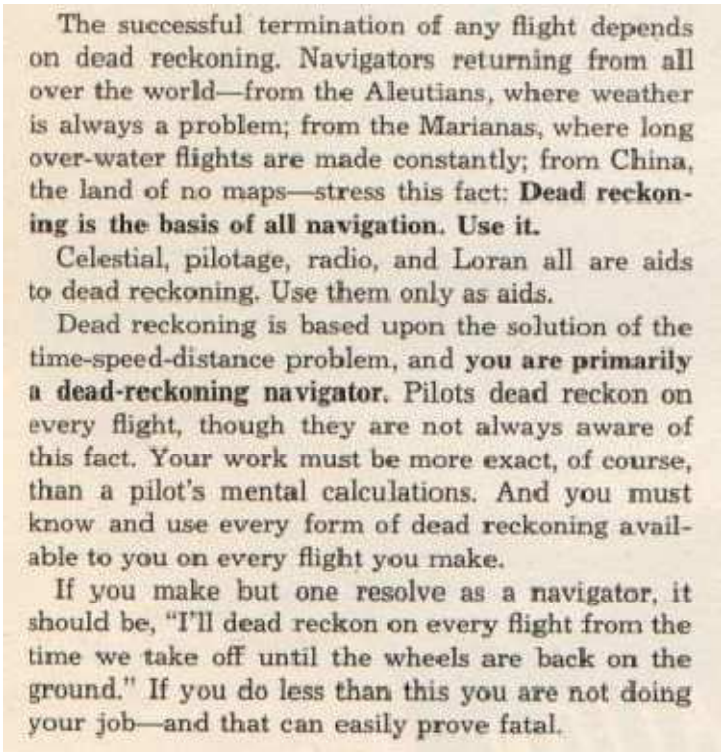
North Atlantic Routes

When the Second World War began, the Air Transport Command (ATC) did not exist. When the United States went to war with Japan and Germany in December, 1941, not a single airplane specifically designed for cargo transport was in use in the country. For the staggering new needs of the military, therefore, the Army Air Forces had to convert as many as possible of their own bombers (e.g. the B-24 Liberator into the C-87), and requisition passenger aircraft from the civilian air companies (Ref. 1). The DC-3, modified to the C-47, and the DC-4, modified to the C-54 (see photos below), both played a significant role in the ATC. Other planes in use by the commercial air lines, and available for military service, included TWA's fleet of Boeing Stratoliners, Pan American's Boeing B314 Clippers, a number of Lockheed Lodestars, Sikorsky Flying Boats, Boeing 247s, DC-2s, Lockheed L10s, and Martin Flying Boats.

The route system that was developed by the ATC included the North Atlantic Route, the South Atlantic Route, Central Pacific Airways, South Pacific Airways, Southwest Pacific Airways, African Air Routes, China-Burma-India Airway, and Air Routes to Alaska. The routes presented in this package are the North Atlantic Routes. Refer to Figure 1 for a map of these routes (Ref. 2).

The North Atlantic routes have been divided into six routes with at total of 17 flights numbered NA01 to NA17. The flights were constructed using FS Navigator 4.0 along with Microsoft Flight Simulator 2004 (FS9).

Navigational aids were sparse or non-existent at the start of the war. Basically, all that was available for navigation was dead reckoning and a few radio (including radio range) stations and weather stations that could be used for homing, and celestial navigation. However, dead reckoning was the primary means of navigation during the war as can be seen from the following excerpt from the World War II Army Air Forces Collection, Navigators' Information File (NIF), July 1945 (Ref. 5).



The successful termination of any flight depends on dead reckoning. Navigators returning from all over the world—from the Aleutians, where weather is always a problem; from the Marianas, where long over-water flights are made constantly; from China, the land of no maps—stress this fact: **Dead reckoning is the basis of all navigation. Use it.**

Celestial, pilotage, radio, and Loran all are aids to dead reckoning. Use them only as aids.

Dead reckoning is based upon the solution of the time-speed-distance problem, and **you are primarily a dead-reckoning navigator.** Pilots dead reckon on every flight, though they are not always aware of this fact. Your work must be more exact, of course, than a pilot's mental calculations. And you must know and use every form of dead reckoning available to you on every flight you make.

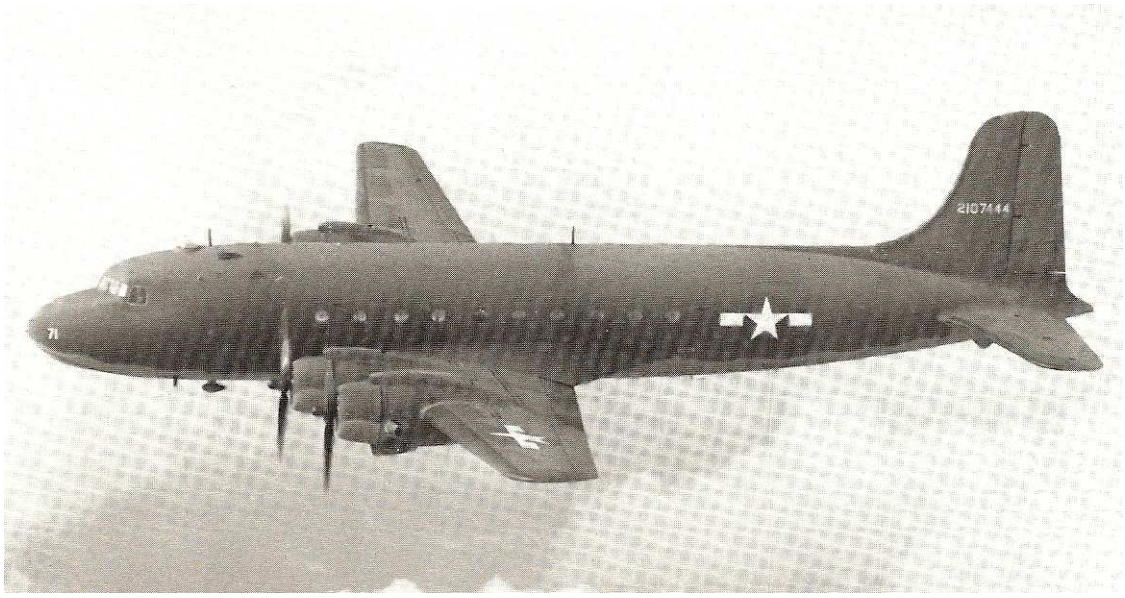
If you make but one resolve as a navigator, it should be, "I'll dead reckon on every flight from the time we take off until the wheels are back on the ground." If you do less than this you are not doing your job—and that can easily prove fatal.

In addition to the scarcity of navigation aids, the weather compounded the difficulty of flying these routes with abundant occurrences of wind, fog, clouds, rain, snow and ice. For WWII literature regarding state of the art of meteorology including information on radio navigation and air navigation, refer to Recommend Reading references 3 and 4. Equally informative as a navigation reference is Peter Tucker's Charter Flight for DC-3 Airways for E.K. Gann's North Atlantic Route which contains an excellent presentation of Long Range Navigation with Limited Facilities (Ref. 4). The route presented in the E.K. Gann charter flight is roughly similar to Route IV contained in this package.

The FS Navigator (FSN) flights contained herein are designed to reflect the actual navigation aids available in 1941. The navigation aids used from FSN to create the flights consist of NDBs and fixes every 200 miles. For use in obtaining position readings, I have included Dave Bitzer and Mark Beaumont's User's Handbook for the Simulated Bubble Sextant for FS9. This handbook contains instructions for using the sextant for celestial navigation and also instructions for downloading and installing the sextant into aircraft. Additionally an excellent presentation on celestial navigation can be found in Ref. 5, World War II Army Air Forces Collection, Navigators' Information File (NIF), July 1945. http://aafcollection.info/topic-nav.html

When flying the flights, the weather should be setup to use actual weather. The flight altitudes used are approximately 7500 feet for the C-47 and 10,500 feet for the C-54, except where higher altitudes are required to clear mountains. However, it should be noted that the pilots flying these routes had the flexibility to avoid severe weather by flying above, below (sometimes at 500 ft over the ocean), or at any altitude in between necessary to safely navigate to their destinations and make safe landings. There was virtually no air traffic control for these routes during this period. Therefore, pilots are encouraged to fly at the altitude which will result in a safe and successful trip.

WWII C-47



WWII C-54 (Credit - Ref. 3)

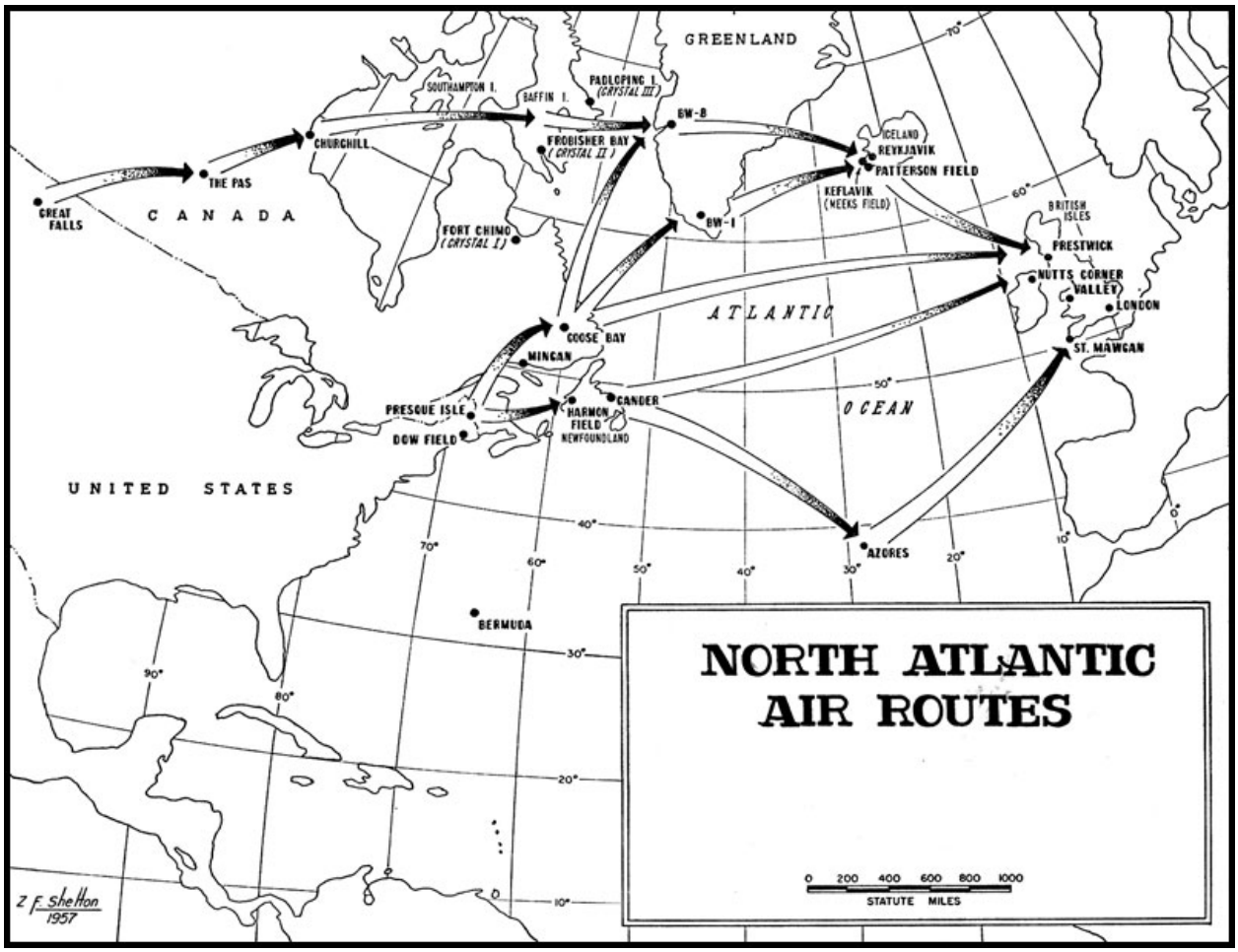


Figure 1

Note that cancelling a flight or turning back to the airport of origin or going to an alternate airport were options that were often used by the ATC pilots when unacceptably bad weather was forecast or encountered en route.

The MSFS flight plans for these routes were constructed using navigational aids consisting of VFR with VOR to VOR stations. However, more often than not, direct (GPS) routes had to be used since there are very few, if any, VOR stations.

The flights of the North Atlantic routes are summarized in a spreadsheet included in this package. Flight descriptions are furnished separately for both MSFS9 and FSN in the form of printouts of the navigation log and flight plan, respectively.

Pilots are encouraged to use C-47s and C-54s having textures of the AAF. They can be found at www.fsplanet.com, www.simviation.com, www.avsim.com, and other locations. This will add a further touch of realism and will add to the enjoyment of these flights. Of course, the excellent DC-3s and DC-4 provided by DC-3 Airways can also be used.

References:

1. Hugh B. Cave, Wings Across the World, The Story of the Air Transport Command, Dodd, Mead & Company, New York, 1945.
2. W. F. Craven & J. L. Cate, editors, The Army Air Forces in World War II, Volume VII, Services Around the World, HyperWar Foundation, http://www.ibiblio.org/hyperwar/AAF/VII/index.html.
3. James M. Mangan, To The Four Winds, A History of the Flight Operations of American Airlines Personnel for the Air Transport Command, 1942-1945, Including Project 7A, Turner Publishing Company, 2001.
4. Peter Tucker, Long-Range Navigation with Limited Facilities, DC-3 Airways, Charter Flight for EK Gann's North Atlantic Route.
5. World War II Army Air Forces Collection, Navigators' Information File (NIF), July 1945. http://aafcollection.info/topic-nav.html

Recommend Reading:

1. Ernest K. Gann, Fate is the Hunter, Simon & Schuster, New York, N.Y., 1961
2. Jack L. King, Wings of Man, An Informal Biography of Captain H.T. "Dick" Merrill, Aviation Book Company and Jack L. King Associates, 1961.
3. Colin H. McIntosh, Radio Navigation for Pilots, Instrument Flight, Part Two, McGraw-Hill Book Company, New York and London, 1943
4. Bert A. Shields, Lt. Comdr., USNR, Meteorology and Air Navigation, McGraw-Hill Book Company, Inc., New York and London, 1942.
5. Bob Buck, North Star Over My Shoulder, A Flying Life, Simon & Schuster, New York, 2002.

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