

CMA-9000 FMS/RMS

Flight Management System for Commercial, Paramilitary and Military Helicopters



The CMA-9000 is an industry leading Flight and Radio Management System (FMS/RMS) designed for demanding commercial, paramilitary and military helicopter applications.

Compact, single box and civil-certified, the CMA-9000 FMS/RMS provides a flexible, reliable and responsive flight and radio management solution that is fully compliant with the requirements of civil airspace navigation, while offering unique mission capabilities.

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CMC's FMS and GPS systems are standard equipment on several platforms, including Airbus Helicopters' H215/H215M, H225/ H225M, H145M, H175, the new H160 as well as AVIC's AC352 and AC312C/E helicopters. The CMA-9000 is also in service on other platforms, including the EC135, EC145, EC635, AS332, AS532, AS365, AS565, NH90, CH-53 and Mi-17.

The CMA-9000 has the unique advantage of combining the latest in Required Navigation Performance Area Navigation (RNP RNAV) airspace advancements, Satellite-Based Augmentation System/Wide Area Augmentation System (SBAS/WAAS) navigation, radio control and innovative tactical features, making it the product of choice for various applications such as Police, Border Patrol, Emergency Medical Services (EMS), Search and Rescue (SAR), Off-shore applications and Corporate transport.

The CMA-9000 complies with the latest industry requirements of TSO-C115c, DO-236B/DO-283A, and TSO-C146c (gamma-3) while meeting and frequently exceeding the requirements of the ICAO Performance Based Navigation (PBN) manual. As a result, the CMA-9000 provides superior PBN and RNP navigation features, enabling operators to fly more precise and predictable routes while minimizing required separation, resulting in lower operational costs, landing clearances and preferential departures and arrivals.

In addition to its non-precision approach capabilities (supports operations down to RNP 0.3), Baro-VNAV approaches and Point-in-Space (PinS) approaches, the CMA-9000, combined with the CMA-5024 GPS Landing System Sensor Unit (GLSSU), supports SBAS-based approaches such as Localizer Performance with Vertical Guidance (LPV), Localizer Performance (LP) and SBAS Lateral Navigation/Vertical Navigation (LNAV/VNAV). This capability allows operators to fly more precise approaches to lower minima (down to 200 ft), while reducing the visibility requirements. Approaches may be autopilot coupled, both laterally and vertically, thus minimizing pilot workload during instrument approaches.

The CMA-9000 FMS/RMS and CMA-5024 GLSSU support Automatic Dependent Surveillance-Broadcast (ADS-B Out) next generation surveillance technology in addition to most of the other NextGen and Single European Sky Air Traffic Management Research program (SESAR) requirements. This brings significant safety and efficiency benefits by offering properly equipped aircraft and rotorcraft more flexible fuel-saving routes through airspace previously managed using only procedural air traffic control.



FLEXIBLE, RELIABLE AND RESPONSIVE!

MULTI-SENSOR NAVIGATION

The CMA-9000 FMS offers much more than basic GPS navigation. Using its multi-sensor navigation capabilities, the CMA-9000 FMS provides seamless navigation through all phases of flight. Its ability to interface with a wide variety of navigation sensors and radios enables the CMA-9000 FMS to provide navigational information in different navigation modes, including GPS (civil and/or Military), INS/GPS, INS, DME/DME, VOR/DME, DVS and Kalman filter navigation for short GNSS outages.

RADIO MANAGEMENT

The CMA-9000 FMS/RMS provides centralized management and control of navigation and communication radios, including DME, VOR/ILS, DF, ADF, VHF (Nav and Comm), V/UHF, HF, civil and military transponders (TPDR, IFF). Voice and text communication is also supported by interfaces to satellite phones utilizing the Iridium satellite communication network. The CMA-9000 FMS/RMS has a radio library feature that can hold 99 data-loadable presets for each communication and navigation radio.

FLIGHT MANAGEMENT

- Extensive flight planning, route creation and modification second route, inverse route, SIDS, STARS, Direct to, Direct to with moving desired track and leg/course interception, holding patterns, DME arcs, procedure turns and offset tracks
- Multi-Sensor navigation modes with installed navigation sensors and radios
- Search and Rescue pattern definition and navigation
- Required and actual navigation performance (RNP/EPU)
- Approved for RNP/RNAV (RNP4, RNP2, RNP1, RNP0.3, RNP APCH, RNAV5, RNAV2, RNAV1, P-RNAV, A-RNP ...)
- Time and Fuel Management, including Required Time of Arrival (RTA)
- Digital Map display interface to support route and waypoint exchange and positioning
- Kalman Filter integration with GPS/AHRS (INS) to provide short-term guidance when no navigation sensors are operational
- High reliability with an MTBF > 7,500hrs in rotarywing environment.

MISSION FEATURES

The CMA-9000 includes a comprehensive set of features to enhance the operational efficiency of pilots for many types of specialized missions. These features include:

- Tactical approaches (or Pilot-Defined Approaches) function allows the crew to define a vertically guided approach at any location world-wide. These approaches can be stored and loaded from a special database.
- Search and Rescue patterns that were designed to improve the coverage, accuracy and speed of search and rescue operations.
- The Transition to Hover Feature takes into account current conditions and provides unparalleled flexibility in enabling a pilot to quickly find and converge towards a person in distress, in both adverse weather and sea conditions.
- Approaches to Offshore Oil Rigs designed exclusively for Airbus Helicopters platforms.
- Supports simulation of the effects of One Engine Inoperative (OEI) and Out Of Ground Effect (OGE) scenarios.
- Mark on Top and Moving Waypoint definition and rendezvous guidance.



CMC-9000 FMS/RMS Flight Management System for Commercial, Paramilitary and Military Helicopters – Specifications

PHYSICAL

Size	160.02 mm (6.3 in) depth, 146.05 mm (5.75 in) wide, 171.45 mm (6.75 in) high
Power	28 W @ 28 VDC typical load at ambient temperature 46 W @ 28 VDC typical load during cold temperature startup
Power Interrupt	DO-160E, Section 16.0 Cat. A 200ms power interrupt:
Lighting	Integral keyboard lighting: external control Display dimming lighting: external/internal control
Passive Cooling	No forced-air required
External Connector	MIL-STD-D38999/20FJ35AN mating with MIL-STD-D38999/26FJ35SN(128 pins ea.)
Reliability	7,500 airborne hours MTBF at 30°C ambient temperature.
Mounting	5.75" (146 mm) wide DZUS rails

DISPLAY

Type	Active-matrix LCD, 8 colors
Screen Size	3.95in X 3.12in
Resolution	320 horizontal x 234 vertical/RGB
Alphanumeric Data	14 lines of 24 characters (including scratchpad)
Viewing Angle	Vertical bottom: 30° Vertical top: 10° Horizontal bottom sides: ± 45°
Contrast Ratio	3:1 daylight; 320:1 night
Display Luminance	1 to 160 fI (standard display) 0.1 to 3.0 fI (NIGHT display)
NVG Compatible	MIL-STD-3009 NVIS class B No NVIS option is also available

OPERATOR INTERFACE

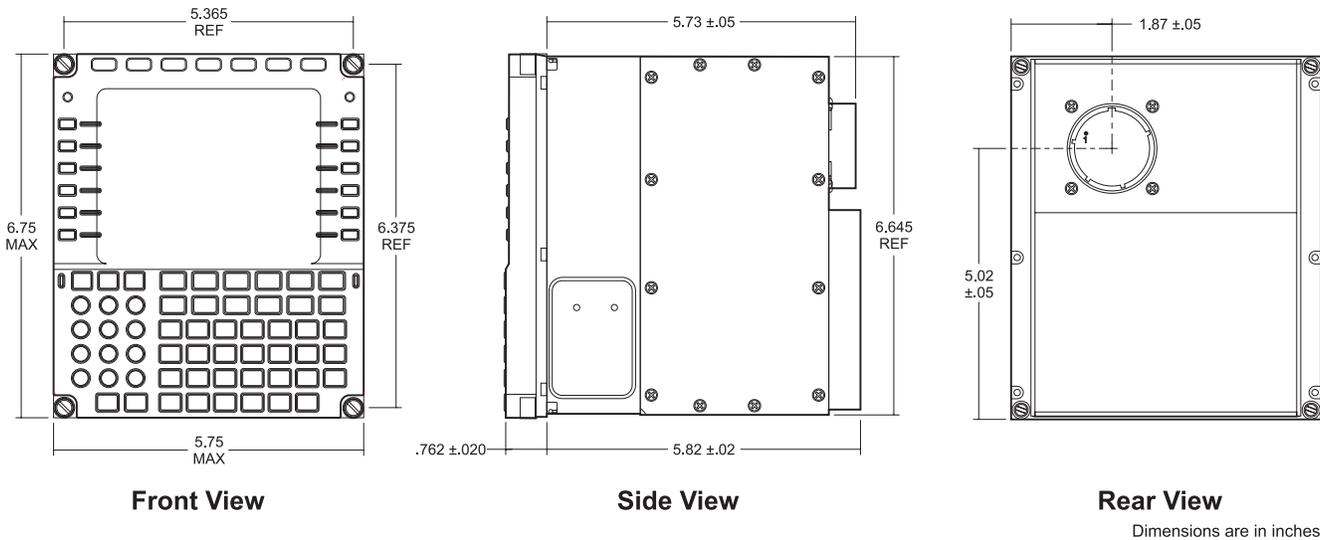
Line Select Keys	12
Function Keys	15
Alphanumeric Keys	41
Annunciators	9
Integral Keyboard	Display Dimming: external dimming source supported
Lighting or Display Dimming	Integral lighting: 28 VDC sense or 5VDC sense options

SIGNAL INTERFACE/SOFTWARE

Digital ARINC-429 Interfaces:	24 ARINC 429 input 8 ARINC 429 outputs
Serial Interfaces	Up to 4 RS-422 ports Up to 2 RS-485 ports Up to 1 RS-232 port
Discrete Inputs	16 open/ground
Discrete Outputs	8 open/ground
Processor	Pentium class (K6), 220 MHz
Software	DO 178B Level C

APPROVAL/ENVIRONMENTAL

Current Approvals	TSO-C113, TSO-C115c (RNP) TSO-C146c class Gamma-3 (SBAS/LPV support) with approved TSO-C145/146c external GPS receiver
Environment	RTCA DO-160E, DO-254



For more information, visit www.cmcelectronics.ca or email us at sales@cmcelectronics.ca



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