

NAVAIR 00-110AH53-2

Standard Aircraft Characteristics

NAVY MODEL
CH-53D
AIRCRAFT

PUBLISHED BY DIRECTION OF THE
COMMANDER OF THE NAVAL AIR SYSTEMS COMMAND

JUNE 1971



STANDARD AIRCRAFT CHARACTERISTICS

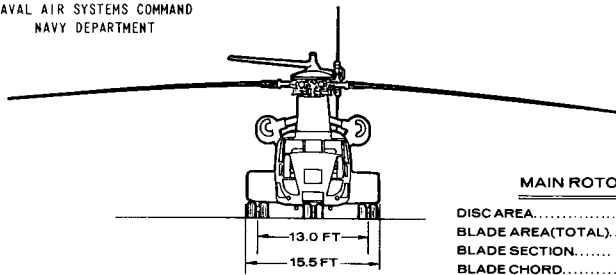
CH-53D

SIKORSKY

SERVICE

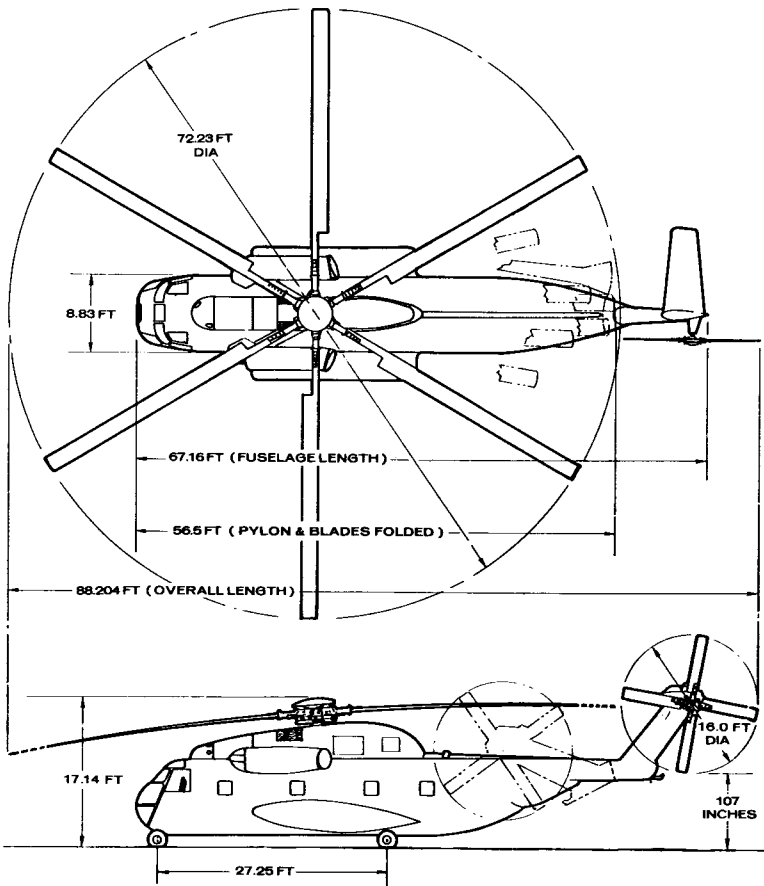
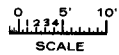
NAVAIR 00-110AH53-2

NAVAL AIR SYSTEMS COMMAND
NAVY DEPARTMENT



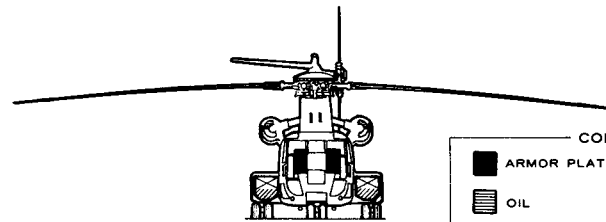
MAIN ROTOR DATA

DISC AREA..... 4098.135 SQ FT
BLADE AREA (TOTAL).... 374.952 SQ FT
BLADE SECTION..... NACA .0011 MOD
BLADE CHORD..... 26.0 INCH
MAIN ROTOR GEAR RATIO..... 73.55:1



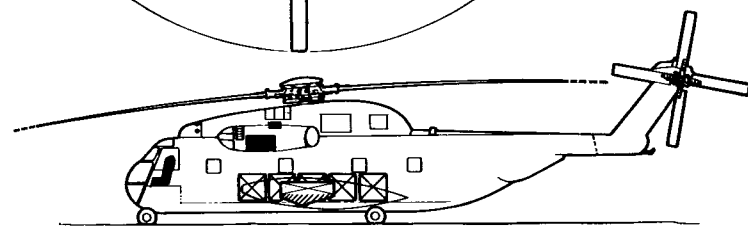
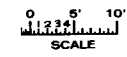
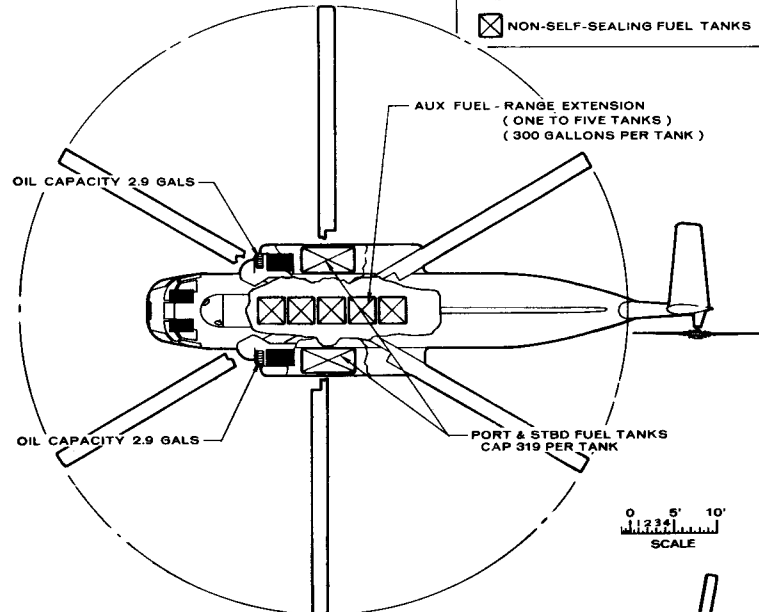
DESCRIPTIVE ARRANGEMENT

NAVAL AIR SYSTEMS COMMAND
NAVY DEPARTMENT



CODE

- ARMOR PLATE
- OIL
- SELF-SEALING FUEL TANKS
- NON-SELF-SEALING FUEL TANKS



ARMAMENT AND TANKAGE

POWER PLANT	MISSION AND DESCRIPTION	WEIGHTS																																					
<p>No. and Model: (2)T64-GE-413 Manufacturer: General Electric Engine Spec. No.: E1159(19 March 1969) Type: Axial Length: 78.8 inches Diameter: 23.8 inches Gear Ratio (Eng/Rotor) 73.55 to 1</p> <p style="text-align: center;">RATINGS</p> <table border="1"> <thead> <tr> <th>S. L. STATIC</th> <th>SHP</th> <th>RPM</th> <th>MIN.</th> </tr> </thead> <tbody> <tr> <td>Max.</td> <td>*3925</td> <td>13600</td> <td>10</td> </tr> <tr> <td>Military</td> <td>3695</td> <td>13600</td> <td>30</td> </tr> <tr> <td>Normal</td> <td>3230</td> <td>13600</td> <td>Cont.</td> </tr> </tbody> </table> <p>* See Note Performance Summary page for transmission ratings.</p>	S. L. STATIC	SHP	RPM	MIN.	Max.	*3925	13600	10	Military	3695	13600	30	Normal	3230	13600	Cont.	<p>Primarily designed as an assault transport, the helicopter is employed in the movement of cargo and equipment and in the transportation of troops. When appropriately equipped, it may be used in the recovery of downed aircraft and personnel, performing mine countermeasure missions, and towing of vehicles and ships.</p> <p>The twin turbine engine helicopter uses a single main rotor and a single anti-torque tail rotor. The blades are all metal construction. Main rotor blades are equipped with Sikorsky BIM[®] to eliminate mandatory blade retirement. Conventional helicopter controls are provided for both pilot and copilot. The mechanical controls are augmented by two parallel and independent hydraulic servo systems. An automatic flight control system (AFCS) is also provided. Landing gear is retractable. Main rotor blades and tail pylon fold for stowage aboard an aircraft carrier. To facilitate cargo loading, the aircraft is equipped with a hydraulically operated rear ramp, two cargo winches, roller conveyors, and tie-down facilities.</p>	<table border="1"> <thead> <tr> <th>LOADING</th> <th>POUNDS</th> <th>L.F.</th> </tr> </thead> <tbody> <tr> <td>Empty (A)</td> <td>23628</td> <td></td> </tr> <tr> <td>Basic</td> <td>23634</td> <td></td> </tr> <tr> <td>Design</td> <td>33500</td> <td>3.0</td> </tr> <tr> <td>**Design Alternate</td> <td>42000</td> <td>2.39</td> </tr> <tr> <td>*Combat</td> <td>34958</td> <td></td> </tr> <tr> <td>*Take-off</td> <td>36693</td> <td></td> </tr> </tbody> </table> <p>(A) Actual * For Basic Mission ** ECP 6144 Part II</p>	LOADING	POUNDS	L.F.	Empty (A)	23628		Basic	23634		Design	33500	3.0	**Design Alternate	42000	2.39	*Combat	34958		*Take-off	36693	
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ELECTRONICS		FUEL AND OIL																																					
AN/ARC-51A Radio Set (UHF) AN/ARN-52 Tacan Navigation Set AN/AFX-64 IFF Transponder Set AN/ARC-94 Radio Set AN/ARN-59 ADF AN/ARC-54 or 131 Radio Set (VHF) AN/AIC-14 Interphone System AN/APN-154 Radar Beacon Set AN/APN-171 Radar Altimeter ID-351 or 387/ARN Course Indicator ID-663A/U or B/U or C/U Bearing Distance Heading Indicator	<p style="text-align: center;">DEVELOPMENT</p> <p>First Flight: ----- 27 January 1969 First Service Use: ----- 7 March 1969 Production Status: ----- In Production</p> <p style="text-align: center;">DIMENSIONS</p> <p>Main Rotor Dia.-----72'-2.8" Length (blades & pylon folded)-----56'-6" Height (blades & pylon folded)-----17'-1.7" No. of Blades, main-----6 Blade Area (each)-----62.5 sq. ft. Disc Area-----4098.1 sq. ft. Main Wheel Tread-----13'-0" Max. Width (Main Blades and Pylon Folded)-----15'-6"</p>	<table border="1"> <thead> <tr> <th>LOCATION</th> <th>NO. TANKS</th> <th>GAL.</th> </tr> </thead> <tbody> <tr> <td>L. Sponson*</td> <td>1</td> <td>319</td> </tr> <tr> <td>R. Sponson*</td> <td>1</td> <td>319</td> </tr> <tr> <td>Cabin**</td> <td>5</td> <td>1500</td> </tr> <tr> <td></td> <td style="text-align: right;">TOTAL</td> <td>2138</td> </tr> </tbody> </table> <p>Grade ----- JP-4, JP-5 Specification-----MIL-J-5624D *Bottom third self-sealing **Aux. tanks for range extension</p> <p style="text-align: center;">OIL</p> <p>Nacelles ----- 2 (tot. 5.8) Specification-----MIL-L-23699</p>	LOCATION	NO. TANKS	GAL.	L. Sponson*	1	319	R. Sponson*	1	319	Cabin**	5	1500		TOTAL	2138																						
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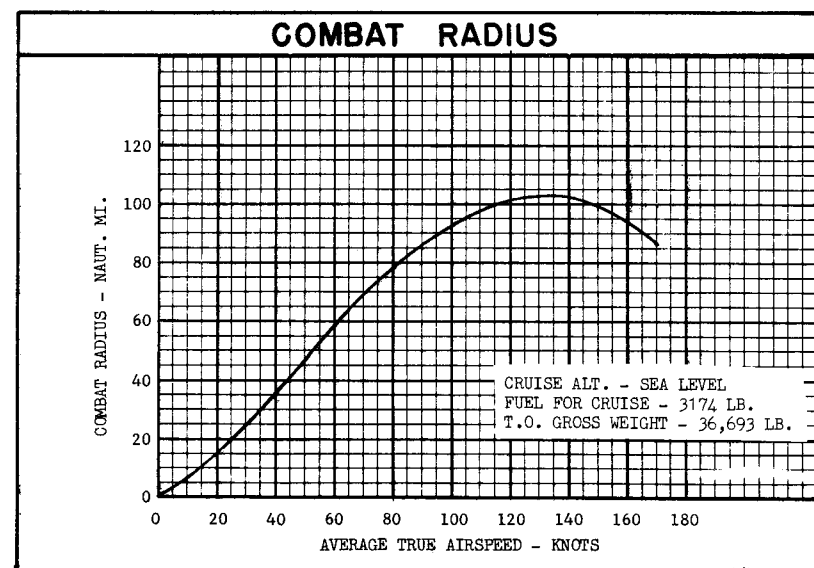
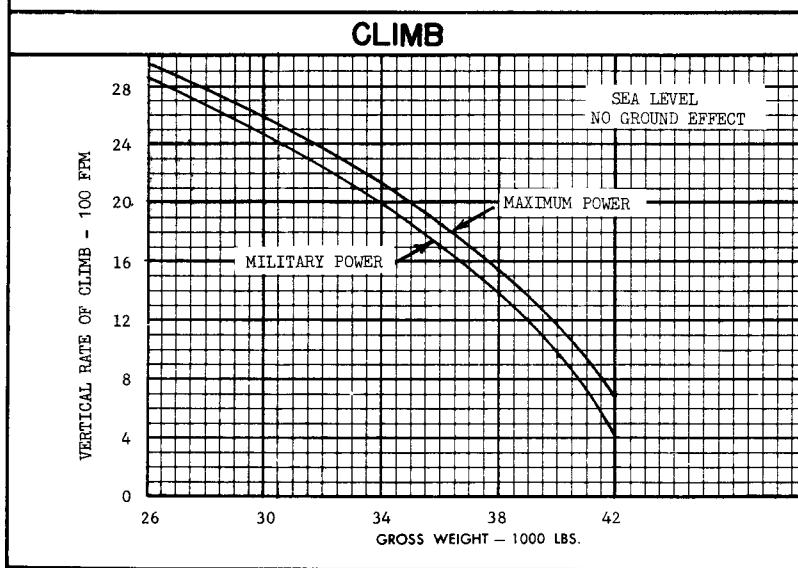
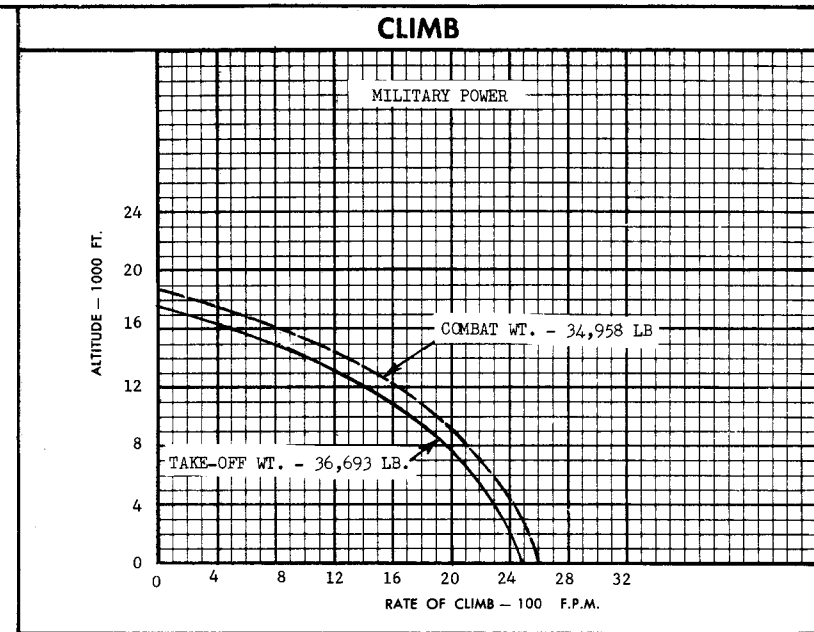
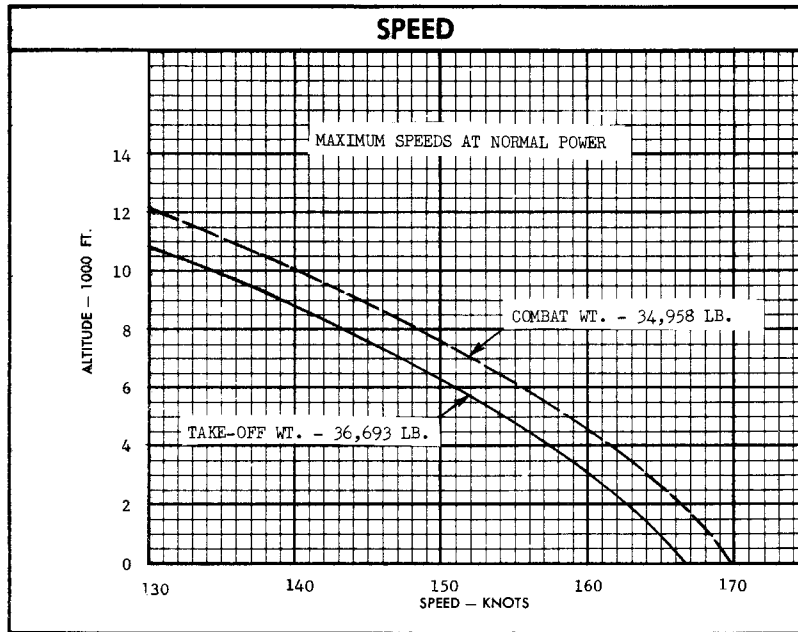
PERFORMANCE SUMMARY

TAKE-OFF LOADING CONDITION	BASIC ASSAULT MISSION I	OVERLOAD ASSAULT MISSION II	COMBAT RANGE MISSION III	FERRY RANGE MISSION IV	RETRIEVAL (TROPICAL DAY)* MISSION V
TAKE-OFF WEIGHT LB.	36693	41435	36693	41513	28693
FUEL LB.	4338	4338	4338	14538	4338
PAYLOAD LB.	8000/4000	12742/4000	8000/0	0/0	0/9289**
DISC LOADING LB./SQ.FT.	8.95	10.11	8.95	10.13	7.00
VERTICAL RATE OF CLIMB AT S.L. (B/C) FPM.	1590/1740	580/840	1590/1740	560/820	2110/2325
ABSOLUTE HOVERING CEILING (B/C) FT.	6250/7200	1700/2900	6250/7200	1650/2850	7900/8900
MAX. RATE OF CLIMB AT S.L. (A/B) FPM.	2180/2460	1845/2160	2180/2460	1855/2150	2320/2710
SERVICE CEILING (100 FPM.) (A) FT.	16750	13350	16750	13300	17500
SPEED AT S.L. (A) KN.	166	158	166	157	172
MAX. SPEED/ALTITUDE (A) KN./FT.	166/S.L.	158/S.L.	166/S.L.	127/8000	169/3000
COMBAT RANGE N.MI.	---	---	228	886	---
AVERAGE CRUISING SPEED KN.	---	---	140	135	---
CRUISING ALTITUDE FT.	---	---	0	8000	---
COMBAT RADIUS N.MI.	100	95	---	---	106
AVERAGE CRUISING SPEED KN.	150	150	---	---	138
Cruising altitude FT.	0	0	---	---	3000
Total-mission time HRS.	1.48	1.40	1.63	6.62	1.55

NOTES: (A) Normal power
 (B) Military power
 (C) Maximum power
 * Tropical Day: 91.5°F. at 3000 ft. cruise altitude.
 ** Inbound payload is carried externally ($\Delta f = 35$ sq. ft.)

Performance Basis:

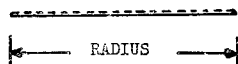
- (1) ICAO Standard conditions (except Mission V), no wind, no ground effect.
- (2) Calculated data based on Navy flight tests on CH-53A helicopter.
- (3) Range and radius based on General Electric specification fuel consumption data using fuel grade JP-5.
- (4) Fuel consumption data are increased 5% above engine specification values.
- (5) Transmission ratings are 7560 HP dual engine and 3780 HP single engine operation.
- (6) Aircraft red line airspeed is 170 knots IAS.
- (7) Weight data based on "Actual Weight and Balance Report", SER-65575 dated 10 March 1970.
- (8) Performance reference: Sikorsky Report, SER-65583, "Substantiating Data for Standard Aircraft Characteristics and Performance Charts for CH-53D Helicopter."



NOTES

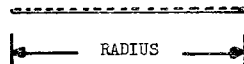
BASIC ASSAULT

Warm-Up & Take-Off: 2 min. at S.L., NRP
 Cruise Out: At 150 kts. air-speed at S.L. to remote base
 Hover Over Remote Base: At S.L. out of ground effect, for 10 min.
 Land At Remote Base: Discharge 8000 lbs. and accept 4000 lbs. for return
 Warm-Up & Take-Off: 2 min. at S.L., NRP
 Cruise Back: At 150 kts. air-speed at S.L.
 Reserve: 10% of initial fuel load



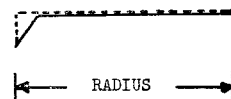
OVERLOAD ASSAULT

Warm-Up & Take-Off: 2 min. at S.L., NRP
 Cruise Out: At 150 kts. air-speed at S.L. to remote base
 Hover Over Remote Base: At S.L. out of ground effect for 10 min.
 Land At Remote Base: Discharge 12,742 lbs. and accept 4000 lbs. for return
 Warm-Up & Take-Off: 2 min. at S.L., NRP
 Cruise Back: At 150 kts. air-speed at S.L.
 Reserve: 10% of initial fuel load



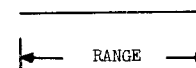
DUD RETRIEVAL (TROPICAL DAY)

Warm-Up & Take-Off: 5 min. at S.L., 90°F, NRP
 Climb: On course to 3000 ft. 91.5°F with Mil power
 Cruise Out: At best range speeds to remote base
 Hover Over Base: Out of ground effect, at 3000 ft., 91.5°F for 10 min. Pick up external maximum payload (O.G.E. hover, $\Delta f=35 \text{ ft}^2$)
 Cruise Back: At best range speeds 3000 ft., 91.5°F
 Descend: To S.L. (no fuel used, no distance gained)
 Reserve: 10% of initial fuel load



COMBAT RANGE

Warm-Up & Take-Off: 5 min. at S.L., NRP
 Cruise Out: At S.L. at best range speeds until reserve fuel remains
 Reserve: 10% of initial fuel load



FERRY RANGE

Warm-Up & Take-Off: 5 min. at S.L., NRP
 Climb: On course to 8000 ft. with Mil power
 Cruise Out: At best range speeds until reserve fuel remains
 Descend: To S.L. (no fuel used, no distance gained)
 Reserve: 10% of initial fuel load

