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By Auth. of the C.G.:
XXI Bomber Command
19 July 45 EMS
Date Initials:

HEADQUARTERS
XXI BOMBER COMMAND
APO 234

SUBJECT: Report of Incendiary Strikes Against Takamatsu, Kochi, Himeji and Tokushima, 3/4 July 1945.

TO: Commanding General, Twentieth Air Force, Washington 25, D.C.

1. IDENTIFICATION OF MISSIONS:

a. Field Order Number 95, Headquarters XXI Bomber Command, dated 3 July 1945, directed the 58th, 73rd, 313th, and 314th Bombardment Wings to participate in incendiary attacks on Takamatsu, Kochi, Himeji and Tokushima in XXI Bomber Command Missions Number 247 through 250.

b. Targets Specified:

(1) Primary Visual and Radar Targets:

Mission	Wing	Force Assigned	Target
247	58th	4 Groups	Takamatsu Urban Area
248	73rd	4 Groups	Kochi Urban Area
249	313th	3 Groups	Himeji Urban Area
250	314th	4 Groups	Tokushima Urban Area

(2) No secondary or last resort targets were named.

2. STRATEGY AND PLANS OF OPERATION:

a. Selection of D-Day: Due to continuance of weather conditions which did not permit visual bombing, it was decided to plan strikes similar to the recent Wing efforts against 4 different cities. The attacks were to employ the radar bombing methods used successfully on recent similar missions (for details see XXI Bomber Command Tactical Mission Reports for Missions Numbers 234 through 237 and 240 through 243). On the basis of the weather prediction made 3 July, firm decision was made to attack.

b. Importance of Targets:

(1) Mission Number 247, Takamatsu: Located in the extreme northeast part of Shikoku on the Bisan Straits of the Inland Sea and southeast of Okayama on Honshu, Takamatsu is Shikoku's leading port. As the terminus of the railroad ferry connecting with Ano on Honshu, the city is the focal point of Shikoku's major rail and road systems, has a commanding position to the Bisan Straits, is the capital of Kasawa Prefecture and has some industrial significance due to its railroad ferry, yards and shops. Among the industries in Takamatsu are the Kurashiki Aircraft Plant, the Makita

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Iron Works-Chemical plant, as well as facilities for the manufacture of explosives and an oil refinery. This city's population of 111,207 (1940 figure) is in a triangular 2¼ square mile territory. Takamatsu is based on the water front, is highly congested (density of 49,000 per square mile), and has no effective fire breaks.

(2) Mission Number 248, Kochi: This important prefectural capital and industrial and commercial center of southern Shikoku is located on the south side of the island at the head of Irado Bay, which is on an arm of Tosa Bay. The city is built on a delta plain on the north side of the Kagami River, has an east-west axis of about 3 miles and a north-south length of 1 mile near its central portion. On both sides of the center of the city it narrows down to less than ½ mile. A small portion of the city extends south of the river. One and 2 story wood and plaster buildings predominate in the city, whose only fire break is the Kagami River.

(3) Mission Number 249, Himeji: Condensed in an area about 2 miles long and 1½ miles wide and having a population of 104,000 (1940 figure), Himeji is an important rail terminal located on the San-yo main line, which is a trunk of the Kobe-Shimonoseki line. Himeji also has spur connections to Hirohata, Shikama and to the northern Honshu coast. An important military center, Himeji has 2 sizable military zones, 1 just north of and outside the densely populated areaand 1 in the north-west section of the built-up area. Located in the city is the Kawanishi Aircraft Assembly Plant.

(4) Mission Number 250, Tokushima: Near the northeast corner of Shikoku on the delta of the Yoshino River, Tokushima faces Kobe and Osaka, 51 miles northeast, and is close to the eastern entrance on the Inland Sea. Although there are no numbered targets in the area, it is the commercial center for the very important agricultural region in which it is located. The city's shape is largely controlled by the mountains to the northeast and by the courses of the many tributaries of the delta along which it is built. Its greatest east-west length is 3 miles, with its main width about 1½ miles. Due to the many islands created by the tributaries of the Yoshino River, the city is not compact, but is scattered. There is only 1 small compactly, built-up area, which is in the central part and contains business structures and residences. Substantial residences and schools are located in the outskirts. Tokushima is about 1 3/4 miles from Tokushima Harbor, which is accessible only to small boats. Its port city is Komatsushima, 3½ miles to the south. A railroad connects Tokushima with Takamatsu, Kochi and Hiwase. There are moderately large paper and textile mills 2 to 4 miles to the northwest and small pulp and lumber mills about ½ mile southeast of the city. There is a small railroad servicing shop in the south central part of the city. The population density is about 40,000 per square mile.

c. Details of Planning--Operational:

(1) Bombing Plans:

(a) Determination of Bomb Load:

1. All aircraft were to carry 100 per cent loads of incendiary bombs and clusters.

2. Mission Number 247, Takamatsu: Two Groups of the 58th Wing were to carry M47A2 incendiary bombs and 2 Groups were to carry clusters containing M69 bombs.

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5. Axes and altitudes of attack were specified on the basis of radar and antiaircraft considerations, which are discussed in subsequent planning sections. The missions were planned on the basis of 3750 tons of bombs being dropped on the targets. Important bombing data included the following:

Mission	Wing	Axis of Attack (degrees)	Length of Run (miles)	Time of Run (minutes)	Drift (degrees)
247	58th	78	29	6 1/6	1 right
248	73rd	299	41½	11¼	6 right
249	313th	38	41½	9	6 right
250	314th	284	31½	8½	5 right

6. Each Wing's main force was to be preceded by 12 pathfinder aircraft, which were to be the first 12 aircraft airborne and were to include the best radar crews. Aircraft loaded with M47A2 bombs were to take off to strike first to mark the targets.

(2) Navigation: The 4 forces were to use Iwo Jima en route out and on return per XXI Bomber Command Tactical Doctrine. From Iwo Jima to the target and return, route plans were as follows:

(a) Mission Number 247:

Route	Reasons for Choice
3244N-13248E to	This easily identified point on lower Shikoku was selected for landfall.
341030N-13307E to	This turning point was designated to the initial point to give a longer bomb run.
341530N-1333330E (IP) to	This easily identified landmark on the coast was in line with the turning point onto the target.
Target	A right turn to Iwo Jima was designated after bombs away.

(b) Mission Number 248:

Route	Reasons for Choice
331430N-1341030E (IP) to	Easily identified Muroto Saki Point was selected to start the bomb run.
Target	A left turn over the water was designated to Iwo Jima.

(c) Mission Number 249:

Route	Reasons for Choice
3338N-13429E to	O Shima, southeast of Shikoku, which was easily identifiable was designated for landfall.
3421N-13415E (IP) to	A point on the northeast corner of Shikoku that could be easily identified and would provide for a good radar bomb run was designated as the initial point.

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(b) Mission Number 248:

1. Two approaches were planned to Kochi, from the southeast or the southwest tip of Shikoku. The former was chosen since it provided for a clearer radar route and the Bay, south of Kochi, was expected to give good land-water detail. Although the fact that landfall and initial points were the same would result in the time being short for wind run and wind computations, it was expected that use of the synchronous radar release at 10,000 to 10,800 feet would result in some corrections of ground speed errors.

2. The city would give a good radar return, but careful reference would have to be made on check points in the Bay to avoid errors in signal identification since some of the surrounding hills would give some fairly birght returns. However, it was expected that use of the shorter sweep speed would result in proper identification.

(c) Mission Number 249:

1. The route to Himeji was to be similar to the one used to attack the Kawanishi Aircraft Plant in the city. (See XXI Bomber Command Tactical Mission Report for Mission Number 217 for details.) This route utilized the best radar check points and landfall was on the distinctive southeast tip of Shikoku. The initial point also was expected to be easily identified because it was a coastal landmark.

2. The axis of attack had numerous island reference points which were expected to aid in establishing proper course and drift. The city showed up as a good signal and was expected to be bombed by using the synchronous radar method at 10,000 feet. If offset bombing were to be used, back slant range release from the coast could be employed.

(d) Mission Number 250:

1. The approaches to Tokushima were limited to the ones from the east or southeast due to the hilly terrain west of the city. Located near the coast with 2 large bays and a wide river on the north side, the bridge crossing the river and the river entering the northwest section of the city would show up well on all scopes. At a 20-mile radius, the river itself would open up on the radar scope and would be an excellent reference to identify the center of the city.

2. Landfall and initial point were the same, with the course planned to pass within a few miles of the coastline starting at Kushimoto, which was expected to enable radar operators to accomplish 2 wind runs before reaching the initial point. Synchronous release was to be made at 10,000 feet.

(5) RCM: Since the 4 targets had relatively meager flak defenses, special jamming airplanes were not recommended. Each airplane was to be equipped with an electronic jammer to barrage the 73-megacycle band and from 190 to 210 megacycle regions and to spot jam any gun-laying or searchlight radars appearing outside the barrage. Rope (window) was to be carried to be dispensed according to existing regulations. Search for enemy radar from 20 to 3000 megacycles was to be continued and enemy communications were to be recorded.

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(6) Air-Sea Rescue: The Navy was furnished with details of the missions and provided the facilities shown on the chart in Annex A, Part VIII, which also includes the XXI Bomber Command rescue facilities.

d. Details of Planning--Intelligence:

(1) Enemy Air Opposition:

(a) Mission Number 247: Weak opposition was expected from the 30 to 40 aircraft that were available to intercept the B-29's.

(b) Mission Number 248: Air opposition was expected to be negligible from the 10 to 15 fighters that were expected to be available for interception.

(c) Mission Number 249: Approximately 20 to 25 interceptors were expected to offer weak opposition.

(d) Mission Number 250: Negligible opposition was expected from the 10 to 15 fighters that would be available to the Japanese.

(e) The comparatively weak showing of Japanese fighters during recent operations was believed to be due to the commitment of many fighters to the anticipated invasion. Another controlling factor was believed to be the shortage of aviation gasoline. Although the Japanese have night fighters, they are not numerous and their equipment is believed to be below American standards. Because of these factors night fighter interception and night fighter-day fighter combinations still remained ineffective. Most of the interception was expected to occur in the target areas, where the B-29's would probably be silhouetted by fires and/or searchlights. There was nothing to indicate the enemy might employ new tactics and it was assumed that the enemy would be able to alert defenses from 3 to 5 hours prior to landfall by the B-29's. This was expected to result in some interceptors coming 50 miles out to sea to meet the bombers. The diversity of targets and the anticipated poor operational weather were additional factors that were expected to reduce the anticipated fighter reaction.

(2) Enemy Antiaircraft:

(a) The altitude of attack for all missions was designated at 10,000 as a result of the following antiaircraft considerations:

1. For Mission Number 247, the only antiaircraft defenses in the Takamatsu area were 24 medium weapons at an airfield south of the city. The route was planned to avoid all known flak areas.

2. For Mission Number 248, photographs of Kochi revealed only 2 heavy antiaircraft guns. In view of these defenses, flak was no planning consideration.

3. For Mission Number 249, Himeji was defended by 23 heavy guns, 24 medium weapons and 5 searchlights. This defense was expected to have nil to meager effectiveness. The approach was planned from the southwest, with the breakaway being designated to the west to avoid the Akashi and Kobe defenses.

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4. For Mission Number 250, the Tokushima defenses included 5 heavy guns and 12 medium weapons at the airfield north of the city and there were 5 heavy guns and 1 searchlight south of the city. This was considered a meager defense. The routes to and from the target avoided all known flak areas.

3. EXECUTION OF THE MISSIONS:

a. Take-Off: Take-off was accomplished as follows:

Mission Number	Wing	Pathfinders Airborne	Aircraft Airborne	First Take-Off	Last Take-Off
247	58th	12	116	030940Z	031120Z
248	73rd	12	117	030922Z	031012Z
249	313th	12	95	030723Z	030849Z
250	314th	12	125	030845Z	031025Z
XXI B.C.		48	453*	030723Z	031120Z

* This does not include 4 superdumbo aircraft.

b. Route Out: Long range navigation was accomplished by aircraft proceeding individually to the target, with Iwo Jima being used as a check point. A spread in altitudes and calibrated air speeds were used to compress the times of attack. Time control on the missions was considered excellent.

c. Over Targets:

(1) Primary Targets: (For a detailed breakdown of performances on the separate missions see Annex A, Part IV, Bombing, and Annex E, Consolidated Statistical Summary.) Target area navigation, wind determination and bombing were accomplished by radar. Winds in the target area varied from 300 to 310 degrees at 25 knots. Of the 501 aircraft airborne, 476 bombed the primary targets between 1450Z and 1942Z at altitudes ranging from 9900 to 16,940 feet, dropping 3711.8 tons of bombs. The targets were visible to 246 aircraft and not visible to 230.

(2) Targets of Opportunity: Five aircraft bombed 5 different targets of opportunity from 1646Z to 1910Z at altitudes ranging from 8350 to 10,500 with 34.9 tons of bombs.

(3) Twenty B-29's were non-effective.

d. Route Back: Navigation to home bases was accomplished satisfactorily. No deviations from routes outside the limits of navigational accuracy occured. Forty B-29's landed at Iwo Jima.

e. Landings: Aircraft of the main forces landed at their bases as follows:

Mission Number	Wing	First Landing	Last Landing
247	58th	032350Z	040216Z
248	73rd	032208Z	040017Z

Mission Number	Wing	First Landing	Last Landing
249	313th	032105Z	032332Z
250	314th	032237Z	040106Z
	XXI B.C.	032105Z	040216Z

f. Losses: Three aircraft were lost, 2 to accidental or mechanical reasons and 1 to unknown causes.

g. Operational Summary:

(1) Navigation: See Annex A, Part I, for track charts.

(2) Bombing: (See Annex A, Part IV, for detailed reports of the separate missions.) Bombing results were considered good.

(3) Flight Engineering: (See Annex A, Part V, for charts, and Annex E, Consolidated Statistical Summary, for fuel consumption and weight data.)

(a) Narrative of Missions as Flown:

1. Cruise to the Mainland: Individual climbs were made immediately after take-off to altitudes between 4000 and 8000 feet, where the initial cruise was flown. No assemblies were made. Compression of the forces was achieved by varying altitudes and air speeds.

2. Bomb Run: Bombing was conducted by individual aircraft.

3. Return to Base: Return to base was conducted by individual aircraft without difficulty. Minimum fuel was used by cruising at 15,000 feet, where tail winds existed until 2 hours from bases, where descent was made into the traffic pattern. The best fuel consumption was obtained at a calibrated air speed of 180 to 185 miles per hour.

(b) Comments: The head wind encountered en route to the targets caused excess fuel consumption and was responsible for the fact that 40 airplanes landed at Iwo Jima.

(4) Radar: (See Annex A, Part VI, for detailed report.) Radar bombing was effective on these missions.

(5) Gunnery: (See Annex A, Part VII, for detailed report.) There was little air opposition, but equipment was 100 per cent operative.

(6) Air-Sea Rescue: One of the 58th Wing's aircraft crashed into the sea, about 2 miles from the base. One survivor was rescued.

h. Weather: (See Annex B for details.) The weather encountered on these missions was approximately as forecast and did not interfere with their performance.

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PART VIII AIR-SEA RESCUE CHART

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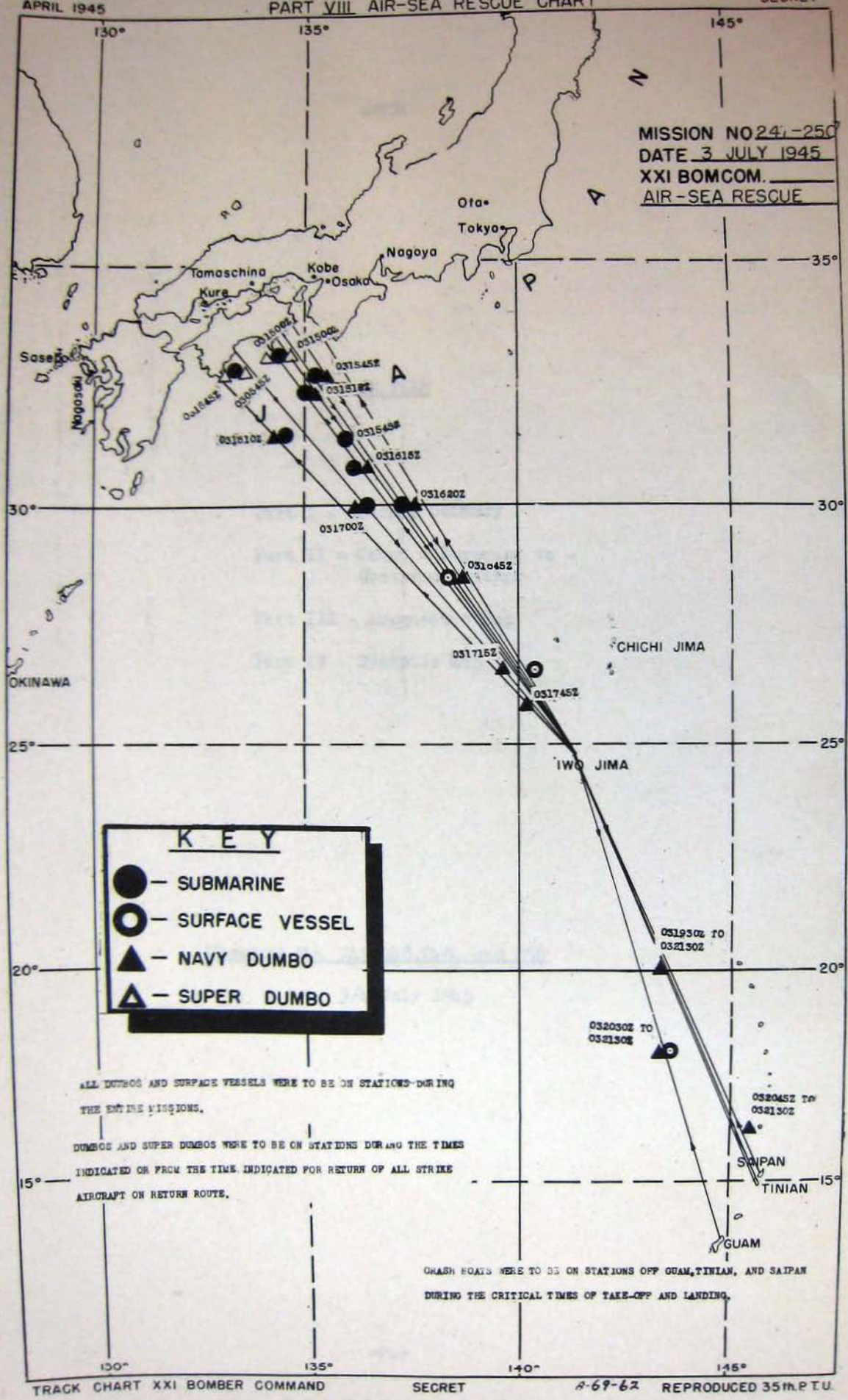

TRACK CHART XXI BOMBER COMMAND SECRET A-69-62 REPRODUCED 35th P.T.U.

PART I - RCM

1. Purpose:

a. To D/F early-warning and gun laying radars.

b. To conduct a general search in the 20-3000 mc region.

c. To barrage jam the enemy gun laying and searchlight radars in the 72-84 mc and 190-210 mc bands and to spot jam any enemy radar signals that appeared outside the barrage in an effort to render ineffective the enemy radar defenses.

d. To confuse enemy searchlight and gun laying radars by the use of rope.

e. To record enemy voice communications.

2. Method:

a. Twenty-six RCM observers participated and used the following equipment to accomplish the search and jamming: 336-APT-1, 195-APQ-2, 11-ARQ-8, 2-APT-1, (Modified), 20-APT-3(Modified), 1-APR-5,2-ANQ-1,25-APR-4, 13-APA-11, 5-APA-24 and 3-ARR-7.

b. Rope was dispensed at the rate of 3 bundles per 10 seconds when protection was needed from searchlights.

3. Results:

a. Since the airplanes bombed individually the barrage was not complete at all times: however, it was believed to be adequate.

b. Japanese voice communications were heard at 4892, 4768, 4520, 3850kc but the recordings were of no value because of the low S/N ratio.

c. Rope was reported as successful by a number of crews.

d. Ninety-nine intercepts were made and are listed at the end of this section.

4. Remarks:

a. C.W. signals were intercepted on a frequency of 20.15, 20.6 and 20.75 mc.

b. Unmodulated carriers were intercepted on frequencies of 19.5, 20.05 and 22 mc.

c. A 4 mc. signal modulated with a ticking sound and having a rhythm like that of a clock was intercepted over Kochi. It was believed to be a Japanese time signal.

d. Two sine wave modulated signals were heard on frequencies of 42.2 and 44 mc beyond lands end as far as 3200N - 13340E. They were believed to be early warning radars.

e. Four centimeter signals were intercepted and could not be positively identified.

f. Carriers with 1000 cycle modulation were intercepted on frequencies of 155, 123, 183, 202, 303 mc at 3430N - 13410E.

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1. 10820 kcs:

(1) Steady tone at 1950Z was very effective.

(2) CW hash between 1730Z-1800Z was partially effective.

7. Distress: All wings reported some instances of distress traffic. The 73rd Wing Ground Station recorded an OPASR message from an aircraft of the 315th Wing regarding the sighting of flares. The message also intercepted by the 73rd Ground Station when the aircraft sent the same message to the Iwo Jima Air-Sea Rescue Radio Station. An aircraft of the 314th Wing transmitted a message to the Ground Station giving position of flares sighted. The following distress traffic was reported by the 313th Wing: "Crosstown 34 at 1720Z on VHF Channel "D" transmitted "25 Moles Hole 230". Message receipted for by Airdale 21. (Crosstown 34's AN/ART-13 transmitter was damaged over the target.) Crosstown 34 called Airdale 21 at 1730Z and cancelled distress message. Crosstown 34 was buddied to Iwo Jima by Miser 36, 314th Wing aircraft. Crosstown 34 told Miser 36 to inform Ground Station of his difficulty, having a buddy, unable to transmit and going to Iwo Jima. Miser 36 informed Crosstown 34 that the message was relayed. Crosstown 34 landed safely at Iwo Jima at 2040Z."

The 58th Wing reported the following messages:

TIME	AIRCRAFT	TEXT
1255Z	30V667	Sighted flashing light 19 20 N 143 50 E. Source was not identified.
1530Z	28V667	Engine feathered position 23 10 N 141 20 E. Returned to base.
1747Z	39V536	Sighted four flares two star red.
1802Z	37V536	Sighted four flares two star red.
1905Z	William 24	to Playmate 48, Sighted red flares on water at position Shackle YPTNX North TPXXL east.
2042Z	72V674	Ditching 336 Picadilly 318 11 0270.
2240Z	31V135	Ditching 336 Picadilly 318. This message was sent on 3310 kcs. The operator heard it on a harmonic 6620kc. It was receipted for by 00V180 (Iwo Jima Air Sea Rescue)

8. Equipment Malfunctions: AN/ART-13, 1 keyed continuously when turned on and would not channel; 1 inoperative; 2 antennas broken; 1 no side tone; BC-348, 4 inoperative; 2 intermittent and dynamotor noise; SCR-522, 2 inoperative, 1 stuck on Channel "A", 2 on-off-switch stays in "on" position, 1 transmitted on receive position; AN/ARN-7, 4 sense antennas broken; Interphone, 4 inoperative; 1 inoperative on "Liaison" position, 1 microphone switch inoperative, 1 microphone button inoperative, 2 jackbox leakage; RL-42, 4 inoperative, 1 tangled wire, 1 lost weight, 4 stuck or sluggish.

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MISSION 247 - 250
DATE 3 July 1945

AIRCRAFT LOST AND DAMAGED — PERSONNEL CASUALTIES

UNIT	AIRCRAFT LOST							AIRCRAFT DAMAGED									PERSONNEL CASUALTIES				
	ENEMY A/C	ENEMY A/A	ENEMY A/C & A/A	ACC. & MECH.	OTHER	UN-KNOWN	TOTAL	ENEMY A/C	ENEMY A/A	ENEMY A/C & A/A	ACC. & MECH.	OWN GUNS	OTHER	UN-KNOWN	TOTAL MAJOR	TOTAL MINOR	TOTAL PARTICI-PATING	KILLED	MISS-ING	WOUNDED & INJURED	TOTAL CASUALTIES
											Mission #247										
58WG	-	-	-	2 [a]	-	-	2	-	-	-	1	-	-	-	1		1488	11	-	8	19
											Mission #248										
73WG	-	-	-	-	-	1 [b]	1							N	O	N	E	1527	-	13	2	15
											Mission #249										
313 WG						NONE		-	-	1	1	-	1	-	2	1		1196			NONE	
											Mission #250										
314 WG						NONE								N	O	N	E	1537			NONE	
TOT-AL			2	-	1	3		-	-	1	1	1	1	-	2	2		5748	11	13	10	34

[a] One aircraft ditched in sea immediately after take-off. 12 men aboard. 1 rescued.
One aircraft had engine malfunction on take-off. Brakes failed to hold and aircraft ran off runway.
[b] Missing - no word; 13 men missing.

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MISSIONS 247 - 250

DATES 3 July 1945

FLIGHT DATA & FUEL CONSUMPTION

MISSION NUMBER	#247	#248	#249	#250
UNIT	58TH WING	73RD WING	313TH WING	314TH WING
AIRCRAFT CONSIDERED	92	122	89	127
AVERAGE FLYING TIME	14:39	13:32	14:07	14:21
FUEL CONSUMED				
Average	5728	5766	5968	5853
Maximum	6125	6595	6355	6361
Minimum	5150	5296	5580	5100
FUEL REMAINING				
Average	734	791	676	762
Maximum	1250	1225	1205	1450
Minimum	300	205	235	200
AVG. GALS. USED PER HOUR	391.0	426.2	422.7	407.9
TOTAL USED ON AIRBORNE A/C	739637	757776	639944	781827

WEIGHT DATA

NO. AIRCRAFT AIRBORNE	128	129	95 a	137
AVG. BASIC WT. OF AIRCRAFT	74919	75000	75127	75633
AVERAGE USEFUL LOAD	59098	61953	60719	60281
AVG. NO. OF BOMBS LOADED	Mixed Load	Mixed Load	Mixed Load	Mixed Load
AVG. WT. OF BOMBS LOADED	14999	17455	15428	15675
AVERAGE FUEL LOADED	6454	6553	6641	6605
AVG. WT. OF FUEL LOADED	38724	39318	39846	39630
AVERAGE MISC. WEIGHT	5375	5180	5113	4976
AVG. GROSS WT. AT TAKE OFF	134017	136953	135837	135914

a Excludes Pathfinder Aircraft.

Bomb Weights:

E46(I.C.)	-	425 lbs.
AN-M47A2(I.B.)	-	70 lbs.
AN-M64(Comp B.)	-	550 lbs.
AN-M76(I.B.)	-	480 lbs.
AN-M17(I.C.)	-	465 lbs.
M46	-	52 lbs.