



Defence Research and
Development Canada

Recherche et développement
pour la défense Canada



Helicopter Maritime Environment Trainer: Data Package

Edited by:

Leo Boutette

Ken Ueno

Jason Dielschneider

This manual represents the operation of the HeIMET System as originally installed with hardware updates to the current date. For current system start-up procedures consult the Helicopter Maritime Environment Trainer (HeIMET) Start-Up, Virtual Lesson Plan (VLP) Editor & Shutdown Manual Application Version 4.0. For current Operational Procedures consult the Helmet 4 4 IOS User's Guide _Rev_011.

Defence R&D Canada
Technical Memorandum
DRDC Toronto TM 2011-052
June 2011

Canada

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Principal Author

Original signed by See Original Document. Edited by Leo Boutette, Ken Ueno, Jason Dielschneider

See Original Document. Edited by Leo Boutette, Ken Ueno, Jason Dielschneider
Human Effectiveness Exploitation Centre

Approved by

Original signed by David Eaton

David Eaton
Section Head, Human Effectiveness Exploitation Centre

Approved for release by

Original signed by Dr. Stergios Stergiopolous

Dr. Stergios Stergiopolous
Acting Chair, Knowledge and Management Committee
Acting Chief Scientist

This document is a revision of DRDC Toronto Document: CR2002-032 Atlantis Document: ED999-01183 titled Helicopter Maritime Environment Trainer: Data Package with updates to Version 4.4 of the HelMET software.

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Abstract

The Helicopter Maritime Environment Trainer (HelMET) was developed by Defence R&D Canada – Toronto (DRDC Toronto) for training helicopter pilots to land on the flight deck of a Canadian Patrol Frigate (CPF) in a virtual environment. The HelMET was installed at 12 Wing, Canadian Forces Base (CFB) Shearwater, Nova Scotia, Canada [reference: Summary per document cited in next paragraph].

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As third party support for the HelMET system did not come to fruition, DRDC Toronto has been supporting the HelMET system at 12th Wing Shearwater with hardware and software updates. The current version of HelMET is Version 4.4. Many of the updates implemented were made to allow the simulator to be used as a procedures trainer.

This document is a revision of CR2002-032 updated to reflect the large number of changes that have been implemented by DRDC Toronto since version 1.1. The purpose of this document is to update the description so that the system can be maintained and operated by Director Aerospace Development Program Management, Radar and Communications Systems or its representatives.

Résumé

Le Simulateur d'entraînement virtuel pour hélicoptère maritime (HelMET) a été développé par Recherche et développement pour la défense Canada – Toronto (RDDC Toronto) afin d'entraîner les pilotes d'hélicoptère à l'atterrissage sur le pont d'envol d'une frégate canadienne de patrouille dans un environnement virtuel. Le système HelMET a été installé à la 12^e Escadre, Base des Forces canadiennes Shearwater, Nouvelle-Écosse, Canada [référence : sommaire par document cité dans le paragraphe suivant].

Document RDDC Toronto : CR2002-032, document Atlantis : ED999-01183 intitulé Simulateur d'entraînement virtuel pour hélicoptère maritime : Trousse d'information, documentation de la version 1.1 du logiciel HelMET.

Étant donné que la prise en charge du système HelMET par un tiers ne s'est pas réalisée, c'est RDDC Toronto qui en assure, par conséquent, le soutien à la 12^e Escadre Shearwater au moyen de mises à niveau de matériel et de mises à jour de logiciel. La dernière version du logiciel HelMET est la version 4.4. De nombreuses fonctionnalités qui ont été implémentées visaient à permettre au simulateur d'être utilisé comme système d'entraînement aux procédures.

Le présent document est une révision du document CR2002-032 dont la mise à jour vise à refléter le grand nombre de modifications apportées au logiciel par RDDC Toronto depuis la version 1.1. L'objectif de ce document est de mettre à jour les descriptions de façon à ce que le système puisse être maintenu et utilisé par le Directeur – Gestion du programme de développement aérospatial (système de radar et de communication) ou ses représentants.

Executive summary

Helicopter Maritime Environment Trainer: Data Package:

Leo Boutette; DRDC Toronto TM 2011-052; Defence R&D Canada – Toronto; June 2011.

The Helicopter Maritime Environment Trainer (HelMET) was developed by Defence R&D Canada – Toronto (DRDC Toronto) for training helicopter pilots to land on the flight deck of a Canadian Patrol Frigate (CPF) in a virtual environment. The HelMET was installed at 12 Wing, Canadian Forces Base (CFB) Shearwater, Nova Scotia, Canada [reference: Summary per document cited in next paragraph].

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Sommaire

Helicopter Maritime Environment Trainer: Data Package:

**Leo Boutette; DRDC Toronto TM 2011-052; R & D pour la défense
Canada – Toronto; Juin 2011.**

Le Simulateur d'entraînement virtuel pour hélicoptère maritime (HelMET) a été développé par Recherche et développement pour la défense Canada – Toronto (RDDC Toronto) afin d'entraîner les pilotes d'hélicoptère à l'atterrissage sur le pont d'envol d'une frégate canadienne de patrouille dans un environnement virtuel. Le système HelMET a été installé à la 12^e Escadre, Base des Forces canadiennes Shearwater, Nouvelle-Écosse, Canada [référence : sommaire par document cité dans le paragraphe suivant].

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SYSTEM USAGE WARNING

AT THE REQUEST OF THE CANADIAN FORCES (CF), DRDC TORONTO CONSTRUCTED A LOW COST EXPLORATORY DEVELOPMENT SIMULATOR FOR SEA KING HELICOPTER DECK LANDING (HDL). THE HDLS WAS VALIDATED IN AN EXPERIMENTAL INTER-SIMULATOR TRANSFER OF TRAINING STUDY. BASED ON THE RESULTS, AND FAVOURABLE COMMENTS FROM EXPERIENCED SEA KING PILOTS, CF REQUESTED THE PRODUCTION OF A SIMULATOR TO "DEMONSTRATE, TO THE MARTIME HELICOPTER COMMUNITY, THE CAPABILITIES OF THE SIMULATOR AND GET THEM INVOLVED IN THE PROCESS OF DEVELOPING THE STRETCH POTENTIAL OF THIS TECHNOLOGY". WITH THE ASSISTANCE OF PILOTS, THE HDLS WAS RE-CONFIGURED (HelMET, PILOT/INSTRUCTOR OPERATOR STATION OPERATOR) TO DIRECTLY EVALUATE TRANSFER OF TRAINING IN SHEARWATER. THE DESIGN FOCUS WAS TO PROVIDE A HELICOPTER MARITIME ENVIRONMENT TRAINER (HelMET) CAPABLE OF THREE OPERATIONS SEQUENCES (DAYTIME LAND/LAUNCH FREE DECK & HAUL DOWN, AND NIGHT TIME FREE DECK OPERATIONS) AS DERIVED FROM SHIPBORNE HELICOPTER OPERATIONS PROCEDURES (SHOPS).

AT THE SUGGESTION OF 12 WING, ISSUES SUCH AS THE CONSTRUCTION OF A BARRIER AROUND THE MOTION BASE AND PLATFORM, WERE EXPLORED BY THE PILOTING COMMUNITY AFTER THE INSTALLATION IN SHEARWATER. CAUTION SHOULD ALWAYS BE EXERCISED IN THE USE OF THE SIMULATOR CONSISTENT WITH ITS PLANNED USAGE. THESE CAUTIONS INCLUDE CARE IN THE MOUNTING OF THE MOTION PLATFORM, ATTENTION TO THE OPERATIONS SEQUENCES OF POWERING THE MOTION PLATFORM, KEEPING ALL PERSONNEL AT AN ADEQUATE DISTANCE FROM THE PLATFORM DURING ITS OPERATION, AND NOT USING THE PLATFORM OUTSIDE OF ITS DESIGN LIMITS.

WARNING

THE MOTION BASE IS IN A 'PARKED POSITION' WHEN THE SIMULATOR IS NOT IN USE. AS THE SIMULATOR IS ACTIVATED, THE MOTION BASE IS RAISED FROM ITS PARKED POSITION TO A NEUTRAL POSITION, BUT DOES NOT BEGIN TO MOVE UNTIL THE INSTRUCTOR OPERATOR STATION (IOS) OPERATOR STARTS THE MOTION BASE BY PRESSING THE 'START' BUTTON ON THE IOS OPERATOR GRAPHIC USER INTERFACE. THE NORMAL METHOD FOR SHUTTING DOWN THE MOTION BASE IS FOR THE IOS OPERATOR TO BRING THE MOTION BASE TO A NEUTRAL AND THEN PARKED POSITION; ACCORDING TO THE PROCEDURES IN SECTION 4 ON SIMULATOR OPERATING PROCEDURES IN THE OPERATOR MANUAL.

APART FROM THE NORMAL PROCEDURE FOR STOPPING THE MOTION BASE, FOUR SWITCHES ARE AVAILABLE TO DIS-ENGAGE THE MOTION BASE: AN EMERGENCY BUTTON LOCATED ON THE ELECTRICAL POWER CONTROL PANEL, A SWITCH ON THE MOTION PLATFORM CONTROL COMPUTER, A STOP BUTTON AT THE IOS OPERATOR CONSOLE, AND A SWITCH (TRIGGER) ON THE COLLECTIVE PITCH LEVER AVAILABLE TO THE PILOT. WE DO NOT RECOMMEND THE SWITCH (TRIGGER) ON THE COLLECTIVE PITCH LEVER FOR ROUTINE USE. HOWEVER, SHOULD THE PILOT NEED TO DIS-ENGAGE THE MOTION BASE IN AN EMERGENCY, THE SWITCH (TRIGGER) SHOULD BE PULLED AND HELD IN POSITION FOR APPROXIMATELY 3 to 5 SECONDS, THE IOS OPERATOR WILL THEN NEED TO BE CALLED FOR AN ORDERLY SHUTDOWN. THE STUDENT/PILOT WILL NEED TO CONTINUE HOLDING THE TRIGGER UNTIL THE IOS OPERATOR REPORTS THE PLATFORM PARKED. **NOTE:** THE TRIGGER ONLY STOPS PLATFORM MOTION WHEN HELD IN POSITION. IF THE TRIGGER IS RELEASED PRIOR TO PARKING, THE PLATFORM WILL RESUME MOVING.

WARNING

THE VOLTAGES EMPLOYED IN THIS EQUIPMENT ARE SUFFICIENTLY HIGH TO ENDANGER HUMAN LIFE. A REASONABLE PRECAUTION HAS BEEN OBSERVED IN DESIGN TO SAFEGUARD THE OPERATING PERSONNEL. OPERATING PERSONNEL SHOULD BE PROHIBITED FROM TAMPERING WITH PROTECTIVE DEVICES SUCH AS MOTION SWITCHES, POWER CONTROL PANEL, AND EMERGENCY BUTTONS. THE POWER SHOULD BE REMOVED COMPLETELY AND THE HIGH-VOLTAGE CAPACITORS IN POWER SUPPLIES DISCHARGED WITH THE AID OF A SHORTING BAR BEFORE MAKING ANY INTERNAL ADJUSTMENTS.

SAFETY SUMMARY

The following are general safety precautions that are not related to any specific procedures and therefore do not appear elsewhere in this publication. These are recommended precautions that personnel must understand and apply during many phases of operation and maintenance.

KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must at all times observe all safety regulations. Do not replace components or make adjustments inside the equipment with the high voltage supply turned on. Under certain conditions, dangerous potentials may exist when the power control is in the off position, due to the charges retained by capacitors. To avoid casualties always remove power and discharge and ground a circuit before touching it.

DO NOT SERVICE OR ADJUST ALONE

Under no circumstances should any person reach into or enter the enclosure for the purpose of servicing or adjusting except in the presence of someone who is capable of rendering aid.

RESUSCITATION

Personnel working with or near high voltages should be familiar with modern methods of first aids and resuscitation.

NOTES TO USERS

WARNING, CAUTION, and NOTE data are defined in the following manner:

WARNING

To emphasize operating procedures, practices, etc., which, if not correctly followed, could result in personal injury or loss of life.

CAUTION

To emphasize operating procedures, practices, etc., which, if not correctly followed, could result in damage to or destruction of equipment.

NOTE

To highlight a procedure, event or practice that is desirable or essential.

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1 Introduction

1.1 Purpose of the Sea King Helicopter Maritime Environment Trainer

The Sea King Helicopter Maritime Environment Trainer (HelMET), herein referred to as the simulator, Helicopter Deck Landing Simulator (HDLS), Virtual Reconfigurable Simulator (VR-Sim), or Reconfigurable Helicopter Simulator (RHS), is designed to provide comprehensive initial and refresher training course in a virtual environment for pilots of the Sea King helicopter in landing on a flight deck of a Canadian Patrol Frigate (CPF). Use of the simulator provides for effective training and evaluation while minimizing the high cost of operating ship and aircraft for training missions and eliminating the inherent danger of personnel injury and/or damage of aircraft and ship.

1.2 Use of the Data Package

This Data Package (DP) has been prepared to aid maintenance operators in performing effective maintenance for the simulator. It provides maintenance operators with the data necessary to perform product support.

1.3 Document Overview

This document provides a collection of commercial off-the-shelf (COTS) documents. A brief outline of the contents of this document is given below:

Section 1 – Introduction

This section contains the introduction that describes the purpose of the simulator equipment and the intended use of this data package.

Section 2 – Drawings and Documents

This section contains the commercial off the shelf engineering drawings and documents.

2 Commercial Off The Shelf Documents

This section contains the following COTS documents:

- a. Servos and Simulation, Inc. Six Degree of Freedom Motion Platform Model 710-6-2000 Drawings, 1997
- b. Servos and Simulation, Inc. Six Degree of Freedom Motion Platform, Maintenance Document, October 1997
- c. Servos and Simulation, Inc. Six Degree of Freedom Motion Platform, Interface Communication Document, October 1997
- d. Servos and Simulation, Inc. Six Degree of Freedom Motion Platform, Acceptance Test Report, 1997
- e. EMS G5 Series Instruction Manual, 1996
- f. BG Systems, Inc. CerealBox Hardware Manual, 4.02, November 1998
- g. BG Systems, Inc. LV824 Software Manual, 4.03, June 1999
- h. Polhemus Inc. 3SPACE FASTRAK User's Manual, Revision F, November, 1993
- i. Virtual Research Systems, Inc. VR1280 User Guide,
- j. Yamaha DEQ7 Digital Equalizer Operating Manual
- k. BSS Audio Ltd. FDS 360 User's Manual
- l. Carver TFM-6C High-Headroom/Low-Feedback Power Amplifier Owner's Manual
- m. Clark Synthesis Tactile Sound Installation and Operation Guide (229, 329, 3710 & Platinum)
- n. Mackie 1202-VLZ PRO 12 Channel Mic/Line Mixer Owner's Manual
- o. Dell Dell Dimension 4100 System Reference
- p. Dell Dell UltraScan P991 Color Monitor Quick Setup
- q. American Power Conversion Matrix UPS User's Manual, 1994

- r. Tyan B4985 Transport FT48
Service Engineers Manual Barebone System
- s. Color Graphic Monitor Operating Instructions
- t. Tyan S4985 Thunder n4250QE User's Manual,
- u. Color Monitor User's Manual
- v. Sony Corporation Trinitron Color Graphic Display Multiscan 17se
Operating Instructions, 1994
- w. Dell Dell Precision 650 User's Guide
- x. Dell Dell Precision 650 Service Manual
- y. Dell Dell Precision 530 User's Guide
- z. Dell Dell Precision 530 Service Manual

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DOCUMENT CONTROL DATA <small>(Security classification of the title, body of abstract and indexing annotation must be entered when the overall document is classified)</small>		
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(U) The Helicopter Maritime Environment Trainer (HelMET) was developed by Defence R&D Canada – Toronto (DRDC Toronto) for training helicopter pilots to land on the flight deck of a Canadian Patrol Frigate (CPF) in a virtual environment. The HelMET was installed at 12 Wing, Canadian Forces Base (CFB) Shearwater, Nova Scotia, Canada [reference: Summary per document cited in next paragraph].

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(U) Virtual reality ; Team Trainer; Helicopter Deck Landing; Sea King; Canadian Patrol Frigate; simulator; part–task trainer

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