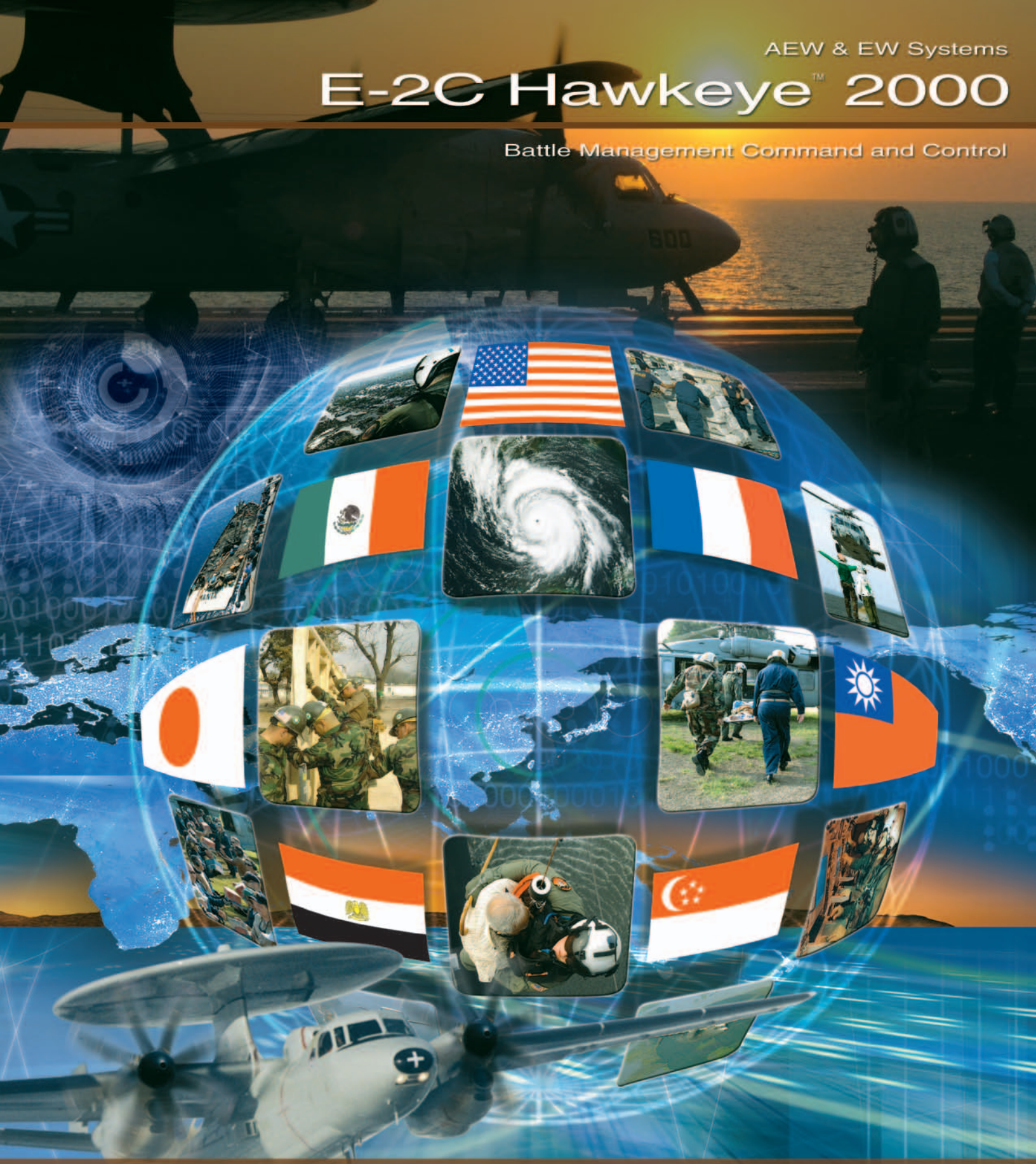
AEW & EW Systems

E-2C Hawkeye™ 2000

Battle Management Command and Control



NORTHROP GRUMMAN

E-2C Hawkeye

Battle Management Command and Control

Since introduction, the E-2C continues to demonstrate systems and capability growth to meet evolving mission requirements.

Automatically Surveys Large Air, Land, and Sea Areas

On station, E-2C simultaneously monitors all air and maritime traffic in a cylindrical volume greater than six million cubic miles.

Passive Detection and Identification Beyond Radar Range

Hawkeye's electronic support measures system can pick up and identify emitting targets well beyond radar limits.

Enhances Air Defense Systems

United by high-speed digital data links, E-2C and surface command centers work together to significantly extend the coverage, connectivity, and effectiveness of air defense systems.

Advanced Hawkeye

A new Advanced Hawkeye configuration is in development that includes an improved radar, a modular communication suite and upgraded cockpit and navigation systems.

Hawkeye Nation

Global presence in support of sovereign power projection for national defense and security

United States
Mexico
France
Egypt
Japan
Taiwan
Singapore

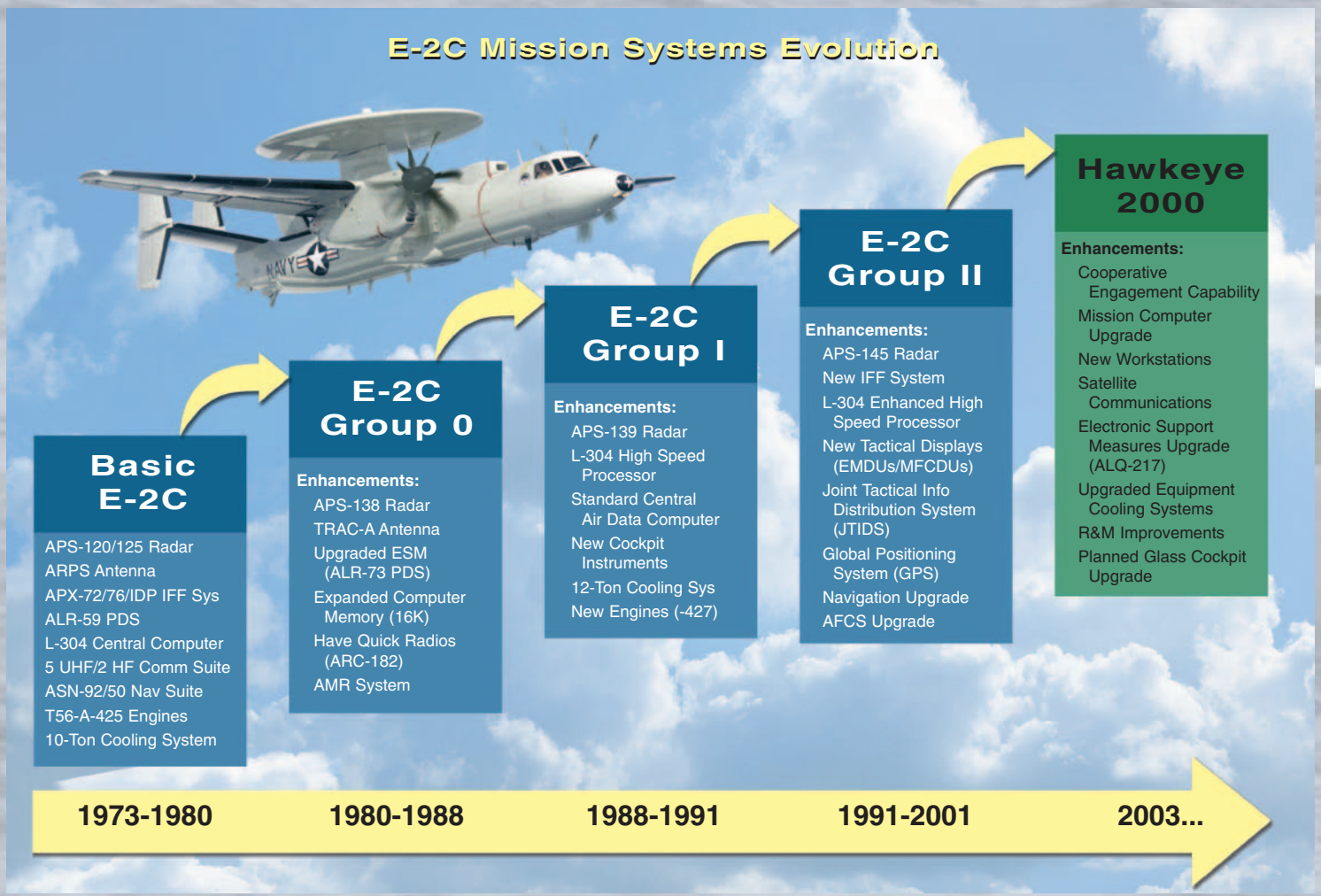
E-2C Hawkeye 2000

Battle Management Command and Control

This multimission system enhances a force's effectiveness through its advanced detection and information processing capabilities. The E-2C's radar and identification friend or foe (IFF) systems can detect targets at ranges in excess of 300 nmi, and its electronic support measures (ESM) system detects and classifies targets at distances beyond the radar limits. Onboard communication and data processing/distribution subsystems are capable of transmitting the tactical picture to command centers at sea or ashore, making it an ideal airborne battle management command and control asset and a key FORCEnet enabler within the Sea Power 21 warfighting construct.

The flight crew consists of two pilots and three mission system operators. The incorporation of high levels of automation in the target acquisition and identification systems enables the three operators to perform a wide range of battle management functions. Each operator can work independently in all operational roles: sensor utilization, monitoring/control of the tactical situation, and transfer of onboard tactical information to key battle group participants or land-based command centers.

The AN/APS-145 radar system incorporates a significant extension in detection range over predecessor Hawkeye radar systems. It also includes several elements designed to optimize performance in the littoral environment, including an environmental processor, a triple pulse repetition frequency (PRF) mode, an automatic channel monitoring/selection feature to provide the operator optimum radar channel utilization, and a variable rotodome speed control. The IFF system's range is extended commensurate with the radar system and incorporates several features to improve target detection and identification. The incorporation of a Joint Tactical Information Distribution System (JTIDS) enhances the existing communications suite with greater anti-jam, secure, voice, and data communications. The combined Carrier Airborne Inertial Navigation System Version II (CAINS II) and



global positioning system (GPS) navigational aids provide fully integrated, accurate and reliable navigation and target location.

Hawkeye 2000 Elements

Mission Computer Upgrade (MCU)

At the core of the Hawkeye 2000 system configuration is an open architecture central mission computing system. Capitalizing on commercial off-the-shelf (COTS) technology, the current mission computer, based upon the Raytheon Model 940, provides the memory, processing power, and data throughput to support the expanding mission roles of the Hawkeye 2000. In the near future, a follow-on computer upgrade will occur which will utilize a COTS single-board computer (SBC) to improve the processing power of the mission system and decrease operating and procurement costs. The SBC architecture will allow for more rapid and frequent upgrades to the computer as both technology and mission requirements evolve. A COTS-based data loader/recorder unit serves to load the tactical programs and provides recording capability for the mission. The tactical program and other mission-related data are contained on a removable media cartridge (RMC) for insertion into the system prior to each flight; upon mission completion, the RMC can be removed and mission data can be played back and reviewed.

Cockpit Upgrade

To satisfy communications, navigation, and surveillance requirements for air traffic management (CNS/ATM) developed by the Federal Aviation Administration (FAA) and International Civil Aviation Organization (ICAO) and augmented by Chief of Naval Operations (CNO), the Hawkeye 2000 will undergo a cockpit upgrade. The upgrade will provide the ability to comply with 8.33 KHz radio communication channel separation, enhanced mode S transponder, and required navigation performance (RNP) area navigation (RNAV) to operate in national and international airspace. In addition, the cockpit upgrade will improve the flight management software computer processing by updating the multifunction computer display units (MFCDUs) and replacing the traditional airspeed, altitude, and attitude references with 6x8 in. and 9x12 in. flat panel active-matrix liquid crystal displays (AMLCD). This planned upgrade will allow for the implementation of a tactical fourth operator (T4O) at the co-pilot position. Supplementing this upgrade is a COTS-based precision approach capability utilizing the Garmin-530 which delivers land-based ILS, VHF omni-range, and color moving-map display.

Advanced Control Indicator Set (ACIS)

Color tactical workstations, commonly referred to as the ACIS, provide each operator with greater flexibility in display management and presentation. The ACIS is a COTS open architecture workstation that leverages the technology and rugged military construction of the AN/UYQ-70 Advanced Display System workstation to meet the AEW&C requirements with full supportability. The ACIS workstation consists of a 20-in. high resolution flat panel display and a Versa Modular European (VME) rack

containing all the processing, I/O interfaces, and mass storage housed in an environmentally insulated package. The human-machine interface designed into the ACIS allows the operators to perform many battle management functions. The ACIS and its Windows-like functionality allows the three-person crew to perform missions that require a much larger crew size in other systems.

Cooperative Engagement Capability

Integrated into the Hawkeye 2000 and key to Theater Air Defense is the Cooperative Engagement Capability (CEC). The CEC airborne Common Equipment Set (CES) provides a high capacity data exchange of detailed sensor information between multiple platforms, the aircraft carrier's command center, and surface combatants for enhanced fleet-wide connectivity and situational awareness. The CES consists of a Cooperative Engagement Processor (CEP) and a Digital Distribution System (DDS) with a 54-in. electronically steerable circular antenna mounted on the lower centerline of the E-2C fuselage. This new system enables data fusion of onboard and offboard sensor information to enhance the fleet's composite tactical picture.

The CEP, the heart of the CEC system interfacing with the Hawkeye's central mission computer, facilitates the network's data exchange with onboard tactical information (radar, IFF) and enables the CEC relay function to extend surface long range connectivity.

Satellite Communications

The Hawkeye's vast suite of HF/VHF/UHF and JTIDS communications systems has been expanded with a fully integrated satellite communications (SATCOM) capability. Incorporation of a SATCOM radio communications set and the Multimission Advanced Tactical Terminal (MATT) provides the Hawkeye with an expanded over-the-horizon (OTH) wide-band and narrow-band voice/data communications capability. This system provides the E-2C with longer range connectivity and enables access to various tactical databases for improved situational awareness and connectivity beyond the Hawkeye's existing surveillance volume.

Electronic Support Measures

Advancements in receiver and processor technology have enabled replacement of the previous ESM system with a more capable system at significantly less weight and volume. This system complements the active sensor suite with a passive system capable of detecting a wide range of airborne and surface emitters, determining the emitter's signal parameters and azimuth, and identifying the emitter by comparing it to an onboard intelligence file.

NP2000

The Hawkeye's familiar four-bladed propellers have been replaced with an eight-bladed system called NP2000. This system upgrade offers many benefits including reduced noise and vibration, improved reliability, and increased maintainability. The propeller blades are constructed of a composite material, mounted on a single-piece steel hub, and digitally controlled.

E-2C Hawkeye 2000 Specifications

Dimensions

Wingspan	80 ft 7 in. (24.56 m)
Width, wings folded	29 ft 4 in. (8.94 m)
Length overall	57 ft 8.75 in. (17.60 m)
Height overall	18 ft 3.75 in. (5.58 m)
Diameter of rotodome	24 ft (7.32 m)

Weight

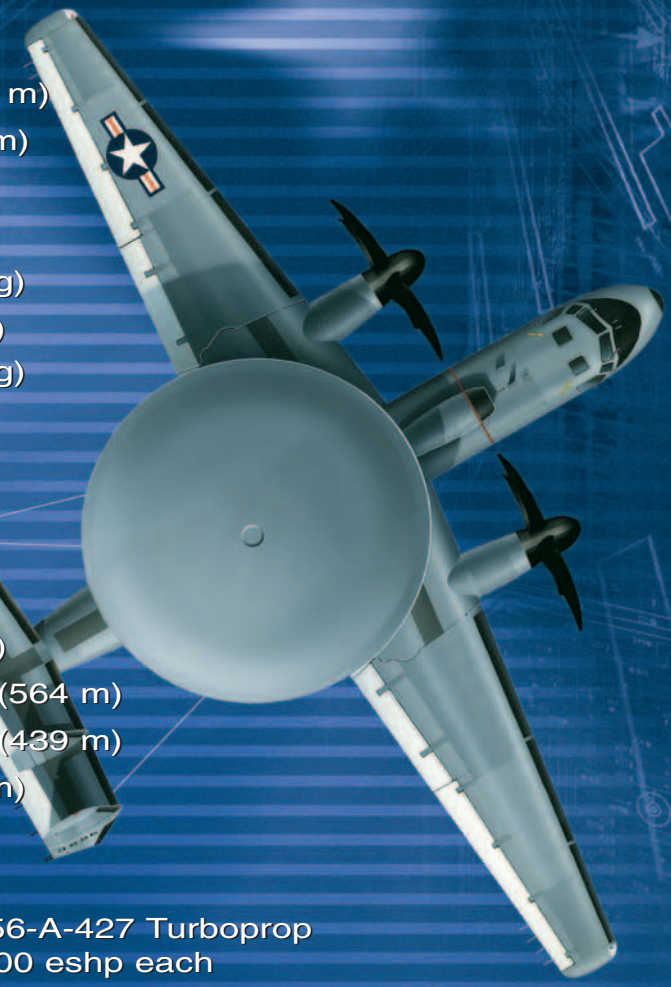
Weight empty	40,484 lb (18,364 kg)
Internal fuel	12,400 lb (5,624 kg)
T.O. gross weight	54,426 lb (24,689 kg)

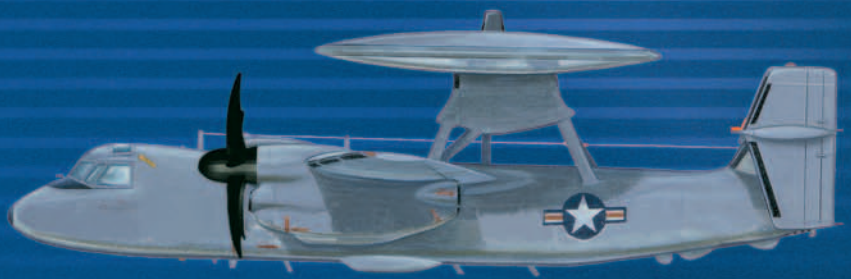
Performance

Max. level speed	338 kt (626 km/hr)
Max. cruise speed	325 kt (602 km/hr)
Cruise speed	259 kt (480 km/hr)
Approach speed	103 kt (191 km/hr)
Service ceiling	37,000 ft (11,278 m)
Min. T.O. distance	1,850 ft ground roll (564 m)
Min. landing distance	1,440 ft ground roll (439 m)
Ferry range	1,541 nmi (2,854 km)

General Data

Crew members	5
Power plant	Two Rolls-Royce T56-A-427 Turboprop engines rated at 5100 eshp each





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DEFINING THE FUTURE

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