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OPERATION IVY

**Report to the Scientific Director
Documentary Photography**

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**J. L. Gaylord
Lookout Mountain Laboratory
Los Angeles, CA**

1 February 1953

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<p>The objective of Task Unit 9 was to record on film, both still and motion picture, the activities connected with certain events and programs of OPERATION IVY. This documentation will serve as a basis for (1) a photographic record for historical purposes; (2) a motion-picture report by the Commander, JTF 132 to the JCS and to the Atomic Energy Commission, depicting the scope and conduct of OPERATION IVY; (3) still and motion-picture photography for special scientific reports; (4) photography for future training and technical services; and (5) special photography as assigned by Commander, Task Group 132.1, and Commander, JTF 132.</p> <p>Task Unit 9 accomplished all the necessary field photography and was still in the process of editing this footage at Lookout Mountain Laboratory to form a completed motion picture record at the time this report was written.</p>				
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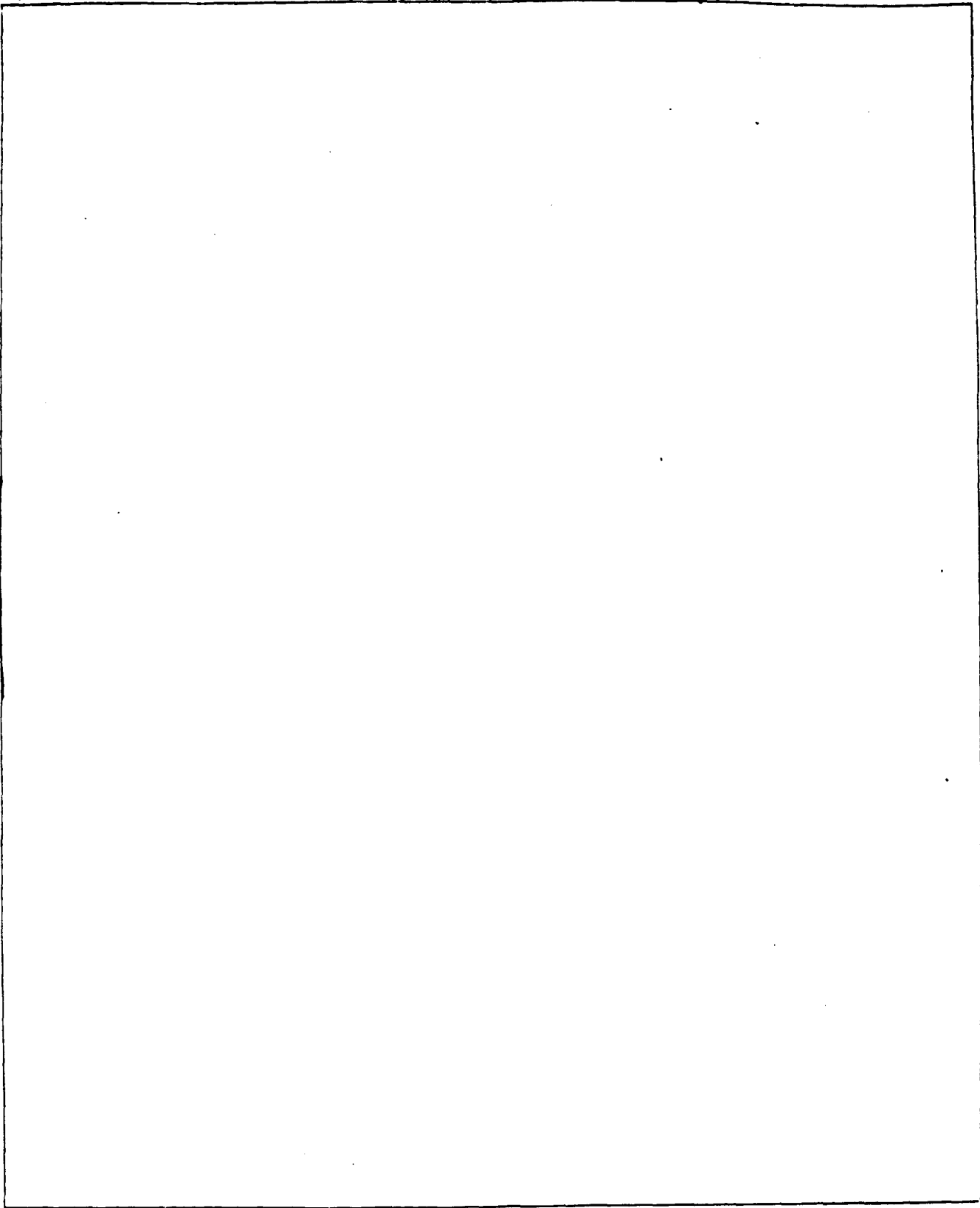
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FOREWORD

Classified material has been removed in order to make the information available on an unclassified, open publication basis, to any interested parties. The effort to declassify this report has been accomplished specifically to support the Department of Defense Nuclear Test Personnel Review (NTPR) Program. The objective is to facilitate studies of the low levels of radiation received by some individuals during the atmospheric nuclear test program by making as much information as possible available to all interested parties.

The material which has been deleted is either currently classified as Restricted Data or Formerly Restricted Data under the provisions of the Atomic Energy Act of 1954 (as amended), or is National Security Information, or has been determined to be critical military information which could reveal system or equipment vulnerabilities and is, therefore, not appropriate for open publication.

The Defense Nuclear Agency (DNA) believes that though all classified material has been deleted, the report accurately portrays the contents of the original. DNA also believes that the deleted material is of little or no significance to studies into the amounts, or types, of radiation received by any individuals during the atmospheric nuclear test program.

Report to the Scientific Director

DOCUMENTARY PHOTOGRAPHY

By

**James L. Gaylord
Lt Col, USAF**

**Lookout Mountain Laboratory
Los Angeles, California
February 1963**

**SCENES OF
MIKE AND KING DETONATIONS**



Mike Detonation



5



Mike Detonation



King Detonation



King Detonation

ABSTRACT

The objective of Task Unit 9 was to record on film, both still and motion picture, the activities connected with certain events and programs of Operation Ivy; this documentation was to serve as a basis for:

1. A photographic record for historical purposes.
2. A motion-picture report by the Commander, Joint Task Force 132 to the Joint Chiefs of Staff and to the Atomic Energy Commission, depicting the scope and conduct of Operation Ivy.
3. Still and motion-picture photography for special scientific reports.
4. Photography for future training and technical services.
5. Special photography as assigned by Commander, Task Group 132.1, and Commander, Joint Task Force 132.

In order to obtain the foregoing objective, a photographic unit, known as Task Unit 9, was organized to operate directly under the Scientific Task Group, 132.1. This unit accomplished the necessary field photography and, at the time this report was written, was still in the process of editing this footage at Lookout Mountain Laboratory to form a completed motion-picture record.

PREFACE

This report is the final summation of the activities of Task Unit 9 in obtaining the documentary photography during Operation Ivy.

It is intended to replace the preliminary report of Task Unit 9 submitted to the Commander, Task Group 132.1, on 3 December 1952.

CONTENTS

	Page.
ABSTRACT	9
PREFACE	11
CHAPTER 1 REPORT OF OPERATIONS — ZONE OF INTERIOR PHASE	17
1.1 Activation of Unit	17
1.1.1 Objectives	17
1.1.2 Personnel	17
1.2 Photographic Aircraft	18
1.2.1 Procurement	18
1.2.2 Modification	18
1.2.3 Photographic Flight Crews	23
1.3 Logistics	23
1.3.1 Specialized Equipment	23
1.3.2 Movement	30
1.4 Budget	30
1.5 Security	31
1.6 Operation During the Zone of Interior Phase	31
1.6.1 Script	31
1.6.2 Zone of Interior Photography	33
1.6.3 Project 3.7	33
CHAPTER 2: REPORT OF OPERATIONS — OVERSEAS PHASE	34
2.1 Organizational Setup	34
2.2 Operational Procedures	35
2.2.1 Work Orders	35
2.2.2 Security Control	35
2.2.3 Film Processing	35
2.2.4 Communications	35
2.2.5 Remote Camera Installation and Recovery	35
2.2.6 Aerial Practice Missions	50
2.2.7 RB-50 Mapping Missions	50
2.3 Mike Day Operations	53
2.3.1 Aerial	53
2.3.2 Remote Cameras	53
2.4 King Day Operations	53
2.4.1 Aerial	53
2.4.2 Remote Cameras	53
2.5 Roll-up	60

CONTENTS (Continued)

	Page
CHAPTER 3 RESULTS	61
CHAPTER 4 CONCLUSIONS	62
4.1 Activation of the Unit	62
4.1.1 Personnel	62
4.1.2 Equipment	62
4.1.3 Organization	62
4.2 Operations	63
4.2.1 Procedures	63
4.2.2 Crew Training	63
4.2.3 Control of Aircraft	63
4.2.4 Roll-up	63
CHAPTER 5 RECOMMENDATIONS	64
5.1 Activation of the Unit	64
5.1.1 Personnel	64
5.1.2 Equipment	64
5.1.3 Organization	65
5.2 Operations	65
5.2.1 Procedures	65
5.2.2 Crew Training	65
5.2.3 Control of Aircraft	65
5.2.4 Roll-up	65

ILLUSTRATIONS

SCENES OF MIKE AND KING DETONATIONS

Mike Detonation	4
Mike Detonation	5
King Detonation	6
King Detonation	7

CHAPTER 1 REPORT OF OPERATIONS—ZONE OF INTERIOR PHASE

1.1 TU 9 Organizational Chart	19
1.2 C-54 Photographic Aircraft, Showing Camera Installation and Slip-stream Spoiler	20
1.3 Flexible Racks for Motion-picture Cameras Installed in C-54 Photographic Aircraft	21
1.4 Flexible Racks for Aerial Still Cameras Installed in C-54 Photographic Aircraft	22
1.5 Breathing-oxygen Equipment for Installation in C-54 Photographic Aircraft	24
1.6 Electrical Power-distribution, Signal, and Intervalometer Panel in C-54 Photographic Aircraft	25
1.7 Auto-remote Camera Installations	26

ILLUSTRATIONS (Continued)

	Page
1.8 Design of Camera Boom	27
1.9 Special-purpose Camera Boom in Use	28
1.10 Camera Boom, Showing Installation on Weapons Carrier	29
1.11 Photographic Crew at National Bureau of Standards Liquid-hydrogen Plant, Boulder, Colo.	32
 CHAPTER 2 REPORT OF OPERATIONS—OVERSEAS PHASE	
2.1 Photography Work-order Form	36
2.2 Photography Caption-sheet Form	37
2.3 Camera Sound Crew on Location Aboard USS Estes	38
2.4 Camera Sound Crew on Location Aboard USS Estes	39
2.5 Obtaining Sound Effects Alongside Runway at Eniwetok	40
2.6 Still Photographer Covering King Detonation from Tower on Parry Island	41
2.7 Still Photographer Covering Inspection by General Clarkson, Commander, JTF 132	42
2.8 Camera Sound Crew During Location Shooting on Beach at Eniwetok	43
2.9 Location Shooting at Eniwetok	44
2.10 Cameraman Covering Night Take-offs on Kwajalein	45
2.11 Installation of Auto-remote Camera	46
2.12 Auto-remote Camera Installed in Special Casing on Engebi Island	47
2.13 Location of Auto-remote Camera Stations for Mike Day	48
2.14 Location of Auto-remote Camera Stations for King Day	49
2.15 RB-50 Photographic Aircraft on Fire at Eniwetok, 23 October 1952	51
2.16 Close-up View of RB-50 Photographic Aircraft Destroyed by Fire, Eniwetok, 23 October 1952	52
2.17 C-54 Photographic-aircraft Flight Patterns for Mike Day	54
2.18 C-54 Photographic-aircraft Camera Installations	57
2.19 C-54 Photographic-aircraft Flight Patterns for King Day	58
2.20 RB-50 Photographic-aircraft Flight Patterns for King Day	59

TABLES

CHAPTER 1 REPORT OF OPERATIONS—ZONE OF INTERIOR PHASE

1.1 Air- and Water-lift Movement of Equipment to and from Operation Site	30
1.2 Air- and Water-lift Movement of Personnel to and from Forward Area	31

CHAPTER 2 REPORT OF OPERATION—OVERSEAS PHASE

2.1 Evacuation of TU 9 Personnel from Eniwetok for Mike Day	34
2.2 Photography Operations Schedule for Mike Day, TU 9	55
2.3 Photography Operations Schedule for King Day, TU 9	56

CHAPTER 3 RESULTS

3.1 Types and Amounts of Film Exposed for Operation Ivy	61
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CHAPTER 1

REPORT OF OPERATIONS—ZONE OF INTERIOR PHASE

1.1 ACTIVATION OF UNIT

Following preliminary conferences between members of Joint Task Force (JTF) 132, Headquarters U. S. Air Force, Task Group (TG) 132.1, and Lookout Mountain Laboratory, Task Unit 9 (TU 9) was activated by General Orders No. 3, Headquarters Task Group (HTG) 132.1, Los Alamos, N. M., on 22 January 1952 pursuant to authority of Section 1, General Orders No. 1, Headquarters, JTF 132 dated 2 January 1952.

1.1.1 Objectives

Complete documentary motion-picture and still coverage of Operation Ivy was required and obtained to produce a scientific historical documentary motion picture of Operation Ivy that would summarize the record of the operation and would not be limited by security classification. This film will not be required to contain Top Secret Restricted Data. Such data will be included, however, if deemed necessary to portray the history of the operation. In the event that this film is Top Secret, only three prints will be made, with distribution as follows: AEC, Washington, D. C.; Chief, AFSWP, Washington, D. C.; and AEC, Los Alamos, N. M.

In the event that the film being produced is given a final security classification of Top Secret, it will be reedited to produce a film with a lower security classification so that it may be shown to larger audiences. To produce this version, all Top Secret sequences will be removed to make the classification no higher than Secret. Seven copies of this reedited version will be made and distributed as follows: JTF 132, Washington, D. C.; AEC, Washington, D. C.; Chief of Staff, Army; Chief, Naval Operations; Chief of Staff, USAF; Chief, AFSWP, Washington, D. C.; and AEC, Los Alamos, N. M.

Complete still coverage of Operation Ivy, including photographs for historical purposes, was required of the various Task Units and Task Groups.

All film exposed on Operation Ivy is to be catalogued and indexed. Cataloguing will be accomplished utilizing the microfilm process, with one copy of the final catalog to be distributed to AEC, Los Alamos, N. M., and one copy to AFSWP, Washington, D. C. AFSWP is to be the coordinating authority for additional prints of any stock footage shown in the catalog that are required by Department of Defense agencies.

No restrictions have been imposed on the length of the documentary film; however, approximately 60 min running time is desirable. The film is to document Operation Ivy, the problems encountered and the solutions to these problems.

1.1.2 Personnel

(a) *Procurement.* Personnel for TU 9 was for the most part drawn from the U. S. Air Force, Lookout Mountain Laboratory. This group consisted of 8 officers, 6 airmen, and 13

civilians permanently assigned to Lookout Mountain Laboratory but detailed to TU 9 for the duration of Operation Ivy.

In order to supplement this group, TU 9 requested TG 132.1 to initiate a request to JTF 132 to supply an additional complement of 18 persons; this group was to possess appropriate photographic specialties and to be physically qualified for overseas-duty assignment.

Of the 18 people requested, 10 were lost to TU 9 for the following reasons:

Physically unqualified	2
Professionally unqualified	1
Insufficient time remaining in current enlistment to allow overseas assignment	2
Clearance denials	2
Clearance not initiated in time to be completed prior to assignment to operational duty	3

Therefore 10 staff members of Lookout Mountain Laboratory were detailed from assignments on other projects to replace these 10 people. This occasioned a serious handicap to the fulfillment of other projects previously committed by Lookout Mountain Laboratory.

(b) *Radiation Physical Examinations.* Lookout Mountain Laboratory has no medical facilities; therefore the required radiation physical examinations were obtained for all personnel, military and civilian, through the cooperation of the director of the Atomic Energy Project at the University of California, Los Angeles, using the medical facilities of that organization.

(c) *Organization.* Since TU 9 was to operate from two bases in the Forward Area, Kwajalein and Eniwetok, it was organized as illustrated in the organizational chart (Fig. 1.1).

1.2 PHOTOGRAPHIC AIRCRAFT

1.2.1 Procurement

Three C-54 aircraft were assigned to TU 9 from the Military Air Transport Service (MATS) for use during the operation.

One RB-50 aircraft was assigned from the Strategic Air Command (SAC), and a replacement was obtained following the destruction by fire on Eniwetok of the original aircraft (Sec. 2.2.7).

1.2.2 Modification

No modification was needed on the RB-50 aircraft. It was necessary to modify the C-54 aircraft for photographic purposes as follows:

1. A multiple-camera flexible rack was fabricated and installed at the cargo-door position of each aircraft (see Figs. 1.2 to 1.4). Design and fabrication of these racks were accomplished by the Technical Photographic Services Section at Wright-Patterson Air Force Base, Dayton, Ohio.

Installation of the racks was accomplished by the 1500th Maintenance Group, MATS, Hickam Air Force Base, Hawaii. Installations on the C-54's which were done at Hickam Air Force Base were made at that location because the three C-54 aircraft were based there.

2. A slip-stream spoiler was fabricated and installed at the leading edge of the cargo door. This was necessary to reduce wind buffeting of cameras in flight when the cargo door was removed. This work was accomplished by the 1500th Maintenance Group, MATS, at Hickam.

3. Installation and wiring of a 110-volt auxiliary power source was necessary. This involved the installation of special generator equipment and was done by the 1500th Maintenance Group, MATS, at Hickam.

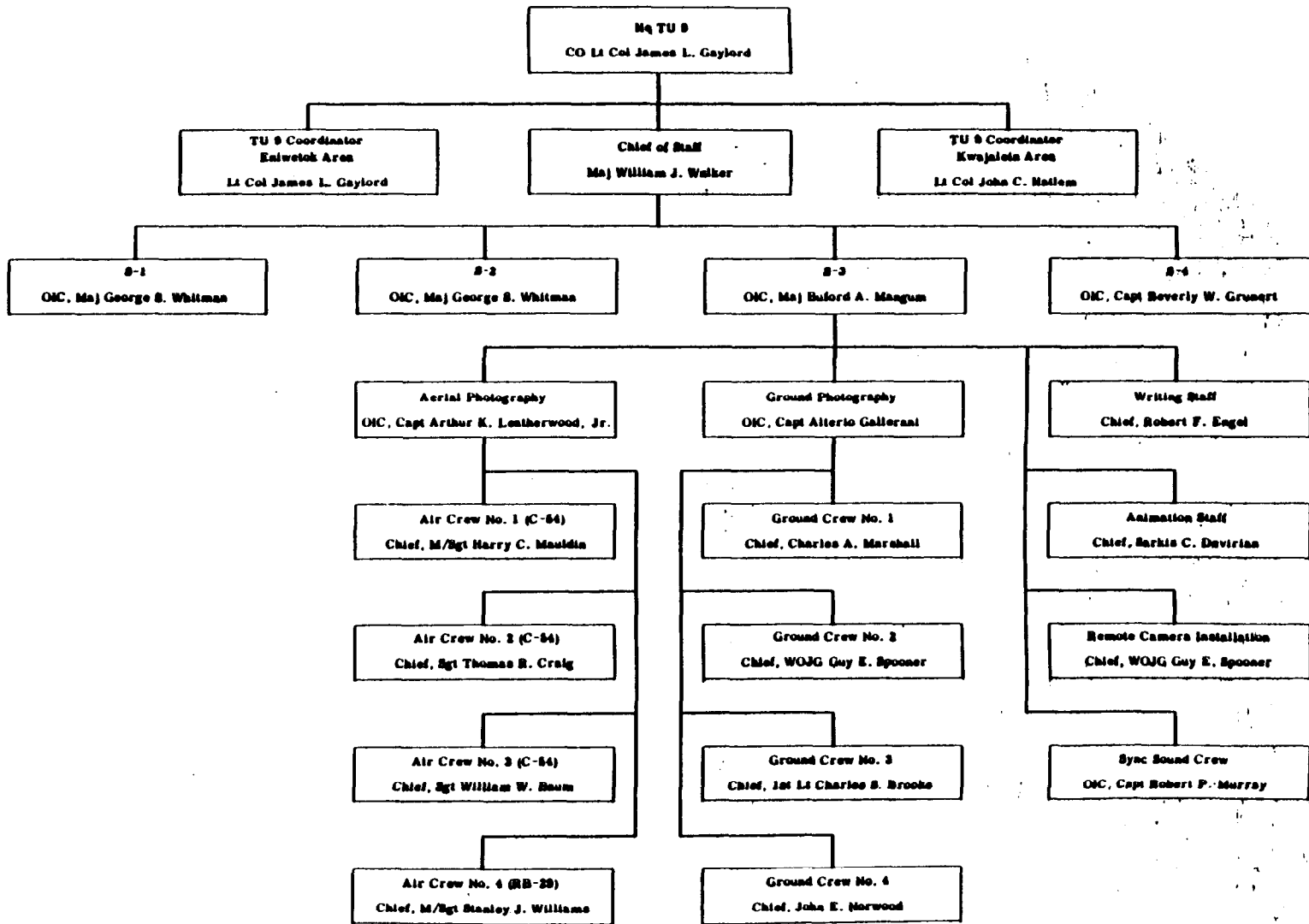


Fig. 1.1—TU 9 organizational chart.

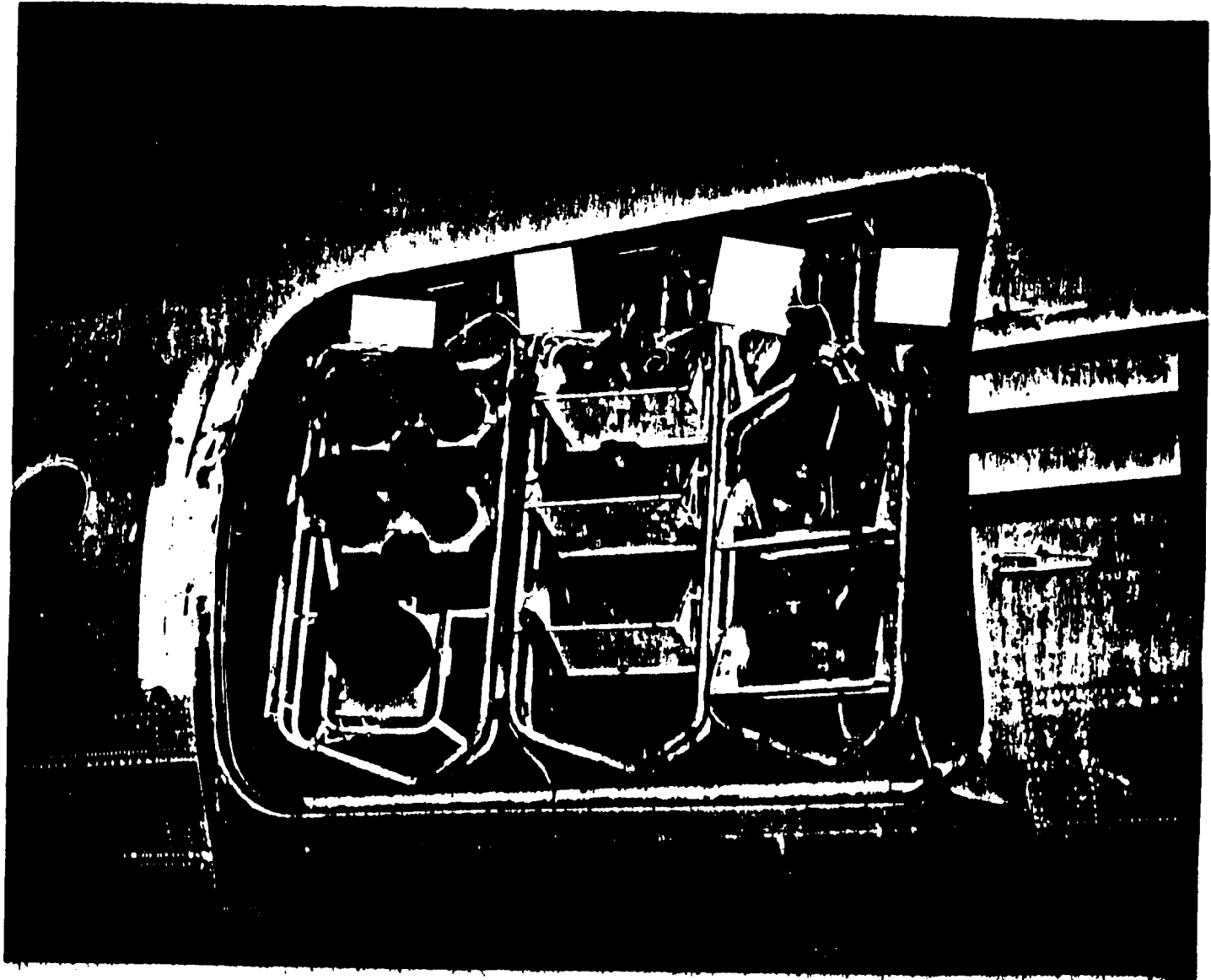


Fig. 1.2—C-54 photographic aircraft, showing camera installation and slip-stream spoles,



Fig 1.3—Flexible racks for motion-picture cameras installed in C-54 photographic aircraft.



Fig 1.4—Flexible racks for aerial still cameras installed in C-54 photographic aircraft.

4. Special communications equipment was installed at the cargo-door position to provide five jackboxes and earphones and one microphone outlet. This equipment was installed by the 1500th Maintenance Group, MATS, at Hickam.

5. Since the possibility of radiation exposure was present, provision had to be made for five oxygen outlets capable of supplying 100 per cent oxygen to photographic-crew members at the cargo-door position (Fig. 1.5). This equipment was fabricated and installed by the 1500th Maintenance Group, MATS, at Hickam.

6. Fabrication and installation of an electrical power-distribution and signal panel (Fig. 1.6) to supply various types of power to cameras in the racks were necessary. Fabrication was accomplished at Lookout Mountain Laboratory, and installation was made by the 1500th Maintenance Group, MATS, at Hickam.

1.2.3 Photographic Flight Crews

Photographic-crew members were selected from members of TU 9, as determined by the experience and skills of each person. Appropriate ground training was given at Lookout Mountain Laboratory.

Twenty-two persons were selected for flight duty. Included were four complete crews for C-54 aircraft (one for reserve) and additional personnel to man cameras in the RB-50 and other aircraft where positions could be made available.

The necessity for requesting flight status for additional crew members over and above the immediate need was amply justified during Operation Ivy. During the aerial photography on Mike Day, the crew members of the crater-survey aircraft received levels of radiation exposure which precluded their flying on King Day or at any location where additional radiation exposure was possible.

1.3 LOGISTICS

1.3.1 Specialized Equipment

Design, fabrication, and/or procurement of specialized equipment for use by TU 9 was an important aspect of the preoperational phase.

1. Casings for six remotely operated cameras were designed by Lookout Mountain Laboratory and fabricated by local commercial facilities. Proof testing of these casings was carried out in the Nevada experiments in May and June 1952, and based upon results of these tests certain modifications of the casings were incorporated for use on Operation Ivy. The design and configuration of these casings were as illustrated in Fig. 1.7.

2. Special camera booms were designed by Lookout Mountain Laboratory for installation on weapons carriers in order to facilitate operations in the field. These were fabricated by local commercial facilities. They were invaluable equipment for ease of rapid portability and for obtaining certain photographic effects. The design was as illustrated in Fig. 1.8. Pictures of the camera boom in use are shown in Figs. 1.9 and 1.10.

3. Special-purpose radio equipment for installation in vehicles and for island-to-island communication was requested early in the operation. After clearance by the JTF communications officer, six Motorola radios plus one base station were procured from funds allotted to TU 9 for specialized equipment. The basis for granting approval for use of this equipment by TU 9 was that, since TU 9 was a part of a permanent organization, such equipment could be used experimentally on Operation Ivy and, if acceptable in performance, would continue to be used by Lookout Mountain Laboratory in future operations and on any Nevada tests.

4. Four weapons carriers were procured from the Department of the Army and converted to special-purpose camera vehicles by installing the camera boom described earlier.

5. One administrative-office trailer was renovated and air-conditioned by the 822nd Air Force Specialized Depot, Maywood, Calif. One equipment trailer was renovated by the same



Fig. 1.5—Breathing-oxygen equipment for installation in C-54 photographic aircraft.

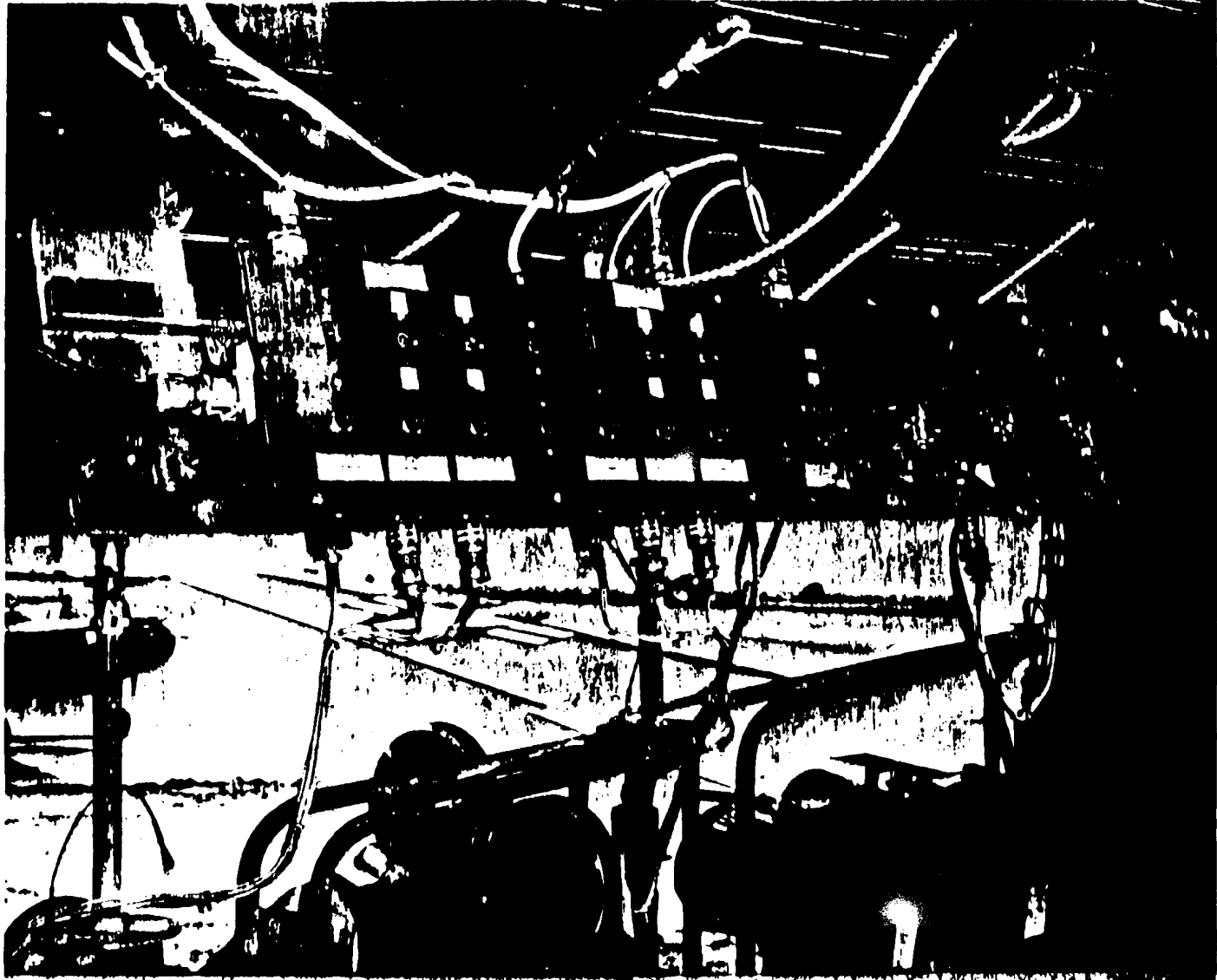


Fig. 1.6—Electrical power-distribution, signal, and intervalometer panels in C-54 photographic aircraft.

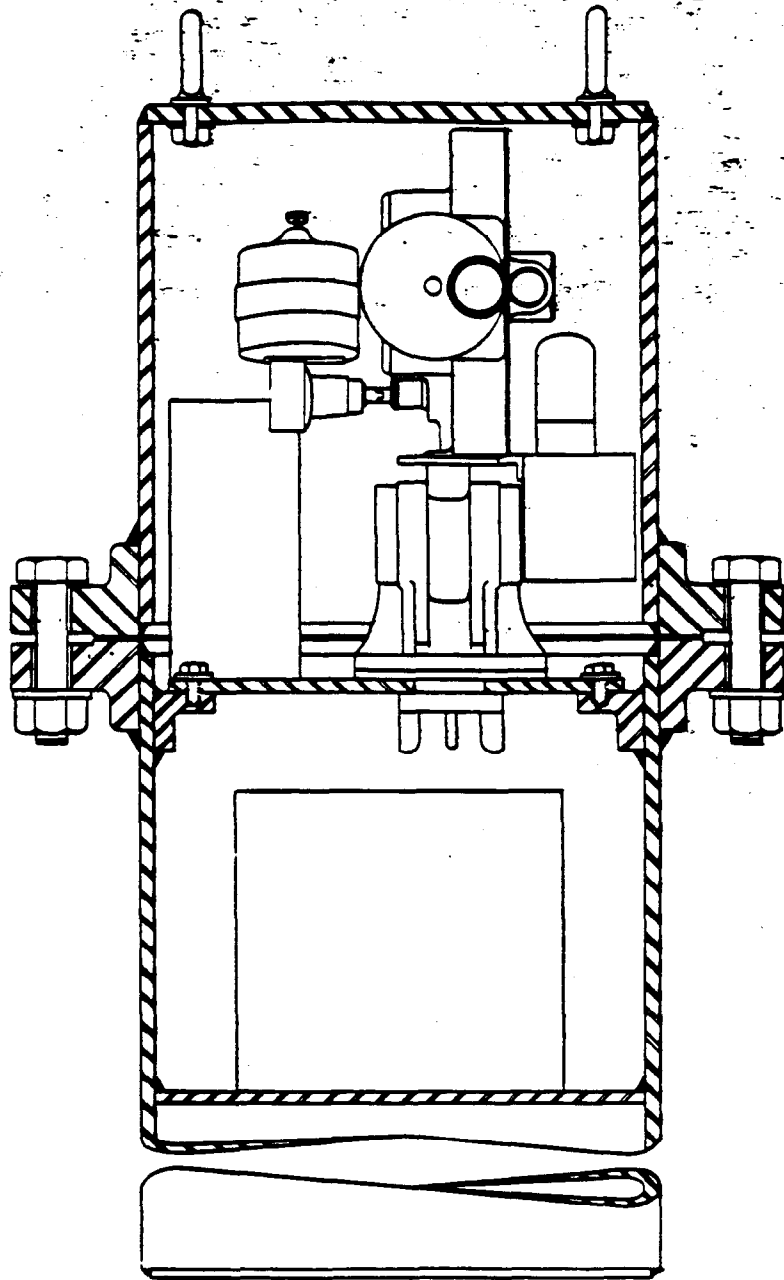


Fig. 1.7—Auto-remote camera installations.

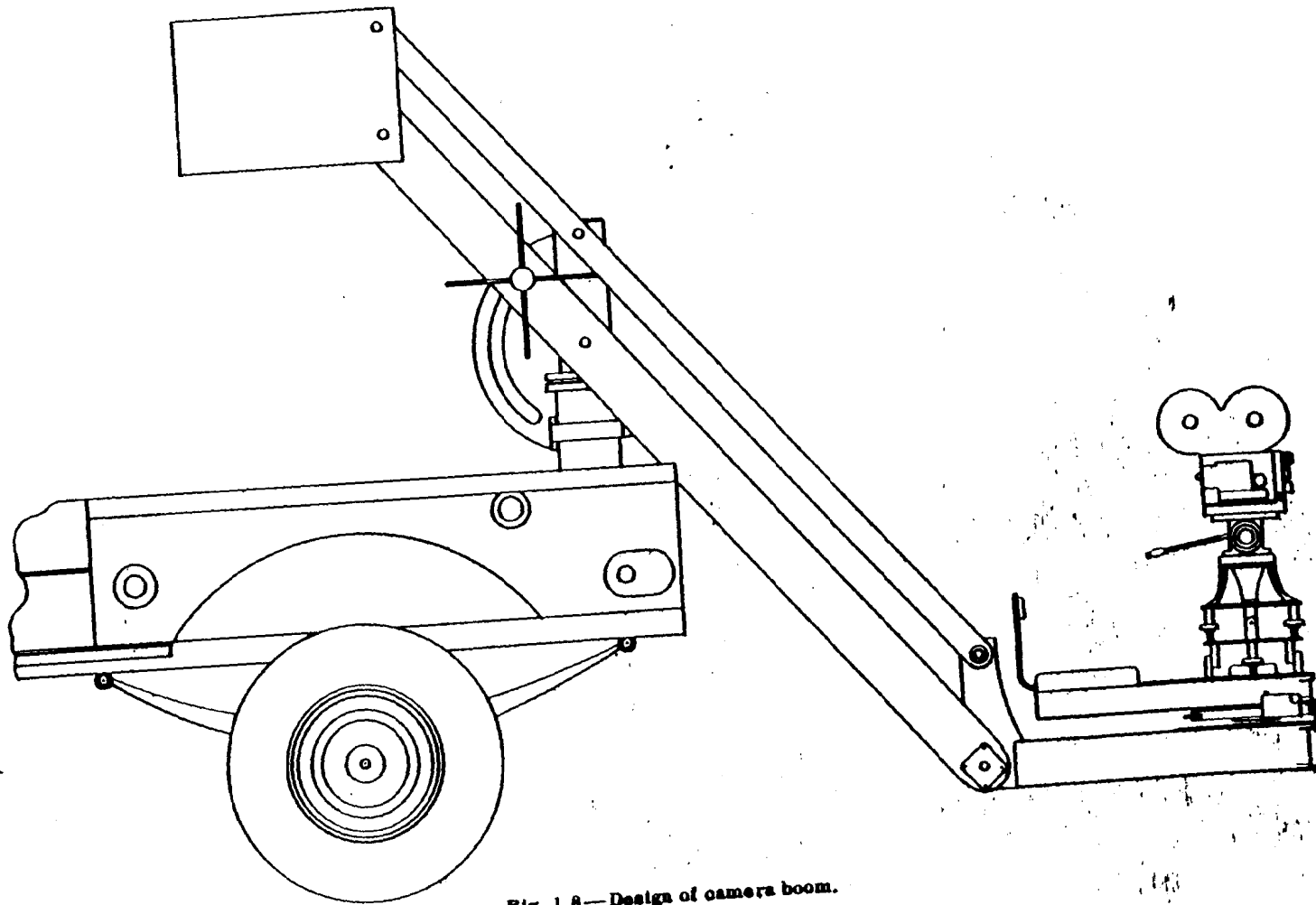


Fig. 1.8—Design of camera boom.

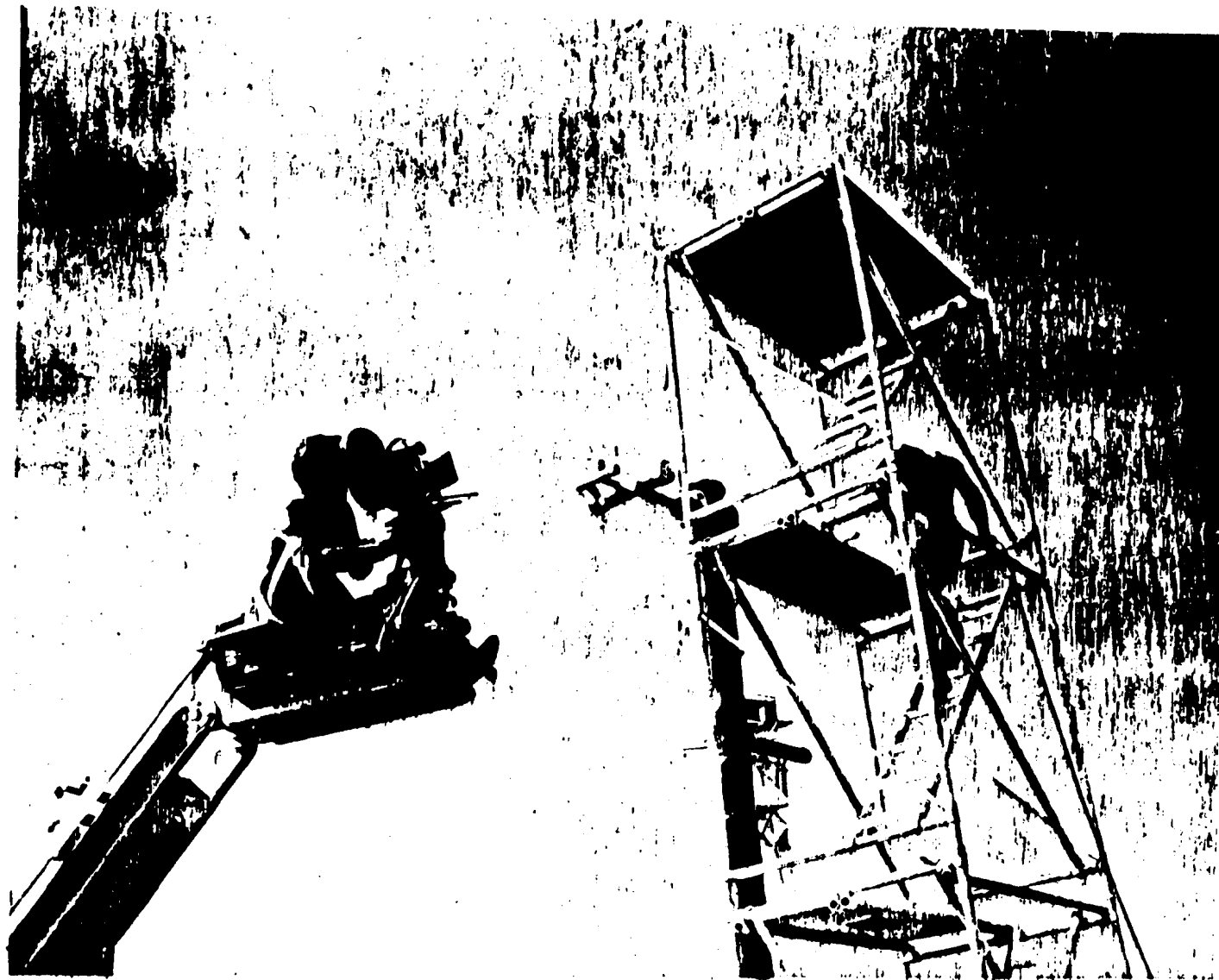


Fig. 1.9 —Special-purpose camera boom in use.

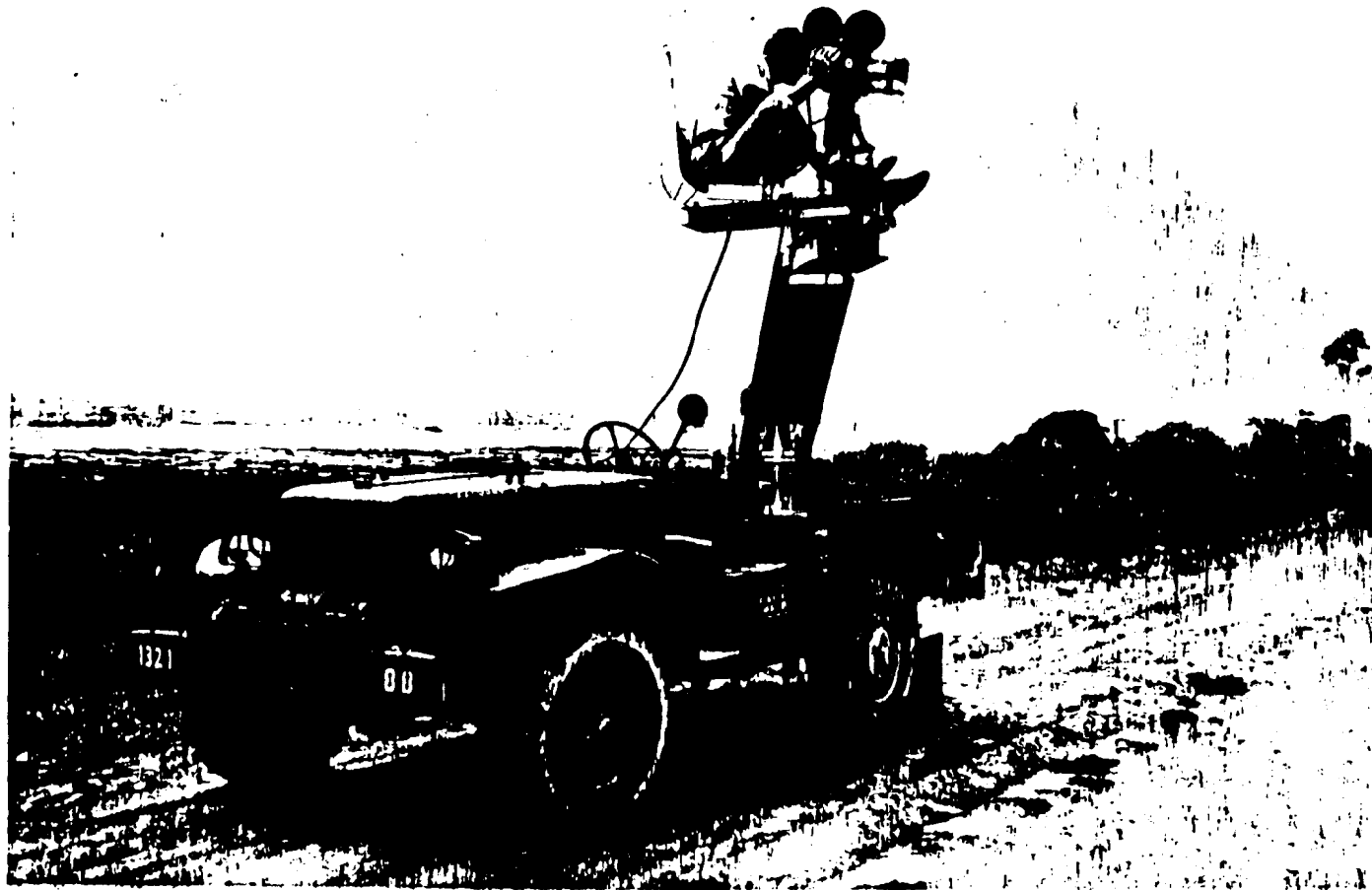


Fig. 1.10—Camera boom, showing installation on weapons carrier.

unit, and both trailers, loaded with water-lift camera equipment, were dispatched to the Forward Area in September 1952.

1.3.2 Movement

Air- and water-lift movement of equipment and personnel to and from the operations site was as shown in Tables 1.1 and 1.2.

Table 1.1—AIR- AND WATER-LIFT MOVEMENT OF EQUIPMENT TO AND FROM OPERATION SITE

Movement	Pounds	Tons	Cube
9 September to 15 October			
To operation site:			
Air	26,934	13.5	1,870
Water	99,116	49.5	11,649
Totals	126,050	63.0	13,519
To Eniwetok:			
Air	15,775	7.9	1,139
Water	68,125	34.0	6,747
Totals	83,900	41.9	7,886
To Kwajalein:			
Air (Project 3.7)	5,768	2.9	258
Water (Project 3.7)	12,804	6.4	890
Air (TU 9)	5,391	2.2	473
Water (TU 9)	18,187	9.0	4,012
Totals	42,150	21.0	5,633
25 November to 1 December			
Return from operation site to Lookout Mt. Lab.:			
Air	7,500	3.8	397
Water	112,293	56.0	12,889
Totals	119,793	59.8	13,286

1.4 BUDGET

The approved budget, broken down in the following tabulation, amounted to a total of \$142,100.

01	Civil overtime	\$ 11,220
02	Temporary duty	23,880
03	Freight and express	1,000
07	Contractual services	50,000
08	Material and supplies	46,000
09	Equipment	10,000
	Total	\$142,100

Table 1.2—AIR- AND WATER-LIFT MOVEMENT OF PERSONNEL
TO AND FROM FORWARD AREA*

Date	Officers	Airmen	Civilians	Date	Officers	Airmen	Civilians
Departed for Forward Area:				2 Oct.	1		
21 Mar.			2	9 Oct.			1
25 July		3	1	13 Oct.			2
31 July	1	1	1	25 Oct.			1
29 Aug.			1	29 Oct.			1
3 Sept.	2	3	1	31 Oct.			3
8 Sept.	7	6	8	1 Nov.			2
9 Sept.		1		5 Nov.	1		
15 Sept.		1	1	6 Nov.			1
17 Sept.			2	8 Nov.			2
23 Sept.	1			10 Nov.		2	
27 Sept.			1	11 Nov.	1		
1 Oct.		1		13 Nov.	1		1
10 Oct.			1	15 Nov.			1
13 Oct.			1	17 Nov.	1		1
17 Oct.			1	18 Nov.	2		
18 Oct.	1		1	20 Nov.	1		
24 Oct.			1	21 Nov.	3	10	5
				23 Nov.		2	1
Returned from Forward Area				25 Nov.	1		
8 Apr.			2	12 Dec.		1	
31 Aug.		1					

*All movements were by air.

1.5 SECURITY

Rigid security controls were established for the handling of all film and classified material. All film, both still and motion-picture, was classified and handled as Secret Restricted Data prior to exposure. Following exposure, film was classified as either Secret Restricted Data or Top Secret Restricted Data, depending upon the subject matter, and was then held for review by the classification officer of TG 132.1 for any downgrading. In this way the film accountability was assured and maintained.

Special couriers were designated for the transport of all exposed and unexposed film between the Zone of Interior and overseas sites. Courier orders for each individual designated that the primary duty would be to transport this film, thereby ensuring prompt and secure delivery of the material.

1.6 OPERATIONS DURING THE ZONE OF INTERIOR PHASE

1.6.1 Script

The complete first draft of the documentary motion-picture script was prepared during the period 1 February 1952 to 31 July 1952. The script was coordinated with all appropriate agencies, such as the staff of JTF 132, Atomic Energy Commission, TG 132.1, and TG 132.4, to ensure technical accuracy and treatment suitability.



Fig. 1.11 —Photographic crew at National Bureau of Standards liquid-hydrogen plant, Boulder, Colo.

1.6.2- Zone of Interior Photography

Photographic crews were dispatched from Lookout Mountain Laboratory on 10 July 1952 and 23 July 1952 for purpose of photographing certain phases of the cryogenics and assembly work at Los Alamos as called for in the script.

On 23 July 1952 additional cryogenics scenes were photographed at the National Bureau of Standards cryogenics plant at Boulder, Colo. (see Fig. 1.11).

On 12 July 1952 photographs of the trial assembly at Buffalo, N. Y., were obtained.

1.6.3- Project 3.7

On 7 May 1952 Project 3.7 was assigned to TU 9 by AFSWP through the Air Force Research and Development Command. The purposes of this project were (1) to locate ground zero of Mike Detonation through back triangulation (data to be obtained through aerial, vertical, still photography) and (2) to determine the depth and width of the crater, the height of crater lips, and the depth of debris fallback in the crater. The requirement for the second phase of the project was later canceled.

In conjunction with the aerial photography of Project 3.7, TU 9 was assigned to obtain aerial photographs of Eniwetok and Bikini atolls for the engineering staff of TG 132.1. These photographs were for the purpose of preparing photomosaics from which accurate, up-to-date charts of these atolls could be prepared.

A fund of \$35,000 was allotted to TU 9 for the accomplishment of this project, of which all but \$10,000 was subsequently returned.

This project is the subject of a separate report now in preparation.

CHAPTER 2

REPORT OF OPERATIONS—OVERSEAS PHASE

2.1 ORGANIZATIONAL SETUP

The organization was as outlined in the TU 9 organizational chart shown in Fig. 1.1. In the early phase of operation the Eniwetok unit comprised a total of 30 persons: 8 officers, 11 airmen, and 11 civilians. Of this total, one crew, consisting of one officer, one civilian, and three airmen, was dispatched to the Mike Shot area for full-time duty to document the Mike assembly progress in that area.

Administrative, operational, and living space at Eniwetok were provided by TG 132.1.

The Kwajalein unit comprised a total of six persons: two officers, three airmen, and one civilian. Operational and camera-repair space was provided by TG 132.4. Camera-storage and administrative space was provided by TU 9 through the utilization of special-purpose trailers.

By M-3 day all personnel of TU 9 on Eniwetok were evacuated and distributed as shown in Table 2.1.

Table 2.1 — EVACUATION OF TU 9 PERSONNEL FROM ENIWETOK FOR MIKE DAY

No. persons	Date	Base	Assignment
5	M-2	USS Curtiss	Proceed to Kwajalein M+1 day
3	M-1	USS Rendova	Installation-recovery team for remote cameras; recovery to be made as soon as cleared by the Radiological Safety Group
1	M-3	USS Estes	
1	M-3	USS Rendova	Return to Eniwetok for airlift to Zone of Interior
1	M-3	USS Shanks	Proceed to Kwajalein
14	M-3	Kwajalein	Air crew members to participate in M-3 dress rehearsal, then to proceed to base at Kwajalein
6	M-10	Kwajalein	Sound crew

2.2 OPERATIONAL PROCEDURES

2.2.1 Work Orders

Photography for each scene of the approved script was accomplished according to written work orders (Fig. 2.1) prepared by the Operations Section of TU 9. After completion of the assigned photography, work orders and completed caption sheets (Fig. 2.2) were returned, and data from these were entered on a master control board, where up-to-date daily progress could be noted. Caption sheets were then forwarded with exposed film to aid in the cataloguing process.

Figures 2.3 to 2.10 show camera crews and individual photographers executing various assignments.

2.2.2 Security Control

Security of film and classified documents was tightly controlled. Film was secured in a locked refrigerated film-storage trailer vault supplied by TU 9. From here it was logged in and out by the security officer by the use of inventory registers and receipt systems. Documents were secured in 3-combination safes and controlled in the same manner.

2.2.3 Film Processing

No great amount of film was required to be processed in the Forward Area. That film which was processed was handled as follows:

1. Aerial still film amounting to 10 rolls was processed and printed in the photographic laboratory aboard the USS Estes.
2. Ground still photographs amounting to approximately 800 negatives were processed and printed in the TU 8 photographic laboratory on Parry Island.
3. Certain motion-picture test film and remotely operated camera film from shot days were processed in the mobile processing laboratory of Edgerton, Germeshausen & Grier, Inc. (EG&G).
4. Aerial mosaic film of Eniwetok and Bikini was processed and printed in the Navy photographic laboratory on Kwajalein, with the assistance of Naval personnel there.

2.2.4 Communications

Communication between units in the field and TU 9 Headquarters on Parry Island was accomplished through the use of commercial type VHF radio equipment. Mobile units were mounted in each of four camera trucks, and one base station was installed at Headquarters. The assigned frequency was 49.5 Mc.

This system of communication during the operation proved invaluable in that up-to-the-minute information was available at all times and complete control of mobile crews in the field could be maintained.

2.2.5 Remote Camera Installation and Recovery

A special crew of three men was established for the purpose of installing and recovering film and equipment (Figs. 2.11 and 2.12) from the six remote camera stations (Fig. 2.13) used on Mike Day and from the three stations used on King Day (Fig. 2.14).

For Mike and King detonations these cameras were installed as follows:

Station 390.01, Engebi: One 16-mm camera was pointed at the north and west sides of the multistory building on Engebi. This camera, triggered by a photocell and loaded with a special panchromatic film, emulsion type 918, operated successfully on both the Mike and the King tests.

PROJECT		SCENE			ORDER NO.								
LOCATION					DAY	NIGHT							
					SYNOPSIS								
							35	16	4x5	BW	C		
							PHOTO CREW NO.						

Fig. 2.1—Photography work-order form.



Fig. 2.3—Camera sound crew on location aboard USS Estes.



Fig. 2.4—Camera sound crew on location aboard USS Estes.



Fig. 3.5—Obtaining sound effects alongside runway at Enfwetoh.



Fig. 2.6—Still photographer covering King detonation from tower on Parry Island.



Fig. 2.6—Still photographer covering King detonation from tower on Parry Island.



Fig. 2.7—Still photographer covering inspection by General Clarkson, Commander, JTF 132.



Fig. 2.8—Camera sound crew during location shooting on beach at Rajwot.

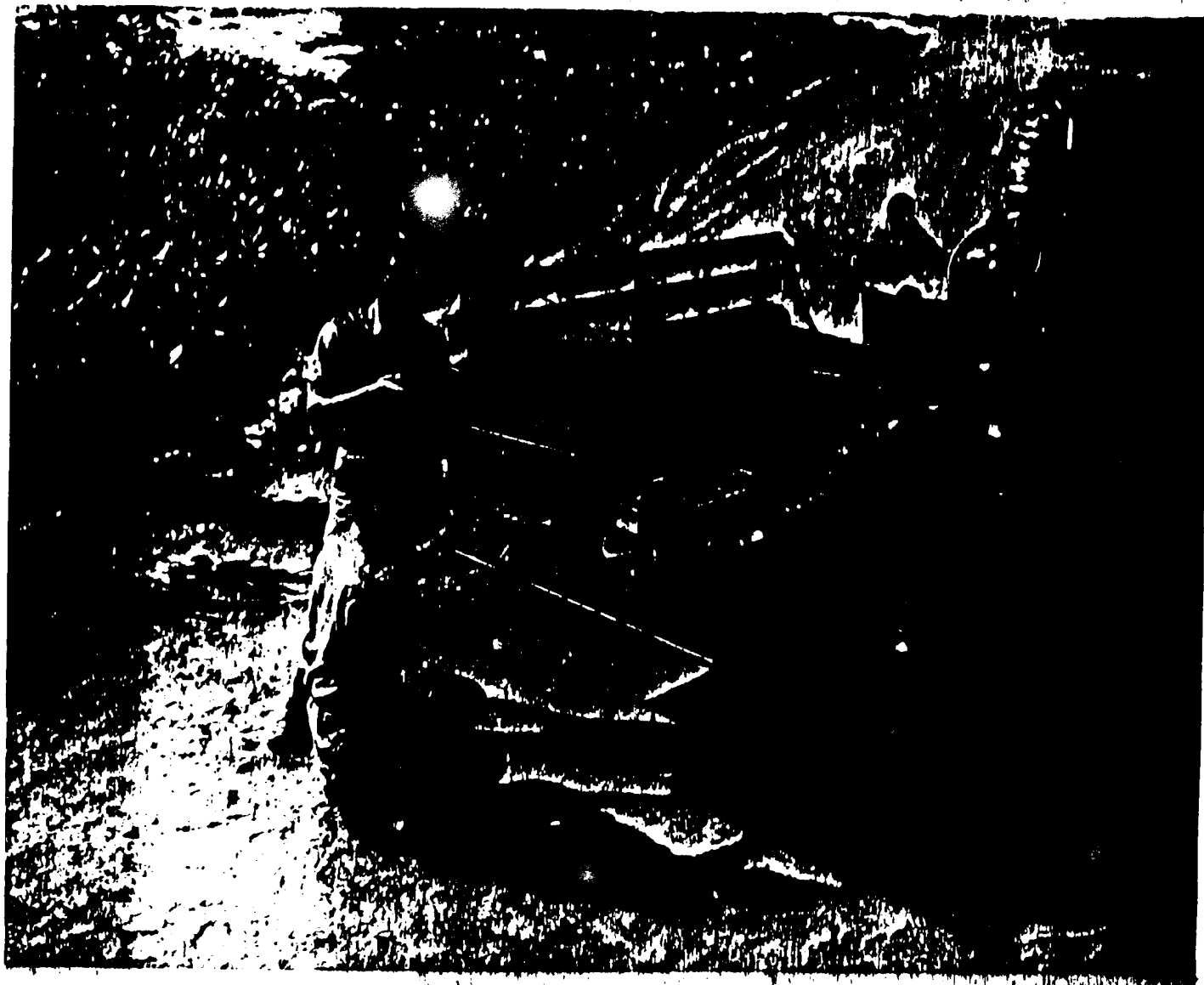


Fig. 2.9 — Location shooting at Eniwetok.



Fig. 2.10—Cameraman covering night take-offs on Kwajalein.



Fig. 2.11 — Installation of auto-remote camera.

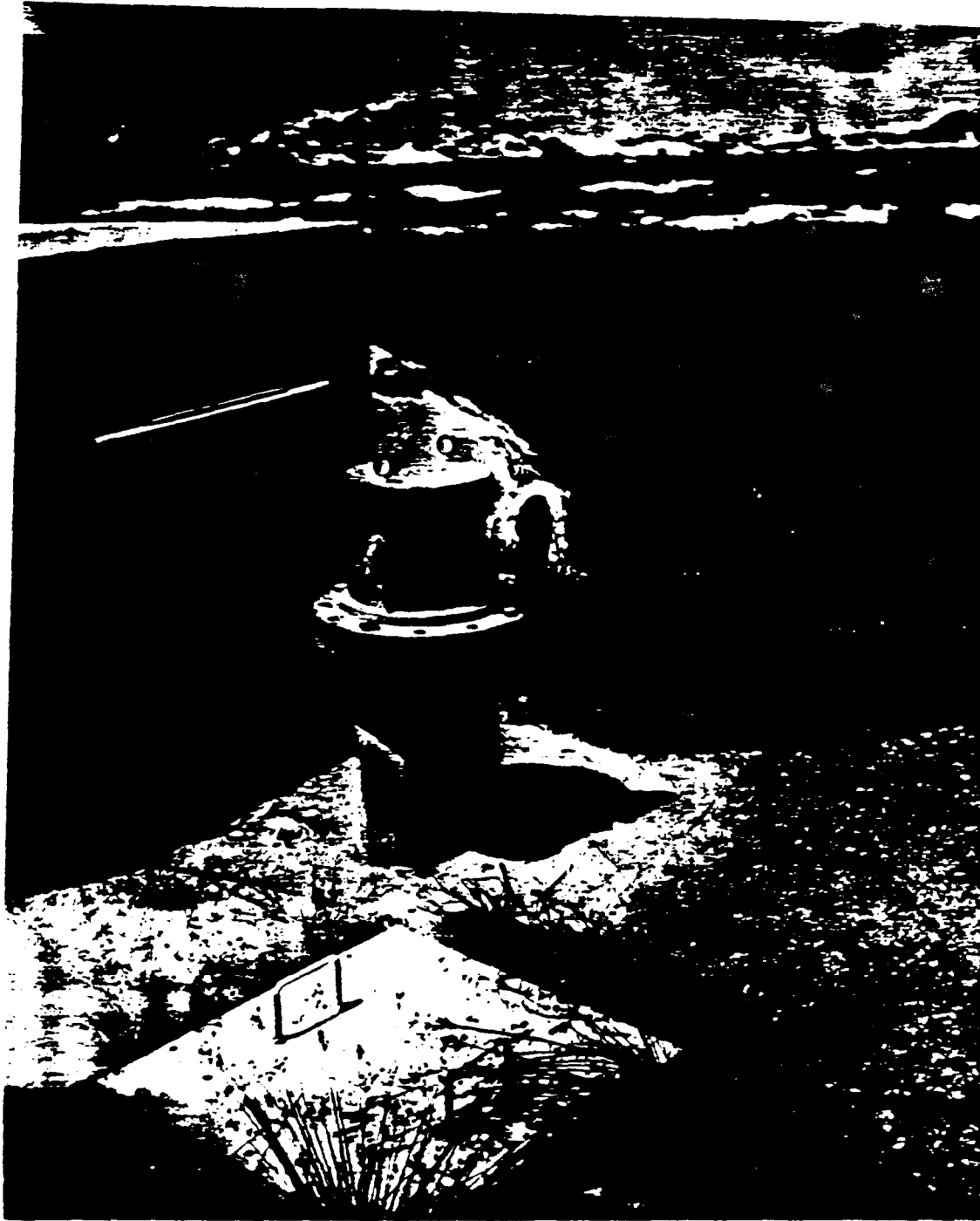


Fig. 2.12—Auto-remote camera installed in special casing on Engebi Island.

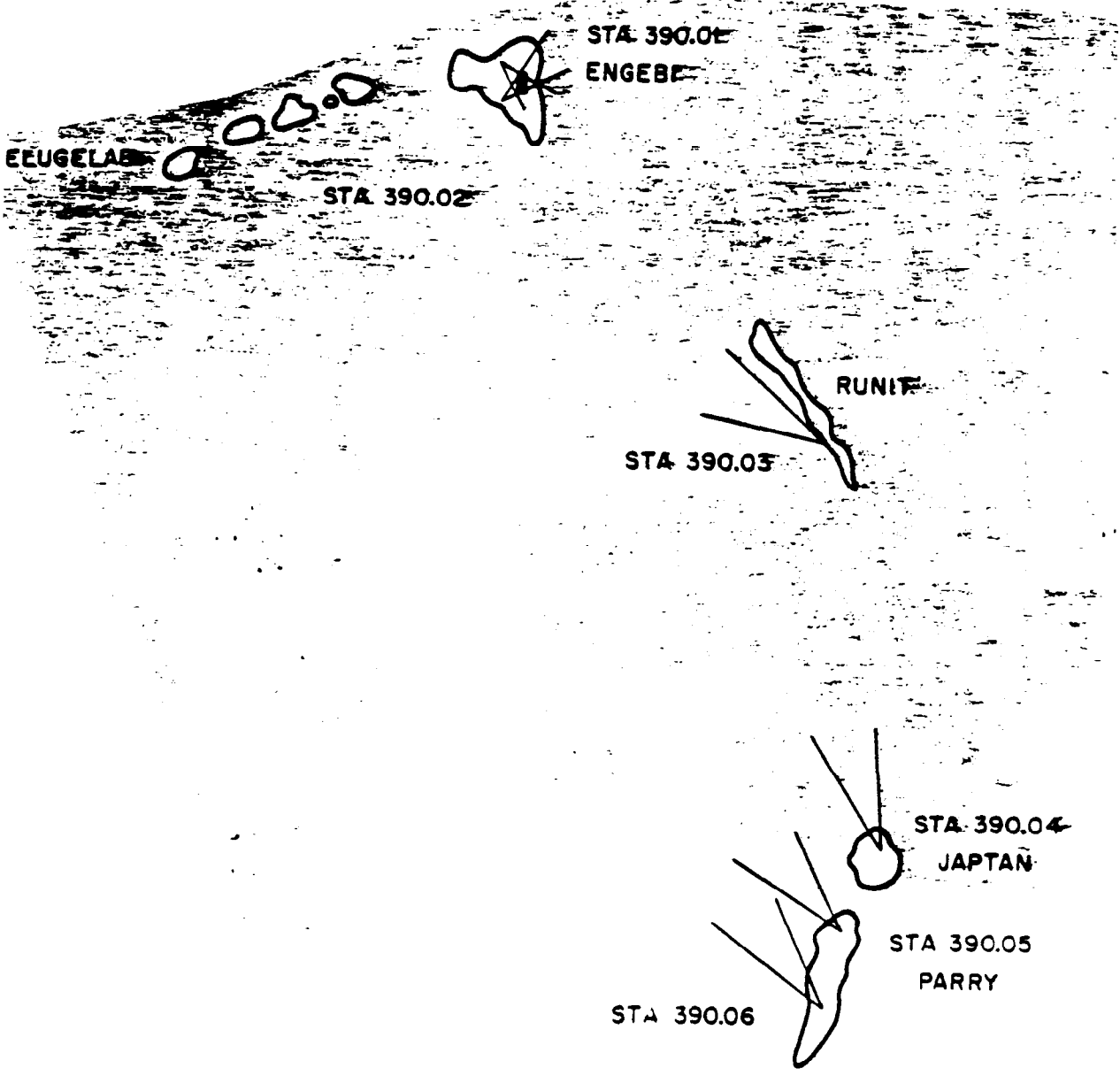


Fig. 2.13—Location of auto-remote camera stations for Mike Day.

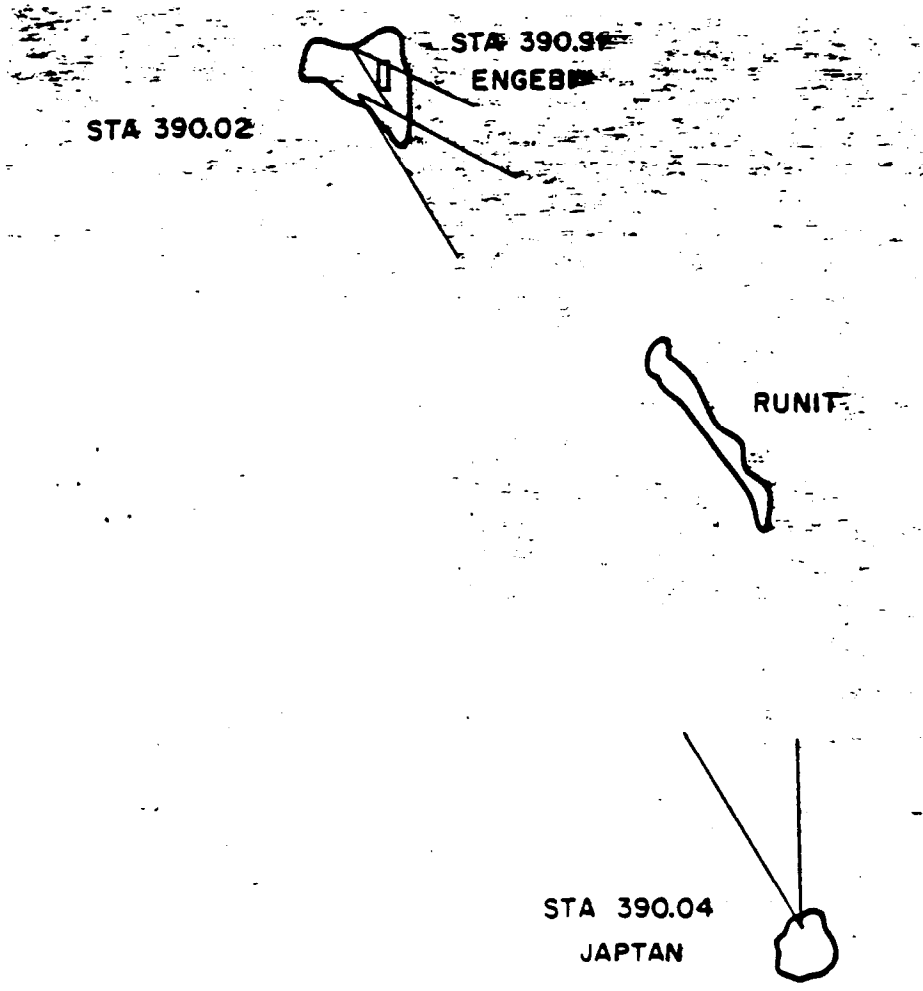


Fig. 2.14—Location of auto-remote camera stations for King Day.

Station 390.03, Engebi: One 16-mm camera was pointed at the south and west sides of the multistory building on Engebi. This camera, triggered by a photocell and loaded with a special panchromatic film, emulsion type 918, operated successfully on the Mike test. For the King test, the camera was turned to cover the burst; it failed to operate.

Station 390.04, Runit: One 16-mm camera, pointed at the dock on Runit and also covering the burst, was triggered by a photocell and was loaded with special panchromatic film, emulsion type 918. It operated successfully on the Mike test. This camera station was removed for the King test.

Station 390.04, Japtan: One 16-mm camera was pointed at the burst, shooting through the trees on Japtan. This camera was triggered by a photocell and was loaded with Eastman color negative. It failed to operate on both the Mike and the King tests.

Station 390.05, Eniwetok: One type K-25 aircraft camera was pointed at the burst from the north tip of Eniwetok. This camera, triggered by a photocell and loaded with Ektachrome film, failed to operate on the Mike test. This installation was removed for the King test.

Station 390.06, Eniwetok: One 16-mm camera was pointed at the beach club and the burst. It was triggered by a photocell and was loaded with Eastman color negative. This camera did not operate on the Mike test and was removed for the King test.

2.2.6 Aerial Practice Missions

C-54 practice missions for Mike were held on 14 and 18 October. Inasmuch as a number of flight-crew personnel were on Eniwetok, the C-54's landed there on the dress-rehearsal mission of 18 October to pick up these crew members. Landings were made after the mission to drop these crew members off before the aircraft returned to base at Kwajalein. The 18 October mission was cut short by engine trouble in the RB-50.

Similar practice missions were flown for King Day, with all crews departing from, and returning to, Kwajalein.

2.2.7 RB-50 Mapping Missions

On the first mapping mission, flown on 20 October, approximately 50 per cent of the low-altitude mosaic coverage of Eniwetok was obtained. In addition, low-altitude vertical coverage of the Mike site was obtained.

On 23 October all aerial-mosaic photography of Eniwetok, plus low-altitude oblique coverage of the Mike site, was completed. However, this film was destroyed in a fire which resulted during the landing roll of this aircraft at Eniwetok (see Figs. 2.15 and 2.16). The entire aircraft and all film were completely destroyed.

One C-54 was dispatched on 25 October to reshoot the low-altitude oblique coverage of the Mike site. This was successfully completed.

The replacement RB-50 arrived at Kwajalein on M-1 day but was unable to participate in this operation because of mechanical difficulties.

On 2 November the replacement RB-50 proceeded to Eniwetok and accomplished aerial-mosaic photography at this atoll at 1500 and 2500 ft. This photography was incomplete, however, because of poor light conditions. Low-altitude vertical post-blast photos of suitable quality of the Mike detonation area were obtained on this mission.

On 9 November this aircraft flew a mission which resulted in approximately 40 per cent completion of the project.

On 20 November the RB-50 proceeded to Eniwetok and completed the aerial-mosaic photography of that area. From here it proceeded to Bikini and completed the mapping mission of that atoll.



Fig. 2.15—RA-59 photographic aircraft on fire at Entwetok, 23 October 1963.



Fig. 2.16—Close-up view of RB-50 photographic aircraft destroyed by fire, Eniwetok, 23 October 1952.

2.5 MIKE DAY OPERATIONS

2.5.1 Aerial

Three C-54 photographic aircraft proceeded to the target area and orbited zero point at 10,000, 12,000, and 14,000 ft at a slant range of 50 nautical miles (see Fig. 2.17).

The RB-50 aircraft was unable to take off on this mission because of mechanical difficulties. Considerable cloud cover was encountered in the target area; however, acceptable photography was obtained.

Camera installations and types were as illustrated in Fig. 2.18.

Following detonation, C-54 No. 5575 descended to 1000 ft to perform low-altitude photography of the surface ships at the rendezvous point, as called for in the script. Following this, it proceeded to the target area, where it made several low-altitude survey flights over the crater area until excessive radiation fall-out was encountered. At this point the pilot turned away and returned to the base at Kwajalein. However, the initial fall-out encountered was sufficient to fog all film and preclude all members of the crew from participating in King Day operational flights. The circumstances surrounding this radiation exposure were made the subject of a separate report submitted to the Commander, TG 132.1, in November 1952.

Data as to footage exposed, additional camera locations, and camera malfunction are shown in Table 2.2.

2.5.2 Remote Cameras

Considerable difficulty in the way of inoperative cameras was encountered with the remote camera installations. This was largely attributable to the fact that the photocell triggering mechanism was set so as to prevent triggering by flashes of lightning during the night preceding zero hour. Because of this the photocells would not trigger unless activated by a sharp increase in light intensity, which was the predicted light-intensity behavior for Mike. However, the actual behavior was apparently not as predicted. The Mike light intensity was comparatively slow in building up; therefore, the photocells did not respond.

Camera locations are indicated in Fig. 2.13.

2.4 KING DAY OPERATIONS

2.4.1 Aerial

Three C-54 aircraft proceeded from Kwajalein and orbited the target area until detonation time. Stations were at 10,000, 12,000, and 14,000 ft, respectively, at a slant range of 15 nautical miles (see Fig. 2.19).

The RB-50 aircraft proceeded from Kwajalein and orbited the target area at 22,000 ft and 30 nautical miles slant range. It was positioned so as to be heading into the blast at zero hour in order that the photographer in the nose could bring cameras to bear on the detonation (see Fig. 2.20). Weather conditions at zero hour were good, and excellent photographic coverage of all phases of the explosion were obtained. Total footage and camera malfunction data were as noted in Table 2.3.

Camera placement in C-54 aircraft was as shown in Fig. 2.18.

2.4.2 Remote Cameras

An additional airborne camera was installed in the bomb bay of the drop B-36 for recording the bomb drop. This camera failed to function, presumably because of the low temperature at the bombing altitude in the unpressurized bomb bay.

King Day remote installations were as noted in Fig. 2.14.

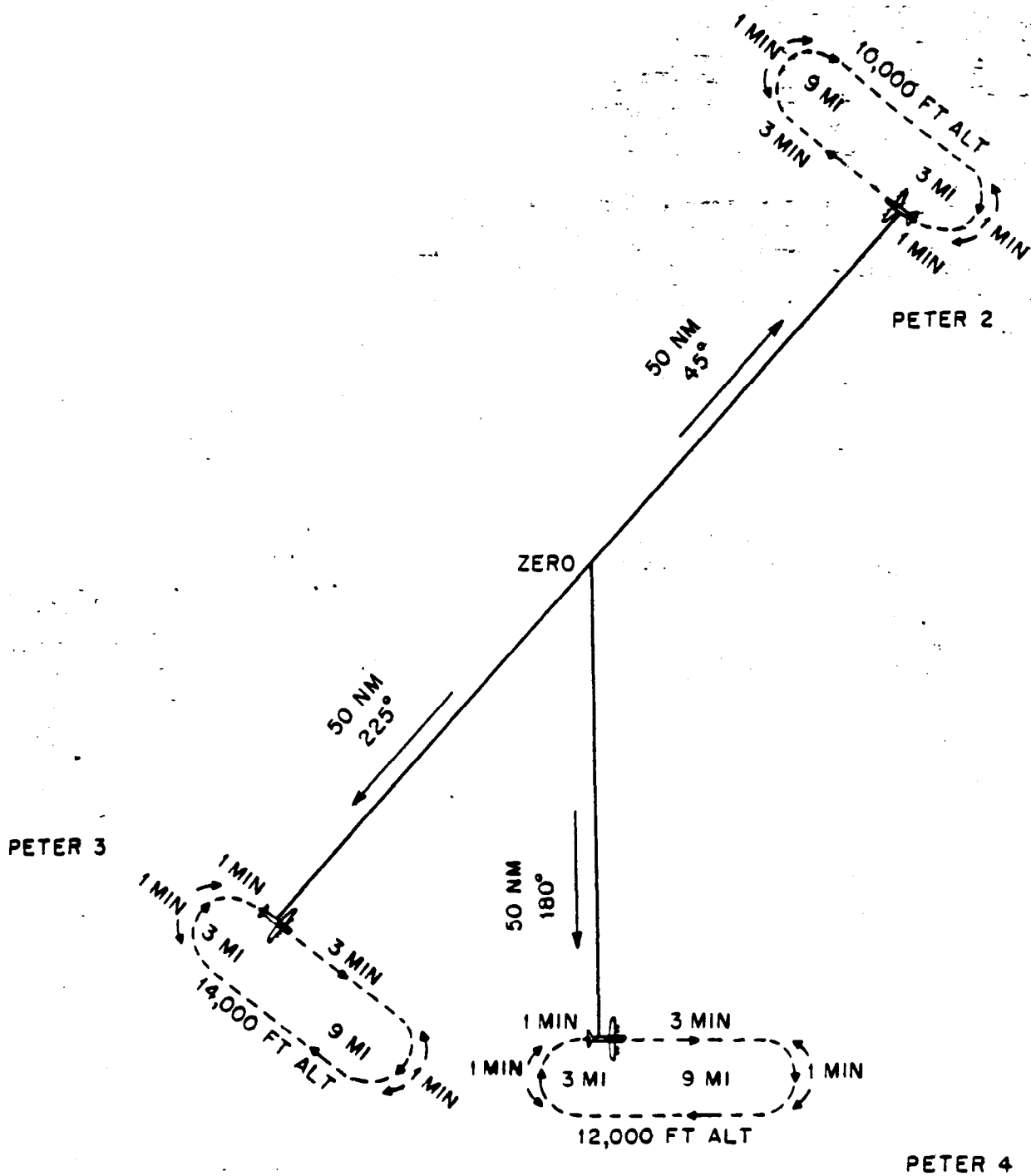


Fig. 2.17—C-54 photographic-aircraft flight patterns for Mike Day. \uparrow = aircraft position and altitude to point "Z" at H-hour. True airspeed 180 nm/hr.

Table 2.2—PHOTOGRAPH

LOCATED	CAMERA TYPE	CAMERA NO.	FILM TYPE	1st LOAD	2nd LOAD	PLATES	REMARKS
PETER 4 AIRCRAFT 880	HAUSER	714	ECC	400		63	VARIABLE
"	E-20	492 477	EXTACHROME	360	360	HP-5 HP-5	P-2
"	E-20	100 140	"	"	"	HP-5 HP-5	P-2
"	"	100 200	"	"	"	HP-5 HP-5	P-2
"	"	110 127	S&W	"	"	E-2	"
"	"	100 215	"	"	"	"	P-2
"	E-19	40-100 091	EXTACHROME	70' BELL	"	HP-5 HP-5	P-2
"	HAUSER	220	ECC	400	400	63	P-2
"	S-1A	000	"	"	"	"	"
"	EASTMAN K.L.	100	ECC	100	"	"	P-2
"	HAUSER	200	"	400	400	"	P-2
"	MITCHELL 35	000	BLACK X	1000	1000	A-1	"
PETER 3 AIRCRAFT 880	HAUSER	240	ECC	400	400	63	P-2
"	E-20	"	EXTACHROME	BELL	BELL	HP-5 HP-5	P-2 P-2
"	E-24	111 000	SUPER XX	"	"	E-2	P-2
"	"	100 000	EXTACHROME	"	"	HP-5 HP-5	P-2
"	"	100 100	SUPER XX	"	"	E-2	P-2
"	"	100 200	EXTACHROME	"	"	HP-5 HP-5	P-2
"	E-17	40 770	"	200 EXP. BELL	"	"	"
"	HAUSER	200	ECC	400	400	63	VARIABLE
"	E-1	000	"	"	"	"	P-2
"	EASTMAN K.L.	1000	"	1000	"	"	P-2
"	HAUSER	201	"	400	400	"	P-2
"	MITCHELL 35	000	BLACK X	1000	1000	A-2	P-2
PETER 3 AIRCRAFT 880	MITCHELL "	100	ECC	400	"	63	P-2
"	E-20	20 000	SUPER XX	BELL	BELL	20 A.	VARIABLE
"	E-20	30 100	EXTACHROME	"	"	COMP.	P-2
"	"	21 000	S&W	"	"	A-2	P-2
"	"	110 214	EXTACHROME	"	"	COMP.	"
"	"	100 100	SUPER XX	"	"	A-2	P-2
"	E-17	40 404	TRIPLE X PAN	200 EXP. BELL	"	"	P-2
"	HAUSER	200	ECC	400	400	63	P-2
"	S-1A	000	"	"	"	63	P-2
"	PASTAR	10 100	"	100	"	"	P-2
"	HAUSER	207	"	400	400	"	P-2
"	MITCHELL 35	011	BLACK X	1000	1000	"	P-2
PETER 1 AIRCRAFT 8-50	S-1A	004	ECC	5-100	"	"	"
AIRCRAFT 8-29 TAMBER	"	006	"	"	"	"	VARIABLE
"	"	004	"	"	"	"	"
KWAL	ECLAIR MITCHELL	20 131	SUPER XX 35 ECC	400	400	"	P-2 A-1
"	ECLAIR	20	SUPER XX 35 ECC	400	400	"	P-2 VARIABLE
"	S-1A	004	ECC	100	"	"	P-2 P-2
"	ECLAIR	51	SUPER XX ECC	400	400	"	P-2 VARIABLE
"	C-6	000 100	SUPRAME	PACK 12 EXP.	PACK 12 EXP. PACK 12 EXP.	NONO.	VARIABLE
CURTIS	S-1	"	ECC	100	4 X 100	63	VARIABLE
"	ANCO-RELEX	"	S&W	16 EXP.	"	NONO.	"
"	S-1A	110	ECC	100	"	63	A-1
RENOVA	"	000	"	"	"	63	VARIABLE
SHARPS	"	126	"	"	"	"	Z-1
CITIZ	ECLAIR	02	"	400	"	63	"

OPERATIONS SCHEDULE FOR MIKE DAY, TU 9

TAKE	FILM PER SECOND	FILM NO.	AMOUNT EXPOSED		LENS	MALFUNCTION	REMARKS	REMARKS
			1st LOAD	2nd LOAD				
10 SEC		REP-120	400'		1"			
5"	AT VLL 1/220	DLA-10	20'		6 3/8"			
"	1 PER 10 SEC 1/400	DPY-10E	40'		7"			STICKS SHUTTER
"	"	DPY-22C	40'		20"			
"	" 1/80	DLA-24	56'		12"			
"	"	DLA-25	56'		20"			
"	SUNRAY	APB-27	75'		12"			
"	22	REP-65	400'		6"	YES	FILM JAM REWIND	
"	"	REP-120	400'		15 mm			
"	1000	REC-110	100'		40 mm			
5"	22	REP-111	400'		63 mm			
"	40	MCC-1	1000'		6"			
10"	20	REP-120	400'		15 mm			
5"	AT VLL 1/220	DPY-22	20'		6 3/8"			
"	1 PER 10 SEC 1/400	DLA-12	15'		12"	YES	MAGAZINE AT 15'	FILM JAM
"	1 PER 10 SEC 1/400	DPY-21	40'		7"			LAST PART STICKS SHUTTER
"	1 PER 10 SEC 1/400	DLA-22	56'		12"			
"	1 PER 10 SEC 1/400	DPY-16	40'		7"			
"	SUNRAY 1/220	APB-28	75'		12"			
"	24	REP-65	400'		11"			
"	22	REP-65	400'		25 mm			
5"	1000	REC-113	100'					
5"	40	REP-61	200'		3"			
5"	22	MCC-1	1000'		6"			
10"	20	REP-120	400'		1"			
5"	AT VLL	DLV-10	20'		6 3/8"			
"	1 PER 10 SEC	DPY-6	40'		7"			LAST PART FOGGED
"	1 PER 10 SEC 1/400	DLA-20	56'		20"			
"	1 PER 10 SEC 1/400	DPY-25	40'					LAST PART FOGGED
"	1 PER 10 SEC 1/400	DLA-20	0		7"	YES	CAMERA FAILURE	
"	SUNRAY	ALB-42	200'		12"			
"	24	REP-120 REP-120	400'	400'	63 mm			
"	64	REP-120 REP-120	"	"	3"			
5"	1000	REC-105	100'		10"			
5"	22	REP-120	400'		63 mm			
"	40	MCC-5 & 6	1000'	1000'	132 mm			
"	22				2"			NO MIRROR AIRCRAFT ABORT
"	40	REC-50	25'		2"			
"	"	REC-140 REC-141	100' 100'	100'	2"			
GRND	24	HLT-5 & 6 REP-75	400' 0	400' 0	50 mm			
"	"	REP-42 REP-48	0 400'	HLF-7 400'	VARIED			
"	"	REC-100	100'		25 mm			
"	"	HLT-8 & 9 REP-60	400'		VARIED			
"	STILL	PAC-60 PAC-70 PAC-71	12 EXP. " "		135 mm			
5"	24		100'	400'				
5"	24	REC-140	100'		1"			
5"	"	REC-140	100'		1"			
10"	"	REC-140	100'		1"			
5"	"	REC-120	100'		2000			
3"	"	REP-60	400'		20 mm			

SUMMARY OF FILM TOTALS

16 mm KCB	MT. PIC.	1000'
25 mm B/W	"	1200'
25 mm EE	"	0
4 X 5 B/W	GROUND STILLS	24 EXP.
4 X 5 EE	"	0
AMCO REFLIX B/W		24 EXP.
E-20 & E-24 EX 1/8 X 3/4		200'
E-20 & E-24 B/W 5/8 X 3/4		250'
E-17 9/16 X 9/16 AERIAL B/W		120'
E-17 9/16 X 9/16 AERIAL EE		200'

Table 2.3—PHOTOGRAPHY OPERATIONS SCHEDULE

LOCATION	CAMERA TYPE	CAMERA NO.	FILM TYPE	FIRST LOAD	SECOND LOAD	FILTER	F STOP	START	PRE. PER. S
PETER 4 AIRCRAFT - 5488	MAURER	714	KLO	400'		85	2.9	-30 SEC	25
" " "	K-24	10 F. 144	EKTACHROME	ROLL 40'		H. P. 5 & 3 E. P. 10		-10 SEC.	1 EVERY 5'
" " "	" "	160 809	SUPER XX	" 56'		K-2		" "	" " " "
" " "	" "	110 139	B & W	" "		"		" "	" " " "
" " "	" "	162 216	"	" "		"		" "	" " " "
" " "	K-17	44-190871	EKTACHROME	" 75'		H. P. 5 & 3 E. P. 4 & 5		" "	RUNAWAY
" " "	MAURER	222	KCO	400'		85		" "	32
" " "	B-1A	873	"	"		"		" "	"
" " "	EASTMAN H.S.	1629	"	100'		"		-1 SEC.	1000
" " "	MAURER	201	"	400'		"	8	-10 SEC.	32
" " "	MITCHELL 35	907	BACK-X	1000'		A-1	8	" "	48
PETER 3 AIRCRAFT - 5489	MAURER	240	KCO	400'		85		-30 SEC.	32
" " "	K-25		EKTACHROME	40'		COMP		0 "	AT WILL
" " "	K-24	111 692	SUPER XX	56'		K-2	5.6	-10 "	1 EVERY 3 SEC.
" " "	K-24	161 928	EKTACHROME	40'		H. P. 3 & 5	3.6	" "	" " " "
" " "	" "	162 162	SUPER XX	56'		K-2	5	" "	" " " "
" " "	" "	160 291	SUPER XX	56'		"	5.6	" "	" " " "
" " "	K-17	43 779	EKTACHROME	200'		H. P. 3 & 5	8	" "	RUNAWAY
" " "	MAURER	239	KCO	400'		85	6	" "	24
" " "	B-1A	866	"	"		"	6	" "	32
" " "	EASTMAN H.S.	1608	"	100'		"	6	-1 SEC.	500
" " "	MAURER	221	"	400'		85	9.5	-10 "	48
" " "	MITCHELL 35	898	BKG-X	1000'		A-2	11	" "	32
PETER 2 AIRCRAFT - 5473	MITCHELL 16	192	KCO	400'		85	2.5	-30 "	"
" " "	K-24	38 208	SUPER XX	56'		A-2	5.6	-10 "	1/5 1/500
" " "	" "	21 686	" "	"		"	"	" "	" " " "
" " "	" "	110 314	EKTACHROME	40'		COMP	8	" "	1/400
" " "	" "	109 199	SUPER XX	56'		A-2	8	" "	1/900
" " "	K-17	44 258	" "	200'		"	11	" "	RUNAWAY
" " "	MAURER	225	KCO	400'		85	8	" "	24
" " "	B-1A	859	"	"		"	12.5	" "	64
" " "	FASTAX	16 106	"	100'		"	22	-1 "	1500
" " "	MAURER	237	"	400'		"	8	-10 "	32
" " "	MITCHELL 35	911	BKG-X	1000'		A-2	5.6	" "	48
PETER 1 AIRCRAFT RB-50	B-1A	709 886	KCO	100'	100'	85	5.6	" "	64
KWAJALEIN	C-6	847 399	ANECO SUPREME	12 EXP	36 EXP		VARIED	-3 HOURS	

SUMMARY OF FILM TOTALS

16 mm KCO	5400 FT.
35 mm B/W MOT. PIC.	3000 FT.
35 mm BK	0
4 X 5 B/W GROUND STILLS	48 EXPOSURES

SCHEDULE FOR KING DAY, TUES

FILM NO.	AMMUNITION EXPENDED		LENS	MALFUNCTION	REASON	REMARKS
	FIRST LOAD	SECOND LOAD				
RKP-98	400'		1"			
DPY-100	40'		12"			
DLA-8	56'		20"			
DLA-2	"		12"	YES	UNKNOWN	
DLA-9	"		20"	"	"	
APB-10	75'		12"			
RKP-120	400'		4"			
RKP-108	"		15 mm	YES	JAM AT 237 FT.	
RKC-65	100'		63 mm	"	CAMERA JAM	
RKP-124	400'		"			
MCG-3	1000'		6"			
	400'		15 mm			
	40'		6 3/8"			
DLA-10	56'		12"	YES	UNKNOWN	
DPY-4	40'		7"			
DLA-5	40'		12"			
DLA-6	56'		7"			
APB-16	75'		12"			
RKP-141	400'		1"	YES	CAMERA JAM	
RKP-132	"		25 mm			
RKC-77	100'		"			
RKP-130	400'		2"			
MCG-7	1000'		4"			
RKC-148	100'		1"			
DLA-11	56'		7"			
DLA-15	"		20"			
DPY-20	40'		"			
DLA-13	56'		7"			
ALB-24	200'		12"			
RKP-79	400'		63 mm			
RKP-127	"		3"			
UNKNOWN	100'		10"			GENERATOR TROUBLE
RKP-129	400'		63 mm			" "
MCG-8	988		152 mm			" "
RKC-144	100'	100'	1"			
RKC-93	1'					
	12 EXP.	36 EXP.	6 3/8"			

35 mm - BOLSEY 0
 K-20 & K-26 EK 5 1/2 X 5 1/2 140 FT.
 K-20 & K-24 B/W 5 1/2 X 5 1/2 400 "
 K-17 9 1/2 X 9 1/2 AERIAL B/W 200 "
 K-17 9 1/2 X 9 1/2 " EK 150 "

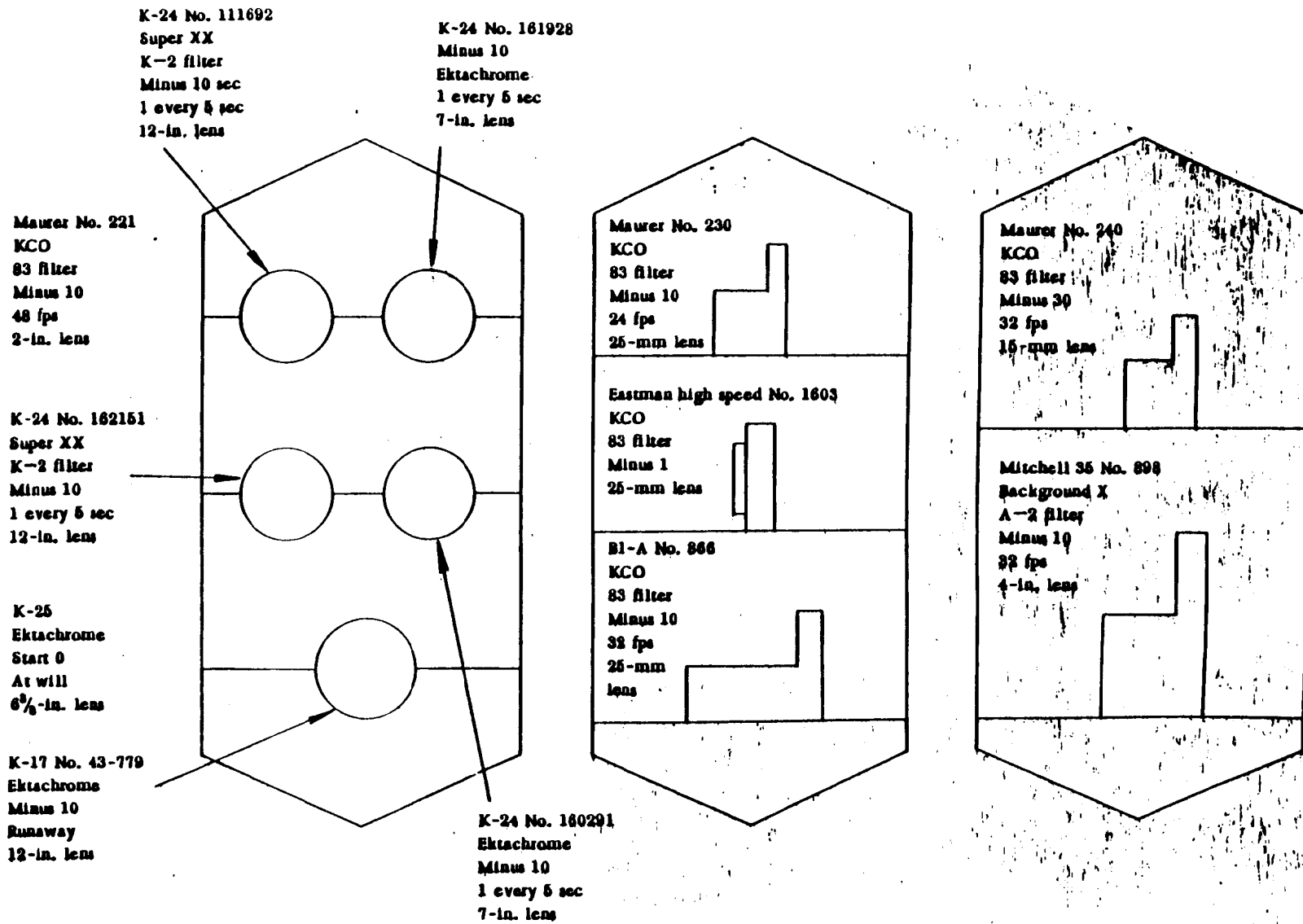


Fig. 2.18—C-54 photographic-aircraft camera installations.

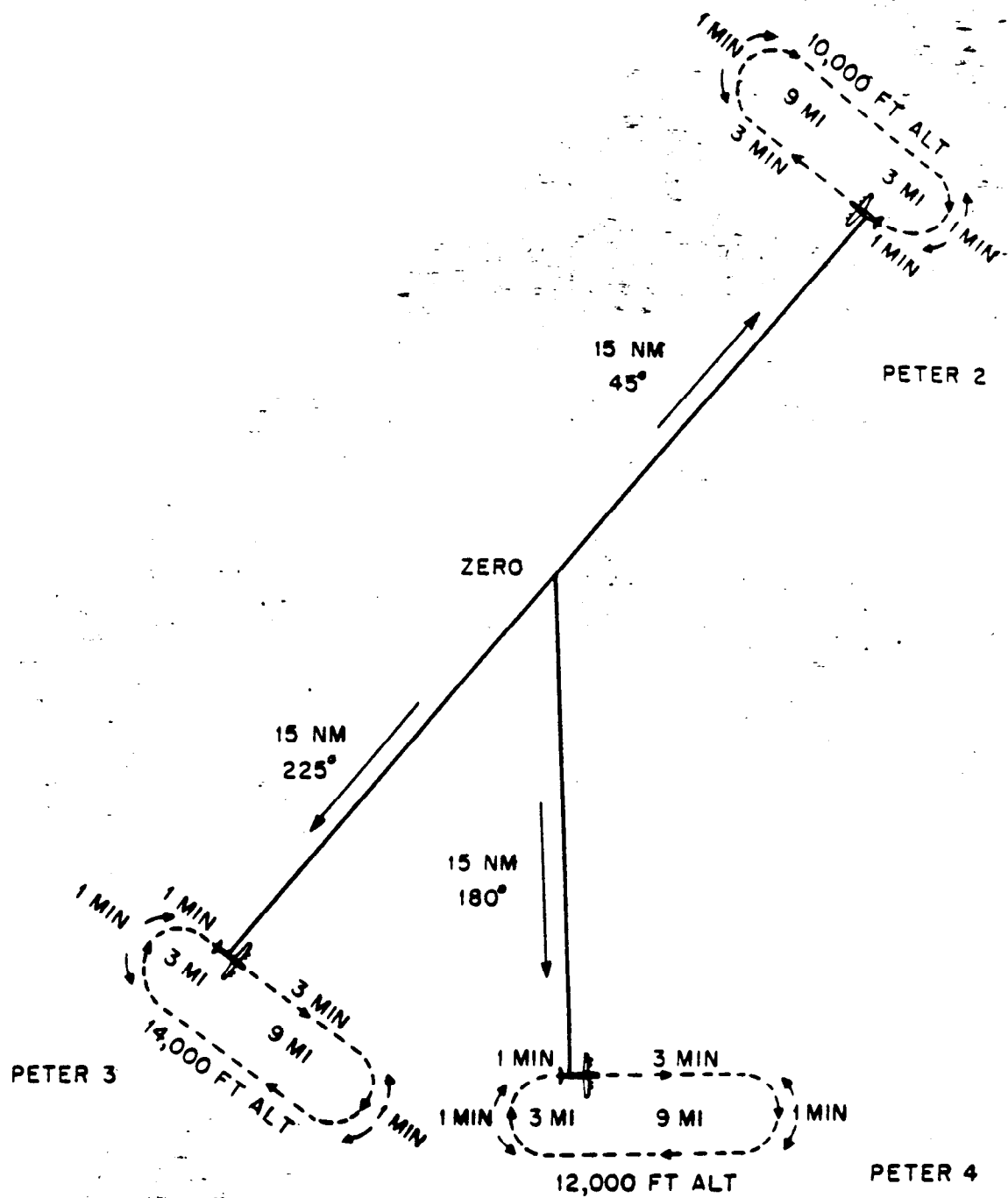


Fig. 2.19—C-54 photographic-aircraft flight patterns for King Day. † = aircraft position and altitude to point "Z" at H-hour. True airspeed 180 sm/hr.

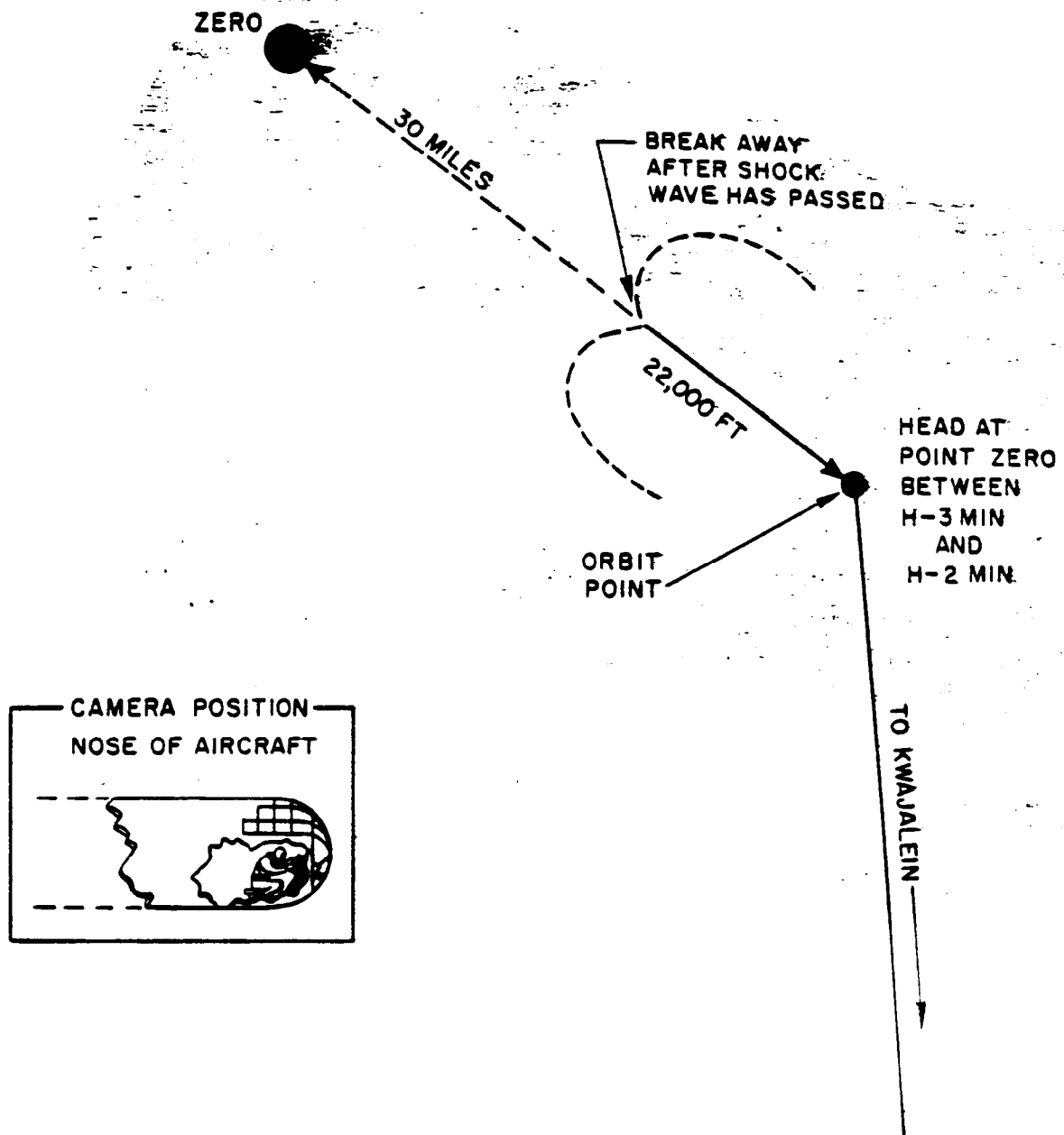


Fig. 2.20—RB-50 photographic-aircraft flight patterns for King Day.

2.5 ROLL-UP

Roll-up of personnel and equipment was as shown in Tables 1.1 and 1.2.

Roll-up of personnel and critical items of equipment was expedited through the use of two of the C-54 photographic aircraft for transportation from Kwajalein to the Zone of the Interior.

Roll-up of water-lift equipment was expedited through the use of TU 9 trailers as cargo carriers and through the use of one transportainer provided by TG 132.1. The latter unit was particularly helpful for this purpose.

CHAPTER 3

RESULTS

Full results of the TU 9 mission on Operation Ivy cannot be set down at this time inasmuch as the documentary motion picture is still in the process of preparation (editing, sound effects, etc.).

The scope of the mission is somewhat delineated in Table 3.1, which shows the amount of all types of film exposed on Operation Ivy.

Table 3.1 — TYPES AND AMOUNTS OF FILM EXPOSED FOR OPERATION IVY

Type of film	Amount
16-mm KCO (commercial Kodachrome)	61,600 ft
35-mm black and white motion picture	18,000 ft
35-mm Eastman color motion picture	1,000 ft
4 by 5 black and white stills	2,244 each
4 by 5 Eastman color ground stills	130 each
35-mm still rolls	36 rolls
K-20 and K-24 5½ by 5½ black and white aerial exposures	1,500 each
K-20 and K-24 5½ by 5½ color aerial exposures	400 each
K-17 9½ by 9½ Eastman color aerial exposures	360 each
K-17 9½ by 9½ black and white aerial exposures	500 each

Project 3.7 requirements were fully satisfied through aerial photographs exposed on this project. The results of this project will be made a part of a separate report.

CHAPTER 4

CONCLUSIONS

4.1 ACTIVATION OF THE UNIT

4.1.1 Personnel

1. The method of supplying Task Group personnel for duty with TU 9 was unsatisfactory inasmuch as only 8 of the 18 individuals requested were actually made available.

2. Flight-status orders for the aerial photography crew members were unsatisfactory, since status as noncrew members only was granted. This was obviously in error inasmuch as the entire mission of each aircraft was dependent upon the functions of the photographic crew members. Flight-status orders were issued from different headquarters, resulting in Army personnel obtaining orders at a different time than Air Force personnel.

3. Flight-crew members of the photographic aircraft should be assigned to the administrative control of the Photographic Unit.

4.1.2 Equipment

1. Priorities established for Operation Ivy simplified expeditious procurement of equipment.

2. Radio units supplied for mobile and fixed communication facilities were of great help, and no equipment malfunction was encountered.

3. Camera booms designed and fabricated under the supervision of Lookout Mountain Laboratory were exceptionally useful for mobile operations and special photographic effects. Some modification of these units will be necessary to obtain more efficient utilization.

4. More research into triggering mechanisms for remotely operated cameras must be done in order to ensure a lower rate of malfunction.

5. Items of aircraft equipment, such as power racks, power supplies, mounts, oxygen equipment, and communications outlets for installation in photographic aircraft, should be fabricated and installed at Zone of Interior depot facilities under the supervision of the personnel who will be using the equipment. Whereas installation effected at Hickam Air Force Base was entirely satisfactory, much confusion and lost time could be avoided by doing this work prior to the overseas phase of the operation.

4.1.3 Organization

This operation was the first in the history of tests in the Forward Area in which the Documentary Photo Unit was assigned directly under the Scientific Task Group. This arrangement was proposed several times on the past tests but because of various circumstances was never actually carried through.

It is the conclusion of all concerned that the documentary photographic mission for Operation Ivy was accomplished with a minimum of the operational handicaps which have slowed

production so badly on previous tests. It was conclusively shown that this production efficiency was directly attributable to the organizational arrangement just mentioned in which the Documentary Photo Group was established as a Task Unit of the Scientific Task Group. Specifically, the following advantages which resulted from this organizational system should be mentioned:

1. Unnecessary channels of communication were eliminated since the Photo Unit was already a part of the Task Group with whose activities it was mainly concerned.
2. Information as to schedules of events and any last-minute changes was readily available inasmuch as the Photo Unit was present along with other Task Units at regular staff meetings.
3. Important personal contacts were easily and quickly made.
4. Technical advice as to important script changes was readily available.

4.2 OPERATIONS

4.2.1 Procedures

Operational procedures for control of the ground photography were satisfactory.

4.2.2 Crew Training

The system of crew training on practice missions was unsatisfactory. Since air-crew members were also ground-crew members, this necessitated bringing all crew members in from outlying locations the night prior to the mission. Furthermore, due to the Kwajalein-Eiwetok separation of crews and aircraft, much confusion was encountered in pickup, delivery to base, etc.

4.2.3 Control of Aircraft

Control of the C-54 aircraft was confusing during parts of the operation. Although TU 9 had theoretical controls, there were instances when one or more of these aircraft were used for other missions of purely transport nature, thus putting time on the engines and jeopardizing their use during photographic air operations. Through the cooperation of TG 132.4 this situation was minimized; however, continued requests for such utilization of photographic aircraft by other units was encountered.

4.2.4 Roll-up

Roll-up was expedited by use of the photographic C-54 aircraft for the transport of personnel and equipment to the Zone of Interior.

The use of one transportainer was of great help in transporting water-lift equipment to the Zone of Interior. These units were very useful in that they ensured sturdy, breakproof, and weatherproof packaging of delicate photographic equipment.

CHAPTER 5

RECOMMENDATIONS

5.1. ACTIVATION OF THE UNIT

5.1.1 Personnel

1. To ensure the obtaining of qualified personnel in time to be utilized on operations in the Forward Area, the following four qualifications are considered mandatory, and each individual should be carefully screened to be sure that he meets them:

(1) Personnel must be "Q" cleared, or clearance procedures must be started sufficiently prior to the operation to ensure time for clearing a replacement should the first individual fail to qualify for clearance.

(2) Personnel must be physically fit for overseas duty, and they should be given physical examinations to determine this prior to departure from their permanent stations.

(3) Personnel must be fully qualified for the performance of the duties for which their services were requested.

(4) There must be sufficient time remaining in the current enlistment or service statement of each individual to ensure his utilization throughout the entire period of the operation for which his services were requested.

2. Requests for flight-status orders for the aerial-photographic-crew members should be expedited and acted upon in sufficient time to ensure orders being prepared to give status as crew members. In past instances orders have never been received prior to actual flights by crew members in operational phases of the air mission. If additional justification for status as crew members is then required, it is too late to supply such justification and have it acted upon by all necessary administrative channels prior to completion of the operation. Requests for such orders should originate so that all personnel for whom orders are requested are issued orders at the same time. These requests should be handled as a Task Force matter and not as a request of an individual service, such as the Army or the Air Force.

3. Flight-crew members of the photographic aircraft should be assigned to the administrative control of the Photographic Unit.

5.1.2 Equipment

1. The priority system for the procurement of material should continue to be authorized down to the lowest units of the Task Force.

2. Radio units, such as the Motorola type used by TU 9 for mobile communications, should be authorized for continued usage by such organizations as TU 9.

3. Modify the present camera booms used by TU 9 in order to make them more adaptable, and continue their use.

4. Conduct studies and research on photocell or other triggering devices for remotely operated camera installations to ensure better reliability, and continue their use. Also, conduct-

studies and research into methods of heating or otherwise protecting cameras such as the ones installed in the bomb bay of the B-36 drop aircraft in order to ensure against malfunctions from such factors as low temperature and faulty electrical circuits.

5. Install all necessary specialized equipment for photographic aircraft at Zone of Interior depots and other locations, and make installation directly under the supervision of the organization using the equipment.

5.1.3. Organization

In Operation Ivy as well as in future tests, the documentary photographic emphasis must necessarily be upon the scientific program. With certain exceptions the military participation in the tests presents only the routine logistic support to be documented, and, since this does not change, it does not present anything new to add to a documentary motion picture. It is in the Scientific Program that the heart of the documentary story lies. Therefore it appears evident, and it is strongly recommended, that in all future tests the Documentary Photo unit should be assigned as a part of the Scientific Group as it was on Operation Ivy.

5.2 OPERATIONS

5.2.1 Procedures

Continue work orders and the script system for accomplishing documentary photography.

5.2.2 Crew Training

Arrange to assume control of all photographic aircraft before departing for overseas operations and in sufficient time prior to the move to ensure a training period in the Zone of the Interior during which photographic and flight crews can become oriented and trained in the specialized aspects of the aerial photography of nuclear explosions. In this way all training can be accomplished while photographic crews have no other duties with which to be concerned. Furthermore, all personnel will be centrally located and immediately available for training missions as required.

It is further recommended that the number of practice photographic missions flown be at the discretion of the Task Unit Commander until he is assured that all crew members are trained and competent in their assigned duties.

5.2.3 Control of Aircraft

It is recommended that all photographic aircraft and flight crews be assigned to the Air Photographic Unit for the sole purpose of conducting aerial photography as directed by the commander of that unit. A clear and written understanding of such operational control should be established early in the planning phase of the operation. Emphasis must also be placed on the amount of ground time necessary to install and maintain camera equipment in each aircraft.

5.2.4 Roll-up

It is recommended that all aircraft assigned for photography be made available to the photographic unit for required airlift of personnel and equipment, both to the overseas site and from there back to the home base of the photographic unit. Operational controls should extend from the organizational phase through the final roll-up.

It is further recommended that arrangements be made to obtain the necessary number of transportainer units to provide secure water-lift packing for the delicate photographic equipment required to be water-lifted to overseas bases.