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OPERATION DOMINIC
 PHASE I
 FINAL REPORT
 JTU 8.4.4

Exempt from Declassification under LAW E.O. 12958
 Reviewed by Stephen F. [REDACTED] PL/HO
 [REDACTED] 87
 Sign/Date [Signature]

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DECLASSIFIED WITH DELETIONS
 Authority EO 12958, as amended
 DOE 2006 DDOO 749-GB
 Air Force 14CS/SCSL #01-MDR-037
 DTRA [Signature] Date 18 Dec 2007

DISTRIBUTION STATEMENT A
 APPLIES PER NTPR REVIEW.
[Signature] DATE 18 Dec 2007

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Report Documentation Page

Form Approved
OMB No. 0704-0188

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1. REPORT DATE AUG 1962	2. REPORT TYPE Final	3. DATES COVERED 01 MAR 1962 - 31 JUL 1962			
4. TITLE AND SUBTITLE Operation Dominic Phase I Final Report JTU 8.4.4		5a. CONTRACT NUMBER			
		5b. GRANT NUMBER			
		5c. PROGRAM ELEMENT NUMBER			
6. AUTHOR(S)		5d. PROJECT NUMBER			
		5e. TASK NUMBER			
		5f. WORK UNIT NUMBER			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) United States Air Force Joint Task Unit 8.4.4		8. PERFORMING ORGANIZATION REPORT NUMBER			
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S)			
		11. SPONSOR/MONITOR'S REPORT NUMBER(S)			
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release, distribution unlimited					
13. SUPPLEMENTARY NOTES Declassified with deletions, 18 December 2007.					
14. ABSTRACT Joint Task Unit 8.4.4 was organized 18 March 1962 at the Naval Air Station, Barbers Point, Hawaii, with the arrival of the advance party from Kirtland Air Force Base, New Mexico. Two B-52 aircraft instrumented specifically for research, development and test work plus two C-130 aircraft instrumented for gathering diagnostic data arrived in the forward area on 2 April 1962. On April 1962 the first of nine practice missions was flown to the Christmas Island drop site. Four missions were flown with 750 pound practice bombs and three with the dry run mission (DRX) shapes. All missions exactly simulated the actual drop for aircraft crews and ground instrumentation. On 25 April 1962 the first nuclear device was dropped from the B-52 aircraft. The last of 24 devices dropped by the B-52 aircraft was detonated on 11 July 1962. This report covers the personnel guidance, operations, weapons handling, communications and electronics, maintenance, instrumentation, materiel, diagnostics and security of that unit.					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT SAR	18. NUMBER OF PAGES 69	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

69 pg

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I. FOREWORD

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[REDACTED]

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FOREWORD

1. Joint Task Unit 8.4.4 was organized 18 March 1962 at the Naval Air Station, Barbers Point, Hawaii, with the arrival of the advance party from Kirtland Air Force Base, New Mexico. Two B-52 aircraft instrumented specifically for research, development and test work plus two C-130 aircraft instrumented for gathering diagnostic data arrived in the forward area on 2 April 1962. On 6 April 1962 the first of nine practice missions was flown to the Christmas Island drop site. Four missions were flown with 750 pound practice bombs and three with the dry run mission (DRM) shapes. All missions exactly simulated the actual drop for aircraft crews and ground instrumentation. On 25 April 1962 the first nuclear device was dropped from the B 52 aircraft. The last of 24 devices dropped by the B-52 aircraft was detonated on 11 July 1962.
 2. The attached table summarizes JTU 5.4.4's participation in Operation DOMINIC.
- 
-



DATE	CODE	YIELD		TARGET	ALTITUDE	AIRSPEED	ESCAPE	HEIGHT		CREW	AIRCRAFT	MEASURED COURSE	CIRCULAR ERROR	TIMING ERROR
		PRED	MAX					OF BURST						
5 APRIL	ADOBE			GZ-10	45000	450	FLYOVER	2600		HORTON	013	120.7	2355/0200	5 Sec
7 APRIL	AZTEC			GZ-10	45000	450	FLYOVER	2610		EDMAN	620	120.0	1694/1230	6 Sec
2 MAY	ARKANSAS			GZ-15	35000	450	FLYOVER	5030		HORTON	013	119.0	235/0500	5 Sec
4 MAY	QUESTA			GZ-12	45000	450	FLYOVER	5230		EDMAN	620	118.0	1915/0100	1 Sec
8 MAY	YUKON			GZ-10	25000	435	FLYOVER	2880		EDMAN	620	117.0	1896/0130	14.5 Sec
9 MAY	MESILLA			GZ-10	45000	450	FLYOVER	2450		HORTON	013	120.5	903/1230	3 Sec
1 MAY	MUSKEGON			GZ-10	25000	435	FLYOVER	2995		EDMAN	620	119.5	1942/1200	4 Sec
2 MAY	ENCINO			GZ-12	45000	450	FLYOVER	5510		HORTON	013	119.5	201/0130	1 Sec
4 MAY	SUWANNEE			GZ-10	35000	450	FLYOVER	2940		EDMAN	620	116.5	1075/1200	0 Sec
9 MAY	CHETCO			GZ-10	25000	435	FLYOVER	6900		HORTON	013	120.5	782/0700	2 Sec
5 MAY	TANANA			GZ-30	25000	435	FLYOVER	9030		EDMAN	620	119.5	229/0500	0 Sec
7 MAY	NAMEE			GZ-10	45000	450	FLYOVER	7140		HORTON	013	118.5	384/0430	2 Sec
8 JUNE	ALMA			GZ-15	45000	450	BREAKAWAY	8865		HORTON	620	115.0	321/1100	1 Sec
9 JUNE	TRUCKEE			GZ-10	35000	450	FLYOVER	6970		EDMAN	013	120.0	266/0400	1 Sec
0 JUNE	YESO			GZ-20	45000	450	BREAKAWAY	8325		HORTON	013	120.0	666/0800	9 Sec
2 JUNE	HARLEM			GZ-17	45000	450	FLYOVER	13645		EDMAN	620	119.5	770/0900	3 Sec
5 JUNE	RINCONADA			GZ-17	45000	450	BREAKAWAY	9105		HORTON	013	120.2	627/0530	5 Sec
7 JUNE	DULCE			GZ-10	45000	450	FLYOVER	9090		HORTON	620	120.0	383/0630	0 Sec
9 JUNE	PETIT			GZ-17	40000	450	FLYOVER	15000		HORTON	620	119.5	515/0700	3 Sec
12 JUNE	OTTAWA			GZ-10	45000	450	FLYOVER	9000		HORTON	013	119.5	346/0530	0 Sec
17 JUNE	BIGHORN			GZ-30	45000	450	FLYOVER	12000		HORTON	013	119.0	511/030	7 Sec
30 JUNE	ELDESTONE			GZ-17	35000	450	FLYOVER	5000		GRAFF	620	120.5	1002/1130	4 Sec
10 JULY	SUNSET			GZ-17	45000	450	BREAKAWAY	5000		HORTON	620	120.0	1293/1200	6 Sec
11 JULY	PAMELICO			GZ-25	45000	450	FLYOVER	14500		GRAFF	620	120.1	591/1100	2 Sec

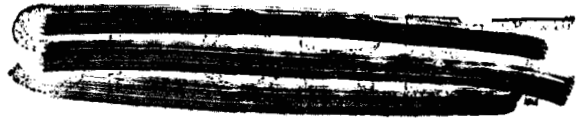
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AVERAGE
AVERAGE DRAGLE
AVERAGE FREEFALL



897 feet 3.5 Sec
818 feet
\$76 feet

NOTE : A preliminary analysis of target errors made by personnel of the Ballistics Directorate, APGC, reveals a 600 foot east transmission error between the Tracking Computer and the Polar Converter in A/C 56-620. This was discovered after Muskegon and the majority of the error removed. It was not until after Suwannee that the computers were able to be realigned. After correcting the problems in the bomb-nav system, the remaining drops from 620 were made with small circular errors.



II. PERSONNEL AND ADMINISTRATION

- A. Emergency Leave Orders
- B. Administration Publications



~~TOP SECRET~~

SUBJECT: Emergency Leave Orders

REFERENCES: Not Applicable

PROBLEM: Lack of authority of Unit Commander to publish Emergency Leave Orders caused delay in departure of some personnel, which created hardship.

DISCUSSION: Upon activation, Commander S.4.4 did not have authority to publish special orders to place personnel on emergency leave. This did not appear to be necessary inasmuch as TDY orders for each member authorized TDY travel to assignment location and return, plus variations in itinerary authorized. Normally these orders accompanied by Red Cross verifying the emergency would authorize the member priority travel. However, it developed that in some instances adequate information was available to the Commander wherein he was in a position to authorize leave but Red Cross verification was delayed. This delayed departure of the member served only to increase his anguish, because all the facts of the emergency were known but nothing could be done to expedite travel until receipt of Red Cross verification was produced. To resolve this problem, authority to publish Emergency Leave Orders was requested from next higher headquarters, TG 3.4. This authority was granted to S.4.4 to be used in similar cases.

RECOMMENDATIONS: That authority to issue emergency leave orders be granted to all units and detachment commanders who are physically separated from the parent organization.

K-19-1
USAF Edition

~~TOP SECRET~~

[REDACTED]

SUBJECT: Administrative Publications

REFERENCES: Not Applicable

PROBLEM: Lack of Administrative Publications caused much delay in obtaining correct answers for members of this unit who were faced with various problems.

DISCUSSION: Upon arrival at the forward area this unit experienced difficulty in the personnel and administrative operation due to a lack of administrative publications. This particular problem was not of great significance to this unit due to our close proximity to an Air Force Base. However, for future planning it should be recognized that future units may be in isolated locations whereby the problem would be more highly aggravated.

RECOMMENDATIONS: In future operations, units whose operational locations will be divorced from their higher headquarters should be advised to bring with them adequate USAF publications to properly support their own personnel and administrative functions.

USAF Edition

(K-20-1)

[REDACTED]



III. OPERATIONS

- A. Flight Operations Facilities
- B. Crew Training Standards
- C. Integration of SAC and TAC Crews
- D. Selection of TAC and SAC Crews
- E. Check Lists and SOP's
- F. Operations Division idanning
- G. Timing Problem





SUBJECT: Flight Operations Facilities

REFERENCES: Advanced Party Report

PROBLEM: Inadequate facilities for Flight Operations planning, briefing, and operating.

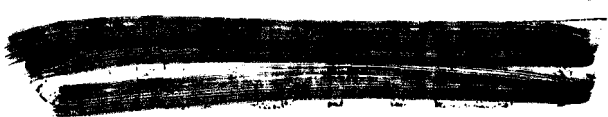
DISCUSSION: The quonset hut allotted to the Operations Division had the following deficiencies:

- (1) Roof and windows leaked badly; floor sagged; building vibrated excessively when an aircraft ran up outside, or if air conditioners were turned on.
- (2) Too many operations were conducted in too small an area; the operations section, communications center and briefing room.
- (3) The building was located too far from the Headquarters Section, requiring administrative personnel to make frequent trips each day over a two-block distance.

RECOMMENDATIONS:

- (1) If testing is to be of a continuing nature, more permanent facilities are recommended.
- (2) The Communications Center should be located in a separate but contiguous building.
- (3) The briefing area should be separated from the work area.
- (4) The Operations Division should be in close proximity with Headquarters and both certified as secure.

JTFB Edition



[REDACTED]

SUBJECT: Crew Training Standards

REFERENCES: Not Applicable

PROBLEM: The use of crews from two different commands created problems in scheduling and mission flexibility due to different standards of crew training.

DISCUSSION: During DOMINIC operational requirements dictated that crews be proficient in radar bombing and precise timing. The requirement also existed that certain drops would require a "breakaway" maneuver. During the operation, although not called upon, in-flight refueling could have been required. The Strategic Air Command's mission requires that their crews be proficient in all these requirements whereas the same does not apply to the Air Force Systems Command. The Systems Command crew did not get in-flight refueling nor breakaway maneuver training thus limiting any operation requiring these maneuvers to be performed by the SAC crew.

RECOMMENDATIONS: That all crews selected for future operations be trained by the same standards and be highly proficient in radar bombing, precise timing, in-flight refueling and the breakaway maneuver.

AF Edition

R-21-1

[REDACTED]

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SUBJECT: Integration of SAC and TAC Crews

REFERENCES: Not Applicable

PROBLEM: Closer integration of SAC and TAC crews was not possible due to compressed time schedule and the fact that both crews were still responsible to their parent organization in regard to SOP's, training standards, etc.

DISCUSSION : The urgency of Project EVERREADY and Operation DOMINIC plus SAC's and TAC's requirements for air-crew integrity prevented a closer standardization of B-52 and C-130 crew procedures. During the training phase they had to adhere to their own command's operating procedures while undergoing DOMINIC indoctrination. The fact that all crews operated so well together is attributable to their motivation and spirit of cooperation. The development of techniques such as the timing pattern, the development of special weapons checklists and device familiarization hindered the completion of standardized procedures.

RECOMMENDATIONS; When crews of different commands are to be integrated into a test operation the crews should be designated as permanent nuclear test crews. These crews can then be attached to the command responsible for conduct of the airborne operation for periods of temporary duty to be brought up to date on latest developments, plans, techniques and procedures. They should also fly practice missions during these periods of duty. They must be permitted to deviate from their own command procedures, if necessary, to meet the training requirements of the testing organization. The periods of training will have to be variable to be consistent with the time span between actual test series. This should enable a standardization of procedures to be evolved for intra-command crew integration.

11-22-1
USAF Edition

[REDACTED]

[REDACTED]

SUBJECT: Selection of TAC and SAC Crews

REFERENCES: Not Applicable

PROBLEM: Informing Parent Command of Mission Requirement

DISCUSSION: The "need to know" requirement for the hurried planning of Operation EVERREADY and Operation DOMINIC prevented full dissemination of information to the major air commands, SAC and TAC, that were asked to provide crews. In the case of SAC, no problem resulted. The TAC crews; however, were hampered in the following ways:

- (1) The line of command was not clear cut, as a relatively junior Captain acted as Commander, when a Major and two senior Captains were present. This complicated procedures but the officer designated as commander did an outstanding job.
- (2) Maintenance support for inspections was not forthcoming until it was directed by Air Force.
- (3) The choice of crew selection was probably not given the same consideration as it would have been if it had been known what the actual test requirements were. Personnel from the home base thought that the C-130's were being used purely for logistic support.

RECOMMENDATIONS: That sufficient time be given to fully inform major air commands from whom men or equipment are to be borrowed of the truly demanding nature of nuclear test requirements. This would insure selection of the best personnel, aircraft and support.

AF Ed. Finis

11-23-1

[REDACTED]

[REDACTED]

SUBJECT: Check Lists, Briefings and SOP's

REFERENCES: Not Applicable

PROBLEM: Prior to DOMINIC test mission check-lists were not up to nuclear test standards; test mission briefings tended to be perfunctory when the mission was a routine one. Also, there was no prior coordination with Sandia, LASL, LRL, on special test check list requirements. This resulted in confusion when Operation DOMINIC started.

DISCUSSION: Briefings and check lists furnished by project engineers for routine missions, while adequate for the mission being flown, are not adequate for nuclear test standards of proficiency. Further, the revision of standard unit check lists to special test weapon requirements had been made with Sandia personnel. Innumerable conferences, messages, etc. finally made it possible for a satisfactory check list to be arrived at.

RECOMMENDATIONS: Project engineers should make it a practice to set up check lists for every mission which is up to nuclear test standards. Briefings for every mission, no matter how routine, should be conducted on the same basis, to achieve the desired degree of professionalism. Liaison with Sandia personnel should be maintained to insure that check lists for special test units can be conveniently fitted into current operating procedures.

JTF 8 Edition

[REDACTED]

[REDACTED]

SUBJECT: Operations Division Manning

REFERENCES: Not Applicable

PROBLEM: Insufficient personnel for 24 hour operation of Operations Division.

DISCUSSION :


(1) The original concept for manning JTU 8.4.4 was to utilize personnel from existing AFSWC resources. Manning was to be on an austere basis to provide only a minimum work force in the forward area commensurate with the basic needs of the organization. The workload resulting from mission requirements in the forward area had not been anticipated and as a result personnel of the Operations Division were required to be on duty on a 24 hour basis three or four days prior to each mission. During the first month of the operation personnel worked extremely long hours without the benefit of rest. As a result additional personnel had to be requested to support flight operations. Final manning, although still inadequate, was:

- One Lt Col - Operations Officer
- One Captain - B-52 Backup Pilot
Asst Opns Officer
Unit PIO
Unit Historian
- One Captain - Backup Navigator
Security Officer
Materiel Officer
Roll-up Officer
- One Lt - Comm-Elect Officer
Asst Operations Off
Asst Admin Officer
- One SSGT - Flight Opns NCOIC

(2) Experience in the forward test area revealed a need for additional personnel requirements for scheduling missinns, conducting briefings, and serving as the focal point for all operational matters.

K-24-1

[REDACTED]



(3) Since AFSWC was not manned to provide all support required by DOMINIC and continue in-house projects, a compromise in personnel assignments was necessary to support the two missions.

RECOMMENDATIONS;

(1) That certain key UMD positions within AFSWC be earmarked as "hardcore" and the incumbents be trained or experienced to support a test series.

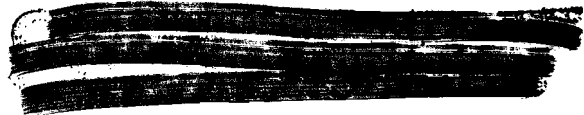
(2) That the earmarked slots be backed up by someone to perform the duties of the incumbent in his absence.

(3) That the Operations Division, Drop and Diagnostic Unit be manned by:

1 - Lt Col	Opns Staff Off
1 - Capt	Opns Off
3 - Lt's	Opns Off
1 - Capt	C-E Staff Off
1 - SSGT	Comm Specialist
1 - TSGT	Opns Supv
2 - A1C or A2C	Opns Specialists
1 - A2C	Clk & Driver

(4) That those personnel who cannot be provided from AFSWC resources be obtained from other Air Force units which utilize the type of aircraft assigned the Drop and Diagnostic Unit.

K-24-2



[REDACTED]

SUBJECT: Timing Problem

REFERENCES: Not Applicable

PROBLEM: Release of test vehicle within ± 10 seconds of predetermined release time.

DISCUSSION: The "open sea" concept imposed stringent timing requirements on the drop aircraft. Because of camera coverage and other diagnostic requirements, exact positioning of drop and diagnostic aircraft is critical. To achieve the desired position and timing, it is necessary for the B-52 aircraft to release the test vehicle on the designated target within ± 10 seconds of a predetermined release time. A special timing formula and a system for its use was designed. The formula has given completely satisfactory results. (See attached report on "Timing Techniques").

RECOMMENDATIONS: That the present timing system and pattern be used for future test events.

JTF-8 Evaluation

[REDACTED]

TIMING TECHNIQUES

1. Basic conditions assumed constant:
 - a. A 16 minute right hand pattern.
 - b. Constant 1° per second rate of turn will be maintained in all turns.
 - c. A constant true air speed of 450 knots.
 - d. A constant airming point or X-hair placement.
 - e. An accurate WWV time hack will be maintained.
2. Pattern Description: The basic race track pattern consists of two straight legs of approximately five minutes each and two constant rate turns of 180° each plus or minus drift correction. ~~The release will occur 1 minute prior to the start of the turn to the outbound heading on all dummy runs.~~ *WILL OCCUR ONE MINUTE PRIOR TO THE START OF THE TURN TO THE OUTBOUND HEADING ON ALL DUMMY RUNS.*
3. Timing Solution:
 - a. A scheduled release time of 15452 has been assigned for an illustrative example.
 - b. It has been found by experience that at least three dry run releases must be made prior to an actual release in order to insure that the timing will be accurate. Using 15452 as the scheduled release, the dry run release would be scheduled for 14572, 15132, and 15292.
 - c. To enter the pattern, an orbit is established on the bomb run track and a departure from orbit is made in order to make a release approximately 16 minutes prior to the first dry run. This release time would be 14412 and the run is called a "Locksee". A tolerance of two minutes on this release is adequate; however, one minute is desirable and an early release is preferred so that the following pattern will not be shortened excessively.
 - d. The Looksee run is used to get an accurate wind run for computing ground speed and headings. To maintain a perfect pattern it is necessary to double the drift correction on the outbound leg. This is only a rough correction for the pattern and the outbound heading may have to be altered slightly to insure rolling out on the proper bomb run track. At simulated release, the time is recorded and the bomb run heading is maintained for 60 seconds prior to starting a turn to the outbound heading.



e. In the example the "Looksee" release occurred 61 seconds early at 1439' 59"Z and the wind recorded gave a computed ground speed of 466 knots on the bomb run and 434 knots on the outbound heading with the observed drift correction of $-3\frac{1}{2}^{\circ}$ on bomb run and thus doubled and applied to outbound heading it gives us = 190° total turn.

f. In the basic 16 minute pattern there are 960 seconds. If the turns are made at 1° per second, the two turns will use 360 seconds leaving 600 seconds to be flown on the straight legs. The problem thus involves determining what portion of the 600 seconds should be flown on the outbound heading.

g. A basic radius of action formula states: ground speed inbound divided by sum of ground speed inbound and outbound = time outbound divided by total time. Since the "Looksee" release occurred 61 seconds early, the next pattern must contain 661 seconds total straight time. Substituting the computed ground speeds and total desired time into the above formula gives the following:

$$\frac{466}{466 + 434} = \frac{\text{time outbound}}{661} \text{ or time outbound equals } 343 \text{ seconds.}$$

h. In this example the turn from bomb run to outbound heading contains 190° and will, therefore, take 3'10" to complete. Adding the one minute from release to start turn, plus the time for turn (3'10"), plus the computed time for the outbound track (343" or 5'43") all to the actual release time of 14 39'59", a time of 14 49'52" is determined for starting the inbound turn to bomb run heading.


i. In the example, the first dry run release occurred 20 seconds early at 14 56'40". This shows that 20 seconds less than the desired total straight time of 661 seconds was flown, therefore, a new ratio can be written for the times that were actually flown on which computations for the next pattern may be based. As before, since release occurred 20 seconds early, the next pattern must contain 620 seconds total straight time, and a ratio of times can be written as follows:

$$\frac{\text{Outbound time flown (343)}}{\text{actual total time (661-20)}} = \frac{\text{new outbound}}{\text{desired total time (620)}}$$

The new outbound time is 332" or 5'32". Adding as before a new time for turning inbound is calculated.

Actual release	14	56	40
1 Min from release		1	
Turn time		3	12
<u>Outbound time</u>		<u>5</u>	<u>32</u>
New turn time	15	06	24





As shown in the example, this turn time gave a release two seconds early on the second dry run.

j. This manner of comparing actual times flown on the straight legs to that desired in the following pattern can be continued indefinitely as shown in the sample timing sheet, the figures for which came from an actual mission. The slight change in "Time to Turn" was due to a refinement in the heading and heading change with more accurate wind information.

k. Pilots will notice that the aircraft may have to be led into the turn by a few seconds to be sure that when the turn command is given the aircraft begins to turn. The B-52 at the airspeed, altitude and weight experienced on these missions lagged by 5 seconds and for the one degree per second turn a bank angle of about $22\frac{1}{2}^{\circ}$ was used.




SUMMARY

The solution of the timing problem has been proven and may be adapted to any pattern; however, the sixteen minute pattern is as short a pattern as is practicable. It is desirable to hold the release heading for one minute after release for a number of reasons. The one minute gives the pilot time to prepare for the turn, the navigator time to record release information, is simple to figure in the timing problem and of utmost importance, gives the crew time to complete the abort checklist, if an abort should occur late in the bomb run and the timing problem must be continued.

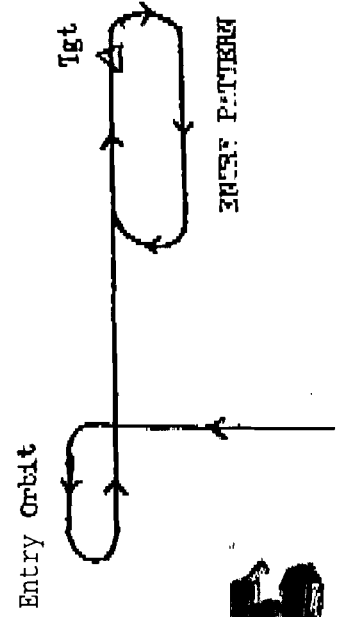
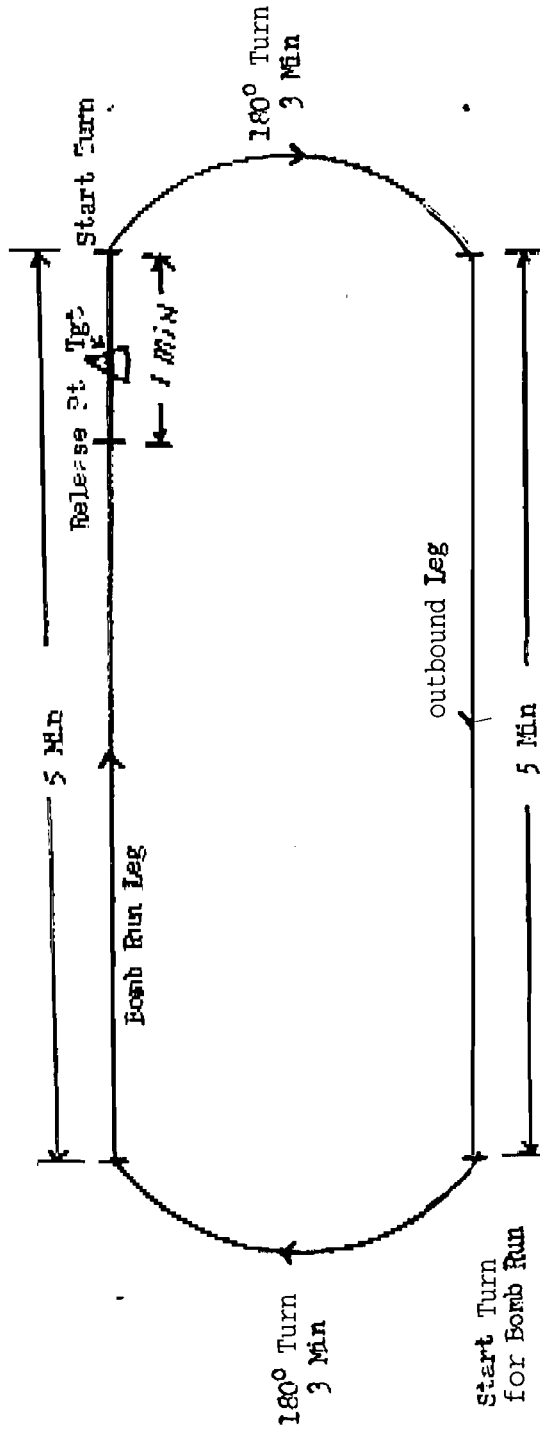
The average bomb run is now four minutes long and increasing the length of the bomb run would serve no worthwhile purpose since wind synchronization on the MA-6A Radar is not accurate over 250 seconds prior to release.

The complete timing problem is solved to obtain a time to start the turn to bomb run heading. To preclude the possibility of human error it is vital that the co-pilot perform the timing computations in conjunction with the navigator. It is imperative that the number of variables in the problem be held to an absolute minimum. The most difficult constant to maintain is the 1° per second rate of turn. If the turn is not held properly it is impossible to compensate for the induced errors. The one variable impossible to control is the wind. A light and variable or shifting wind will induce errors that cannot be compensated for to obtain the necessary timing accuracy.



"BASED ON WIND PATTERN"

16 Minute Right Hand No Wind Pattern



	Look-See	Dummy #1	Dummy #2	Dummy #3	Live
Early - Late	<u>61</u> Early	a20 Early	02 Early		
Sched Time	1441	1457	1513	1526	1545
Act. Time	1439:59	1456:46	1512:58		1545
Early + Late -	600	600	600	600	
Time Remain	<u>+61</u> 661	<u>+20</u> 620	<u>+2</u> 602	<u>+0</u> 600	
Start Turn	1443:59	1457:40	1513:58	1530	
Time In Turn	3:210	3:12	3:13	3:13	
Roll Out	1444:39	1500:52	1517:11	1533:13	
Early - Late +	$\overline{900} \times \frac{343}{661} \text{ Sec}$	$\overline{641} \times \frac{332}{620}$	$\frac{332}{618} \times \frac{323}{602}$	$\frac{323}{602} \times \frac{322}{600}$	
T1					
$\overline{T1+T2} \text{ Corr.} =$ <u>New T1</u> Time Remain	= 5:43 Sec	5:32	5:23	5:22	
Start Turn Time For Bomb Run	1449:52	1506:24	1522:34	1539:35	
Bomb Run True Heading					
Bomb Run Wind					



IV. WEAPONS HANDLING

- A. Clip-in Bomb Suspension System
- B. Weapons Handling Equipment
- C. Test Device Loading and Handling Crews
- D. Test Device Assembly and Storage Facilities
- E. Equipment and Facilities
- F. Nuclear Safety Rules





SUBJECT: "Clip-In" Bomb Suspension System

REFERENCES: Not Applicable

PROBLEM: Discrepancies encountered in the "Clip-In" bomb suspension system

DISCUSSION: Operation DOMINIC provided an excellent field test for the "Clip-In" bomb suspension system. One MLU-2/C explosive cartridge failed to fire at release time. The other cartridge fired and released the unit. The aircraft system was checked and found to be in proper operating order. Faulty cartridge was assumed to be the problem of malfunction. The lock/unlock adjustments on the MHU-21/C rack is very critical and on all loadings it was necessary to monitor the position of the lock/unlock function of the rack in relation to the amount of travel on the Bomb Release Lock Cable. On one mission it was necessary to hold the BRL handle at the extreme out position by hand during the bomb run in order to maintain the system in an unlocked condition.

RECOMMENDATIONS: Although the cartridge has been a subject for an Unsatisfactory Report and the lock-unlock discrepancy brought to the attention of the development **agency**, continuous surveillance on the clip-in system should be exercised for these or other malfunctions.

USAF Edition

R-25-1





SUBJECT: Weapons Handling Equipment

REFERENCES: List of necessary handling equipment required for Operation DOMINIC; AFM 92-1; Air Force Safety Manual

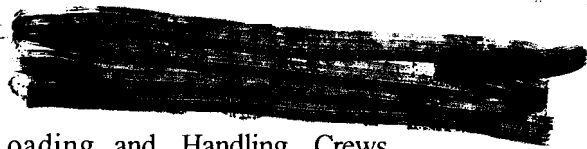
PROBLEM: Handling equipment lists were not complete, specific example: No proper vehicle was listed for towing of MHU-7/M trailer. Certain equipment supplied for weapons handling was not in proper repair, specific examples: (a) XH-2 Straddle Carrier had a bent casting in the primary lifting system. (b) A warehouse tractor (TUG) furnished for test device movement was very short on power (poor compression) and the clutch was very jerky. (c) Forklift and tugs were not equipped with fire extinguishers.

DISCUSSION: During the pre-operational "shake-down" exercise a tug was used in towing vehicle of MHU-7/M trailer. On review of equipment list and operational towing requirements for MHU-7/M trailer it was found that no vehicle compatible with MHU-7/M trailer requirements was listed. After researching MHU-7/M trailer technical orders and vehicle supply technical orders, proper vehicle requirements were listed and proper vehicle was procured. It is very essential that all weapons handling equipment be kept in first class condition. For this operation where inadequate or faulty equipment was on hand, special compensations were made. Where fire extinguishers were missing, the equipment was used in close proximity to portable fire extinguishers or other equipment equipped with fire extinguishers. The movements on the straddle carrier were made at a walking speed for safety reasons. Several tugs were issued for test device movements that were not adequate for the job, such as a jerky clutch very low power (low compression).

RECOMMENDATIONS:

1. That list of necessary handling equipment be reviewed prior to future test series to insure that equipment listed is compatible for the mission to be accomplished.
2. That all equipment supplied for a Nuclear Test Operation be thoroughly inspected by a qualified inspector and only serviceable equipment be issued. All motorized equipment should be equipped with fire extinguishers as specified in AFM 32-6.
3. That a rigid periodic inspection of all equipment be performed) as a minimum the inspection required by the applicable Technical Orders or other applicable maintenance publications.





SUBJECT: Test Device Loading and Handling Crews

REFERENCES: JTF-3 Operations Plan 2-62 agreement between 3.4 and 3.1 that Air Force loading crews would load and perform all banding and handling operation of the test devices at Earbers Point NAS.

PROBLEM: Loading and handling crews were required for this operation that were experienced in the B-52 loading procedures and techniques as well as other procedures such as banding and transportation of test devices.

DISCUSSION : In order to meet the requirements for this operation the AFSWC Test Directorate armament personnel were assembled into teams as outlined in the Job Orientated Technical Order (T.O.-1B-52B-14-1). The loading teams were experienced in loading various kinds of inert shapes and test devices aboard the B-52 aircraft. They were very familiar with the aircraft loading equipment and suspension systems. The loadings performed by the AFSWC teams were usually of units of which only 3 or 4 were manufactured and specific check tests and procedures were not developed for these operations. Certain general checks were used on each loading and supervised by a Test Project Officer. Since most of these loadings consisted of inert units, the loading crews were not accustomed to the strict adherence to checklists and prescribed loading procedures as used by the Strategic Air Command loading teams. However, these AFSWC armament teams were experienced in banding procedures for the "Clip-In" sub assemblies and were familiar with the equipment required for test device handling operations. To acquaint the loading teams selected for the DOMINIC Operation with the strict procedures and safety precautions required, they were given a SAC standardization check on B-52 loading procedures.

RECOMMENDATIONS: That for future operations the loading teams be trained on the safety procedures and checklists to be used for the specific operations. These may or may not be similar to checklists used for normal SAC aircraft loadings.

That the loading teams be well experienced on the type of equipment and aircraft system required for the test device shapes involved.



R-27-1



SUBJECT: Test Device Assembly and Storage Facilities at Barbers Point NAS

REFERENCES: Building 278 and Storage Igloos at Barbers Point NAS

PROBLEM:

1. Entrance door into the high bay area of building 278 was only 7 feet wide.
2. The apron in front of entrance to building 272 was sloping and too narrow; the apron in front of the storage igloos was too narrow.

DISCUSSION:

The entrance door into the high bay area of building 278 was cut out especially for Operation DOMINIC. This door was made too narrow for a straddle carrier to enter. This necessitated that the test device be pulled up a slope of 12 inches in 18 feet in a turn such that the test unit would not bump the sides of the entrance. The apron in front of the entrance of both building 278 and the storage igloos was too narrow to adequately position a test device so that it could be pushed straight in to the desired area. These aprons were widened with asphalt approximately four weeks after starting the test drops.

RECOMMENDATIONS:

1. That assembly buildings for assembly of complete test units for any future tests be equipped with an 8 foot wide door and a 30 foot straight-in approach, preferably concrete.
2. That storage facilities for test devices have a level, hard surface apron at least 10 feet wide and extending 30 feet in front of the entrance door. This is required for maneuvering the device into the storage area while on the bolster.
3. That in planning for any future nuclear testing, the organization responsible for weapons handling, participate in early planning stages of storage and assembly requirements.



11-28-7

[REDACTED]

SUBJECT: Equipment and Facilities

REFERENCES: AFR 355-7, AFM 32-3, AFM 32-6, AFM 122-1

PROBLEMS: Inadequate aircraft grounding facilities, inadequate crash-fire facilities to meet operational and disaster control requirements at NAS Barbers Point, and incomplete information on EMR hazards at proposed alternate loading area at NAS Barbers Point.

DISCUSSION: Information on safety matters was furnished to JTG 0.4 safety personnel by staff personnel who had visited forward areas and, after deployment of safety personnel to NAS Barbers Point, some of the information was found to be inaccurate and incomplete. JTG S.4 safety personnel did not have opportunity to conduct a safety survey of forward operating facilities and equipment. The Nuclear Safety Officer arrived at NAS Barbers Point two weeks prior to the arrival of the operational aircraft. Advance information had been furnished him at Kirtland AFB before deployment that facilities at NAS Barbers Point had been examined and found to be adequate with the exception that the crash-rescue personnel needed additional training on the B-52. Corrections had to be made when time was short. Normal minor problems became major problems because of lack of time.

Crash-Rescue. On examination of the Crash-Rescue facility and discussion with NAS Barbers Point Operations Officer it was determined that the Crash-Rescue facility did not have the capability to meet the operational requirements for Operation DOMINIC. Their personnel were not career crash-rescue personnel by USAF standards and did not possess required security clearances except for supervisory personnel. Further, they did not have adequate equipment to support Operation DOMINIC. To resolve this problem ten A/1C career crash-rescue men were received on TDY from SAC bases to form two full crews to man an O-11A crash truck that was requisitioned from PACAF. Extensive evaluation and training of these two crews and of the Navy supervisory personnel was conducted by Fire Chief of Hickam AFB and by the NSO. The end result has been very satisfactory for both Operation DOMINIC and for local Navy operation and gave needed coverage for possible disaster control requirements.

[REDACTED]

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R-27-1

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An alternate loading site on the concrete parking pad south of Building 117 at NAS Barbers Point was proposed. Upon examination of existing operational communications and electronic facilities it was determined that the EMR hazard at the proposed location exceeded the limits established in AFM 32-6. Advance information listed only types of transmitting equipment but not total number. The only completely safe location for loading from EMR hazards was the originally proposed loading site on the taxi way north of runway 4L. One additional EMR problem was the operation of airborne radar equipment flying over and making approaches to NAS Barbers Point. This problem was coordinated with local Naval Operations and they published necessary directives to preclude operation of airborne radar equipment on and over NAS Barbers Point.

A survey revealed that there were no adequate grounding facilities at the B-52 loading site, at the C-124 off-loading site and at the B-52 parking apron south of Building 117. This problem was immediately brought to the attention of NAS Barbers Point Public Works who drew up necessary specifications for grounding points and, through JTG 8.4 at Hickam, Holmes & Narver completed a rush project. Adequate grounding points exist for the B-52 and C-124 operations at NAS Barbers Point.

RECOMMENDATIONS:

That a safety survey be conducted at the planned operational base by safety personnel far enough in advance of deployment to allow time for necessary corrective actions to be taken. If possible, the survey should be conducted six weeks prior to operational deployment.

If air drop operations are from a Naval Air Station, an appropriate serviceable USAF crash truck with adequate spare parts and funds for contract maintenance should be available. The NAS crash-rescue facility should be augmented by at least two five-man crash crews to respond to B-52 requirements.

USAF Edition
K-29-2

[REDACTED]

[REDACTED]

SUBJECT: Nuclear Safety Rules

REFERENCES: Dominic Operations Plan 2-62; JTF 8 AD HOC Group for Nuclear Safety, Technical Nuclear Safety Study of Project DOMINIC


PROBLEM: The abort criteria, emergency procedures and nuclear safety rules for the B-52 air drop operation were not included in DOMINIC Operations Plan 2-62. This necessitated the development of many internal SOP's to cover critical areas that should have been previously formulated and approved prior to publication of the Operations Plan.

DISCUSSION: An official statement or document covering all aspects of Nuclear Safety was needed by the operational element to provide them with officially approved procedures prior to deployment. The AD HOC Safety Group as directed by CJTF 8 conducted the nuclear safety study for Operation DOMINIC and published the report on 12 March 1962. Due to a lack of agreement within the committee the report contained a recommendation by a minority group concerning when to unlock the rack and when to arm the test vehicle. Publication of Appendix A "Safety Summary" to the safety study was delayed until sequence of procedures and time were resolved. This information was not published as an attachment to Operations Plan 2-62. The nuclear safety study by the AD HOC safety group was very useful, however, there were some inadequacies. In most areas the obvious situations were well covered but many possibilities which should have been investigated were not included in the study. This may be attributed to the delay or non-availability of final operational intentions and test vehicle configuration. Consequently, it was necessary for the operational element to develop many internal SUP's to cover areas which should have been considered by the Safety Group.

RECOMMENDATIONS:

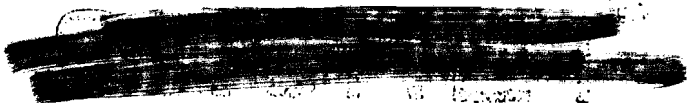
1. For future operations a nuclear safety study should be prepared by a selected nuclear safety group in advance of the proposed project and their recommendations made a part of the Operations Plan. Any changes should be immediately published as changes to the Operations Plan.

[REDACTED]



2. The Operations Plan should consider all known aspects of nuclear safety as pertains to the test series and delegate authority to the Commander, Joint Task Group (Air Force) to deviate if necessary in the interest of safety. Any deviation along with recommendations would be reported immediately to the Task Force Commander.

3. When final configuration and operational intentions are pending, the safety group should note these areas and recommend action to be taken prior to execution. This could be in the form of a recommended SOP checklist to the operational element for further implementation.






V. COMMUNICATIONS AND ELECTRONICS

- A. Planning Time
- B. Frequency Selection
- C. Point to Point Communications
- D. Timing and Release Tones
- E. Morale Communications
- F. Air Traffic Control
- G. Maintenance Communications
- H. Data Communications



SUBJECT :

Planning Time 

REFERENCES:

Operation Dominic Planning Directive 1-62
Operation Dominic Operations Plan 2-62

PROBLEM:


Insufficient information and time to plan adequate communications.

DISCUSSION :

An overall analysis of C-E revealed it to be adequate once initial problems were discovered and resolved; however, C-E was not worked into an acceptable condition for full operational support of the mission until approximately 1 May 62; this primarily through the efforts of Operations personnel after their arrival in Hawaii. It was necessary to enlist the aid of outside agencies to provide the support required. Initial problems which arose appeared to result from a lack of knowledge of the operational concepts desired, lack of information on who was to provide what for whom, and little knowledge of the facilities which could be placed at the disposal of JTG 8.4. It is realized that the last minute move of major functions from Hawaii to Christmas Island caused some confusion and degradation of capabilities in the Hawaii area. As viewed from a Task Unit level there appeared to be no continuity of C-E officers on the JTG 8.4 staff level. This caused considerable confusion and reaccomplishment of work at the unit level. It also caused an increased workload because the JTU 8.4.4 C-E Officer was usually called upon to brief the new staff C-E Officer. This took him away from his primary duties.

RECOMMENDATIONS:

- (1) That advanced liaison and survey parties include highly qualified Communications-Electronic personnel with associated experience in the particular area of operations or maintenance to be surveyed.
- (2) One C-E Officer be located at each operating location a minimum of 30 days prior to in-place dates (just as is done for administrative and supply functions) to insure that communication-electronic systems are operational and useable prior to arrival of the operational units.


K-30-1

[REDACTED]

(3) A C-E Officer should be assigned to the permanent JTG 8.4 staff to insure continuity of planning and consolidation of inputs from Joint Task Units. This officer, if adequately experienced, can also handle C-E matters for the units which have no C-E officers assigned during periods that preparations for testing are being made.

M-30-2
SAF 4/1/68

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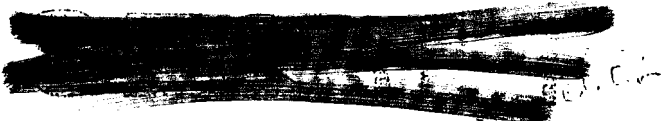
SUBJECT: Frequency Selection

REFERENCES: Hq AFSWC Frequency Requests; AFSWC Ltr to JTF 8 on DME Frequencies; Sandia Conference on Frequencies, February 1962

PROBLEM: Late Selection and Authorities of Frequencies

DISCUSSION: In order to complete procurement actions, equipment design, system installation, and operational tests on diagnostics it is necessary to have firm frequency allocations a minimum of five months prior to in-place dates. Frequency selections for DOMINIC were not approved until late February 1962 with an in-place date of 1 April 1962 established. By the time frequencies were approved, Hq AFSWC had expended over \$500,000 for RF equipment and had operationally checked functioning systems, using frequencies requested. If the specific frequencies had not been approved it would have been necessary to re-engineer the AFSWC distance measuring system. As a result, the system would not have been ready for the operation and the airborne diagnostic capability not available.

RECOMMENDATIONS: Acceptance and approval of frequency requests not later than five months before in-place dates.





SUBJECT: Point to Point Communications

REFERENCES: Not Applicable

PROBLEM: Point-Point Communications Failure

DISCUSSION: (1) Voice circuits from NAS Barbers Point to Christmas Island and CONUS locations were almost unuseable. Volume levels are such that conversations are usually unreadable. Also, they were not always available because of numbers of calls per circuit available. Commercial services proved to be better although more costly.

(2) Teletype needs were more than adequately met by the Navy operated JTF-3 Communications Center.

(3) HF point-to-point circuits were non-existent until individual ground air stations at Hickam AFB, NAS Barbers Point, and Christmas Island were thrown together to meet the requirement for TTY backup levied by CJTG S.4. This satisfied an immediate requirement but a second requirement existed for better, more rapid communications between test units and supporting home bases for handling personnel, technical, and material matters.

(4) The SAC line was almost useless.

RECOMMENDATIONS: (1) Retention of the separate JTF-8 controlled Comm Center concept. Allow the Navy to either provide or supervise this operational need.

(2) Establish two HF/SSB networks:

(a) Command and control net: This network would meet the need for rapid relay of messages between command posts at separate locations and serve as a single network for filing of aircraft position reports from mission aircraft traveling between operating locations. It would serve as back-up to the teletype circuits.

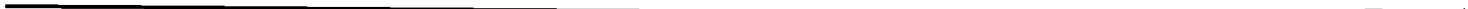
(b) Admin and Liaison Net: This network would serve as an adjunct to existing mainland telephone and teletype service. It would allow a rapid exchange of information in the resolution of personnel, materiel, and morale problems. Each CONUS base providing personnel to the Task Group should be allowed to enter this network.





(c) Both networks can work in harmony from a single, modified Big Rally Van providing a system of timing is utilized to insure that operational traffic is handled properly. Operational requirements require detailed analysis at each location to determine proper operating times.

JTF B Edition





SUBJECT; Timing and Release Tones

REFERENCES : Not Applicable

PROBLEM: Time and release tone inadequacies

DISCUSSION: The methods for determining real and relative times for the air array and associated ground tracking stations were never clearly defined for all interested agencies or the responsibility levied on a single agency to meet the total needs of JTG 8.4 and scientific task units. The key to reliable data collection and diagnostic analysis is a single time reference related to real time and correlated with the time of release.

(1) Release tones indicating separation of the bomb from the aircraft were generated within S.1.4 telemetry in the test device, placed on a telemetry subcarrier, transmitted to a ground station, demultiplexed, and then retransmitted via S.1.6 radio and hard wire systems to various diagnostic aircraft and trailers. This very circuitous route, consisting of many electronic devices subject to malfunction, did not provide consistent receipt of release tones and caused the complete loss of airborne diagnostics on ALMA. Simpler, more reliable means of obtaining release tone information would surely enhance the JTF 8 mission obtaining nuclear diagnostic information.

(2) Receipt of real time and countdown information is a definite must for reasons of safety and data collection. There were three or four methods of receiving countdowns and relative time signals during Operation DOMINIC, but no real time system. Individual laboratories and units used time history generators running at random rates to record events.

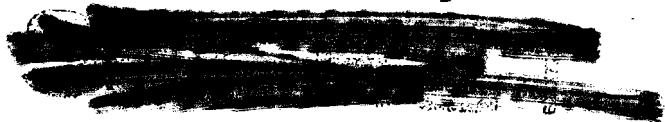
RECOMMENDATIONS: (1) That release tones be transmitted from the drop aircraft on an independent telemetry channel and be wired electronically to indicate actual separation of the weapon from the bomb rack. Agencies desiring release information can then be advised of the release frequency and receive it on their own equipment if they so desire.





(2) That a master countdown and timing facility be developed for receipt and retransmission from the drop aircraft of release tones for long distance relay, for transmission of real time information over the test area, and for transmission of relative counts and abort notices. Frequencies and frequency bands (LF, HF, UHF) should be selected to meet the distance requirements involved and be separate from aircraft control channels. Also, each participant in a test array or area should be able to guarantee receipt of this information from its own resources prior to being allowed participation.

JTF 8 Ed. 1 Jan





SUBJECT: Morale Communications

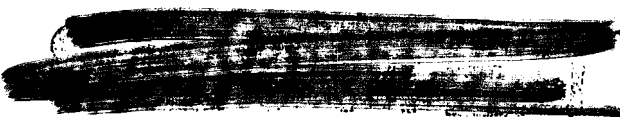
REFERENCES: CJTG-8 Policy on Amateur Radio Operations During DOMINIC

PROBLEM: Morale Communications Difficulties

DISCUSSION: MARS and Amateur Radio Operations were not preplanned because of the JTF-8 policy on amateur radio operations at the onset of the operation. After arriving in the forward area the policy was changed, but it was difficult then to coordinate schedules with the home bases without having more fully researched the matter on the mainland. Through concentrated efforts of several MARS stations and amateur radio operators in the Hawaii area it was possible to manage a small number of phone patches and messages for personnel. The improvement in morale once this service was established is worthy of note.

RECOMMENDATIONS: Request at least two discrete MARS frequencies for use by supporting CONUS home bases and forward area MARS stations. These frequencies would be used where volleys of messages could not solve a problem. They could also be used during off hours for handling personal phone patches to enhance morale.

JTF 8 Edition





SUBJECT: Air Traffic Control

REFERENCES: Not Applicable

PROBLEM: Clearance and enroute reporting procedures

DISCUSSION:


1. Local - adequate.
2. ADIZ - Procedures were coordinated with FA.4 and Hawaii Air Defense Division for specific departure, flight tracking, and approach control frequencies and procedures for all flights. This was valuable in reducing possible control and cockpit confusion. Positive radar tracking was used for all flights with special IFF-SIF codes assigned for ease of identification.
3. Airways - Hickam Airways was unable to maintain communication with the drop aircraft for position reporting. For this reason, single frequency single agency reporting is recommended. The 6594th Recovery Group, Hickam AFB provided this for Operation DOMINIC, but has other conflicting mission requirements and operating personnel were not fully acquainted with nuclear test operations.
4. Communications and Radar Control in the Drop zone were considered excellent.


RECOMMENDATIONS:

1. That specific, exclusive, departure, flight tracking, and approach control procedures in consonance with the needs of the test operation and local FAA - Air Defense procedures be established for future base of operation and tests.
2. Use single frequency - single agency position reporting to a specific Joint Task Group control point at each base of operation to insure continual monitoring of mission progress, continuing radio checks, to participating aircraft, and to provide any special assistance which may be required of ground based technically qualified personnel which Airways and other outside agencies are not qualified to provide.

JTF 8 Edition






SUBJECT; Maintenance 

REFERENCES; SWT letter of Comm Requirements, Jan 62 -
Discussion between Lt Ehren, Maj Saddler -
C.4 Maint Control Personnel, Feb 62


PROBLEM: Unsuitable communications for maintenance and
load control

DISCUSSION: The move of most aircraft maintenance units to
Christmas Island left Barbers Point without a
maintenance control load control radio net.
This is a must when the loading area is physically
separated from the main parking area, for security
and safety reasons. VHF Walkie Talkies were tried,
but proved unuseable. The solution was instal-
lation of a VHF Base Station on the (3.1.4) VHF
network which utilized relay stations for better
coverage. Further, it was found necessary for
maintenance units to talk with aircrews after
the aircraft was on a runway for takeoff.
Situations arose where discussion of a solution
with the Maintenance Officer would have precluded
the aircraft going back to the ramp for further
checks.

RECOMMENDATIONS; Recommend in future operations a single UHF
Maintenance-Weapon Loading Vehicle Control Net
channelized on a JTU 3.4.4 UHF Common. This will
provide contact between all ground units and the
aircraft avoiding confusion which could result
during possible nuclear incidents, end-of runway
aircraft problems, split maintenance functions,
and wide dispersal of vehicles. At least two
stations should also be channelized on the 3.1.4
VHF network utilizing "dual frequency" vehicular
radios to insure adequate coordination between
Weapon Specialists and Weapons Delivery personnel
of JTU 3.1.4. The large number of vehicles,
separate units, and the incongruity of most radio
traffic would make a single network unfeasible.

JTF 5


SUBJECT:

Data Communications 

REFERENCES:

Annex E, Operations Plan 2-62; Discussion among Lt Col Hormats, Mr. F.E. Seusy, and Lt Ehren at JTG S.4, February 1962

PROBLEM:

Diagnostic Data Collection and Analysis

DISCUSSION:

There are two key events vitally necessary to the successful performance of a Distance Measuring System: Proper calibration of the system with the device and rapid, reliable reduction of the data collected from the DME System.

(1) The B-52 and weapon were at NAS Barbers Point and the C-130 DME collection stations at Christmas Island. Independent calibration equipment was used at each location to calibrate the individual DME stations. The first five air drops' DME diagnostics were obtained after utilizing this method of calibration. An analysis of the data collected revealed a poor level of reliability of the system. Subsequent drops were made only after "live" calibrations were made with the B-52, weapon, and C-130's at designated, calibrated locations at Barbers Point. This greatly increased the reliability of the AFSWC DME and provided very successful data collection during subsequent air drops.

(2) Laboratories requested that the DME data be made available to them within 16 hours after the air drop. In order to do this an electronic means of transmitting analog data information over standard overseas telephone cables was developed. The move of the C-130's to Christmas Island required that the data also be transmitted over radio circuits. This, plus a general degradation of the telephone circuits from Hawaii to the mainland, and the placing of a computer at Christmas Island negated the need for the originally developed analog transmission system.

RECOMMENDATIONS:

(1) That the Analog Data Transmission System developed by SWT, AFSWC, for DOMINIC be operationally checked on lower priority projects and a feasibility study be established to determine its usefulness for other data transmission requirements with the Air Force.


K-31-1

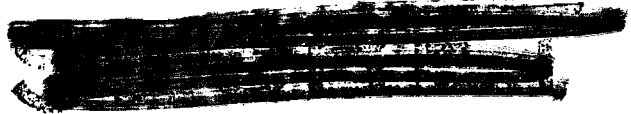
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(2) That a project be initiated and studies pursued to develop a DME system with which stations do not have to be calibrated in physical proximity of one another.

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VI. MAINTENANCE

- A. Bomb-Navigation System
- B. Deployment Kit, B-52 Aircraft
- C. Bomb-Navigation Mock-Up



[REDACTED]

SUBJECT: Bomb/Nav Problems B-52 Aircraft

REFERENCES: Maintenance Data Collection

PROBLEM: Bomb Navigation System


DISCUSSION : Prior to Project DOMINIC the MA-6A Bomb-Nav System installed in AFSWC B-52 aircraft were not fully utilized. This, along with low supply priority resulted in a deterioration of system performance. When the system was required for precision radar bombing a considerable amount of time and trouble shooting was required for alignment. Many cable problems and a high component failure rate existed. The aircraft was delivered to WRAMA for 10 days to rework the system; on return to Kirtland AFB the system was still unserviceable. Personnel were requested from WRAMA, and SAAMA provided further assistance and the Bomb-Nav system was made serviceable, A CTS man from AC Spark Plug Company and two radar technicians from Castle AFB were obtained on a long time loan for Project DOMINIC at Barbers Point, Hawaii. Following are specific problems encountered which can be corrected in future operations:

(1) A bright spot in the center of the radar scope (caused by sea return) which cannot be tuned out of the picture will be corrected when aircraft return to Kirtland AFB. The radar set will be upgraded to the APS-64A configuration by the addition of STC and the RT-503. With STC it will be possible to eliminate the discrepancy.

(2) The MADREC cable configuration must be made interchangeable. It was necessary to remove one cable because of fungus growth in the cannon plugs. All plugs and cables should be fungus proof.


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RECOMMENDATIONS:

- 
- (1) The Bomb Nav systems should be utilized to full capabilities between projects.
 - (2) All spare parts should be bench checked and aligned before leaving ZI.
 - (3) An operational MADREC should be an integral part of the MA-6A Bomb-Nav System.

USAF Edition

11-32-2





SUBJECT: Deployment Kit, 3-52 Aircraft

REFERENCES: AFR 67-1

PROBLEM: Use of Fly Away Kit

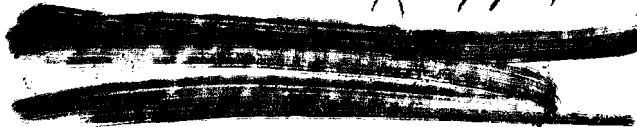
DISCUSSION : During the period of operation of Project DOMINIC there has been no significant problems due to shortages of bench stock and E-52 aircraft spares. Requirements to support two B-52 aircraft for a ninety day period was thoroughly planned, requisitioned and prepared for an overseas operation. The supply action received at Barbers Point NAS from Hickam AFB has been satisfactory for replenishment of all items consumed from the kit.

RECOMMENDATIONS: Recommend that for future operations the present 3-52 deployment kit be maintained and inventoried to adjust stock levels from consumption date experienced during Project DOMINIC.

Recommend that a realistic flying hour allocation and mission requirement be established to justify stock levels.

USAF Edition

1-33-1



[REDACTED]

SUBJECT: Bomb/Navigation Mock-Up

REFERENCES: 1. Requirements established by TG 3.4 Materiel
2. Component shortages action by TG 3.4.3

PROBLEMS: Bomb/Nav Mock-Up AN/GWM-5. The Bomb/Nav Mock-Up for B-52 aircraft Test Element did not arrive complete and in serviceable condition. Component shortages were requisitioned but failed to arrive in time to establish a workable test set.

DISCUSSION: The Bomb/Nav Mock-Up for B-52 Drop Aircraft Element was requested to be in place at Barbers Point NAS, Hawaii, by JTG 8.4 Materiel Officer in January 1962. On arrival of B-52 aircraft 2 April 1962 the Bomb/Nav Mock-Up was in place except for \$79,000.00 worth of components. The test set consisted only of boxes and wire bundles. The component shortages were requisitioned in April through TG 8.4.3 Materiel Office, Hickam AFB. Only seventy percent of the items had arrived by mid June. The remaining time for completion of the test series did not justify further efforts to establish a working Bomb/Nav Mock-Up. This Element has completed twenty-six bombing missions and no requirement has existed for the use of a Mock-Up.

RECOMMENDATIONS: It is recommended that the Bomb/Nav AN/GWM-5 Mock-Up be deleted as a requirement for future test series.

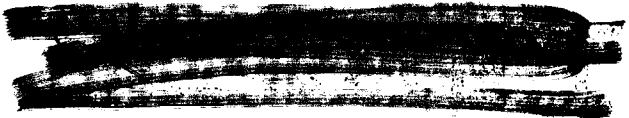
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VII. INSTRUMENTATION

- A. Instrumentation Phase of Diagnostic Aircraft
- B. Coordination
- C. In-Place Equipment Facilities
- D. Classified Film Processing Facilities



[REDACTED]

SUBJECT:

Instrumentation of Aircraft

REFERENCES:

Not Applicable

PROBLEM:

Instrumentation Phase of Diagnostic Aircraft

DISCUSSION:

During the instrumentation phase of the two B-52 and two C-130 aircraft at Kirtland AFB by the AFSWC Test Division for the Los Alamos Scientific Laboratory, the Lawrence Radiation Laboratory, and EG&G, the scientific personnel were uncertain as to their aircraft instrumentation requirements and were not completely knowledgeable of the B-52 and C-130 aircraft capabilities and limitations. This condition was further confused and complicated when it was determined that time scales in most instances prohibited procurement of modern diagnostic equipment. This resulted in the installation of equipment that had been designed for ground diagnostic stations, and many such items had not been used since the 1953 or earlier test series. It was questionable whether or not this type equipment would operate within a completely new environment with the added factors of altitude (temperature and pressure), vibration; loads imposed by turbulent air, takeoffs, and landings; and a possibility of less stable power inputs. This required the installation and removal of various items of equipment in the aircraft from October 1961 until the aircraft departed on 2 April 1962 for the test sight at Christmas Island. These changes in instrumentation required changes in aircraft wiring, power requirements, and antenna installations. Since the participating agencies (LRL, LASL, Sandia, EG&G, and AFSWC) were not always aware of details of each other's installations there were problems of one experiment radiating interference with that of another. These changes resulted in a never ending process since, as delivery was made on more up to date procured items, they were installed.

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RECOMMENDATIONS:

(1) That participating laboratories be given sufficient advanced notice to procure diagnostic instrumentation designed primarily for an aerial platform and if possible the specific type aircraft that will be supporting their requirements.

(2) That prior to future tests, participating laboratories be given a thorough briefing on the capabilities and limitations of the aircraft supporting their requirements; be provided appropriate aircraft publications outlining pressurization capabilities at various altitudes, space available for instrumentations, aircraft range data, speed, and other essential data.





SUBJECT: Coordination

REFERENCES: Not Applicable

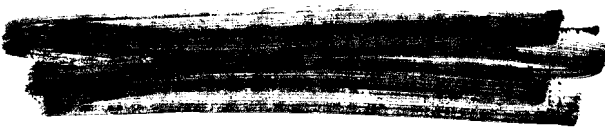
PROBLEM: Lack of coordination between diagnostic agencies

DISCUSSION: There was some delay and confusion caused by lack of coordination between the AFSWC Instrumentation Branch and the scientific agencies after arrival at Barbers Point NAS.

Operational support of the scientific agencies by the AFSWC Instrumentation Branch was hampered because all requirements were unknown. All requests for support were handled as expeditiously as possible although some time was consumed in discussing the problems with the two agencies.

- RECOMMENDATIONS:
- (1) That all interested agencies establish definite liaison channels as early in project planning as possible.
 - (2) Each participating agency appoint a single point of contact to consolidate requirements and route them through the Division Chief, JTU 8.1.4. This will insure scheduling support type work to least interfere with weapon deliveries and checkout.

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[REDACTED]

SUBJECT: In-Place Equipment Facilities

REFERENCES: Not Applicable

PROBLEM: Preplanning of in-place equipment facilities not adequate

DISCUSSION: Upon arrival at Barbers Point NAS, the AFSWC Instrumentation Branch was assigned a vacant room for its work area. The only equipment in the room was a 28 VDC generator and a 120V, 400 CPS generator. There were no work benches, tables, stools, chairs, or safes for classified material on hand. Work benches, tables, and stools had been ordered but were not yet delivered.

It was found that the 400 CPS generator was unusable due to an excessive amount of hash and ripple in the output. Also, the unit did not have the capacity required to supply both the AFSWC and EG&G shops.

RECOMMENDATION: It is recommended that the Chief of the Design facility instrumenting the diagnostic and drop aircraft be included in the advanced party. This individual would be cognizant of specialized and peculiar requirements for sections supporting the effort in the forward area. This would minimize delays after arrival of the main party in preparing the detached unit for operational missions.

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SUBJECT: Classified Film Processing Facilities

REFERENCES: Not Applicable

PROBLEM: Lack of Classified Film Processing Facilities

DISCUSSION: Upon arrival at Barbers Point, NAS, it was found that there were no facilities for processing classified color or black-and-white movie film. The problem was researched and found that none of the military installations in the area could support the project. Attention was then centered on the commercial processing facilities in the Honolulu area. After contacting every film processing studio on the Island, it was found that none had the required security clearance. In addition, only one studio could provide service for the two types of color film planned for use in Project DOMINIC.

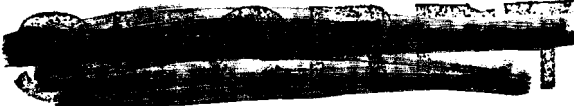
After consulting with JTF 8 at Hickam AFB, it was decided to award a contract to Glenn's Color Processing for all color film. Since the studio did not have a facility clearance, it was necessary to send two or three men into the studio with each batch of film. These men had to follow the film through all stages of processing and be familiar with film processing techniques. This resulted in the loss of service to the Instrumentation Branch of two or three men for an entire day and one man for half a day. In addition, the Instrumentation Branch lost the services of its vehicle for half a day resulting in a serious transportation problem. The number of men required varied from two to three depending upon the type of film being processed.

The black-and-white film did not present as much a problem as the color film.

The photographic laboratory at Barbers Point NAS supported Project DOMINIC in this area.


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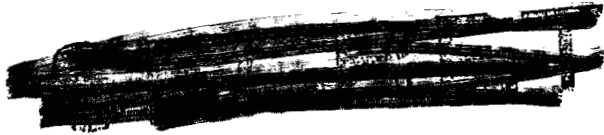
RECOMMENDATIONS:



It is recommended that all military installations on the Island of Oahu be queried regarding types and amounts of film they are capable of handling and if they would be able to support a project similar to DOMINIC. It might be possible to change the film presently in use to a type capable of being handled by a military installation. If this is not feasible or all installations indicate they would be unable to support a project, it is recommended that all commercial processing plants be contacted. If a plant can be found that can handle the projected work load, and types of film, a facility and personnel clearance should be initiated.

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VIII. MATERIEL

- A. Shipments from CONUS to Barbers Point
- B. Loss and Breakage





SUBJECT: Shipment from CONUS to Barbers Point

REFERENCES: Operations, Plan 2-62 Appendix 16 Annex D, Transportation

PROBLEM: Misrouting of Shipments

DISCUSSION: Operations Plan 2-62 Transportation Annex was quite explicit in shipping instructions. However, there was a breakdown in procedures between the sender and receiver inasmuch as coding and designations were not recognized by personnel along the routing; consequently, items plainly marked for Barbers Point ended up at Christmas Island or remained at Hickam for unacceptable lengths of time. This could be attributed to the enormous amount of supplies that suddenly descended upon both the aerial and water ports of embarkation during the initial phase of DOMINIC.

RECOMMENDATIONS: That transportation officers at staff level insure shipping instructions for special projects are clearly understood by personnel in the transportation channels through which supplies will be routed.

JTF 8 Ed. Horn





SUBJECT: Loss and Breakage

REFERENCES: AFM 71-4 "Report of Damage or Improper Shipment"

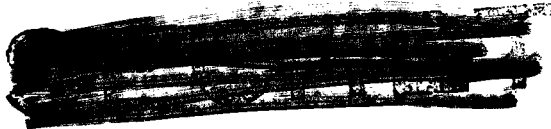
PROBLEM: Shipment of equipment and supplies from Kirtland to the forward area via MATS was unsatisfactory.

DISCUSSION: A large number of items were severely damaged in transit and some items were as long as one month in getting from Kirtland to Hickam.

RECOMMENDATION: Improved control and handling is necessary to prevent damage or delays in the shipment of hi-value and often highly sensitive items of test equipment.

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IX.. DIAGNOSTICS

- A. Diagnostic Element Facilities
- B. Diagnostic Instrumentation





SUBJECT: Diagnostic Element Facilities

REFERENCES: Not Applicable

PROBLEM: Inadequate in place equipment facilities

DISCUSSION: When the diagnostic element moved to Christmas Island much was found lacking in required facilities. The following are the main problem areas noted upon arrival.

- (1) No 115 Volt, 60 cycle power for aircraft air conditioners or the instrument van.
- (2) Inadequate supply of 115 Volt, 3 phase, 400 cycle power.
- (3) Inadequate working quarters for the instrumentation section.

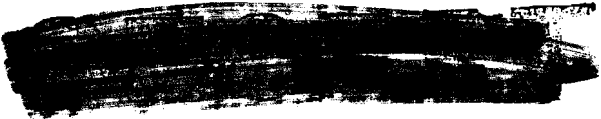
The following actions were taken to solve as much as possible of the problems:

- (1) Two months elapsed before 115 Volt power was available.
- (2) Two MD-4 generators were installed on the flight line.
- (3) The instrumentation section moved into an abandoned building. This kept the equipment drier but did not solve the dirt and humidity problems.

RECOMMENDATIONS: If a future test series is held in an area such as Christmas Island, power units should be either in place or air-transported before the arrival of the aircraft. The instrumentation section should have an airconditioned, clean building equal to facilities offered the laboratories.

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SUBJECT: Diagnostic Instrumentation

REFERENCES: Not Applicable

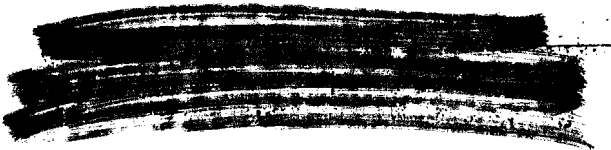
PROBLEM: Demonstrate the feasibility of Airborne Diagnostic Instrumentation

DISCUSSION: 1. Considerable progress has been made in the demonstration of an airborne diagnostic instrumentation capability. Electromagnetic, light, photographic and distance measurements have been reasonably successful. Failures to successfully collect data can be predominately attributed to time and experience factors rather than to the fact that the instruments are airborne. Reports of the performance of instrumentation installed by Sandia, LASL, LRL, and EG&G are not available at this time, and only incomplete results are available on the AFSWC distant measuring system. Problems encountered during the development and proving of the airborne concept are as follows:

- a. Time and experience factors.
- b. Geographical separation of operation groups.

2. The following is a synopsis of progress made in the above areas:

- a. Work started in October 1961 on the development of a distance measurement system. Accuracies of the order of .25% at ranges of the order of 15 nautical miles were requested. Test drops were made over WSMR and PMR to test the system. Results indicated that RMS errors of the order of 300 feet had been achieved, which is higher than the desired figure. Calibrations were made in a ground array.
- b. In February it was determined that the C-130 aircraft would operate from Christmas Island and the 3-52 and weapon would operate from Barbers Point. Equipment was assembled in carts for independent calibration of all transponders. This method of calibration was used on all events prior to the CHETCO event. No data was published using these calibrations, due to failure of the distance derived from the two frequencies to agree within a reasonable tolerance.





c. Since the CHETCO event, all devices have been calibrated in an array with the B-52 and both C-130 aircraft. Results since the CHETCO event have appeared reasonable and yield calculations by EG&G have generally confirmed this conclusion. All yield measurements from the C-130 aircraft that have been calculated have been within 5% of the mean value obtained from ground instrumentation with the exception of one. Rechecks of data are underway to determine the cause of the one specific 10% deviation. Deviations of 5% in yield from ground instrumentation are understood to be not uncommon. Preliminary results indicate that airborne yield measurements are on the average somewhat higher than those obtained from ground instrumentation. The C-130 aircraft are assigned altitudes approximately the same level as the burst and may be subject to lower refraction errors than ground based instrumentation. It is not known at this time if dimensional stability of films with respect to temperature is being considered by EG&G or if this will effect measurements used in final reports. Temperature at ground installations are undoubtedly higher than those of airborne installations.

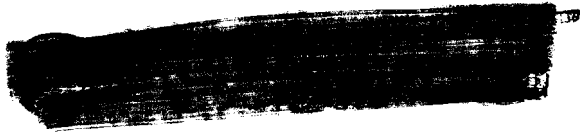
3. In the effort to prove the airborne diagnostic concept it has been necessary for many individuals to shuttle back and forth from Christmas Island and Barbers Point. The C-130 aircraft were required to fly an additional eight hours to calibrate a weapon.

RECOMMENDATIONS:

1. An organization be assembled and maintained within the Air Force to pursue the study and perfection of airborne diagnostic instrumentation. A firm relationship be established with participating agencies to continue the harmonious relationship that developed during the DOMINIC test series.
2. Responsibilities be established well in advance of an operation. This should include the plans for systematic evaluation of instrumentation.
3. If at all possible, primary units of control should be at the same geographical location. Communications can thus be more precise and timely.
4. That the DME system be modified to include the following features:



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- a. Inflight calibration
- b. The provisions for automatic transfer of the master station data acquisition between the C-130 aircraft should a malfunction develop in the selected aircraft master station during flight.
- c. More accurate and efficient data recovery preferably with airborne computations.

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X. SECURITY

A. Security





SUBJECT: Security

REFERENCES: JTF 8 Classification Guide

PROBLEM: Security Guidance

DISCUSSION: During the preparatory stage at Kirtland AFB for DOMINIC a need existed for security indoctrination of personnel. Lectures arranged for 2nd presented were extremely broad and not of an authoritative nature. Although it is understood that copies of JTF 8 Classification Guides were sent to Kirtland AFB, the organization at Barbers Point did not receive distribution and was not aware that such a publication existed until four months after its printing. During the earlier months of the actual test series, the lack of guidance at Barbers Point was still apparent. Procedures established with the assistance and approval of the J-2 representative were in instances later found to be in conflict with the desires of JTF 8. This was especially true in the handling of personal film at Barbers Point containing cloud pictures and the clearance of documentary film obtained from the C-130 aircraft at Christmas Island utilizing AFSWC installed cameras .

RECOMMENDATION: To fix and adhere to one policy.

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