## Appendix A

### Aircraft Capabilities Guide

This ready reference of MAGTF aircraft may be referenced for initial operational planning only. Aircraft performance is affected by many variables such as temperature, atmospheric pressure, humidity, wind, aircraft configuration, and mission requirements. Specific performance parameters are calculated for every mission. Detailed mission planning requires close liaison with the ACE and use of appropriate operations and tactical manuals.

### CH-46E

<table>
<thead>
<tr>
<th><strong>Dimensions</strong></th>
<th></th>
<th><strong>Other Systems</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>16 feet 8 inches</td>
<td>GPS navigation</td>
<td>Miniature Airborne GPS Receiver (MAGR) System</td>
</tr>
<tr>
<td>Weight</td>
<td>16,500 pounds (empty)</td>
<td></td>
<td>(Communications/Navigation Control System [CNCS] configured A/C only)</td>
</tr>
<tr>
<td></td>
<td>24,300 pounds (maximum gross weight)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotor Diameter</td>
<td>51 feet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>84 feet 4 inches</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Airspeed</strong></th>
<th></th>
<th><strong>Communications Equipment</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum endurance</td>
<td>70 KIAS</td>
<td>HF</td>
<td>1 X AN/ARC-94</td>
</tr>
<tr>
<td>Maximum range</td>
<td>110 to 130 KIAS</td>
<td>VHF/UHF</td>
<td>1 X AN/ARC-182 w/KY-58 encryption device</td>
</tr>
<tr>
<td>Maximum airspeed</td>
<td>145 KIAS</td>
<td>UHF</td>
<td>1 X AN/ARC-51A w/KY-58 encryption device</td>
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</table>

<table>
<thead>
<tr>
<th><strong>Fuel Capacity</strong></th>
<th></th>
<th><strong>VHF/UHF</strong></th>
<th>1 X AN/ARC-210 w/KY-58 encryption device (CNCS configured A/C only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pounds</td>
<td>4,488</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gallons</td>
<td>660</td>
<td></td>
<td></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th><strong>Endurance</strong></th>
<th></th>
<th><strong>Aircraft Survivability Equipment</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Payloads</td>
<td>4,300 pounds</td>
<td>RWR</td>
<td>AN/APR-39(V)1 radar warning receiver</td>
</tr>
<tr>
<td></td>
<td>18 pax</td>
<td>IRCW</td>
<td>AN/ALQ-157 infrared jammer</td>
</tr>
<tr>
<td>Endurance</td>
<td>2 + 55 hours</td>
<td>Expendables</td>
<td>AN/ALE-39 countermeasures dispenser</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Weapons Systems</strong></th>
<th></th>
<th>Missle warning</th>
<th>AN/AAR-47 missile warning system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guns</td>
<td>2 X 50 caliber XM 218</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### CH-53

#### CH-53D

**Dimensions**
- Height: 24 feet 11 inches
- Empty weight: 27,000 pounds
- Rotor diameter: 72 feet 3 inches
- Length: 88 feet 6 inches
- Maximum gross weight: 42,000 pounds

**Airspeed**
- Maximum endurance: 70 KIAS
- Maximum airspeed: 130 KIAS

**Fuel Capacity**
- Pounds: 13,178
- Gallons: 1,938

**Endurance**
- Payload: 37 pax, 8,000 pounds internal
- Typical: 3 + 00 hours
- Best case: 5 + 30 hours

**Weapons Systems**
- Guns: 2 X 50 caliber XM 218

**Other Systems**
- None

**Communications Equipment**
- HF: 1 X AN/ARC-94 or AN/ARC-174
- UHF/VHF: 2 X AN/ARC-182 w/KY-58 encryption device or 2 X AN/ARC-210 w/KY-58 encryption device

**Aircraft Survivability Equipment**
- RWR: AN/APR-39(V)1 radar warning receiver
- IRCM: AN/ALQ-157
- Missile warning: AN/AAR-47 missile warning system

#### CH-53E

**Dimensions**
- Height: 28 feet 4 inches
- Empty weight: 36,000 pounds
- Rotor diameter: 79 feet
- Length: 99 feet 1/2 inch
- Maximum gross weight: 73,500 pounds

**Airspeed**
- Maximum endurance: 5 KIAS
- Maximum airspeed: 150 KIAS

**Fuel Capacity**
- Pounds: 15,000
- Gallons: 2,277

**Endurance**
- Payload: 37 to 55 pax, 20,000 pounds internal
- Typical: 4 + 00 hours
- Best case: Indefinite with AR

**Weapons Systems**
- Same as CH-53D

**Other Systems**
- FLIR: AN/AAQ-16B

**Communications Equipment**
- Same as CH-53D

**Aircraft Survivability Equipment**
- RWR: AN/APR-39(V)1 radar warning receiver
- IRCM: AN/ALQ-157
- Missile warning: AN/AAR-47 missile warning system
UH-IN

Dimensions
Height ................................................. 13 feet 1 inch
Weight............................................. 6,900 pounds (empty);
                                      10,500 pounds (maximum gross weight)
Rotor diameter ................................. 48 feet
Length ............................................. 57 feet 4 inches
Fuselage width ................................... 9 feet 4.5 inches

Airspeed
Maximum endurance ....................... 55 to 65 KIAS
Maximum airspeed ............................ 130 KIAS

Fuel Capacity
Pounds............................... 1,329.5 internal; 1,020 additional
                               w/auxiliary fuel cells (2 maximum)
Gallons......................... 195.5; 150 additional w/auxiliary
                              fuel cells (2 maximum)

Endurance
Best case .......................... 1 + 30 (internal fuel only;
                               1,300 pounds gear/ordnance/pax)
                              2 + 20 (1/2 auxiliary fuel cell;
                              900 pounds gear/ordnance/pax)
                              3 + 10 (full auxiliary fuel cell;
                              400 pounds gear/ordnance/pax)
Worst case.......................... 1 + 15 (internal fuel only;
                                   1,300 pounds gear/ordnance/pax)
                                   2 + 00 (1/2 auxiliary fuel cell;
                                   900 pounds gear/ordnance/pax)
                                   2 + 45 (full auxiliary fuel cell;
                                   400 pounds gear/ordnance/pax)

Weapons Systems
Guns..................................... 7.62mm M2A0E
                                   7.62mm GAU-17
                                   50 caliber GAU-16
Rockets ............................... 2.75 inch rockets, WAFFAR
Typical mix: CAS ...................... (14) 2.75 inch rockets,
                                      GAU-16/GAU-17

Other Systems
GPS navigation ................... Doppler GPS Navigation
                               System (CDNU configured
                               A/C only)
FLIR ........................ AN/AAQ-22 Navigation FLIR with
                               LASER range finder and VCR
Miscellaneous .................. loudspeaker
                               for PSYOPS missions; AN/ULQ
                               communications jamming package

Communications Equipment
VHF/UHF .......................... 3 X AN/ARC-210 w/KY-58
                               encryption device
                               (SATCOM available on one
                               radio only)
UHF ............................... 1 X AN/ARC-182 w/KY-58
                               encryption device
UHF ............................... 1 X AN/ARC-159 w/KY-58
                               encryption device
VHF ............................... 1 X AN/ARC-114 w/KY-58
                               encryption device
Miscellaneous ................ ASC-26 communication
                               package provides 1 X UHF
                               and 2 X VHF radios for
                               airborne command and control

Aircraft Survivability Equipment
RWR ............................... AN/APR-39 radar warning
                               receiver
                              AN/APR-44 CW radar
                               warning receiver
IRCM ............................... AN/ALQ-144
Expendables ..................... AN/ALE-39 countermeasures
                               dispenser
Missile warning ..................... AN/AAR-47 missile
                                  warning system
Laser warning ..................... AN/AVR-2
AH-1W

Dimensions
Height .............................................. 13 feet 9 inches
Weight .............................................. 10,5000 pounds (empty)
                                      14,750 pounds (maximum gross weight)
Rotor diameter ............................................... 48 feet
Length ........................................................... 58 feet
Fuselage width .................................. 3 feet 7 inches

Airspeed
Maximum endurance .................................. 72 KIAS
Maximum speed ....................................... 190 KIAS
                                      170 KIAS (w/wing stores)

Fuel Capacity
Pounds ............................................................. 2,037
Gallons ............................................................... 304

Endurance
Payload .................. 2,250 pounds (in addition to full internal fuel)
Typical ...................................................... 2.3 hours
Best case ..................................................... 2,6 hours
                                      4.6 hours (with 2 auxiliary fuel tanks)
Worst case ................................................ 1.8 hours
                                      3.6 hours (with 2 auxiliary fuel tanks)

Weapons Systems
Missiles ............ BGM-71 A/A-1/C/D/E/E-5B TOW
                  AGM-114A/B/C/K Hellfire
                  AGM-122A Sidearm
                  AIM-9L/M Sidewinder
Guns ....................... 20mm turret (+110 AZM, +30 elevation -50°)
                                      20mm ammo (MK 50 series, PGU 27/28/31 series)
Rockets ....................... LAU-61/68 2.75 inch rockets,
                                      7 or 19 shot pod
                                      LAU-10, 5 inch rocket, 4 shot pod
Typical mix:
AAW .................. 2 X AIM-9, 2.75 inch flechette,
                  20mm gun
OAS .................. Hellfire, TOW, 5 inch rockets,
                  internal gun
Armed RECCE ............. Hellfire, TOW, 2.75 inch rockets, internal gun
                  (Sidearm)
Escort .................. Sidewinder, 2.75 inch RP/HE,
                  internal gun, TOW/Hellfire
FAC(A) .................. Hellfire, TOW, 2.75 inch RP,
                  internal gun

Other Systems
GPS navigation .................. Embedded GPS/INS
                  (1686 upgrade)
FLIR .................. Night Targeting System
Laser .................. Pulsed, 1064 nm, neodymium: YAG;
                  laser designator and ranging system
CCTV .................. TV camera
VCR .................. SVHS and VHS recording capability
Optics .................. Direct view optics

Communications Equipment
VHF/UHF ............. 2 X AN/ARC-182 w/KY-58 encryption device
                  (1686 upgrade only)

Aircraft Survivability Equipment
RWR .................. AN/APR-39V(1) radar warning receiver (pulsed)
                  AN/APR-44 radar warning receiver (CW)
IRCM .................. AN/ALQ-144
Expendables ........... AN/ALE-39 countermeasures dispenser
AV-8B

Models
AV-8B Day Attack (DMT);
AV-8B Night Attack (NVD/FLIR);
AV-8B II + RADAR

Dimensions
Height .............................................. 11 feet 8 inches
Weight ............................................ 4,600 pounds (empty)
39,000 pounds mixed gross weight
Wingspan ........................................... 30 feet 3 inches

Airspeed
Maximum endurance ......................... 230 KIAS
Maximum airspeed ..................... 585 KCAS/1.0 IMN

Fuel Capacity
Pounds .................................................. 7,759 internal
11,749 with 2 external drop tanks
830 with 4 external drop tanks

Endurance ................................. Varies significantly with ordnance load and mission profile.
Refer to NWP 3-22.5-AV8B,
Vol I for specific weapons load profiles

Weapons Systems
Guns .............................................. GAU-12 25mm gun
Rockets ........................................... 2.75 and 5 inch HE-Frag,
AT/APERS
HEGP, WP, RP, ILLUM, and chaff
Bombs ......................................... Mk 81, Mk 82, Mk 83
Mk 20 Rockeye, MK 77 Napalm
GBU-12, GBU-16 LGB
CBU-72 FAE, CBU-78 Gator
Missiles ................................ AGM-65E Laser Maverick
AGM-65F IR Maverick
(night attack only)
AGM-122 Sidearm
AIM-9 Sidewinder
Miscellaneous ........... LUU-2A/B Illuminum flares,
Mk 58 Marine Location Marker

Other Systems
GPS navigation ....................... Integrated P-coded GPS targeting system
FLIR ............................................. 1 power navigation FLIR
Dual mode tracker .............. laser spot tracker with 6 power TV video
Camera ......................... VTR HUD/dual-mode tracker recorder

Communications Equipment
VHF/UHF .................................. 2 X RT-1250A/ARC with KY-58 encryption device

Aircraft Survivability Equipment
RWR .................................. AN/ALR-67 radar warning receiver
DECM ................................. AN/ALQ-164 DECM system
Expendables .......... AN/ALE-39 countermeasures dispenser
F/A-18 (Models A/C/D)

Dimensions
Height.......................... 15 feet 3 inches
Weight............................ 24,500 pounds (empty)
                           51,900 pounds (maximum T/O)
Wingspan......................... 40 feet 5 inches

Airspeed
Maximum endurance.................. 250 KIAS
                                      (approximate)
Maximum airspeed........... 750 KIAS (NATOPS)
                                    650 KIAS (sea level)

Fuel Capacity
Pounds.......................... 12,800 (10,800 internal, 2,000 centerline tank)
Gallons.......................... 1,900 (1,500 internal, 400 centerline tank)

Endurance
Typical.......................... 1 + 30 hours
Best case.......................... 2 + 45 hours
Worst case.......................... 12 minutes
Hi Hi Hi profile with centerline tank.......................... 2 + 45 hours

Weapons Systems
Guns.......................... 20mm internal gun
Rockets................. LAU-10 (5 inch rockets)
                        LAU-51 (2.75 inch rockets)
                        LAU-61 (2.75 inch rockets)
Radar.......................... APG-65 multimode radar
Missiles.......................... AGM-65E Laser Maverick
                        AGM-65F IR Maverick
                        AGM-88 Harm
                        Walleye I/II
                        AIM-7 Sparrow
                        AIM-9 Sidewinder

Bombs.......................... Mk 80 series
                           Mk 20 Rockeye, GBU-10/12/16
                           CBU-59 APAM
                           CBU-78 Gator, Mk 77 Napalm
                           Mk 36, Mk 40, Mk 4 (Destructors)
                           Mk 52, Mk 55, Mk 56 (Bottom/Moored Mines)
                           Mk 62, Mk 63, Mk 64, Mk 65 (Quickstrike Mines)
Miscellaneous.............. Tactical air-launch decoy
Typical mix:
Air-to-air.......................... 2 AIM-9, 2 to 4 AIM-7,
                                    6 second 20mm
Air-to-ground..................... 4 to 8 Mk 82 or
                                    2 to 4 Mk 83
                                      2 AIM-9, 2 AIM-7

Other Systems
FLIR.......................... AN/AAS-38 target FLIR
                        AN/AAR-50 navigation FLIR
                        (F/A-18C/D only)
Laser.......................... AN/AS-1 73 laser spot tracker
On-board recording............. HUD recorder, DDI selectable
                        AN/ASQ-1 73 35mm strike camera

Communications Equipment
VHF/UHF.......................... 2 X AN/ARC-182 w/KY-58 encryption device

Aircraft Survivability Equipment
RWR.......................... AN/ALR-67 radar warning receiver
DECM.......................... 2 X ALQ-126B
                        AN/ALQ-167 (tactical contingency pod)
Expendables.................. AN/ALE-39 countermeasures dispenser
# EA-6B ICAP 2

## Dimensions
- **Height**: 16 feet 8 inches
- **Weight**:
  - Empty: 34,000 pounds
  - Maximum T/O: 61,500 pounds
- **Wingspan**: 53 feet

## Airspeed
- **Maximum endurance**: 53 to .55 IMN
- **Maximum airspeed**: 86 IMN (TJS pod limitation)
- **Minimum airspeed**: 114 KIAS (minimum approach speed)
  - 220 KIAS (TJS pod operation)

## Fuel Capacity
- **Pounds**:
  - Total: 25,400
  - Internal: 15,400
  - External: 10,000
- **Gallons**:
  - Total: 3,768
  - Internal: 2,268
  - External: 1,500

## Endurance
- Varies greatly depending on aircraft configuration and mission profile; typical pod and external fuel load will result in approximately 1 hour and 45 minutes loiter without AR
  - **Hi Lo Lo Hi profile with 4 X TJS pods**: 425 nm mission radius

## Weapons Systems
- **Jammers**: 5 X AN/ALQ-99 tactical jamming pods
- **Radars**: AN/APS-130 ground mapping radar
- **Missiles**: AGM-88 HARM
- **Miscellaneous**: AN/ALE-41 and 43 corridor chaff pod, AN/ALQ-99 on-board receiver system
- **Typical mix**: Load based on enemy order of battle and threat; typical load will be 3 to 4 tactical jamming pods, 1 to 2 AGM-88 or external fuel tanks

## Other Systems
- **On-board recording**: AN/ALQ-99 on-board/tactical jamming system recorder
- **Miscellaneous**: UHF/VHF, AM/FM regency scanner, USQ-113 Communications jammer

## Communications Equipment
- **HF**: 1 X AN/ARC-105
- **VHF**: 1 X AN/ARC-175
- **UHF**: 2 X AN/ARC-159 w/KY-58 encryption devices

## Aircraft Survivability Equipment
- **RWR**: None
- **DECM**: 2 X ALQ-167 tactical contingency pod (training only)
- **Expendables**: AN/ALE-39 countermeasures dispenser
KC-130 (Models F/R/T)

**Dimensions**
- Height: 38 feet 4 inches
- Weight (empty): 90,000 pounds
- Maximum gross weight: 155,000 pounds (SLEP), 135,000 pounds (non-SLEP)
- Length: 97 feet 9 inches
- Wingspan: 132 feet 7 inches

**Airspeed**
- Maximum endurance: 240 KIAS
- Maximum airspeed: 350 KIAS

**Fuel Capacity**
- Takeoff fuel KC-130F: 41,406 cargo, 65,831 tanker
- KC-130R/T: 59,606 cargo, 84,032 tanker

**Endurance**
- Typical: 13 hours

**Aircraft Survivability Equipment**
- ALQ-157
- AAR-47
- ALE-139, APR-39*
- Night vision lighting*

*Only specially configured aircraft

**Air Delivery of Cargo and Personnel**
- Container delivery system: Up to 16 bundles, 37,248 pounds
- Military free fall: 64 jumpers
- Heavy equipment: Vehicles, ammo, cargo (42,000 pounds)
- Personnel staticline: 64 jumpers

**Short Unimproved Airfield Operations**
- Size and strength of runway are performance/weight dependent. Standard is 3,500 feet by 60 feet.

**Mission Profiles**
- DASC(A) capable, radio relay, battlefield illumination

**Rapid Ground Refueling Flow Rates**
- (pounds per minute)

<table>
<thead>
<tr>
<th>Model</th>
<th>Point</th>
<th>IFR drogue</th>
<th>SPR panel</th>
<th>Pod</th>
</tr>
</thead>
<tbody>
<tr>
<td>AH-1W</td>
<td>1</td>
<td>59</td>
<td>34</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>54</td>
<td>29</td>
<td>44</td>
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<tr>
<td>CH-46</td>
<td>1</td>
<td>79</td>
<td>44</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>69</td>
<td>35</td>
<td>49</td>
</tr>
<tr>
<td>CH-53</td>
<td>1</td>
<td>66</td>
<td>40</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>56</td>
<td>31</td>
<td>46</td>
</tr>
</tbody>
</table>

**Communications Equipment**
- VHF/VOR: 2 X AN/AR126
- UHF: 2 X AN/ARC-159(V)1
- HF: 2 X AN/ARC-190
- SATCOM*
- DASC suite: AN/UYQ-3A

*Some aircraft are configured to operate these systems

**Other Systems**
- Radar: AN/APS 133 (weather, ground, beacon, IFF capable)
- INS
- GPS*
- Celestial Navigation*

*Some aircraft are configured to operate these systems

**Air Land Delivery of Cargo and Personnel**

<table>
<thead>
<tr>
<th>Cargo-configured Airframe</th>
<th>Passengers</th>
<th>Pallets</th>
<th>Troops</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>92</td>
<td>1</td>
<td>76</td>
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<td></td>
<td>72</td>
<td>2</td>
<td>44</td>
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<td>3</td>
<td>33</td>
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<tr>
<td></td>
<td>41</td>
<td>4</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>70 litters with 6 attendants</td>
<td>74 litters with 2 attendants</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tanker-configured Airframe</th>
<th>Passengers</th>
<th>Pallets</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>40</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>2</td>
</tr>
</tbody>
</table>
## Aerial Refueling Transfer Rates

**(JP-5 at Standard Daytime Temperature)**

<table>
<thead>
<tr>
<th></th>
<th>1 receiver (pounds per minute)</th>
<th>2 receivers (pounds per minute)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F cargo</td>
<td>980</td>
<td>490</td>
</tr>
<tr>
<td>R or T cargo</td>
<td>1,020</td>
<td>510</td>
</tr>
<tr>
<td>F tanker</td>
<td>2,040</td>
<td>2,040</td>
</tr>
<tr>
<td>R or T tanker</td>
<td>2,040</td>
<td>2,040</td>
</tr>
</tbody>
</table>
MV-22

The MV-22 aircraft provides a worldwide self-deploying capability (2,100 nautical miles with inflight refueling). It also provides modern avionics that will improve joint interoperability by providing the capability to transmit, receive, and display information to and from aircraft, ground units, or other Services.

Length ............................................ 57 feet 4 inches
Width ............................................. 84 feet 7 inches
Height..............................................22 feet 1 inch
Troop capacity ............. 24 combat-equipped troops
External capability .................... 10,000 pounds
Cruise airspeed .......................... 230 kts;
130 kts w/external load

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Cruise Airspeed</th>
<th>Combat Radius</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 combat-equipped Marines</td>
<td>230 kts</td>
<td>272.9 nm</td>
</tr>
<tr>
<td>10,000 pound internal load</td>
<td>230 kts</td>
<td>270 nm</td>
</tr>
<tr>
<td>8,000 pound external load (HUMMV)</td>
<td>130 kts</td>
<td>105 nm</td>
</tr>
</tbody>
</table>