



# Roll-On/ Roll-Off (RO/RO) Full-Mission Simulator

## Overview

Historically, different aircraft types, and even different cockpit configurations of the same aircraft type, required separate training devices, resulting in significantly increased investments required for a high quality, simulation-based training program. CAE's roll-on/roll-off (RO/RO) full-mission simulator (FMS) addresses this challenge by delivering a cost-effective and flexible training solution that allows training on multiple aircraft configurations.

CAE pioneered the development of a full-mission simulator with a revolutionary roll-on/roll-off (RO/RO) cockpit design, which enables cockpits representing various aircraft types to be used in a "mothership". The mothership simulator platform includes the core simulation components, such as the motion and visual display systems.

Different aircraft cockpits can then be "rolled-on and rolled-off" the mothership to provide ultimate flexibility and cost-effectiveness. In addition, when a cockpit is not being used in the full-mission simulator mothership, CAE has also developed a docking station so the cockpit can serve as a fixed-based flight training device (FTD). The fully functional, standalone fixed-base FTD can deliver even greater flexibility for the overall training program.

## Determining if a RO/RO solution is the answer

Simulation-based training offers a compelling value proposition because of its inherent advantages related to cost, safety and training effectiveness. However, when customers have smaller fleet sizes or differing configurations of the same platform, it can be difficult to justify a high-fidelity training solution. CAE offers training needs analysis services to help customers define their training requirements and architect a training solution to meet these requirements.

## Our RO/RO offerings

CAE offers RO/RO full-mission simulators for both rotary-wing and fixed-wing aircraft.

### CAE 7000MR RO/RO FMS

The CAE 7000MR RO/RO FMS is designed for Level-D fixed-wing training needs. This simulator features an electric motion

system with a collimated visual display. The instructor station includes an electrical instructor seat with two seat-mounted forward-facing touch-screen displays to control the simulator. The non-simulated area (NSA) can also include a first-observer seat.

### CAE 3000 Series RO/RO FMS

The CAE 3000MR Series RO/RO FMS is designed for Level-D helicopter training needs. This simulator features an electric motion system, vibration platform, and direct- projection visual system with a continuous field-of-view covering the chin windows. There are two CAE 3000MR Series RO/RO mothership types, one with a 10-foot dome display and the other with a 12-foot dome display. The selection of either one is based on cockpit size and eye-point separation (parallax). The instructor station includes an instructor seat with touch screen displays to control the simulator.



## Cockpit interchange process

The cockpit interchange process consists of physically replacing a complete cockpit module with a different one. Each cockpit is fully functional and has its own dedicated interface and electrical flight control system. The process starts by extending the scissor lift that will bridge the gap between the FMS and the mezzanine. Then the cockpit module is disconnected from the mothership FMS before being slid out on air casters and pushed onto the mezzanine. The next cockpit can then be installed on the mothership FMS.

The training center facility needs to be designed to accommodate the RO/RO mothership FMS and its specific requirements regarding the scissor lift installation, mezzanine height, floor finish and loading.

## Docking stations

When off-board operation is required, a separate docking station is provided to supply the power and computing complex necessary to use the cockpit as a FTD up to Federal Aviation Administration (FAA) Level 6.

There are a range of visual solutions available, based on customer needs, to increase the number of training tasks that can be performed on the fixed-base FTD. These visual solutions include: single channel LCD display; multi-channel LCD; cylindrical display using three projectors and collimated visual systems.

## CAE-built RO/RO full-mission simulator specifications

|                             | CAE 3000MR Series RO/RO                                      | CAE 7000MR RO/RO         |
|-----------------------------|--|--------------------------|
| Qualification Standards     | FAA and EASA Level-D   | FAA and EASA Level-D     |
| Applicable Airframe Types   | Rotary-Wing  | Fixed-Wing               |
| Visual Display Type         | Direct-Projection  | Collimated               |
| Field-of-View               | 10' variant - 210° H x 75° V<br>12' variant - 230° H x 88° V | 200x43                   |
| Motion System               | 60" 6-DOF Electric   | 60" 6-DOF Electric       |
| Vibration Platform          | 3-DOF Electric   | None                     |
| Instructor Station          | Mechanical seat  | FFIOS Electrical seat    |
| Motion Envelope (W-H-L) in. | 10': 480-397-496<br>12': 554-445-533                         | 515-398-492              |
| Extractable Modules         | Split Cockpit and NSA  | Combined Cockpit and NSA |
| Cockpit Handling            | Removable Air-Casters  | Fixed Air-Casters        |
| FMS-to-Mezzanine Junction   | Scissor-Lift   | Scissor-Lift             |
| Conversion Time             | Typically 2 - 4 hours  | Typically 1 - 2 hours    |

CAE's revolutionary roll-on/roll-off cockpit designs are currently in use in several training centres throughout the world, including:

| Training Centre   | Location             | Platforms  |
|---|----------------------|--|
| Rotorsim  | Sesto Calende, Italy | AW109, AW139   |
| International Helicopter Training Centre                      | Buckeburg, Germany   | CH-53, EC135, UH-1D  |
| Helicopter Academy to Train by Simulation of Flying (HATSOFF) | Bengaluru, India     | Bell 412, Airbus Helicopters Dauphin, and HAL Dhruv                            |
| Dothan Training Center  | Dothan, Alabama      | C-12U, C-12V, USAF C-12 (U.S. Army and U.S. Air Force variants of the King Air |

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