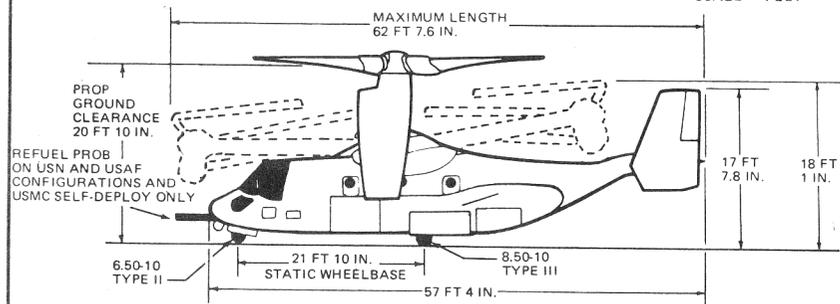
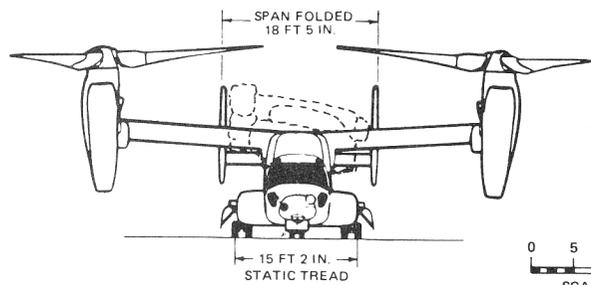
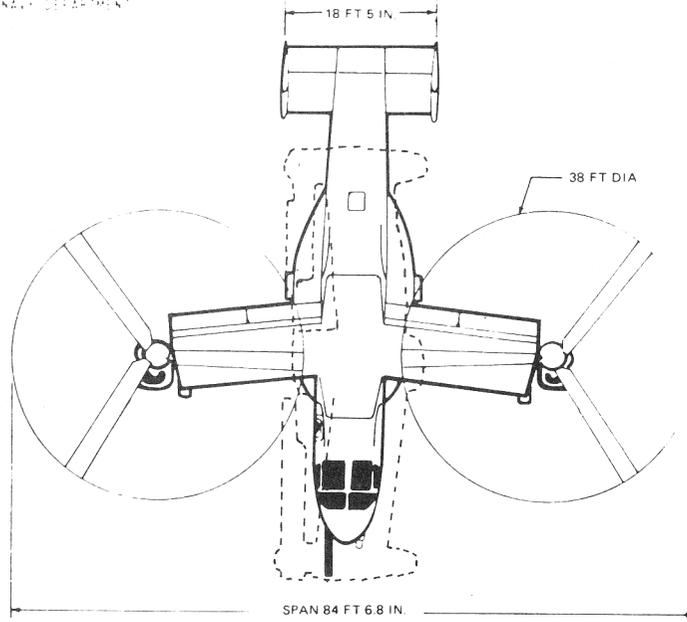


# STANDARD AIRCRAFT CHARACTERISTICS

**MV-22 "OSPREY"  
BELL-BOEING**

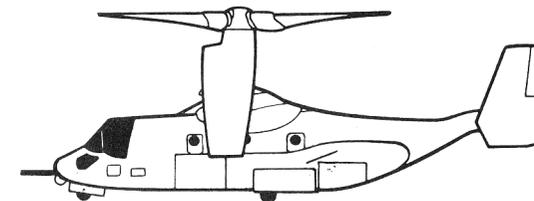
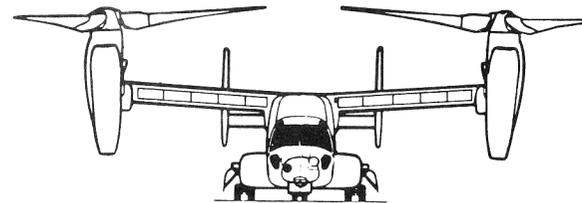
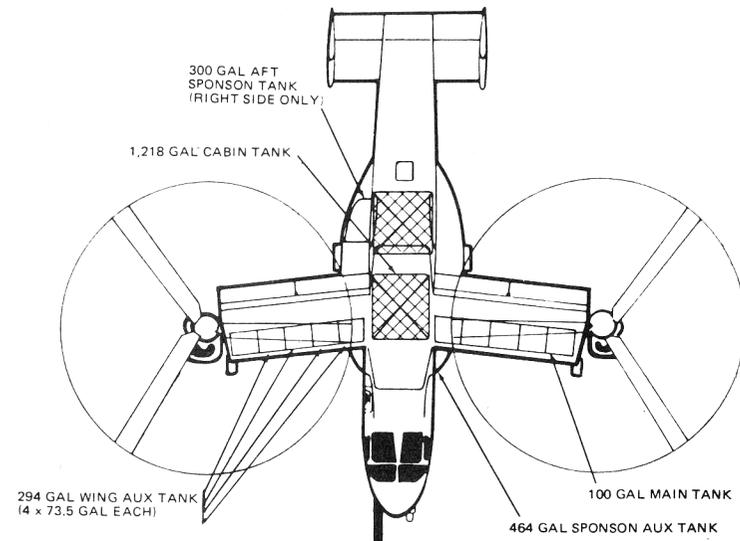
All inquiries concerning data  
in these charts should be  
directed to NAVAIR, code AIR-53012

NAVAL AIR SYSTEMS COMMAND  
NAVY DEPARTMENT



DESCRIPTIVE ARRANGEMENT

NAVAL AIR SYSTEMS COMMAND  
NAVY DEPARTMENT



NONSELF-SEALING; CRASHWORTHY;  
NON-INERTED

NOTE: ALL CONFIGURATIONS CARRY TWO CABIN  
TANKS FOR SELF-DEPLOY ONLY

ARMAMENT AND TANKAGE

POWER PLANT			
No. & Model:	2 T406-AD-400		
Manufacturer:	Allison Gas Turbine Division		
Engine Spec No.:	937 (Fourth Draft) 22 July 85		
Type:	Turboshaft		
RATINGS			
	SHP	RPM	ALT
Maximum	6150*	15,000	Sea Level, 59 <sup>OF</sup>
Intermediate	6150*	15,000	Sea Level, 59 <sup>OF</sup>
Maximum Continuous	5890	15,000	Sea Level, 59 <sup>OF</sup>
Transmission Limits:	3521**	12,575	Cruise rpm
	4200**	15,000	USMC
	4570**	15,578	USN, USAF
	5920	15,578	OEI
Exhaust Nozzle Area 500 in. <sup>2</sup>			
* Engine Torque Limit 2,153 ft-lb			
** RHP			

ELECTRONICS		
VHF/UHF Radio AN/ARC 182	Radar Beacon APX-78	Inertial Nav System SKN-2443 (CFE)
VHF/UHF Encryption KY 58		Mission Computers AYK-14 (XN-6)
VHF/UHF Control Head C-10319A	Missile Warning AAR-47	Interface Units (CFE)
HF Radio ARC-199 or ARC-190	Chaff Flare/Jammer Dispenser ALE-39	VSLED (CFE)
HF Encryption ANDVT	SAHRS USN-2	DTS (CFE)
IFF APX-100	Tacan ARN-118	MFD Color (CFE)
IFF Security Kit 1A TSEC	VOR/ILS MB ARN-144	DEU (CFE)
Intercom (CFE)	Doppler APN-217	CDU (CFE)
FM Homing (CFE)	Radar Altimeter APN-194	HMD (GFE) ASQ-190 FLIR (CFE)
Digital Message Device OA-8990	VHF/UHF ADF OA-8697	Multifunction Radar (CFE) APQ-168
		Night Vision Goggles (GFE AN/AVS-6)
		Digital Map (GFE)

MISSION AND DESCRIPTION	
The V-22 is a multimission aircraft designed for use by all services. The unique ability of the tiltrotor to combine VTOL operations with high altitude and high airspeed flight permits such multimission applications.	
The U.S. Marine Corps will use the V-22 for Vertical Assault Transport of troops, equipment and supplies from amphibious assault ships and land bases.	
The U.S. Navy will use the V-22 for combat search and rescue, delivery and retrieval of special warfare teams, and logistics transportation in support of the fleet.	
The U.S. Air Force will use the V-22 for long range special operations missions, delivering and retrieving U.S. Army special forces troops and equipment at mission radii in excess of 500 NM.	
The U.S. Army will use the V-22 for aero medical evacuation, special forces infiltration and exfiltration and long range assault logistics support.	
The V-22 Osprey is a tiltrotor aircraft with two 38 foot rotor systems and engine/transmission nacelles that are mounted on each wing tip. These rotor systems are powered by two T406-AD-400 engines. The aircraft operates as a helicopter when taking off and landing vertically. Once airborne the nacelles are rotated 90 degrees forward thus converting the aircraft into a turboprop airplane for high-speed, fuel-efficient flight. The rotors are synchronized by means of an interconnect transmission shaft that runs through the wing between the two nacelle mounted transmissions. This shaft also provides power transmission from one rotor system to the other in case of an engine failure.	
The aircraft folds up compactly for stowage aboard ship. This is accomplished by folding the rotor blades inboard in front of the wing then swiveling the wing to be parallel to the fuselage.	
The V-22 airframe is almost completely composite construction. It has crash-worthy seating for combat troops, two external cargo hooks for carriage of out-sized equipment, a rescue hoist, a cargo winch and pulley system of loading and unloading heavy internal cargo loads and an aft loading ramp which permits quick egress and exit of both troops and cargo.	
The Osprey is capable of all weather instrument flight, day or night, and continuous operation in moderate icing conditions. The Navy and Air Force aircraft are equipped to fly in these same conditions at very low level.	
Although all services use a common aircraft, the Marine Corps and Army designation is MV-22A, the Air Force designation is CV-22A and the Navy designation is HV-22A.	
DEVELOPMENT	
First Flight (estimated)	1988
Service Use (estimated)	1991

DIMENSIONS		
Main Rotor		
Diameter:	38 ft	
Disk Area:	2,268 ft <sup>2</sup>	
Blade Area:	261.52 ft <sup>2</sup>	
No. of Blades:	3 per rotor	
Length	Height	Width
Maximum: 688 inches	Maximum: 261 inches	Maximum: 1,014.9 inches
Folded: 751 inches	Folded: 217 inches	Folded: 221 inches
		Tread: 182.6 inches

WEIGHTS			
	(USMC)	Load Factor	
Loading	Weight (lb)	Airplane	Helicopter
Empty	31,818		
Operating	32,623		
Design	39,500	+4.0, -1.0	+3.0, -.5
Combat	42,712	+3.7, -.92	+2.77, -.42
Max Takeoff (VTO)	47,500	+3.3, -.84	+2.5, -.42
Max Takeoff (STO)	55,000	+2.87, -.72	
Self-Deployment (STO)	60,500	+2.61, -.65	

FUEL AND OIL		
FUEL		
Gal.	No. & Type of Tanks	Location
2,436	2 Non Self-Sealing	Cabin (Self-Deployment)
928	2 Partial Self-Sealing	Sponsons
199	2 Self-Sealing	Wing
588	8 Self-Sealing	Wing
300	1 Partial Self-Sealing	Aft Sponson
Fuel Grade JP-4/JP-5/JP-8		
Fuel Spec MIL-T-5624		
OIL		
Engine (gal)	1.93	Spec: DOD-L-85734
Transmission (gal)	25.375	Spec: DOD-L-85734

ORDNANCE	
Provisions for Two (2) .50 Caliber Cabin Guns.	
Additional Provision for Ramp Mounted Gun (USAF only)	

ACCOMMODATIONS	
Crew (mission)	3
Cabin Size Clearance	
Length:	290 inches
Width:	71 inches
Height:	72 inches
Usable Volume:	858 ft <sup>3</sup>
Rescue Hatch Dimensions:	40 inches x 29 inches
Provision for Troop Seats:	24
Provision for Litters:	12
Rescue Hoist Capacity:	600 lb
Cargo Hook Capacity:	15,000 lb
Cargo Floor Limit:	300 psf
Max Cargo Weight:	20,000 lb

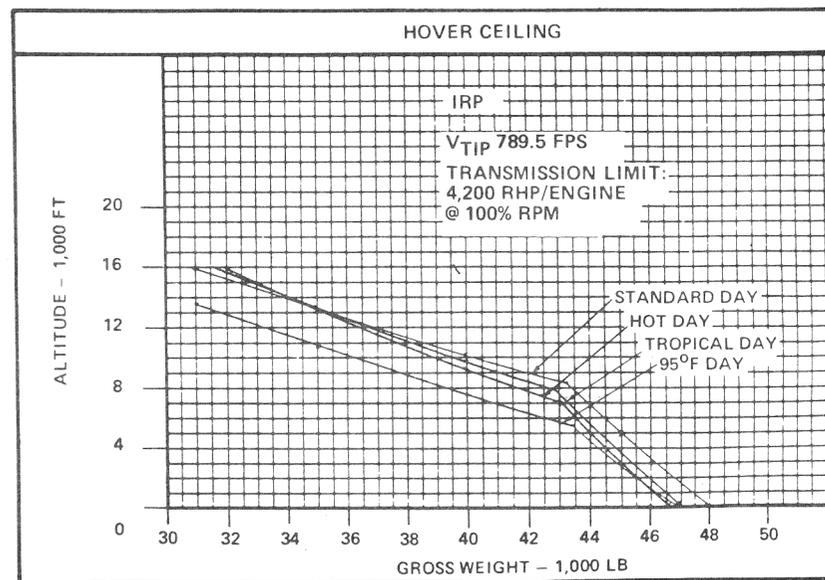
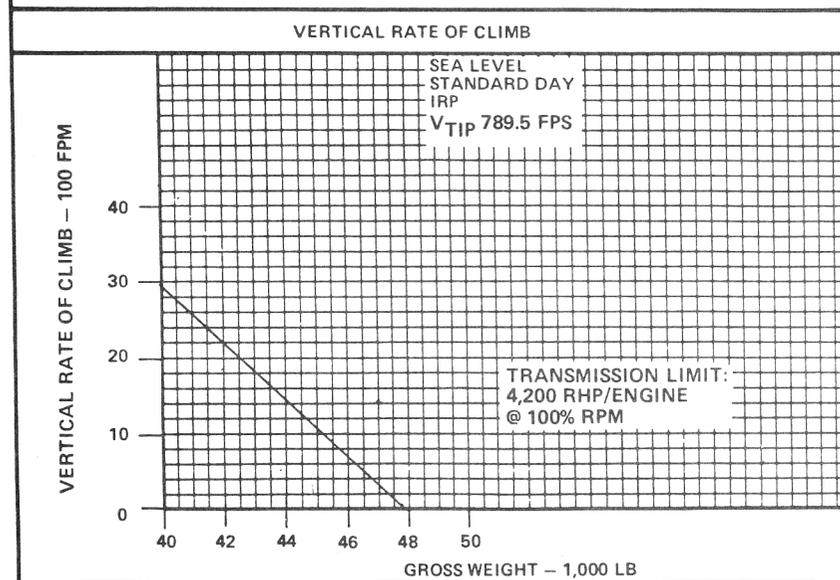
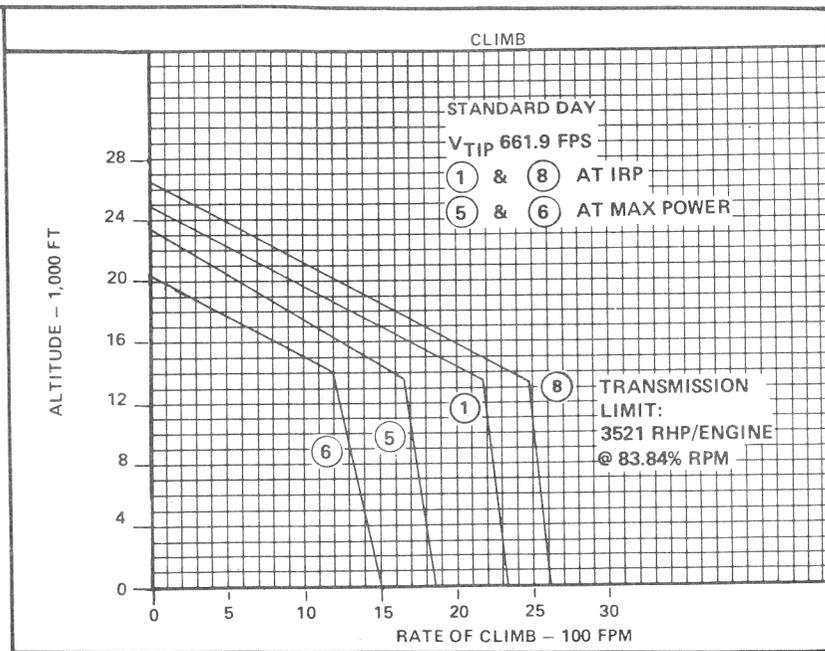
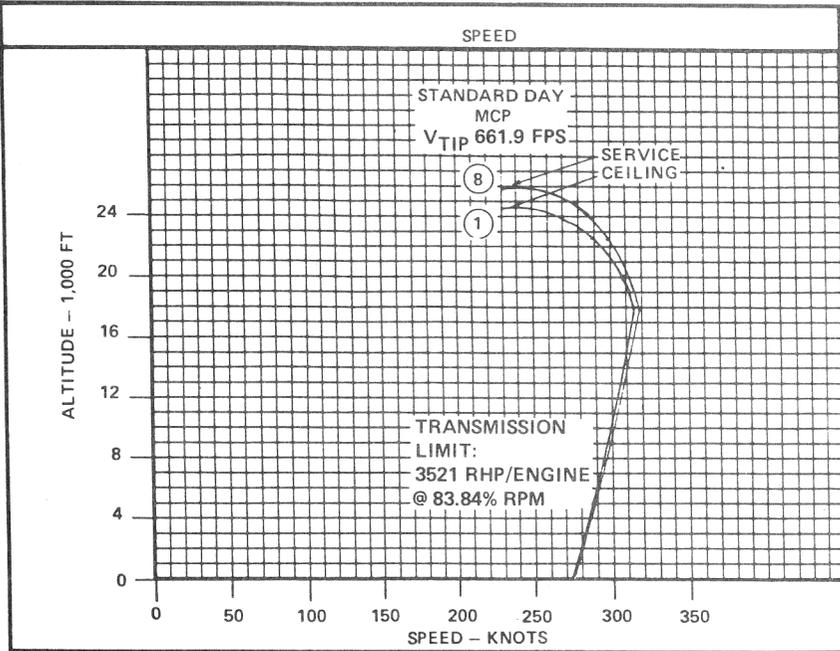
**PERFORMANCE SUMMARY** (STANDARD DAY CONDITIONS)

TAKE-OFF LOADING CONDITION	Amphibious Assault (Troops) ①	Amphibious Assault (Cargo) ②	Land Assault (Troops) ③	Land Assault (Cargo) ④	Combat Search and Rescue ⑤	Special Operations (A) ⑥	USMC Self-Deployment ⑦
TAKE-OFF WEIGHT (E) lb.	45,021	44,259	44,767	44,061	47,921	53,556	60,500
*Fuel internal/external (JP-5) (6.8 lb/gal) lb./lb.	6,838	3,536	6,584	3,338	13,368	15,367 (A)	26,119
Payload lb.	5,760	8,300	5,760	8,300	880	2,880	0
Disc loading lb./sq. ft.	19.8	19.5	19.7	19.4	21.1	23.6	26.7
Vertical rate of climb at SL /Std. fpm.	1,090 (F)	1,340 (F)	1,140 (F)	1,410 (F)	1,000 (B)	NA	NA
Absolute hovering ceiling (OGE Std) ft.	5,000 (F)	6,500 (F)	5,500 (F)	6,800 (F)	4,400 (B)	NA	NA
Max. rate of climb at SL/Std (H) fpm.	2,320	2,400	2,350	2,420	2,030	1,490	1,090
Service ceiling (G) ft.	24,560	24,930	24,680	25,020	23,110	20,180	17,950
Speed at S.L. (H) kn.	273	274	274	274	272	268	264
Max. speed/altitude (Std Day) (H) kn./ft.	315/18,000	315/18,000	315/18,000	315/18,000	314/17,000	305/16,500	294/16,000
O.E.I. Service ceiling (G) ft.	11,300	11,800	11,450	11,900	9,350	5,750	S.L. (B)
Min. speed (O.E.I.) (B) (C) kn.	38	37	38	37	45	63	90
Max. speed (O.E.I.) (B) (C) kn.	231	232	231	233	228	221	202
Combat radius n. mi.	2 x 50	50	200	50	460	520	NA
Mission time (I) hrs.	1.99	0.73	1.90	0.73	4.04	4.25	NA
Average cruising speed kn.	271	180	240	180	244	250	NA
Cruising altitude ft.	3,000	3,000	3,000	3,000	2,000	1,000	NA
Range/Mission Time nmi/hours	515/2.21	108/.83	495/2.20	101/.78	1,020/4.24	1,115/4.47	2,100/7.92
Average cruising speed kn.	233	130	225	130	241	249	264
Cruising altitude ft.	3,000	3,000	3,000	3,000	2,000	1,000	12,000-25,000
Maximum endurance hrs.	2.60	.83	2.50	.78	5.20	5.60	10.01
Endurance speed kn.	175	130	174	130	171	179	223/170
Endurance altitude ft.	3,000	3,000	3,000	3,000	2,000	1,000	10,000
Combat Loading Condition ⑧	60% fuel		60% fuel		60% fuel	60% fuel	
Combat Weight lb.	42,486		42,333		42,773	47,609	
Engine Power	MCP		MCP		MCP	MCP	
Fuel lb.	4,103		3,950		8,021	9,220	
Combat Speed/Cruise Altitude (D) (H) kn./ft.	284/3,000		284/3,000		280/2,000	275/1,000	
Rate of Climb/Cruise Altitude (D) (H) fpm./ft.	2,570/3,000		2,590/3,000		2,580/2,000	2,020/1,000	
Combat Ceiling (500 fpm) (G) ft.	22,200		22,400		23,700	20,800	
Rate of Climb at SL/STD (H) fpm.	2,600		2,620		2,600	2,030	
Max. speed at SL/Std (H) kn.	275		275		275	272	
Max speed/altitude-time airspeed (H) kn./ft.	319/18,000		319/18,000		319/18,000	314/17,000	
Landing Weight	33,615		33,584		36,090	39,926	37,193
Fuel lb.	992		961		1,337	1,537	2,612
Absolute hovering ceiling (OGE) ft.	14,200 (F)		14,240 (F)		12,800 (B)	10,200 (B)	11,900 (F)

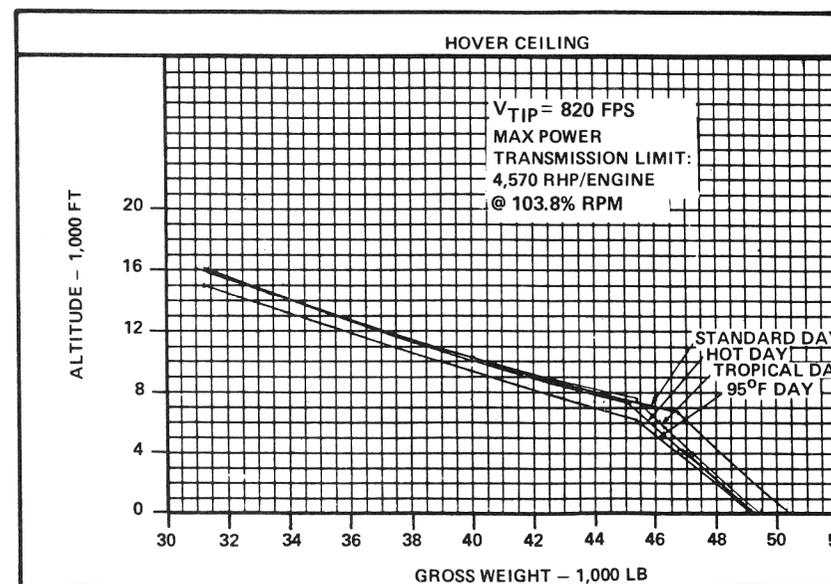
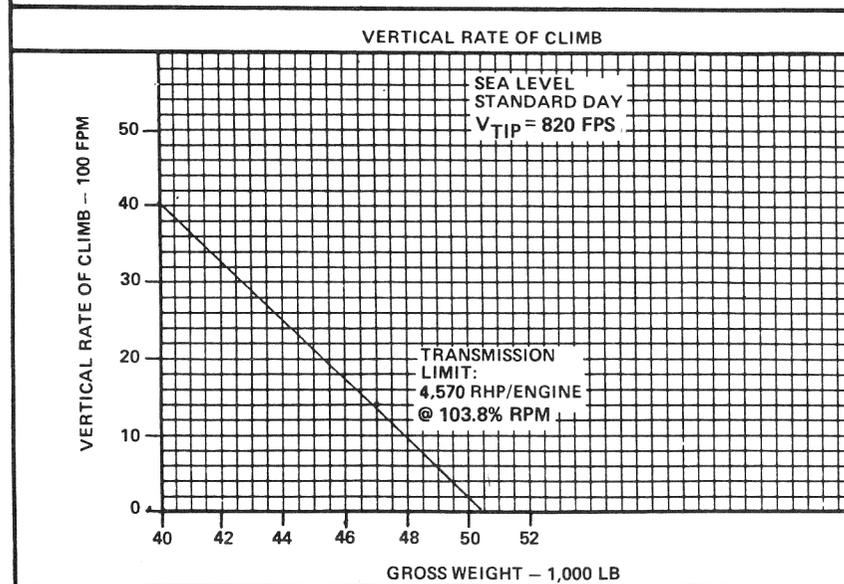
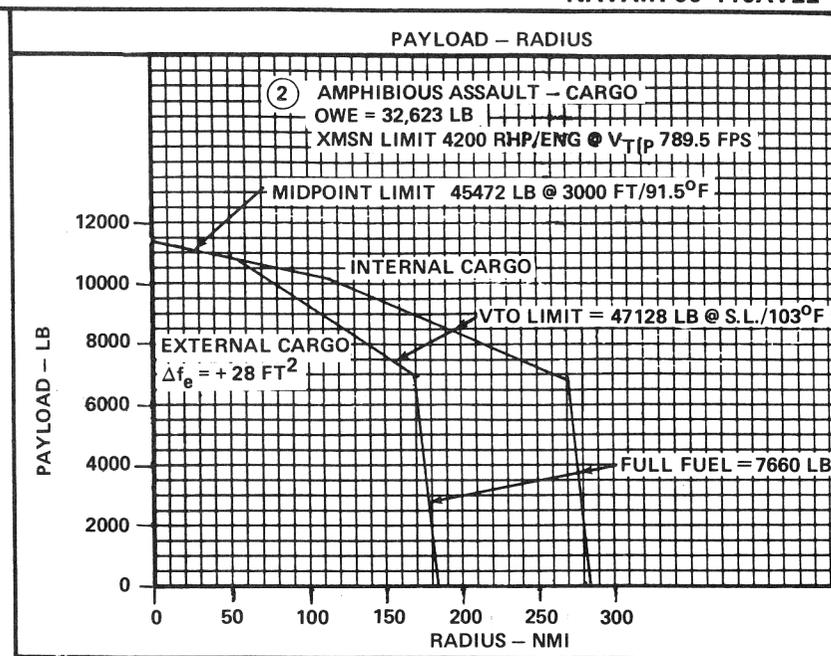
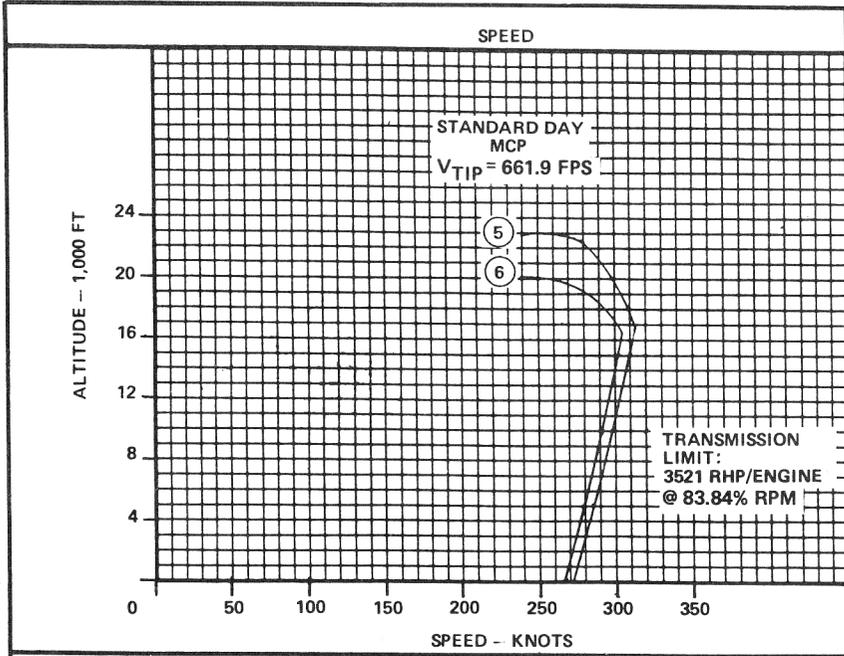
**NOTES**

PERFORMANCE BASIS: ESTIMATED DATA GUARANTEE LEVELS OF PERFORMANCE (SD-572-1) AND ENGINE SPECIFICATION FUEL FLOWS  
 \*WING AUXILIARY FUEL TANKS ARE USMC MISSION ROLE EQUIPMENT

- (A) JP-4 FUEL (6.5 LB/GAL)
- (B) MAX POWER
- (C) SEA LEVEL
- (D) MISSION CRUISE ALTITUDE
- (E) ADD 200 LB OF TAXI/WARM-UP FUEL TO OBTAIN RAMP WT
- (F) IRP
- (G) MCP
- (H) XMSN LIMIT: 3521 RHP/ENG @ CRUISE RPM (V<sub>TIP</sub> = 661.9 FPS)
- (I) DOES NOT INCLUDE 10 MIN. TAXI/WARM-UP TIME



○ LOADING CONDITION COLUMN NUMBER



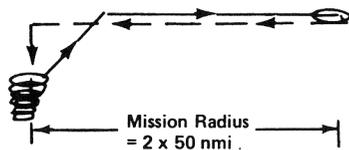
○ LOADING CONDITION COLUMN NUMBER

NOTES

MISSION DEFINITIONS

(1) AMPHIBIOUS ASSAULT, TROOP LIFT (USMC)

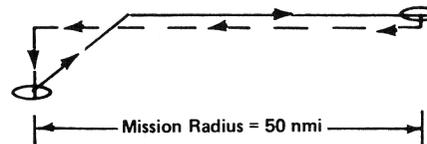
- Takeoff: Warmup/idle 10 minutes, VTO @ SL/103°F (1 minute IRP)
- Loiter: Loiter 40 minutes @  $V_{BE}$
- Climb: Climb to 3,000 ft @ IRP
- Cruise: Cruise to mission radius @  $V_{BR}$
- Maneuver: 5 minutes @ IRP
- Hover: HOGE/land @ 3,000 ft/91.5°F (2 minutes @ IRP), drop P/L, VTO @ 3,000 ft/91.5°F (1 minute @ IRP)
- Maneuver: 5 minutes @ IRP
- Cruise: Cruise back @  $V_{MCP}$
- Descent: Descend to sea level (no fuel used, no distance credit)
- Loiter: Loiter 15 minutes @  $V_{BE}$
- Hover: HOGE/land @ SL/103°F (2 minutes @ IRP), pick up P/L, VTO @ SL/103°F (1 minute @ IRP)
- Climb: Climb to 3,000 ft @ IRP
- Cruise: Cruise to mission radius @  $V_{MCP}$
- Hover: HOGE/land @ 3,000 ft/91.5°F (2 minutes @ IRP), drop P/L, VTO @ 3,000 ft/91.5°F (1 minute @ IRP)
- Cruise: Cruise back @  $V_{BR}$
- Descent: Descend to sea level (no fuel used, no distance credit)
- Reserve: 30 minute sea level loiter @  $V_{BE}$  or 10% initial fuel, whichever is greater



○ Hover symbol (HOGE, VTO/land, maneuver)

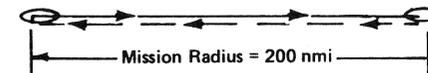
(2) AMPHIBIOUS ASSAULT, EXTERNAL CARGO LIFT (USMC)

- Takeoff: Warmup/idle 10 minutes, VTO @ SL/103°F (1 minute @ IRP)
- Climb: Climb to 3,000 ft @ IRP
- Cruise: Cruise to mission radius (speed not to exceed 130 ktas)
- Hover: HOGE @ 3,000 ft/91.5°F (2 minutes @ IRP), drop P/L
- Maneuver: 5 minutes @ IRP
- Cruise: Cruise back @  $V_{BR}$
- Descent: Descend to sea level (no fuel used, no distance credit)
- Reserve: 30 minute sea level loiter @  $V_{BE}$  or 10% initial fuel, whichever is greater



(3) LAND ASSAULT, TROOP LIFT (USMC)

- Takeoff: Warmup/idle 10 minutes, VTO @ 3,000 ft/91.5°F (1 minute @ IRP)
- Cruise: Cruise to mission radius @  $V_{BR}$
- Hover: HOGE/land @ 3,000 ft/91.5°F (2 minutes @ IRP)  
Drop P/L, VTO @ 3,000 ft/91.5°F (1 minute @ IRP)
- Maneuver: 10 minutes @ IRP
- Cruise: Cruise back @  $V_{BR}$
- Reserve: 30 minute sea level loiter @  $V_{BE}$  or 10% initial fuel, whichever is greater



○ LOADING CONDITION COLUMN NUMBER

NOTES

MISSION DEFINITIONS

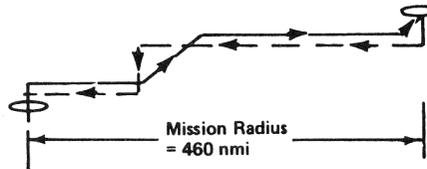
(4) LAND ASSAULT, EXTERNAL CARGO LIFT (USMC)

- Takeoff: Warmup/idle 10 minutes, VTO @ 3,000 ft/91.5°F (1 minute @ IRP)
- Cruise: Cruise to mission radius (speed not to exceed 130 ktas)
- Hover: HOGE @ 3,000 ft/91.5°F (2 minutes @ IRP), drop P/L
- Maneuver: 5 minutes @ IRP
- Cruise: Cruise back @  $V_{BR}$
- Reserve: 30 minute sea level loiter @  $V_{BE}$  or 10% initial fuel, whichever is greater



(5) COMBAT SEARCH AND RESCUE (USN)

- Takeoff: Warmup/idle 10 minutes, VTO @ SL/103°F (1 minute @ max power)
- Cruise: Cruise @  $V_{BR}$  (500 ft AGL)
- Climb: Climb to 2,000 ft @ IRP
- Cruise: Cruise @  $V_{BR}$  to mission radius
- Climb: Climb to 3,000 ft @ IRP
- Hover: HOGE @ 3,000 ft/91.5°F (7.5 minutes @ max power)  
Pick up P/L, HOGE (7.5 minutes @ max power)
- Descent: Descend to 2,000 ft (no fuel used, no distance credit)
- Cruise: Cruise back @  $V_{BR}$
- Descent: Descend to 500 ft AGL (no fuel used, no distance credit)
- Cruise: Cruise back @  $V_{BR}$
- Reserve: 30 minutes sea level loiter @  $V_{BE}$  or 10% initial fuel, whichever is greater

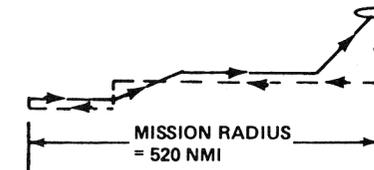


(6) LONG RANGE SPECIAL OPERATIONS (USAF)

- Takeoff: Warmup/idle 10 minutes, STO\* @ SL/103°F
- Cruise: Cruise @  $V_{BR}$
- Climb: Climb to 1,000 ft @ IRP
- Cruise: Cruise to mission radius @  $V_{BR}$
- Climb: Climb to 4,000 ft @ IRP
- Hover: HOGE @ 4,000 ft/95°F (5 minutes @ max Power)
- Descent: Descend to 1,000 ft (no fuel used, no distance credit)
- Cruise: Cruise back @  $V_{BR}$
- Descent: Descend to sea level (no fuel used, no distance credit)
- Cruise: Cruise back @  $V_{BR}$
- Reserve: 30 minutes sea level loiter @  $V_{BE}$  or 10% initial fuel, whichever is greater

\*STO is 2,000 ft maximum distance to clear 50 ft obstacle

JP-4 fuel shall be used for the USAF LRSOF mission



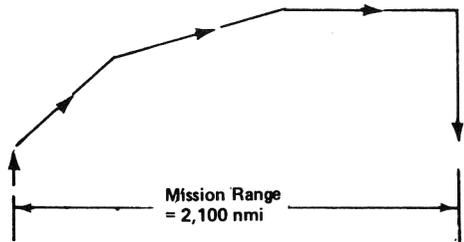
○ LOADING CONDITION COLUMN NUMBER

NOTES

MISSION DEFINITIONS

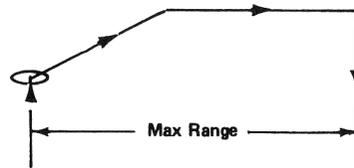
(7) SELF-DEPLOYMENT

Takeoff: Warmup/idle 10 minutes, STO @ SL/90°F at max power  
 Climb: Climb to best cruise altitude @ IRP  
 Cruise: Cruise/climb to 25,000 ft @ V<sub>BR</sub>  
 Reserve: 10% of initial fuel



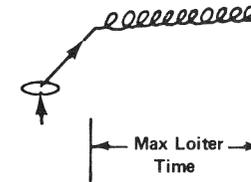
(8) RANGE MISSION

Takeoff: Warmup/idle 10 minutes, VTO (STO for USAF) @ mission altitude/ambient (2 minutes @ IRP)  
 Climb: Climb to mission cruise altitude @ IRP (no climb for land assault missions)  
 Cruise: Cruise @ V<sub>BR</sub>  
 Reserve: 20 minute sea level loiter @ V<sub>BE</sub> or 10% initial fuel, whichever is greater



(9) ENDURANCE MISSION

Takeoff: Warmup/idle 10 minutes, VTO (STO for USAF) @ mission altitude/ambient (2 minutes @ IRP)  
 Climb: Climb to mission cruise altitude (no climb for land assault missions)  
 Loiter: Loiter @ V<sub>BE</sub>  
 Reserve: 20 minute sea level loiter @ V<sub>BE</sub> or 10% initial fuel whichever is greater



○ LOADING CONDITION COLUMN NUMBER