CMA-6024 GPS/SBAS/GBAS Landing System Sensor Unit

High-Performance Landing System with SBAS LPV/LP, GBAS GLS, ADS-B and RNP

- **Patented 24-channel Narrow Correlator® ARINC 743B compliant SBAS/GBAS sensor unit**
- **High-integrity SBAS Beta-3/ Delta-4 and GBAS GAST-C/D sensor for Precision Approach**
- **RNP navigation with full ADS-B compliance and support**
- **All navigation functions fully compatible with all ARINC-743A capable FMS**
- **Precision Approach functions available as a self-contained system with Control Panel or ARINC-739 MCDU, or can be fully integrated with FMS**
- **Precision Approach SBAS LPV or GBAS GLS replaces legacy ILS LOC/GS and DME DTG – a fully compatible, self-contained system**
- **Built-in, high performance VDB receiver meets/ exceeds all RTCA DO-253C/D requirements – can reuse existing VOR antennas**
- **Outstanding reliability, MTBF and rugged environmental performance**
- **Special options include Have Quick timing CSDB interface, Doppler Radar Velocity emulation and custom solutions upon request**

The CMA-6024 aviation GPS/SBAS/GBAS sensor is a complete, self-contained, fully certified, Precision Approach and navigation solution, certified to Design Assurance Level A (DAL-A). It has been designed as a bolt-on, easy-to-integrate solution for all aircraft. The CMA-6024 provides fully compliant ADS-B and RNP navigation as well as SBAS LPV/LP and GBAS GLS CAT-I with a growth path to CAT-II/III (GAST-C/D) Precision Approach guidance for all aircraft, particularly all business, regional, commercial/ military air transport, trainer, helicopter, specialized and ruggedized applications. Custom solutions are available as an option upon request.

Enabling both SBAS LPV/LP and GBAS GLS CAT-I with a growth path to CAT-II/III, the CMA-6024 receiver system comprises two DAL-A receivers in one CMA-6024 chassis: a GPS/ SBAS/GBAS receiver and a VHF Data Broadcast (VDB) receiver.

Built on the successes of the CMA-5024, the CMA-6024 is the next evolutionary step forward that adds a complete GBAS GLS solution. All of the benefits of the CMA-5024 are retained and a new self-contained GBAS GLS functionality is added to produce the CMA-6024.

The CMA-6024 meets or exceeds the most stringent environmental requirements set out in RTCA/DO-160G and then goes further to meet additional requirements for specific aircraft.

Certification meets TSO-C145e Beta-3, TSO-C146e Delta-4, TSO-C161a and TSO-C162a. Future planned certification includes GAST-D pending new TSOs. The current certification supports both Fail-Safe and Fail-Operational requirements either fully integrated or independently of the existing aircraft systems.

The CMA-6024 is a complete, DAL-A, navigation and Precision Approach solution for all aircraft. With the CMA-5025 control panel, the CMA-6024 provides a complete, self-contained, stand-alone SBAS LPV/LP and GBAS GLS Precision Approach solution.

Key CMA-6024 Technology Features

- Three SBAS and twenty-one GPS continuous channels with full RTCA/ DO-229D/E message processing and includes newly introduced SBAS PRNs (120 to 158)
- Can be fully integrated with FMS or can operate completely standalone
- Standalone operation requires optional CMA-5025 Control panel, 3rd party control panel or integration with an ARINC-739 MCDU
- Seamless integration on B737NG with existing NAV Control Panel (pictured above). Solutions available for B737 classic, ATR 42/72 and other platforms
- Built-in LPV/LP database when installed as a standalone system
- Built-in VDB receiver enabling GBAS, can reuse any existing receive-only VHF antenna (ex: a VOR antenna)
- Extensive I/O supporting ARINC-743B/C, 709 and 710 with DME and ILS look-alike digital interfaces
- Designed for easy retrofit into all aircraft
- Highly reliable, environmentally rugged unit designed for extreme operations while maintaining a 27,000hrs MTBF
- Supports all legacy FMS certified under TSO-C129a without modification, all legacy data and wiring retained per ARINC-743A and supports FMS GAMA-3 certification

The CMA-6024 is the result of over 35 years of CMC Electronics' experience in the design and manufacture of certified airborne GPS products for the air transport, helicopter and business aviation markets, and is a collaborative effort with NovAtel Inc. for state-of the art RF front-end and Narrow Correlator® tracking technology.

CMC Electronics

CMA-6024 GPS/SBAS/GBAS Landing System Sensor Unit — Specifications

DESIGN REQUIREMENTS

ARINC	743B/C Characteristic 755-4 Characteristic 709 Characteristic 710 Characteristic
RTCA MOPS	DO-229D/E SBAS DO-246D/E GBAS DO-253C/D GBAS

CERTIFICATION

FAA	TSO-C145e Beta-3, TSO-C146e Delta-4, TSO-C161a, TSO-C162a
Design Assurance Levels	Hardware: RTCA/DO-254 Level A Software: RTCA/DO-178C Level A DAL-A (GPS & VDB receivers) Part 25 Fail Safe & Fail Operational

GPS RECEIVER

Type	24 parallel Narrow Correlator® (patented) simultaneous processing channels 3 SBAS channels + 21 GPS channels
Frequency	L1, 1575.42 MHz, GPS & SBAS C/A codes (SBAS PRN codes from 120 to 158)
Signal Performance	Fully compliant to RTCA/DO-229D/E GPS and SBAS signal acquisition, tracking, and positioning accuracy performance under all interference conditions
Time to First Fix	< 75 seconds maximum, 95% confidence
Navigation Accuracy	RNP0.1 continuously availability with SBAS, Primary Means Navigation as per RTCA/DO-229D/E, Automatic reversion to SA-OFF when out of SBAS coverage
Velocity Accuracy	< 0.5 knots, 95%, SA-OFF, velocity as per RTCA/DO-229D/E Appendix F
Position Update	Independent 1Hz and 10Hz outputs
Approach Guidance	20Hz ARINC-710 LOC/GS with 10Hz rectilinear outputs
Antenna	Active antenna compliant with TSO-C190
BITE	Continuous coverage, >95% fault detection

VDB RECEIVER

General Performance	Meets or exceeds all RTCA/DO-253C and D VDB performance requirements as a Class B receiver with X>=10, Y=0, Z=15
Other	Supports authentication with digital time mark

NEW INTERFACES SUPPORTING GPS APPROACH

ILS Look-alike	ARINC-710 digital GS/LOC
DME	ARINC-709 digital DTG
Control Panel	ARINC-429
Cross-Feed	ARINC-429 for dual and triple installations including Fail Safe and Fail Operational
Linear Deviations	ARINC-429
MCDU	ARINC-739 ports allowing reuse of existing MCDUs instead of Control Panel

OTHER FEATURES

Pressure Altimeter	Automatic incorporation as per RTCA/DO-229D/E Appendix G
FDE/Predictive RAIM	Fault detection and isolation with automatic incorporation of pressure altimeter data as per RTCA/DO-229D/E
Approach Capability	SBAS LPV, LP, LNAV/VNAV as per RTCA/ DO-229D/E, GBAS GAST-C as per RTCA/DO-253C/D
SBAS FAS Database	RTCA/DO-200A certified, world-wide database aprox. 4MB
Database Capacity	Built-in 2 cycle capacity, 12MB/cycle 24MB total flash memory for SBAS FAS database
Data Loader	RS-232 and ARINC-615-3 (429), supports differential SBAS FAS database loads
ADS-B Support	Fully compliant with FAA AC20-165B and RTCA/DO-229D/E Appendix U
Maintenance Port	RS-232
ARINC-743 A & B	Legacy 41-pin ARINC-743A-5 and New 100-pin ARINC-743B connectors
ARNC-743B compliant	Supports “bolt-on” SBAS/GBAS precision approach with built-in digital high integrity switch
MTBF	> 27,000 hours
Options	Have Quick Timing Interface CSDB Interface (LOC and GS) Doppler Radar Velocity Emulation Other Specialty Items (enquire)

PHYSICAL

Size	2.6” x 8.5” x 9.5” (66 x 216 x 24 mm), Alternate form factor ARINC-743B
Weight	6 lb (2.75 kg)
Input Power	18 to 36 VDC
Consumption	28W max, 23W typical

ENVIRONMENT

Temperature	DO-160G Cat. A2F2X, -55 C to + 70 C
Altitude	DO-160G Cat. F2, 55,000 feet (16,500 meters)
Humidity	DO-160G Cat. B
Vibration	DO-160G Cat SCYL & RG
Cooling	Not required
EMC/HIRF	DO-160G Cat. YY (200 V/m)
EMI	DO-160G Cat. M
Lightning	DO-160G Cat A3J3L3

LEGACY ARINC-743 INTERFACES

Inputs	8 ARINC-429, 1 RS-232
Outputs	3 ARINC-429, 1 RS-232, 1 28V fault output discrete Three 1-Hz time marks

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

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CMC-CMA6024-GPS-19-004

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