

# Embedded Systems Engineering

## Mission critical systems & software

Aging fleets, budget constraints, and rising operation and maintenance (O&M) costs are creating special constraints on the transformation of military forces. Although technology is available to significantly improve the capabilities of existing fleets, cost-effective integration of these systems remains a challenge.

CAE has over 20 years of experience in optimizing these mission critical systems. Through its longtime support of the Canadian CF-18 Hornet, CAE has built an international reputation for software engineering excellence in support of complex aircraft systems.

CAE has developed numerous operational flight programs to support ever increasing mission capability requirements, upgrading software for mission computers, stores management set, and integrating modified radar and other avionic systems. A flexible and highly responsive software development process has given the Canadian Forces' CF-18 pilots a customized configuration adapted to the realities and challenges of today's mission.

At the heart of every modern fighter aircraft is software, and here CAE takes the lead. For example, CAE has led the integration of precision guided munitions, enhancing the combat effectiveness of the CF-18 in the mid-1990's. This allowed Canada's front line fighter to make a significant contribution to NATO operations.

Today, the CF-18 is undergoing an extensive modernization project that includes the integration of advanced weapons and sophisticated avionics. CAE has met this challenge head on, developing expertise in the areas such as data link, secure communications, mission planning, and GPS navigation.



## CF-18 modernization program achievements

- Successful deployment of several combat-proven, mission-critical software suites
- Integration of precision guided munitions (PGM) capability
- Upgrade of mission computer processor including a re-hosting of the operating system
- Successful integration and deployment of a ground proximity warning system (GPWS)

## Providing unique and highly-skilled expertise to clients

CAE's embedded systems engineering capabilities are supported by unique expertise in the domain of real-time operating systems, air-to-air weapons, sensors, and air-to-ground ballistics. CAE offers the following core software support capabilities:

- Enhancements to existing software functionality
- New software to support emerging capability
- Weapon system integration and testing
- Improvements to weapon performance and accuracy
- Avionic system upgrades
- Mission support tools

CAE prides itself on understanding and helping clients define complex requirements, and providing complete solutions while preserving operational flexibility and interoperability. Our team is leading the modernization of the CF-18 fleet for extended life and long-term operational effectiveness.

The imminent decommissioning of facilities such as VOR and TACAN introduces necessary changes for the continued operation of aircraft in an environment of reduced conventional navigational tools. Our team is leading the ongoing software upgrades for the CF-18 fleet, providing for long term operational effectiveness.



## Service offerings

### Avionics system engineering

- Cost-effective weapon systems and software support
- Customizable software solutions
- Rapid response to changing mission requirements
- Mission critical software development “on target, on time”

### Systems integration

- Integration of new avionics systems
- Integration of new air-to-air missiles and air-to-ground weapons
- Integration of new technologies such as speech recognition

### Weapons support

- Optimization of air-to-air and air-to-ground ballistics
- High-fidelity modeling
- Development of new radar modes

### Project scope definition and engineering support services

- Concept of operations development
- Rapid application development
- System modelling and prototyping
- System performance benchmarking
- Introductory CF-18 familiarization training (how to fly)

## State-of-the-art facilities

### Software development tools

- Advanced display rapid prototyping tool
- Real-time mission computer and display emulators
- Low-level software testing tools
- Analysis and debriefing station

### High fidelity software testing facilities

- Certified facility for classified work
- Mission computer test station
- System level test station
- Stores management set test station

## Quality assurance

CAE applies a stringent software development process to all its products. This process is designed to be compliant with the Department of National Defence Airworthiness Policy and industry best practices. The CAE quality system conforms to CMMI and ISO 9001: 2000.

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