

# SBAS Solutions for Cargo Operations

Presented by: Tarek Sabanekh  
EGNOS Workshop – Sept. 24, 2019  
Rome, Italy

# Product Portfolio

## AVIONICS DISPLAYS and VISION SYSTEMS



## COMMUNICATIONS



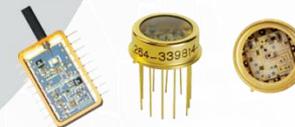
## SYSTEMS INTEGRATION



## NAVIGATION



## MICROELECTRONICS



# Historic Highlights



1901    1903    1909    1912    1919    1921    1925    1931    1951    1951    1953    1956    1957    1960s-70s    1980s-90s

Marconi Wireless Telegraph Company of Canada incorporated

Marconi wireless station receives S.S. Titanic's distress signal

Introduced the first home radio receivers in Canada

Initiated the establishment of a Canadian radio network

CMC's transatlantic telecommunications services acquired by the Canadian Government

First Canadian company to design a complete microwave radio relay system,

Focused on aircraft navigation, monitoring and display systems, tactical radios, radar and telex switching systems

World's first trans-oceanic wireless transmission

First factory opened in Montreal

Established Canada's first experimental commercial broadcasting station

Company name changed to Canadian Marconi Company

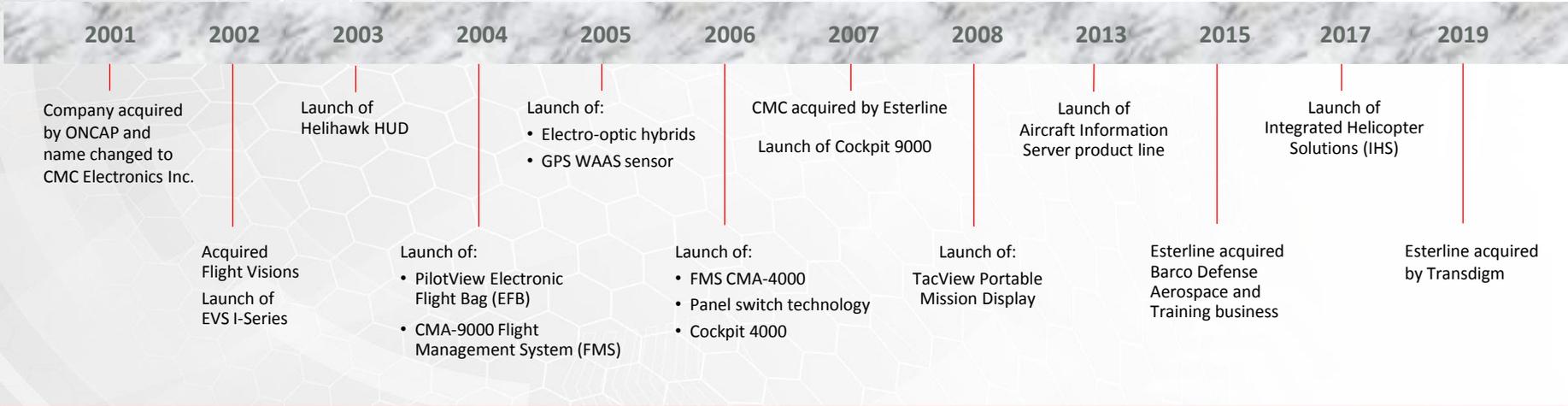
Designed and manufactured T.V. receivers

UK-based English Electric Company Limited acquired 50.6% of Canadian Marconi

First to develop an FM-CW Doppler radar for air navigation

Focused on high-end aviation, communications, infrared sensing, marine electronics, positioning markets, avionics and system integration

# Historic Highlights (2)



# CMC's EGNOS Products

- Market segments: Air Transport, Helicopters, Biz Jet, Regionals, Trainers, Airlines, Aircraft OEMs, Avionics OEMs, Ground Station OEMs; both forward & retrofit
- LPV ARINC739 or control panel options:



3<sup>rd</sup> party products



CMA-5025  
SLS/GLS CP



CMA-3024  
GNSSU  
SBAS Nav +  
ADS-B



CMA-5024  
GLSSU  
+ LPV  
+ A739



CMA-6024  
GLSSU  
+ GBAS GLS



CMA-4124  
GNSSA MMR  
Card



CMA-4024  
Primus Epic

# CMC's EGNOS Products

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- LPV ARINC739 or control panel options:



33,000+ CMC GPS flying today



# One Product Family, Many Platforms



# Why Upgrade to SBAS/EGNOS?

Some of the reasons operators upgrade to EGNOS:

- ADS-B Out Stand-Alone
- SBAS GPS Navigation (RNP)
- SBAS Nav + ADS-B Out
- LPV
- SBAS Nav + LPV
- SBAS Nav + ADS-B Out + LPV
- LPV + GBAS
- SBAS Nav + LPV + GBAS GLS
- SBAS Nav + ADS-B Out + LPV + GBAS GLS

# Why SBAS/EGNOS from CMC?

- Extremely high reliability >45,000FH
- Toughest environmental qualifications in its class, these are the same GPS boxes used on C-130s by Air forces worldwide including USAF
- Available and in production today, SBAS GPS in continuous production since 2005
- Cost: upfront & cost of ownership, more value for lower
- Landing system capabilities: SBAS, LPV and GBAS  
GLS in the same box
- Easy to install

# A300/A310



- LPV
- GPS Nav + ADS-B Out
- FMS + GPS Upgrade

**Esterline CMC Electronics' High-Performance Flight Management Systems  
Receive EASA Certification on A300-600 Aircraft**



7/11/2016  
(Farnborough International Airshow – July 11, 2016) Esterline CMC Electronics (CMC) is pleased to announce that its 9000 Flight Management System (FMS) has been certified by EASA on the A300-600. The Supplier's Certificate of Approval (SCoA) was issued by EASA on July 17, 2016.



**... running Pioneer Projects (2/3) in France**

**Partners :**  
EGIS AVIA  
DSNA  
ATI  
Pildo

**Airports/Procedures:**  
(Clermont-Ferrand)  
Beluga

**Nb Aircraft:** 1 (+4)  
**Beluga – Airbus A300-600ST**  
**Avionics:** CMC Electronics

**Achievements and future milestones**  
Successful ground tests: March 2011  
Certification flight around summer 2011

**Deliverables**  
Initial Business Case  
Lessons learned  
Safety assessment methodology applied



# A300-600 Beluga LPV Auto-land @TLS



# A320

- ADS-B Out Stand-alone
- GPS Nav
- GPS Nav + ADS-B Out



Esterline's CMA-5024 GLSSU receives EASA approval on the A320 family for ADS-B Out

6/30/2018

Farnborough International Airshow, June 30, 2018 -- Esterline Avionics Systems and PMV Engineering are pleased to announce that PMV Engineering has obtained EASA approval for the upgrade of the older generation GPSSU by CMC's CMA-5024 GLSSU on the A320 family of aircraft.

# B737-300/400/500/600/700/800 CL & NG

- ADS-B Out Stand-alone
- LPV Stand-alone
- GPS Nav + ADS-B Out + LPV



*CMC Electronics' CMA-5024 receives TCCA STC certification for ADS-B out and LPV on B737NG aircraft family*

4/29/2019

Montreal, April 25, 2019 - CMC Electronics is pleased to announce that Transport Canada Civil Aviation (TCCA) has approved an STC to install CMC's SBAS-capable CMA-5024 GLSSU on B737NG aircraft for DO-260B ADS-B out compliance and SBAS/GPS navigation with the option to enable LPV approach capability. FAA and EASA STC approvals are in progress and expected shortly for all B737NG aircraft types (-600/-700/-800).



# 737NG SEAMLESS INTEGRATION



CMA-6024

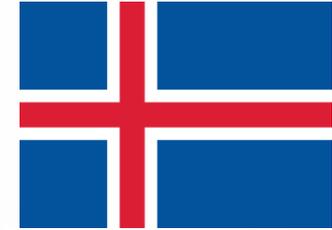


CMA-5024



GABLES G7501 Control Panel

# B757/767



- ADS-B Out Stand-alone
- ADS-B Out + LPV + GBAS GLS *coming soon*



## New ADS-B Out STC Featuring Esterline's CMA-5024 on Boeing 757 and 767 Aircraft

10/18/2018

Esterline Avionics Systems is pleased to announce that Airborne Maintenance & Engineering Services has received FAA Supplemental Type Certificate (ST04319CH) approval of their ADS-B Out solution featuring Esterline's CMA-5024 on Boeing 757, 767-200 and 767-300 aircraft.

# B747-400

- ADS-B Out Stand-alone
- GPSSU Replacement



## SUPPLEMENTAL TYPE CERTIFICATE

10070239

This Certificate/Approval is issued by EASA, acting in accordance with Regulation (EU) 2018/1139 on behalf of the European Union, its Member States and of the European third countries that participate in the activities of EASA under Article 129 of that Regulation and in accordance with Commission Regulation (EU) No. 748/2012 to

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ICELAND  
EASA.21J.679

and certifies that the change in the type design for the product listed below with the limitations and conditions specified meets the applicable Type Certification Basis and, if applicable, environmental protection requirements when operated within the conditions and limitations specified below:

Type Certificate Number: EASA.IM.A.196

Type Certificate Holder: THE BOEING COMPANY

Type: 747

Model: 747-400, 747-400F

### Description of Design Change:

Installation of GPS/SBAS sensors/antenna  
Installation of two (TSO-145c) **CMC Esterline CMA-3024 GPS/SBAS sensors**, (TSO-C190) antennas, and associated wiring. The installed equipment and wiring will be inactive, activation is via separate STC.

### EASA Certification Basis:

EASA CS-25 amendment No. 4 and CRI Special Condition H-01.

The requirements for environmental protection and the associated certified noise and/ or emissions levels of the original product are unchanged and remain applicable to this certificate/ approval.

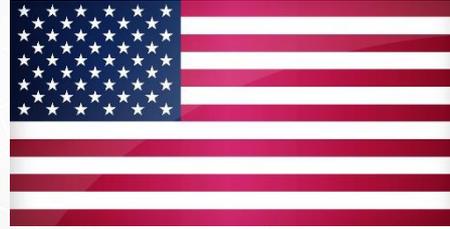
See Continuation Sheet(s)

For the European Aviation Safety Agency

Cologne, Germany, 18 June 2019

# B777

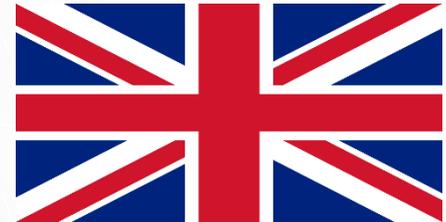
- GPS Nav
- GPS Nav + ADS-B Out



**Esterline develops customized CMA-5024 GLSSU for B777 aircraft under Boeing license**

3/5/2019

Montreal, March 5, 2019 - Esterline's CMC Electronics (CMC) business unit is pleased to announce that they completed development and testing of a customized version of their CMA-5024 SBAS GPS for B777 aircraft under license with Boeing. This tailored version (P/N 100-601967-121) has been installed on several B777-200 aircraft with major airlines wherein the CMA-5024 fully integrates with the on-board avionics, including AIMS.



# EGNOS STCs [www.cmcelectronics.ca/ads-b](http://www.cmcelectronics.ca/ads-b)

AIRCRAFT	MAIN FUNCTION	APPROVALS
A300/A310	RNP NAV	STC – TCCA
A300ST (Beluga)	LPV	STC – EASA
A320 Series	ADS-B Out	STC – EASA, FAA
A320	ADS-B Out & RNP NAV	STC – EASA
A340	ADS-B & RNP NAV	STC – EASA
ATR-42/72	LPV, ADS-B & RNP NAV	STC – EASA
B737-300/400/500	RNP NAV	SB - Boeing
B737-300/400/500	LPV, ADS-B & RNP NAV	STC – TCCA, FAA, EASA
B737-600/700/800	LPV, ADS-B Out & RNP Nav	STC – TCCA, FAA, EASA
B747-400	ADS-B Out & RNP NAV	STC – EASA, FAA
B757	ADS-B Out	STC – FAA, EASA
B767	ADS-B Out	STC – FAA, EASA
B777	ADS-B Out & RNP NAV	STC – FAA, EASA
MD81/82/83/88	ADS-B Out	STC – TCCA, FAA, CASA
MD88/90	ADS-B Out	STC – FAA
Bell 412EPI (Heli)	GVS	STC – FAA

# What Next?

- MCMF (Galileo, BeiDou...) & EGNOS V3
- VTOL/UAS/UAM/HAPS/SAR/EMS Precision Landing:
  - Leverage EGNOS & GBAS tech and avionics
  - Precision approach anywhere
  - Rapidly deployable and movable
  - Lower cost than GBAS ground station
  - No survey required, support moving deck/ship

A word cloud featuring the word "THANK YOU" in large, bold, black letters. Surrounding it are numerous other words in various languages, including "GRACIAS", "ARIGATO", "SHUKURIA", "JUSPAXAR", "DANKSCHEEN", "TASHAKKUR ATU", "YAQHANYELAY", "SUKSAMA", "EKHMET", "MEHRBANI", "GRAZIE", "LE MAAKE", "PALDIES", "GOZAIMASHITA", "EFCHARISTO", "KOMAPSUMNIDA", "BOLZIN", "MERCICI", "TINGKI", "BIYAN", and "SHUKRIA".

