CMA-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 10.0 Cat. A 200ms power interrupt
- **Lighting:** Integral keyboard lighting; external control
- **Passive Cooling:** No forced-air required
- **External Connector:** MIL-STD-38999-290J (1553 pins)
- **Reliability:** 7,500 airborne hours MTBF at 30°C ambient temperature.
- **Mounting:** 5.75” (146 mm) wide

**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: 30º, Vertical top: 10º, Horizontal bottom/sides: ± 45º
- **Contrast Ratio:** 3:1 daylight, 320:1 night
- **Display Luminance:** 1 to 160 fl (standard display), 0.1 to 3.0 fl (NIGHT display)
- **NVG Compatible:** MIL-STD-3009 NVIS class B

**Operator Interface**
- **Line Select Keys:** 12
- **Function Keys:** 15
- **Alphanumeric Keys:** 41
- **Integral Keyboard:** Display Dimming: external/external control
- **Lighting or Display Dimming:** Integral lighting: 28 VDC sense or 5VDC sense options

**Signal Interface/Software**
- **Digital ARINC-429:** 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

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.

For more information, visit www.cmcelectronics.ca

For information purposes only. To accommodate product improvements, specifications are subject to change without notice.

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CMC-CMA9000-FMS-RMS-19-003

Over 100 years of innovation
CMA-9000 FMS/RMS
Flight Management System for Commercial, Paramilitary and Military Helicopters

CMC’s FMS and GPS systems are standard equipment on several platforms, including Airbus Helicopters’ H155/H175, H225/H225M, H145, H175, the new H160 as well as AAV’s AC380 and AC312C/E helicopters. The CMA-9000 is also in service on other platforms, including the EC135, EC145, EC87, AS332, AS352, 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-C116c, DO-236B/DD-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 FBN 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 (Pin) 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 (LNAV). 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 rotocraft more flexible fuel-saving routes through airspace previously managed using only procedural air traffic control.

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/DF, VOR/OM, 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/DF, VHF (Nav and Comm), VHF, HF, civil and military transponders (TURC, IFF). Voice and text communication is also supported by interfaces to satellite phones utilizing the Inmarsat 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, SID, STARs. Direct to, Direct to with moving desired track and leg/course intersection, 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, RNAV, RNPV, RNPW, RNAV, R-P-RNAV, A-RNAV ...).
• 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 worldwide. 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 affects of One Engine Inoperative (OEI) and Out Of Ground Effect (OGE) scenarios.
• Marks on Top and Moving Waypoint definition and rendezvous guidance.

FLEXIBLE, RELIABLE AND RESPONSIVE!
CMA-9000 FMS/RMS
Flight Management System
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The CMA-9000 complies with the latest industry requirements of TSO-C116c, DO-368BD0-3B3A, 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 (Pitot) 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 (LN/VA/N). 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) 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/OM, VOR/DME, DVS and Kalman filter navigation for short GNS1000 outages.

**FLEXIBLE, RELIABLE AND RESPONSIVE!**

**MULTI-SENSOR NAVIGATION**
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- **Power Interrupt**: DO-160E, Section 16.0 Cat. A, 200ms power interrupt
- **Lighting**: Integral keyboard lighting, external control
- **Passive Cooling**: No forced-air required
- **External Cooling**: MIL-STD-D38999/20/J35A mating with Connector MIL-STD-D38999/26/J35AN (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
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or email us at sales@cmcelectronics.ca

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