

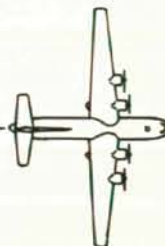
N-16434

An
**OPERATIONAL
SURVEY**

of
The Atlantic Division

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**AN OPERATIONAL
SURVEY**
of
THE MATS
Atlantic Division





Prepared by

CURTISS - WRIGHT CORPORATION
AIRPLANE DIVISION, COLUMBUS, OHIO

NOVEMBER 20, 1948
REPORT NO. 32F-12

THIS REPORT PRESENTS THE RESULTS OF AN INTENSIVE STUDY MADE TO DETERMINE THE MOST EFFICIENT CARGO AIRPLANE FOR USE OVER THE MILITARY AIR TRANSPORT SERVICE ROUTE SYSTEM.

A typical section of this route was selected for investigation - the North Atlantic run to Europe and Asia - with five transport Airplanes being considered for this service - Curtiss-Wright CW-32, Boeing C-97, and Douglas C-124, DC-6A and C-54.

The results, illustrated on the following pages, show the Curtiss-Wright CW-32 cargo transport to be superior in every merit factor analyzed. For any given manufactured weight of aircraft - a substantial measure of equal cost - a fleet of these airplanes will deliver from 23 percent to 99 percent more payload over the system than any of the alternate airplanes studied.

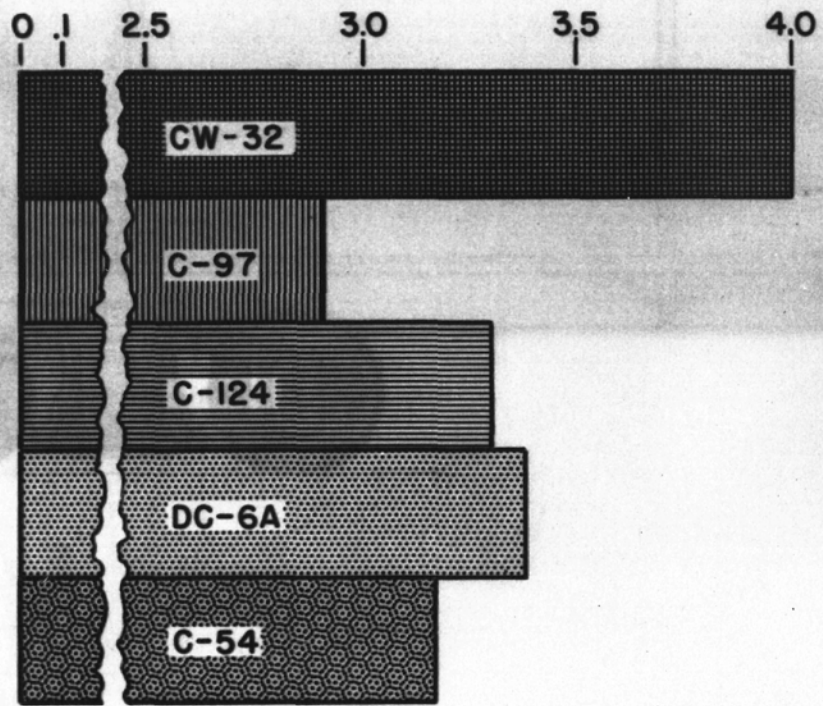
In terms of required engine horsepower to operate each fleet, the CW-32 cargo transport will transport 166.0 tons of goods per power unit each month, compared to 138.4 tons per 10,000 horsepower for the second best and to

97.8 tons per 10,000 horsepower for the least efficient airplane.

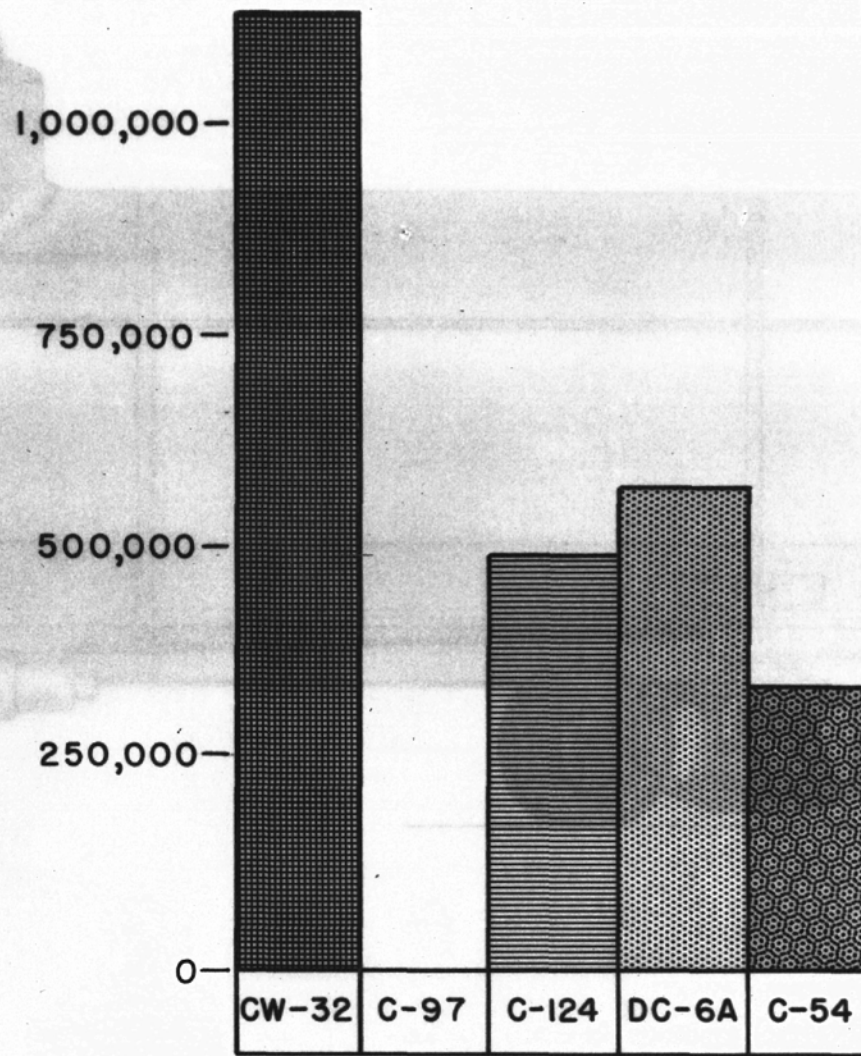
Using fuel and oil consumption as the criteria of merit, this analysis shows that the CW-32 fleet will transport the 6,000 tons of cargo monthly with a fuel saving of 557,500 gallons to 1,133,400 gallons each month.

In addition to the above bases of operating efficiency, the CW-32 cargo transport is the only design based fundamentally on cargo ground handling efficiency. It has been estimated that the truck-bed height, full-end-loading and multiple side doors of this airplane increase its overall utilization as a cargo carrier by greater than 15% when compared with the best alternate design. This time saving can be reflected in reduced fleet size for any given operation, thereby further increasing its superiority in the merit factors discussed above.

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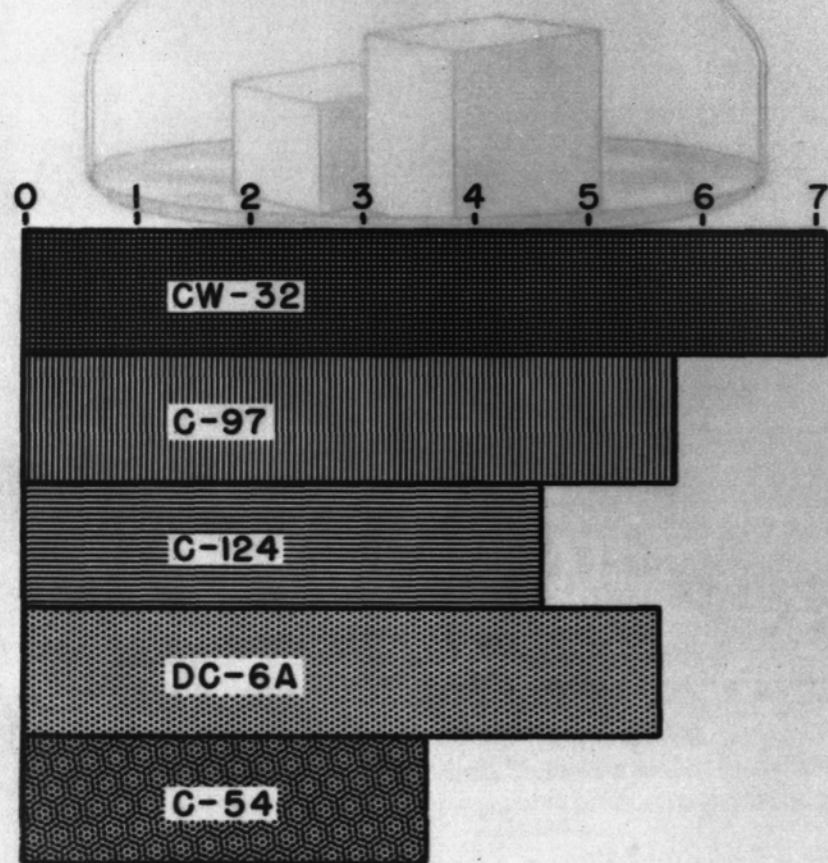
POUNDS OF CARGO
TRANSPORTABLE PER ONE
GALLON OF FUEL



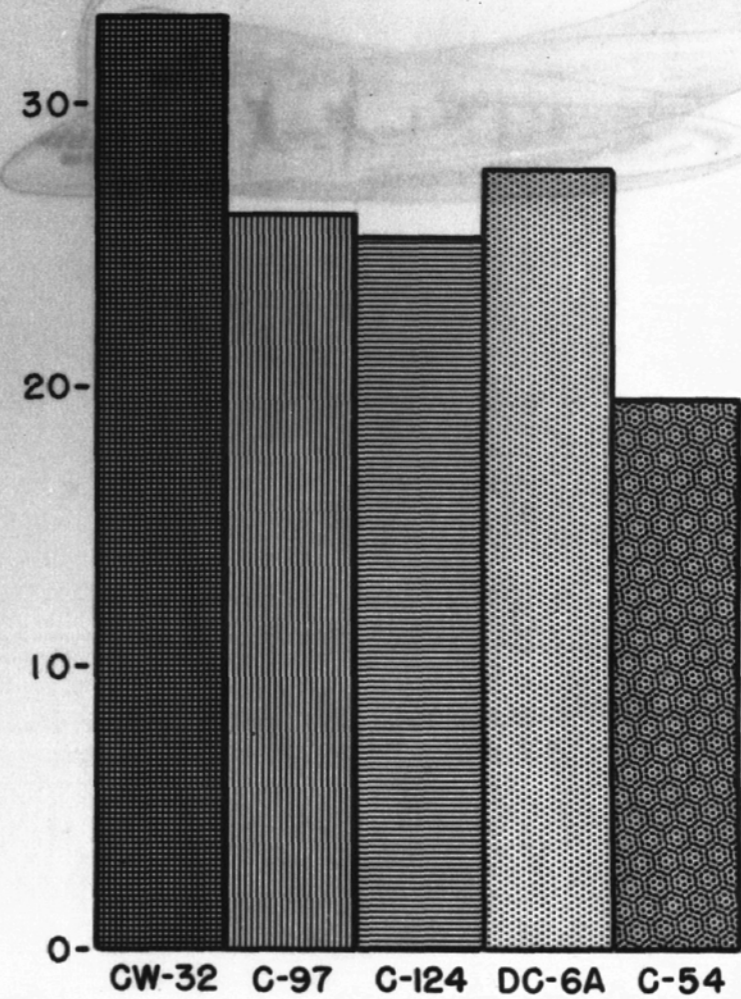
GALLONS OF FUEL SAVED PER
MONTH TO MOVE 6,000 TONS OF
CARGO

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POUNDS OF CARGO TRANSPORTABLE
PER POUND OF AIRPLANE



POUNDS OF CARGO TRANSPORTABLE
PER HORSEPOWER



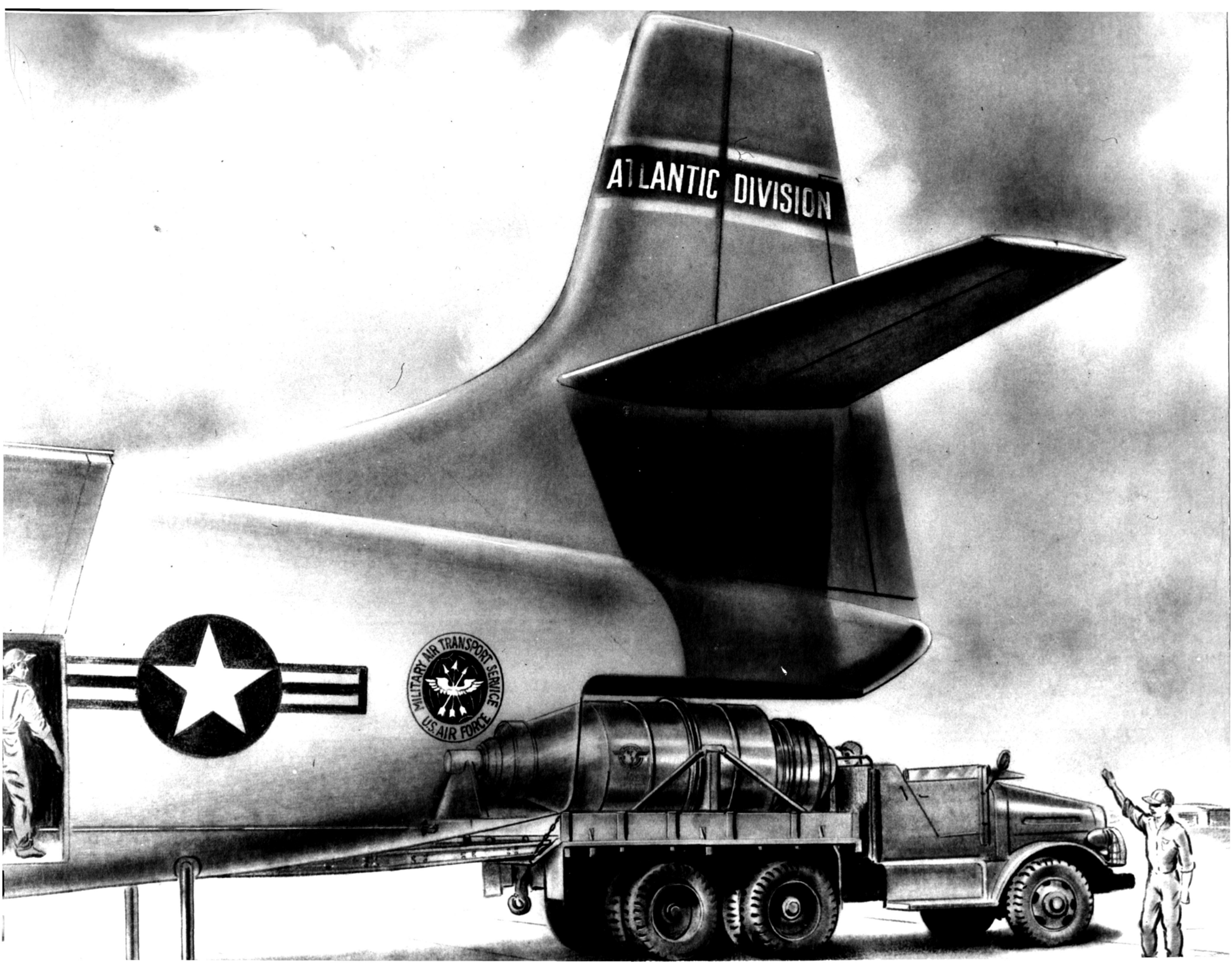
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	<u>CW-32</u>	<u>C-97</u>	<u>C-124</u>	<u>DC-6A</u>	<u>C-54</u>
FLEET SIZE	31	26	27	41	88
CARGO MOVED PER GALLON FUEL AND OIL (pounds)	4.014	2.911	3.306	3.383	3.170
CARGO PER MONTH PER POUND AIRPLANE + ENGINES (pounds)	7.092	5.754	4.567	5.606	3.552
CARGO PER MONTH PER TAKE-OFF HORSEPOWER (pounds)	33.20	26.02	25.22	27.68	19.56
FUEL AND OIL CONSUMED PER MONTH (tons)	9,592	13,205	11,652	11,388	12,134
TOTAL MANUFACTURED WEIGHT (tons)	872	1,073	1,355	1,104	1,740
TOTAL TAKE-OFF HORSE POWER (BHP)	372,600	474,500	490,750	447,300	632,200
TOTAL ROUTE MILEAGE PER MONTH (nautical)	1,673,897	1,562,223	1,223,482	2,173,964	3,407,365
TOTAL TONS OF CARGO PER MONTH (tons)	6,185	6,174	6,188	6,189	6,180
TOTAL TON MILES PER MONTH (nautical)	23,520,536	23,762,684	24,890,549	23,842,195	23,836,159
TOTAL FLIGHT HOURS PER MONTH (hours)	7,534	6,263	6,448	9,860	21,101
MONTHLY UTILIZATION (hours)	243	241	239	240	240
SYSTEM PAYLOAD (pounds)	28,834	30,974	39,669	22,316	14,261
SYSTEM BLOCK SPEED (knots)	222.2	249.4	189.7	220.4	161.5

This analysis is based on the *Military Air Transportation Service* operations. The flight frequencies over the routes analyzed are proportional to those shown on the *MATS* schedule for July 1948: The tonnage carried has been increased to approximately the same amount being moved under present operations. The largest airplane, Douglas C-124 type, was studied first and the frequencies for the other airplanes were then adjusted to give the same tonnage moved.

Reserve fuel for three hours flight at 50 percent METO

power at 10,000 feet was included in addition to trip fuel. Cruising altitude has been based on the recommendations of the manufacturer or the operator, except for flights less than 500 miles where 10,000 feet altitude was used. The climb to cruising altitude was performed at 100% power except when climb data were available only for 80% METO power. Cruising speed is 110 percent of the speed for maximum range. East bound flights were with 0 mph headwind, west bound flights at 20 mph headwind, north bound and south bound flights at 10 mph headwind.



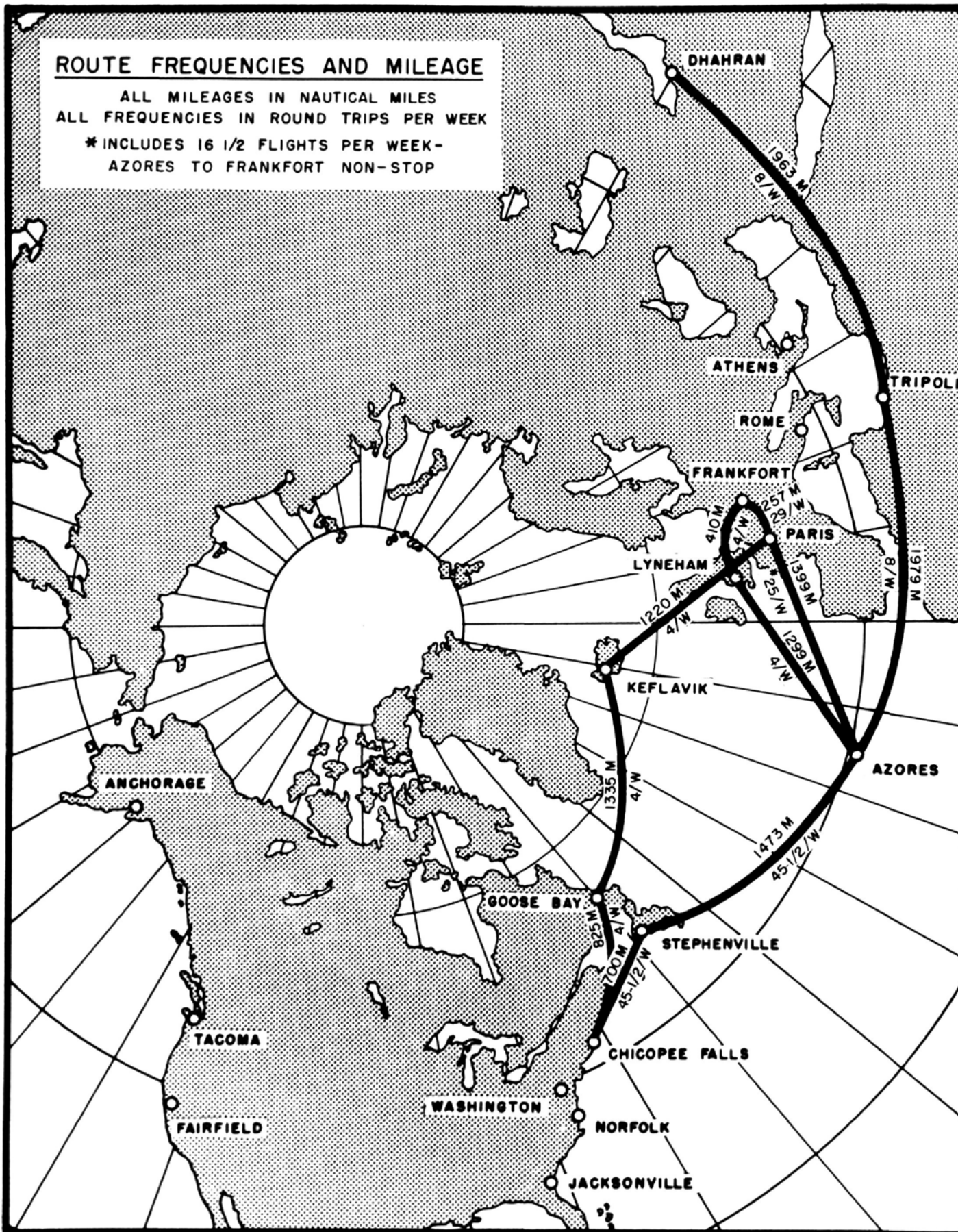
ATLANTIC DIVISION



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ROUTE FREQUENCIES AND MILEAGE

ALL MILEAGES IN NAUTICAL MILES
 ALL FREQUENCIES IN ROUND TRIPS PER WEEK
 * INCLUDES 16 1/2 FLIGHTS PER WEEK -
 AZORES TO FRANKFORT NON-STOP



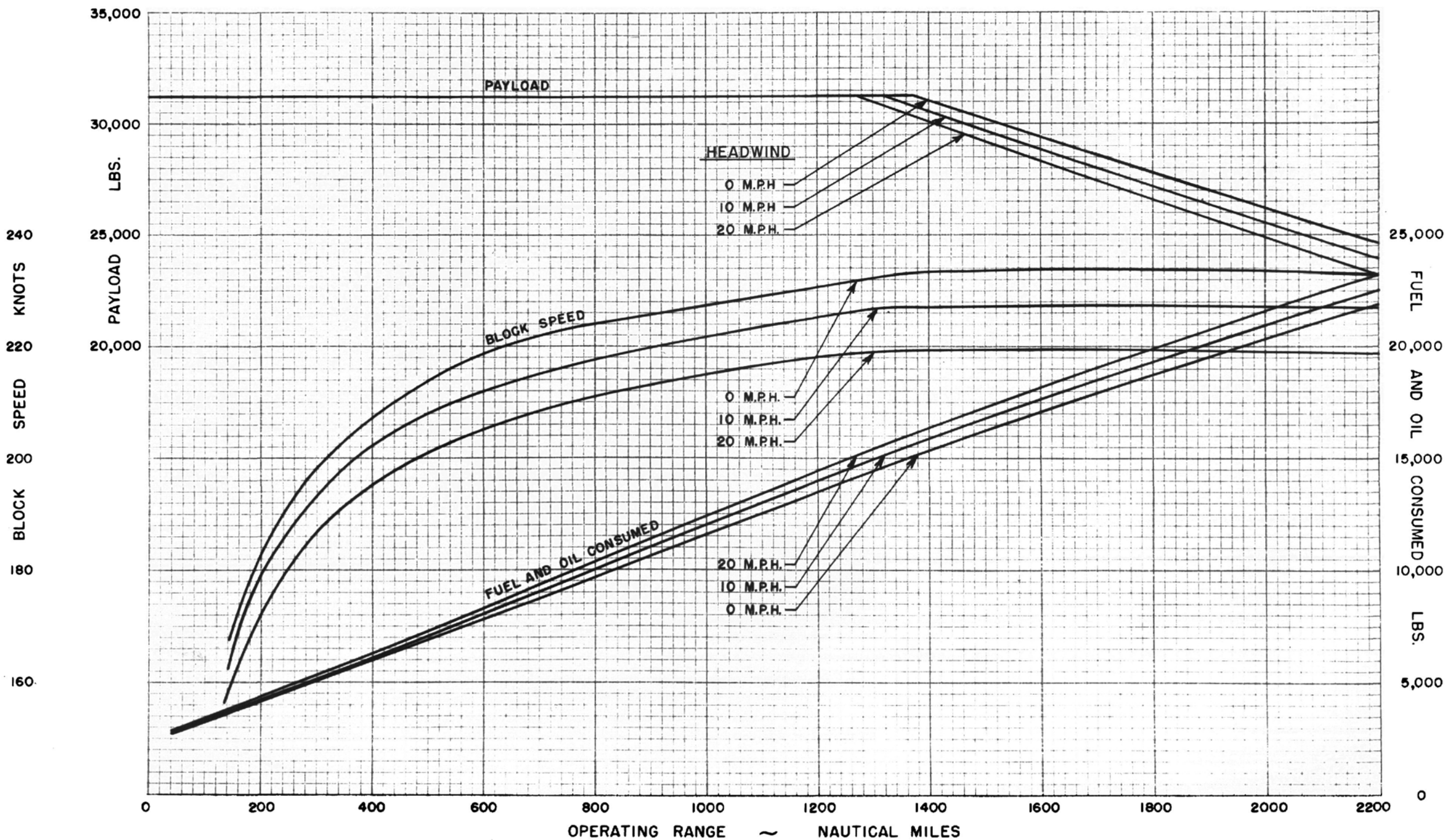
CURTISS - WRIGHT CW-32

THE DATA FOR THE CURTISS-WRIGHT CW-32 WERE OBTAINED FROM WIND TUNNEL TESTS AND ANALYSES. THE OPERATING WEIGHT LIMITS ARE BASED ON C.A.A. REQUIREMENTS. AN UTILIZATION OF 240 HOURS PER MONTH WAS USED FOR THE AIRPLANE AND 800 HOURS PER OVERHAUL FOR THE PRATT AND WHITNEY CB-13 ENGINES.

MAXIMUM TAKE-OFF WEIGHT	106,500 LBS.
MAXIMUM LANDING WEIGHT	91,300 LBS.
MAXIMUM PAYLOAD	31,330 LBS.
MANUFACTURER'S WEIGHT EMPTY	51,425 LBS.
CARGO COMPARTMENT INSULATION	535 LBS.
SEATING FOR 15 PASSENGERS	250 LBS.
LIFE RAFTS FOR 15 PASSENGERS	315 LBS.
GALLEY AND EQUIPMENT	270 LBS.
TRAPPED FUEL	110 LBS.
TRAPPED OIL	250 LBS.
WEIGHT EMPTY	53,155 LBS.
CRWF OF FIVE	1000 LBS.
CREW BAGGAGE	125 LBS.
A.D.I. FLUID	185 LBS.
OPERATING WEIGHT EMPTY	54,465 LBS.
RESERVE FUEL AND OIL	5,510 LBS.
ENGINE WEIGHT	2,390 LBS.
NUMBER OF AIRPLANES	31
NUMBER OF SPARE ENGINES	38

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OPERATIONAL DATA
CURTISS-WRIGHT CW-32 TYPE AIRPLANE
CRUISING ALTITUDE 20,000 FEET
CRUISING AT 110% SPEED FOR MAXIMUM RANGE
RESERVE FUEL FOR 3 HOURS AT 50% METO POWER AT 10,000 FEET



ROUTE FREQUENCIES AND MILEAGE

ALL MILEAGES IN NAUTICAL MILES
 ALL FREQUENCIES IN ROUND TRIPS PER WEEK
 *INCLUDES 15 1/2 FLIGHTS PER WEEK-
 AZORES TO FRANKFORT NON-STOP



BOEING C-97 TYPE *Airplane*

THE DATA FOR THE BOEING C-97 TYPE AIRPLANE WERE OBTAINED FROM MANUFACTURER'S AND/OR OPERATOR'S REPORTS AND HANDBOOKS. THE OPERATING WEIGHT LIMITS ARE BASED ON OPERATOR'S DATA. AN UTILIZATION OF 240 HOURS PER MONTH WAS USED FOR THE AIRPLANE AND 600 HOURS PER OVERHAUL FOR THE PRATT AND WHITNEY WASP MAJOR TSB3-G ENGINES.

MAXIMUM TAKE-OFF WEIGHT 142,500 LBS.
 MAXIMUM LANDING WEIGHT 121,700 LBS.
 MAXIMUM PAYLOAD 36,250 LBS.

MANUFACTURER'S WEIGHT EMPTY (377) 72,914 LBS.

MILITARY CONVERSION 2202 LBS.
 SEATING FOR 15 PASSENGERS 250 LBS.
 LIFE RAFTS FOR 15 PASSENGERS 315 LBS.
 GALLEY AND EQUIPMENT 270 LBS.
 TRAPPED FUEL 300 LBS.
 TRAPPED OIL 470 LBS.

WEIGHT EMPTY 76,725 LBS.

CREW OF FIVE 1000 LBS.
 CREW BAGGAGE 125 LBS.
 A.D.I. FLUID 250 LBS.

OPERATING WEIGHT EMPTY 78,096 LBS.

RESERVE FUEL AND OIL 7,350 LBS.
 ENGINE WEIGHT 3,470 LBS.

NUMBER OF AIRPLANES 26
 NUMBER OF SPARE ENGINES 42

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OPERATIONAL DATA
BOEING C-97 TYPE AIRPLANE
CRUISING ALTITUDE 25,000 FEET
CRUISING AT 110% SPEED FOR MAXIMUM RANGE
RESERVE FUEL FOR 3 HOURS AT 50% METO POWER AT 10,000 FEET

