

# CMA-4000 Flight and Display Management System



**Next-Generation**  
Flight Management,  
Radio Control Management  
and Mission Management System  
for Military and Paramilitary Operations

## FEATURES AND BENEFITS

- **Compact PCI/PMC**  
Open Enhanced obsolescence management
- **Architecture**  
Exceptional growth and upgrade capabilities including third party customer modules
- **Multiple Processor Support**  
Separate operational flight programs/applications, with hardware and software partitioning, possible
- **Solid State Mass Memory Card**  
Map, navigation database, terrain database storage and management (optional)
- **LED Backlight**  
High reliability and high brightness for sunlight readability

# CMA-4000

## Flight and Display Management System

The CMA-4000 is the next generation of Flight and Display Management System (FDMS) designed for rotary and fixed wing mission systems. It comprises Flight Management, Radio Control Management and Mission Management Systems (FMS / RMS / MMS) in a single box. The combination of civil flight plans, with multiple type search patterns, radio control and control of mission specific equipment makes the CMA-4000 FDMS the product of choice for military and paramilitary operations.

- Operational advantages while operating in civil airspace resulting in lower costs, landing clearances and preferential departures.
- Mission effectiveness enhanced through centralized management. Mission data is easily transferred via data cartridge, and control and display of mission sensors by the FDMS increases situational awareness.
- Inclusion of Radio Management, Flight Management and Mission Management in a single lightweight box provides savings in weight and space.
- Multiple search patterns and other capabilities increase the operational effectiveness of the aircraft and further reduce pilot workload.
- Proven interfaces with many avionics equipments, with modern day processors, comprehensive memory and I/O, allow for ease of integration and long term growth.
- Third party specialized software inclusion through additional processors or partitioned software.
- Third party software development.

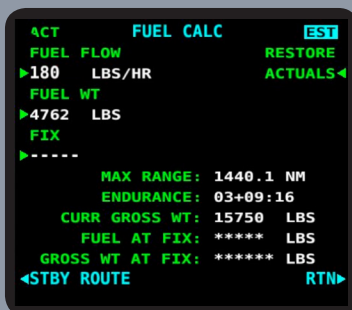
## FUNCTIONS

### CAPABILITIES

The CMA-4000 provides radio management, mission control, flight management and seamless navigation throughout all phases of flight, including en-route, terminal, approach and the mission phases of flight. Its ability to interface with a wide variety of navigation sensors and radios makes it very versatile for a wide variety of applications. Navigational solutions can be obtained via blended INS/GPS, GPS, INS, DME/DME. VOR/DME, VOR/DME/TACAN, DOPPLER and Dead Reckoning. Frequency ranges for controlled radios are from HF, VHF, UHF, and SATCOM.

### FLIGHT MANAGEMENT FEATURES

- Extensive flight planning and route creation, second route modification.
- 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/ANP).
- Time and fuel management including required time of arrival (RTA).
- Ability to accept tactical flight plans from an external mission computer.
- Optional video outputs to drive 2 MFDs with video inputs to overlay video to MFD.
- RS-422 and Ethernet Airborne Data Loading (ADL) capability for database upload and download.



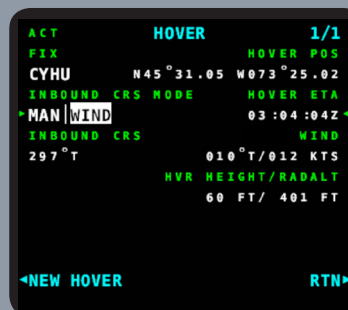
#### FUEL MANAGEMENT

The CMA-4000 computes and displays the maximum endurance, maximum range, fuel mileage and fuel remaining over any defined way point at the displayed fuel rate.



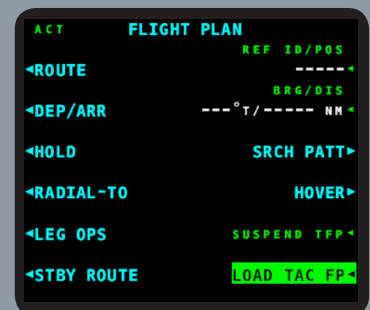
#### RTA

The CMA-4000 is able to compute Required Time of Arrival (RTA) by estimating the necessary True Air Speed (TAS) required to achieve a RTA assigned to any down-track way point.



#### TRANSITION TO HOVER

The CMA-4000 is able to manage a transdown profile to multiple hovers based on a mark point, a track at the mark point opposite to a wind direction or an operator entered course, and a hover height at the mark point.



#### ROUTE PLANNING

Comprehensive route planning available from either pre-stored data or manually entered. Active and standby routes available.



## TACTICAL FEATURES

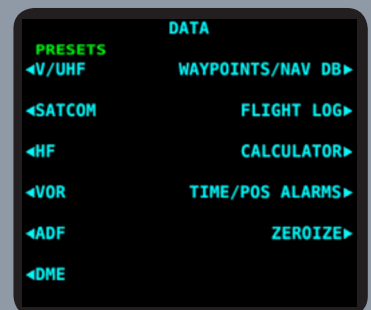
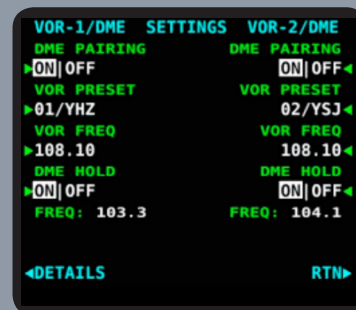
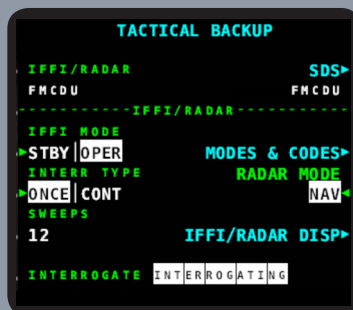
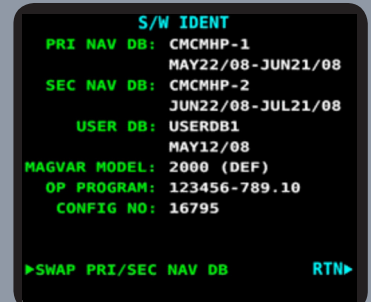
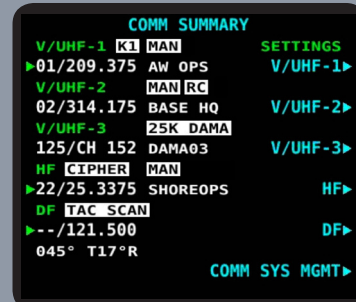
Comprehensive tactical features have been included in the CMA-4000 to enhance the operational efficiency of the crew. Tactical features include:

- 5 Search and Rescue patterns (Creeping Line, Expanding Square, Parallel Track, Sector Search and Track Crawl) specifically engineered to speed up the operation of finding people in the water during SAR and CSAR operations.
- The Transition to Hover facility allows up to five hovers to be included in one flight plan, allowing such features as Dip-to-Dip functionality. The hover algorithms allow for into wind hover or operator defined course into hover, taking into account wind speed and direction to enable a pilot to quickly find and transition onto a casualty in adverse weather and sea conditions.
- Tactical communications interface including SATCOM, LINK11, Radio Relay and HVQK.
- The FDMS can act as a system controller, providing essential mission capabilities such as search and weather radar control, IFF Interrogator control as well as control over self-defence suites.

## RADIO MANAGEMENT

The CMA-4000 provides centralized management and control of navigation and communication radios, including:

- DME, ADF, VOR/ILS, VHF-AM/FM, UHF, HF, SATCOM, DF PLS (personal locator system).
- Radio presets for each radio can be loaded from an external mission data cartridge allowing for ease of cockpit radio control and reducing pilot workload.
- Various mode controls for different radios (Manual, Maritime, Four Channel Scan, HVQK, SATCOM, ALE, Buoy Mode, SAR SCAN, TAC SCAN, LINK11, DICASS programming).
- Extensive Human Factors (HFE) work to ensure all radio controls have similar look and feel to ease pilot training and workload.
- Numerous civilian and military radios have been integrated in the CMA-4000, over Serial, ARINC-429 and MIL-STD-1553 interfaces (details provided on request).



### S.A.R.

The CMA-4000 is able to provide a search pattern function comprising expanding square, creeping line, parallel track, track crawl and sector search. A search pattern may be defined at any en-route way point.

### MISSION SYSTEMS

The CMS-4000 can interface with multiple mission systems to enable crew to have better situational awareness. These include self-defence suites, IFF Interrogator, and Search and Weather Radar controls.

### RADIO MANAGEMENT

The CMA-4000 can remotely tune and control both Nav and Communication radios over multiple bands, with multiple mode controls.

### DATABASES

The CMA-4000 is equipped to store several types of Civilian, Custom and User definable databases. Large memory space available. Databases updated via Ethernet or RS-422 Dataloader.

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# CMC-4000 Flight and Display Management System — Specifications

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(One each processor and graphics carrier cards) PMC module on processor card. One IO Assembly. Two spare 3U cPCI card slots for growth

## GENERAL

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Size	Chassis only, from rear of mounting plate to rear panel: 5.0"W x 8.25"H x 6.8" D Height may be extended beyond chassis to accommodate a larger keypad
Weight	11 lb (nominal) configuration dependant
Power input	+28 Vdc per MIL-STD-704A, MIL-STD-810E and RTCA/DO-160D, max 120 W at full display luminance
Cooling	A combination of conduction, convection and self-contained fans. No forced air cooling required
Connectors	MIL-C-38999 providing up to 284 pins
Mounting	DZUS rail

## DISPLAY

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Type	TFT color LCD with LED backlight
Resolution	VGA
Active Display Size	4" x 4" or 5" x 3", dependant upon keyboard selection. Expandable to 4" x 5"
Viewing Angle	Vertical: ± 35 degrees Horizontal: ± 60 degrees
Color	RGB with 64 grey shades per color
NVG Compatibility	MIL-STD-3009, Class B, Type I/II multicolor displays
Luminance	Full luminance capability up to 300 fL
Contrast ratio	300:1

## KEYBOARD

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The following describes an existing full alphanumeric keyboard

Keys	10 soft, 65 independent alphanumeric, 2 rocker
Annunciators	4 LED, NVG compatible
Integral Lighting	5Vac/dc, LED, NVG compatible, external supply
NVG Compatibility	MIL-STD-3009, Type 1, Class-A-NVIS

## INTERFACE CAPABILITY

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Standard	Qty 2 10/100BaseT Ethernet Qty 2 Dual redundant MIL-STD-1553B interface with independent RT addressing Qty 1 RS-232 port Qty 12 ARINC-429 receivers (expandable to qty 16 if spare cPCI card slot is used) Qty 8 ARINC transmitters (qty 10 if spare cPCI card slot is used, qty 12 with modification to interconnect) Qty 4 RS-44/485/232 transceivers Qty 36 discrete inputs and qty 16 discrete outputs Qty 2 video composite/S-video inputs (qty 4 if auxiliary Graphics Carrier card is installed in spare slot) Qty 2 RGB video outputs (optional) Qty 2 SPDT relay outputs Qty 1 system JTAG chain for test and configuration
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## PROCESSOR/SOFTWARE

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Processor	Standard 500 MHz PowerPC G4, 512K NVRAM, 256M RAM, 4 Gbyte Flash Optional Any PowerPC PMC processor
Operating System	VxWorks, Green Hills Integrity 178B
Symbol Generation (optional)	Raster (RGB, DVI or LVDS)
Graphics Driver (optional)	OpenGL

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**ENVIRONMENT** MIL-STD-810E and RTCA/DO-160D

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**EMI/EMC** MIL-STD-461D and RTCA/DO-160D

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**GROWTH CAPABILITY** Two 3U cPCI card slots together with PMC available for growth

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For more information, visit [www.cmcelectronics.ca](http://www.cmcelectronics.ca)  
or email us at [sales@cmcelectronics.ca](mailto:sales@cmcelectronics.ca)



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