

Aviation and Aerospace Innovation

CMC electronics

Dave Heppenstall

Ottawa, Ontario

Corporate Background

About CMC Electronics Inc.

- 1901** Guglielmo Marconi successfully makes the first trans-oceanic wireless transmission.
- 1902** Marconi founds the *Marconi Wireless Telegraph Company*.
- 1925** Company name changed to *Canadian Marconi Company*.
- 60s** Corporate focus moves towards aircraft navigation, monitoring and display systems.
- 2001** Company name changed to *CMC Electronics*.



Marconi co. circa 1910

CMC Electronics stands on a solid reputation based on over one hundred years of innovation. Today, CMCE is widely recognized to be a world leader in the design, manufacture, sales and support of high-technology electronic products for the aerospace and communication markets.

Program Abstract

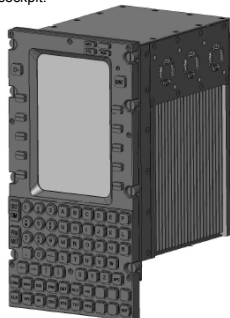


Sikorsky Cyclone CH-148

The Maritime Helicopter Project (MHP)

- Engineering of software design and development of flight computer systems.
- Replacing systems on board aging Sikorsky Sea-King Helicopters.
- System will include components for Flight Management, Mission Data Management, and Communication Management.
- MHP conducted to support Naval Surface Warfare, Sub-surface Warfare and Search and Rescue operations.
- Two Flight Management Control Display Units (FMCDUs) located in cockpit.

The FMCDU creates an interactive display to present critical flight data, mission data and communication system status to the aircraft crew.



Flight Management Control Display Unit

Co-op Student Activities

- Working as a member of the Military Software Engineering team.
- Working closely with the FMCDU device.
- Writing, proofreading and editing software design and requirements documents interface.
- Developing embedded user interface keyboard and display software for the FMCDU in C and in Ada languages.
- Conducting and participating in review sessions to examine produced work.

Work Term Context

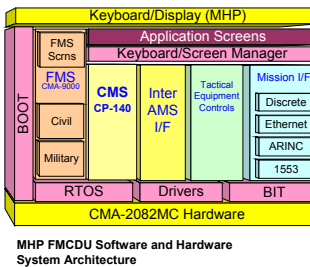
Student Background

- Honours Bachelor of Computing. Three of four co-op semesters completed.
- Previous Co-op Work Experience:
 - Blue Coat Systems** (2005) - Quality Assurance.
 - Rogers Cable** (2006) - Development Support. *Third Prize Winner for Best Work Term Report*
- Work Term Goals:
 - Broaden software development skills.
 - Develop agile decision-making practices.
 - Expand time management abilities.
 - Increase ability to conceptualize large projects.



System Architecture

Foundation, Application and Interface Integration Layers



MHP FMCDU Software and Hardware System Architecture

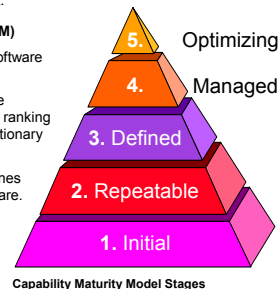
- The MHP FMCDU system is constructed on three levels:
 - Interface layer** contains the graphical user interface (GUI) software to manage user data and response feedback.
 - Application layer** includes application programming interfaces (API), drivers, the kernel and operating system software.
 - Foundation layer** consists of the existing open hardware architecture.

Software Process Maturity Overview

- In general, lives will ultimately depend on the reliability of flight equipment.
- Developing commercial and military aviation equipment must take place in a very sensitive and high precision environment.

Software Capability Maturity Model (CMM)

- Internationally recognized standard for software development.
- The model helps judge the maturity of the software processes of an organization. A ranking between one and five indicates the evolutionary stage for the key procedures in practice.
- Describes and provides company guidelines used for managing and developing software.
- A proven model. Benefits include:
 - Reliable on-time delivery
 - Higher product quality
 - Predictable expenses



Process Technologies

Measuring, Analyzing and Improving

CMM Level Three: Defined.
All projects use standardized management and engineering processes for software development and maintenance.

- October 2003:** CMC Electronics was assessed and certified with **CMM Level Three**. This level provides a foundation from which all engineering processes will be examined and decisions can be made on how to improve them.
- A component of this certification is reliant upon the technologies being utilized within the process management infrastructure:
 - MKS Integrity™** is used for software version control, code and development path management, review session logging and issue tracking.
 - Telelogic DOORS®** is used for managing and tracing system requirements.



Conclusion



- Traceable.** All components of software functionality and low-level implementation detail must be traceable to a higher level of system and customer requirements.
- Defined.** Software which requires a very high degree of dependability necessitates a rigid and highly defined process management infrastructure.
- Consistent.** A corporation-wide set of procedures for design, implementation and maintenance will ensure that all aspects of the product lifecycle are well controlled and documented.

Citations and Acknowledgements

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- My co-op support in Guelph: **Deborah Stacey**, **Sharon Popkey** and **Bruce Wilson**.

Source Document References:

- CMCE Corporate Outline and Presentation. 1999-2006.
- CMCE Capability and Demonstration Brochure. 2005.
- Maritime Helicopter Program Reference Document. 2003-06.
- New Hire Orientation Training Material – Marlene Walker. 2006.

