REQUESTED. PLANNING FACTORS AT THIS TIME ARE FOR A
PERIOD OF SIX WEEKS BEGINNING 15 MAY 1967. YOU WILL BE ADVISED OF
ANY SHIFT IN THESE TARGET DATES. 15-4.0.
HISTORY

341st STRATEGIC MISSILE WING
AND 341st COMBAT SUPPORT GROUP

1 January - 31 March 1968
(Unclassified Title)

CXIH-68-7

ASSIGNED TO
18th Strategic Aerospace Division, 15th Air Force, Strategic Air Command

STATIONED AT
Malmstrom Air Force Base, Great Falls, Montana

William D. Napier
Wing Historian

Carl A. Lohrey, Col
Colonel, USAF
Wing Commander

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there was a power transfer. Headquarters, 15th AF ordered a test to determine if the channel 20 was being caused by noise or a phase sequence problem. If phase relation was the problem, it could possibly damage both the motor generator and the C&G cooler compressor unit. The test was to cover such items as current draw, voltage drop and the phase relation between the primary power and the 206 volt, 60 hertz (cycles per second) motor generator output at the time of the power transfer. 86

(U) a testing on the MW channel 20 alarm and direct current to alternating current problem was held at S-345 Headquarters, Norton AFB, California, on 27 February. Field tests were required before any corrective action could be planned however. The 341st LCM and the Boeing Company conducted a joint study to determine the frequency of the channel 20 alarms by site, and by date, with all related material. The tests were begun in late February and continued through to the end of the quarter. 87

MODIFICATION - EMP TESTING

(U) In direct relation to an incident covered in the April-June 1967 history of the 341st S.M. was the Electro-Magnetic Pulse

86. Msg, dtg 221500Z, 15AF(UM75) to 341SHW(UUM), subj: Channel 20, 22 Jan 68.

87. Msg, dtg 282326Z, SAA50 to 341SHW(LCM), subj: MW channel 20 and DC to AC Power Transfer Problem, 28 Feb 68.
(EMP) testing conducted by SASEC, the Boeing Company and the 341st
SKW at site Sierra-39 of the 564th SNS. The original tests were
terminated on 9 January, and the site was returned to the Wing.
Due to a G&C change, the site did not resume alert posture
until 14 January.

(U) Two Time Compliance Technical Orders (T.C.T.O.) came
from the EMP testing. One was for the addition of EMP pulse suppres-
sion to LF interconnecting boxes to eliminate the effect of
noise generated by electrical discharge type pulses in the Hard-
ened Intersite Cables. The second was the addition of VES monitor
line protection relays to the interconnecting boxes to pre-
vent equipment damage and/or failure from overvoltages below
2000 volts. The two T.C.T.O.s were to accomplished concurrently.
The second of the T.C.T.O.s was not released until 27 March, and
work was not started by the end of the quarter.

(U) A Summer-68 EMP program was scheduled to begin 1 April
at site India-6 of the 12th SNS. However, due to contractual pro-
blems associated with the test program, the start of the program slipped to 1 June 1968. The program was to last for
one year.

86. 1tr, 341SKW(LCM) to 15AP(LCM), subj: Unit Progress, 31 Jan
68. Ex 26.

89. Publication, "Minuteman Service News", Issue 36, Jan-Feb 68.

90. Msg, dtg 16233Z, SAC(UFLD) to 341SKW(LCM), subj: Summer EMP
Program, 16 Feb 68.
DEPARTMENT OF THE AIR FORCE

Headquarters 341st Strategic Missile Wing (SAC)
Malmstrom Air Force Base, Montana, 59402

Bell M 31 January 1968

BCRM

Unit Progress Report (RCS: SAC-U89)
SAC Programming Plan 12-66, LGM 30F (Minuteman) Force Modernization
Program, Malmstrom AFB
Month Ending 31 January 1968

15AF (DCR)

1. Commander's Comments: The LGM 30F (Minuteman) Force Modernization
Program is on schedule in the 341st Strategic Missile Wing.

2. Status Summaries:

   a. Personnel: All tasks will be accomplished on schedule.

   b. Operations and Training: All tasks will be accomplished on schedule.

   c. Communications: All tasks will be accomplished on schedule.

   d. Maintenance:

      (1) Training:

      (a) The programmed ATC formal technical retraining of
      twenty officers and two hundred and seventy-eight technicians in Force
      Modernization (WS133A-M System) is on schedule. During January,
      two ATC Travel Team Courses were completed. Forty members completed
      Course ADF 44370G-4 (Missile Maint. Technician/A-M) and forty
      officers and key noncommissioned officers completed Course ODF 3124G-2
      (WS133A-M Supervisors' and Planners familiarization course). The
      completions of Travel Team Courses included thirty personnel who were
      not originally scheduled in the program. During this report period, the
      inputs into ATC technical courses at Chanute AFB were resumed, after a
      scheduled "break" for Christmas and New Year holidays. Eight members
      departed for Course AZR 31670G-3, Ms1 analyst, (Targeting) A-M; three
      to Course AZR 31672G, Electronics Technician; four to Course AZR 31670G
      -4, Ms1 Analyst (TEAT) A-M and one officer entered training in Course
      OZR 2825-4; TEAT Officer, A-M. As of 31 Jan 68, 248 members of the
      341SMW had completed their technical retraining for maintenance support
      of the Force Modernized flight.
(b) The program to provide the initial Force Modernization retrained mobile teams has been completed, as previously reported. As of 31 January 1968, the 341SMW expects to have fifteen electro-mechanical teams, eight missile maintenance teams and eight combat targeting teams Force Modernization retrained. The on-base launch facility trainer has continued to be used effectively for training of missile maintenance teams and combat targeting teams. Site India - 10 was approved as the 341SMW off-base Electro-Mechanical Team trainer during January. It will be utilized to the maximum possible extent to assure an optimum capability in the EMT support area. The on-base LF trainer was converted to the WS133-B configuration on 5 Jan 68, to fulfill the immediate training needs for Wing VI mobile teams.

(c) The T-20 Control Monitor Trainer has been removed from the On-Base LF Trainer for necessary modifications. It is at the Autonetics Company, McAlester, Okla. The training tasks which would normally require the equipment are being accomplished at the Classroom Control Monitor Trainer, T-19, located in the 341MIMS Hangar. No problems are anticipated in fulfilling our training requirements.

(d) The T-15 Control Monitor Trainer, applicable to WS133B (Wing VI) training, is at the Autonetics Company, Anaheim, California, being modified. It is scheduled for return to Malmstrom AFB by 27 Jun 68.

(e) The WS133A (Wing I) off-base launch facility trainer, Alpha - 11, will be continued as a proficiency trainer and team evaluation facility, until Mar 68. After that date, training and evaluations for WS133A mobile maintenance teams will be accomplished in conjunction with EWO dispatches.

(2) Program:

(a) Golf Flight at 341SMW is scheduled to be repostured on 26 Jan 68.

(b) Juliet Flight is scheduled to be depostured on 30 and 31 Jan 68.

(c) The Electro-Magnetic Pulse (EMP) Lightning Test on Site Sierra - 39 was completed and the site returned to SAC on 9 Jan 68. Posturing of the site began on 10 Jan 68; however, due to a Guidance and Control Package problem, posturing was not completed until 14 Jan 68.
(d) The Flight Command, Interrogation and Status Test
Demonstration M2-1, Security System, Power System, SIN and VRSA Tests
Demonstration M2-2 and Launch and Launch Enable System Test Demon-
stration M2-3 were scheduled for accomplishment at Site Golf - 1 on 20
and 22 Jan 68.

e. Facilities:

(1) "In-House" work on removal of obstacles for helicopter landing
pads has been discontinued because of snow and cold weather. Resumption
of this work at C-7 is tentatively scheduled for 7 February 1968. Work also
remains to be accomplished at C-3 and N-4. Obstacle removal has been
completed at G-9, D-3, N-1, C-1 and N-10.

(2) Drafting of the helicopter landing approach plates for Launch
facilities has been temporarily discontinued at the suggestion of Head-
quarters 15th Air Force, with 75% completion, until they determine standard
criteria for these plates for all missile bases. Currently available approach
plates are adequate for interim operational use.

3. Soft Spots: None

4. Problems/Deficiencies Requiring Higher Headquarters Action: None

JOHN W CARROLL, Colonel, USAF
Commander

Copies to: I8AD(DEXO)-3, C-2, DCO-6
DCM-4, DS-1, MS-1, BC-2,
BP-2, BCE-2, CSUP-2, BSV-1,
BO-2, BCR-1, TSC-1, CXI-4,
DCA-1