

6451-209-001 (SEM 4)
11500-82-2 / AETE 2014-006 (AFTEC 2-2)

14 May 2014

REQUEST FOR ESTIMATE

References: A. CH147F Statement of Operating Intent v 2.0, 13 July 2007
(RDIMS PMOTALC #24996)
B. A-GA-005/AG-002 Air Force Test and Evaluation Coordination, 5 August 2008

PROJECT IDENTIFICATION

1. The following will identify this project:
 - a. Project Title: CH147F Northern Domestic Airspace (NDA) Evaluation;
 - b. Project Number: AETE 2014-006;
 - c. Project Priority: D; and
 - d. Security: Unclassified.

SITUATION/BACKGROUND

2. The CH147F will be required to operate domestically in both the southern and northern domestic airspace as per the Statement of Operating Intent at reference A.
3. DND was unable to obtain technical data from other CH147F operators or the Original Equipment Manufacturer (OEM) to allow for a Technical Airworthiness Clearance (TAC) to be issued authorizing flights into the NDA. Certification requirements to operate in the NDA will be clarified by Director Technical Airworthiness Engineering Support (DTAES) staff prior to tasking this project.
4. With the behaviour of the Honeywell Embedded GPS/INS (EGI) (model number 342-09950-RN14-018) units not characterized while operating at high latitudes, it is necessary to conduct testing in the NDA to identify issues related to the EGI that may affect the Avionics Management System (AMS), Digital Automatic Flight Control System (DAFCS) and Flight Director (FD).

AIM

5. The aim of this project is to support the TAC of the CH147F for flight in the NDA.

IMPLEMENTATION

6. Objectives. The aim of this project will be met through the following objectives:

- a. Verify that the EGI can be aligned on the ground at selected airfields in the NDA;
- b. Confirm the EGI, AMS, DAFCS and FD behaviour during the conduct of EGI ground and in-flight failure mode testing;
- c. Measure the navigation performance of the Inertial Navigation System (INS) portion of the EGI;
- d. Compare the attitude and heading information provided by the Standby Flight Display (SFD) to those presented on the Primary Flight Display (PFD);
- e. Evaluate the effect of the transition from Southern Domestic Airspace (SDA) to NDA, the transition from NDA to SDA, and operations at extreme latitudes in the NDA on the EGI, AMS, DAFCS and FD;
- f. Demonstrate the capability to conduct flight operations under VFR and IFR in the NDA;
- g. Validate the information contained in the Aircraft Operating Instructions (AOI) applicable to ground and flight operations in the NDA;
- h. Confirm sat-phone operations in the NDA; and
- i. Confirm HF communications in the NDA.

Note: The underlined action-words used to define the objectives of this project were determined IAW reference B.

7. Scope. The following factors amplify the objectives and define the scope of this project:

- a. All testing shall be conducted without GPS crypto variable key to provide the worse-case scenario for GPS alignment (to be confirmed by PMO/DTAES);

- b. Testing should be conducted at Rankin Inlet, Cambridge Bay, Resolute and Alert based on acceptable system performance and the constraints associated with this project;
- c. The EGI ground alignment shall be conducted in Gyro Compass Alignment (GC ALN) and Stored Heading Alignment (SH ALN). Time to align the EGI shall be measured;
- d. The EGI ground failure mode testing shall include:
 - (1) Loss of GPS signal to a single EGI, restoration of signal and effect on EGI alignment and AMS;
 - (2) Loss of GPS signal to both EGIs, restoration of signal and effect on EGI alignment and AMS; and
 - (3) Loss of primary and secondary electrical power to a single EGI, restoration of power and effect on EGI alignment and AMS.
- e. The EGI in-flight failure mode testing shall be conducted with FD uncoupled and coupled, and include:
 - (1) Loss of GPS signal to a single EGI, restoration of signal and effect on EGI alignment, AMS, DAFCS and FD;
 - (2) Loss of GPS signal to both EGIs, restoration of signal and effect on EGI alignment, AMS, DAFCS and FD; and
 - (3) Loss of primary and secondary electrical power to a single EGI, restoration of power, and effect on EGI alignment, AMS, DAFCS and FD.
- f. The navigation performance testing of the INS shall be conducted for a minimum flight duration of 2.0 hours. The radial distance between the INS position and the corresponding EGI position as provided by the Cockpit Display Unit (CDU) shall be used;
- g. Navigation in TRUE NORTH while in the NDA shall include:
 - (1) Enroute and Terminal Area Navigation (RNAV) using VOR, ADF and Flight Plan (FPLN) with FD modes coupled and uncoupled;
 - (2) Approach using VOR, VOR/DME, ADF, ILS, LOC(BC), Lateral Navigation (LNAV) and LNAV/Vertical Navigation (VNAV) with the FD modes coupled and uncoupled; and
 - (3) Instrument missed approach using GO-AROUND FD mode.

8. Constraints. The following constraints apply to this project:
 - a. Evaluation should be conducted between 01 Aug 2014 and 30 Sep 2014;
 - b. The latitude at which the OEM considers the EGI airworthy may limit the scope of this test (PMO is awaiting this information from the OEM, Honeywell); and
 - c. Testing should be planned to maintain the CH147F within communication range of supporting unit(s).
9. Method. As proposed by the Commanding Officer of AETE.
10. Deliverables. The following deliverables are required by the Sponsor:
 - a. A formal report within 60 working days of test completion to support the issuance of TAC and provide amendments to AOI.
11. Special Instructions. The following apply to this project:
 - a. If required, PMO MHLH will coordinate with Boeing to use the Systems Integration Laboratory (SIL) to develop test procedures prior to execution the project. Due to limitations with the SIL, system behaviour may not be accurate.
 - b. AETE Estimate shall include the following:
 - (1) Deployment itinerary to allow 450 Sqn to conduct the operational planning, identify the logistical support and deployment cost estimate;
 - (2) Support requirements from 1 CAD, 1 Wing and 450 Sqn;
 - (3) Temporary Duty cost for AETE and 450 Sqn test aircrew;
 - (4) YFR hours; and
 - (5) Shipping cost of AETE test equipment.

PROJECT SUPPORT

12. PMO MHLH will provide financial support, contingent upon acceptance of the AETE and 450 Sqn cost estimates; and
13. PMO MHLH will coordinate Test Team access to Boeing SIL and provision of subject matter experts.

COORDINATION

14. The points of contact for this project are as follows (refer to DIN for further contact information):

- a. Sponsor: Col. A. Fleming, PM MHLH;
- b. Technical OCIs:
 - (1) Maj S. Cote, SEM 4, PMO MHLH;
 - (2) Maj M. Parsons, CTF, PMO MHLH;
 - (3) Mr L. Sumner, DTAES 3-3C;
- c. 1 CAD POC: Maj L. Clifford, SO Tac Avn Sys;
- d. 1 Wing POC: Maj M. Babin, A7;
- e. AFTEC POC: Capt V. Penner, AFTEC 2-2 (DTAES 7-6-2);
- f. AETE POC:
 - (1) Capt D. Edwards, D/PCO; and
 - (2) Maj D. Duval, OIC RW.
- g. LATEF POC: Maj Sceviour, OC LATEF; and
- h. 450 SQN POC: Maj Tyler, Ops O.