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REPORT OF THE SIGNAL CORPS OBSERVER,  
OPERATION "HIGHJUMP"



Submitted by:

Amory H. Waite, Jr.  
Radio Communication Branch  
Coles Signal Laboratory  
Red Bank, New Jersey

**SIGNAL CORPS ENGINEERING LABORATORIES**  
**BRADLEY BEACH N.J.**

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REPORT OF THE SIGNAL CORPS OBSERVER, OPERATION "HIGHJUMP"

1 DECEMBER 1946 to 1 APRIL 1947

Submitted by

Amory H. Waite, Jr., Radio Engineer  
Coles Signal Laboratory, United States Army Signal Corps  
Red Bank, New Jersey

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- ERRATA -
1. Page 24, change "were such", second line, third paragraph to read "was such".
  2. Page 42, change "but noisy devices", last line, paragraph g. to read "but electrically noise devices".
  3. Page 47, put in period after "whose specialty it was", paragraph f.
  4. Change Roman Numeral "VII", page 53, to "V".
  5. Change Roman Numeral "VIII", page 59, to "VI".
  6. Change "growlets", last paragraph, page 19, to "growlers".
  7. Change top line, page 30, to read "3 Aviation Electrician's Mates" instead of "3 Electronician's Mates".

known as the Eastern, Central, and Western Groups, comprising three or more ships and several hundred men each, supported by two tankers, the submarine USS Sennett, and the aircraft carrier USS Philippine Sea, would explore as much territory adjacent to, and as far East and West of Admiral Byrd's old camp of Little America as the natural conditions encountered would permit. Ships and planes would be the primary means of travel.

The Central Group would establish a base and construct an airfield near the Bay of Whales to which heavy aircraft (six R4D's) could be flown from the carrier outside the 600 mile wide pack ice, and from which safe takeoffs for exploratory flights could be made. This base would also provide facilities for the study of many other phases of cold weather living and operation.

The Eastern and Western Groups would operate entirely from vessels, using amphibian and helicopter aircraft.

B. The purposes of Operation Highjump as set forth in Navy directives are quoted as follows:

1. "Training personnel and testing equipment in frigid zones."
2. "Consolidation and extending United States sovereignty over the largest practical area of the Antarctic continent."
3. "Determining the feasibility of establishing, maintaining and utilizing bases in the Antarctic continent and investigating possible base sites."
4. "Developing technique for establishing, maintaining and utilizing air bases on the ice, with particular attention to later applicability of such technique to operations in interior Greenland, where conditions are comparable to those of the Antarctic."
5. "Amplifying existing stores of knowledge of hydrographic, geographic, geological, meteorological and electro-magnetic propagation conditions in the area."

Note: The operation is to be relatively short in duration and will take place during the summer months only. Hence, it will not be possible to study seasonal changes in environment, nor the extreme weather and other conditions characteristic of this area throughout the year. Technical control of Operation Highjump will be with C.N.O., exercised by Rear Admiral Richard E. BYRD, USN, (Ret.) who is officer in charge of the project. The actual expedition comprises a task force of the U.S. Atlantic Fleet, under command of Rear Admiral Richard H. CRUZEN, USN."

C. Preparatory plans were completed and loading of the vessels was begun by October and in mid-November six Army representatives were invited to participate. This group, headed by Dr. Paul A. Siple, WD General Staff, was extended to fourteen and the following persons reported aboard Rear Admiral R. H. Cruzen's Flagship, the USS Mount Olympus, at Norfolk, Virginia

on 1 December 1946:

Lt. Col. Robert C. Love, Aero-medical  
Lt. Col. Wallis S. Johns, AACCS  
Lt. Col. John H. Davis, Airborne Infantry  
Major Dan Crozier, MC  
Major James H. Holcombe, Corps of Engineers  
Captain Charles H. Harrison, Air Weather Service  
Captain Murray A. Wiener, Search and Rescue  
1st Sgt. S. A. London, Search and Rescue  
Pvt. John Shimberg, SC Photographer  
Pvt. J. Waltersdorf, SC Photographer  
Mr. A. H. Waite, Jr., Engineering and Technical Service, OCSigO.

Dr. Siple, Senior War Department Observer, joined the group at Panama and Chief Warrant Officer A. J. L. Morency, Transportation, and Mr. Robert Davis, WD General Staff, Radar Mapping Specialist, at Little America. One enlisted photographer assigned to the Eastern and one to the Western Group completed the roster of the WD personnel.

Observers and scientists from the USMC, the Geodetic Survey, the Geological Survey, Fish and Wildlife Service, NRL, NOL, the Hydrographic Office, the US Weather Bureau, and the US Naval Reserve also accompanied the expedition.

The USS Mount Olympus left Norfolk 2 December 1946.

D. Meetings of the War Department observers were held on alternate days during the voyage from Panama to the Antarctic and a definite observation plan was formulated. This is shown in outline form in Appendix A. The cross reference table was essential since many observers required information for their respective branches of the service which was also of interest to others. Each, therefore, gave priority to the subject he was most interested in, and provided required information on that subject to the rest.

E. A joint WD observers report has been prepared during the return journey following the above plan in such a way that the observer most interested in a given subject prepared its history. When the composite report is circulated, therefore, each service, i.e., Signal Corps, Medical Corps, etc., will receive information pertinent to its own pursuits plus valuable data from all others represented. In this report, the remarks of the writer supplement those of Lt. Col. Johns, AACCS, whose primary interests lay in the overall operational activities of the expedition observed from the viewpoint of the Airforce rather than in detailed equipment behavior.

## II. SUMMARY.

A. This report presents all observations of the writer relative to the use and operation of air, land and water-borne electronic equipment by Task Force 68 throughout the period 1 December 1946 to 1 April 1947

believed of interest to the Signal Corps. In its complete form this report will be circulated only to that service but certain portions have been included in the joint report described in E above. An official Navy Department report on Operation Highjump (to be published later) will include tables of measurements of propagation and Heaviside layer reflection data on all frequencies between 2 and 20 mcs from the United States to Antarctica, as well as an official report on Photography by the Task Force Photographic Officer. In this connection, the Signal Corps Enlisted Photographers assigned to the Central Group acted as photographic observers throughout the trip in addition to their other duties, and their excellent report will be found in the WD paper described in Par. I. D. above. See Photography Par. IV F.

B. Following the outline mutually agreed upon by all Army observers, Section III, Operations Plan, presents the communication section of the Operations Plan of Task Force 68 which establishes rules for ship-to-ship, ship-to-shore, ship-to-plane, and ground-to-plane operation, assigns frequencies and call letters and describes radar results to be expected.

C. Section IV, Observations, sets forth the writer's remarks pertinent to Naval performance in carrying out the directives of the Operations Plan, and can be summarized as follows:

1. The USS Mount Olympus, an Amphibious Command Ship, was expedition Net Control Station until departure from New Zealand for the return to the United States, and all traffic was relayed through it until that time. Standard Navy transmitters operating between 185 kc and 156 mc adequately covered all required distances with varying powers of from 20 to 5000 watts. Radar was used extensively.

2. An Airstrip Control Station constructed at Little America handled plane-to-ground (max. 800 miles), base-to-ship (2-700 miles), and base-to-base (2 miles) traffic throughout the period 23 January to 24 February 1947 without excessive difficulty.

3. An Emergency Base Station, built for possible year-long occupation in case of need, was equipped with higher power equipment and better antennas which included rhombics for overseas contacts. Successful contacts were made with Washington with 500 watts on 4, 6, 12, and 18 mcs during a two day test period, and a major part of ship-shore traffic was handled here throughout the stay on the ice (3-700 miles).

4. Electronic equipment in the six R4D aircraft was standard, required little maintenance and provided reliable air-ground communications to distances of 800 miles, the longest flight flown. New corona insulated antennas proved successful.

5. A Ground Control Approach unit taken to the Antarctic was not used but a GPN, installed on the Ross Shelf Ice at Little America IV, worked perfectly to its 30 mile limit. Plane and ship search radar operated normally and large icebergs were discovered at 40,000 yards. Small ones were seldom



installed with improved power and counterpoise systems whenever snow is more than a few feet thick above water or land to provide a 200 mile range.

7. Noise levels in standard communications receivers operated on high barrier ice or snow, where electrical grounding was impossible and counterpoises became pickup antennas suspended in space, were exceedingly high. Individual antenna-counterpoise systems for each transmitter and receiver are therefore recommended for similar operations in future. All transmitters, vehicles, power units, and particularly DC generators should be isolated as far as possible from receiving positions, and non-mobile noise generators should be equipped with filters for isolating noise voltages from radiating power lines and/or bonded to a central connection other than those used for propagation or reception. In addition, all battery charging near receiving installations should be accomplished with AC rectifiers instead of DC generators.

8. Two USMC LVT's equipped with SCR-508's for intercommunication, and one with a standard Navy TCS 25 watt 2-12 mc transmitter-receiver unit for tractor-to-base contacts comprised the only radio-equipped trail party to leave Little America. This travelled to a point 134 miles away and stayed out a week. The SCR-508's became inoperative after a few miles, but the TCS easily maintained schedules with a dipole antenna throughout the trip on 6430kc although voice contacts on 4125 kc using whip antennas petered out at about 25 miles. The SCR-694, carried as a spare, was found inoperative upon its return because of the excessive pounding it received on the cargo sled which carried it.

9. All equipment at Little America was operated in warmed tents or buildings except a few SCR-610's and SCR-536's and certain power units, and temperatures averaged above zero so little can be added to already available information on winterization. Lows of -6, -18, and -25 degrees F. were experienced for short periods.

10. The officers and men employed to operate shipboard equipment were drawn from each ships complement. Those for the moving ashore, installation, operation and maintenance of the shore stations and airborne equipment were part of the Staff. Two officers, two chief petty officers, and 28 electricians, technicians and radiomen comprised the shore detail, one half of which was schooled in aviation electronics.

D. Section V, Recommendations, details to the best of the writer's ability what the Signal Corps should do to get optimum results if and when confronted by the problems encountered by Task Force 68, in addition to those in C. above.

E. Section VI, Miscellaneous, sets forth miscellaneous items of information which may have little value to most readers, but which should not go unrecorded in Signal Corps files.

F. An Appendix and many officially and personally taken photographs are added to form the complete report.

### III. OPERATIONS PLAN.

The communications portion of the Commander of Task Force 68's Operation Plan #2-46, "HIGHJUMP", is included in its entirety to indicate the wide scope of the communications involved in an operation of this magnitude, and to serve as a potential model for similar actions in future. It was followed with but few changes and these were largely frequency variations dictated by unforeseen propagation conditions.

ANNEX B TO COMMANDER TASK FORCE SIXTY EIGHT  
OPERATION PLAN NO. 2-46 "HIGHJUMP"  
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# Operation Highjump

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**Operation Highjump (OpHjp)**, officially titled **The United States Navy Antarctic Developments Program, 1946-1947**, was a United States Navy operation organized by RADM Richard E. Byrd Jr. USN, (Ret), Officer in Charge, Task Force 68, and led by RADM Richard H. Cruzen, USN, Commanding Officer, Task Force 68. Operation Highjump commenced 26 August 1946 and ended in late February 1947. Task Force 68 included 4,700 men, 13 ships, and multiple aircraft. The primary mission of Operation Highjump was to establish the Antarctic research base Little America IV.<sup>[1][2]</sup>

Highjump's objectives, according to the US Navy report of the operation, were:

1. training personnel and testing equipment in frigid conditions;
2. consolidating and extending United States sovereignty over the largest practicable area of the Antarctic continent (This was publicly denied as a goal even before the expedition ended);
3. determining the feasibility of establishing, maintaining and utilising bases in the Antarctic and investigating possible base sites;
4. developing techniques for establishing, maintaining and utilising air bases on ice, with particular attention to later applicability of such techniques to operations in interior Greenland, where conditions are comparable to those in the Antarctic;
5. amplifying existing stores of knowledge of hydrographic, geographic, geological, meteorological and electro-magnetic propagation conditions in the area;
6. supplementary objectives of the Nanook expedition. (The Nanook operation was a smaller equivalent conducted off eastern Greenland.)<sup>[3]</sup>



USS *Sennet* (SS-408) participating in *Operation Highjump*

## Timeline

The Western Group of ships reached the Marquesas Islands on December 12, 1946, whereupon the *Henderson* and *Cacapon* set up weather monitoring stations. By the 24th, the *Currituck* had begun launching aircraft on reconnaissance missions.

The Eastern Group of ships reached Peter I Island in late December 1946.

On January 1, 1947, LCDR Thompson and Chief Petty Officer Dixon utilized "Jack Browne" masks and DESCO Oxygen rebreathers to log the first dive by Americans under the Antarctic.<sup>[4]</sup> Paul Allman Siple, PhD was the senior U.S. War Department representative on the expedition. Dr. Siple was the same Eagle Scout who accompanied Admiral Byrd on the previous Byrd Antarctic expeditions.

## Human losses

On December 30, 1946, aviation radiomen Wendell K. Hendersin, Fredrick W. Williams, and Ensign Maxwell A. Lopez were killed when their PBM Mariner *George I* crashed during a blizzard. The surviving six crewmembers, including Aviation Radioman James H. Robbins and co-pilot William Kearns, were rescued 13 days later. A plaque was later erected at the McMurdo Station research base, honoring the three killed crewmen.

In December 2004, an attempt was made to locate the remains of the plane.<sup>[5]</sup> There are ongoing efforts to repatriate the bodies of the three men killed in the crash.<sup>[6]</sup> Killed airman Maxwell A. Lopez had a mountain named in his honour after his death, Mount Lopez on Thurston Island.

Additionally, Vance N. Woodall died during a "ship unloading accident" sometime after December 30, 1946. In a crew profile, deckman Edward Beardsley described his worst memory as "when Seaman Vance Woodall died on the Ross Ice Shelf under a piece of roller equipment designed to "pave" the ice to build an airstrip."

## Afterwards

Father William Menster served as chaplain during the expedition, and in a service in 1947 he consecrated Antarctica.

The Central Group of ships reached the Bay of Whales on January 15, 1947, where they constructed temporary runways along the glaciers, in a base dubbed *Little America IV*.

Naval ships and personnel were withdrawn back to the United States in late February 1947 and the expedition was terminated, due to the early approach of winter and worsening weather conditions (Summerhayes & Beeching, 2007, p. 15-16).

Admiral Byrd in an interview with Lee van Atta of International News Service aboard the expeditions command ship, the USS Mount Olympus, discussed the lessons learned from the operation. The interview appeared in the Wednesday, March 5, 1947 edition of the Chilean newspaper *El Mercurio*, and read in part as follows: 'Admiral Richard E. Byrd warned today that the United States should adopt measures of protection against the possibility of an invasion of the country by hostile planes coming from the polar regions. The admiral explained that he was not trying to scare anyone, but the cruel reality is that in case of a new war, the United States could be attacked by planes flying over one or both poles. This statement was made as part of a recapitulation of his own polar experience, in an exclusive interview with International News Service. Talking about the recently completed expedition, Byrd said that the most important result of his observations and discoveries is the potential effect that they have in relation to the security of the United States. The fantastic speed with which the world is shrinking – recalled the admiral – is one of the most important lessons learned during his recent Antarctic exploration. I have to warn my compatriots that the time has ended when we were able to take refuge in our isolation and rely on the certainty that the distances, the oceans, and the poles were a guarantee of safety.'<sup>[7][8]</sup>

After the operation ended, a follow-up Operation Windmill returned to the area, in order to provide ground-truthing to the aerial photography of Highjump. Finn Ronne also financed a private operation to the same territory, until 1948.

As with other U.S. Antarctic expeditions, interested persons were allowed to send letters with enclosed envelopes to the base. Here commemorative cachets were added to their enclosures which were then returned to the senders. These souvenir philatelic covers are readily available at low cost.

## Participating units

### Eastern Group (Task Group 68.3)<sup>[9]</sup>

*CAPT George J. Dufek, USN, Commanding.*

- Seaplane Tender *USS Pine Island*. *CAPT Henry H. Caldwell, USN, Commanding.*
- Destroyer *USS Brownson*. *CDR H.M.S. Gimber, USN, Commanding.*
- Tanker *USS Canisteo*. *CAPT Edward K. Walker, USN, Commanding.*

### Western Group (Task Group 68.1)

*CAPT Charles A. Bond, USN, Commanding.*

- Seaplane Tender *USS Currituck*. *CAPT John E. Clark, USN, Commanding.*
- Destroyer *USS Henderson*. *CAPT C.F. Bailey, USN, Commanding.*
- Tanker *USS Cacapon*. *CAPT R.A. Mitchell, USN, Commanding.*

### Central Group (Task Group 68.2)

*RADM Richard H. Cruzen, USN, Commanding Officer.*

- Communications and Flaship *USS Mount Olympus*. *CAPT R.R. Moore, USN, Commanding.*
- Supplyship *USS Yancey*. *CAPT J.E. Cohn, USN, Commanding.*
- Supplyship *USS Merrick*. *CAPT John J. Hourihan, USN, Commanding.*
- Submarine *USS Sennet*. *CDR Joseph B. Icenhower, USN, Commanding.*
- Icebreaker *USS Burton Island*. *CDR Gerald L. Ketchum, USN, Commanding.*
- Icebreaker *USCGC Northwind*. *CAPT Charles W. Thomas, USCG, Commanding.*

### Carrier Group (Task Group 68.4)

*RADM Richard E. Byrd Jr. USN, (Ret), Officer in Charge.*

- Aircraft carrier and Flagship *USS Philippine Sea*. *CAPT Delbert S. Cornwell, USN, Commanding.*

### Base Group (Task Group 68.5)

*CAPT Clifford M. Campbell, USN, Commanding.*

- Base Little America IV.



Helicopter landing on icebreaker USCGC Northwind during Operation Highjump

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