

CMA-5024 GPS/SBAS Landing System Sensor Unit

High-Performance ADS-B, RNP-RNAV and LPV GPS Approach Sensor



- Patented 24-channel Narrow Correlator® ARINC 743B compliant SBAS sensor unit
- High-integrity SBAS Beta-3/Delta-4 sensor for RNP RNAV and SBAS approaches
- Can host entire SBAS worldwide approach database or use SBAS FAS from FMS
- Self-contained GPS approach solution with an integrated digital high-integrity switch and a companion control head
- Compatible with existing legacy TSO C-129 FMS, ILS and DME
- Fault Detection and Exclusion (FDE) and predictive RAIM with automatic pressure altimeter incorporation
- Outstanding MTBF

The CMA-5024 aviation SBAS/GPS sensor provides full ADS-B compliance SBAS/GPS Primary Means Navigation and SBAS approach capability for business, regional, commercial air transport and helicopter aircraft. The CMA-5024 meets all TSO C-145c Beta-3 and TSO C-146c Delta-4 requirements. The CMA-5024 meets FAA certification FAR Part-25, RTCA/DO-178B Level B, RTCA/DO-254 Level B and RTCA/DO-160E requirements; and complies with the existing ARINC-743B characteristic. The CMA-5024 is intended for both retrofit and OEM installations.

When out of SBAS coverage, the CMA-5024 incorporates improved signal processing and correction models with SA-OFF at all times as per RTCA/DO-229D. When in SBAS coverage, SBAS ranging, integrity and differential corrections are automatically incorporated. The result is a significantly improved Predictive RAIM and RNP (RNAV or RNP AR) navigation performance over any TSO C-129a receiver.

The CMA-5024 provides an ARINC-743B compliant interface with connectors to support both legacy avionics and those designed to take advantage of a TSO C-145c Beta-3 and TSO C-146c Delta-4 sensor. The result is that any FMS can immediately benefit from improved RNP navigation performance.

The CMA-5024 is capable of providing SBAS (or GBAS) precision approach guidance. When enabled, the CMA-5024 will provide ILS look-alike Localizer and Glide-Slope guidance signals to the autopilot and instruments. The CMA-5024 includes a built-in digital high integrity switch for approach selection between ILS and GPS (SBAS or GBAS). With the CMA-5025 control panel, the CMA-5024 provides a

complete, self-contained, stand-alone SBAS/LPV or GBAS/GLS approach solution. The CMA-5024 is compatible with ARINC compliant DME and ILS digital signal formats.

Key CMA-5024 Technology Features

- Four SBAS and twenty GPS continuous channels with full RTCA/DO-229D message processing
- Can host the entire SBAS LPV approach database or can accept SBAS Final Approach Segment (FAS) from the FMS
- Superb RNP performance with SBAS LPV approach capability
- Extensive I/O supporting ARINC-743B, 709 and 710 with DME and ILS look-alike digital interfaces
- Designed for easy retrofit into all aircraft or into OEM integrations
- Supports all legacy FMS certified under TSO C-129a without modification, all legacy data and wiring retained per ARINC-743A
- Supports FMS GAMMA-3 certification
- LAAS/GBAS/GLS upgradeable (CMA-5024 software with internal VBD receiver)

The CMA-5024 is the result of over 25 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.

CMA-5024 GPS/SBAS Sensor Unit — Specifications

DESIGN REQUIREMENTS

ARINC	743B Characteristic 755-4 Characteristic
RTCA	DO-229D SBAS MOPS DO-246D (in development) DO-253C (in development)

CERTIFICATION

FAA	TSO C-145c Beta-3 and TSO C-146c Delta-4 TSO-161a and TSO-162a (in development) FAR Part 25
Software	RTCA/DO-178B Level B
Hardware	RTCA/DO-254 Level B

RECEIVER

Type	24 parallel Narrow Correlator® (patented) simultaneous processing channels 4 SBAS channels + 20 GPS channels
Frequency	L1, 1575.42 MHz, GPS and SBAS C/A codes
Signal Performance	Fully compliant to RTCA/DO-229D 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	SA-OFF, RNP0.1 >99.999% availability with SBAS, and Primary Means Navigation as per RTCA/DO-229D
Velocity Accuracy	< 0.5 knots, 95%, SA-OFF, velocity as per RTCA/DO-229D Appendix F
Position Update	Independent 1Hz and 10Hz outputs
Approach Guidance	20Hz ARINC-710 LOC/GS and new 10Hz rectilinear outputs
Antenna	Active antenna compliant with TSO C-190
BITE	Continuous coverage, >95% fault detection
MTBF	> 40,000 hours

NEW INTERFACES SUPPORTING GPS APPROACH

ILS Look-alike	ARINC 710 digital GS/LOC
DME	ARINC-709
Control Head	ARINC-429
Cross-Feed	ARINC-429 for dual and triple installations
Linear Deviations	ARINC-429

OTHER FEATURES

Pressure Altimeter	Automatic incorporation as per RTCA/DO-229D Appendix G
FDE/Predictive RAIM	Fault detection and isolation with automatic incorporation of pressure altimeter data as per RTCA/DO-229D
Approach Capability	SBAS LPV, LP, LNAV/VNAV as per RTCA/DO-229D
SBAS FAS Database	RTCA/DO-200A certified, maximum world-wide database < 4MB maximum per cycle
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 AC20-165A and RTCA/DO-229D Appendix U
Maintenance Port	RS-232
41-pin connector	Legacy ARINC 743A-5 and ARINC 743B compliant
100-pin connector	ARINC 743B compliant
	Supports "bolt-on" SBAS/GBAS precision approach with built-in digital high integrity switch

PHYSICAL

Size	2.6" x 8.5" x 9.5" (66 x 216 x 24 mm), Alternate form factor ARINC-743A
Weight	5.5 lb (2.5 kg)
Input Power	18 to 36 VDC
Consumption	20W max, 16W typical, with digital interfaces

ENVIRONMENT

Temperature	DO-160E Cat. A2F2X, -55 C to + 70 C
Altitude	DO-160E Cat. F2, 55,000 feet (16,500 meters)
Humidity	DO-160E, Cat. B
Vibration	DO-160E, Cat (CYL), R(G)
Cooling	Not required
EMC/HIRF	DO-160E, Cat. YY (200 V/m)
EMI	DO-160E, Cat. M
Lightning	DO-160E Cat A3J33

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

Specifications are subject to change without notice. Narrow Correlator® tracking technology is a registered trademark of NovAtel Inc.

For more information, visit www.cmcelectronics.ca
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Over 100 Years
of Innovation

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