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**ORGANIZATION
LOGISTICS
PLANNER'S
GUIDE**

Prepared by
OFFICE OF LOGISTICS

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ORGANIZATION LOGISTICS PLANNER'S GUIDE

INTRODUCTION

1. The evolution of Organization materiel doctrine and the development of different types of operations, together with the need for rapid and positive actions to meet sudden requirements, cause the practice of Organization logistics to be complex and ever-changing. The logistics officer has the assigned tasks of developing logistics support plans and performing those logistics functions necessary to the implementation of the plans. Logistics planning, as applied in this Guide, is that planning to accomplish:

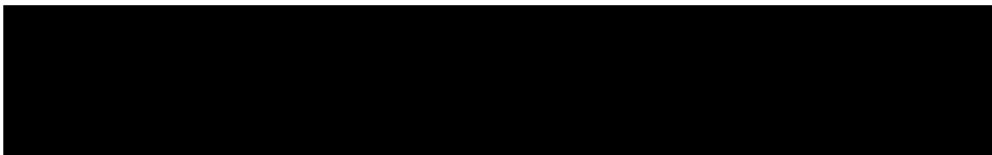

- a. Acquisition, storage, movement, maintenance, distribution, and disposition of materiel.
- b. Acquisition or construction, maintenance, operation, and disposition of facilities.
- c. Acquisition or furnishing of logistic services.
- d. Movement of personnel and baggage.

2. The purpose of this Guide is to provide the logistics officer with the basic logistics planning data and formats for use in developing logistics support plans. The Guide has been compiled to provide information, procedures, and references in a form that will assist the user in his day-to-day planning tasks. For those requirements which are beyond the scope of this Guide, a list of appropriate references is included at Appendix VIII.

3. Users of this Guide are requested to submit recommendations for changes or corrections to the Director of Logistics, Attention: Planning Staff.

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CHAPTER 1

LOGISTICS OFFICER

1. Functions of the Logistics Officer

a. The logistics officer is a member of a group organized to assist the chief in the execution of his mission. He may function on an Organization staff that deals solely with logistics matters; he may function on an Organization support-type staff, either individually or with other logistics or support officers; or he may function individually under a chief of a division or station.

b. The chief and his logistics officers assist in the accomplishment of the overall Organization mission by providing for the successful accomplishment of the missions of the support elements. The logistics officer must utilize and help to administer the resources of time, space, and materiel in the accomplishment of the overall mission.

c. The proper use of these resources requires the performance of the following basic functions:

(1) *Securing Information.* This means more than simply receiving and examining information. It means going and getting it from any and all possible sources. The information must be reliable, timely, and as complete as possible. Information secured should also be made available to any branch or division which needs it. Accurate and complete information is required as the basis for all action.

(2) *Making Plans.* Plans are based on information and they result in decision. They must reflect good judgment, for much of the effectiveness of Organization projects will depend on the quality of the planning. In order to be meaningful, plans should answer the following questions: What has to be done? Who does it? When and where must it be done? Under what conditions? How should it be done? After plans are developed, programming and scheduling follow.

(3) *Coordinating.* Within the scope of this function, the logistics officer is required to secure agreement to, understanding of, and assistance in, the implementation of his task or project. He will have to determine the need for coordination and the people with whom to coordinate. He will have to determine the method (such as a meeting or conference), and then actually accomplish the coordination. Effective coordination will promote cooperation and reduce friction among those involved in the task or project.

(4) *Making Decisions.* The logistics officer will be called upon to make many decisions in carrying out the policies and directives of his chief. These decisions must be based on the best information available. As an example, a logistics officer who is charged with developing the table of equipment for a project must consider carefully all factors, such as temperature, climate, utilities, and physical characteristics of people involved. He will normally make decisions within the framework of established policy or recommend decisions to his chief as to the specific materiel to be used. The logistics officer usually will not be called upon to make command or policy decisions, but when such decisions are made by his chief, or higher authority, the logistics officer must be loyal and precise in the execution of his duties in support of these decisions. If established policy or procedures are conflicting or need changing, he should develop and submit to his chief specific recommendations for changes.

d. The logistics officer's specific duties will be in the fields of supply, transportation, procurement, real estate and construction, printing, and support services. He may be called upon to operate as a staff logistics officer or an operating logistics officer in performing his day-to-day work. *When the*

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requirements levied upon him are beyond his capabilities, he should call upon the Office of Logistics to assist him. In this respect, the Planning Staff, Office of Logistics, is available to provide a wide range of assistance within the field of Organization logistics. This staff is the focal point for assistance in the development of plans and requirements. Direct contact with other staff elements of the Office of Logistics should be effected during the operational phase.

e. The logistics officer may be called upon to perform duties both of a staff and of an operating nature. Thus, he may be required to:

(1) Advise his chief on logistical matters and keep him informed on the logistical status of the Organization.

(2) Procure and maintain that logistics information required in fulfilling his mission.

(3) Prepare logistics estimates, plans, and staff studies.

(4) Prepare necessary documentation to obtain supplies and materiel.

(5) Prepare budgetary data necessary for logistics purposes.

(6) Coordinate and monitor the activities of his office with respect to logistics matters.

(7) Coordinate the utilization of materiel, services, and facilities between the using and supplying organizations.

(8) Coordinate the implementation of logistics plans.

(9) Exercise supervision over such logistical matters as his chief may designate.

f. The logistics officer may be assigned other duties. The above list is neither detailed nor all-inclusive. While his functions are basically centered around the fields of supply, transportation, procurement, real estate and construction, printing, and support services, there are differences in the scope of his activities at station, base, depot, division, and Headquarters levels.

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CHAPTER 2

LOGISTICAL PLANNING

1. Definitions

a. *Planning* is the systematic application of intelligence to a problem, the solution to which is not immediately apparent.

b. A *logistical plan* is a document designed and prepared to insure the availability of adequate resources to support an operational plan.

c. The *functional areas of logistics* in this Organization include supply, transportation, procurement, real estate and construction, printing, and support services.

2. Logistical Estimate

a. Logistical planning must be carried out concurrently with, or in some cases prior to, operational planning. Coordinated logistical and operational planning are indispensable to the successful attainment of operational objectives.

b. The logistical estimate serves three broad purposes:

(1) It will bring into focus all the logistical implications of an operational plan.

(2) It will indicate whether the operation can be supported adequately.

(3) It will indicate one or more logistical courses of action to provide adequate support to the operational plan.

c. All logistical plans should be based on logistical estimates so that logistics planners can confidently advise as to whether operations can be supported.

d. A suggested format for a logistical estimate is attached as Appendix I. It incorporates instructions concerning the processes involved in its use. These processes are demanding in that they require an accurate status of facilities, stocks, and personnel to determine logistical capabilities for comparison with requirements in deriving proper courses of logistical action for support of operations.

3. Development of Logistical Plans

a. Based on the logistical estimate, logistical plans should announce the decision of a headquarters for logistics support. Logistical plans should, where possible, provide for:

(1) Efficient use of transportation.

(2) Reduction in multiple handling of supplies.

(3) Reduction in time between ordering and receiving.

(4) Elimination, or reduction to a minimum, of requirements that do not contribute directly to the progress of operations.

(5) Maximum and efficient utilization of manpower.

(6) Economy in use of supplies and equipment.

(7) Elimination of nonessential and improbable contingency items.

(8) Establishment and maintenance of minimum supply levels.

(9) Alternate means to provide support and obtain flexibility.

b. In order to develop logistical plans, the following information is essential to the planner:

(1) He must be advised of the basic concept of operations early in the planning phase. Logistical considerations often alter or even dictate operational concepts.

(2) He must know force strengths and composition. Vehicles, weapons, transport replacement and consumption materials, reserve stocks and service requirements cannot be computed without a reasonable idea of numbers to be supported and composition of the organization.

(3) He must know transportation requirements and capabilities. The logistical planner must match these requirements against known

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capabilities to insure that materiel can be moved in accordance with requirements. If reliable data is unavailable, estimates must be made based on available information. Transportation planning data must include the following:

- (a) Movement requirements for personnel and supplies.
- (b) Number, types, and characteristics of transport vehicles.
- (c) Terminal capacities in both the loading and unloading areas, as applicable.
- (d) Condition of airports and seaports to be used.

(4) The logistics planner must know the available sites for depots and service installations in the loading and unloading area, as applicable. Existing facilities should be used where feasible. Factors which govern the location of these installations include the ability to support the operation, accessibility to the existing transportation nets, and security conditions.

(5) The logistical planner must anticipate use of Organization, military, and other U.S. source labor and indigenous labor resources available. In many instances, it may be necessary to depend primarily on Organization personnel for labor because of security conditions. Where possible, other source labor should be used.

(6) A suggested format for the logistical plan is attached as Appendix II. It incorporates instructions concerning the processes involved in its use.

4. Determination of Logistical Materiel Support Requirements

a. *Planning.* As a general rule, support requirements planning passes through three fundamental phases: Estimation, Calculation, and Modification. The first phase must be accomplished with few, if any, tangible figures. Each successive step in planning is developed with more concrete and accurate data than the preceding one until a firm list of materiel is evolved.

(1) *Estimation.* The initial step in the development of requirements often must be accomplished with little more than a brief statement of the mission and concept of operation.

Logistics planners employ broad experience factors such as replacement and consumption data and initial issue information. Factors representing the best available experience are used and the planner should make only such changes as later experience and background dictate.

(2) *Calculation.* Calculation of support requirements begins when estimates are received from supported and supporting elements. Total support requirements can be derived from these initial lists, which should be more accurate than the estimates used to initiate planning. However, support estimates should be evaluated and carefully scrutinized before acceptance. Calculation of requirements continues after the preparation of the initial support requirements. Factors and other data used in the initial estimations are discarded in favor of actual (or adjusted) figures extracted from the initial lists.

(3) *Modification.* Modifications, adaptations, or alterations dictated by policy, by direction, or by conditions peculiar to the area of operations are applied in the third phase. Each revision must be checked to make certain that all materiel aspects have been considered and that the resultant list is balanced.

b. *Procedural Steps for the Determination of Support Requirements.* The following steps are recommended as a guide for systematic support requirement determination planning:

(1) Operational missions and objectives generate support requirements.

(2) Approved operational requirements form the fundamental basis for determining support requirements.

(3) A forecast of projected operational requirements may be added directly or on a percentage basis to the initial approved operational requirements.

(4) Guidance must be provided from top policy and planning staffs to lower echelons to assist in requirement determinations.

(5) Support requirements, after determination and coordination, are submitted to senior echelon for approval.

(6) Upon approval, requirements are then firmly established for basis of procurement, storage, stockpile and distribution.

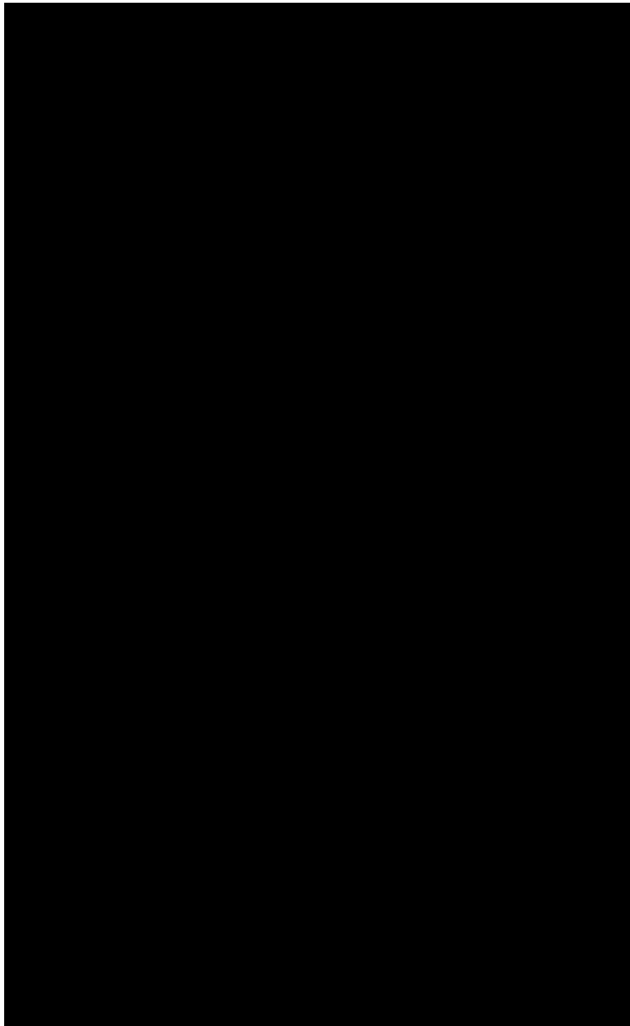
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(7) Requirements should be reviewed and revised periodically as operational concepts are changed.

5. Determination of Logistics Personnel Requirements

a. The exact composition of the support organization depends upon certain variable factors which the planner must analyze continuously to provide adequate support. These are:

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6. Standing Operating Procedures (SOP)

a. *General.* A standing operating procedure (SOP) is a set of instructions giving the methods to be followed by a particular element for the performance of those duties (operational and administrative) which the senior member desires to make routine. These instructions reduce the number and length of directives that must be issued. The purposes of the SOP are:

(1) To simplify the preparation and transmission of directives.

(2) To facilitate and expedite actions, both operational and administrative, and to minimize confusion and errors.

b. *Scope and Form.*

(1) Each subordinate element normally develops appropriate and effective procedures conforming to those established by the senior element. The SOP should be sufficiently complete to advise new arrivals or newly attached personnel of the procedures followed within an organization. The SOP's are based upon directives and policies of the next headquarters.

(2) The SOP's are published in a form most effective for the type of organization. The form utilized may be a single pamphlet or separate pamphlets, each pertaining to a separate function. Regardless of the form, the component parts make up the unit SOP and are published by authority of the senior representative. (See Appendix V for recommended format for an SOP.)

7. Standard Planning References

Appendix VIII contains a recommended list of standard references for logistics planning. It is not all-inclusive, and users of this Guide should consult indexes for additional references in researching a staff problem.

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CHAPTER 3

STAFF WRITING

1. General

a. At all levels, the complexity of staff actions normally requires the use of written directives, reports, orders, and studies. The logistics staff officer must, therefore, develop his ability to write accurately, concisely and clearly.

b. A staff paper should satisfy the following principles:

(1) ACCURACY

- (a) Conform to facts.
- (b) Be free from error.

(2) BREVITY

Be accurate, concise and to the point.

(3) CLARITY

- (a) Use simple sentences.
- (b) Use correct grammatical construction.
- (c) Use correct punctuation.
- (d) Use only accepted abbreviations.
- (e) Eliminate vague, meaningless or ambiguous phrases.
- (f) Use topic sentences at start of each paragraph.
- (g) Should not sacrifice clarity for brevity.

(4) COHERENCE

- (a) Develop subject in logical sequence.
- (b) Place related items (ideas) in orderly sequence.
- (c) Present subject logically.

(5) COMPLETENESS

- (a) Present all logical alternatives.
- (b) Indicate that views of others concerned have been obtained and considered.
- (c) Present draft orders, letters or instructions for placing recommendations into effect.

(6) EMPHASIS

Stress the more significant points.

(7) OBJECTIVITY

- (a) Maintain an impersonal viewpoint.
- (b) Maintain an unbiased viewpoint.
- (c) Analyze all aspects of the problem.

(8) UNITY

Adhere to the subject.

(9) SIMPLICITY

- (a) Present facts simply and accurately so as to require a minimum of effort when reading the paper.
- (b) Do not indulge in flowery prose which detracts from the subject.

2. Staff Study

The staff study is a formal staff paper containing a concise and accurate analysis and a recommended solution of a problem. It is the result of research and is the means of conveying to a superior a report of the analysis made by the writer, together with his conclusions and recommendations. It assists the superior in making a decision. *Appendix VI* prescribes the format of a staff study and a guide to the content of each paragraph.

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SECTION III

CONEX DATA

<u>CONEX</u>	<u>CARGO</u>	<u>CAPACITY</u>	<u>SHIPPING</u>	
	<u>WGHT.</u>	<u>CUBE</u>	<u>MAX. WGHT.</u>	<u>CUBE</u>
1. Type 1	9000	135	10,500	180
2. Type 2	9000	295	10,500	365

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SECTION IV

MILITARY AIRLIFT COMMAND (MAC)
TARIFF INSTRUCTIONS AND RATE TABLES

Rate tables have been divided into four tables, as follows, to facilitate their use:

- I Europe, North Africa, Northeast Cold Countries to/from U.S.
- II Mid-East between Athens and New Delhi
- III Caribbean, South Atlantic, Central and South America, South Africa to/from U.S.
- IV Alaska, Pacific Area, India to/from U.S.

To obtain any rate, consult the alphabetized Index of Stations and ascertain the rate table in which each station is located. The rate table indicated will list the cost of movement of a passenger and cargo.

Charges for carrying cargo are assessed by pound or cube. The cubic foot measurement indicated on each shipping requisition will be multiplied by

seven pounds and compared with the weight. The larger of the two will be used for computing the charges. No surcharge will be applied to computed charges for weight category or valuation. No package is considered as weighing less than seven pounds because its cube is computed as at least one cubic foot, i.e., one cubic foot equals seven pounds.

Example: A cargo shipment of 640 pounds with a cube of 180 is transported from Bangkok, Thailand to Dhahran, Saudi Arabia. 180 cube x 7 lbs. (minimum weight per cube) equals 1,260 lbs. Since 1,260 is in excess of 640, the charge will be computed on the basis of a 1,260 lb. shipment:

Bangkok to New Delhi (Table IV)	11.9¢
New Delhi to Dhahran (Table II)	9.5¢
1,260 times	<u>21.4¢</u>
Total Charge	\$269.64

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INDEX OF STATIONS

<i>Geographical Place Name</i>	<i>Code</i>	<i>Airport</i>	<i>Rate Table</i>
Adak, Aleutian Islands	ADK	Adak NAS	IV
Adana, Turkey	ADA	Incirlik AB	II
Addis Ababa, Ethiopia	ADD	Haile Selassie I Airport	II
Amman, Jordan	AMM	Amman Airport	II
Anchorage, Alaska	EDF	Elmendorf AFB	IV
	ANC	Anchorage Int'l Airport	IV
Ankara, Turkey	ESB	Esenboga Airport	II
Argentia, Newfoundland, Canada	YAR	Argentia NAS	I
Ascension Island	ASI	Wideawake Field	III
Asmara, Eritrea	ASM	Yohannes IV Airport	II
Athens, Greece	ATH	Athens Central Airport	I, II
Aviano, Italy	AVB	Aviano AB	I
Bangkok, Thailand	BKK	Don Muang Airport	IV
	VSH	Qu Tapao Airfield	IV
Beirut, Lebanon	BEY	Beirut Int'l Airport	II
Berlin, Germany	THF	Templehof AB	I
Bermuda Island, BWI	BDA	Kindley AFB	I, III
Blenheim, New Zealand	BHE	Woodbourne AS	IV
Bogota, Colombia	DDO	El Dorado Int'l Airport	III
Brindisi, Italy	BDS	Brindisi AS	I
Cairo, Egypt	CAI	Cairo Int'l Airport	II
Calcutta, India	CCU	Dum Dum Airport	IV
Cam Ranh Bay, Vietnam	VCR	Cam Ranh Bay AB	IV
Charleston, SC	CHS	Charleston AFB/Muni	I, III, IV
Chateauroux, France	DEO	Deols Aux Airfield	I
Christchurch, New Zealand	CHC	Christchurch Int'l Airport	IV
Churchill, Canada	YYQ	Churchill Airport	I
Cocoa Beach, Florida	COF	Patrick AFB	I, III
Danang, Vietnam	DAD	Danang AB	IV
Dhahran, Saudi Arabia	DHA	Dhahran Airfield	II
Diyarbakir, Turkey	DIY	Diyarbakir AS	II
Dover, Delaware	DOV	Dover AFB	I, III, IV
Eleuthera Island, Bahama Islands	ELH	Eleuthera Aux AFB	III
Eniwetok Atoll, Marshall Islands	ENT	Eniwetok AB	IV
Fairbanks, Alaska	EIL	Eielson AFB	IV
	FAI	Fairbanks Int'l Airport	IV
Fernando De Noronha, Brazil	FDN	Fernando De Noronha Airport	III
Frankfurt, Germany	FRF	Rhein-Main AB	I
Goose Bay, Labrador Canada	YJR	Goose AB	I
Grand Bahama Island, Bahama Islands	GBI	Grand Bahama Aux AFB	III
Grand Turk Island, BWI	GDT	Grand Turk Aux AFB	III
Guam, Mariana Islands	UAM	Andersen AFB	IV
Guantanamo Bay, Cuba	GAO	Leeward Point Airport	III
Honolulu, Hawaii	HNL	Honolulu Int'l Airport	IV
	HIK	Hickam AFB	IV
Iraklion, Crete	VWH	Iraklion AS	II
Istanbul, Turkey	IST	Yesilkoy Airport	II
Iwo Jima, Volcano Islands	IWO	Iwo Jima AB	IV
Izmir, Turkey	IGL	Cigli AB	II
Jidda, Saudi Arabia	JID	Jidda Airfield	II
Johannesburg, South Africa	JNB	Jan Smuts Airport	III
Johnston Island	JON	Johnston Island AB	IV

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<i>Geographical Place Name</i>	<i>Code</i>	<i>Airport</i>	<i>Rate Table</i>
Karachi, Pakistan	KHI	Karachi Int'l Airport	II
Keflavik, Iceland	KEF	Keflavik Airport	I
Khartoum, Sudan	KRT	Khartoum Airdrome	II
Kinshasa, Republic of Congo	FIH	Kinshasa Airport	III
Kwajalein Island, Marshall Islands	KWA	Kwajalein PMRF	IV
Lahore, Pakistan	LHE	Lahore Airport	II
Lajes, Azores	LGS	Lajes Field	I
Lisbon, Portugal	LIS	Lisbon Airport	I
London, England	LON	Croydon Aerodrome	I
Los Angeles, California	LAX	Los Angeles Int'l Airport	IV
Madrid, Spain	TOJ	Torrejon AB	I
Manila, Philippine Islands	CRK	Clark AB	IV
	MNL	Manila Int'l Airport	IV
	NOP	Mactan Airfield	IV
	CUA	Cubi Point NAS	IV
Marcus Island	MUS	Marcus	IV
Mayaguana, Bahama Islands	MYG	Mayaguana Aux AFB	III
McGuire AFB, Wrightstown, NJ	WRI	McGuire AFB	I, III, IV
Midway Island, Pacific	MDY	Midway NAS	IV
Mildenhall, England	MHZ	RAF Mildenhall	I
Moron, Spain	OZP	Moron AB	I
Nandi, Fiji Islands	NAN	Nandi	IV
Naples, Italy	NAP	Capadichino Airport	I
New Delhi, India	NDH	Palam Airport	II, IV
New York, NY	JKF	John F. Kennedy Int'l Airport	I
Nicosia, Cyprus	ICO	Nicosia Airport	II
Norfolk NAS, Va	NGU	Norfolk NAS	I, III
Okinawa, Ryukyu Islands	DNA	Kadena AB	IV
	AHA	Naha AB	IV
Oslo, Norway	FBU	Fornebu Airport	I
Pago Pago, American Samoa	PPG	Pago Pago Airport	IV
Panama, Canal Zone	HOW	Howard AFB	III
Paramaribo, Surinam	ZAN	Zandery Airport	III
Paris, France	ORY	Orly Airport	I
Peshawar, West Pakistan	PEW	Peshawar AS	II
Pisa, Italy	PSA	San Giusto Airport	I
Port of Spain, Trinidad	POS	Piarco Airport	III
Prestwick, Scotland	PIK	MOA Prestwick Airfield	I
Quonset Point, Rhode Island	NCO	Quonset Point NAS	I
Ramey AFB, Puerto Rico	BQN	Ramey AFB	III
Recife, Brazil	REC	Ibura Airport	III
Richmond, Australia	RCM	RAAF Airdrome	IV
Rio De Janeiro, Brazil	RIO	Galeao Airport	III
Roosevelt Roads, Puerto Rico	NRR	Roosevelt Roads NAS	III
Rota, Spain	RTA	Rota NAS	I
Saigon, Vietnam	SGN	Tan Son Nhut Airfield	IV
	HOA	Bien Hoa Airfield	IV
St. Johns, Antigua Island, BWI	SJH	Coolidge Airport	III
St. Lucia Island, Windward Islands	SLU	Vigie Airport	III
Samsun, Turkey	SSX	Samsun AS	II
San Antonio, Texas	SKF	Kelly AFB	IV
San Bernardino, California	SBD	Norton AFB	IV
San Francisco, California	SFO	San Francisco Int'l Airport	IV

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<i>Geographical Place Name</i>	<i>Code</i>	<i>Airport</i>	<i>Rate Table</i>
San Isidro, Santo Domingo	SSO	San Isidro AB	III
San Salvador Island, Bahama Islands	SSD	San Salvador Aux AFB	III
Sao Paulo, Brazil	CUK	Cumbica Airport	III
Seattle, Washington	SEA	Seattle-Tacoma Int'l Airport	IV
	TCM	McChord AFB	IV
Seoul, Korea	SEL	Kimpo AB	IV
Shemya, Aleutian Islands, Alaska	SYA	Shemya AFS	IV
Soesterberg, Netherlands	SSS	Camp New Amsterdam AB	I
Sondrestrom, Greenland	SFJ	Sondrestrom AB	I
Soudha Bay, Crete	SOC	Soudha AS	II
Stephenville, Newfoundland, Canada	YJT	Ernest Harmon AFB	I
Taipei, Taiwan	TPE	Taipei Int'l Airport	IV
Teheran, Iran	THR	Mehrabad Airport	II
Tel Aviv, Israel	TLV	Lod Airport	II
Thule, Greenland	THU	Thule AB	I
Tokyo, Japan	TAW	Tachikawa AB	IV
	TYO	Tokyo Int'l Airport	IV
Trabzon, Turkey	TZX	Trabzon AS	II
Travis AFB, Fairfield, California	SUU	Travis AFB	IV
Tripoli, Libya	TIP	Wheelus Field	I
Wake Island, Pacific	AWK	Wake Island AS	IV
Winnipeg, Manitoba, Canada	YWG	Stevenson Field	I
Yalova, Turkey	TYA	Yalova Airport	II

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RATE TABLE I—PASSENGER AND CARGO RATES

Passenger fares stated in dollars; cargo rates stated in cents per pound.

And \ Between	Argentina		Athens		Aviano		Berlin		Bermuda		Brindisi	
	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo
Athens Greece	89	16.6										
Aviano Italy	75	14.0	19	3.6								
Berlin Germany	—	—	—	—	—	—						
Bermuda British West Indies	50	11.9	120	22.3	106	19.7	—	—				
Brindisi Italy	80	14.9	9	1.7	10	1.9	—	—	111	20.6		
Chateauroux France	55	10.2	34	6.4	20	3.8	—	—	86	15.9	25	4.7
Churchill Canada	84	22.7	169	35.7	155	33.1	—	—	70	17.3	160	34.0
Frankfurt Germany	64	11.8	28	5.4	9	1.8	—	—	94	17.4	20	3.7
Goose Bay Canada	14	3.8	102	19.0	88	16.4	—	—	48	11.4	93	17.3
Keflavik Iceland	41	11.2	63	11.8	44	8.2	—	—	87	21.9	55	10.1
Lajes Azores	34	6.2	71	13.2	57	10.6	—	—	49	9.0	62	11.5
Lisbon Portugal	62	11.6	43	8.2	29	5.5	—	—	93	17.3	34	6.5
Madrid Spain	55	10.2	36	6.7	22	4.1	—	—	86	15.9	27	5.1
Mildenhall England	55	10.2	38	7.3	19	3.7	—	—	86	15.9	29	5.6
Moron Spain	62	11.5	42	8.0	28	5.4	—	—	93	17.2	33	6.3
Naples Italy	75	14.1	14	2.6	15	2.9	—	—	106	19.3	5	1.0
Oslo Norway	79	14.6	43	8.2	24	4.6	—	—	109	20.2	34	6.5
Paris France	56	10.4	36	6.8	17	3.2	—	—	87	16.1	27	5.1
Pisa Italy	71	13.2	20	3.8	5	1.0	—	—	102	18.9	11	2.1
Prestwick Scotland	61	11.3	44	8.4	26	4.8	—	—	92	16.9	36	6.8

SECRET

SECRET

RATE TABLE I—PASSENGER AND CARGO RATES (Cont'd)

Passenger fares stated in dollars; cargo rates stated in cents per pound.

Between And	Argentina		Athens		Aviano		Berlin		Bermuda		Brindisi	
	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo
Rota Spain	63	11.7	44	8.3	30	5.6	—	—	94	17.4	35	6.6
Soesterberg Netherlands	61	11.4	34	6.5	15	2.9	—	—	92	17.1	25	4.8
Sondrestrom Greenland	43	11.8	129	24.0	115	21.4	—	—	77	19.3	120	22.3
Stephenville Canada	6	1.6	95	17.6	81	15.0	—	—	42	9.8	86	15.9
Thule Greenland	60	16.1	144	26.7	130	24.1	—	—	93	23.7	135	25.0
Tripoli Libya	86	16.1	21	4.0	28	5.4	—	—	117	21.8	18	3.5
Winnipeg Canada	64	17.4	149	30.4	135	27.8	—	—	50	12.0	140	28.7
USAPOE East Coast	32	8.6	117	21.7	103	19.1	98	18.1	18	3.3	108	20.0

Passenger Rates—Direct service is not available between all points for which a rate is published.

Charge for passenger baggage in excess of 66 lbs. equals $.005 \times$ passenger fare \times lbs. excess.

RATE TABLE II JOINS THIS TABLE AT ATHENS.

RATE TABLE III JOINS THIS TABLE AT USAPOE, EAST COAST.

SECRET

RATE TABLE I—PASSENGER AND CARGO RATES (Cont'd)

Passenger Fares stated in dollars, Cargo Rates stated in cents per pound.

And \ Between	Chateauroux		Churchill		Frankfurt		Goose Bay		Keflavik		Lajes	
	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo
Churchill Canada	135	29.3										
Frankfurt Germany	11	2.0	143	30.9								
Goose Bay Canada	68	12.6	82	22.1	77	14.2						
Keflavik Iceland	34	6.3	121	32.6	35	6.4	53	14.3				
Lajes Azores	37	6.8	108	24.4	45	8.4	47	8.6	61	16.6		
Lisbon Portugal	22	4.3	142	30.7	34	6.4	75	14.0	55	10.3	44	8.2
Madrid Spain	14	2.6	135	29.3	25	4.6	68	12.6	48	8.9	37	6.8
Mildenhall England	9	1.6	135	29.3	9	1.8	68	12.6	25	4.7	37	6.8
Moron Spain	22	4.1	142	30.6	33	6.2	75	13.9	55	10.2	44	8.1
Naples Italy	20	3.9	155	33.2	25	4.7	88	16.5	54	10.2	57	10.7
Oslo Norway	26	4.9	158	33.7	15	2.8	92	17.0	50	9.2	61	11.3
Paris France	4	.8	136	29.5	7	1.3	69	12.8	31	5.8	38	7.0
Pisa Italy	16	3.0	151	32.3	15	2.8	84	15.6	50	9.3	53	9.8
Prestwick Scotland	15	2.7	134	29.2	15	2.8	68	12.6	19	3.6	43	7.9
Rota Spain	23	4.4	143	30.8	33	6.1	76	14.1	56	10.4	45	8.3
Soesterberg Netherlands	11	2.1	141	30.5	6	1.1	74	13.8	31	5.9	43	8.0
Sondrestrom Greenland	95	17.6	111	30.1	104	19.2	29	7.9	82	22.2	77	18.0
Stephenville Canada	61	11.2	76	20.5	69	12.8	8	2.3	45	12.0	39	7.2
Thule Greenland	110	20.3	127	34.4	118	21.9	53	14.3	98	26.6	88	16.3
Tripoli Libya	31	5.9	166	35.2	38	7.2	100	18.6	66	12.4	68	12.7

SECRET

RATE TABLE I—PASSENGER AND CARGO RATES (Cont'd)

Passenger Fares stated in dollars, Cargo Rates stated in cents per pound.

Between And	Chateauroux		Churchill		Frankfurt		Goose Bay		Keflavik		Lajes	
	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo
Winnipeg Canada	115	24.0	20	5.3	123	25.6	62	16.8	101	27.3	88	19.1
USAPOE East Coast	83	15.3	52	14.0	91	16.9	30	8.1	69	18.6	56	10.4

Passenger Rates—Direct service is not available between all points for which a rate is published.

Charge for passenger baggage in excess of 66 lbs. equals $.005 \times$ passenger fare \times lbs. excess.

RATE TABLE II JOINS THIS TABLE AT ATHENS.

RATE TABLE III JOINS THIS TABLE AT USAPOE, EAST COAST.

SECRET

RATE TABLE I—PASSENGER AND CARGO RATES (Cont'd)

Passenger fares stated in dollars; cargo rates stated in cents per pound.

And \ Between	Lisbon		Madrid		Mildenhall		Moron		Naples		Oslo	
	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo
Madrid Spain	7	1.3										
Mildenhall England	32	6.0	23	4.3								
Moron Spain	14	2.7	7	1.3	31	5.9						
Naples Italy	29	5.5	22	4.1	30	5.7	28	5.4				
Oslo Norway	48	9.2	40	7.4	25	4.7	47	9.0	39	7.5		
Paris France	27	5.0	18	3.4	7	1.3	26	4.9	25	4.7	22	4.2
Pisa Italy	24	4.5	16	3.1	25	4.7	23	4.4	16	3.1	29	5.6
Prestwick Scotland	36	6.7	29	5.3	6	1.1	37	7.0	36	6.8	30	5.6
Rota Spain	15	2.9	8	1.5	31	5.8	2	.5	30	5.6	49	9.3
Soesterberg Netherlands	34	6.4	25	4.7	6	1.2	33	6.2	30	5.8	20	3.9
Sondrestrom Greenland	102	19.0	95	17.6	95	17.6	102	18.9	115	21.5	119	22.0
Stephenville Canada	68	12.6	61	11.2	61	11.2	68	12.5	81	15.1	84	15.6
Thule Greenland	117	21.7	110	20.3	110	20.3	117	21.6	130	24.2	133	24.7
Tripoli Libya	41	7.8	34	6.4	41	7.7	40	7.7	13	2.5	52	9.9
Winnipeg Canada	122	25.4	115	24.0	115	24.0	122	25.3	135	27.9	138	28.4
USAPOE East Coast	90	16.7	83	15.3	83	15.3	90	16.6	103	19.2	106	19.7

Passenger Rates—Direct service is not available between all points for which a rate is published.

Charge for passenger baggage in excess of 66 lbs. equals .005 × passenger fare × lbs. excess.

RATE TABLE II JOINS THIS TABLE AT ATHENS.

RATE TABLE III JOINS THIS TABLE AT USAPOE, EAST COAST.

SECRET

RATE TABLE I—PASSENGER AND CARGO RATES (Cont'd)

Passenger fares stated in dollars; cargo rates stated in cents per pound.

Between And	Paris		Pisa		Prestwick		Rota		Soesterberg		Sondrestrom	
	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo
Pisa Italy	20	3.8										
Prestwick Scotland	13	2.4	31	5.8								
Rota Spain	27	5.1	24	4.6	38	7.3						
Soesterberg Netherlands	7	1.3	21	3.9	12	2.3	34	6.5				
Sondrestrom Greenland	96	17.8	111	20.6	95	17.5	103	19.1	101	18.8		
Stephenville Canada	62	11.4	77	14.2	60	11.2	69	12.7	67	12.4	38	10.2
Thule Greenland	111	20.5	126	23.3	110	20.3	118	21.8	116	21.5	19	5.0
Tripoli Libya	35	6.7	29	5.5	47	8.9	42	7.9	42	8.1	126	23.5
Winnipeg Canada	116	24.2	131	27.0	114	23.9	123	25.5	121	25.2	92	24.8
USAPOE East Coast	84	15.5	99	18.3	82	15.2	91	16.8	89	16.5	59	16.0

Between And	Stephenville		Thule		Tripoli		Winnipeg	
	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo
Thule Greenland	54	14.6						
Tripoli Libya	92	17.1	141	26.2				
Winnipeg Canada	56	15.3	108	29.1	146	29.9		
USAPOE East Coast	24	6.5	75	20.4	114	21.2	32	8.7

Passenger Rates—Direct service is not available between all points for which a rate is published.

Charge for passenger baggage in excess of 66 lbs. equals .005 × passenger fare × lbs. excess.

RATE TABLE II JOINS THIS TABLE AT ATHENS.

RATE TABLE III JOINS THIS TABLE AT USAPOE, EAST COAST.

SECRET

RATE TABLE II—PASSENGER AND CARGO RATES

Passenger fares stated in dollars; cargo rates stated in cents per pound.

And \ Between	Adana		Addis Ababa		Amman		Ankara		Asmara		Athens	
	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo
Addis Ababa, Ethiopia	35	10.8										
Amman, Jordan	7	2.3	28	8.8								
Ankara, Turkey	6	2.0	41	12.8	14	4.3						
Asmara, Eritrea	28	8.8	7	2.3	21	6.5	35	10.8				
Athens, Greece	13	3.9	34	10.6	15	4.7	9	2.9	28	8.6		
Beirut, Lebanon	5	1.6	31	9.5	2	.7	12	3.6	23	7.2	13	4.0
Cairo, Egypt	11	3.3	24	7.5	5	1.7	17	5.3	18	5.5	10	3.1
Dhahran, Saudi Arabia	23	7.2	46	14.3	17	5.3	28	8.5	39	12.0	31	9.6
Diyarbakir, Turkey	5	1.5	41	12.6	12	3.8	7	2.3	33	10.3	18	5.4
Iraklion, Crete	14	4.2	31	9.5	16	4.8	11	3.3	24	7.5	3	1.1
Istanbul, Turkey	9	2.8	39	12.1	16	5.0	4	1.2	33	10.1	7	2.0
Izmir, Turkey	9	2.8	35	10.9	14	4.4	6	1.9	29	8.9	4	1.1
Jidda, Saudi Arabia	21	6.4	15	4.6	14	4.2	27	8.5	8	2.3	20	6.3
Karachi, Pakistan	34	10.6	65	20.0	36	11.1	37	11.4	57	17.7	47	14.5
Khartoum, Sudan	27	8.5	8	2.4	22	6.8	34	10.4	8	2.3	27	8.2
Lahore, Pakistan	45	14.0	76	23.5	47	14.6	48	14.8	69	21.2	58	17.9
New Delhi, India	46	14.3	77	23.8	48	14.9	49	15.1	70	21.5	59	18.2
Nicosia, Cyprus	3	1.1	32	9.7	5	1.5	10	3.1	25	7.7	10	3.2
Peshawar, Pakistan	50	15.4	80	24.9	52	15.9	52	16.2	73	22.6	62	19.1
Samsun, Turkey	6	1.7	41	12.6	13	4.0	4	1.2	34	10.5	13	4.1
Soudha Bay, Crete	14	4.4	32	9.8	16	5.1	12	3.6	25	7.8	3	.9
Teheran, Iran	14	4.4	54	16.6	24	7.6	17	5.1	46	14.1	27	8.3
Tel Aviv, Israel	8	2.3	—	—	—	—	14	4.3	—	—	13	4.1
Trabzon, Turkey	6	1.8	41	12.7	13	4.1	7	2.2	34	10.6	16	5.1
Yalova, Turkey	8	2.6	40	12.3	16	4.8	3	1.0	33	10.3	7	2.2

Passenger Rates—Direct service is not available between all points for which a rate is published.

Charge for passenger baggage in excess of 66 lbs. equals .005 × passenger fare × lbs. excess.

RATE TABLE I JOINS THIS TABLE AT ATHENS.

RATE TABLE IV JOINS THIS TABLE AT NEW DELHI.

RATE TABLE II—PASSENGER AND CARGO RATES (Cont'd)

Passenger fares stated in dollars; cargo rates stated in cents per pound.

Between And	Beirut		Cairo		Dhahran		Diyarbakir		Iraklion		Istanbul	
	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo
Cairo, Egypt	7	2.2										
Dhahran, Saudi Arabia	18	5.6	21	6.5								
Diyarbakir, Turkey	10	3.1	17	5.2	20	6.2						
Iraklion, Crete	13	4.1	7	2.0	28	8.5	18	5.7				
Istanbul, Turkey	14	4.4	15	4.6	32	9.7	11	3.5	8	2.6		
Izmir, Turkey	12	3.7	11	3.4	30	9.4	14	4.3	4	1.3	4	1.3
Jidda, Saudi Arabia	16	4.9	10	3.2	31	9.7	26	8.0	6	1.8	25	7.8
Karachi, Pakistan	37	11.4	40	12.2	19	5.8	29	9.1	46	14.3	41	12.6
Khartoum, Sudan	24	7.3	17	5.1	38	11.6	33	10.3	23	7.2	32	9.8
Lahore, Pakistan	48	14.9	51	15.7	30	9.2	41	12.5	57	17.7	52	16.0
New Delhi, India	49	15.2	52	16.0	31	9.5	41	12.8	58	18.0	53	16.3
Nicosia, Cyprus	3	.8	7	2.3	21	6.4	8	2.6	11	3.3	13	3.9
Peshawar, Pakistan	53	16.2	55	17.1	34	10.6	45	13.9	62	19.1	56	17.4
Samsun, Turkey	11	3.3	16	5.1	28	8.5	7	2.3	14	4.4	8	2.4
Soudha Bay, Crete	14	4.4	7	2.3	28	8.8	19	5.9	2	.5	9	2.9
Teheran, Iran	22	6.9	30	9.1	11	3.4	9	2.9	36	11.0	21	6.4
Tel Aviv, Israel	—	—	—	—	—	—	12	3.8	—	—	17	5.1
Trabzon, Turkey	11	3.4	17	5.2	24	7.5	4	1.3	18	5.4	11	3.4
Yalova, Turkey	13	4.1	15	4.8	31	9.5	11	3.3	9	2.8	2	.5

Passenger Rates—Direct service is not available between all points for which a rate is published.

Charge for passenger baggage in excess of 66 lbs. equals .005 × passenger fare × lbs. excess.

RATE TABLE I JOINS THIS TABLE AT ATHENS.

RATE TABLE IV JOINS THIS TABLE AT NEW DELHI.

SECRET

RATE TABLE II—PASSENGER AND CARGO RATES (Cont'd)

Passenger fares stated in dollars; cargo rates stated in cents per pound.

And \ Between	Izmir		Jidda		Karachi		Khartoum		Lahore		New Delhi	
	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo
Jidda, Saudi Arabia	21	6.5										
Karachi, Pakistan	43	13.4	50	15.4								
Khartoum, Sudan	28	8.5	15	4.7	56	17.4						
Lahore, Pakistan	55	16.9	61	18.9	11	3.5	67	20.8				
New Delhi, India	56	17.2	62	19.2	12	3.8	68	21.1	23	7.2		
Nicosia, Cyprus	9	2.9	18	5.4	38	11.6	24	7.4	49	15.1	50	15.4
Peshawar, Pakistan	59	18.2	66	20.3	16	4.8	72	22.2	4	1.4	28	8.6
Samsun, Turkey	10	3.1	27	8.2	37	11.4	33	10.2	48	14.3	49	15.1
Soudha Bay, Crete	5	1.6	18	5.4	47	14.5	24	7.4	58	18.0	59	18.3
Teheran, Iran	23	7.2	42	13.0	20	6.2	46	14.3	31	9.7	32	10.0
Tel Aviv, Israel	14	4.2	—	—	42	12.9	—	—	53	16.4	54	16.7
Trabzon, Turkey	13	4.1	27	8.3	33	10.3	33	10.3	45	13.3	46	14.1
Yalova, Turkey	5	1.4	26	7.9	40	12.4	32	9.9	51	15.3	52	16.1

Passenger Rates—Direct service is not available between all points for which a rate is published.

Charge for passenger baggage in excess of 66 lbs. equals $.005 \times$ passenger fare \times lbs. excess.

RATE TABLE I JOINS THIS TABLE AT ATHENS.

RATE TABLE IV JOINS THIS TABLE AT NEW DELHI.

SECRET

RATE TABLE II—PASSENGER AND CARGO RATES (Cont'd)

Passenger fares stated in dollars; cargo rates stated in cents per pound.

Between And	Nicosia		Peshawar		Samsun		Soudha Bay		Teheran		Tel Aviv	
	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo
Peshawar, Pakistan	53	16.5										
Samsun, Turkey	9	2.8	52	16.2								
Soudha Bay, Crete	12	3.6	63	19.4	15	4.7						
Teheran, Iran	18	5.4	36	11.0	17	5.1	36	11.3				
Tel Aviv, Israel	4	1.3	57	17.7	13	4.1	16	4.9	22	6.7		
Trabzon, Turkey	9	2.9	49	15.2	3	1.0	18	5.7	13	4.1	14	4.2
Yalova, Turkey	12	3.6	56	17.2	7	2.2	10	3.0	20	6.2	16	4.9

Between And	Trabzon	
	Pax	Cgo
Yalova, Turkey	10	3.2

Passenger Rates—Direct service is not available between all points for which a rate is published.
Charge for passenger baggage in excess of 66 lbs. equals $.005 \times$ passenger fare \times lbs. excess.
RATE TABLE I JOINS THIS TABLE AT ATHENS.
RATE TABLE IV JOINS THIS TABLE AT NEW DELHI.

SECRET

RATE TABLE III—PASSENGER AND CARGO RATES

Passenger fares stated in dollars; cargo rates stated in cents per pound.

Between And	Antigua		Ascension Island		Bermuda		Bogota		Eleuthera Island		Fernando De Noronha	
	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo
Ascension Island	87	28.2										
Bermuda British West Indies	—	—	—	—								
Bogota Colombia	41	10.8	113	30.8	—	—						
Eleuthera Bahamas	25	8.1	109	35.4	—	—	50	13.7				
Fernando De Noronha Brazil	64	21.0	38	12.2	—	—	91	23.6	86	28.1		
Grand Bahama Island Bahama Islands	28	9.2	112	36.5	—	—	53	14.8	3	1.1	87	28.3
Grand Turk Island Bahama Islands	16	5.3	100	32.5	—	—	41	10.9	9	2.3	78	25.3
Guantanamo Bay Cuba	22	6.0	106	33.3	—	—	28	7.0	31	8.9	83	24.8
Johannesburg South Africa	155	50.5	82	26.6	—	—	196	60.0	190	62.0	119	38.8
Kinshasa Republic of Congo	131	42.7	45	14.5	—	—	158	47.9	153	49.9	82	26.7
Mayaguana Bahama Islands	19	6.2	103	33.5	—	—	44	11.0	6	1.9	80	26.2
Panama Canal Zone	30	8.3	103	28.2	43	10.8	10	2.6	39	11.2	81	21.0
Paramaribo Surinam	24	7.3	63	18.0	—	—	51	12.8	45	12.6	41	13.3
Port of Spain Trinidad	11	3.6	75	24.6	—	—	38	9.7	33	9.5	53	16.4
Ramey AFB Puerto Rico	8	2.6	92	29.9	20	5.1	33	8.2	17	5.5	69	22.6
Recife Brazil	57	18.5	30	9.7	—	—	84	23.6	78	23.4	8	2.5
Rio De Janeiro Brazil	66	17.9	54	15.7	—	—	93	23.4	87	23.2	32	8.5
Roosevelt Roads Puerto Rico	7	2.2	93	30.4	—	—	35	8.8	20	6.1	71	22.3
St. Lucia Island Windward Islands	5	1.6	82	26.6	—	—	46	12.3	30	9.7	59	18.5
San Isidro Santo Domingo	12	3.5	96	30.8	—	—	36	9.1	15	4.7	73	23.5

SECRET

SECRET

RATE TABLE III—PASSENGER AND CARGO RATES (Cont'd)

Passenger fares stated in dollars; cargo rates stated in cents per pound.

Between And	Antigua		Ascension Island		Bermuda		Bogota		Eleuthera Island		Fernando De Noronha	
	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo
San Juan Puerto Rico	6	2.0	93	30.2	—	—	35	8.7	19	6.1	71	23.0
San Salvador Bahama Islands	22	7.1	106	34.4	—	—	47	12.8	3	1.0	83	25.0
Sao Paulo Brazil	71	19.2	59	18.9	—	—	98	24.7	92	24.5	37	9.8
USAPOE East Coast	36	11.6	119	38.9	—	—	49	12.4	11	3.5	97	31.6

Passenger Rates—Direct service is not available between all points for which a rate is published.

Charge for passenger baggage in excess of 66 lbs. equals $.005 \times$ passenger fare \times lbs. excess.

RATE TABLE I JOINS THIS TABLE AT USAPOE, EAST COAST.

SECRET

RATE TABLE III—PASSENGER AND CARGO RATES (Cont'd)

Passenger fares stated in dollars; Cargo rates stated in cents per pound.

Between And	Grand Ba- hama Island		Grand Turk Island		Guantanamo Bay		Johannes- burg		Kinshasa		Mayaguana	
	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo
Grand Turk Island Bahama Islands	12	3.9										
Guantanamo Bay Cuba	28	7.8	22	6.1								
Johannesburg South Africa	194	63.1	181	57.0	187	57.7						
Kinshasa Republic of Congo	156	48.8	144	44.9	150	45.6	37	12.1				
Mayaguana Bahama Islands	9	3.0	3	.9	25	7.0	184	57.9	147	45.3		
Panama Canal Zone	42	12.3	30	8.4	18	4.5	186	57.4	148	45.3	33	9.3
Paramaribo Surinam	48	13.7	36	9.8	42	10.5	145	47.2	108	35.3	39	10.7
Port of Spain Trinidad	36	10.6	24	6.7	30	7.5	157	50.3	120	38.3	27	7.6
Ramey AFB Puerto Rico	20	6.6	8	2.7	14	3.4	173	54.3	136	44.4	11	2.8
Recife Brazil	82	26.7	70	20.6	74	21.2	112	36.3	74	24.2	72	21.5
Rio De Janeiro Brazil	90	24.3	78	20.4	84	21.2	136	42.3	98	30.2	81	21.3
Roosevelt Roads Puerto Rico	22	7.2	10	3.3	16	4.0	175	56.1	138	44.0	13	4.2
St. Lucia Windward Islands	33	10.8	21	6.8	27	7.5	163	52.3	126	40.2	24	7.7
San Isidro Santo Domingo	18	5.8	6	1.9	17	4.4	177	57.4	140	45.3	9	2.8
San Juan Puerto Rico	22	7.2	10	3.2	16	3.9	175	56.9	137	44.8	13	4.1
San Salvador Bahama Islands	6	2.1	6	1.9	28	8.0	187	61.0	150	46.7	3	1.0
Sao Paulo Brazil	95	25.6	92	23.8	89	22.5	141	43.6	103	31.5	86	22.6
USAPOE East Coast	7	2.4	19	6.3	21	5.4	201	65.5	164	53.4	17	5.4

Passenger Rates—Direct service is not available between all points for which a rate is published.

Charge for passenger baggage in excess of 66 lbs. equals .005 × passenger fare × lbs. excess.

RATE TABLE I JOINS THIS TABLE AT USAPOE, EAST COAST.

RATE TABLE III—PASSENGER AND CARGO RATES (Cont'd)

Passenger fares stated in dollars; cargo rates stated in cents per pound.

Between And	Panama		Paramaribo		Port of Spain		Ramey AFB		Recife		Rio De Janeiro	
	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo
Paramaribo Surinam	41	10.2										
Port of Spain Trinidad	28	7.1	12	3.1								
Ramey AFB Puerto Rico	22	5.7	28	7.1	16	5.3						
Recife Brazil	74	21.0	33	10.8	46	14.8	62	20.1				
Rio De Janeiro Brazil	83	20.9	42	10.6	54	13.7	70	17.7	24	6.0		
Roosevelt Roads Puerto Rico	25	6.2	30	9.0	18	5.9	2	.6	62	19.8	72	19.6
St. Lucia Windward Islands	35	9.8	18	5.2	6	2.1	13	4.1	52	16.0	60	15.8
San Isidro Santo Domingo	26	6.6	32	8.0	20	6.2	4	.9	66	21.0	74	18.7
San Juan Puerto Rico	24	6.2	30	9.3	17	5.7	2	.5	63	20.5	72	19.9
San Salvador Bahama Islands	36	10.3	42	11.7	30	8.6	14	4.6	75	22.5	84	22.3
Sao Paulo Brazil	88	22.1	47	11.9	59	15.0	75	19.0	29	7.3	5	1.3
USAPOE East Coast	39	9.9	55	14.0	44	14.3	27	6.9	89	29.1	98	24.6

Between And	Roosevelt Roads		St. Lucia Island		San Isidro		San Juan		San Salvador		Sao Paulo	
	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo
St. Lucia Windward Islands	12	3.8										
San Isidro Santo Domingo	6	1.5	17	5.0								
San Juan Puerto Rico	2	.5	11	3.6	6	1.4						
San Salvador Bahama Islands	16	5.2	27	8.7	12	3.8	16	5.1				
Sao Paulo Brazil	77	20.9	67	21.7	79	19.9	77	21.2	89	23.6		
USAPOE East Coast	30	7.4	40	13.1	25	6.3	29	7.3	14	4.5	103	25.9

Passenger Rates—Direct service is not available between all points for which a rate is published.
Charge for passenger baggage in excess of 66 lbs. equals .005 × passenger fare × lbs. excess.
RATE TABLE I JOINS THIS TABLE AT USAPOE, EAST COAST.

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RATE TABLE IV—PASSENGER AND CARGO RATES

Passenger fares stated in dollars; cargo rates stated in cents per pound.

Between And	Adak		Anchorage		Bangkok		Calcutta		Cam Ranh Bay		Christchurch	
	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo
Anchorage Alaska	21	5.9										
Bangkok Thailand	141	40.3	162	46.2								
Calcutta India	164	46.8	185	52.7	23	6.5						
Cam Ranh Bay Vietnam	127	36.5	148	42.4	15	4.2	37	10.7				
Christchurch New Zealand	225	64.5	205	58.6	273	77.8	295	84.3	259	74.0		
Danang Vietnam	129	36.7	150	42.6	19	5.6	42	12.1	7	1.9	260	74.3
Eniwetok Marshall Islands	144	41.0	164	47.0	117	33.5	140	40.0	104	29.6	179	51.2
Fairbanks Alaska	27	7.7	6	1.8	—	48.0	—	54.7	—	44.2	—	60.4
Guam Mariana Islands	97	28.0	118	33.9	71	20.4	94	26.9	58	16.5	201	57.5
Hickam AFB Hawaii	111	31.9	91	26.0	158	45.3	181	51.8	145	41.4	114	32.6
Iwo Jima Volcano Islands	79	22.7	100	28.6	97	27.8	120	34.3	83	23.8	231	66.0
Johnston Island Pacific	130	37.3	110	31.4	145	41.4	168	47.9	131	37.5	133	37.9
Kelly AFB Texas	96	27.4	76	21.5	249	70.9	271	77.4	234	66.8	211	60.3
Kwajalein Marshall Islands	134	38.4	155	44.3	108	30.8	131	37.3	94	26.9	170	48.6
Manila Philippine Islands	107	30.8	128	36.7	33	9.5	56	16.0	20	5.7	239	68.3
Marcus Island Pacific	89	25.5	110	31.4	107	30.6	130	37.1	94	26.7	241	68.7
Midway Island Pacific	120	34.4	121	34.6	138	39.5	161	46.0	125	35.6	144	41.2
Nandi Fiji Islands	185	52.9	165	47.0	232	66.3	255	72.8	219	62.4	42	12.0
New Delhi India	182	52.2	203	58.1	42	11.9	19	5.4	56	16.1	314	89.8
Okinawa Ryukyu Islands	84	24.0	105	29.9	57	16.3	80	22.8	43	12.4	235	67.0

SECRET

SECRET

RATE TABLE IV—PASSENGER AND CARGO RATES (Cont'd)

Passenger fares stated in dollars; cargo rates stated in cents per pound.

Between And	Adak		Anchorage		Bangkok		Calcutta		Cam Ranh Bay		Christchurch	
	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo
Pago Pago Samoa	172	49.1	152	43.2	219	62.5	241	69.0	205	58.6	54	15.4
Richmond Australia	231	66.2	211	60.3	278	79.5	301	86.0	265	75.7	46	13.2
Saigon Vietnam	130	37.3	151	43.2	11	3.0	33	9.5	4	1.2	262	74.8
Seoul Korea	81	23.3	102	29.2	99	28.4	122	34.9	85	24.4	233	66.6
Shemya Aleutian Islands	9	2.7	30	8.6	132	37.6	155	44.3	118	33.8	235	67.0
Taipei Taiwan	93	26.6	114	32.5	50	14.3	73	20.8	37	10.5	244	69.6
Tokyo Japan	62	17.7	83	23.6	80	22.8	103	29.3	66	18.8	213	61.0
Wake Island Pacific	108	31.0	129	36.9	106	30.2	129	36.7	92	26.3	167	47.7
Woodbourne New Zealand	222	63.4	202	57.5	269	76.8	292	83.3	255	72.9	4	1.1
USAPOE West Coast	55	15.8	35	9.9	208	59.3	230	65.8	193	55.2	170	48.7
USAPOE East Coast	107	30.5	86	24.6	248	70.8	271	77.3	234	66.9	231	65.9

Passenger Rates—Direct service is not available between all points for which a rate is published.

Charge for passenger baggage in excess of 66 lbs. equals $.005 \times$ passenger fare \times lbs. excess.

RATE TABLE II JOINS THIS TABLE AT NEW DELHI.

SECRET

RATE TABLE IV—PASSENGER AND CARGO RATES (Cont'd)

Passenger fares stated in dollars; cargo rates stated in cents per pound.

Between And	Danang		Eniwetok		Fairbanks		Guam		Hickam AFB		Iwo Jima	
	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo
Eniwetok Marshall Islands	105	29.9										
Fairbanks Alaska	155	44.5	170	48.8								
Guam Mariana Islands	59	16.8	46	13.1	—	35.7						
Hickam AFB Hawaii	146	41.7	65	18.7	—	27.8	87	24.9				
Iwo Jima Volcano Islands	84	24.1	99	28.4	—	30.4	54	15.3	117	33.5		
Johnston Island Pacific	132	37.8	47	13.3	—	33.2	73	21.0	19	5.4	127	36.4
Kelly AFB Texas	229	65.3	163	46.4	—	23.3	185	52.6	97	27.7	186	53.1
Kwajalein Marshall Islands	95	27.2	9	2.7	—	46.1	36	10.4	56	16.0	90	25.7
Manila Philippine Islands	21	6.0	84	23.9	—	38.5	38	10.8	125	35.7	63	18.1
Marcus Island Pacific	95	27.0	109	31.1	—	33.2	63	18.0	127	36.2	18	5.2
Midway Island Pacific	126	36.0	95	27.3	—	36.4	117	33.5	30	8.6	76	21.8
Nandi Fiji Islands	220	62.7	139	39.7	—	48.8	161	45.9	74	21.0	191	54.5
New Delhi India	61	17.5	159	45.4	—	59.9	113	32.3	200	57.2	139	39.8
Okinawa Ryukyu Islands	45	12.7	79	22.5	—	31.7	33	9.4	122	34.7	41	11.6
Pago Pago Samoa	206	58.9	126	35.9	—	45.0	147	42.1	60	17.2	177	50.6
Richmond Australia	266	76.0	185	52.9	—	62.1	207	59.2	120	34.3	237	67.7
Saigon Vietnam	9	2.6	107	30.5	—	45.0	61	17.4	148	42.3	87	24.8
Seoul Korea	86	24.7	101	29.0	—	31.0	56	15.9	119	34.0	37	10.7
Shemya Aleutian Islands	119	34.1	134	38.4	36	10.4	88	25.3	121	34.6	70	20.0
Taipei Taiwan	38	10.8	88	25.0	—	34.3	42	12.0	131	37.3	49	14.0

SECRET

RATE TABLE IV—PASSENGER AND CARGO RATES (Cont'd)

Passenger fares stated in dollars; cargo rates stated in cents per pound.

And \ Between	Danang		Eniwetok		Fairbanks		Guam		Hickam AFB		Iwo Jima	
	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo
Tokyo Japan	60	17.2	82	23.3	—	25.4	36	10.3	99	28.4	18	5.0
Wake Island Pacific	93	26.6	26	7.5	—	38.7	34	9.8	53	15.1	64	18.3
Woodbourne New Zealand	256	73.2	176	50.2	—	59.3	197	56.4	110	31.5	227	65.0
USAPOE West Coast	188	53.7	122	34.8	—	11.7	144	41.0	56	16.1	145	41.5
USAPOE East Coast	235	67.2	182	52.0	—	26.4	204	58.3	117	33.4	186	53.2

Passenger Rates—Direct service is not available between all points for which a rate is published.
Charge for passenger baggage in excess of 66 lbs. equals .005 × passenger fare × lbs. excess.
RATE TABLE II JOINS THIS TABLE AT NEW DELHI.

SECRET

RATE TABLE IV—PASSENGER AND CARGO RATES (Cont'd)

Passenger fares stated in dollars; cargo rates stated in cents per pound.

Between And	Johnston Island		Kelly AFB		Kwajalein		Manila		Marcus Island		Midway Island	
	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo
Kelly AFB Texas	116	33.1										
Kwajalein Marshall Islands	37	10.7	153	43.7								
Manila Philippine Islands	111	31.8	214	61.1	74	21.2						
Marcus Island Pacific	137	39.1	196	55.9	100	28.4	74	21.0				
Midway Island Pacific	49	14.0	127	36.3	89	25.3	105	30.0	86	24.5		
Nandi Fiji Islands	92	26.4	171	48.7	130	37.0	199	56.7	200	57.2	104	29.6
New Delhi India	187	53.3	290	82.8	150	42.7	75	21.5	149	42.5	180	51.4
Okinawa Ryukyu Islands	107	30.4	191	54.4	69	19.8	24	6.7	49	14.1	81	23.0
Pago Pago Samoa	79	22.5	158	44.9	116	33.2	185	52.9	187	53.4	90	25.8
Richmond Australia	139	39.6	217	62.0	176	50.3	245	70.0	247	70.5	150	42.9
Saigon Vietnam	134	38.4	238	67.9	97	27.8	23	6.5	96	27.6	128	36.5
Seoul Korea	129	37.0	188	53.7	92	26.3	65	18.7	47	13.4	78	22.3
Shemya Aleutian Islands	140	40.0	106	30.1	125	35.7	98	28.1	80	22.3	111	31.7
Taipei Taiwan	116	33.0	200	57.0	78	22.3	17	4.8	58	16.7	90	25.6
Tokyo Japan	110	31.3	169	48.1	72	20.7	46	13.2	27	7.3	58	16.7
Wake Island Pacific	72	20.5	150	42.8	17	4.8	72	20.7	74	21.1	27	7.8
Woodbourne New Zealand	129	36.9	208	59.2	166	47.5	235	67.2	237	67.7	140	40.1
USAPOE West Coast	75	21.5	—	—	112	32.1	173	49.5	155	44.3	86	24.7
USAPOE East Coast	136	38.7	—	—	173	49.4	214	61.2	196	56.0	147	42.0

Passenger Rates—Direct service is not available between all points for which a rate is published.

Charge for passenger baggage in excess of 66 lbs. equals .005 × passenger fare × lbs. excess.

RATE TABLE II JOINS THIS TABLE AT NEW DELHI.

RATE TABLE IV—PASSENGER AND CARGO RATES (Cont'd)

Passenger fares stated in dollars; cargo rates stated in cents per pound.

And \ Between	Nandi		New Delhi		Okinawa		Pago Pago		Richmond	
	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo
New Delhi India	274	78.2								
Okinawa Ryukyu Islands	194	55.5	99	28.2						
Pago Pago Samoa	96	27.4	260	74.4	181	51.6				
Richmond Australia	46	13.3	320	91.5	241	68.7	100	28.5		
Saigon Vietnam	222	63.3	52	14.9	46	13.3	208	59.4	268	76.5
Seoul Korea	193	55.1	141	40.3	42	12.0	179	51.2	239	68.3
Shemya Aleutian Islands	195	55.6	173	49.5	75	21.3	182	51.8	241	68.9
Taipei Taiwan	203	58.1	92	26.3	9	2.6	190	54.2	250	71.3
Tokyo Japan	173	49.4	122	34.7	22	6.3	160	45.6	219	62.7
Wake Island Pacific	127	36.1	148	42.2	68	19.3	113	32.3	173	49.4
Woodbourne New Zealand	38	11.0	311	88.7	231	66.0	50	14.3	50	14.2
USAPOE West Coast	130	37.1	249	71.2	150	42.8	117	33.3	176	50.4
USAPOE East Coast	190	54.4	290	82.7	191	54.5	177	50.6	237	67.6

Passenger Rates—Direct service is not available between all points for which a rate is published.
Charge for passenger baggage in excess of 66 lbs. equals .005 × passenger fare × lbs. excess.
RATE TABLE II JOINS THIS TABLE AT NEW DELHI.

SECRET

RATE TABLE IV—PASSENGER AND CARGO RATES (Cont'd)

Passenger fares stated in dollars; cargo rates stated in cents per pound.

And \ Between	Saigon		Seoul		Shemya		Taipei		Tokyo	
	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo	Pax	Cgo
Seoul Korea	89	25.4								
Shemya Aleutian Islands	121	34.6	72	20.6						
Taipei Taiwan	40	11.3	51	14.5	84	23.9				
Tokyo Japan	69	19.8	20	5.6	53	15.0	31	8.9		
Wake Island Pacific	95	27.2	66	18.9	99	28.3	77	21.9	47	13.3
Woodbourne New Zealand	258	73.8	229	65.5	231	66.0	240	68.6	210	59.9
USAPOE West Coast	197	56.3	147	42.1	65	18.5	159	45.4	128	36.5
USAPOE East Coast	237	67.8	188	53.8	116	33.2	200	57.1	169	48.2

And \ Between	Wake Island		Woodbourne		USAPOE West Coast	
	Pax	Cgo	Pax	Cgo	Pax	Cgo
Wake Island Pacific	—	—				
Woodbourne New Zealand	163	46.6				
USAPOE West Coast	109	31.2	167	47.6		
USAPOE East Coast	170	48.5	227	64.9	—	—

Passenger Rates—Direct service is not available between all points for which a rate is published.

Charge for passenger baggage in excess of 66 lbs. equals .005 × passenger fare × lbs. excess.

RATE TABLE II JOINS THIS TABLE AT NEW DELHI.

SECRET

SECTION V

AIRCRAFT CARGO CAPABILITIES

The aircraft cargo capacities shown below are maximum weights capable of being airlifted under ideal or optimum flying conditions. In planning airlift capabilities, it should be remembered that there are a number of variables that can reduce cargo capability of an aircraft. Some of these are:

(a) flight altitude and head-winds, (b) flight plans and alternate landing fields, (c) elevation of destination fields, (d) fueling capability at destination fields, and (e) runway lengths and weight capabilities at both takeoff and landing fields.

PLANE	CARGO CAPACITY 1000 MI FLIGHT	CARGO CAPACITY 2000 MI FLIGHT	CARGO CAPACITY 3000 MI FLIGHT	CARGO DOOR MEAS.
C-141	70,000 lbs.	70,000 lbs.	70,000 lbs.	10x2 x 9.0
C-135	87,000 lbs.	87,000 lbs.	63,000 lbs.	9x7 x 6.5
C-133	100,000 lbs.	78,000 lbs.	50,000 lbs.	12.0 x 12.2
C-130	35,000 lbs.	35,000 lbs.	8,000 lbs.	10.0 x 9.2
C-124	52,900 lbs.	38,000 lbs.	26,500 lbs.	11.6 x 11.3
C-123	16,000 lbs.	10,000 lbs.	5,000 lbs.	8.3 x 9.2
C-121	22,500 lbs.	22,500 lbs.	14,000 lbs.	9.3 x 6.1
C-119	15,000 lbs.	8,500 lbs.	NIL lbs.	8.0 x 9.2
C-118	42,000 lbs.	40,000 lbs.	23,000 lbs.	10.3 x 6.5
C-97	42,500 lbs.	36,000 lbs.	25,000 lbs.	6.5 x 6.7
C-74	54,000 lbs.	40,000 lbs.	28,000 lbs.	10.4 x 10.0
C-54	16,900 lbs.	10,200 lbs.	5,000 lbs.	5.6 x 7.9
C-47	8,000 lbs.	6,500 lbs. for 1,440 miles.		5.9 x 7.0
C-46	10,275 lbs.	10,275 lbs. for 1,895 miles.		6.8 x 8.1

NOTE: USAF policy establishes reduced payloads for over-water flights.

DESIGN DATA FOR AIR FORCE AIRCRAFT

I. C-97 STRATOFREIGHTER

Description

a. General. The C-97 (figure 1) is a four-engine, low-wing, all metal, heavy transport aircraft. The principal missions of the C-97 include transportation of troops and cargo, medical evacu-

ation, and air resupply. There are four models of this aircraft—C-97A, C-97C, KC-97F, and KC-97G. The KC-97 F and G are tankers with the air refueling equipment removed. All models have essentially the same configuration except as noted below (figure 2).

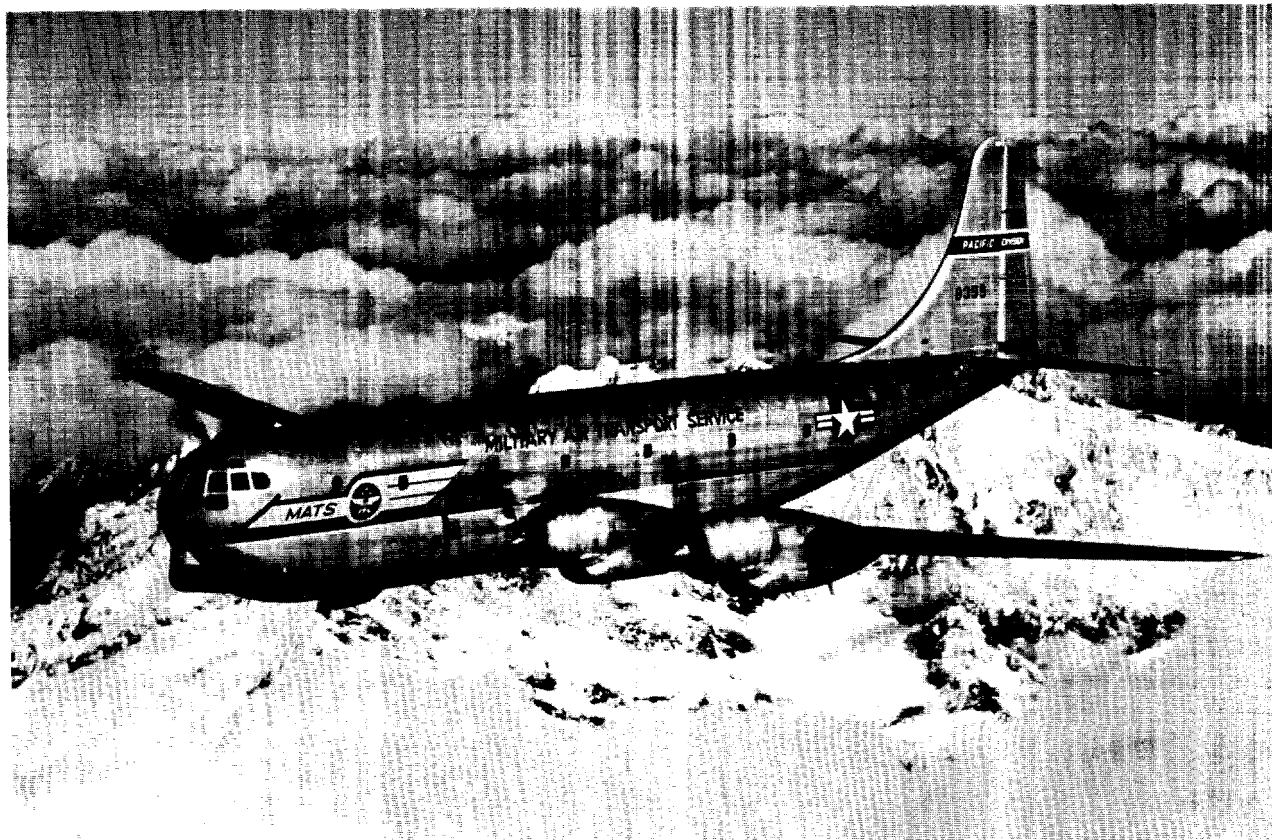


Figure 1. C-97 Stratofreighter.

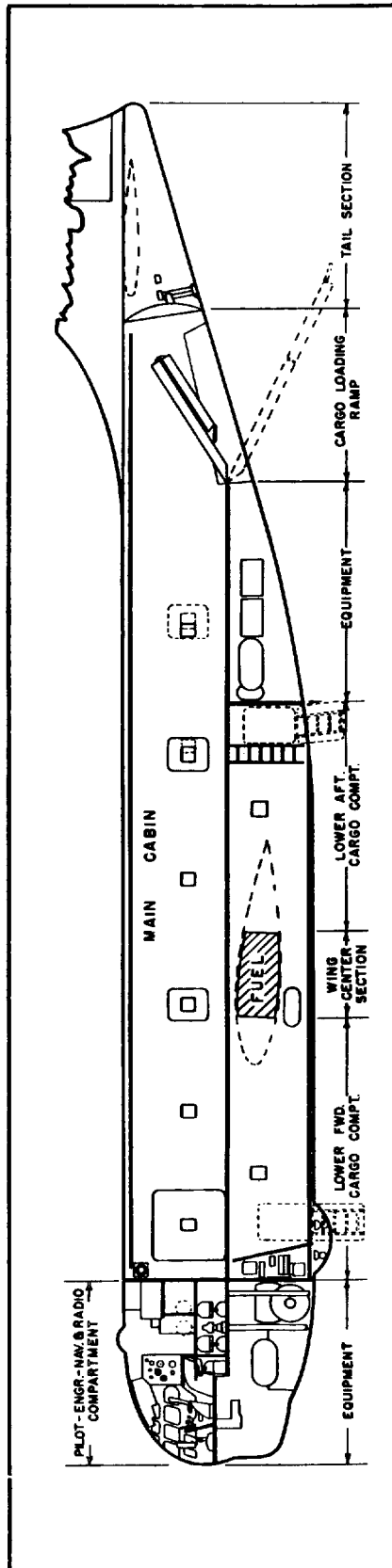


Figure 2. C-97 cross section.

b. Characteristics.

	<i>C-97A</i>	<i>C-97C</i>	<i>KC-97F</i>	<i>KC-97G</i>
(1) Cruising speed.....	194 knots	194 knots	215 knots	209 knots
(2) Takeoff distance (maximum gross weight).	4,425 feet	4,425 feet	4,425 feet	4,425 feet
(3) Landing distance (maximum landing weight).	2,840 feet	2,840 feet	2,870 feet	2,900 feet
(4) Restraint criteria:				
(a) Forward	- 8.0 main cargo compartment. - 3.0 lower cargo compartment.			
(b) Aft	- 1.5.			
(c) Vertical	- 2.5.			
(d) Lateral	- 1.5.			

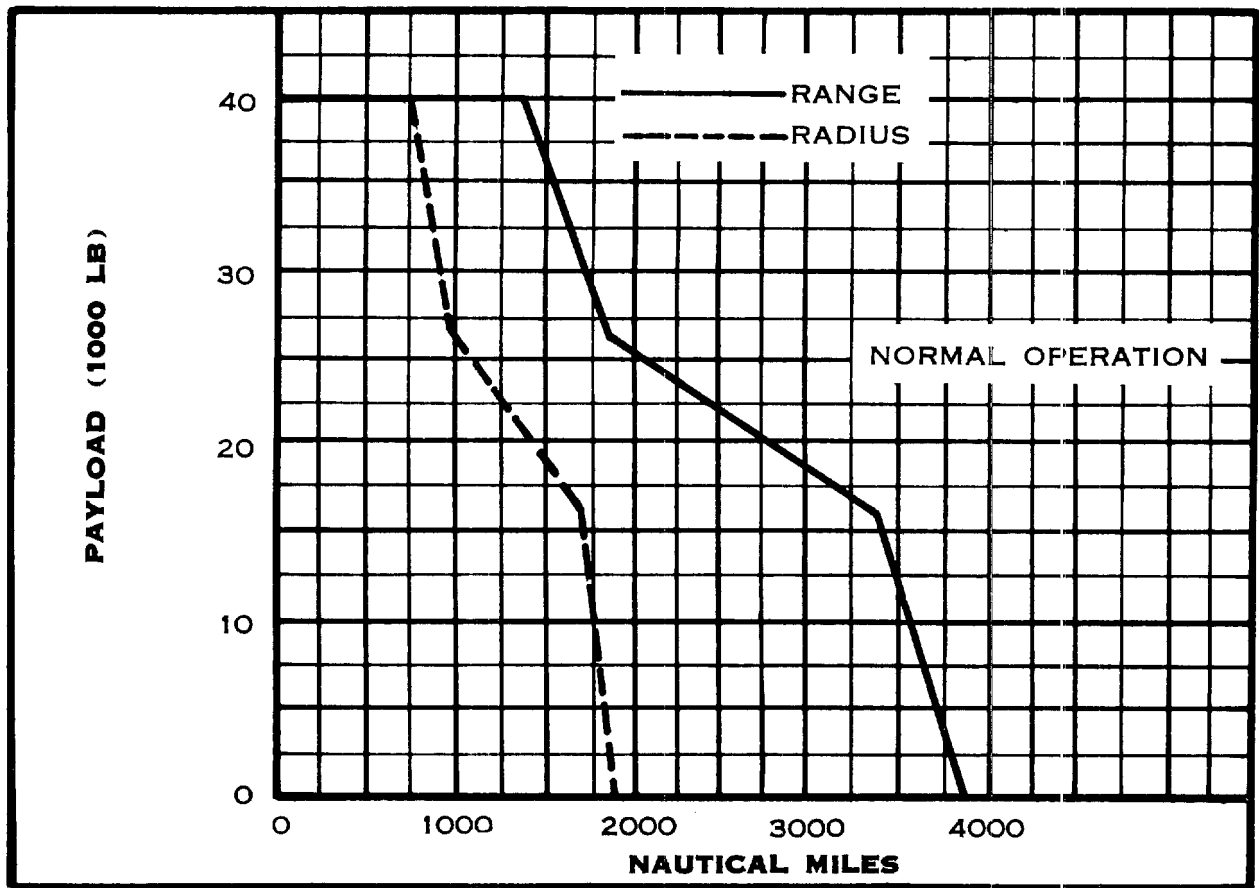


Figure 3. Payload distance, C-97A.

Cargo Compartment

a. Personnel. The C-97 has a normal crew of five (pilot, copilot, navigator, engineer, and loadmaster), except the KC-97G which has a crew of four. The following is a comparison of the troop-carrying capabilities of the various models:

	<i>C-97A</i>	<i>C-97C</i>	<i>KC-97F</i>	<i>KC-97G</i>
(1) Troops.....	86	32	130	96
or				
(2) Litters.....	54	54	79	None
plus				
Attendants..	4	4	4	None

b. Cargo Capacities.

(1) Main compartment (total volume)-----	Cubic feet 4,309
(2) Lower compartment (total volume)-----	1,818

(b) Width (fore and aft)-----	Inches 103/72
(c) Height (above ground)-----	112
(d) Vertical clearance-----	84

c. Floor Strength.

(1) Main deck-----	200 pounds per square foot.
(2) Lower deck-----	100 pounds per square foot.
(3) Treadways (single axle load).	12,250 pounds.

(3) Cargo door (right side between stations 246 and 326):	Inches
(a) Height-----	77
(b) Width-----	78
(c) Height (above ground)-----	137

d. Critical Dimensions.

(1) Main cabin:	Inches
(a) Length-----	764
(b) Width (floor level)-----	108
(c) Height-----	92
(2) Main loading door:	
(a) Length-----	171

Cargo Loading Provisions

a. Loading Ramp. Heavy equipment is loaded over the organic folding ramps. The ramps are 27 inches wide and adjustable to two loading angles—a straight-on angle of 24° or a combination 15° to 30° angle (figures 7 and 8). Using the 24° angle, the overhead clearance between the ramp tread and the fuselage is 81 inches. Using

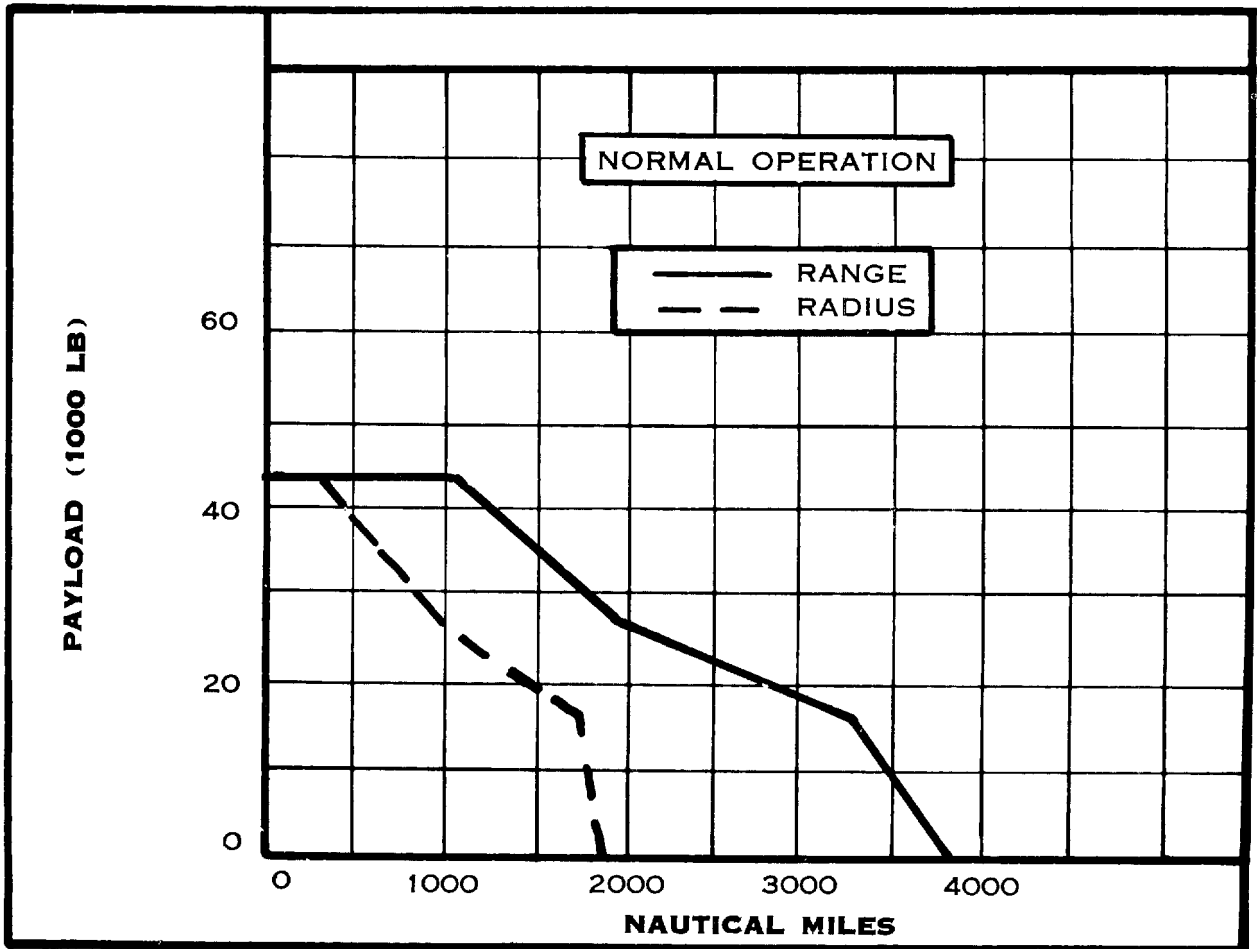


Figure 4. Payload distance, C-97C.

the 15° to 30° angle, the clearance is 97 inches. The ramps are normally stored in a folded position over the cargo door opening; however, they can be removed for air delivery operations.

b. *Monorail.* A cargo hoist is operated by a winch mounted on the bulkhead at the forward end of the main cargo compartment. By use of an

overhead monorail the hoist is capable of lifting and traversing 2,500 pounds the entire length of the main cargo compartment. A total of 5,000 pounds can be traversed with the use of a free trolley. By use of snatch block, with triple line, a horizontal towing force of 7,500 pounds can be produced.

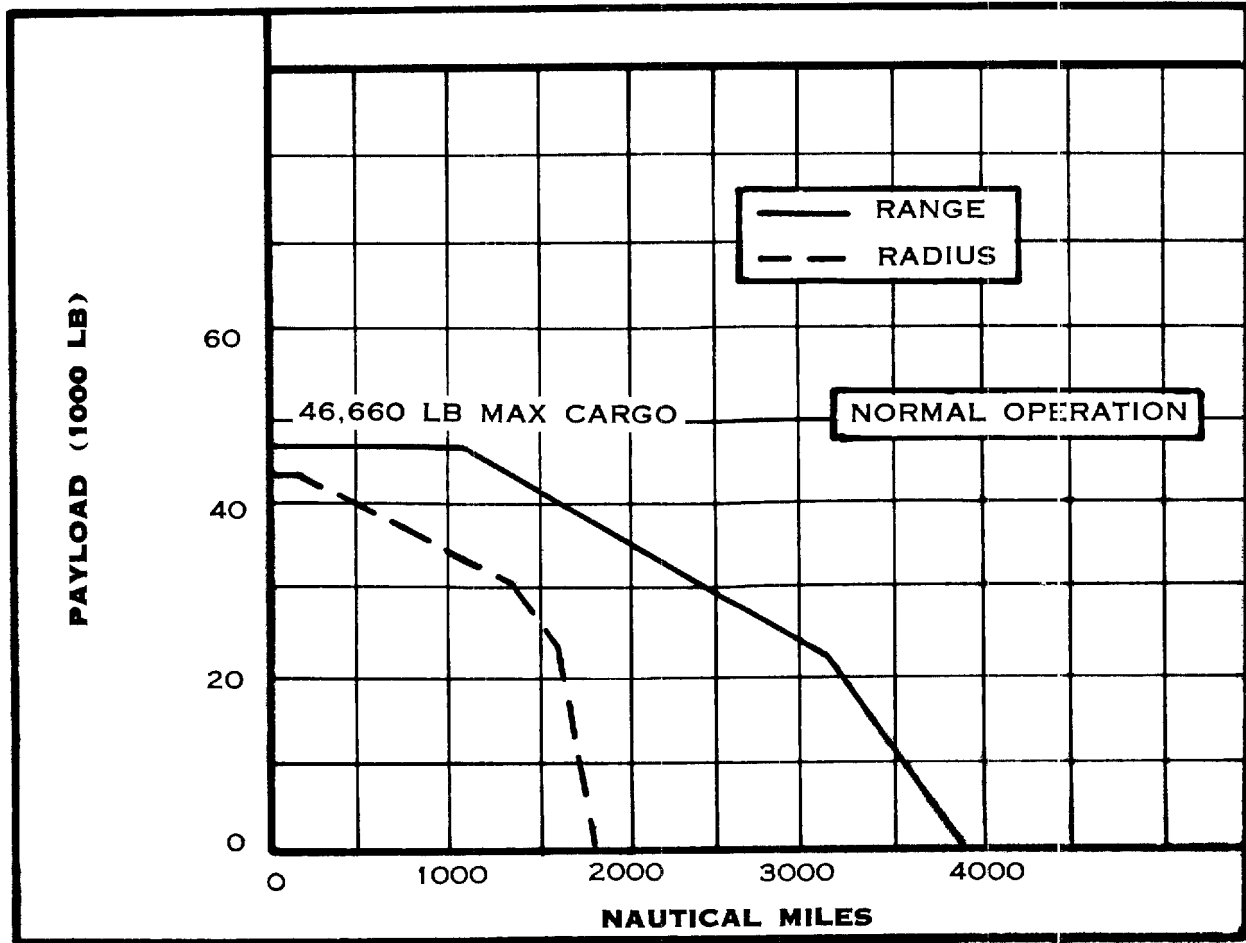


Figure 5. Payload distance, KC-97F.

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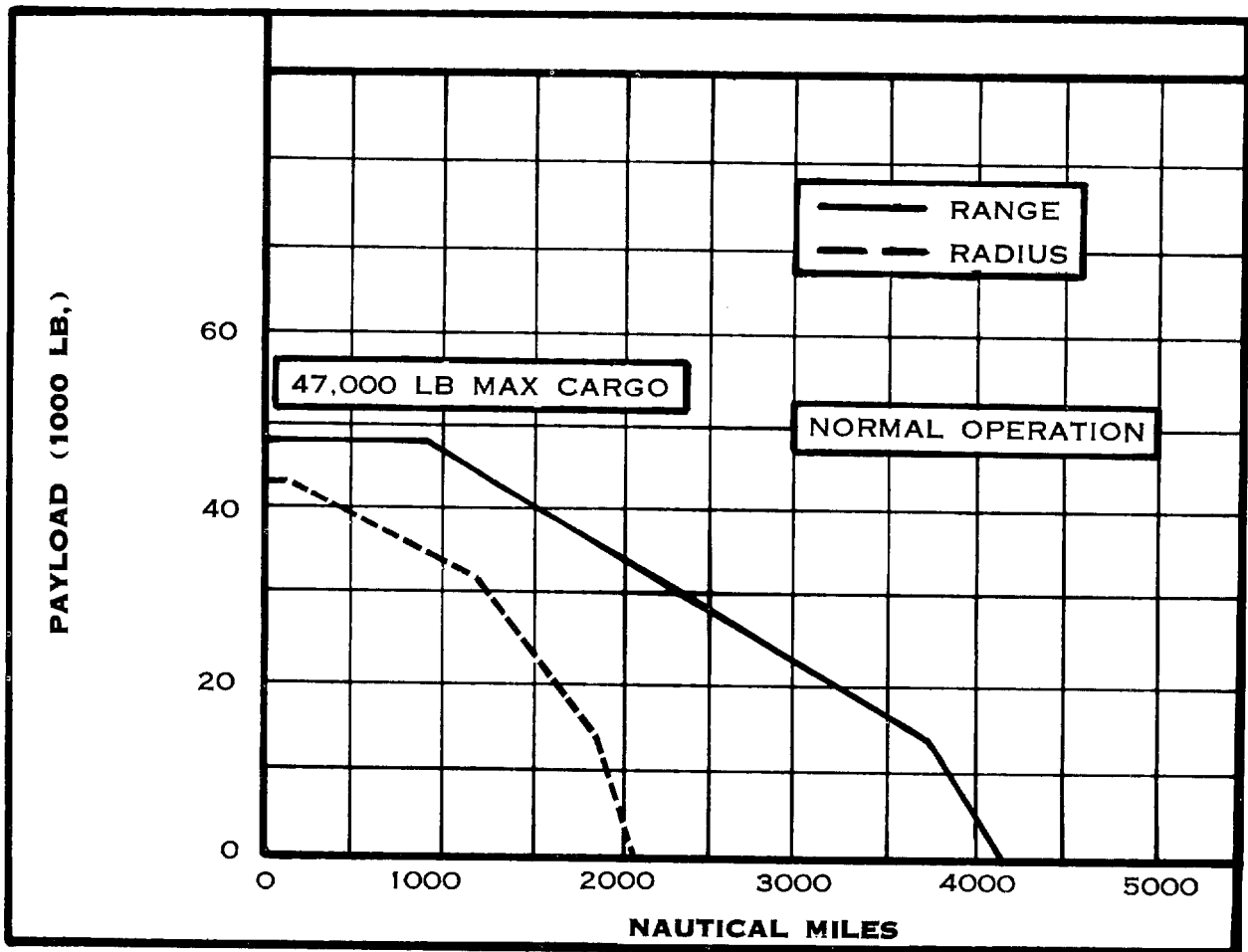


Figure 6. Payload distance, KC-97G.

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Figure 7. Cargo loading ramp, 24° angle.



Figure 8. Cargo loading ramp, 15°-30° angle.

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Weight and Balance Data

	<i>C-97A</i> (pounds)	<i>C-97C</i> (pounds)	<i>KC-97F</i> (pounds)	<i>KC-97G</i> (pounds)
a. Maximum gross weight.....	153,000	153,000	153,000	153,000.
b. Operating weight.....	83,400	83,460	89,830	88,330.
c. Maximum fuel weight.....	46,740	46,740	46,740	54,032.
d. Payload.....	Figure 3	Figure 4	Figure 5	Figure 6.
Center of gravity limits.....	Figure 9			

Provisions for Parachutists and Air Delivery

a. *Parachutists.* There are no provisions for paratroop delivery.

b. *Air Delivery.* The main cargo door can be opened in flight, thereby permitting air delivery

of equipment. The monorail supports 17 air delivery trolleys, each of which holds up to five containers. The system is capable of delivering 25,500 pounds of cargo in approximately 15 seconds. For specific information on air delivery see TM 10-500-series (Airdrop of Supplies and Equipment).

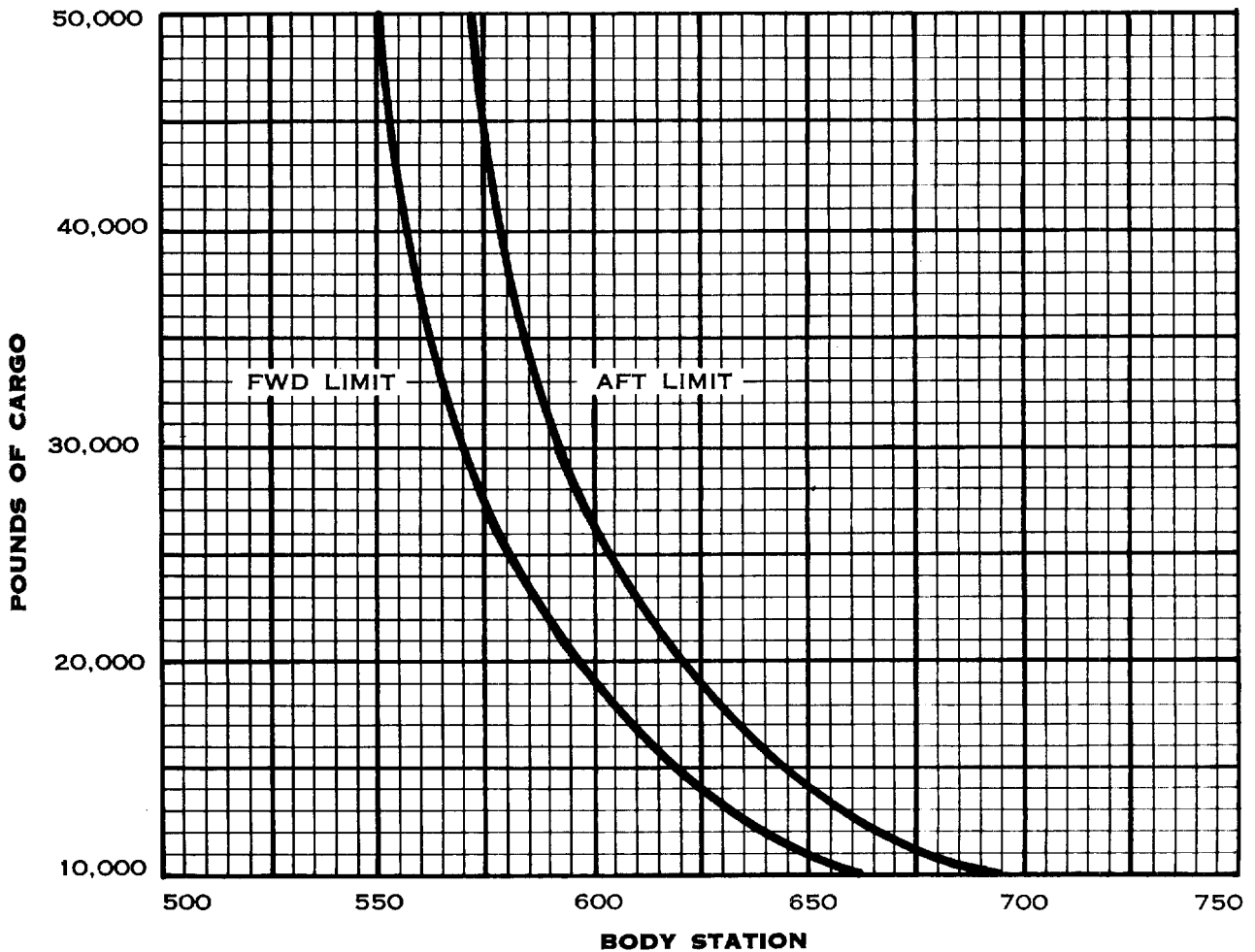


Figure 9. Cargo center of gravity limits, C-97.

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II. C-118A LIFTMASTER

Description

a. General. The C-118A (figure 10) is a long-range, low-wing, medium transport equipped with a pressurized cabin, air conditioning, and a low pressure oxygen system. The principal mission of the C-118A is the transportation of personnel, cargo, and litter patients.

b. Characteristics.

- | | |
|--|-------------|
| (1) Cruising speed..... | 220 knots. |
| (2) Takeoff distance (maximum gross weight)..... | 3,755 feet. |
| (3) Landing distance (maximum landing weight)..... | 2,750 feet. |
| (4) Restraint criteria: | |
| (a) Forward | 1.34 |
| (b) Aft | 1.29 |
| (c) Vertical | 2.47 |
| (d) Lateral | 1.00 |

Cargo Compartment

a. Personnel. The C-118A has a normal crew of four—pilot, copilot, navigator, and flight engineer. It will carry 76 combat-equipped troops or 60 litters plus six attendants.

b. Cargo Capacities (figure 11).

- | | <i>Cubic feet</i> |
|---|-------------------|
| (1) Main cargo compartment (volume)..... | 4,307 |
| (2) Forward lower compartment (volume)..... | 213 |
| (3) Aft lower compartment (volume)..... | 247 |

c. Floor Strength.

- | | <i>Pounds per square foot</i> |
|---------------------------------|-------------------------------|
| (1) Main cargo compartment..... | 200 |
| (2) Lower cargo compartment: | |
| (a) Stations 90-730..... | 75 |
| (b) Stations 730-938..... | 30 |

d. Critical Dimensions.

- | | |
|------------------------------|---------------|
| (1) Main compartment: | <i>Inches</i> |
| (a) Length | 816 |
| (b) Width (floor level)..... | 104 |
| (c) Height (maximum)..... | 93 |

- | | |
|--------------------------------|------------------|
| (2) Main loading door: | <i>Inches</i> |
| (a) Width | 124 |
| (b) Height | 78 $\frac{3}{4}$ |
| (c) Height (above ground)..... | 107 |
| (3) Forward loading door: | |
| (a) Width | 90 $\frac{3}{4}$ |
| (b) Height | 67 |
| (c) Height (above ground)..... | 104 |
| (4) Lower cargo doors (2): | |
| (a) Width | 37 |
| (b) Height | 45 |

Cargo Loading Provisions

A self-powered loading elevator which folds up for storage can be attached to either the front or rear cargo doorframe. The maximum hoist capacity is 4,000 pounds.

Weight and Balance Data

- | | <i>Pounds</i> |
|------------------------------|---------------|
| a. Maximum gross weight..... | 107,000. |
| b. Operating weight..... | 66,400. |
| c. Maximum fuel weight..... | 32,424. |

Provisions for Parachutists and Air Delivery

There are no provisions for parachutists or air delivery with the C-118A.

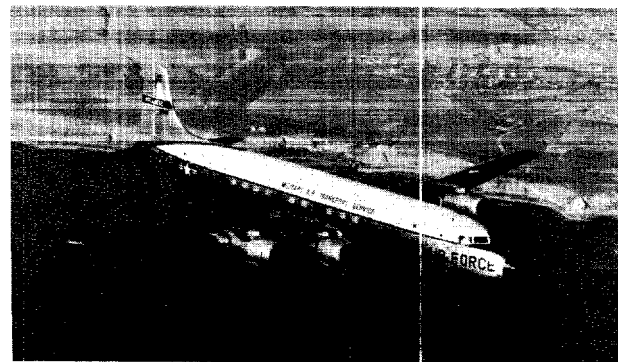


Figure 10. C-118A Liftmaster.

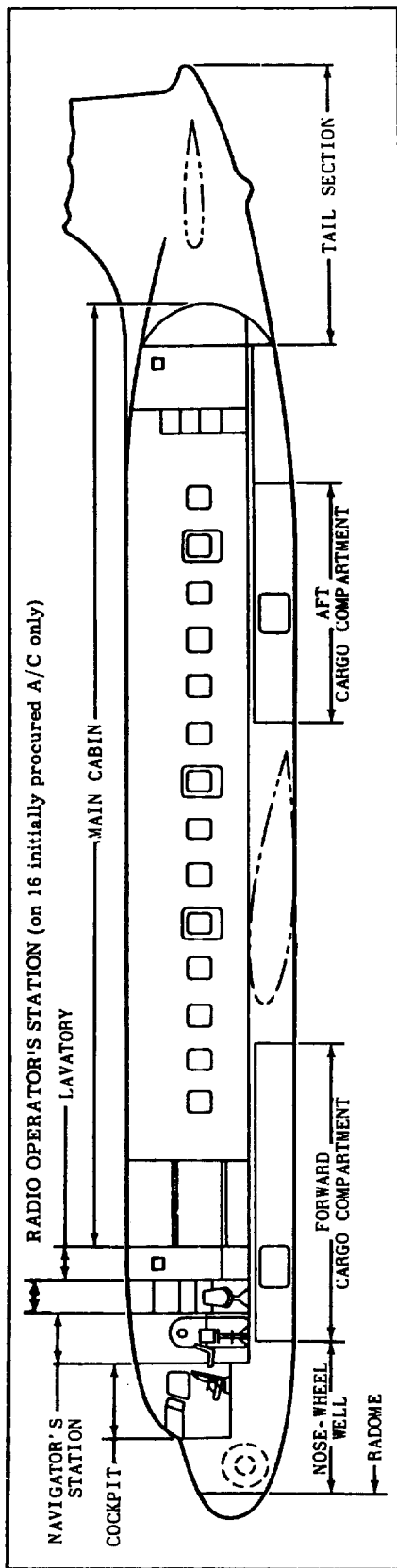


Figure 11. Cross section, C-118A.

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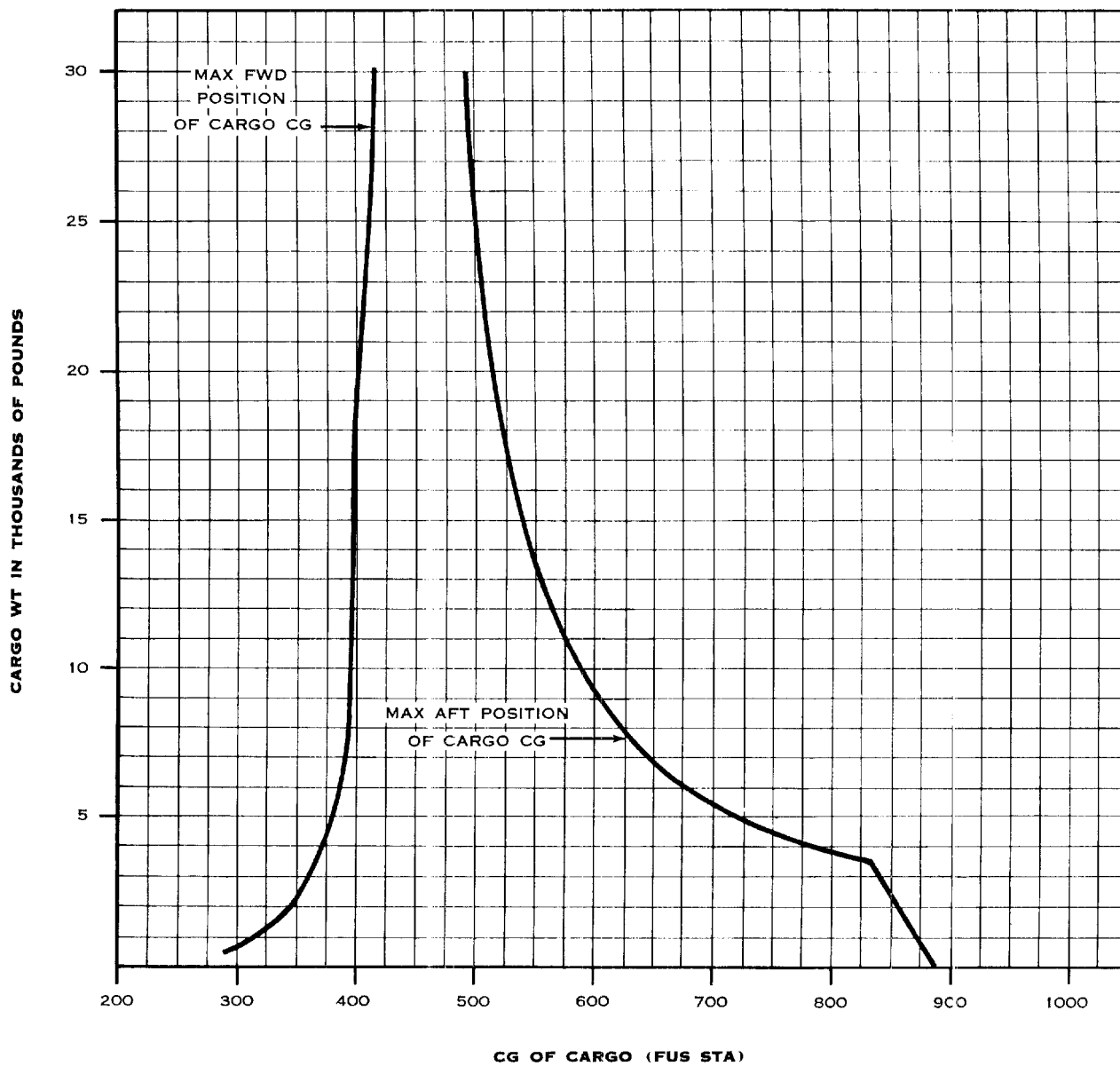


Figure 12. Cargo center of gravity limits, C-118A.

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III. C-119G FLYING BOXCAR

Description

a. General. The C-119G (figure 13) is a high-wing, twin-engine, twin-boom, medium transport. Its principal mission is to transport cargo, personnel, or litters. In addition, it is used for air delivery. This aircraft features removable clamshell doors which are removed to permit air delivery of heavy equipment. When the aircraft is operated with these doors removed its flight characteristics are altered somewhat, as indicated below.

b. Characteristics.

	<i>Doors on</i>	<i>Doors off</i>
(1) Cruising speed..	160 knots..	150 knots.
(2) Takeoff distance (maximum gross weight).	4,530 feet..	3,985 feet.
(3) Landing distance.	3,098 feet..	3,408 feet.
(4) Restraint criteria:		
(a) Forward		4.5
(b) Aft		1.5
(c) Vertical		2.25
(d) Lateral		1.5

can carry 62 troops. In the aeromedical configuration, the C-119 can carry 35 litters plus four attendants.

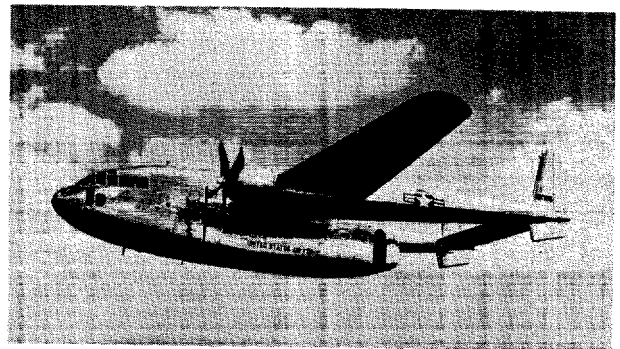


Figure 13. C-119G Flying boxcar.

b. Cargo Capacities (figure 14).

	<i>Cubic feet</i>
(1) Main compartment (maximum volume)	3,150
(2) Main compartment (doors off)	2,850

c. Floor Strength. The floor is designed for a uniformly distributed load of 200 pounds per square foot and a maximum vehicle tire pressure of 50 pounds per square inch. The treadways will support an axleload up to 15,500 pounds. Each loading ramp will support a maximum load of 9,400 pounds. When the clamshell doors are closed and locked, the cargo door floor strength is 56 pounds per square foot.

Cargo Compartment

a. Personnel. The C-119G has a crew of five—pilot, copilot, navigator, radio operator, and loadmaster. The aircraft can carry 42 troops or parachutists. When center aisle seats are installed, it

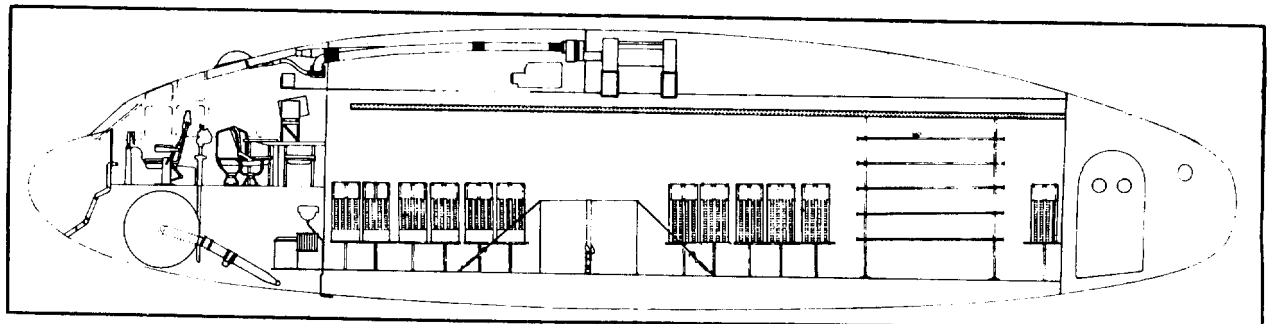


Figure 14. Cargo compartment, C-119.

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d. Critical Dimensions.

	<i>Inches</i>
(1) Main compartment:	
(a) Length -----	443
(b) Width (maximum) -----	118
(c) Height -----	92
(2) Main cargo door:	
(a) Width (floor level) -----	110
(b) Height -----	95¾
(c) Height (above ground) -----	45½
(3) Paratainer well:	
(a) Length -----	70
(b) Width -----	55
(4) Air delivery limitations:	
(a) Length -----	371
(b) Width -----	104
(c) Height -----	86

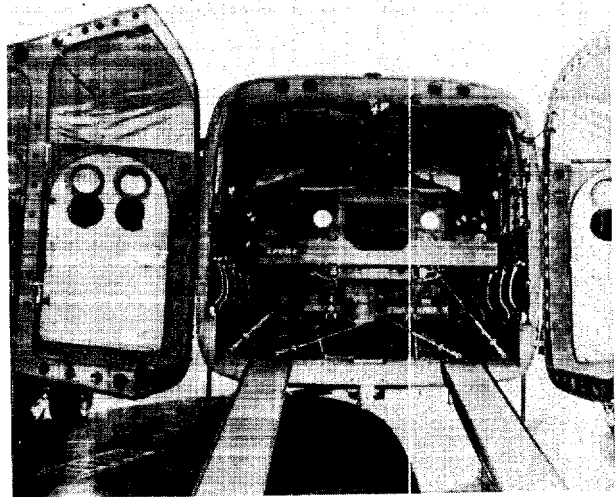


Figure 15. Cargo entrance, C-119.

Cargo Loading Provisions

a. Loading Ramps. Two detachable, treaded loading ramps are provided to facilitate vehicle loading (figure 15).

b. Swiveling Hitch. A swiveling hitch for block and tackle, attached at the front or rear of the cargo compartment, is provided for winching. The maximum allowable pulling force is 3,160 pounds.

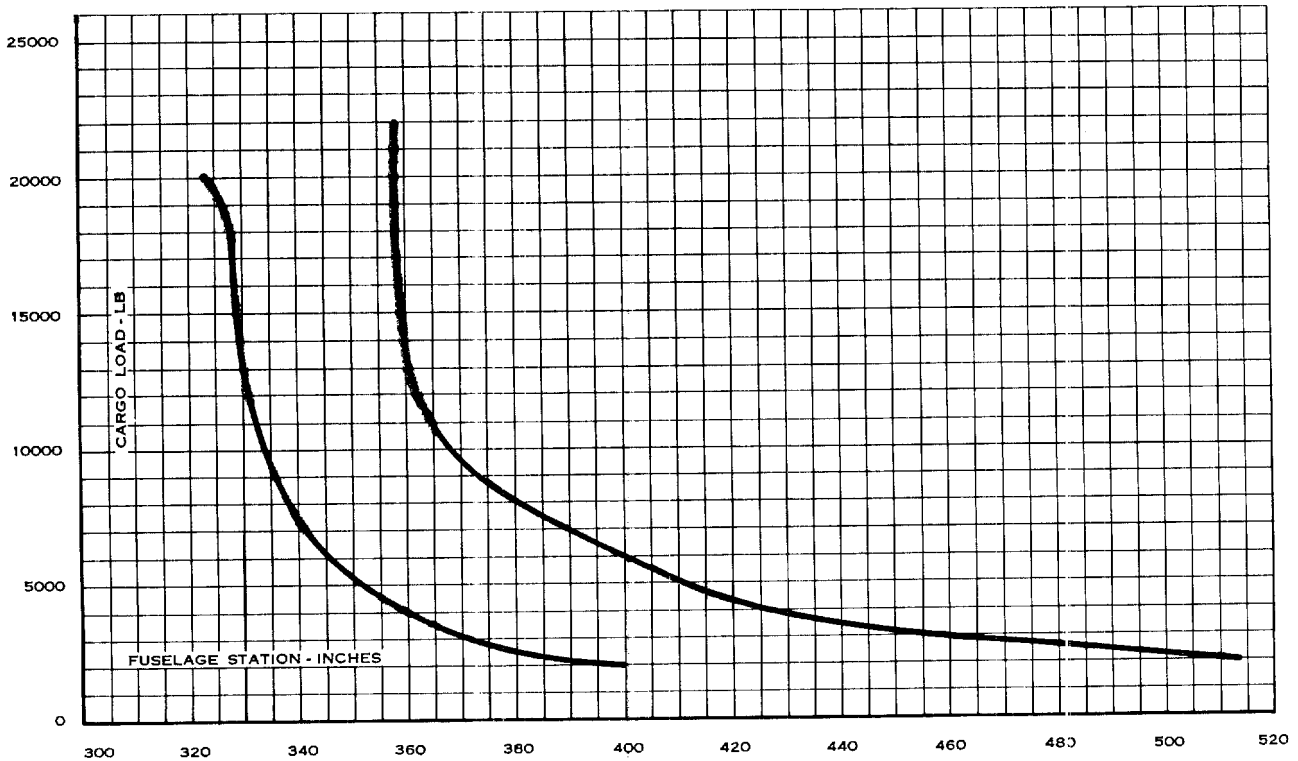


Figure 16. Cargo center of gravity limits, C-119G.

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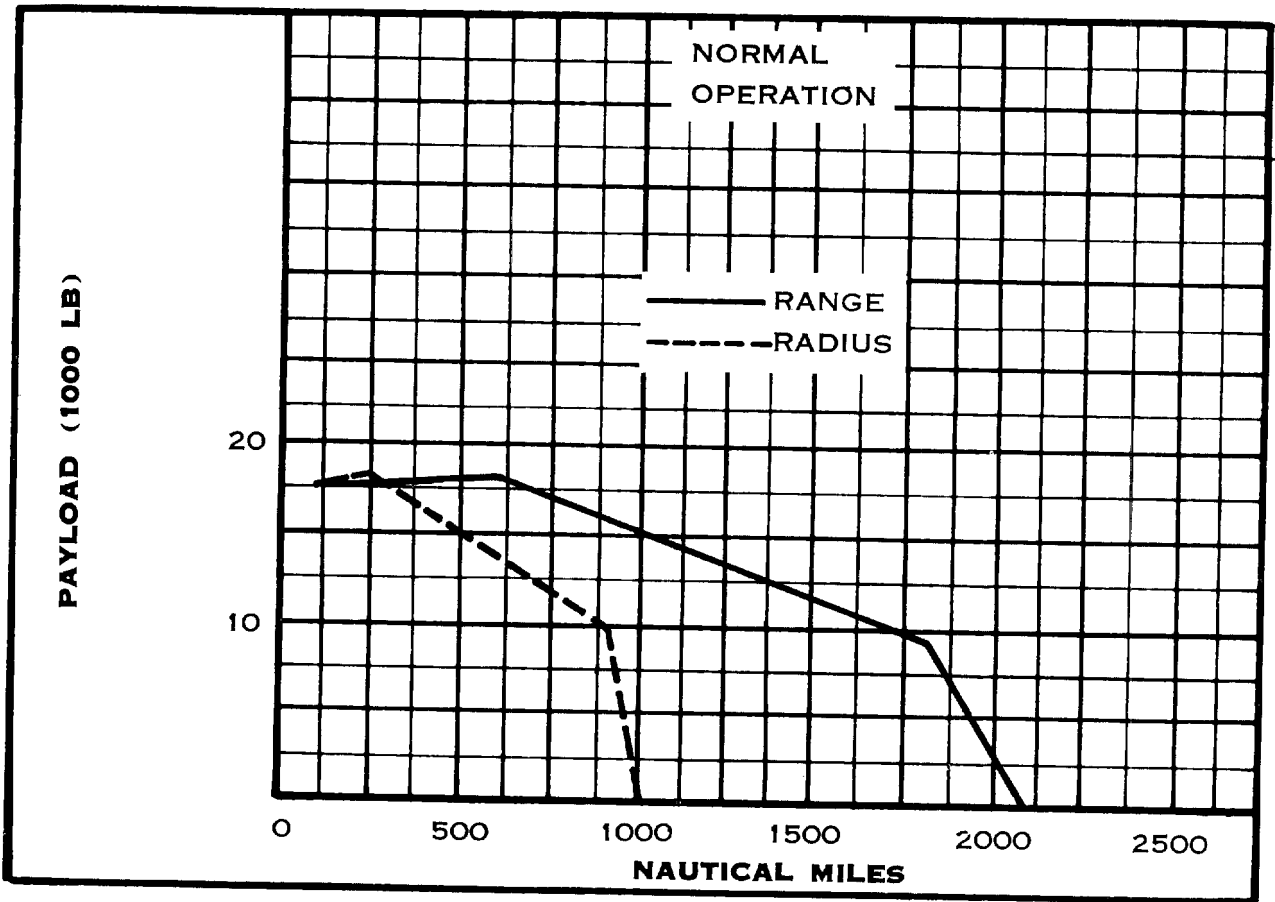


Figure 17. Payload distance, C-119G.

Weight and Balance Data

	Doors on (pounds)	Doors off (pounds)
a. Maximum gross weight	64,000	64,000
b. Operating weight	43,498	43,068
c. Maximum fuel weight	15,540	15,540
d. Center of gravity limits	Figure 16.	
e. Payload range	Figure 17.	

Provisions for Parachutists and Air Delivery

a. *Parachutists.* The C-119 has a maximum capacity for 42 paratroops. Exit doors are located at the rear of the fuselage, one on each side of the cargo compartment. Each door is six feet high and three feet wide.

b. *Air Delivery.* The C-119 is equipped with an interior overhead monorail system for inflight discharge of supplies or equipment through the paratrooper well. Capacity of the monorail is twenty 500-pound air delivery containers (10,000 pounds). This aircraft can be fitted for ejecting supplies or equipment from the rear of the fuselage. When so employed, the clamshell doors are removed, roller conveyors are positioned on the cargo compartment floor, and supplies or equipment are placed on top. Capacity of the conveyor system is governed only by the allowable cargo load and interior dimensions of the cargo compartment. With the clamshell doors removed, equipment and containers can be ejected out of the open aft end.

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IV. C-121 SUPERCONSTELLATION

Description

a. *General.* The C-121 (figure 18) is a four-engine, low-wing, long-range transport. It is designed for use as an overwater cargo, personnel, and evacuation transport.

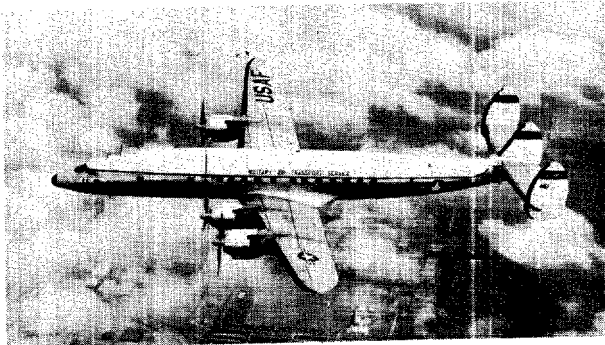


Figure 18. C-121.

b. Characteristics.

- (1) Cruising speed----- 223 knots.
- (2) Takeoff distance (maximum gross weight) 3,300 feet.
- (3) Landing distance maximum landing weight) 2,375 feet.
- (4) Restraint criteria:
 - (a) Forward----- 6.0
 - (b) Aft----- 1.5
 - (c) Vertical----- 2.0
 - (d) Lateral ----- 1.5

Cargo Compartment

a. The C-121 has an operating crew of four—pilot, copilot, flight engineer, and radar navigator, plus provisions for a relief crew of four. The C-121G has an additional crew member, a radio operator, and provisions for a relief crew of five. The C-121C can carry 75 troops, or 47 litters plus four attendants; the C-121G can carry 72 passengers, or 47 litters plus two attendants.

- b. *Cargo Capacities* (figure 19). *Cubic feet*
- (1) Main cargo compartment----- 3,800
 - (2) Aft lower compartment----- 424
 - (3) Forward lower compartment----- 269

- Pounds per square foot*
- c. *Floor Strength.*
- (1) Main compartment----- 300
 - (2) Lower compartment----- 70
- d. *Critical Dimensions.*
- (1) Cargo compartment: *Inches*
 - (a) Length ----- 983
 - (b) Width (maximum floor level) -- 121
 - (c) Height (maximum)----- 84
 - (2) Forward cargo door:
 - (a) Height ----- 72
 - (b) Width ----- 58
 - (c) Height (above ground)----- 133
 - (3) Main cargo door:
 - (a) Height ----- 74.5
 - (b) Width ----- 108.5
 - (c) Height (above ground)----- 111.5
 - (4) Lower compartment doors (2):
 - (a) Length ----- 40
 - (b) Width ----- 30

Cargo Loading Provisions

a. *Aerolift.* Aerolift is a mobile, knockdown cargo elevator with a 10 by 10 foot platform which will rise 144 inches above the ground. The platform has a load capacity of 13,000 pounds.

b. *Portable Cargo Lift.* Provisions are incorporated at the main cargo door entrance to accommodate the installation and stowage of a portable cargo lift with a maximum capacity of 4,000 pounds.

c. *Portable Litter Lift.* A stowable litter lift is provided which can lift two litters.

Provisions for Parachutists and Air Delivery

There are no provisions for parachutists or air delivery in the C-121.

Weight and Balance Data

- Pounds*
- a. Maximum gross weight----- 133,000
 - b. Operating weight----- 78,360
 - c. Maximum fuel weight----- 39,300

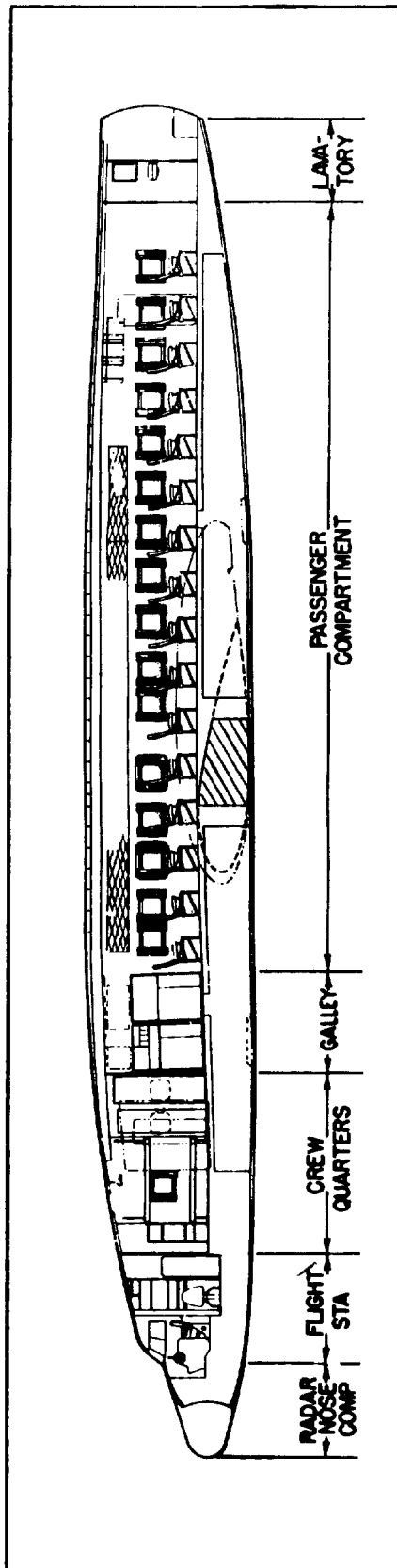


Figure 19. Cargo compartment, C-121.

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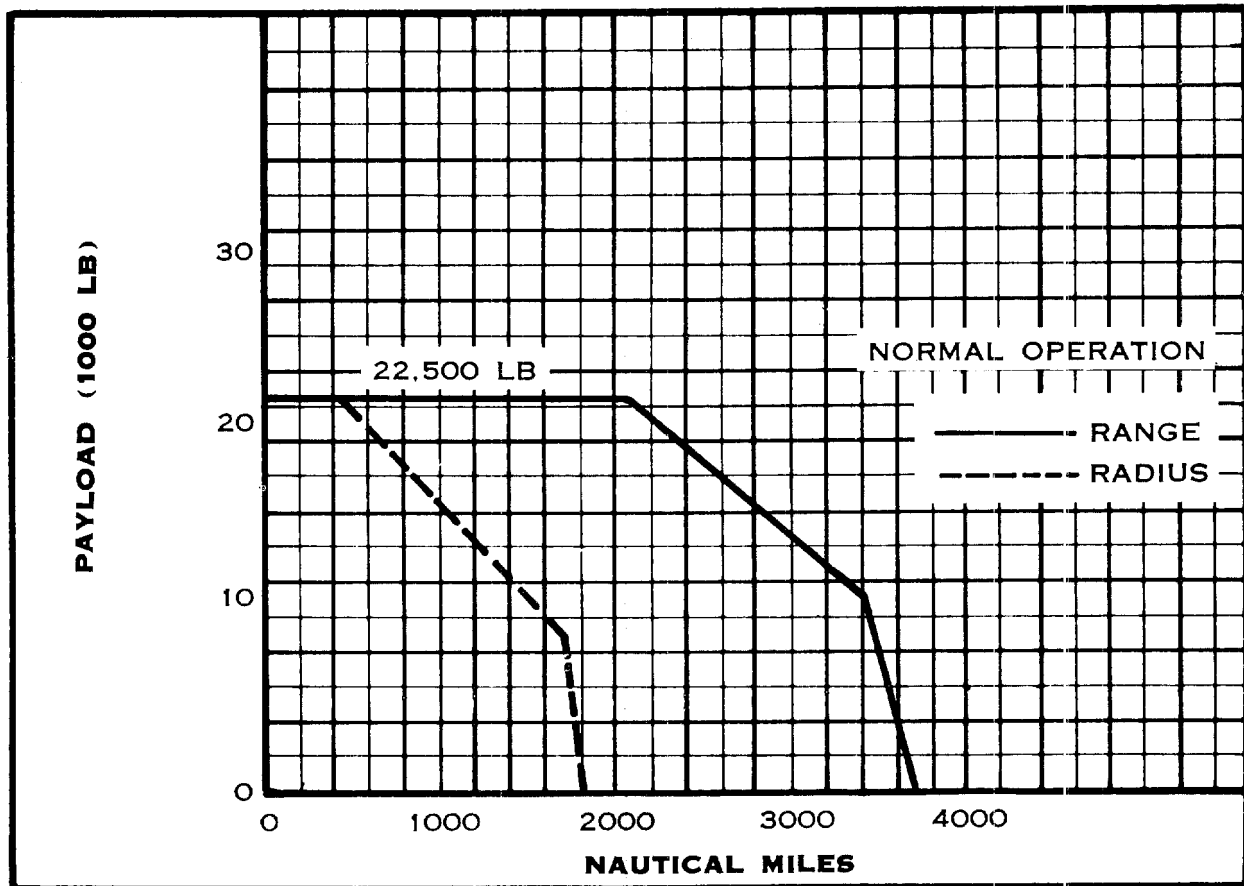


Figure 20. Payload distance, C-121.

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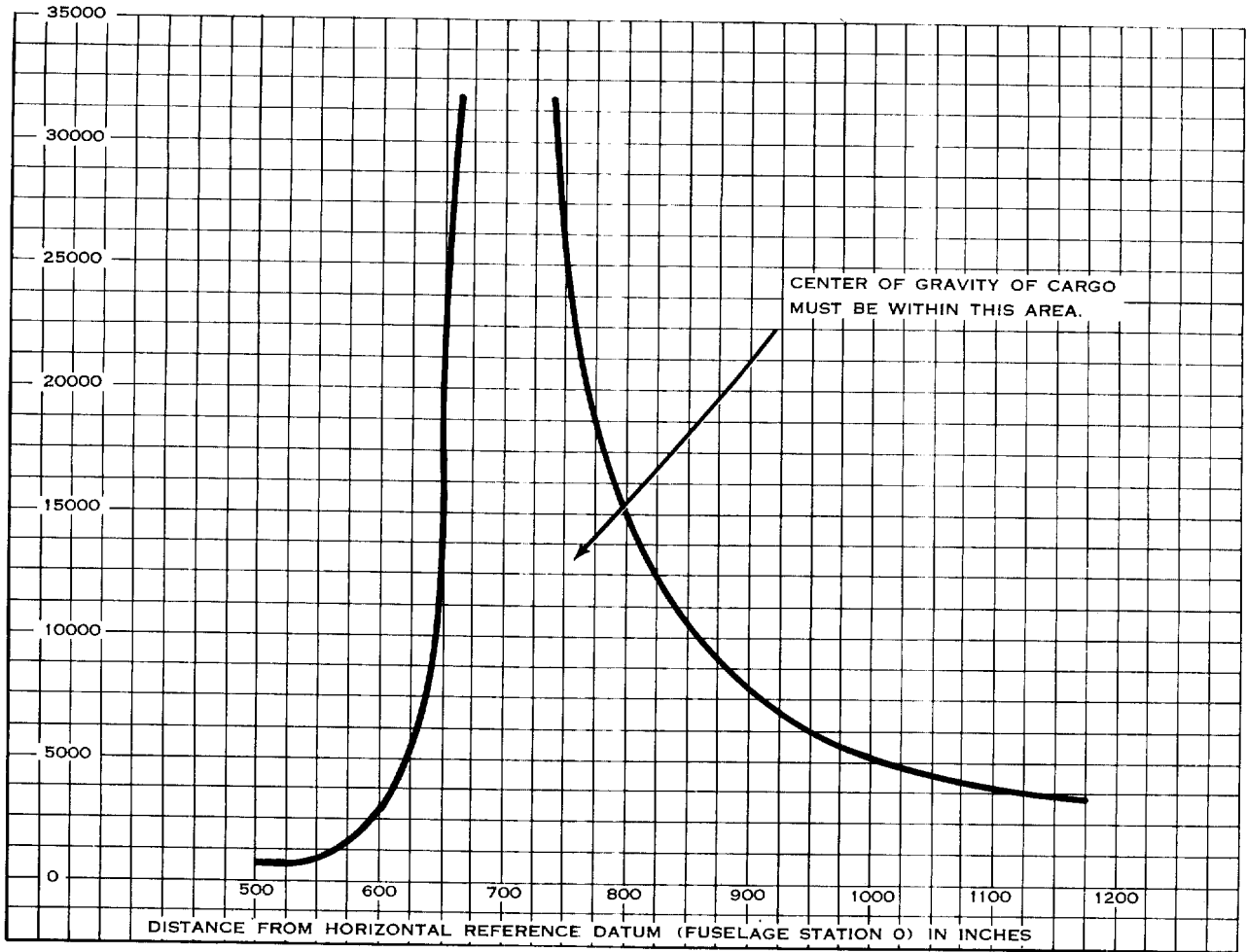


Figure 21. Cargo center of gravity limits, C-121.

V. C-123B PROVIDER

Description

a. General. The C-123B (figure 22) is a twin-engine, medium assault aircraft. It is used primarily as a troop and cargo carrier with the capability of operating from hastily prepared airfields. Other missions include air delivery, medical evacuation, and parachute operations.

b. Performance Characteristics.

- (1) Cruising speed..... 130 knots.
- (2) Takeoff distance to clear to 50-foot obstacle..... 4,130 feet.
- (3) Landing distance to clear 50-foot obstacle..... 2,243 feet.
- (4) Restraint criteria:

 - (a) Forward 8.0
 - (b) Aft 2.0
 - (c) Vertical 4.5
 - (d) Lateral 1.5

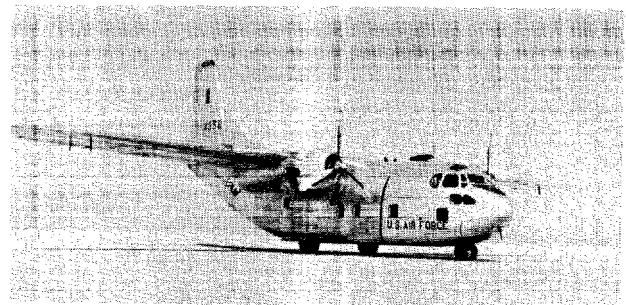


Figure 22. C-123B.

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Cargo Compartment

a. Personnel. The C-123B has a normal crew of four—pilot, copilot, navigator, and loadmaster. It is capable of carrying 60 troops; 46 parachutists; or 50 litters plus six ambulatory patients.

b. Cargo Capacities and Limitations (figure 23). The rear loading ramp permits straight-in loading into the cargo compartment, which has 2,420 cubic feet of cargo space. In placing cargo, the following limitations should be noted in planning loads for the C-123: when the navigator's station is installed, the overhead clearance in the forward right portion of the cargo compartment is limited. A bailout chute, which must be left clear, is located beneath the navigator's seat in the vicinity of station 145.

c. Critical Dimensions.

(1) Cargo compartment:	<i>Inches</i>
(a) Length -----	345
(b) Width at wheel wells (including ramp) -----	110(444)
(c) Height -----	98
(2) Cargo loading door:	
(a) Width -----	110
(b) Height -----	98
(c) (Height above ground) -----	33½
	<i>Degrees</i>
(d) Ramp angle -----	15

d. Floor Strength. The treadways will withstand a concentrated load of 3,000 pounds or an evenly distributed load of 200 pounds per square foot. The inner walkway will also carry 200

pounds per square foot, but the concentrated load is limited to 2,000 pounds. The outer walkways are designed for a 1,000-pound concentrated load and a distributed load of 100-pounds per square foot.

Cargo Loading Provisions

a. Auxiliary Ramps. Two auxiliary ramps are provided for use when loading vehicles which require a more gradual slope than that provided by the main ramp. The auxiliary ramps may be spaced to accommodate the tread width of any vehicle to be loaded.

b. Load Assist Pulley. A pulley is provided for winching loads into the aircraft. The pulley mechanism can be bolted to the tiedown fittings in the cargo floor. The sheave may be used with cables up to three-quarters of an inch in diameter. When the towing vehicle or winch is placed aft of the aircraft, the maximum draw pull is 3,300 pounds. If the cable is routed through the front entrance door, the maximum permissible load is 2,800 pounds.

Provisions for Air Delivery

a. Parachutists. The C-123B may be used to jump parachutists, either from the two rear personnel doors or from the cargo ramp. For specific details to jump from this aircraft, see TM 57-220.

b. Air Delivery. The C-123E has a limited air delivery capability using the gravity ejection method. Models AF 57-6185 through 57-6202 are equipped with a pendulum release for use in cargo extraction.

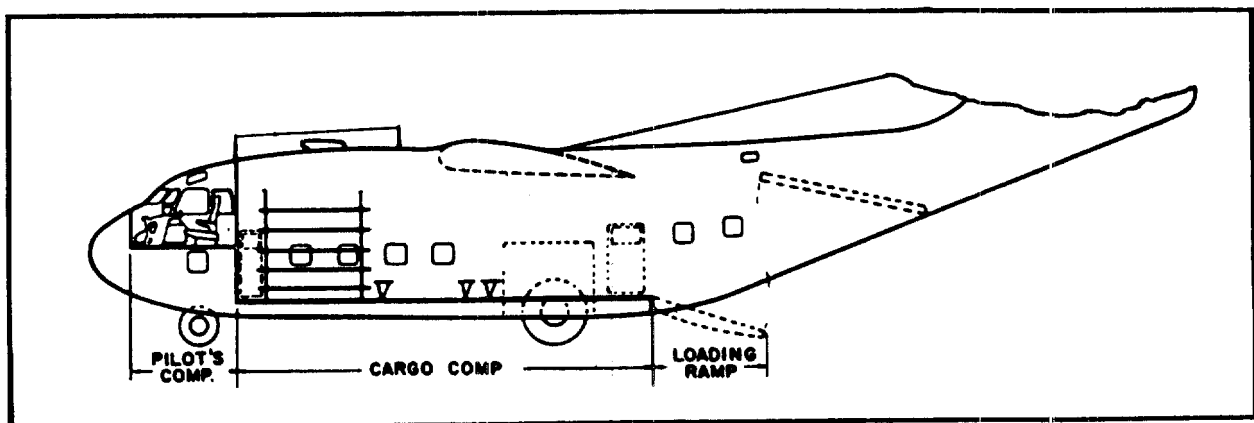


Figure 23. Cargo compartment, C-123B.

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Weight and Balance Data

	<i>Pounds</i>	
a. Maximum gross weight.....	55,200.	c. Fuel capacity..... 13,920.
b. Operating weight.....	33,000.	d. Payload Figure 24.
		e. Center of gravity limits..... Figure 25.

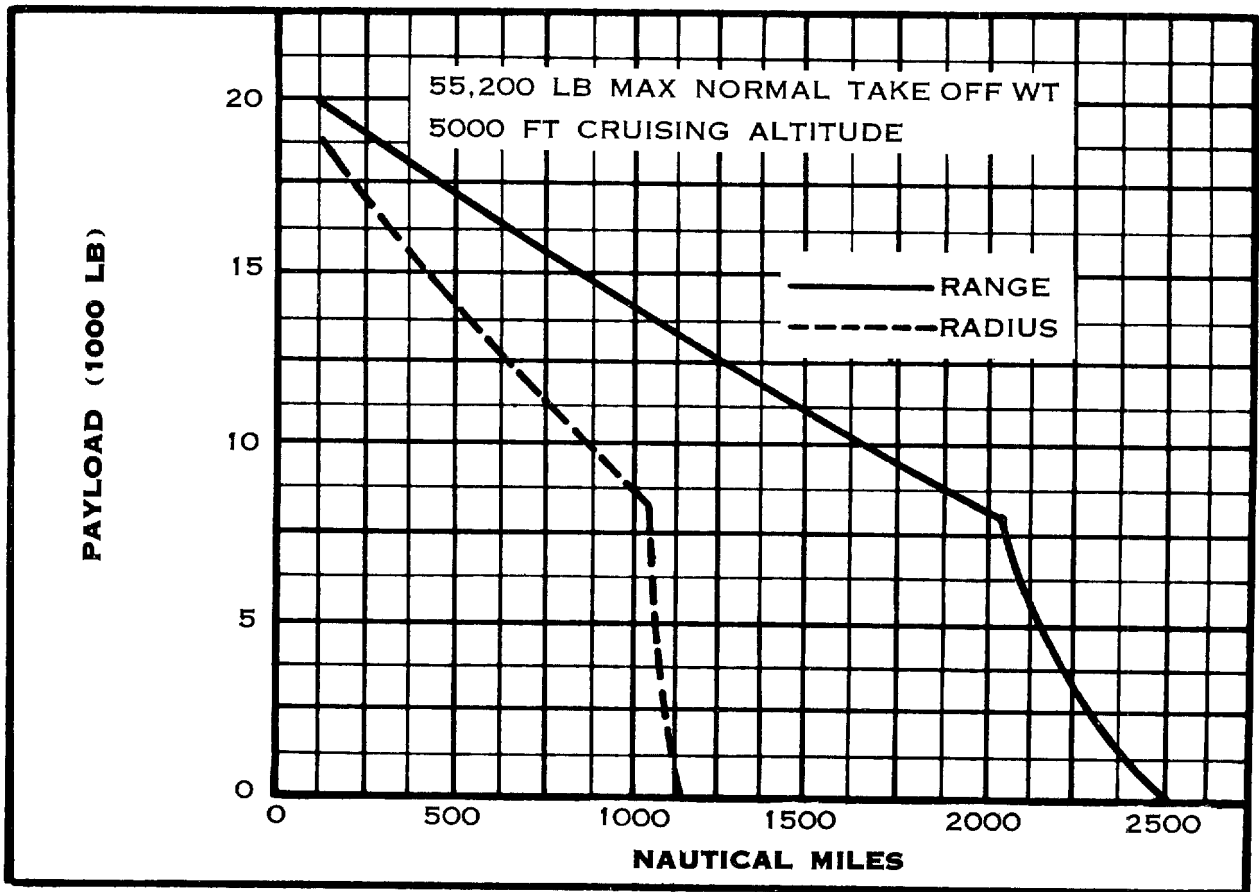


Figure 24. Payload distance, C-123.

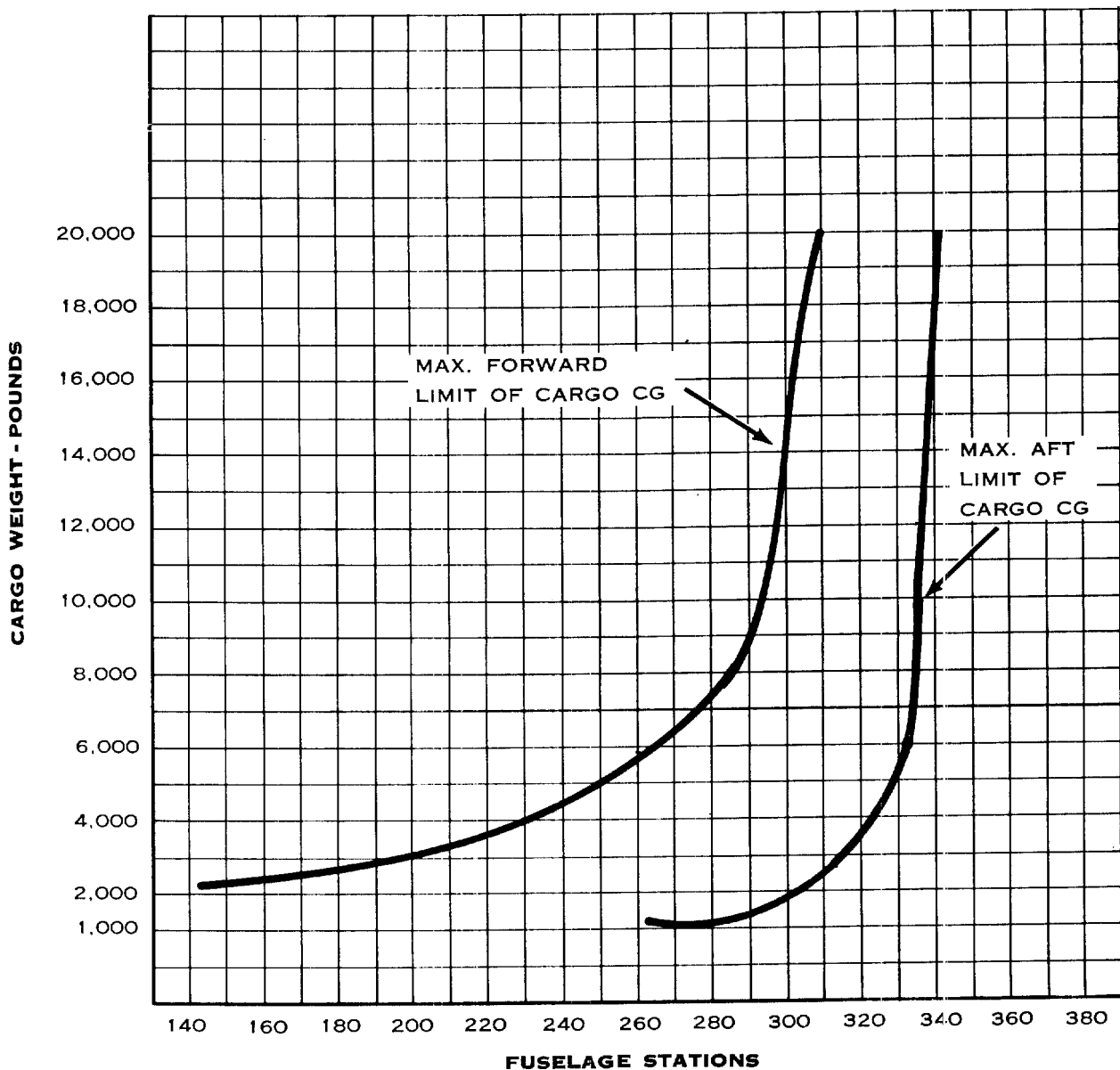


Figure 25. Cargo center of gravity limits, C-123B.

VI. C-124 GLOBEMASTER

Description

a. *General.* The C-124 (figure 26) is a four-engine, long-range, heavy transport with a principal mission of airlifting personnel and outsized cargo. It may also be employed for air delivery or medical evacuation. This aircraft features a clam-

shell-type door in the nose which permits straight-in loading, and an auxiliary folding floor for increased deck area. There are two models of this aircraft—the C-124A and C-124C. The principal difference between the two models is their powerplants. Significant differences in performance are indicated below.

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b. Performance Characteristics.

	<i>C-124A</i>	<i>C-124C</i>
(1) Cruising speed.	200 knots.	200 knots.
(2) Takeoff distance (maximum gross weight).	4,820 feet.	4,820 feet.
(3) Landing distance (maximum landing weight).	4,000 feet.	4,200 feet.
(4) Restraint criteria:		
(a) Forward:		
1. Troops in cargo compartment.		8.0
2. No troops in cargo area.		4.0
(b) Aft.		1.5
(c) Vertical.		2.0
(d) Lateral.		1.5

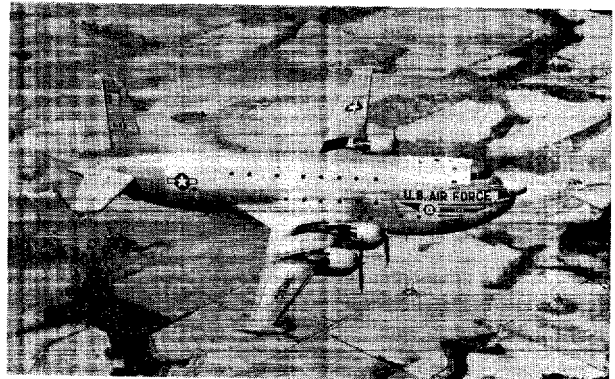


Figure 26. C-124C.

Cargo Compartment

a. Personnel. The C-124 has a crew of five—pilot, copilot, flight engineer, navigator, and radio operator. There are provisions for a relief crew of three. The C-124 can carry 200 combat-equipped troops; 112 parachutists; or 127 litter patients with 25 attendants.

b. Cargo Areas (figure 27).

(1) *Main cargo floor.* The main cargo floor extends from station 236 to station 1120. From station 236 to station 360 the floor slopes up as a continuation of the nose loading ramps at an angle of 17°. At

station 360 the floor angle is reduced to 11° and continues to station 460. From station 460 to station 1120 the floor is nearly level. The main cargo floor is divided into two areas—the treadway and/or maneuvering areas and the red area. Two 32-inch wide treadways run from stations 236 to 1060, the entire length of the floor. Additional high strength areas are provided on each side of the treadways to permit positioning of wheel vehicles. Because of the steep angle of the ramps, overhead clearance can become critical on outsized loads (figure 28).

(2) *Auxiliary floor.* An auxiliary floor is provided to increase the capacity of the aircraft. The floor is hinged to the fuselage and is supported by stanchions

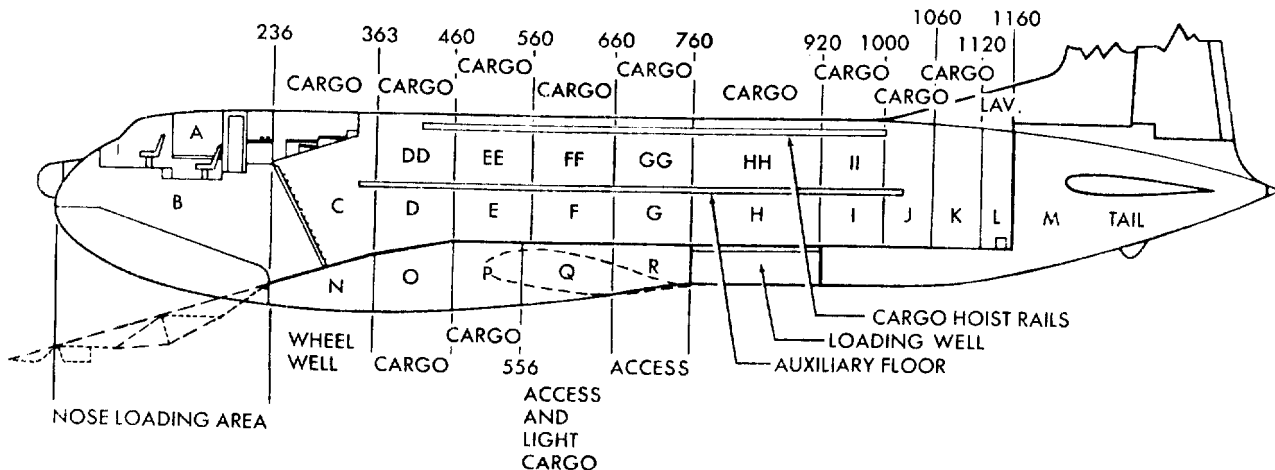


Figure 27. Cross-section, C-124C.

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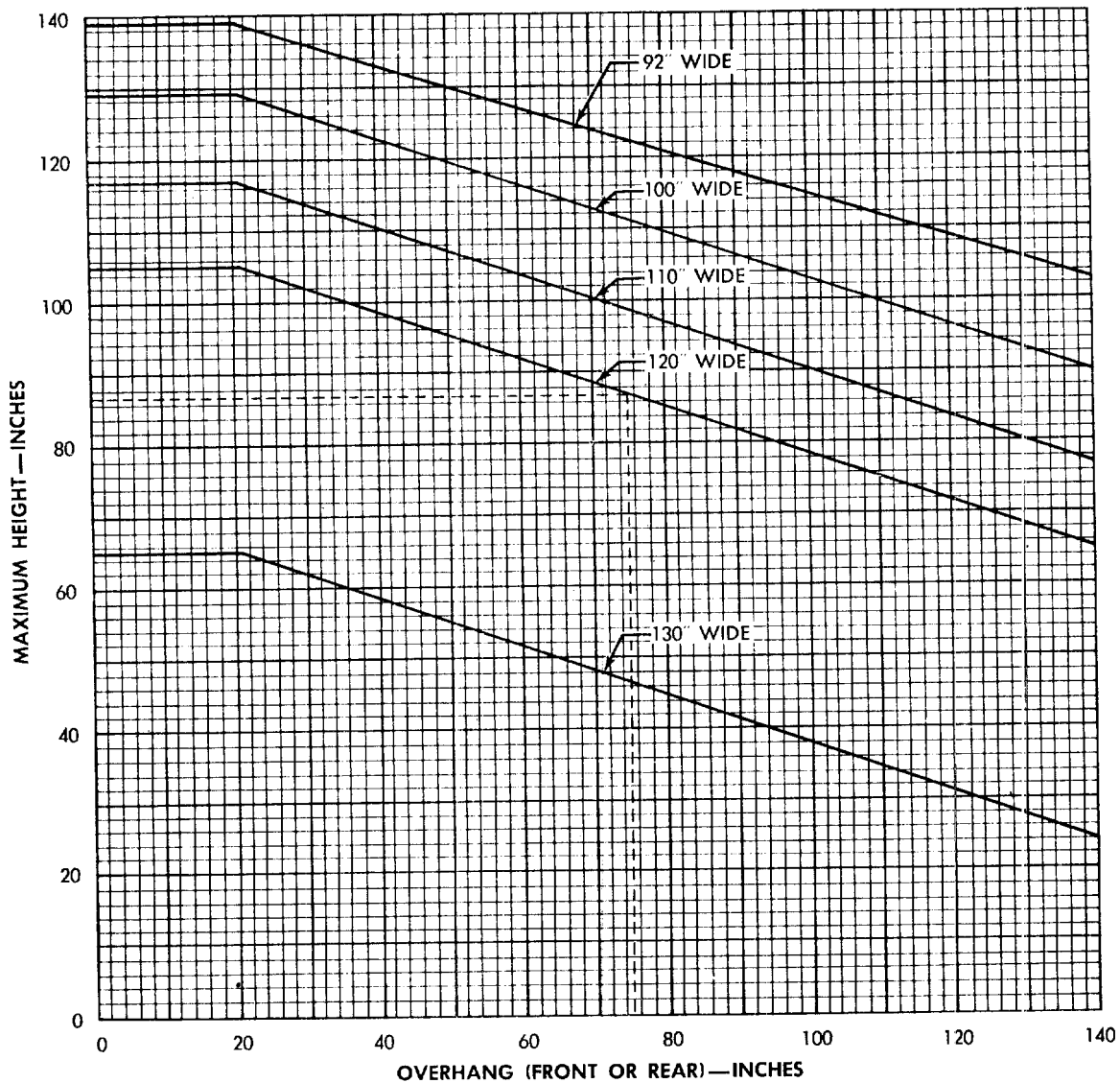
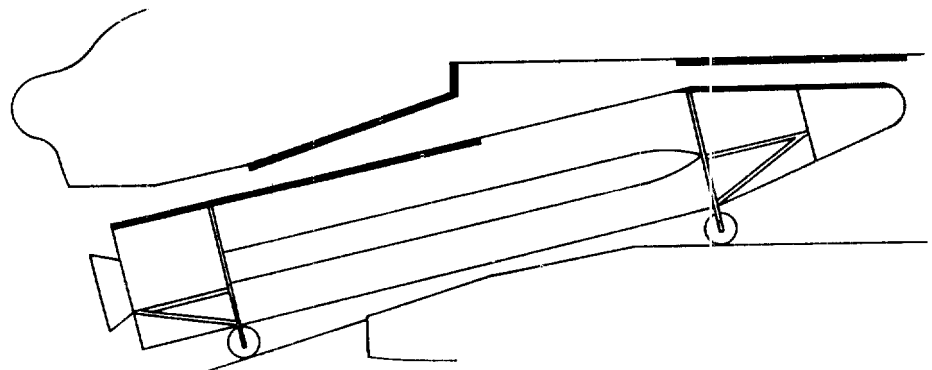


CHART SHOWS MAXIMUM ALLOWABLE HEIGHT OF VEHICLE AT VARIOUS WIDTHS. IT ALSO INDICATES THE MAXIMUM ALLOWABLE OVERHANG (FRONT OR REAR) FROM AXLE CENTERLINES. EXAMPLE: A VEHICLE 120 INCHES WIDE, WITH AN OVERHANG OF 75 INCHES—THE MAXIMUM ALLOWABLE HEIGHT WOULD BE 87 INCHES.



HEIGHT CLEARANCE CHART

Figure 28. Nose loading clearance chart, C-124.

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attached to the main cargo floor. The auxiliary floor is constructed in sections which may be used independently of each other. This allows flexibility in load planning, particularly when employing mixed loads of personnel and equipment.

c. Floor Strength. The maximum single axle-load on the treadways and maneuvering areas is 20,000 pounds. The red area will support a distributed load of 30 pounds per square inch. The auxiliary floor is designed for low density cargo and personnel only. The maximum load is 43 pounds per square foot.

d. Critical Dimensions.

(1) Main cargo compartment:	<i>Inches</i>
(a) Length -----	884
(b) Width (floor level) -----	136
(c) Height (maximum clearance) --	139½
(d) Height (auxiliary floor installed) -----	73¾

(2) Nose loading door:

(a) Width -----	136
(b) Height -----	140
(c) Ramp angle -----	<i>Degrees</i> 17

(3) Loading well:

(a) Length -----	<i>Inches</i> 159
(b) Width -----	93
(c) Vertical clearance (from ground) -----	105

Cargo Loading Provisions

a. Nose Loading Ramps. The nose loading ramps (figure 29) consist of two separate, laterally adjustable, 36-inch wide ramps. The ramps may be positioned to a maximum of 50 inches apart and a minimum of 24 inches apart, measured from inside edge to inside edge. The nose loading ramps are used when loading vehicles and large, heavy cargo; they are capable of supporting



Figure 29. Loading ramp, C-124.

50,000 pounds or a single axle load of 17,800 pounds.

b. Loading Well Platform. The loading well platform is located between stations 760 and 920; when in place it forms the cargo floor over the top of the loading well. The platform is capable of supporting a maximum load of 9,300 pounds. Two traveling cranes serve as the elevator mechanism for lowering and raising the platform.

c. Traveling Cranes. To assist in the loading and positioning of cargo in the aircraft, two dual hoist, bridge-type traveling cranes are installed

on rails in the main cargo compartment from stations 436 to 1000. Each crane is equipped with two hoist cables. The maximum allowable load that each cable can hoist unassisted is 2,000 pounds; however, with the use of snatch blocks, the maximum is increased to 16,000 pounds when both traveling cranes are used.

d. Winch Cable Pulleys. Two large pulleys are installed at station 1117 for winching heavy cargo into the aircraft. The pulleys are designed for use with a 3/4-inch cable with a maximum pull of 30,000 pounds.

Weight and Balance Data

	C-124A (pounds)	C-124C (pounds)
a. Maximum gross weight.....	175,000	185,000.
b. Operating weight.....	112,880	114,685.
c. Maximum fuel weight.....	65,143	66,760.
d. Allowable cargo load.....	Figure 30	Figure 31.
e. Center of gravity limits.....	Figure 32	

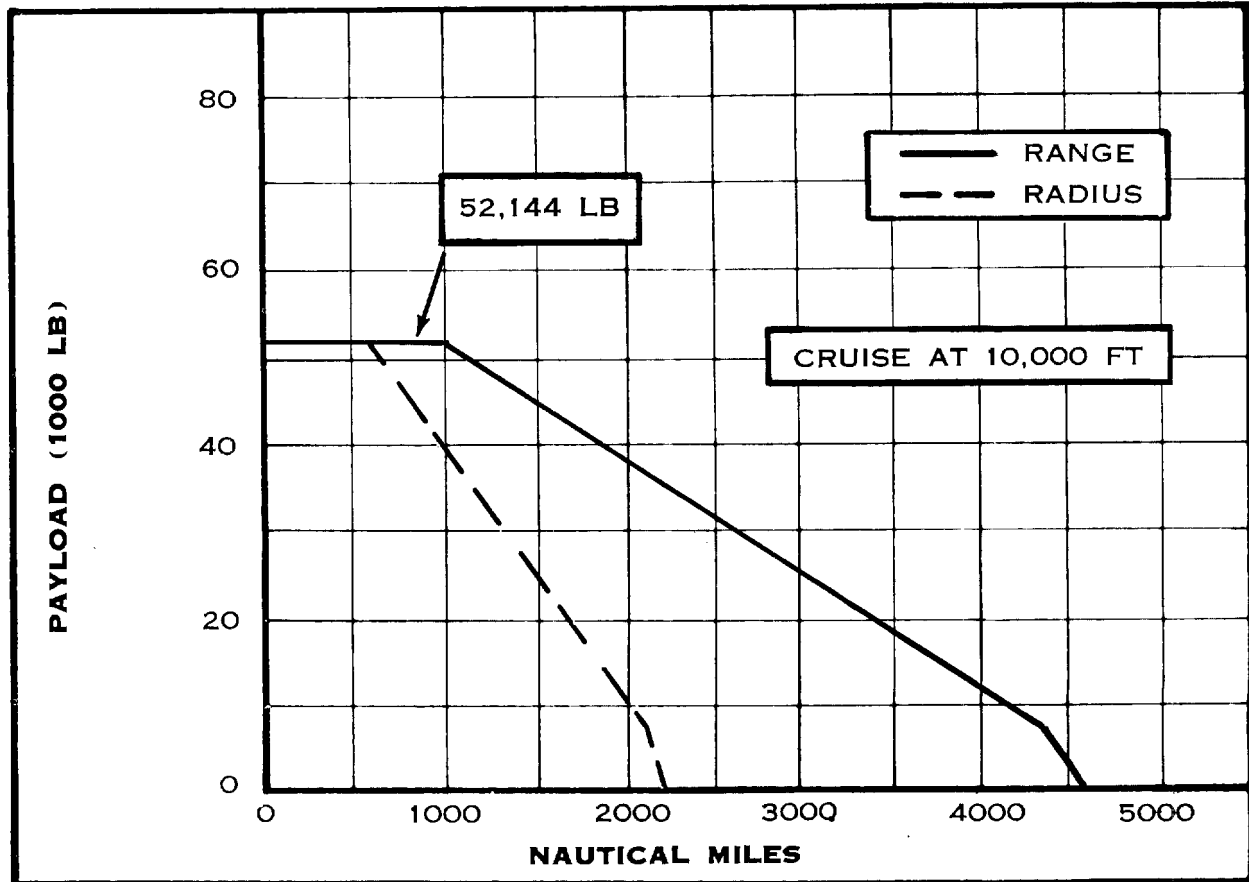


Figure 30. Payload distance, C-124A.

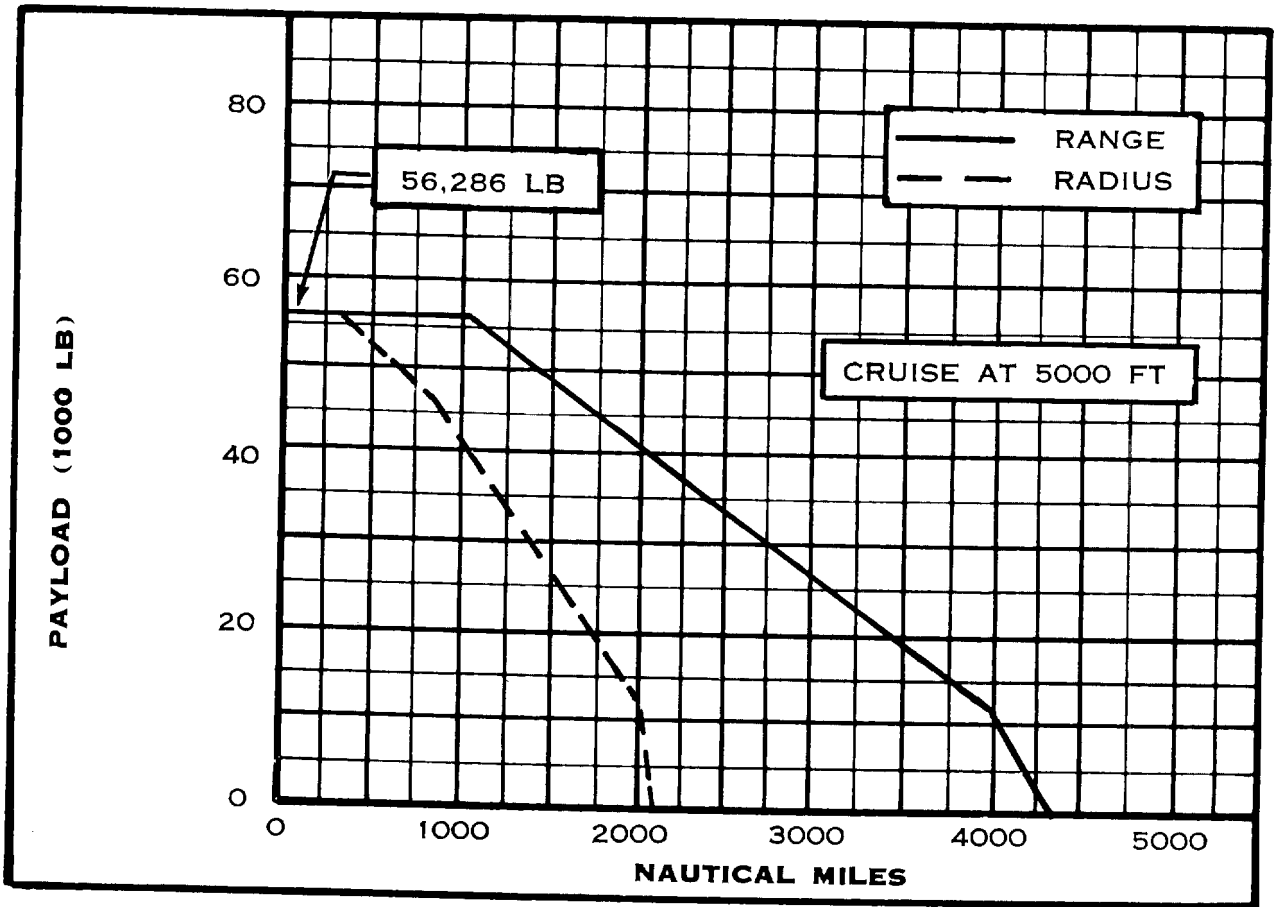
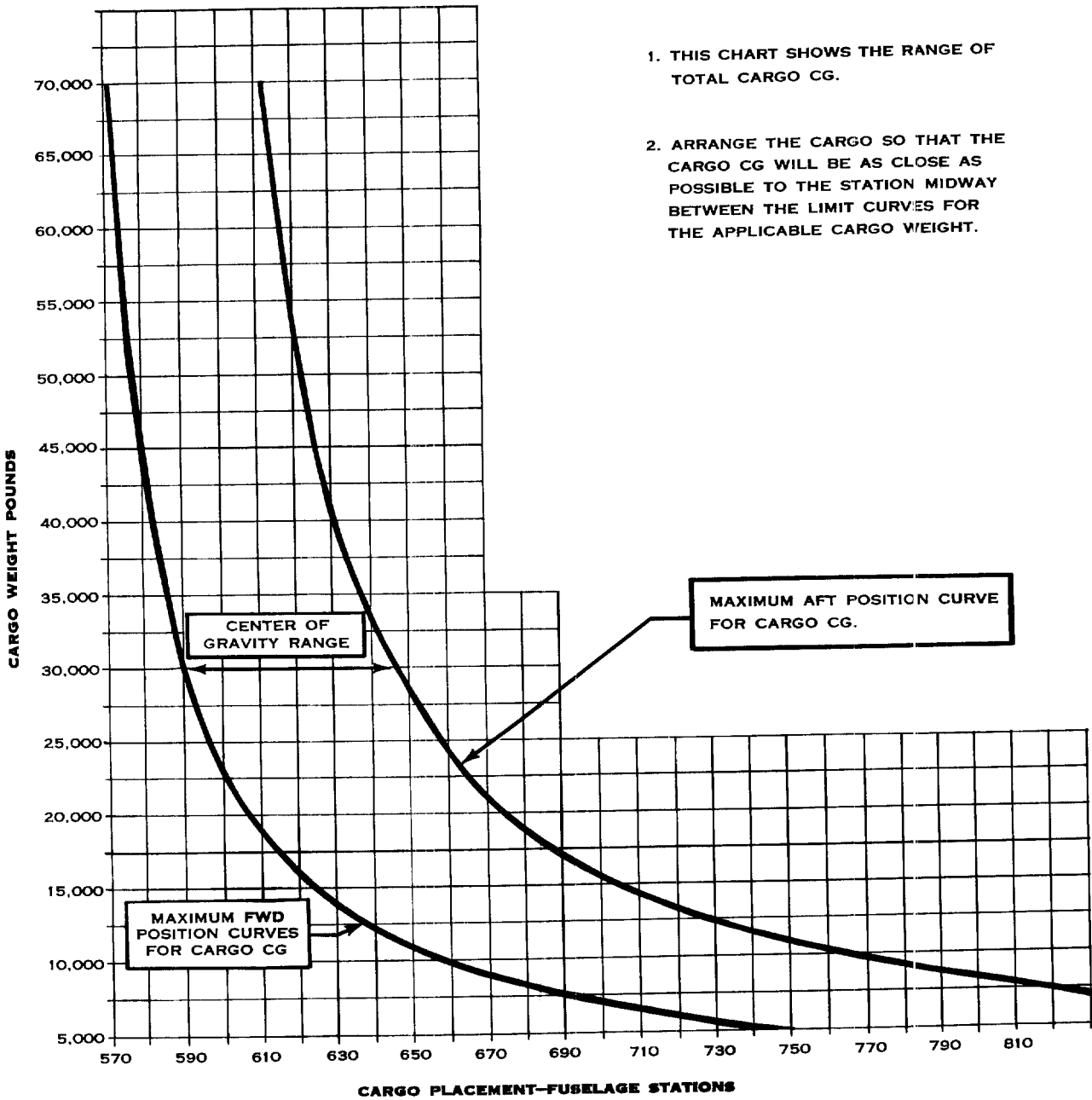


Figure 31. Payload distance, C-124C.



1. THIS CHART SHOWS THE RANGE OF TOTAL CARGO CG.
2. ARRANGE THE CARGO SO THAT THE CARGO CG WILL BE AS CLOSE AS POSSIBLE TO THE STATION MIDWAY BETWEEN THE LIMIT CURVES FOR THE APPLICABLE CARGO WEIGHT.

Figure 32. Cargo center of gravity limits, C-124.

Provisions for Air Delivery

a. *Parachutists.* The C-124 can deliver 112 parachutists. For specific procedures for rigging the aircraft for jumping, see TM 57-220.

b. *Air Delivery.* The C-124 may be used for air delivery of equipment through the elevator well. Specific information for air delivery is contained in the TM 10-500-series.

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VII. C-130 HERCULES

Description

a. General. The C-130 (figures 33 and 34) is a four-engine, turboprop, medium assault transport. There are three models of this aircraft—the C-130A, B and E. Principal differences include powerplants, cargo door size, and fuel capacity. The C-130A and B are used for tactical airlift, while the C-130E, with its increased gross

weight and fuel capacity, is used for both strategic and tactical airlift. Missions of the C-130 include air transport, assault missions, air delivery, and medical evacuation. Special features of the C-130 are cargo compartment pressurization, ground and in-flight air conditioning, and an up-swept aft fuselage which contains a built-in loading ramp that serves as the rear door (figure 35).

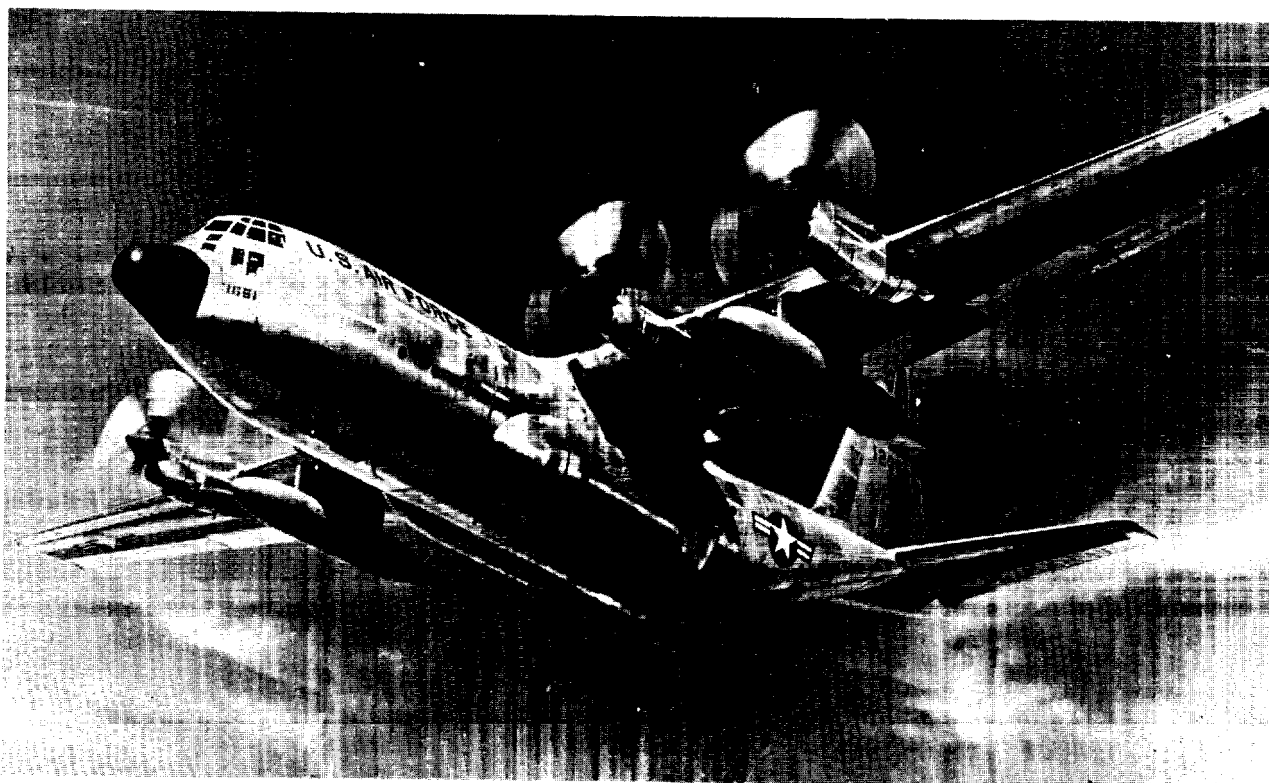


Figure 33. C-130E.

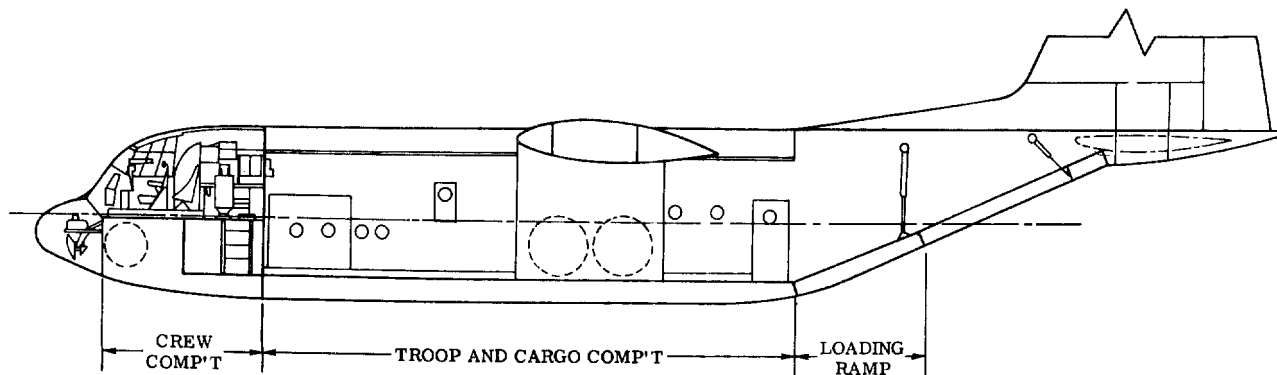


Figure 34. Cross section, C-130.

<i>b. Performance Characteristics.</i>	<i>C-130A</i>	<i>C-130B</i>	<i>C-130E</i>
(1) Cruising speed.....	290 knots.....	275 knots.....	275 knots.
(2) Takeoff distance.....	2,540 feet.....	3,000 feet.....	4,210 feet.
(3) Landing distance.....	1,555 feet.....	2,100 feet.....	2,230 feet.
(4) Restraint criteria (all models):			
(a) Forward (airlanded mission/air delivery).....			8.0/4.0
(b) Aft (with JATO assist).....			1.5 (2.0)
(c) Vertical.....			2.0
(d) Lateral.....			1.5



Figure 35. Cargo loading ramp, C-130.

(d) Maximum width for air delivery	113
(2) Cargo loading door:	
(a) Width (ramp level).....	119½
(b) Height (C-130A/C-130 B and E).....	106/109
(c) Height (above ground, nominal)	40
	<i>Degrees</i>
(d) Ramp angle.....	11

Cargo Loading Provisions

a. Auxiliary Loading Ramps. Auxiliary truckloading and auxiliary groundloading ramps are used to bridge any gap between the ramp and the truck, platform, or ground. These auxiliary ramps are attached to the aft end of the loading ramp and may be adjusted to conform to vehicle tread widths as required.

b. Snatch Blocks. Two moveable snatch blocks are provided for winching loads into and within the aircraft. The cable to the prime mover may be routed either through the rear or forward cargo door. (On later models of the C-130E there is no forward cargo door.)

c. Portable Winch. A portable cargo winch capable of winching any authorized load into the aircraft with the aid of snatch blocks is provided. The winch may be attached to any 10,000- or 25,000-pound tiedown fitting.

Provisions for Air Delivery

a. General. The C-130 has the dual-rail air-drop system installed. Single platform loads up to 25,000 pounds, or multiple loads up to the capacity of the aircraft, may be delivered. For procedures on air delivery of cargo, see TM 10-500 series.

b. Parachutists. Sixty-four parachutists may be delivered from the C-130 using the paratroop

Cargo Compartment

a. Personnel. The C-130 has a crew of five—pilot, copilot, navigator, flight engineer, and loadmaster. It can carry a total of 92 personnel; 64 parachutists; or 74 litters plus two attendants.

b. Floor Strength. On the C-130A model, 21-inch wide treadways are installed 58 inches apart. On C-130B and E models, 35-inch wide treadways are installed 30 inches apart. The treadways will support an axleload of 13,000 pounds except that during flight the load on the treadway, forward of station 337 and aft of station 682, is limited to 6,000 pounds per axle. Outside the treadway areas the load must not exceed 2,500 pounds per wheel. These axle and wheel limitations are based on a tire pressure of 100 pounds per square inch. A load of 5,000 pounds may be placed on the ramp provided the load does not exceed 125 pounds per square foot.

<i>c. Critical Dimensions.</i>	<i>Inches</i>
(1) Cargo compartment:	
(a) Length (including range) ..	492 (612)
(b) Width	123
(c) Height	108

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doors aft of the wheel wells. When this aircraft is used for heavy drop, parachutists will follow the loads out the rear cargo door since the buffer

boards and roller conveyors block the paratroop doors. For specific procedures for jumping from the C-130, see TM 57-220.

Weight and Balance Data

	<i>C-130A (pounds)</i>	<i>C-130B (pounds)</i>	<i>C-130E (pounds)</i>
a. Maximum gross weight.....	124,200.....	135,000.....	155,000.
b. Operating weight.....	61,192.....	69,341.....	76,000.
c. Maximum fuel capacity.....	34,125.....	44,850.....	62,920.
d. Allowable cargo load.....	Figure 36.....	Figure 37.....	Figure 38.
e. Center of gravity limits.....	Figure 39.....

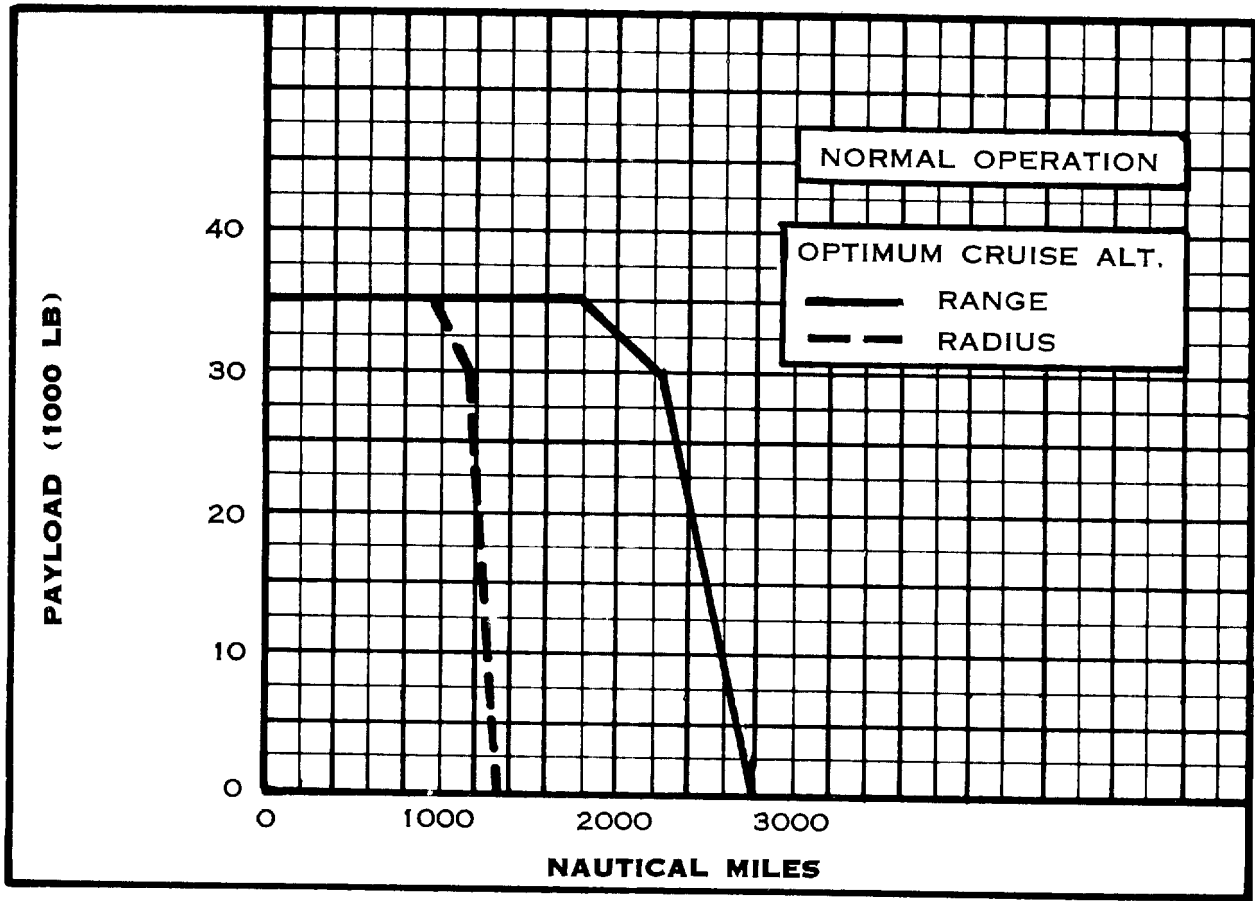


Figure 36. Payload distance, C-130A.

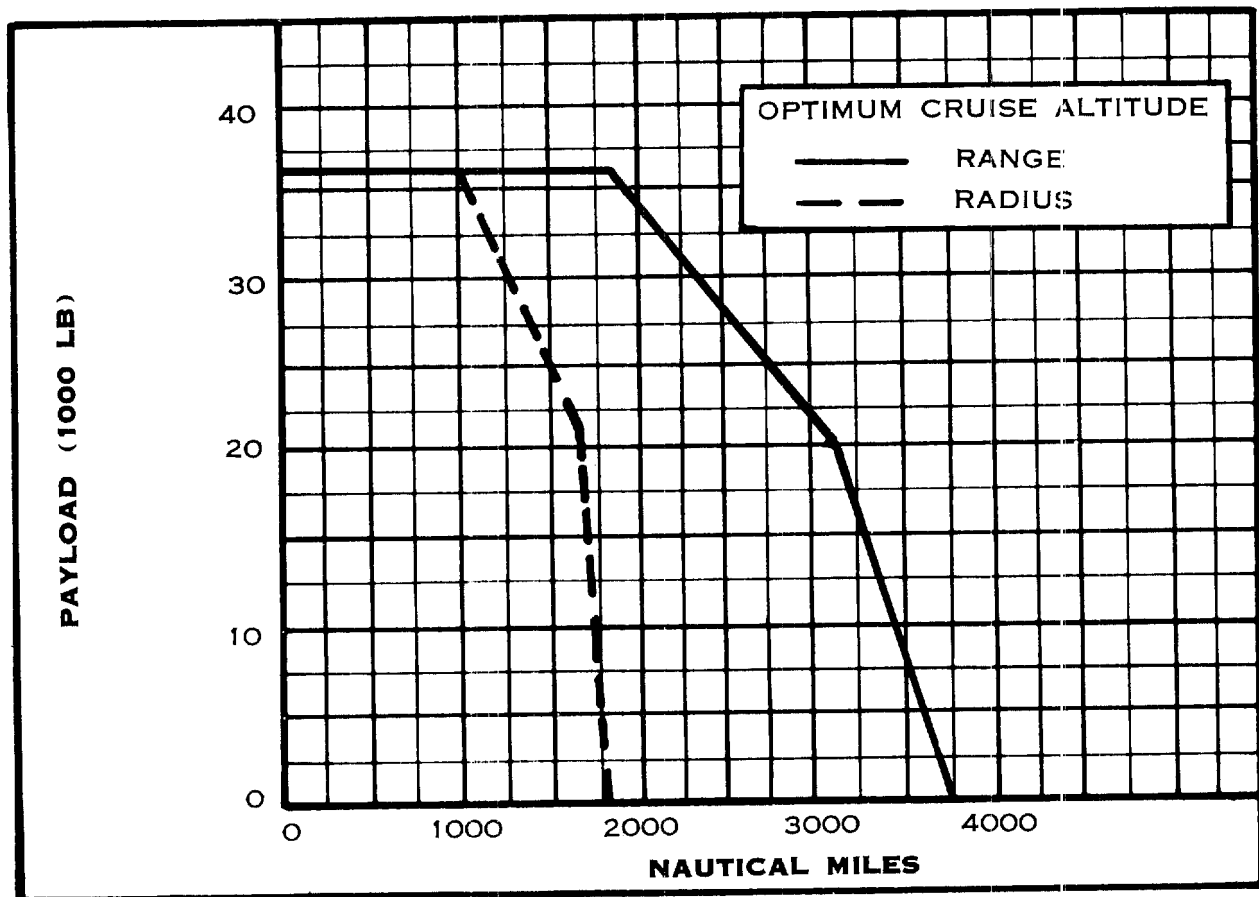


Figure 37. Payload distance, C-130B.

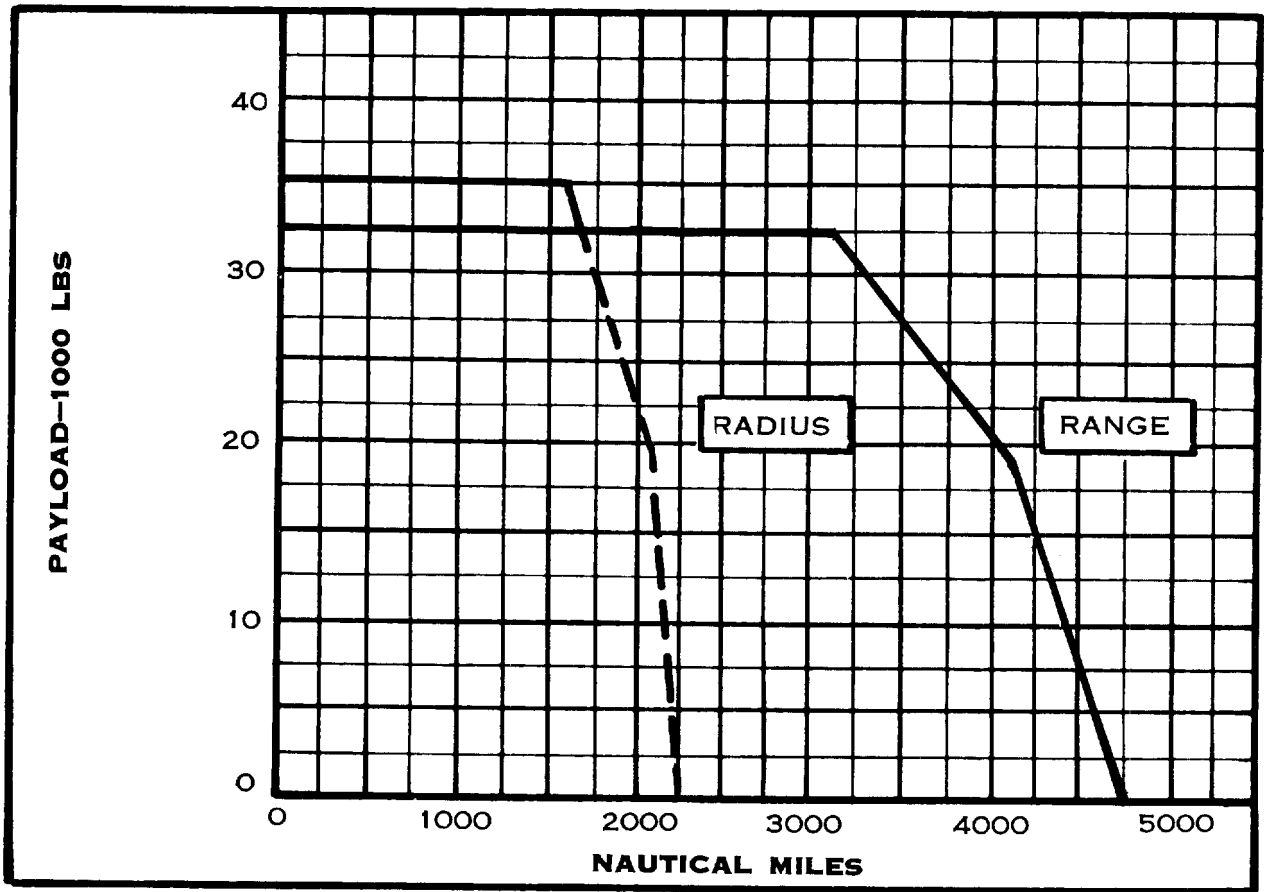


Figure 38. Payload distance, C-130E.

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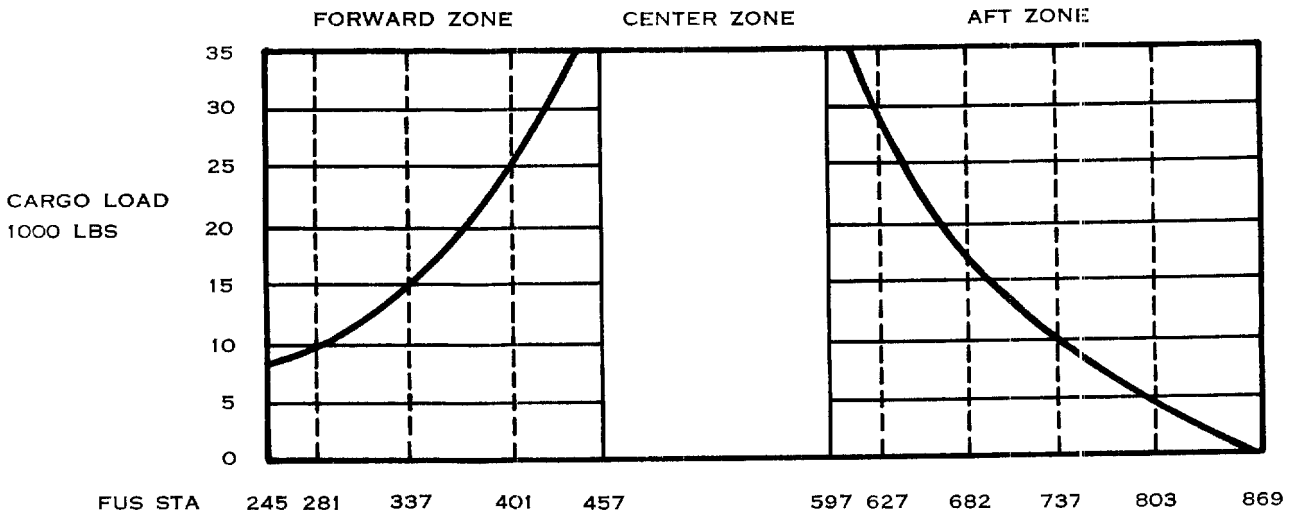


Figure 39. Cargo center of gravity limits, C-130.

VIII. C-133 CARGOMASTER

Description

a. *General.* The C-133 (figure 40) is a four-engine, propjet, long range, heavy cargo carrier. Its principal mission is the airlift of heavy, out-sized cargo, such as missile systems and their sup-

port. There are two models of this aircraft in the inventory, the A and B. The C-133B differs from the C-133A by the incorporation of more powerful engines and clamshell-type aft cargo loading doors (figures 41 and 42).

b. Performance Characteristics.

	C-133A	C-133B
(1) Cruising speed.....	260 knots.....	270 knots.
(2) Takeoff distance.....	4,250 feet.....	4,510 feet.
(3) Landing distance.....	3,500 feet.....	4,135 feet.
(4) Restraint criteria:		
(a) Forward.....		3.0
(b) Aft.....		1.5
(c) Vertical.....		3.0
(d) Lateral.....		1.5

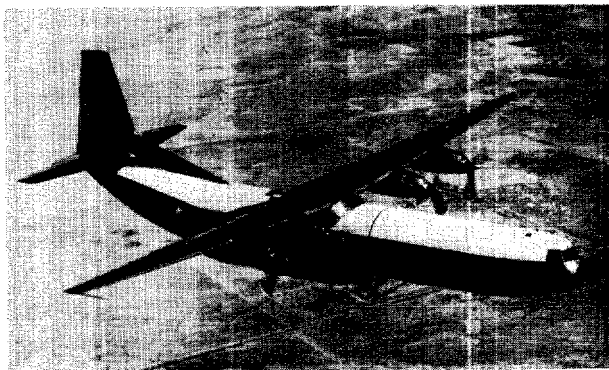


Figure 40. C-133A.

Cargo Compartment

a. *Personnel.* The C-133 has a crew of four—pilot, copilot, navigator, and flight engineer. There are also provisions for a relief crew of three. This aircraft is designed as a cargo carrier. However, if required, 120 high-density seats, or 55 litters, may be installed.

b. *Floor Strength.* The rated strength of the cargo compartment floor for distributed loads is 300 pounds per square foot, except between stations 772 and 914 where the allowable floorload is

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375 pounds per square foot. The treadways will support a single axleload up to 20,000 pounds and a tandem axleload up to 44,000 pounds. Up to 10,000 pounds may be stowed on the ramp.

c. Critical Dimensions.

(1) Cargo compartment:	<i>Inches</i>
(a) Length -----	1,168
(b) Width (floor level) -----	142
(c) Height -----	143

(2) Rear cargo doors:	
(a) Width (C-133 A, B) -----	142, 132½
(b) Height (C-133 A, B) -----	150, 159
(c) Height (above ground) -----	50
	<i>Degrees</i>
(d) Ramp angle -----	9

(3) Side cargo door:	<i>Inches</i>
(a) Width -----	106
(b) Height -----	100
(c) Height (above ground) -----	50

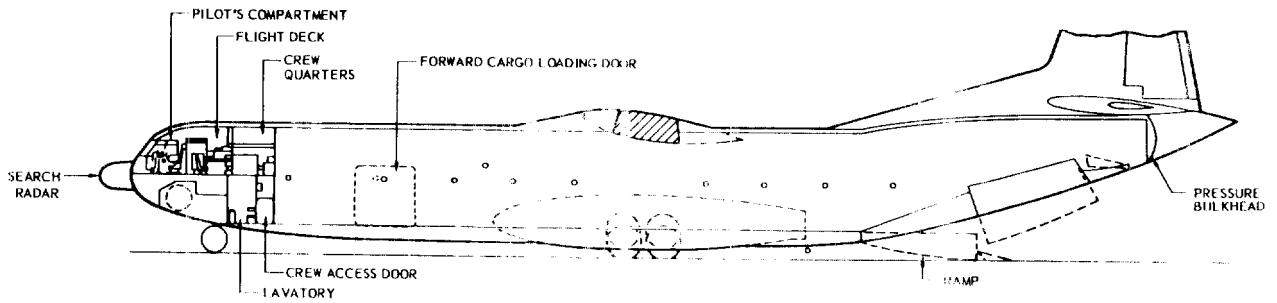


Figure 41. Cross section, C-133B.

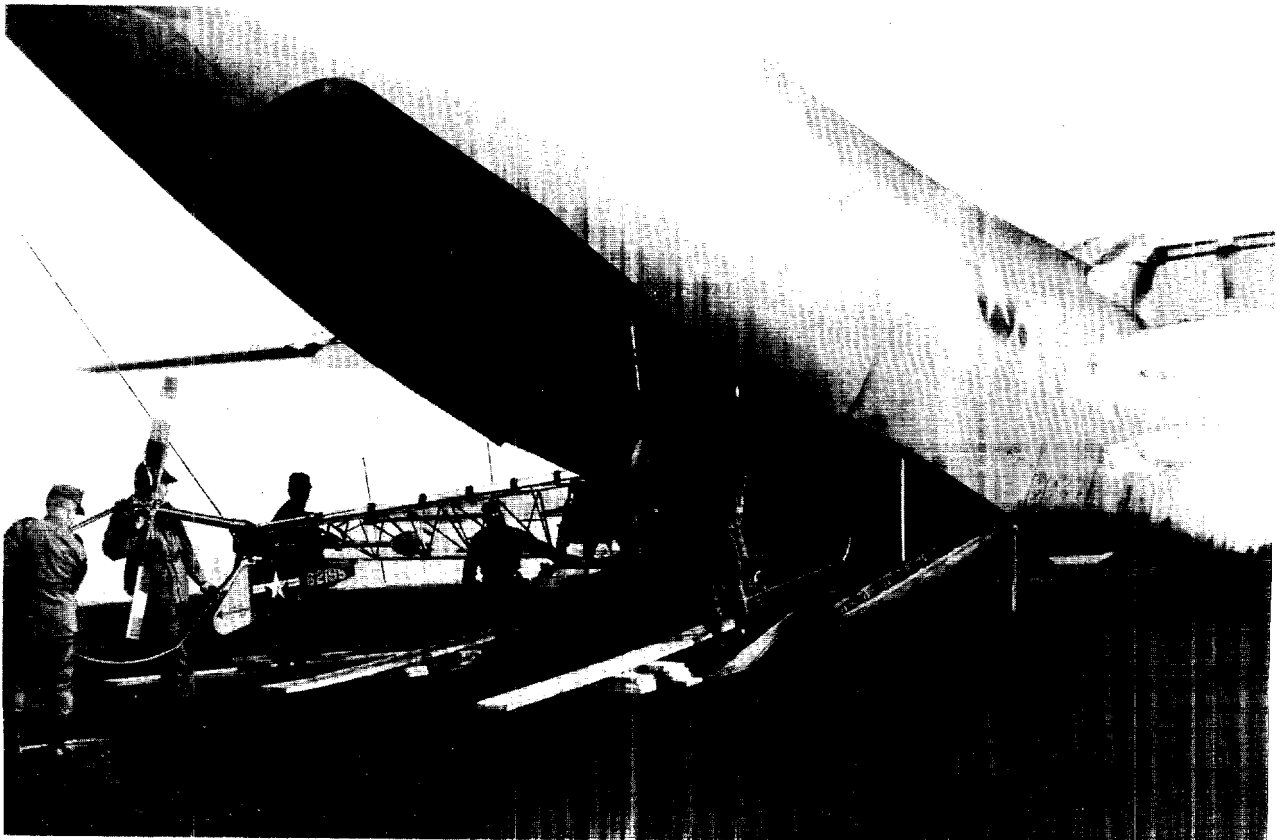


Figure 42. Cargo Loading ramp, C-133A.

Cargo Loading Provisions

a. Ramp Toes. Two removable ramp toe sections, each 30 inches wide, are furnished to provide an extension from the ground onto the rear cargo ramp. The toes can be adjusted laterally to accommodate tread widths up to 136½ inches.

b. Portable Electric Winch. A portable winch, which can be attached to the 25,000- or 35,000-pound tiedown fittings, is furnished. The winch is capable of a 15,000-pound drawbar pull.

c. Cargo Loading Sheaves. Heavy cargo may be winched into the aircraft using an externally located prime mover and two cargo loading sheaves. The sheaves may be used with a winching cable of ¾-inch diameter or less. The maximum allowable cableload is 20,000 pounds.

Provisions for Air Delivery

There are no provisions for air delivery or parachutists with the C-133.

Weight and Balance Data

	<i>C-133A</i> (pounds)	<i>C-133B</i> (pounds)
<i>a.</i> Maximum gross weight.....	275,000	286,000.
<i>b.</i> Operating weight.....	128,000	129,000.
<i>c.</i> Maximum fuel capacity.....	117,728	118,534.
<i>d.</i> Allowable cargo load.....	Figure 43	Figure 44.

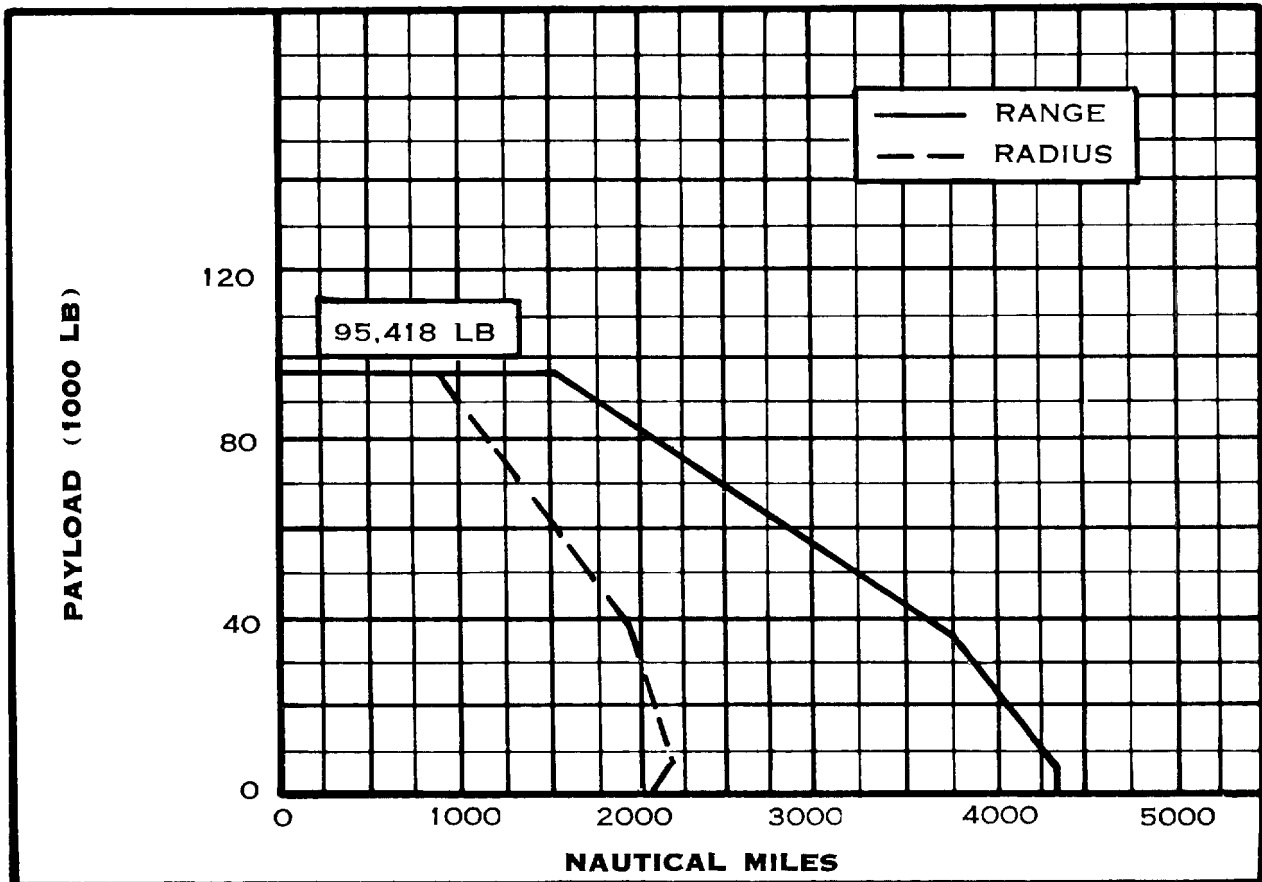


Figure 43. Payload distance, C-133A.

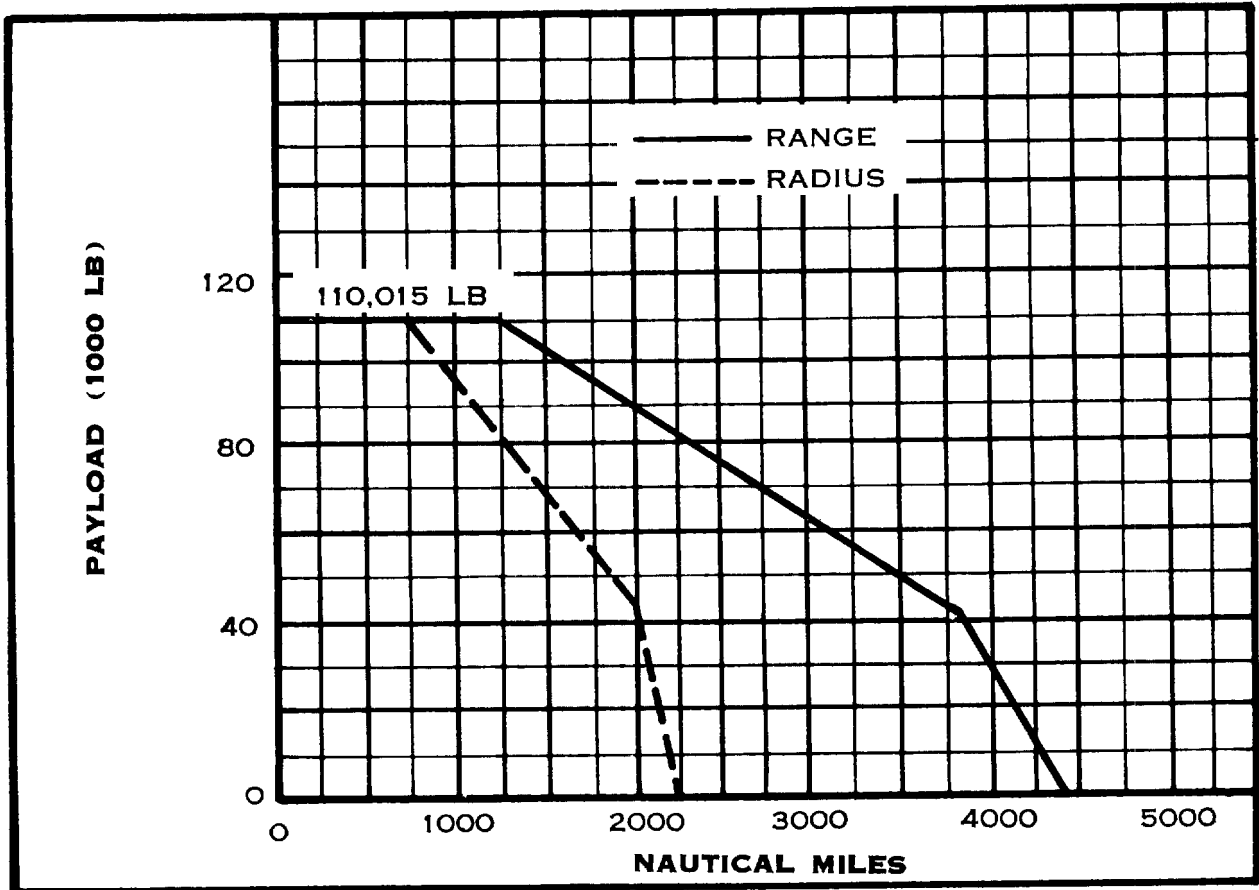


Figure 44. Payload distance, C-133B.

IX. C-135 STRATOLIFTER

Description

a. General. The C-135 (figure 45) is a long-range, high performance, four-engine jet transport. This aircraft is capable of hauling cargo, troops, or litter patients. The upper deck, cock-

pit, and aft lower baggage compartment are pressurized and air conditioned. There are two models of the C-135, the A and B. The C-135A has turbojet engines. The C-135B has turbofan engines and hence greater range and speed.

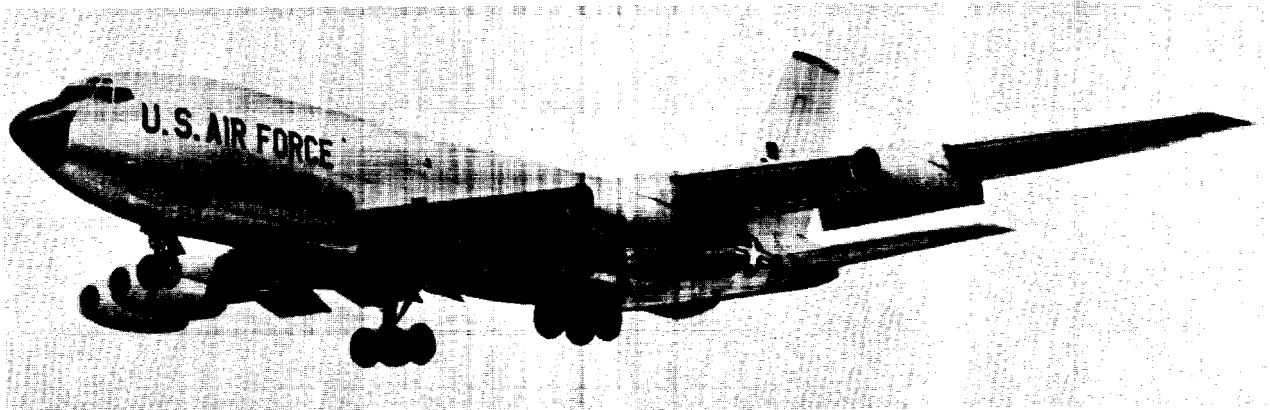


Figure 45. C-135A.

b. Characteristics.

	C-135A	C-135B
(1) Cruising speed	460 knots	467 knots.
(2) Required runway length	8,850 feet	7,200 feet.
(3) Restraint criteria:		
(a) Forward	8.0	8.0.
(b) Aft	1.5	1.5.
(c) Vertical	2.0	2.0.
(d) Lateral	1.5	1.5.

Cargo Compartment

a. Personnel. The C-135 has a crew of four—pilot, copilot, navigator, and loadmaster. The aircraft is capable of carrying 126 troops using six-abreast seating, or 75 troops using side seats. In an aeromedical role the C-135 can carry 44 litters, 48 ambulatory patients and six attendants.

	Inches
(b) Width (maximum)	136
(c) Height	85
(2) Main loading door:	
(a) Width	117
(b) Height	78
(c) Height (above ground)	121

b. Capacities.

	Cubic feet
(1) Cargo compartment (volume)	5,478
(2) Aft baggage compartment (volume)	100

c. Floor Strength.

	Pounds per square foot
(1) Main compartment	200
(2) Aft baggage compartment	40

d. Critical Dimensions.

	Inches
(1) Cargo compartment:	
(a) Length	860

Cargo Loading Provisions

Due to the 10-foot height of the cargo door above the ground, materiel handling equipment, such as high lift trucks or forklifts, is required to load heavy cargo. The C-135 is particularly adaptable to palletized loads. The cargo handling system includes a ball transfer plate, roller conveyors, guide rails, and pallet locks. The ball transfer plate, adjacent to the cargo door, provides for a 90° change of direction for loading and unloading pallets.

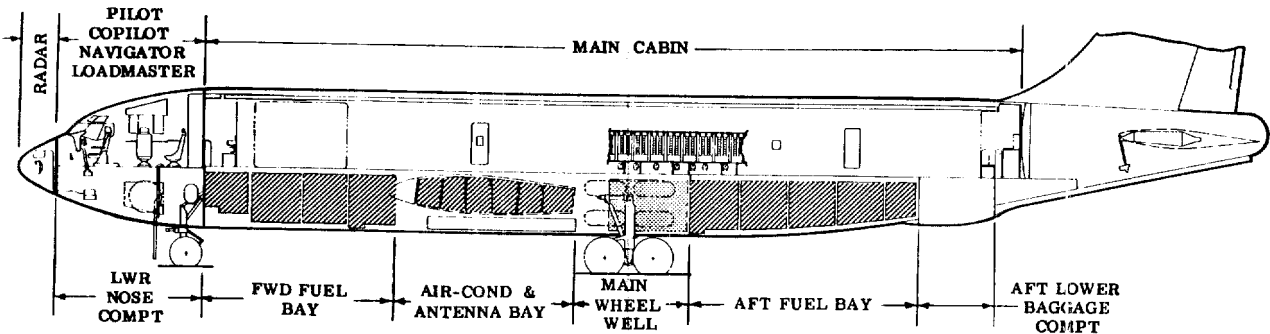


Figure 46. Cross section, C-135.

Weight and Balance Data

	C-135A (pounds)	C-135B (pounds)
a. Maximum gross weight	270,000	274,000.
b. Operating weight	112,000	117,500.
c. Maximum fuel weight	170,864	167,588.
d. Payload distance	Figure 47	Figure 48.
e. Center of gravity limits	Figure 49	

Provisions for Airdrop

There are no provisions for parachutists or airdrop with the C-135.

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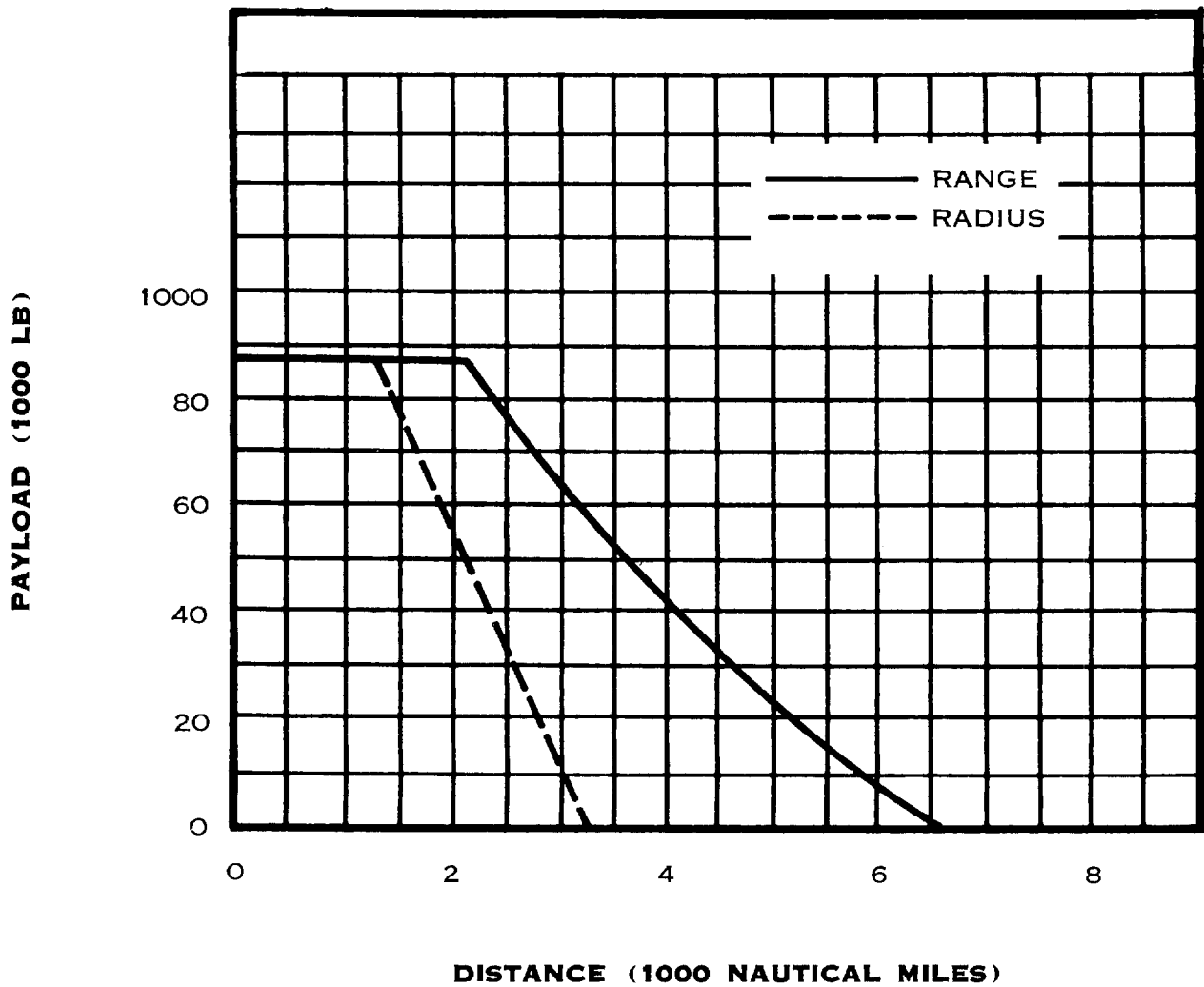


Figure 47. Payload distance, C-135A.

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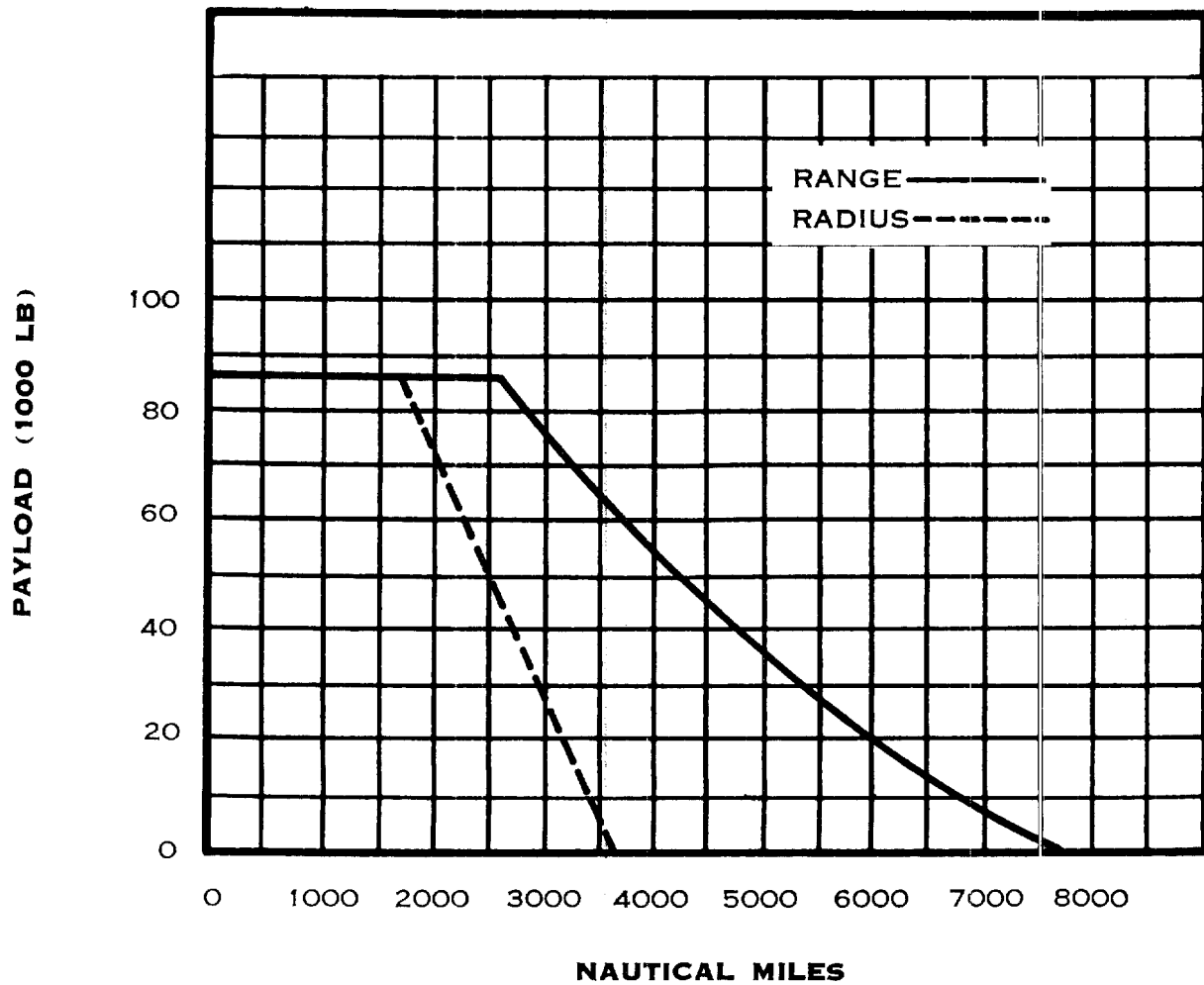


Figure 48. Payload distance, C-135B.

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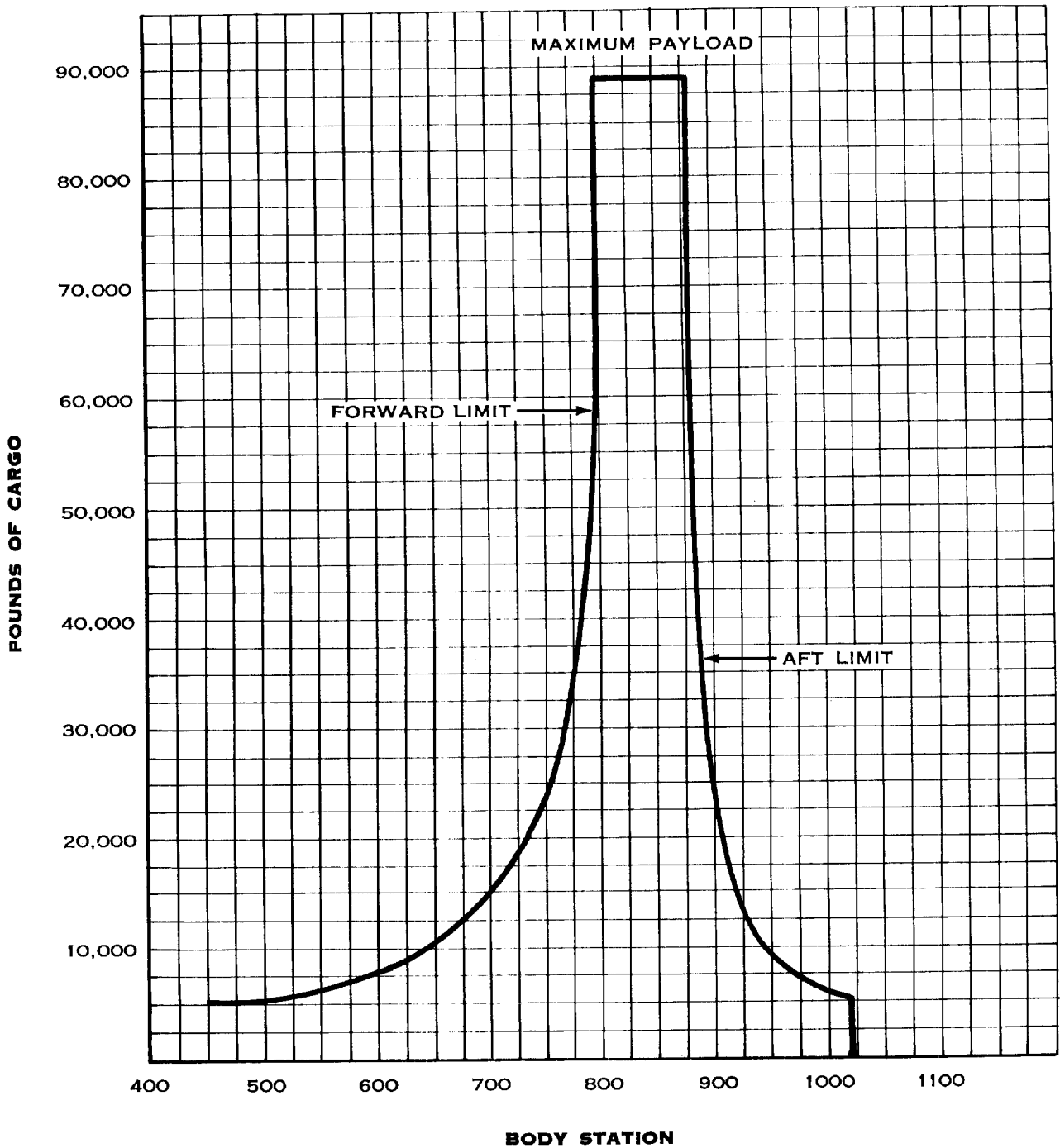


Figure 49. Cargo center of gravity limits, C-135.

X. C-141A STARLIFTER

Description

a. General. The C-141A (figure 50) is a high-wing, four-engine, heavy transport. Its mission is the transport of cargo and personnel. Features of this aircraft include crew and cargo compartment pressurization, and ground and in-flight air conditioning. This turbofan aircraft will become the backbone of the strategic airlift capability of the U.S. Air Force. The data listed for the C-141 is design data and is subject to change based on actual flight tests.

b. Performance.

- (1) Cruising speed----- 440 knots.
- (2) Takeoff roll----- 3,900 feet.
- (3) Landing roll----- 1,750 feet.
- (4) Restraint criteria:
 - (a) Forward ----- 8.0
 - (b) Aft ----- 1.5
 - (c) Vertical ----- 2.0
 - (d) Lateral ----- 1.5

Cargo Compartment

a. Personnel. The C-141A has a crew of four—pilot, copilot, navigator, and flight engineer. It will carry up to 154 troops; 123 parachutists; or 80 litters plus eight attendants.

b. Cargo Capacity (figure 51).

- (1) Volume (excluding 6,524 cubic feet ramp area).
- (2) Design payload----- 68,500 pounds.

c. Critical Dimensions.

- (1) Cargo compartment:

	<i>Inches</i>
(a) Length -----	840
(b) Height -----	109
(c) Width -----	123 $\frac{1}{4}$
- (2) Cargo loading door:

(a) Width -----	123 $\frac{1}{4}$
(b) Height -----	109
(c) Height (above ground)-----	50
	<i>Degrees</i>
(d) Ramp angle-----	11

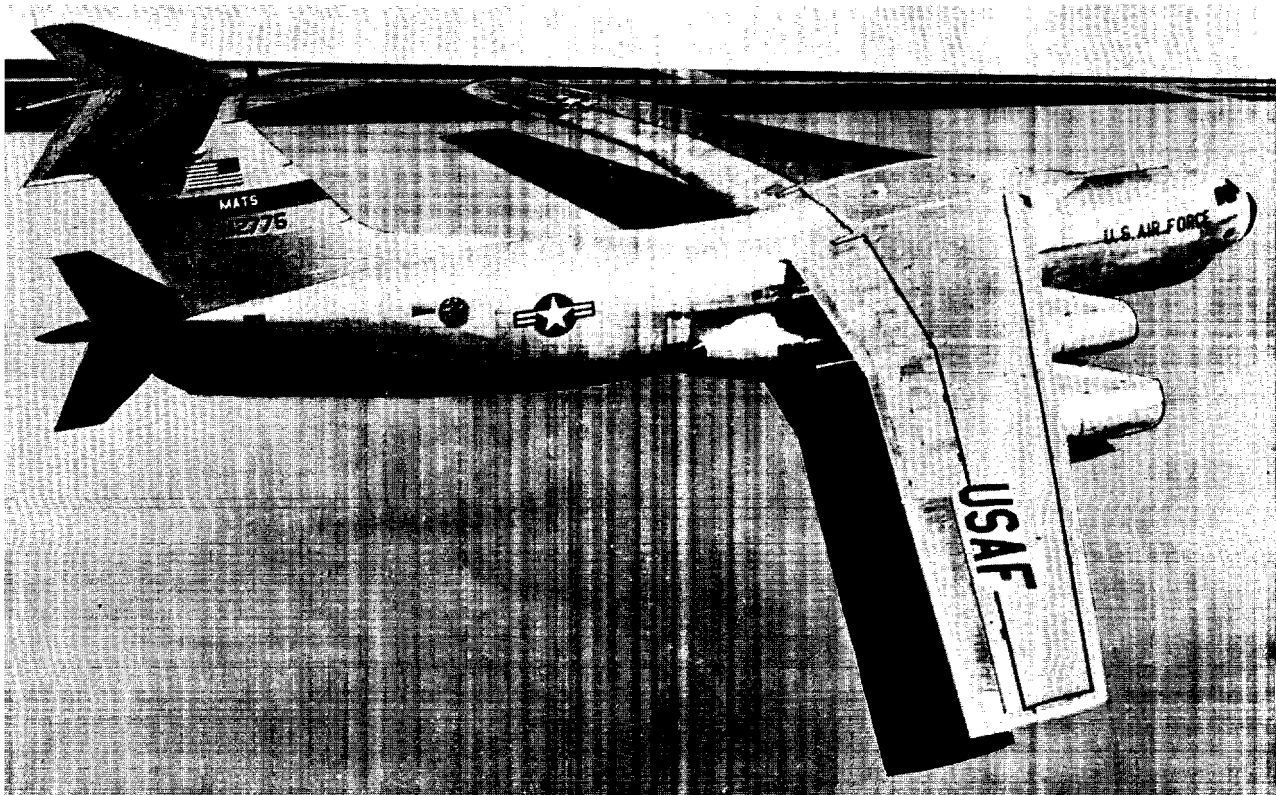


Figure 50. C-141A.

d. Floor Strength. The cargo floor is designed for a distributed load of 300 pounds per square foot and an axleloading of 10,000 pounds, except in the high strength area between stations 678 and 998 where the floor limit is 400 pounds per square foot and a 20,000 pound axleload. The ramp may be loaded to 200 pounds per square foot with a total load limitation of 7,500 pounds.

Cargo Loading Provisions

a. Loading Ramp. Only rear end loading is provided on the C-141A. The aft cargo compartment is furnished with the ramp and the pressure door. The ramp, hinged at its forward end,

lowers to a position in the plane of the cargo floor (for truck-bed-height loading), or to the ground for loading vehicles.

b. 463L System. The C-141A is equipped with the 463L pallet system. Four rows of roller conveyors run the entire length of the cargo compartment and ramp. These conveyors are easily detached from the floor and can be stowed in an inverted position in recesses in the floor to present a flush surface when not in use. Restraint rails are installed to be compatible with the cargo pallets of the system. The cargo compartment will handle nine 463L pallets on the main floor and one on the ramp (figure 52).

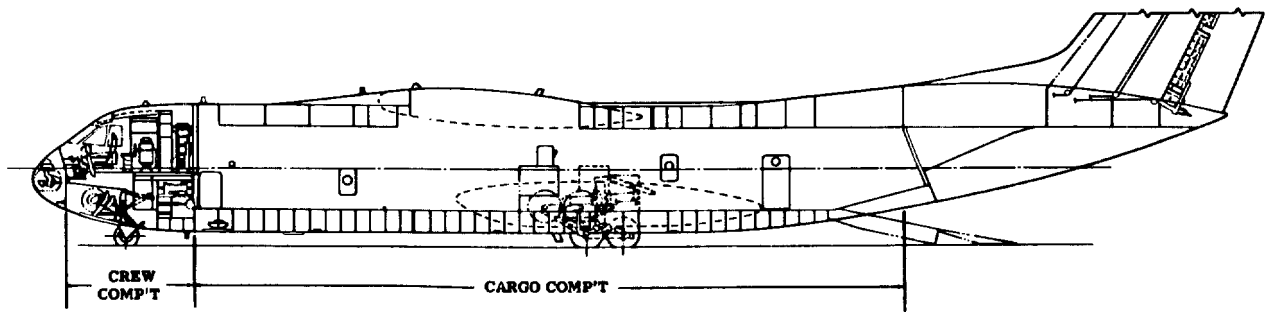


Figure 51. Cross section, C-141A.

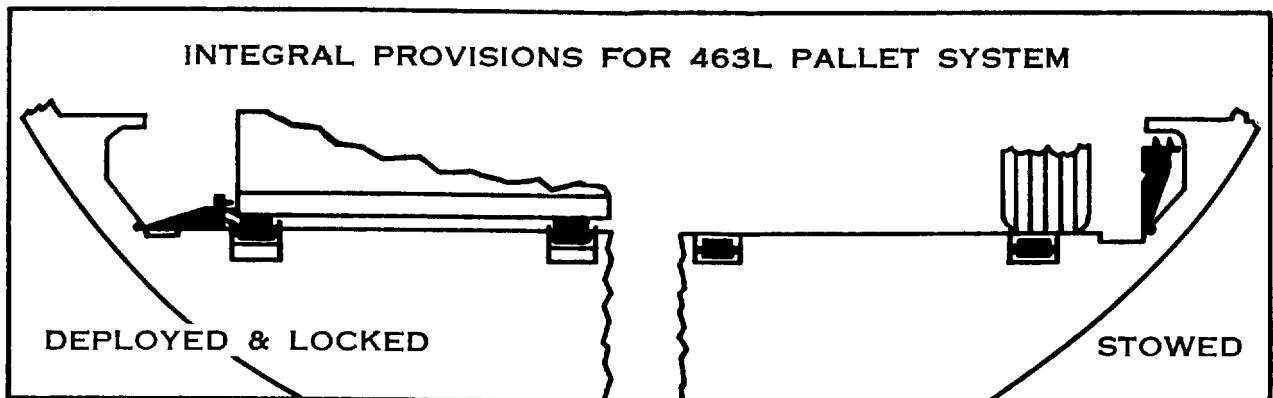


Figure 52. C-141 cargo floor design.

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Provisions for Airdrop

a. Parachutists. A total of 123 parachutists may be delivered from jump doors located on each side of the aft cargo compartment.

b. Air Delivery. The cargo ramp and aft cargo doors are flight-operable, permitting airdrop of loads up to 35,000 pounds per single package.

Weight and Balance Data

	<i>Pounds</i>
<i>a.</i> Maximum gross weight.....	316,600
<i>b.</i> Operating weight (varies with mission requirements).....	139,174
<i>c.</i> Maximum fuel weight.....	150,020
<i>d.</i> Payload	Figure 53

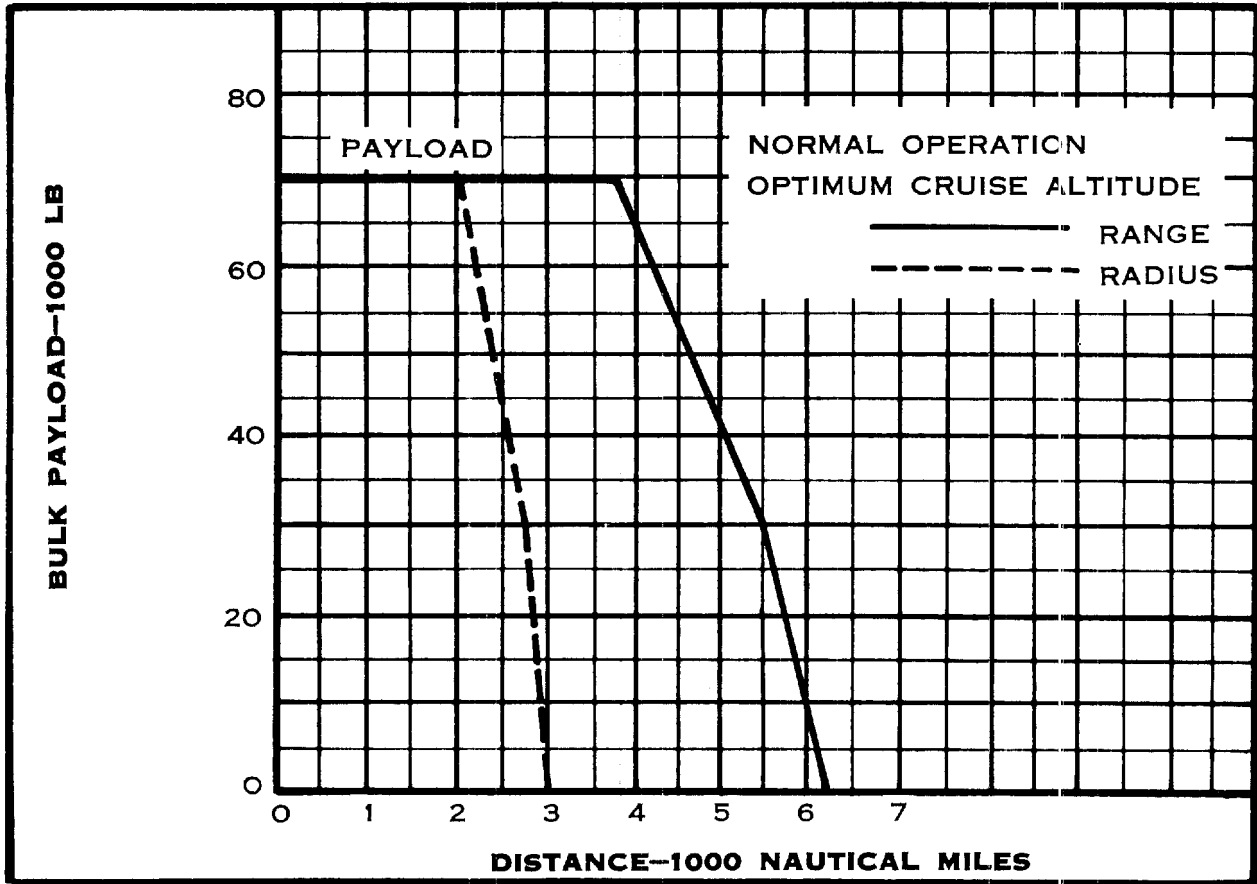


Figure 53. Payload distance, C-141A.

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DESIGN DATA FOR ARMY AIRCRAFT

I. O-1 BIRD DOG

Description

a. General. The O-1 (figure 1) is an all metal, high-wing, two-place (tandem) monoplane powered by a Continental six cylinder, air-cooled engine. There are three models—the O-1A, O-1E, and TO-1D (instrument trainer). The A and E models are observation aircraft which, with modification, can be converted to instrument trainers. The O-1 features the conventional fixed landing gear. It can carry one passenger or a 250-pound bundle under each wing attached to bomb shackles.

b. Characteristics. (A and E models are the same except the A model has a gross weight of

65 pounds less than the E model. TO-1D is not described since its use is normally restricted to instrument training.)

- (1) Cruising speed----- 87 knots.
- (2) Takeoff distance to clear 634 feet.
50-foot obstacle.
- (3) Landing distance to clear 550 feet.
50-foot obstacle.
- (4) Endurance at cruising speed 4 hours 15
minutes.

Weight and Balance Data

	<i>Pounds</i>
<i>a. Maximum gross weight</i> -----	2,165
<i>b. Operating weight</i> -----	1,839
<i>c. Maximum fuel capacity</i> -----	258



Figure 1. O-1 Bird Dog with wing bundles attached.

II. U-6A BEAVER

Description

a. General. The U-6A (figure 2) is an all metal, high-wing monoplane powered by a single Pratt and Whitney engine developing 450 horsepower. It is designed to carry a pilot and five passengers. The U-6A is a utility aircraft, with a fixed conventional landing gear used for personnel cargo, and medical evacuation. Two litter patients and three passengers can be transported by

this aircraft (figure 3). It can also be used for parachute operations with a maximum of four parachutists. External load capability is 1,000 pounds suspended on four bomb shackles, two under each wing with a capacity of 250 pounds per bomb shackle.

b. Characteristics.

- (1) Normal cruising speed---- 105 knots.
- (2) Takeoff distance to clear 50- 950 feet.
foot obstacle.

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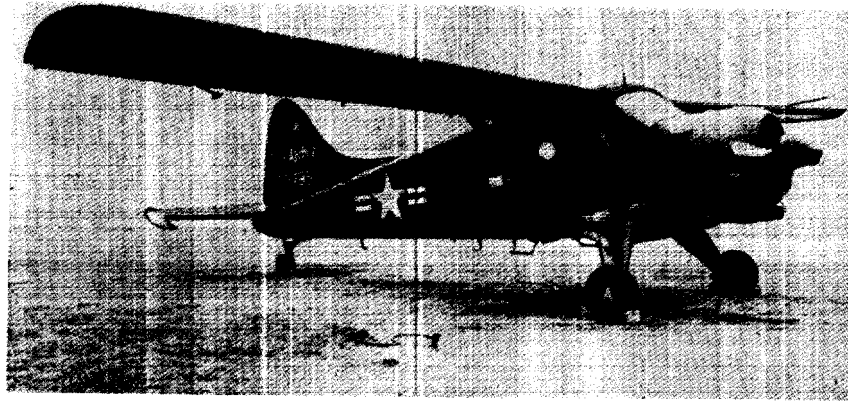


Figure 2. The U-6A.

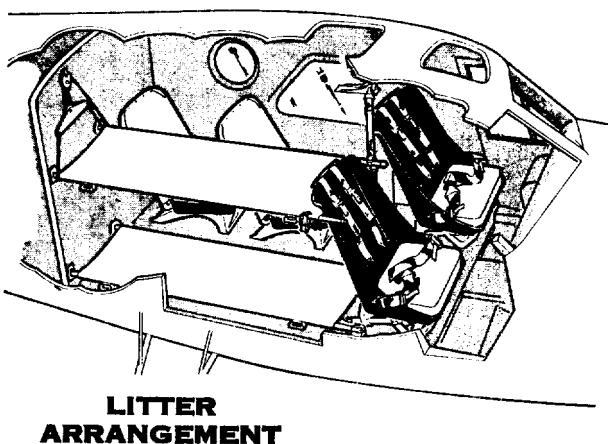
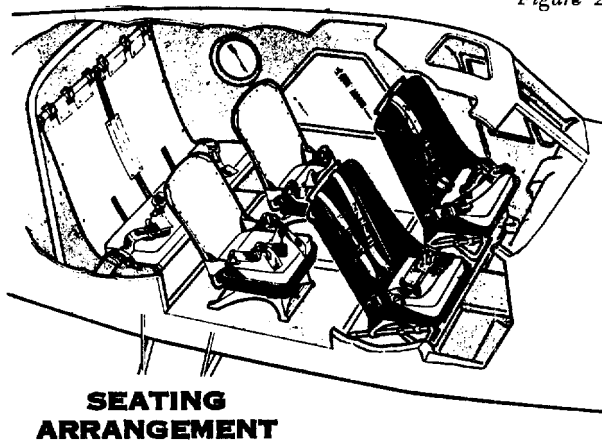


Figure 3. Seating and litter arrangement, U6A.

- (3) Landing distance to clear 1,040 feet. 50-foot obstacle.
- (4) Endurance at cruising speed 5 hours, 30 minutes. (full wing tanks).

Cargo Compartment

a. *Capacity.* The U-6A is designed for operation by one crew member, the pilot. The cargo compartment has an entrance on each side of the aircraft, measuring 30 by 40 inches. The cargo floor is limited to 100 pounds per square foot for an evenly distributed load.

b. *Dimensions of the Cargo Compartment.*

	<i>Inches</i>
(1) Length.....	76
(2) Width.....	48
(3) Height.....	51
(4) Height of floor (above ground).....	46

Weight and Balance Data

	<i>Pounds</i>
a. Maximum gross weight.....	5,100
b. Operating weight.....	3,338
c. Fuel capacity.....	828
d. Allowable cargo load (maximum fuel).....	934
e. Allowable cargo load (50-nautical-mile radius).....	1,558
f. Allowable cargo load (100-nautical-mile radius).....	1,426

III. U-1A OTTER

Description

a. *General.* The U-1A (figure 4) is a single-engine, high-wing airplane with fixed conventional

landing gear. It is a utility aircraft and its missions include the transport of light cargo, air delivery, medical evacuation, and liaison. The

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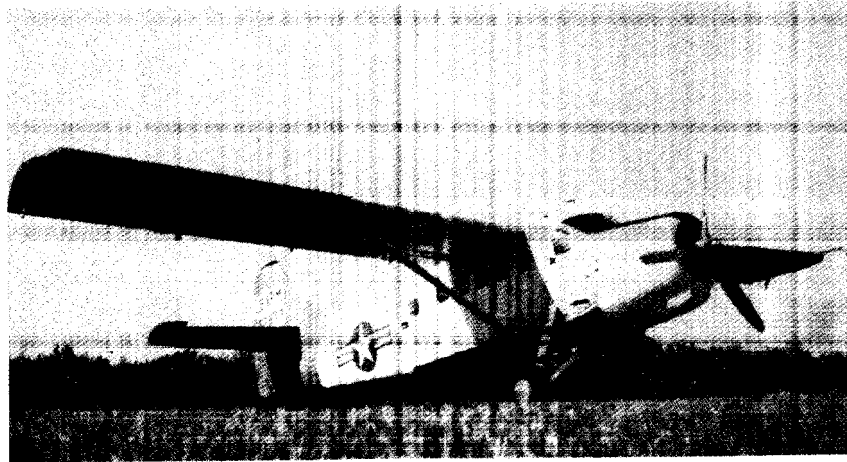


Figure 4. The U-1A.

U-1A has dual controls, but is designed for operation by only a pilot.

b. Characteristics.

- (1) Normal cruising speed----- 105 knots.
- (2) Takeoff distance to clear 1,000 feet.
50-foot obstacle.
- (3) Landing distance to clear 900 feet.
50-foot obstacle.
- (4) Endurance at cruising 6 hours.
speed.

Cargo Compartment

a. Capacity. The cargo compartment is fitted with nine removable seats, giving the U-1A a maximum passenger capacity of 10 (figure 5). The aircraft can also be rigged to accommodate four

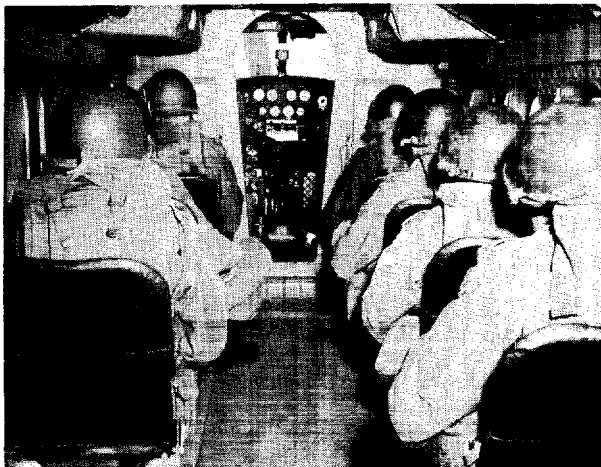


Figure 5. Cargo compartment, U-1A.

litters, two ambulatory patients, and one medical attendant. Five parachutists may be dropped from the U-1A. For specific procedures for parachuting from this aircraft, see TM 57-220. The floor of the cargo compartment is fitted with 10 permanent and four removable tiedown rings for securing general cargo. The floor is limited to 100 pounds per square foot. Behind the cargo compartment is a baggage compartment with a 70-cubic-foot capacity and a floor strength of 75 pounds per square foot.

b. Dimensions.

	<i>Inches</i>
(1) <i>Cargo compartment:</i>	
(a) Length -----	156
(b) Width (floor)-----	60
(c) Height (maximum)-----	52
(2) <i>Baggage compartment:</i>	
(a) Length-----	45
(b) Width -----	51
(c) Height-----	55
(3) <i>Main cargo door:</i>	
(a) Width -----	45
(b) Height-----	46
(c) Height (above ground)-----	39

Weight and Balance Data

	<i>Pounds</i>
<i>a.</i> Maximum gross weight-----	8,000
<i>b.</i> Normal operating weight-----	5,190
<i>c.</i> Maximum fuel capacity-----	1,281
<i>d.</i> Allowable cargo load (50-nautical-mile radius)-----	2,522
<i>e.</i> Allowable cargo load (100-nautical-mile radius)-----	2,314

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IV. U-8 SEMINOLE

Description

a. General. The U-8 (figure 6) is a twin-engine, command-type aircraft. Its principal mission is the transport of personnel and other liaison functions. This aircraft may be used for aerial surveillance and target acquisition by some modi-

fications and the installation of aerial sensory devices. There are two models of the U-8 in the inventory—the D and F models. The F model differs from the D in that the former has a larger passenger compartment and entrance door, and it is powered by two fuel injection engines. Differences in performance are noted as appropriate.

b. Characteristics

	U-8D	U-8F
(1) Normal cruising speed.....	155 knots.....	155 knots.
(2) Takeoff distance to clear 50-foot obstacle.....	2,155 feet.....	2,200 feet.
(3) Landing distance to clear 50-foot obstacle.....	2,135 feet.....	2,125 feet.
(4) Endurance at cruising speed.....	5 hours, 40 minutes.....	5 hours, 30 minutes.

Cargo Compartment

a. U-8D. The U-8D has two, three-place seats. The front seat accommodates the pilot and copilot, plus one passenger; the rear seat carries three additional passengers. The U-8D has a baggage compartment in the aft end with a capacity of 300 pounds.

b. U-8F. The U-8F has separate pilot and passenger compartments. The passenger compartment has five airline-type reclining seats which are readily removable to convert the aircraft into a light cargo carrier. The U-8F also has a 300-pound baggage compartment aft of the passenger compartment.

c. Critical Dimensions.

	U-8D (inches)	U-8F (inches)
(1) Cargo compartment:		
(a) Length.....	50.5	110½
(b) Width.....	53½	55
(c) Height.....	46.7	55
(2) Cargo door:		
(a) Width.....	35	50½
(b) Height.....	36½	26½

Weight and Balance Data

	U-8D (pounds)	U-8F (pounds)
<i>a.</i> Maximum gross weight.....	7,300	7,700
<i>b.</i> Normal operating weight...	5,450	5,950
<i>c.</i> Maximum fuel capacity.....	1,380	1,380

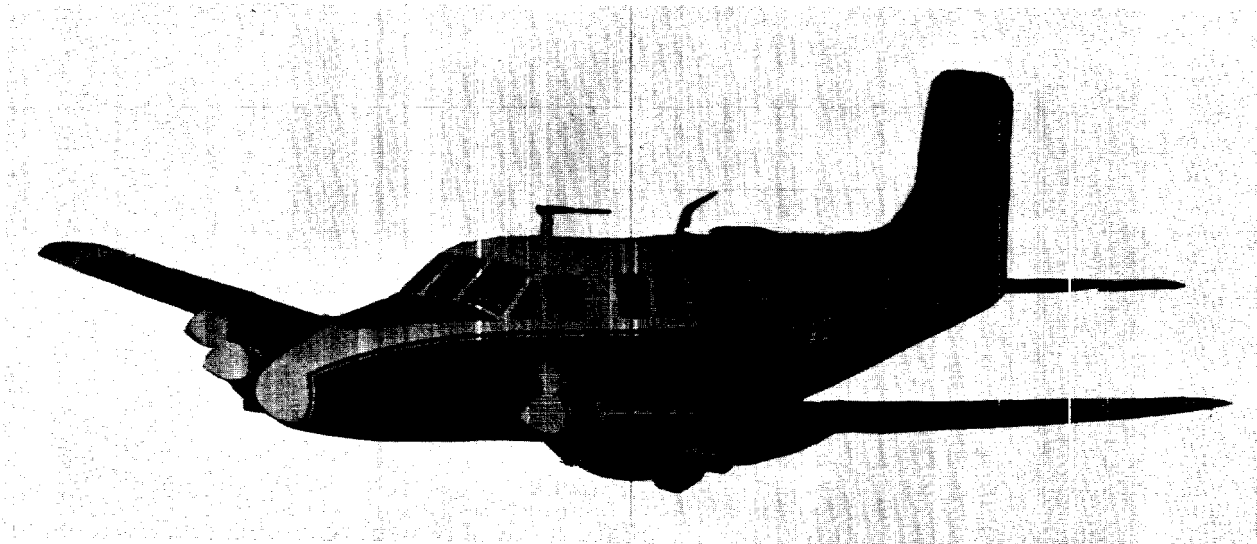


Figure 6. The U-8F.

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V. CV-2B CARIBOU

Description

a. General. The CV-2B (figure 7) is an all metal, high-wing monoplane powered by two 1,450 horsepower reciprocating engines. The aircraft has a fully retractable tricycle landing gear and a power-operated cargo door and ramp which, in conjunction with the up-swept rear fuselage, permits straight-in cargo loading. The CV-2B is a medium transport and its missions include transport of troops and cargo, air delivery of supplies and paratroops, and medical evacuation.

b. Characteristics.

- (1) Normal cruising speed----- 157 knots.
- (2) Takeoff distance to clear 550 feet.
50-foot obstacle.
- (3) Landing distance to clear 740 feet.
50-foot obstacle.
- (4) Endurance at cruising 6 hours,
speed. 20 minutes.
- (5) Restraint criteria.

(a) Air-landed mission:

- 1. Forward ----- 8.0

- 2. Aft ----- 2.0
- 3. Vertical ----- 2.0
- 4. Lateral ----- 1.5
- (b) Air delivery mission:
- 1. Forward ----- 4.0
- 2. Aft ----- 1.5
- 3. Vertical ----- 2.0
- 4. Lateral ----- 1.5

Cargo Compartment

a. Capacity. The CV-2 has a crew of three—pilot, copilot, and flight crew chief. The aircraft is capable of carrying 32 combat-equipped troops, 24 parachutists, or 14 litters plus eight ambulatory patients.

b. Floor Strength. Bulk loads must not exceed 1,000 pounds per square foot, while at the same time not exceeding 1,200 pounds per running foot. A running foot is a foot-wide strip extending across the full width of the cargo floor. Vehicle loads on the treadways must not exceed 2,000 pounds per wheel during loading and unloading. This is also the maximum wheel loading on the treadways forward of station 397.6 during flight.



Figure 7. The CV-2B.

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On the treadway areas aft of station 397.6 during flight, and the remainder of the floor area under all conditions, the loading must not exceed 1,000 pounds per wheel. Vehicle load limits are based on a tire pressure of not more than 40 pounds per square inch. Caution must be taken that tire pressures do not exceed this value.

c. Critical Dimensions.

(1) Cargo compartment:	<i>Inches</i>
(a) Length -----	345
(b) Width -----	73½
(c) Height -----	75
(d) Height (floor above ground) --	45½
(2) Cargo door:	
(a) Width -----	73½
(b) Height -----	75
	<i>Degrees</i>
(c) Ramp incline -----	16

Cargo Loading Provisions

a. Ramp Extensions. Two ramp extensions 120 inches long and 15 inches wide are provided for each aircraft. When not in use, the extensions are stored in racks above the cargo door. The distance between the ramp extensions may be adjusted to match the wheel tread of any vehicle to be loaded.

b. Tiedown Devices. The tiedown devices supplied with each aircraft consist of six MB-1 chain devices, 20 MC-1 webbing devices, and one A-2 cargo net.

Air Delivery System

a. Supply Drops. The CV-2 is equipped for air delivery of supplies and equipment rigged on platforms or in containers, using the extraction, gravity, or manual ejection methods. For specific information on air delivery of supplies and equipment from this aircraft, see TM 10-500-b-series.

b. Personnel Drops. For instructions on rigging the CV-2 for parachute jumping, see TM 57-220.

Weight and Balance Data

	<i>Pounds</i>
<i>a. Maximum gross weight</i> -----	28,500
<i>b. Operating weight</i> -----	19,475
<i>c. Fuel capacity</i> -----	4,968
<i>d. Allowable cargo load (maximum fuel aboard)</i> -----	4,057
<i>*e. Allowable cargo load (50 nautical mile radius)</i> -----	7,500
<i>*f. Allowance cargo load (100 nautical mile radius)</i> -----	7,500
	<i>Figure</i>
<i>g. Center of gravity limits</i> -----	8

*Allowable cargo load is the same for 50 and 100 nautical mile radius of action since this aircraft has a 27,000-pound zero fuel weight. (Weight of aircraft before fuel is added will not exceed 27,000 pounds.)

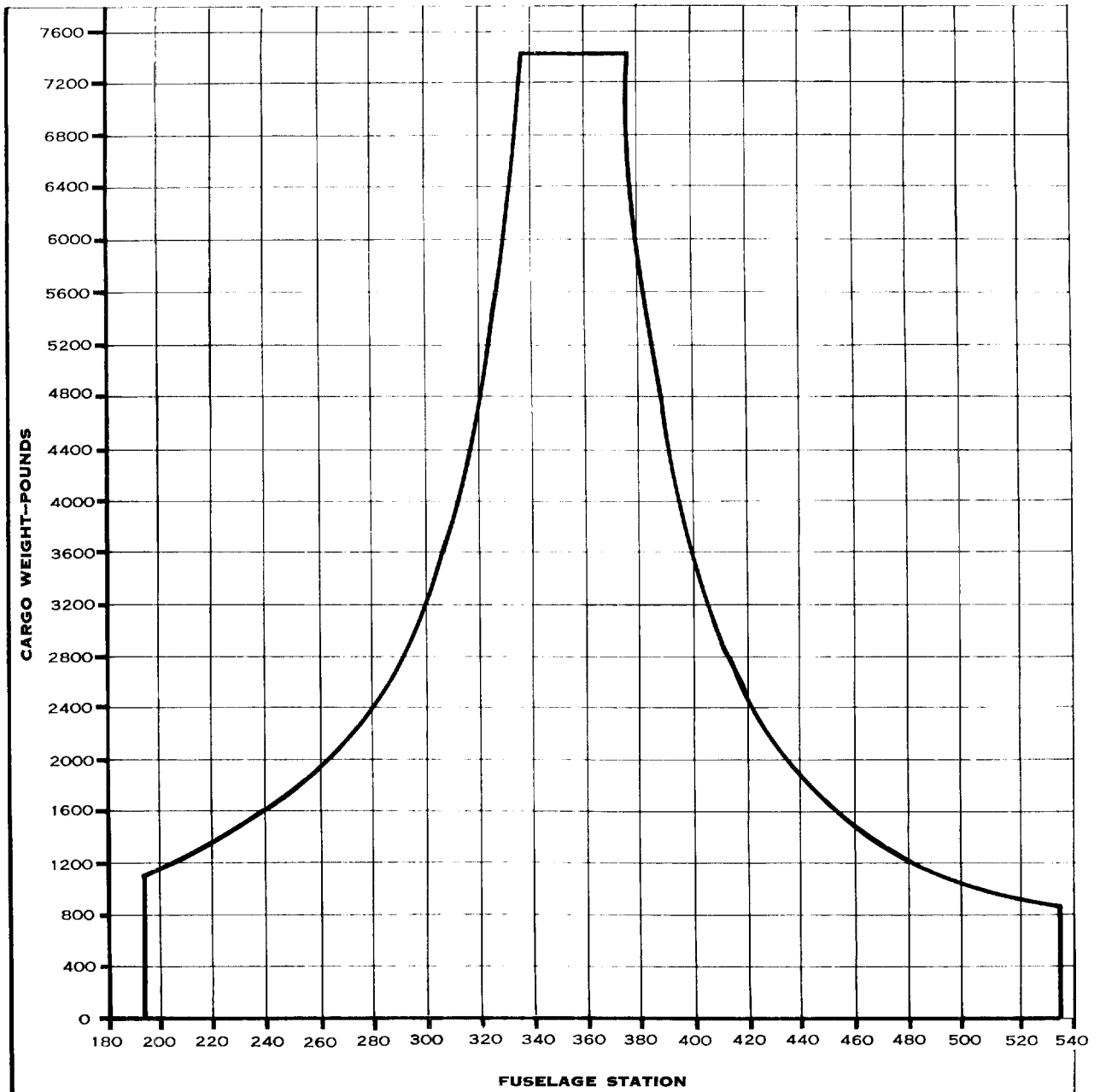


Figure 8. Cargo center of gravity limits, CV-2B.

VI. OH-13H SIOUX

Description

a. General. The OH-13II (figure 9) is a two-place helicopter designed for training, observation, reconnaissance, medical evacuation, and general utility missions. It is powered by a 200 horsepower 0-435 air-cooled engine. This aircraft normally carries only one passenger seated in the cockpit beside the pilot. It can also transport two litter patients in pods mounted on the cross tubes along each side of the aircraft. Light, critical cargo may be transported by this aircraft, and it can lay wire across difficult terrain.

b. Characteristics.

- (1) Normal cruising speed----- 70 knots.
- (2) Takeoff distance to clear 250 feet.
50-foot obstacle.
- (3) Landing distance to clear 225 feet.
50-foot obstacle.
- (4) Endurance at cruising 2 hours,
speed. 30 minutes.

Weight and Balance Data

	<i>Pounds</i>
<i>a.</i> Maximum gross weight-----	2,450
<i>b.</i> Normal operating weight-----	1,941
<i>c.</i> Maximum fuel weight-----	258



Figure 9. The OH-13.

VII. OH-23D RAVEN

Description

a. General. The OH-23D (figure 10) is a three-place, multi-purpose helicopter designed for reconnaissance, training, medical evacuation, and observation. It is powered by a 245 horsepower Lycoming 0-435 air-cooled engine. It has a capability of transporting two persons seated beside the pilot or two litter patients in pods mounted on the helicopter landing gear spring tubes. Light, critical cargo may be transported by this aircraft, and it can lay wire across difficult terrain.

b. Characteristics.

- (1) Normal cruising speed----- 70 knots.
- (2) Takeoff distance to clear Vertical.
50-foot obstacle.
- (3) Landing distance to clear Vertical.
50-foot obstacle.
- (4) Endurance at cruising 2 hours, 10
speed. minutes.

Weight and Balance Data

	<i>Pounds</i>
<i>a.</i> Maximum gross weight-----	2,700
<i>b.</i> Normal operating weight-----	2,038
<i>c.</i> Maximum fuel weight-----	276

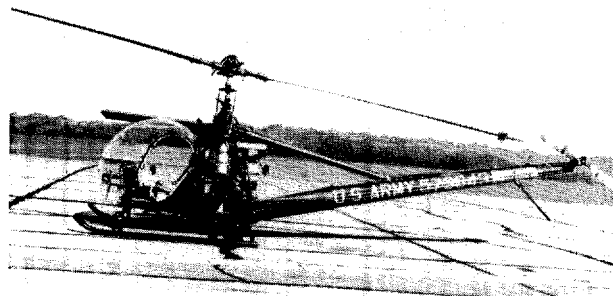


Figure 10. The OH-23D.

VIII. UH-1 IROQUOIS

Description

a. General. The UH-1 (figure 11) is the standard utility helicopter. It is turbine powered and features a skid-type landing gear. There are three models of the UH-1 in the inventory—the A, B,

and D. Difference between models includes engine horsepower and size of the cargo compartment. The UH-1 A and B are used primarily for utility purposes, such as aerial fire support, medical evacuation, and aerial command posts; the UH-1D is used as a light tactical transport.

b. Performance.

	UH-1A	UH-1B	UH-1D
(1) Cruising speed.....	95 knots.....	95 knots.....	95 knots.
(2) Takeoff distance to clear 50-foot obstacle.....	110 feet.....	0 feet.....	0 feet.
(3) Landing distance to clear 50-foot obstacle.....	328 feet.....	0 feet.....	275 feet.
(4) Endurance at cruising speed—internal fuel.....	1 hour, 30 minutes.	1 hour, 30 minutes.	2 hours, 30 minutes.
165-gallon auxiliary fuel tank.....	3 hours, 45 minutes.	3 hours, 45 minutes.	(Not applicable).
350-gallon auxiliary fuel tank.....	(Not applicable).	6 hours, 10 minutes.	(Not applicable).



Figure 11. The UH-1B.

Cargo Compartment and Sling Assembly

a. Capacity. All models of this helicopter have dual controls, although it is designed for operation

with only a pilot. The seating capacity (to include the cockpit) is seven persons in the UH-1A, nine in the UH-1B, and 13 in the UH-1D (figures 12 and 13). The UH-1 A and B can carry three litters or deliver five parachutists, while

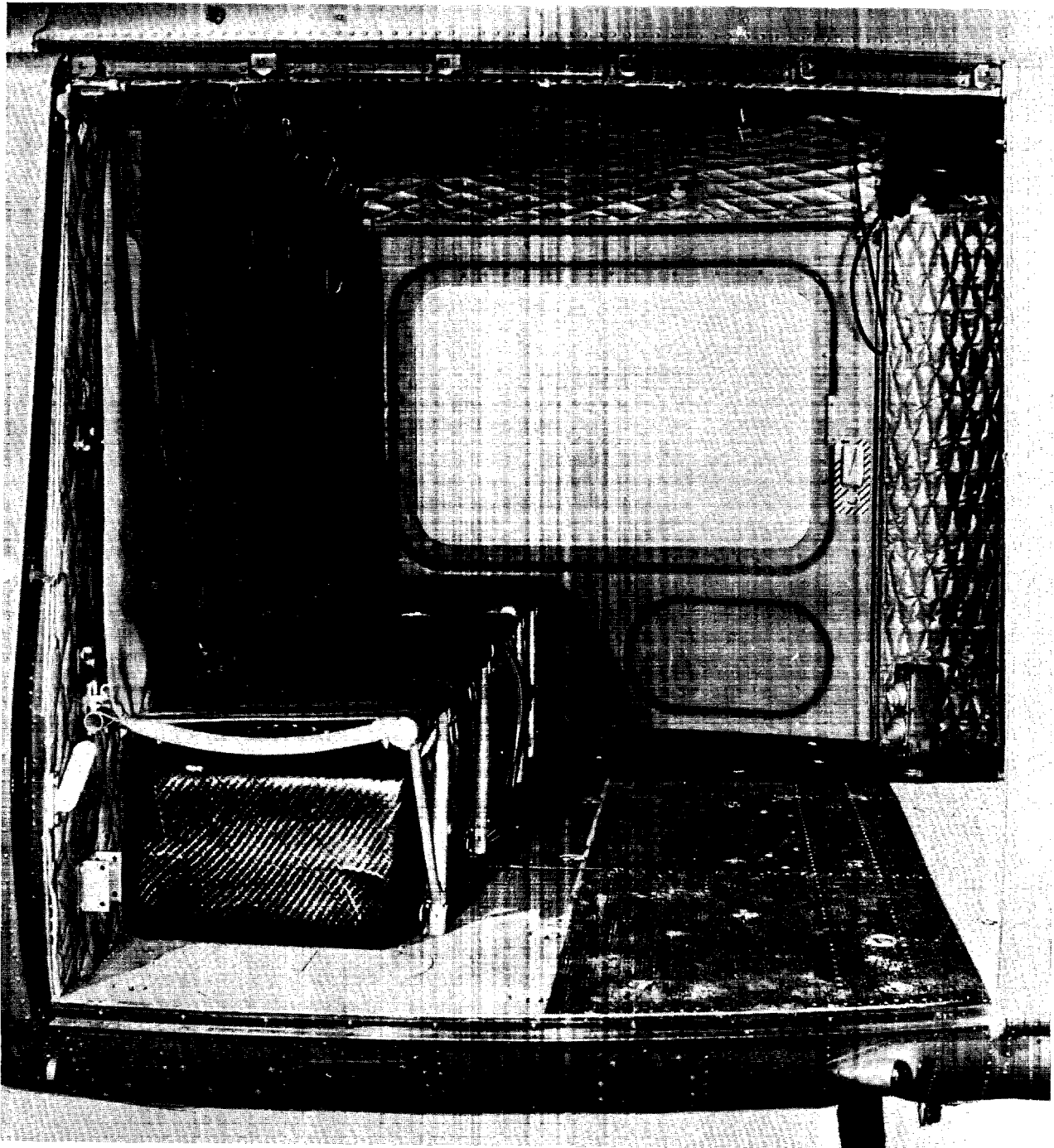


Figure 12. Cargo compartment, UH-1B.

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the UH-1D can carry six litters or eight paratroopers. The cargo compartment floor in all models has a load limit of 175 pounds per square

foot. The external sling load capacity of the UH-1A is 3,000 pounds; the sling capacity of the UH-1 B and D is 4,000 pounds.

b. Dimensions.

	<i>UH-1A</i> (inches)	<i>UH-1B</i> (inches)	<i>UH-1D</i> (inches)
(1) Cargo compartment:			
(a) Length.....	48	60	92
(b) Width.....	80½	92	97½
(c) Height.....	48	54	49
(d) Height (floor above ground).....	26	27	32
(2) Cargo door (one each side):			
(a) Width.....	48	48	92
(b) Height.....	48	48	49

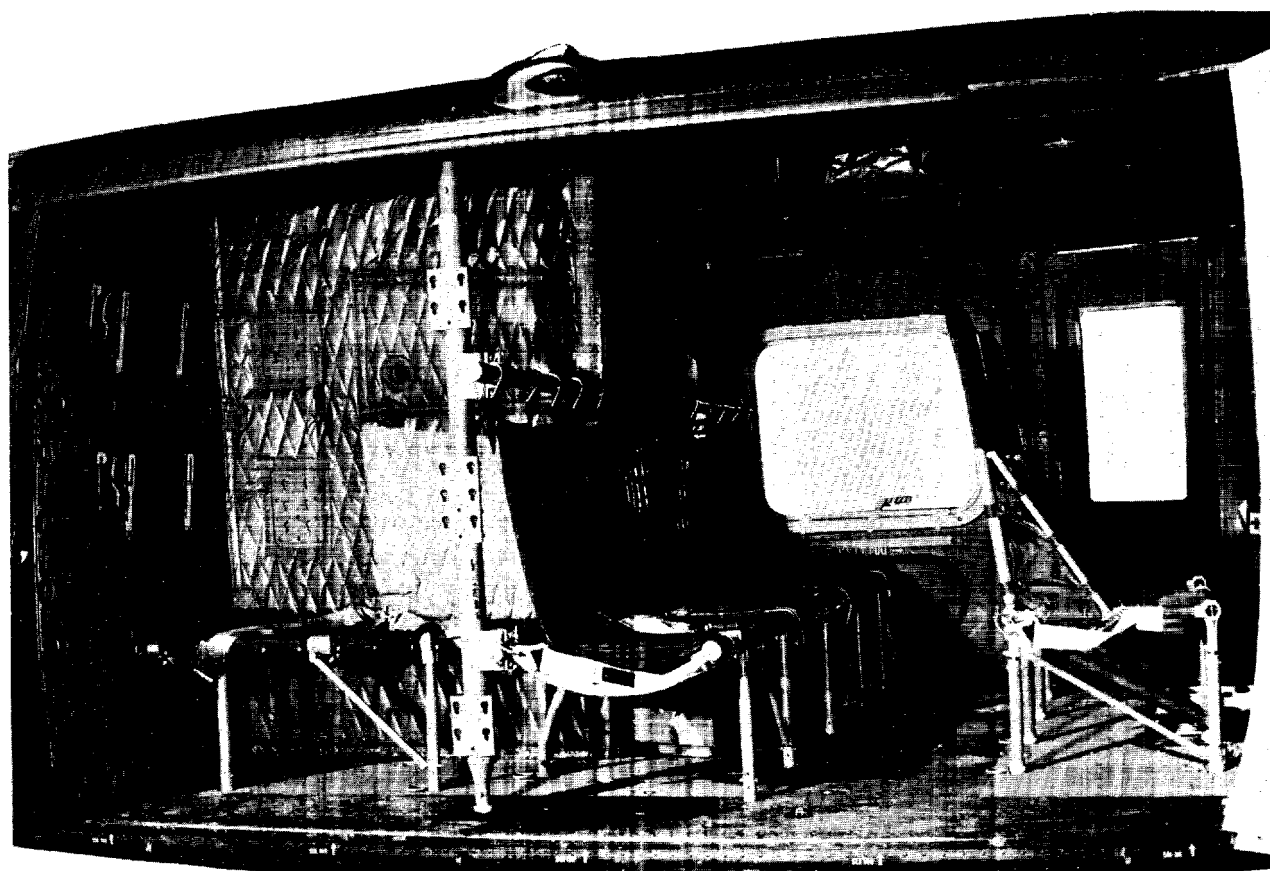


Figure 13. Cargo compartment, UH-1D.

Weight and Balance Data

	<i>UH-1A</i> (pounds)	<i>UH-1B</i> (pounds)	<i>UH-1D</i> (pounds)
a. Maximum gross weight.....	7, 200	8, 500	8, 800
b. Operating weight.....	4, 243	4, 635	4, 889
c. Internal fuel weight.....	1, 008	1, 008	1, 430
d. Allowable cargo load (maximum internal fuel).....	1, 843	2, 857	2, 305
e. Allowable cargo load (50-nautical-mile radius).....	2, 202	2, 966	2, 582

IX. UH-19 CHICKASAW

Description

a. General. The UH-19 (figure 14) is a utility helicopter. The Army has two models of this aircraft, the C and D. Essentially both models have the same operational characteristics. It can be used for movement of personnel, transport of light cargo, medical evacuation, and parachute operations. Its principal use under the ROAD concept is medical evacuation. This aircraft is programmed to endure a wearout period and eventually be replaced by a turbine-powered helicopter such as the UH-1 Bell series.

b. Characteristics.

- (1) Normal cruising speed---- 70 knots.
- (2) Takeoff distance to clear 50 feet.
50-foot obstacle.
- (3) Landing distance to clear 180 feet.
50-foot obstacle
- (4) Endurance at cruising speed 2 hours
25 minutes.

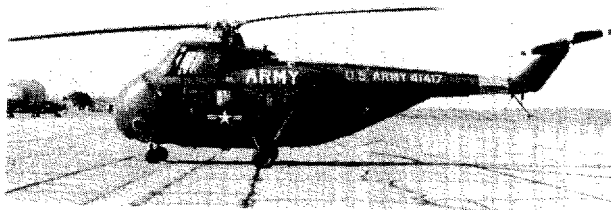


Figure 14. The UH-19D.

c. Cargo Compartment. The UH-19 is designed for operation by a crew of one, the pilot. For medical evacuation, or operations under instrument conditions, additional crew members such as a copilot and medical attendant may be required. The aircraft can transport 10 passengers or six litters internally. The external cargo hook is limited to 2,000 pounds. Five parachutists can be exited from the aircraft for parachute operations.

d. Dimensions.

(1) Cargo compartment:

	<i>Inches</i>
(a) Length -----	120
(b) Width -----	66
(c) Height -----	60
(2) Cargo compartment door:	
(a) Length -----	48
(b) Width -----	48

Weight and Balance Data

	<i>Pounds</i>
<i>a.</i> Maximum gross weight-----	7,900
<i>b.</i> Operating weight-----	5,850
<i>c.</i> Fuel capacity-----	1,050
<i>d.</i> Allowable cargo load (maximum fuel aboard) -----	508
<i>e.</i> Allowable cargo load (50-nautical-mile radius) -----	1,487
<i>f.</i> Allowable cargo load (100-nautical- mile radius)-----	1,073

X. CH-21 SHAWNEE

Description

a. General. The CH-21 (figure 15) is an all metal, single engine, tandem rotor helicopter. Power is supplied by an air-cooled, radial engine located within the fuselage aft of the cargo-passenger compartment. It has dual controls and features a fixed tricycle landing gear. Two models of this aircraft are in the Army inventory, the B and C models, both having essentially the same performance characteristics. A rescue hoist is available with 100 feet of cable, the winch having a 400-pound capacity.

b. Characteristics.

- (1) Normal cruising speed--- 85 knots.
- (2) Takeoff distance to clear 515 feet.
50-foot obstacle

- (3) Landing distance to clear 0 feet.
50-foot obstacle.
- (4) Endurance at cruising speed:
 - (a) Normal operations----- 3 hours
10 minutes.
 - (b) With auxiliary fuel 5 hours
tanks. 10 minutes.

Cargo Compartment

a. Capacity. The CH-21 is designed for a crew of one, the pilot. The troop-cargo compartment (figure 16) is capable of transporting 20 combat troops, 12 parachutists, or 12 litter patients with two passengers. The external cargo hook is limited to 5,000 pounds.

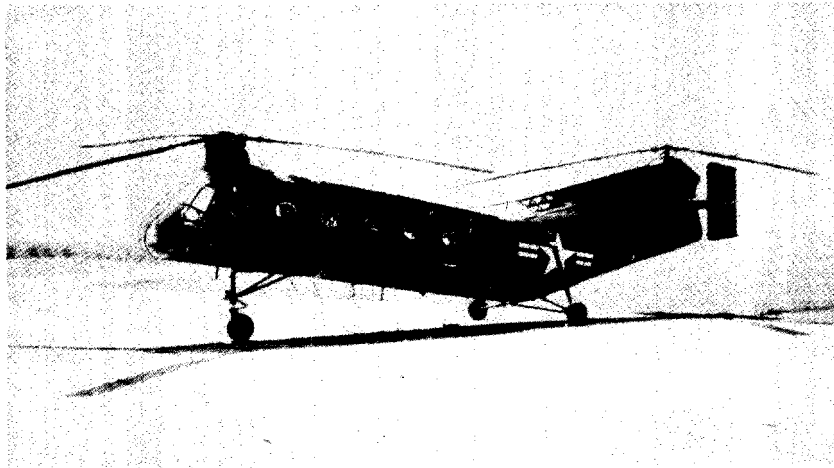


Figure 15. The CH-21.

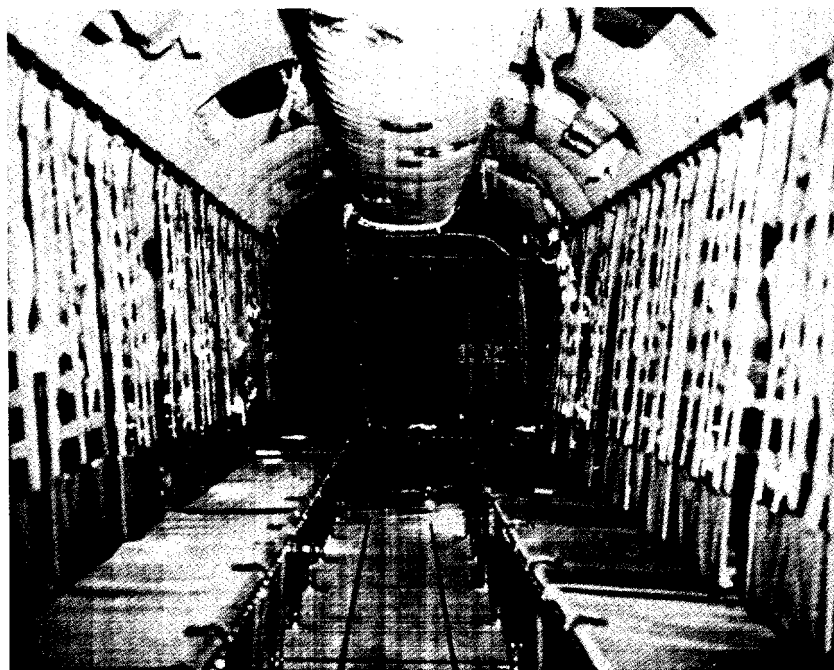


Figure 16. Cargo compartment, CH-21C.

b. Cargo Floor. The cargo-passenger compartment is made of prefabricated metal panels with four cargo rails installed so that heavy cargo can be slid along without puncturing the panels. There are 25 cargo tiedown fittings in the floor. Cargo tiedown rings, 20 with 2,000-pound capacity and two with 5,000-pound capacity, are bolted to the fuselage above the floor on each side of the aircraft.

c. Dimensions.

	<i>Inches</i>
(1) Cargo compartment:	
(a) Length.....	240
(b) Width	46
(c) Height.....	60
(d) Height (floor above ground) ---	38
(2) Cargo door:	
(a) Width	45
(b) Height.....	59

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Weight and Balance Data

	<i>Pounds</i>
a. Maximum gross weight	15,200
b. Operating weight	9,251
c. Maximum fuel capacity	1,800

d. Allowable cargo load (maximum fuel aboard)	4,125
e. Allowable cargo load (50-nautical-mile radius)	4,749

XI. CH-34 CHOCTAW

Description

a. *General.* The CH-34 (figure 17) is an all metal, single-engine helicopter with a four-blade main rotor. It is powered by an R-1820 engine producing a maximum of 1,425 horsepower. It has dual controls and a conventional fixed landing gear. Entrance to the cabin compartment is through a single sliding door (53 by 48 inches) on the right side of the fuselage. Two models, A and C, of this aircraft are in the Army inventory. Both models are identical except for installation of automatic stabilization equipment (ASE) in the C model. The aircraft is a light cargo helicopter designed for transport of cargo, personnel, and medical evacuation.

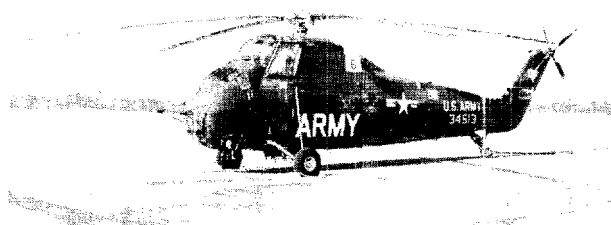


Figure 17. The CH-34.

b. *Characteristics.*

- (1) Normal cruising speed..... 80 knots.
- (2) Takeoff distance to clear Vertical. 50-foot obstacle.
- (3) Landing distance to clear 442 feet. 50-foot obstacle.
- (4) Endurance at cruising 2 hours, 30 speed. minutes.
- (5) Restraint criteria :
 - (a) Forward 4.0
 - (b) Aft 2.0
 - (c) Lateral 1.5
 - (d) Vertical 1.0

Cargo Compartment

a. *Capacity.* The CH-34 is designed for operations with a crew of one, the pilot. Under normal circumstances it is operated by a crew of three—pilot, co-pilot, and flight crew chief. The troop-cargo compartment (figure 18) will accommodate 18 passengers or eight litter cases with two attendants. Ten parachutists can be exited from the aircraft. The cargo hook capacity for external loads is rated at 5,000 pounds. A 600-pound capacity hoist is available for installation for rescue work. The hoist has a 95-foot cable. The cargo floor is rated at 200 pounds per square foot for an evenly distributed load.

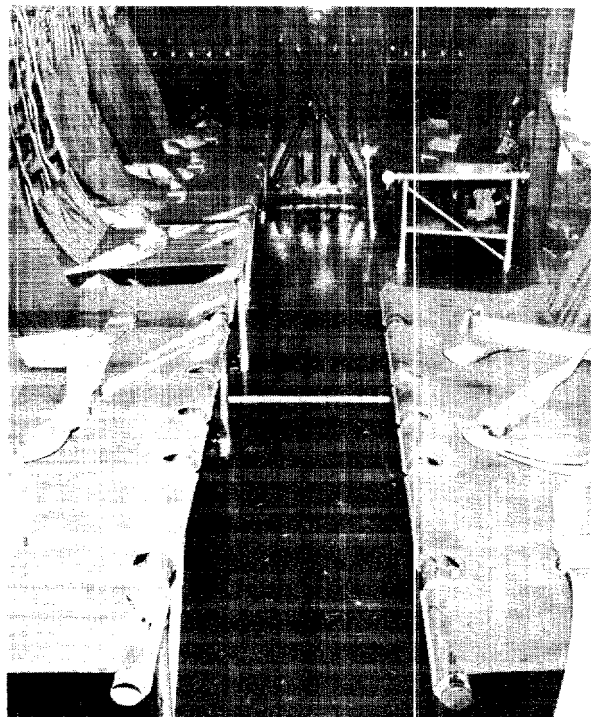


Figure 18. Cargo compartment, CH-34.

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b. Dimensions.

(1) Cargo compartment:	<i>Inches</i>
(a) Length -----	163½
(b) Width -----	59
(c) Height:	
Stations 82.5 to 112-----	49
Stations 112 to 246-----	70
(d) Height (floor above ground)---	34
(2) Cargo entrance door:	
(a) Width -----	53
(b) Height -----	48

c. Tiedown Devices. There are 35 tiedown rings in the cargo compartment floor rated at 1,250 pounds each. Ten 1,250-pound fabric cargo tie-

down devices are stowed in pockets along the cargo compartment side walls.

Weight and Balance Data

	<i>Pounds</i>
a. Maximum gross weight-----	13,600
b. Operating weight-----	8,417
c. Fuel capacity-----	1,578
d. Allowable cargo load (maximum fuel aboard) -----	3,605
e. Allowable cargo load (50-nautical-mile radius)-----	4,283
f. Allowable cargo load (100-nautical-mile radius)-----	3,635

XII. CH-37 MOJAVE

Description

a. General. The CH-37 (figure 19) is an all metal, twin-engine helicopter with a single, five blade main rotor and a single four-blade antitorque tail rotor. It is powered by two 2,100 horsepower radial engines. It has dual controls; retractable, conventional landing gear (two main wheels and one tail wheel); clamshell cargo loading doors and a loading ramp in the nose section (figure 21). Jettisonable fuel tanks may be mounted externally to increase the range. There are two models of this helicopter. The CH-37A has an adjustable stabilizer mounted on the aft fuselage section, while the CH-37B has a fixed-type stabilizer on the right side of the pylon. The performance characteristics of the two models are essentially the same. The CH-37 is a medium transport helicopter with a principal mission of transporting troops and cargo. In addition, it can be used for medical evacuation and parachute operations.



Figure 19. The CH-37.

b. Characteristics.

- (1) Cruising speed----- 80 knots.
- (2) Takeoff distance to clear 50-foot obstacle. 316 feet.
- (3) Landing distance to clear 50-foot obstacle. 302 feet.
- (4) Endurance at cruising speed:
 - Normal operations----- 1 hour, 20 minutes.
 - With auxiliary fuel tanks... 4 hours, 10 minutes.
- (5) Restraint criteria:
 - (a) Forward ----- 4.0
 - (b) Aft ----- 2.0
 - (c) Vertical ----- 2.0
 - (d) Lateral ----- 1.5

Cargo Compartment

a. Capacity. The CH-37 is designed for a crew of three—pilot, copilot, and flight crew chief. The troop-cargo compartment (figure 20) is capable of carrying 23 combat-equipped troops, 23 parachutists, or 24 litter patients. The external cargo sling assembly is designed for loads up to 10,000 pounds. A monorail with an electric winch is provided for cargo loading and rescue operations. The winch has a capacity of 2,000 pounds; however, when used for rescue or for lowering personnel, the maximum load is 600 pounds.

b. Floor Strength. Except for the treadways, the cargo floor will support 300 pounds per square foot during flight and/or loading. The outboard

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treadways between stations 160 and 187 are designed to support a wheel load of 2,575 pounds, an axleload of 5,100 pounds, or an evenly distributed load of 1,600 pounds per square foot during flight and/or loading. Between stations 80 and 160 the treadways are designed to support these same loads, except that the evenly distributed flight load is only 700 pounds per square foot. The inboard treadways, which extend the entire length of the cargo compartment, are designed to support (during loading) a wheel load of 930 pounds, an axleload of 1,860 pounds, or an evenly distributed load of 950 pounds per square foot. During flight these treadways will support the same wheel load; however, the evenly distributed load is limited to 700 pounds per square foot.

c. Critical Dimensions.

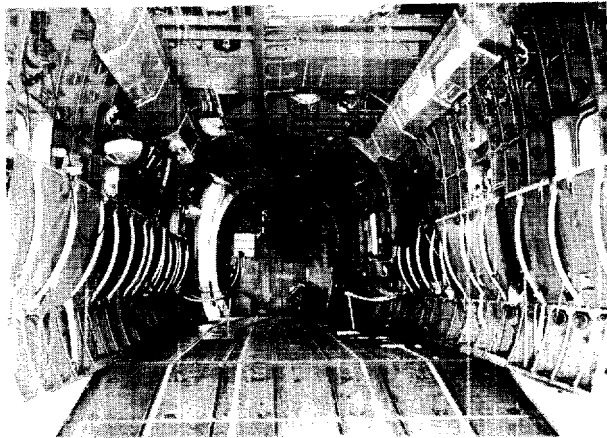


Figure 20. Cargo compartment, CH-37.



Figure 21. Loading ramp, CH-37.

(1) Cargo compartment:

- (a) Length ----- 364 inches.
- (b) Width:
 - Stations 80 to 298 ----- 87 1/4 inches.
 - Stations 298 to 444 ----- Tapers from 87 1/4 inches to 52 3/4 inches.
- (c) Height:
 - Stations 80 to 330 ----- 81 1/2 inches.
 - Stations 330 to 444 ----- 66 inches.
- (d) Height (floor above ground) ----- 36 inches.

(2) Nose cargo door:

- (a) Width ----- 87 1/4 inches.
- (b) Height ----- 72 inches.
- (c) Ramp length ----- 80 inches.
- (d) Ramp incline ----- 13 degrees.

(3) Right side cargo door:

- (a) Width ----- 72 inches.
- (b) Height ----- 72 inches.

(4) Floor cargo hatch:

- (a) Length ----- 72 inches.
- (b) Width ----- 48 inches.

Cargo Loading Provisions

a. Traverse Hoist System. The traverse hoist system consists of a monorail and an electrically driven 2,000-pound capacity winch, which is capable of picking up cargo at the right side door or through the cargo compartment.

b. Tiedown Devices. There are 30 MC-1 tiedown devices stowed in pockets along the side of the cargo compartment.

Weight and Balance Data

- a.* Maximum gross weight ----- 31,000. *Pounds*
- b.* Operating weight ----- 22,550.
- c.* Maximum internal fuel capacity ----- 2,460.
- d.* Allowable cargo load (maximum internal fuel capacity) ----- 5,990.
- e.* Allowable cargo load (50-nautical-mile radius) ----- 6,110.
- f.* Center of gravity limits ----- Figure 22.

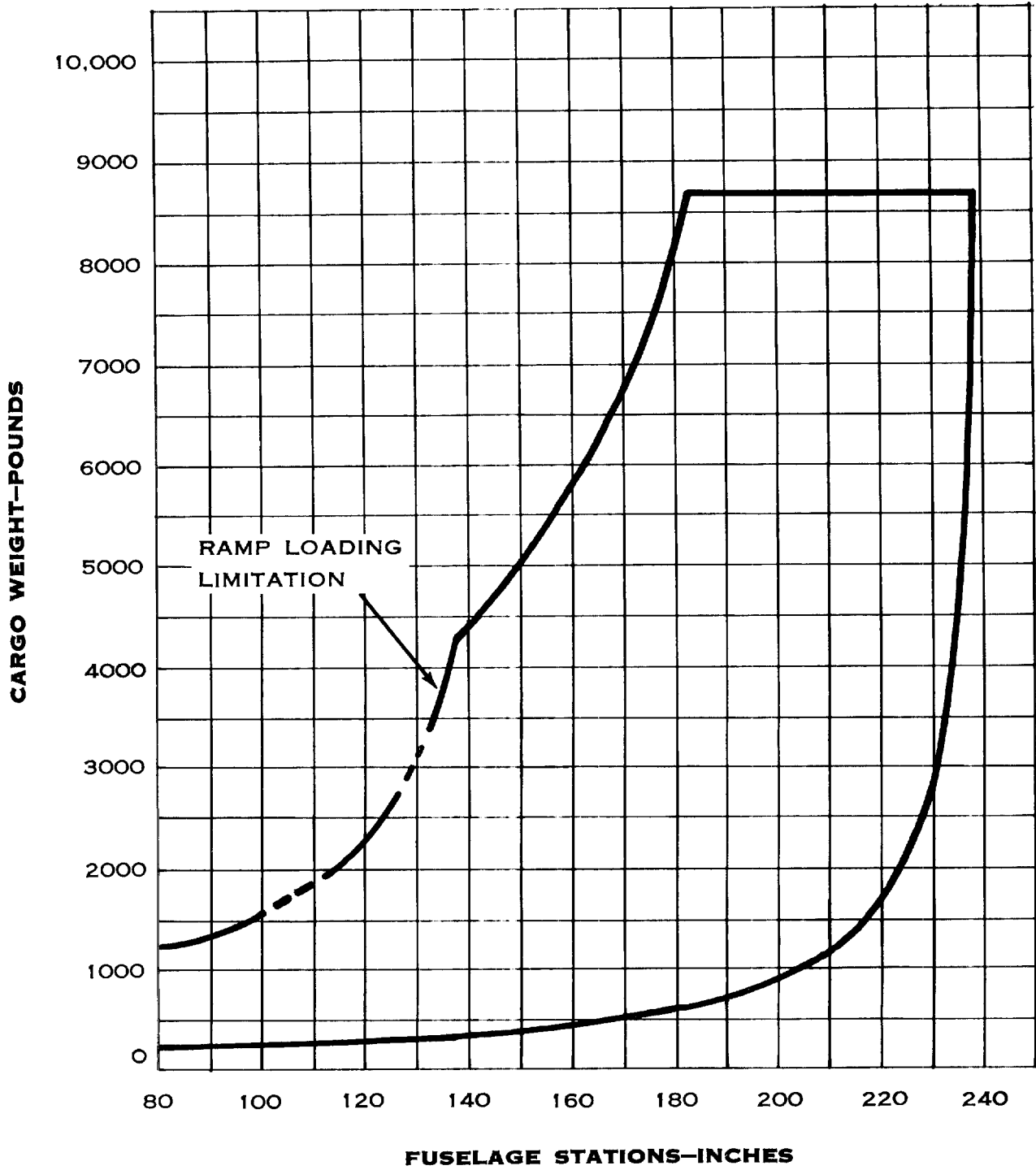


Figure 22. Cargo center of gravity limits, CH-37.

XIII. CH-47A CHINOOK

Description

a. General. The CH-47A (figure 23) is a twin-engine, tandem rotor, medium transport helicopter. It is powered by two 2,200 horsepower turbine engines mounted on the aft fuselage. The engines simultaneously drive tandem, three-blade rotors. The helicopter is equipped with non-retractable quadricycle landing gear. The CH-47A has a power operated, rear loading ramp which permits straight-in loading. The sealed hull gives the CH-47A an emergency water landing capability.

b. Characteristics.

- (1) Normal cruising speed----- 130 knots.
- (2) Takeoff distance to clear 50- Vertical.
foot obstacle.
- (3) Landing distance to clear Vertical.
50-foot obstacle.
- (4) Endurance at cruising 1 hour, 30
speed. minutes.
- (5) Restraint criteria:
 - (a) Forward ----- 8.0
 - (b) Aft ----- 4.0
 - (c) Vertical ----- 8.0
 - (d) Lateral ----- 8.0

Cargo Compartment

a. Capacity. The CH-47A normally has a crew of three—pilot, copilot, and flight crew chief. The

troop-cargo compartment (figure 24) is capable of carrying 33 combat-equipped troops, 24 parachutists, or 24 litters. The external sling has a rated capacity of 16,000 pounds. An electric winch is provided for cargo loading and rescue operations. This helicopter is capable of internally transporting the major items of the Pershing missile system.

b. Floor Strength. The floor area, except for the treadways, will withstand a load of 200 pounds per square foot. The treadways aft of station 160 will withstand a wheel load of 2,500 pounds; the remaining treadway area will withstand a wheel load of 1,000 pounds. When used for additional cargo space, the ramp must be positioned level with the cargo floor and the load on the ramp must not exceed 2,000 pounds.

c. Critical Dimensions.

(1) Cargo compartment :	<i>Inches</i>
(a) Length -----	366
(b) Width -----	90
(c) Height -----	78
(d) Height (floor above ground) ---	30
(2) Aft cargo door and ramp (figure 25):	
(a) Width -----	90
(b) Height -----	78
(c) Ramp incline -----	<i>Degrees</i> 13

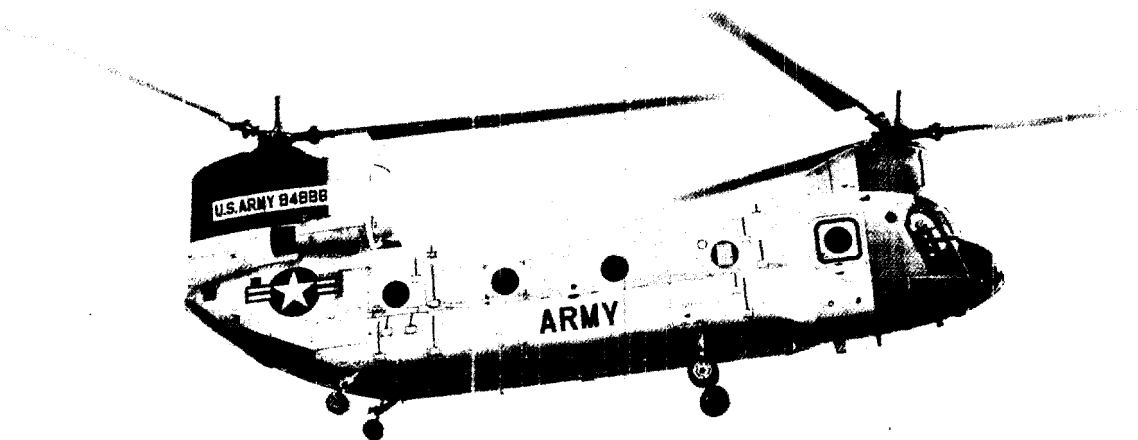


Figure 23. The CH-47A.

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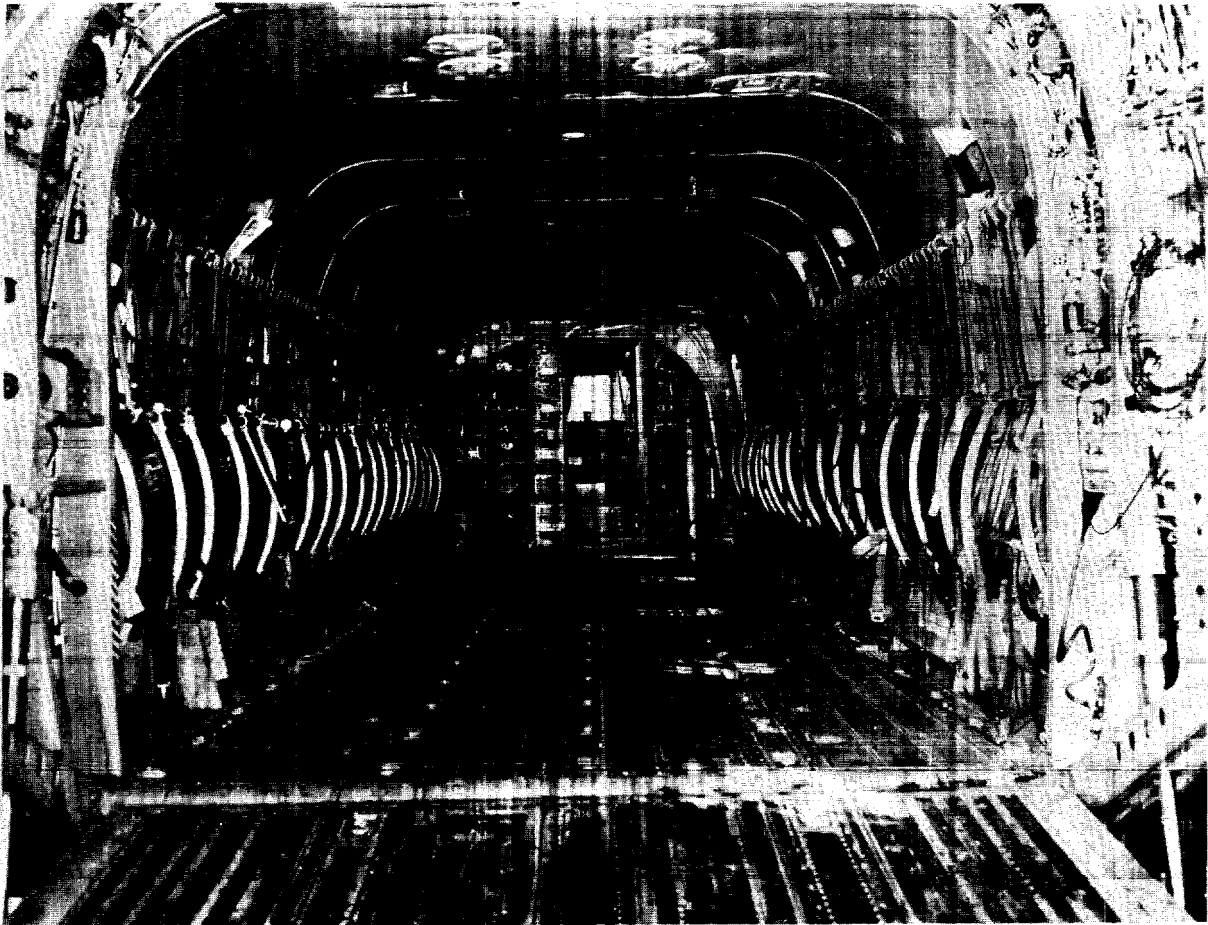


Figure 24. Cargo compartment, CH-47A.

Cargo Loading Provisions

a. Auxiliary Loading Ramps. Three auxiliary loading ramps are hinged to the aft end of the ramp. When the ramp is lowered, these auxiliary ramps provide flush contact between the ramp and the ground. They may be positioned to accommodate various vehicle tread widths or butted together to facilitate the loading of bulk cargo.

b. Winching System. A 3,000-pound capacity winch is mounted on the floor in the right hand forward bulkhead. The winch is provided with 150 feet of cable and is capable of winching up to 12,000 pounds of cargo with the aid of snatch blocks.

c. Hoisting System. The hoisting system is used for air rescue and aerial loading of light cargo through the utility hatch in the floor. The hoist load capacity is limited to 600 pounds.

Weight and Balance Data

	<i>Pounds</i>
<i>a.</i> Maximum allowable gross weight----	33,000
<i>b.</i> Normal operating weight -----	17,154
<i>c.</i> Maximum fuel weight -----	4,090
<i>d.</i> Allowable cargo load (50-nautical-mile radius), approximately-----	13,000
<i>e.</i> Allowable cargo load (100-nautical-mile radius) -----	*11,756

(*100-nautical-mile radius uses 8 minutes of fuel reserve.)

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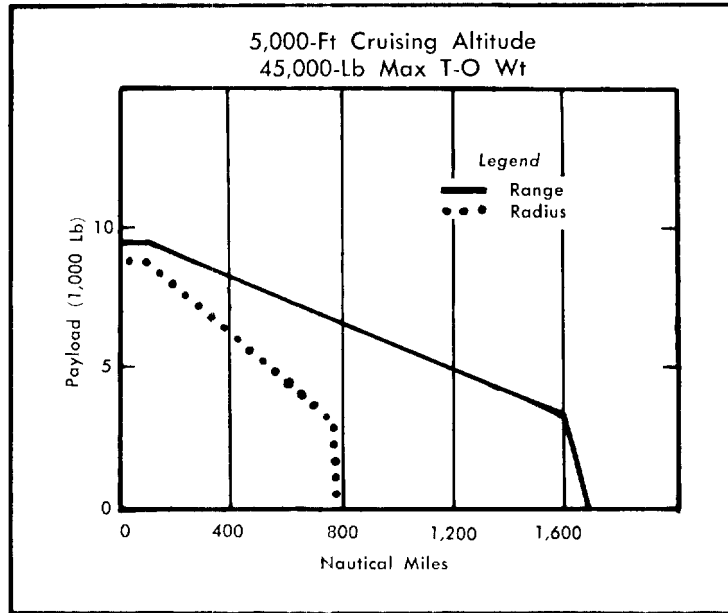


Figure 25. Loading ramp, CH-47A.

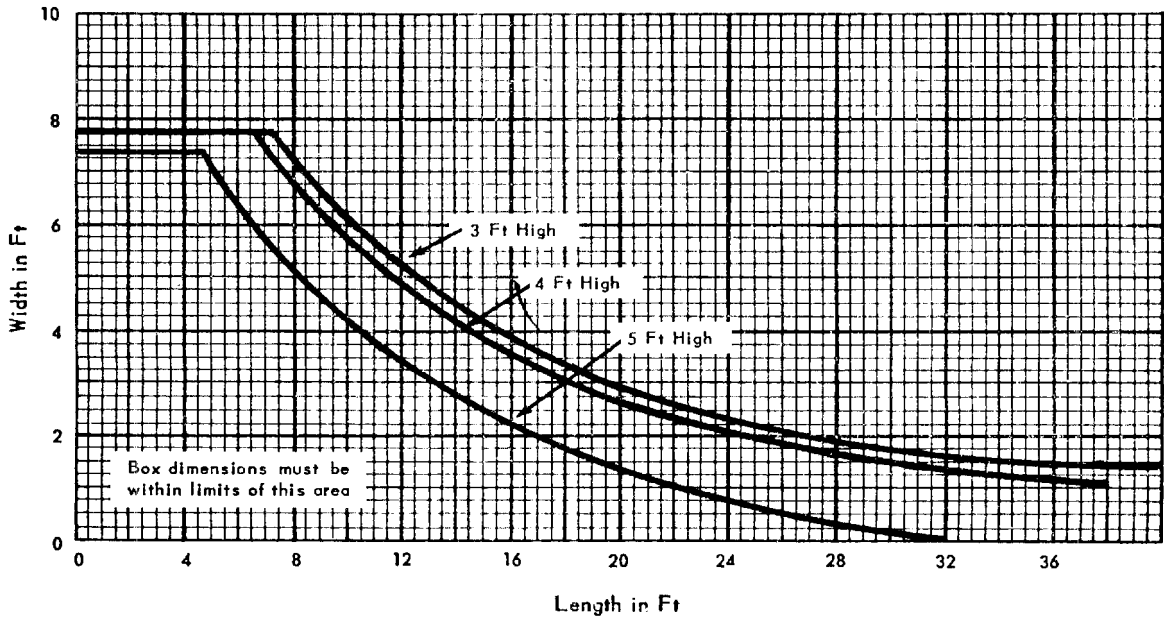
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DESIGN DATA FOR MISCELLANEOUS AIRCRAFT

C-46F Aircraft Payload-Distance



C-46 Aircraft Cargo-Size Limitations



Example: To determine whether or not a box 5.5-feet wide, 3-feet high, and 11-feet long can be loaded through the large cargo door into cargo compartment, locate 5.5 (width) in column marked "Width in Feet" and trace line horizontally across the graph until it contacts the "3-Feet High" curve. By dropping a vertical line down to "Length in Feet" at base of the graph, it can be seen that the cargo door will receive a box 5.5 feet by 3 feet by 11.4 feet. Obviously a box 5.5 feet by 3 feet by 11 feet can be loaded.

Note: This chart is for the C-46F airplane equipped with large cargo door and with troop benches installed and folded up.

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C-47 Aircraft Mission and Description

The principal mission of the C-47 aircraft is the transportation of materiel and personnel, including paratroops.

A variety of loading provisions permits transport of engines, heavy artillery, and other equipment. Litters may be installed for transportation of casualties.

Glider tow arrangement is provided on some airplanes for towing one or more gliders. Propellers and parapacks may be carried underneath the fuselage.

Cargo

Max load See payload-distance table
 Typical load..... One 75 mm gun & carriage (8,400 lb)
 or
 Engines (on cradles)
 Four R-1830 or
 Four V-1570 or
 Three V-1710 or
 Two R-3350
 Typical Load (external)
 Six Parapacks or
 Two 4 blade props

Clearances

Main compartment:
 Length (overall) 30.1 ft
 Width (max) 7.4 ft
 Height (max) 6.4 ft
 Main loading door:
 Height (fwd/aft) 5.9/4.6 ft
 Width 7.0 ft
 Height from ground 4.7 ft
 Paratrooper door:
 Height 5.5 ft
 Width 2.5 ft

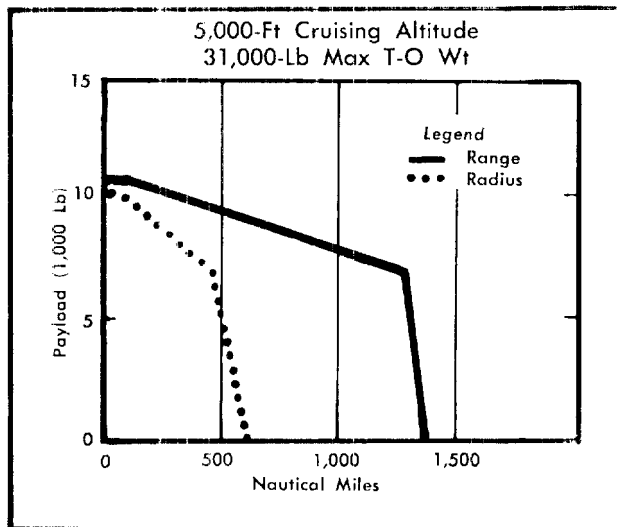
Capacities

Main cargo compartment:
 Volume (tot) 1,227 cu ft
 Floor area 213 sq ft
 Glider tow 17,700 lb

Personnel

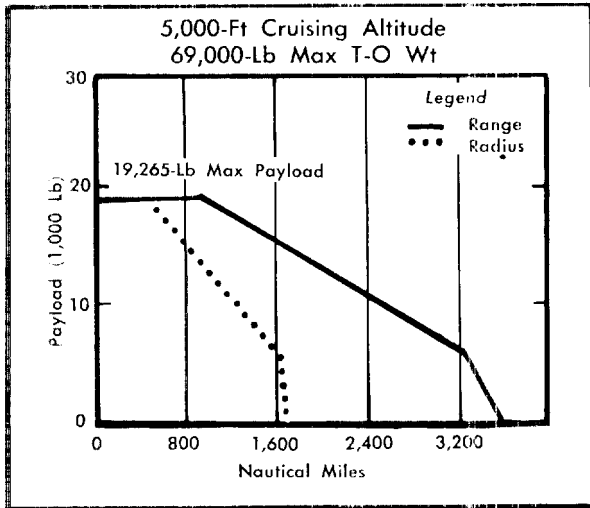
Crew (normal) 5
 Paratroops (max) 27
 or
 Litters (level) 24
 or
 Litters (inclined) 18
 plus
 Attendants 2

C-47D Aircraft Payload-Distance

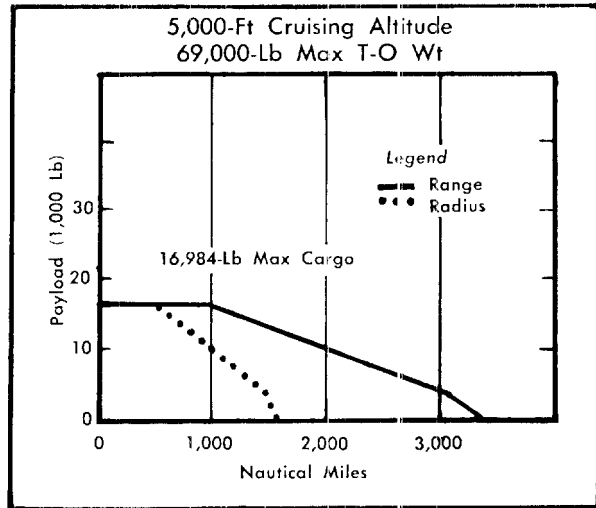


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C-54G Aircraft Payload-Distance

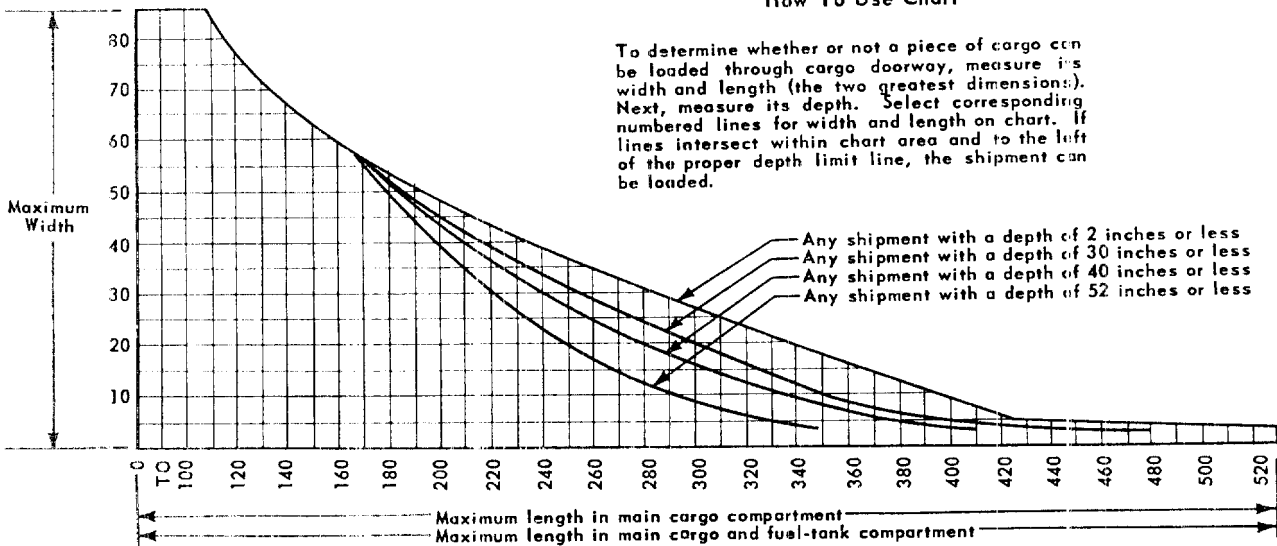


C-54M Aircraft Payload-Distance



C-54 Aircraft Cargo-Size Limitations

How To Use Chart



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C-119 Aircraft Mission and Description

The principal mission of the C-119 aircraft is to transport cargo, personnel, litter patients, mechanized equipment, and/or paratroops.

The cargo compartment is designed to provide ease of loading and unloading; the floor of the cargo compartment is at approximately truck bed height and the rear cargo doors have been removed to facilitate air drop of large or bulky cargo. Two metal ramps are provided for loading mobile equipment.

The monorail system is incorporated for aerial delivery of paracans through doors in the floor of the cargo compartment.

Cargo	
Max load:.....	See payload-distance tables
Typical item:.....	90-mm AA gun*
	(partially dismounted)
*Requires special load-distributing devices.	

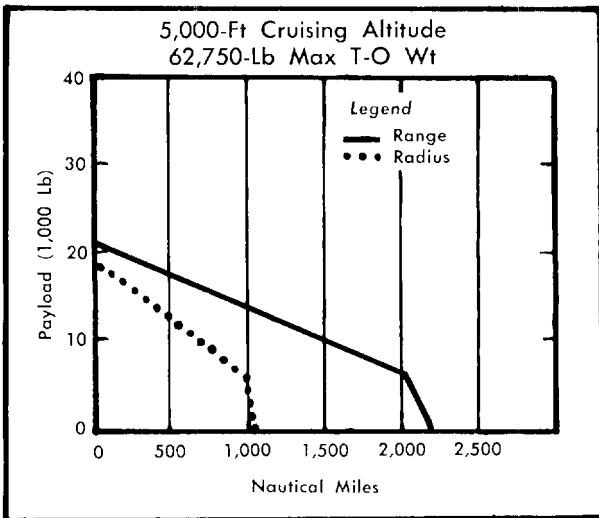
Main loading door:	
Height	8.0 ft
Width	9.2 ft
Height from ground	4.0 ft

Capacities	
Main compartment	3,150 cu ft
Main compartment (tot floor area)	353 sq ft
Floor loading	200 lb/sq ft
Ramp strength	9,400 lb ea

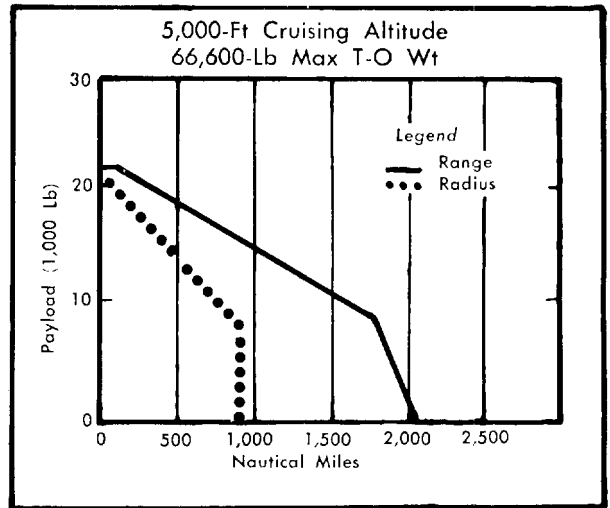
Personnel	
Crew (normal): pilot, copilot, navigator, radio operator, and crew chief	
Troops (normal)	42
	or
Troops (max)	62
	or
Litters	35
	plus
Attendants	4
	or
Emergency evacuation:	
Troops	62
	plus
Litters	14
	plus
Attendants	4

Clearances	
Main compartment:	
Length (overall)	36.9 ft
Width (max)	9.8 ft
Width (min)	9.1 ft
Height (max)	8.0 ft
Height (min)	7.9 ft
Height (clear under trolley)	7.7 ft

C-119B Aircraft Payload-Distance



C-119C Aircraft Payload-Distance



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THE TYPE 331 POWERED HELI PORTER

This aircraft is a single engine, high wing, monoplane capable of transporting personnel and materiel.

DIMENSIONS

Span 49'10"
 Length 36'
 Height 36'6"

WEIGHTS

Empty with wheels 2,460 lbs.
 With floats, add 392 lbs.
 With skis, add 192 lbs.
 Useful load 2,390 lbs.
 Maximum for both take-off and landing 4,850 lbs.
 Maximum fuel 126 US gals.

PERSONNEL

Pilot
 Copilot
 Six Passengers

CABIN COMPARTMENT

Length (pilot's seat to rear cabin wall) 90.6"
 Additional length (beside pilot's seat) 55.1"
 Width 45.7"
 Height 50.4"
 Floor hatch 35.4" x 22.8"

SIDE DOORS

(May be located on either or both sides of cabin)

Width 62.2"
 Height 41"
 Pilot and Copilot Door
 Width 22"
 Height 45"

RANGE 400 NMI

THE BEECH TC-455

(Also known as the SNB-5 and the USAF C-45)

This aircraft is a twin engine, low wing, land monoplane of all metal construction, the principal mission of which is transportation of personnel.

DIMENSIONS

Wing Span 47.7'
 Length 34.2'
 Height 9.65'

WEIGHTS

Empty 6,176 lbs.
 Useful load 1,554 lbs.
 Maximum for both take-off and landing 8,730 lbs.

PERSONNEL

Pilot
 Copilot
 Five Passengers

RANGE 500 NMI

CABIN

Width 52"
 Height 60"
 Length 96"
 Door 38" x 22"

THE BELL MODEL 204B

The Bell Model 204B is a general purpose helicopter.

DIMENSIONS

Overall length (rotor on) 57'0"
 Fuselage length 48'1"
 Maximum width (clevator) 9'4"
 Cabin width 8'2"
 Overall height 14'6"
 Tread 8'8"

WEIGHTS

Basic (empty) 4,620 lbs.
 Useful load 3,880 lbs.
 Gross (certified maximum) Part 7 8,500 lbs.
 Maximum fuel 240 US gals.

PERSONNEL

Pilot
 Nine Passengers

CABIN COMPARTMENT

Cargo Area
 Length (overall) 5'0"
 Width (floor level) 7'8"
 Height (maximum) 4'8"
 Cargo Door Opening
 Height 4'0"
 Width 4'0"
 Height above ground 2'4"
 Usable Cubage
 Main cargo area 140 cu. ft.
 Left side passenger area 20 cu. ft.
 Baggage compartment 30 cu. ft.

RANGE 300 NMI

SECRET

THE DORNIER-WERKE 28A-1

This aircraft is a twin engine, high-wing, monoplane capable of transporting personnel and materiel.

DIMENSIONS

Wing span 46.4'
 Length 30.1'
 Height 10.4'

WEIGHTS

Empty 3,750 lbs.
 Useful load 1,568 lbs.
 Maximum for both take-off and landing 5,318 lbs.
 Maximum fuel 123 US gals.

PERSONNEL

Pilot
 Seven Passengers

CABIN COMPARTMENT

Length 11.5'
 Luggage compartment 8.8 cu. ft.

RANGE
 450 NMI

THE VOLPAR SUPER TURBO-18

(Modification of BEECH SUPER-18)

This aircraft is a twin engine, low-wing, all metal, monoplane capable of transporting personnel and materiel.

DIMENSIONS

Wing span 46'
 Length 37.6'
 Height 9.6'

WEIGHTS

Empty 6,220 lbs.
 Useful load 3,892 lbs.
 Take-off 10,286 lbs.
 Landing 9,772 lbs.
 Maximum fuel 502 US gals.

PERSONNEL

Pilot
 Copilot
 Nine Passengers

RANGE
 1,200 NMI

CABIN COMPARTMENT

Width 52"
 Height 67"
 Length 96"
 Air Stair & Cargo Door Approx. 54"W x or 48"H

**THE HELIO STOL SUPER CARRIER
 MODEL H-295 (U-10)**

This aircraft is a single-engine, high-wing STOL (short take-off, landing) aircraft capable of transporting personnel and materiel.

DIMENSIONS

Span 39'
 Length 31'
 Height 8'10"

WEIGHTS

Empty 2,010 lbs.
 Maximum for both take-off and landing 3,000 lbs.
 Maximum pay load 990 lbs.
 Maximum fuel 60 US gals.

PERSONNEL

Pilot
 Copilot
 Four Passengers

CABIN COMPARTMENT

Length 10'3"
 Width 3'9"
 Height 4'4"
 Floor Area 30 sq. ft.

**THE PIPER APACHE H
 (PA-23-160)**

This aircraft is a twin engine, high-wing, monoplane capable of transporting personnel and materiel.

DIMENSIONS

Span 37'
 Length 27'1½"
 Height 9'6"

WEIGHTS

Empty 2,280 lbs.
 Maximum for both take-off and landing 3,800 lbs.
 Maximum fuel 72 US gals.

PERSONNEL

Pilot
 Copilot
 Four to Five Passengers

CABIN COMPARTMENT

Maximum space — 80 cu. ft. with the two front seats installed.

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THE BOEING 727C

This aircraft is a three-engine jet, low-wing aircraft capable of transporting personnel and materiel.

Crew of Three

DIMENSIONS

Span 108'
Length 133'2"
Height 34'

WEIGHTS

Empty 89,394 lbs.
Maximum take-off 160,000 lbs.
Maximum landing 135,000 lbs.
Maximum pay load 38,400 lbs.
Maximum fuel 7,680 US gals.

PERSONNEL

Crew of Three
One Hundred and Thirteen Passengers

CABIN COMPARTMENT

Length 72'8"
Width 10'9"
Height 7'2"
Floor Area 766 sq. ft.

**THE CONVAIR
CV-880 MODEL 22-M**

This aircraft is a four-engine jet, low-wing, monoplane capable of transporting personnel and materiel.

DIMENSIONS

Span 120'
Length 129'4"
Height 36'4"

WEIGHTS

Empty 93,000 lbs.
Maximum for both take-off and landing 184,500 lbs.
Maximum pay load 24,165 lbs.
Maximum fuel 12,534 US gals.

PERSONNEL

Crew of Five
First Class Passengers — 88;
OR Coach Class Passengers — 110

CABIN COMPARTMENT

Length 89'3"
Width 10'8"
Height 7'1"

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Staff or Division _____
 Station _____
 Program _____
 Project _____

GUIDE FOR DETERMINING
 ADMINISTRATIVE AND HOUSEKEEPING SUPPORT
 REQUIREMENTS

Copy _____ of _____

Due Date of this Report _____

Item No.	Category of Support	Gross Requirements for Period _____ Thru _____						Supply Source	Remarks
		Quarter Year	Quarter Year	Quarter Year	Quarter Year	Half Year	Half Year		
A	B	C	D	E	F	G	H	I	J
1	Rations: Class A-1 Class A-2 Class B-1 Class B-2								
2	Clothing and Equipage: Class A-1 Class A-2 Class A-3 Class B-1 Class B-2 Class B-3								
3	Commissary & PX Supplies: Class A-1 Class A-2 Class B-2								
4	Office Supplies & Equipment: Class C-1 Class C-2								
5	Quarters & Messes: Group I Group II Group III								

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APPENDIX IV

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TAB A
to APPENDIX IV

**PREPARATION OF ADMINISTRATIVE AND
HOUSEKEEPING SUPPORT REQUIREMENTS**

A. Expendable

1. This category normally includes such items as food, clothing, commissary and post exchange commodities, janitorial supplies and equipment, spare parts for vehicles, POL (petroleum, oil and lubricants) and office supplies.

2. This portion will reflect administrative and housekeeping requirements which are based on man strength, vehicle strength and facility strength.

B. Columnar Entries

1. "Item No.," Column A, and "Category of Support," Column B

These refer to categories of strength support.

2. Columns C through H

a. Enter requirements in terms of the units of measure indicated below.

b. These requirements will represent support required during each respective period and will not be cumulative:

*Category of Support
Items 1 through 4*

Unit of Measure

- Class A-1 Average number of United States nationals to be supported at the individual's expense.
- Class A-2 Average number of United States nationals to be supported at project expense.
- Class A-3 Number of United States nationals included in Class A-2 who will require initial issue of clothing and equipment.
- Class B-1 Average number of personnel other than United States nationals to be supported at the individual's expense.
- Class B-2 Average number of personnel other than United States nationals to be supported at project expense.
- Class B-3 Number of personnel other than United States nationals included in Class B-2, who will require initial issue of clothing and equipment.

Category of Support

Unit of Measure

Items 1 through 4 (Cont'd)

Class C-1 Average number of office personnel who will require recurring replenishment of supplies.

Class C-2 Average number of office personnel included in Class C-1 who will require initial issue of office equipment and furnishings.

Item 5

Group I

Number of family dwellings to be furnished or refurnished. (Specify grade or rank of principal occupant and note unusual circumstances under "Remarks.") The number of dwellings now on hand, and furnished, for which attrition of furnishings is applicable, will be indicated under "Remarks."

Group II

Number of additional bachelors to be quartered who will require initial issues of furniture and furnishings. (Specify grade or rank of principal occupant and note unusual circumstances under "Remarks.")

Group III

Number of messes to be opened and equipped, followed by numbers of persons to be messed: for example, 1-40 would indicate one new mess to be opened to accommodate forty persons. (Note unusual circumstances under "Remarks.")

Item 6

Class 1

Number of dwellings assigned to United States personnel and/or dependents.

Class 2

Average number of persons quartered in BOQ-type accommodations.

Class 3

Average number of persons quartered in barracks.

Class 4

Maximum square feet of warehouse space, by type, according to the following code:

- W — Wood floor
- C — Concrete floor
- T — Temporary structure
- P — Permanent structure

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*Category of Support
Items 7, 8 and 9*

involved (for example, PACOM, EUCOM, RYCOM).

3. "Supply Source," Column I

For each category of support enter Code DD as the source of supply. Specify under Remarks the supporting service (Army, Navy or Air Force), and indicate the theater command

4. "Remarks," Column J

Enter any additional remarks which may assist Headquarters in identifying the requirements.

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APPENDIX V

FORMAT FOR A STANDING OPERATING PROCEDURE

Part I—Organization and Functions

1. Application: In this section, give the purpose and scope of the standing operating procedure (SOP) and applicability of procedures prescribed.
2. Organization: Show the organization.
3. Function: A general paragraph should explain the composition of the element and broad responsibilities and functions of members.

Part II—Command-Staff Relationships

Section I. General

1. Command and Technical channels.
2. Dual responsibilities, such as one individual being both a staff officer and member of task organization.
3. Responsibility for liaison and coordination with higher, lower and adjacent elements.
4. Cooperation between staff sections.

Section II. Intelligence

This section outlines responsibilities for and describes the procedures for all matters pertaining to intelligence.

Section III. Estimates—Plans—Orders

This section outlines the responsibilities for and describes the procedures for preparation of estimates, plans and orders.

Section IV. Security

This section outlines responsibilities for security, area security and defense and area damage control. (This may be done by reference to an appropriate annex in the SOP.)

Section V. Logistics

In this section, detailed procedures should be given covering supply, transportation, procurement, real estate and construction, printing, and support services. This portion is closely related to the logistics plan (Annex) and many aspects covered in the SOP need not be repeated in the logistics plan (Annex). However, applicable references to the SOP should be made.

Section VI. Administration

This section should give complete and detailed procedures pertaining to internal administrative matters not included elsewhere. Activities such as the following might be included: leave policy, postal services, labor, travel, finance, law and order, records management, office hours, courier and messenger services, and handling of classified documents.

Section VII. Command and Communication

This section covers such activities as special instructions and reports not covered in other parts; also included are communications operations and standing communications instructions and location of the headquarters, including alternate headquarters.

Authorized Representative

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APPENDIX VI

GUIDE FOR THE PREPARATION
OF A STAFF STUDY

1. General

Staff studies will be submitted for consideration by a supervisor when required by him or his representative, or when an element prepares one on its own initiative concerning a subject which is clearly within its scope of responsibility.

2. Purpose

The purpose of the staff study is to provide the supervisor with a paper which will assist him in the consideration of a problem and enable him to reach a sound decision.

3. Format

To facilitate rapid and logical consideration by the supervisor on matters placed before him, a standard format is prescribed which permits an orderly transition from the problem being considered to the conclusions reached and the recommendations resulting therefrom. The format at Tab A (page 137) should be used for all staff studies submitted to the supervisor for consideration. The checklist at Tab B (page 139) should be used to insure proper preparation of the staff study.

4. Principal Parts

The principal parts of the staff study, which are as follows, are explained in the subsequent paragraphs:

- a. Statement of the Problem
- b. Assumptions
- c. Facts Bearing on the Problem
- d. Discussion
- e. Conclusions
- f. Recommendations
- g. Annexes
- h. Attachments
- i. Concurrences

5. Statement of the Problem

A proper statement of the problem is one of the most important sections of the staff study. It is imperative that the author of the staff study phrase the statement of the problem in clear and explicit language which will enable the supervisor to comprehend quickly the substance of the problem to which the staff study is addressed. The problem to be stated is the one which faces the supervisor, NOT the problem which faces the author of the staff study. The following are examples of a proper statement of the problem:

- a. "In response to a request by the supervisor, to determine whether the Blank Depot should be retained."
- b. "In response to a request by the supervisor, to develop a policy for the assignment of priorities to requisitions."

6. Assumptions

An assumption is anything taken for granted, a supposition, or a presumption. Assumptions are NOT REQUIRED in staff studies but may be included at the discretion of the author of the staff study. Any lengthy presentation of the assumptions deemed necessary for a thorough analysis will be placed in a lettered annex. If an annex is used for any or all of the assumptions, a paragraph will be added under this section as follows: "For (additional) assumptions, see Annex ____."

7. Facts Bearing on the Problem

A fact is anything that has actually happened or is true. This section of the staff study will set forth a summary of the pertinent facts arranged in logical sequence to facilitate understanding of the discussion in the next section. THIS SUMMARY WILL BE FACTUAL AND DEVOID OF THE AUTHOR'S OPINIONS, ASSUMPTIONS, AND DIS-

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CUSSION. Any detailed presentation of the facts deemed necessary for a thorough analysis will be placed in a lettered annex. If an annex is used, a paragraph will be added under this section as follows: "For additional facts, see Annex _____."

8. Discussion

This is the section of the staff study where, through a logical analysis and evaluation, the facts bearing on the problem are converted into conclusions. Although it is desirable that the discussion be as brief as possible, it should not be curtailed to the extent of omitting consideration of any essential aspect of the problem. The technique of stating alternative solutions, the advantages and disadvantages of each, and the rationale supporting the action recommended, should be employed in those papers which lend themselves to this approach. ANY PART OR ALL OF THE DISCUSSION MAY BE PLACED IN AN ANNEX. In this instance, a paragraph will be included under this section as follows: "For (additional) discussion, see Annex _____." If the facts bearing on the problem are considered to lead directly to the conclusions and discussion is considered unnecessary, the discussion section may be omitted.

9. Conclusions

The conclusions represent the considered opinions of the author relative to the problem and provide the basis for the recommendations.

10. Recommendations

The recommendations will consist of concise statements of actions to be taken. A specific recommendation must be consistent with the conclusions. In approving the dispatch of an implementing attachment which reflects the conclusions in a staff study, the supervisor does, in fact, approve the conclusions, and it is unnecessary to make a separate recommendation that the conclusions be approved. However, in rare cases, there may be conclusions which are not reflected in an implementing attach-

ment but which the originator desires to have approved. In this instance, it is proper to recommend that the supervisor approve these conclusions.

Order of Presentation of Recommendations. The order of presentation of recommendations is as follows:

(1) Recommendations pertaining to implementing attachments.

(2) Recommendation pertaining to conclusions (to be included only if the implementing attachments do not reflect the conclusions).

11. Annexes

Information necessary to an understanding of the problem, but too detailed for inclusion in the staff study, accompanies the study as lettered annexes. These must be identified and referred to in the ASSUMPTIONS, FACTS, or DISCUSSION paragraphs.

12. Attachments

Memorandums, messages and directives necessary to implement the recommendations, if approved, are prepared in final form for the signature of the proper authority and accompany the staff study as numbered attachments. These must be identified and referred to in the RECOMMENDATIONS paragraphs.

13. Concurrences

Concurrences must be secured in writing from the offices affected by the problem. This is accomplished by providing a place at the end of the staff study for the office title, date and signature of the concurring officers.

Enclosures:

Tab A — Format for a Staff Study

Tab B — Checklist for a Staff Study

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TAB A
to APPENDIX VI

FORMAT FOR A STAFF STUDY

TO:

DATE:

FROM:

SUBJECT:

1. PROBLEM

- a. Specific and concise statement of problem.

2. ASSUMPTIONS

- a. Use only assumptions required for a logical discussion of problem.
- b. Assumptions, while not facts, must have a basis or foundation of fact.
- c. Do not use assumptions when facts are available.

3. FACTS BEARING ON THE PROBLEM

- a. List essential facts in logical sequence.
- b. List unfavorable as well as favorable facts.
- c. List only important facts bearing directly on problem.

4. DISCUSSION

- a. Analyze facts collected for both advantages and disadvantages.
- b. List all feasible solutions to the problem.

5. CONCLUSIONS

- a. Eliminate alternate lines of action.
- b. State the results (conclusions) derived by a reasoned judgment of the effects and implications of the essential facts.

6. RECOMMENDATIONS

- a. Provide a direct solution.
- b. Chart a complete, concise, and clear-cut course of action permitting simple approval or disapproval.

Signature _____

Title _____

Annexes: (Include detailed supporting information in succeeding lettered annexes. Reference must be made to these in body of study. Staff studies should be complete without having to read annexes. Annexes should only provide correlating and substantiating information.)

Concurrences: (List here other offices or individuals affected by the problem. Provide space for date and signature of concurring officer. When there is a nonconcurrence, reasons therefor will be stated and attached as an annex.)

Action by Approving Authority:

Date _____

Approved (Disapproved), exceptions, if any.

Signature _____

Attachments: (Implementing memorandums, messages, and directives in final form for the signature of the proper authority.)

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TAB B
to APPENDIX VI

CHECKLIST FOR A STAFF STUDY

1. **Statement of the Problem:**
 - a. Did you recognize and isolate the problem?
 - b. Did you state the problem properly?
2. **Assumptions:**
 - a. Are your assumptions things taken for granted, suppositions or presumptions?
 - b. Are your assumptions essential to the solution of the problem?
 - c. Are your assumptions realistically derived?
3. **Facts Bearing on the Problem:**
 - a. Are your facts things that actually happened or are true?
 - b. Did you list all pertinent facts?
 - c. Are your facts logically arranged?
 - d. Did you exclude facts which, although true, have little or no bearing on the problem?
 - e. Did you exclude facts which are not valid?
 - f. Did you exclude "facts" which are actually assumptions?
4. **Discussion:**
 - a. Is your discussion in sufficient detail?
 - b. Does it follow a logical thought sequence?
 - c. Does it consider the advantages and disadvantages of the various courses of action?
 - d. Does it support your conclusions and recommendations?
 - e. Does it include facts which should be included in paragraph 3?
 - f. Is it brief and to the point?
 - g. Does it contain irrelevant material?
5. **Conclusions:**
 - a. Are your conclusions in sufficient detail?
 - b. Do they follow a logical thought sequence?
 - c. Do they consider the advantages and disadvantages of the various courses of action?
 - d. Do they support your discussion and recommendations?
 - e. Do they include facts which should be included in paragraph 3?
 - f. Are they brief and to the point?
 - g. Do they contain irrelevant material?
6. **Recommendations:**
 - a. Do your recommendations offer a clear opportunity for decision?
 - b. Do your recommendations derive logically from your conclusions?
 - c. Are your recommendations complete?
 - d. Are your recommendations beyond the scope of the problem?
 - e. Did you include material in your recommendations which should have been presented earlier in your study?
 - f. Did you unnecessarily repeat discussion material in your action recommended?
7. **Annexes:**
 - a. Is supporting but detailed information placed in an annex?
 - b. Are the annexes referred to and identified in the ASSUMPTIONS, FACTS, or DISCUSSION paragraphs of the staff study?
8. **Attachments:**
 - a. Are implementing attachments (memorandums, messages, and directives) included as attachments in final form for the signature of the proper authority?
 - b. Are the attachments referred to and identified in the RECOMMENDATIONS paragraph?
9. **General:**
 - a. Is the meaning of the words used clear?
 - b. Are the sentences too long and involved?
 - c. Can the thought be easily followed from sentence to sentence and from paragraph to paragraph?
 - d. Is each paragraph limited to one "thought"?
 - e. Does each paragraph contain a topic sentence?
 - f. Does the writing have force?
 - g. Is the level of abstraction too high (use of words, examples, and quotations which do not evoke concrete thoughts)?
 - h. Is the style consistent and easy to read?
 - i. Is proper credit given for sources used?
 - j. Is spelling accurate?
 - k. Have the rules of punctuation been followed?

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APPENDIX VIII

STANDARD REFERENCE LIST

This appendix contains a recommended list of Organization and standard military references for logistics planning. It is not all-inclusive, and users of this Guide should consult appropriate military indexes for additional references in researching a staff problem, or as requirements exist.

Dept. of Army Publications

FM 3-5	Chemical, Biological and Radiological (CBR) Operations
FM 3-8	Chemical Corps Reference Handbook (Change 1)
FM 5-13	The Engineer Soldier's Handbook
FM 5-25	Explosives and Demolitions
FM 5-31	Use and Installation of Booby Traps (Changes 1 & 2)
FM 5-34	Engineer Field Data
FM 5-35	Engineers Reference and Logistical Data
FM 7-24	Communications in Infantry and Airborne Divisions
FM 8-10	Medical Services, Theater of Operations (Changes 1 & 2)
FM 8-55	Army Medical Service Planning Guide (Changes 3 & 4)
FM 9-1	Ordnance Service in the Field
FM 9-2	Ordnance Corps Logistical Data
FM 10-10	Quartermaster Service in a Theater of Operations (Change 1)
FM 10-60	Supply of Subsistence in a Theater of Operations (Change 1)
FM 10-64	Quartermaster Class II and IV Supply in Theaters of Operations
FM 11-20	Signal Operations, Theater of Operations (Change 1)
FM 19-15	Civil Disturbances and Disasters
FM 20-15	Pole and Frame Supported Tents
FM 23	Weapons Series
FM 27-10	The Law of Land Warfare
FM 31-8	Medical Services in Joint Overseas Operations
FM 31-10	Barriers and Denial Operations
FM 31-11	Doctrine for Amphibious Operations
FM 31-12	Army Forces in Amphibious Operations (The Army Landing Force) (Change 1)
FM 31-15	Operations Against Irregular Forces
FM 31-16	Counter guerrilla Operations
FM 31-20	Special Forces Operational Techniques (Changes 1 & 2)
FM 31-21	Guerrilla Warfare and Special Forces Operations (Change 1)
FM 31-22	US Army Counterinsurgency Forces
FM 31-25	Desert Operations

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FM 31-30 Jungle Operations
FM 31-50 Combat in Fortified and Built-up Areas
FM 31-60 River-crossing Operations (Change 1)
FM 31-70 Basic Cold Weather Manual (Change 1)
FM 31-71 Northern Operations
FM 31-72 Mountain Operations
FM 33-5 Psychological Operations
FM 38-1 Logistics Supply Management (packaging and shipping of materials)
FM 38-5 Logistics Maintenance Management
FM 41-10 Civil Affairs Operations
FM 54-1 The Logistical Command (Changes 1 & 2)
FM 55-6 Transportation Services in Theaters of Operations
FM 55-31 Motor Transportation Service in Theaters of Operations
FM 57-10 Army Forces in Joint Airborne Operations
FM 57-35 Airmobile Operations
FM 57-38 Pathfinder Operations
FM 60-30 Embarkation and Loading, Amphibious
FM 100-5 Field Service Regulations — Operations (Change 1)
FM 100-10 Field Service Regulations — Administration (Change 1)
FM 100-20 Field Service Regulations — Counterinsurgency
FM 101-5 Staff Officers Field Manual; Staff Organization and Procedures
FM 101-10 Organization Technical and Logistical Data Parts I, II, and III
FM 101-31-1 Staff Officers Field Manual; Nuclear Weapons Employment
TC 5-9 Near Infrared Night Vision and Detection Equipment and its Application
DA Pamphlet Military Publications: Index of Administrative Publications
310-1
DA Pamphlet Military Publications: Doctrinal, Training and Organizational Publications
310-3 (Change 2)
DA Pamphlet Military Publications: Index of Technical Manuals, Technical Bulletins, Supply
310-4 Manuals, Supply Bulletins, Lubrication Orders, and Modification Work Orders
DA Pamphlet Military Publications: Index of Training Aids and Devices
310-5
DA Pamphlet Military Publications: Index of Supply Manuals: Signal, Types 1, 2, 3, and 10
310-21
DA Pamphlet Military Publications: Index of Supply Manuals: Transportation Materiel
310-22
DA Pamphlet Military Publications: Index of Supply Manuals: Engineer Type Items (Change 1)
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DA Pamphlet Military Publications: Index of Supply Manuals: Ordnance Corps (Change 3)
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DA Pamphlet Military Publications: Index of Supply Manuals: Quartermaster Corps (Change 1)
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AFM 1-1 USAF Basic Doctrine
AFM 66-1 Maintenance Management
AFM 66-12 Vehicle Management and Maintenance
AFM 67-1 USAF Supply Manual (Vol. I-VI, IX, & XX)
AFM 67-3 Storage and Materials Handling
AFM 68-3 Defense Yard Handbook
AFR 71-6 Preservation, Packaging, Packing, and Marking Policy and Equipment
AFM 71-4 Packaging and Handling of Dangerous Materials for Transportation by Military Aircraft
AFM 88-12 Fuel Storage and Distribution
AFM 88-18 Storage
AFM 88-54 Air Force Civil Engineer Handbook
AFM 146-4 Standard B Ration for the Armed Forces
AFM 160-20 Administration of Medical Treatment Activities
AFM 160-27 Medical Service in Joint Overseas Operations
AFP 67-2-3 Supply Management Handbook for AF Commanders
AFR 0-2 USAF Numerical Index of Administrative Publications

Air Force Specification Bulletin

AFR 400-3 Interservice Exchange of Logistics Research Information
AFR 400-6 Military Assistance Sales
AFR 400-15 Logistic Support U. S. Non-Governmental, Non-Military Agencies and Individuals in Overseas Military Commands

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