
**E-AUCTION TENDER DOCUMENTS**

**FOR**

**A SUPPLY AND INSTALLATION OF ONE FLIGHT INSPECTION SYSTEM**

**SECTION A-F, MAY 2017**

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**AERONAUTICAL RADIO OF THAILAND LTD.**

**BANGKOK, THAILAND**

CONTENTS

SECTION A

INVITATION TO TENDER

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## 1 INTRODUCTION

1.1. Aeronautical Radio of Thailand Ltd., hereinafter called AEROTHAI, hereby invites qualified Tenderers to participate in the e-Auction of A SUPPLY AND INSTALLATION OF ONE FLIGHT INSPECTION SYSTEM and other services, if required, hereinafter called the "Activities", in accordance with the terms, conditions, and specifications contained in the Tender Documents.

1.2. This Tender is part of the overall procurement process for the provision of A SUPPLY AND INSTALLATION OF ONE FLIGHT INSPECTION SYSTEM

1.3. This Invitation to Tender together with the other Tender Documents specifies the requirements, terms and conditions of the Tender to be complied with by Tenderers in preparing and submitting Tenders.

1.4. The requirements of the Tender Documents shall be strictly complied with and shall not be modified by Tenderers.

## 2 TENDERER QUALIFICATIONS

For a Tenderer to be considered eligible and accepted for further evaluation, all of the following qualifications must be met:

2.1 The Tenderer shall be a juristic person professionally in business of manufacturing and supplying flight inspection systems. No joint venture or consortium or the likes will be eligible for tender submission.

2.2 The Tenderer shall not be charged with, or be affected by another person(s) or juristic person(s) charged with debarment due to abandonment of Activities, and shall not be named in the "Black List" circulated among all government agencies as persons excluded from Royal Thai Government procurement programs.

2.3 The Tenderer shall certify that he is without a special privilege or immunity which enables him to refuse being taken to a Thai court or, if he has such privilege or immunity, certify that such privilege or immunity has been waived.

2.4 The Tenderer shall not be a "jointly interested tenderer", have any co-interest with any other Tenderer and/or e-MarketPlace, and/or obstruct fair price competition at

the time of Tender Submission in accordance with the 'Regulations of the Office of the Prime Minister on Procurement' contained in Appendix A-1.

2.5 No AEROTHAI officer is connected with the Tenderer as a manager, managing partner, managing director, executive or person authorized to operate the business of a natural person or juristic person or a partner in ordinary partnerships or limited partnerships, or a major shareholder in limited companies or public limited companies, or a consultant to such business.

2.6 The Tenderer shall be the original manufacturer of the main Equipment proposed thereof must provide with his Tender, a certified copy of original documentation to demonstrate his status as such.

2.7 Only Tenderers who have purchased Tender Documents directly from AEROTHAI will be entitled to submit Tenders for the Activities.

2.8 The successful tenderer (only listed companies in Thailand) who will enter into contract with AEROTHAI shall declare its revenue-expenditure account statement to the Revenue Department of Thailand, as required by the Office of the National Counter Corruption Commission's Announcement on "Regulations and Instructions to Declare Revenues and Expenditures of Contractual Project between Person or Juristic Person and Government Entity B.E. 2554", dated 11 August 2011, and its second announcement dated 7 December 2011.

## 3 AVAILABILITY OF TENDER DOCUMENTS

Tender Documents are available for examination by prospective Tenderers between 09.00 to 16.00 hours, **from 2017** and may be purchased on written request at the following address:

**Procurement and Inventory Control Department**
**Aeronautical Radio of Thailand Ltd.**
**5th Floor, Administration Building**
**102 Ngamduplee, Tungmahamek,**
**Sathon, Bangkok 10120,**
**THAILAND**

Formal requests for the purchase of Tender Documents should be made on the Tenderer's official letterhead accompanied by a non-refundable payment of **Baht 5,000.-** (comprising 1 hard copy and 1 soft copy). Payment may be in cash.

Tenderers under Item 2.1 are able to assign an officially authorized person or agent to purchase Tender Documents on their behalf.

## 4 TENDER SECURITY

Tenders must be accompanied by Tender Securities detailed in Section B, Item 11 as required to the value of **Baht 5,756,425.00 (**equivalent to five (5) percent of the initial price) valid not less than **days** from the Tender Submission Date **(from ).**

## 5 SUBMISSION OF TENDERS

5.1 Tenders have to be delivered **by hand** only to:

**Committee for e-Auction,**
**A SUPPLY AND INSTALLATION OF ONE FLIGHT INSPECTION SYSTEM**
**Procurement and Inventory Control Department**
**Aeronautical Radio of Thailand Ltd.**
**5th Floor, Administration Building**
**102 Ngamduplee, Tungmahamek,**
**Sathon, Bangkok 10120,**
**THAILAND**

5.2 Tender(s) shall be delivered between 9.00 a.m. and 11.00 a.m., Bangkok local time, on **only 2017** (the Tender Submission Date). For the avoidance of doubt, any Tender(s) received after 11.00 a.m. on the Tender Submission Date will not be accepted and will be returned unopened to the Tenderer(s).

5.3 AEROTHAI will issue a receipt in respect of each and every Tender submitted in due time and the date and time of such receipt shall be regarded as the official time of receipt.

5.4 Tenders received by AEROTHAI in due time shall not be changed, altered, modified or withdrawn, whether in whole or in part, but certain clarifications not changing or

violating the substance or any requirement of a Tender for the best interest of AEROTHAI may be accepted.

## 6 NOTIFICATION TO QUALIFIED TENDERERS

AEROTHAI will individually inform the Tenderers who have passed or failed Pre-Qualification Evaluation. Only such notice, the Qualified Tenderers shall participate in A SUPPLY AND INSTALLATION OF ONE FLIGHT INSPECTION SYSTEM e-Auction.

## 7 COST PROPOSAL

7.1 Price quotation will be proceeded via electronic auction **on 2017** at the following e-Marketplace:

CAT Telecom Public Company Limited
99 Moo 3 Chaeng Watthana Road
Tung Songhong, Laksi,
Bangkok 10210-0298
THAILAND

7.2 A Successful Tenderer is to provide a full and complete Cost Proposal in accordance, both in content and format, with the requirements detailed in Section C of the Tender Documents **within three (3) days from e-Auction Date** or as otherwise requested by AEROTHAI.

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## Regulations of the Office of the Prime Minister on Procurement

**Definitions** (NOTE: for the purposes of these definitions, the terms "government" and "government agency" shall be understood to include AEROTHAI as a state enterprise)

**"jointly interested tenderer"** means a natural person or a juristic person who tenders a bid for the purchase of materials by the government, or who tenders a bid for employment as a consultant, or for design and supervision of work for a government agency, and who has an interest, either directly or indirectly in the business of another natural person or juristic person who tenders a bid or bids for work to that government agency at the same time.

The interest, either direct or indirect, in another natural person or juristic person as aforesaid includes relationships in the following manner:

(1) Management relationship, whereby the manager, the managing partner, the managing director, the executive, or the person authorized to operate the business of a natural person or a juristic person has the power, or is able to exercise the power, in managing the business of one or more natural persons or juristic persons who tenders a bid or bids to that government agency at the same time;

(2) Capital relationship, whereby a partner in an ordinary partnership or a partner with unlimited liability in a limited partnership or a major shareholder in a limited company or public limited company is a partner in one or more ordinary partnerships or limited partnerships, or is a major shareholder in the other one or more limited companies or public limited companies who tender a bid or bids for work to that government agency at the same time;

The term "major shareholder" means

i. A shareholder who holds **more than twenty - five (25) percent** of the shares of that business or at such other ratio as the Procurement Committee (KorWorPor) deems appropriate to prescribe for certain types or sizes of businesses.

ii. A shareholder who holds **more than five (5) percent** of the shares of the e-Marketplace which is selected by AEROTHAI in this e-Auction or at such other ratio as the Procurement Committee (KorWorPor) deems appropriate to prescribe for certain types or sizes of businesses.

(3) Cross relationship between (1) and (2), whereby the manager, managing partner, managing director, executive or person authorized to operate the business of a natural person or juristic person is a partner in one or more ordinary partnerships or limited partnerships, or is a major shareholder in one or more limited companies or public limited companies who tender a bid or bids for work to that government agency at the same time, or vice versa.

The holding of position, being a partner or holding of shares as aforesaid by spouse or child under legal age of the person in (1), (2) or (3), shall be deemed the holding of position, being a partner or holding of shares by such person.

If any person uses the name of another person as the manager, managing partner, managing director, executive, partner or shareholder, but in which case he himself in fact exercises the power in management or he himself is the real partner or shareholder of the partnership or limited company or public limited company, as the case may be, and the related partnership or limited company or public limited company tenders a bid or bids for work to that government agency at the same time, the person who tenders a bid or bids for work shall be deemed to have a relationship under (1), (2) or (3), as the case may be.

**"obstruction of fair price competition"** means any act of one or more persons who tender a bid or bids for work, which act obstructs or prevents the opportunity for fair price competition in the tendering of bids or bidding for work to a government agency, whether done by collusion, or by granting, requesting, or agreeing to grant, demand, accept or agreeing to accept money or property or other benefit or by committing an act of violence or by threatening to commit an act of violence or presenting a false document or doing any act in bad faith, with the objective of acquiring benefit among the tenderers or bidders for work, or in order to give benefit to any tenderer or bidder for work so that such person will be entitled to enter into a contract with that government agency, or in order to avoid fair price competition, or in order to take advantage of the government agency other than in the ordinary course of business.

SECTION B

INSTRUCTIONS TO TENDERERS

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## 1. DEFINITIONS

1.1. The words and expressions defined elsewhere in the Tender Documents shall apply equally hereto, except where the context otherwise requires for example those specific terms and meaning in Section F:.

1.2. Additional definitions of words and expressions, which are not defined elsewhere, or which require re-definition for the purposes of the Instructions to Tenderers (ITT), are given below:

| | |
|---|---|
| "Addendum" and "Addenda" | mean respectively an addendum and all addenda to the Tender Documents as may be issued by AEROTHAI during the Tender Period in accordance with the provisions of the Tender Documents. |
| "AEROTHAI" | means Aeronautical Radio of Thailand Ltd. |
| "Contract" | means the contract between AEROTHAI and the Contractor for the Activities dated_____ together with the Contract Documents, and any amendment thereof (if any) |
| "Contract Documents" | means documents specified in the Contract as forming integral part of the same. |
| "Contractor" | means the juristic person or persons, firm or company whose Tender has been accepted by AEROTHAI and who agrees to accomplish the Activities for AEROTHAI and includes the Contractor's personal representatives, legal successors, and permitted assignees. |
| "Cost Proposals" | means the response to Section C, (FORM OF TENDER) of the Tender Documents submitted by a Successful Tenderer to AEROTHAI **within three (3) days** from the e-Auction Date or as otherwise requested by AEROTHAI. |
| "e-Auction" | means the purchasing process, conducted over the internet by using the service of an electronic intermediary market, including e-Marketplace. |
| "e-Auction Date" | means the date stipulated by AEROTHAI for the e-Auction. |

| | |
|---|---|
| "Technical Proposal" | means the Tenderer's response to Section F, TECHNICAL SPECIFICATIONS, including its annexes. |
| "Tender (s)" | means an offer to perform the Activities submitted by a Tenderer in response to the Tender Documents. |
| "Tender Submission Date" | means the date specified for the submission of Tenders set out in the ITT. |
| "Tender Period" | means the period from the date of the ITT until the Tender Submission Date. |
| "Eligible Tenderer" | means the Tenderer who has passed the General Qualification. |
| "Pre-Qualification" | means pre-qualification requirements (GENERAL AND QUALIFICATION AND TECHNICAL PROPOSAL) to be evaluated and determined by the Committee for e-Auction under Item 13 (PRE-QUALIFICATION OF TENDERERS) and other relevant Items of the ITT. |
| "Qualified Tenderer" | means the Eligible Tenderer who has passed the Pre-Qualification. |
| "Successful Tenderer" | means the Qualified Tenderer who has been selected by AEROTHAI. |

## 2. TENDER DOCUMENTS

2.1 Tenders shall consist of the following Tender Documents:

| | | |
|---|---|---|
| SECTION | A | Invitation to Tender |
| | B | Instructions to Tenderers |
| | C | Form of Tender and Price Schedule |
| | D | Form of Contract |
| | E | Conditions of Contract |
| | F | Technical Specifications : General Requirements |
| | | Annex A : FIS Specifications; |
| | | Annex B : INTENTIONALLY LEFT BLANK (Not Applicable) |

2.2 The Tenderer shall submit his Tender on the understanding that the Tender Documents (and the Tenderer's response thereto) are intended to cover all the Activities within the scope of any resultant Contract and that, unless expressly excluded in his Tender, any and all labor and materials not indicated therein, but which may be necessary to complete any part of the Activities in a proper and workmanlike manner, are considered to be included and are to be furnished by the Successful Tenderer.

2.3 Throughout the Tender Period, there shall be no communication from the Tenderer to any officer, agent or consultant of AEROTHAI in connection with this procurement process, other than in the form of the Request for Clarification procedure using the form at **Appendix B-1.**

2.4 Any Tenderer in violation of this provision, as determined by AEROTHAI, will be disqualified and AEROTHAI shall not be liable to the Tenderer for any consequences thereof.

2.5 a) Such requests are to be addressed as follows:
Procurement and Inventory Control Department
Aeronautical Radio of Thailand Limited
5th Floor, Administration Building
102 Ngamduplee, Tungmahamek, Sathon,
Bangkok 10120, **THAILAND**

b) Project name: **A SUPPLY AND INSTALLATION OF ONE FLIGHT INSPECTION SYSTEM**
Dispatch Date: Day/Month/Year
Ref. No.: Name of project/XX
From: Name of Tenderer
Subject: A specific topic should be identified

c) All correspondence shall be delivered by hand to reach AEROTHAI not later than fifteen (15) days prior to the Tender Submission Date. AEROTHAI will not be responsible for non-receipt of any correspondence sent by post, registered or otherwise. It is the Tenderer's responsibility to confirm that the correspondence has been delivered properly.

d) All correspondence sent by facsimile or email shall only be considered as an intention on the part of the Tenderer to further send an original hard copy to AEROTHAI on time, and upon receipt thereof AEROTHAI will take note and act accordingly.

e) Responses by AEROTHAI to any Request for Clarification will be issued as early as possible and prior to the Tender Submission Date. Such responses will be copied to all Tenderers.

f) Any clarifications, modifications or amendments to the Tender Documents shall only be made as follows:

i. official responses to Requests for Clarification issued by AEROTHAI ; and
ii. modifications and amendments through official Addenda issued by AEROTHAI,

otherwise they shall be deemed invalid. Both i. and ii. shall be incorporated

## 3. SITE SURVEY

INTENTIONALLY LEFT BLANK (Not Applicable)

## 4. TENDERER UNDERSTANDING

The Tenderer shall be deemed to have carefully examined all of the Tender Documents including any clarifications, modifications or amendments thereto and to have fully informed himself as to all conditions, local and/or otherwise, affecting the carrying out of the Activities of the Contract, and to have calculated the equipment and facilities available and needed, for the performance thereof. Failure to do so will be at the Tenderer's own risk and cost.

## 5. TENDER COSTS

All and any costs incurred in the preparation and submission of the Tender and all matters arising therefrom shall be totally at the Tenderer's expense.

## 6. PREPARATION OF TENDERS

6.1 LANGUAGE

With the exception of the Tenderer's response to Section F, TECHNICAL SPECIFICATIONS,: General Requirements, Annex A, B and C which is to be prepared in English, the Tender - including any supplementary documentation – may be prepared in English or in Thai.

6.2 AUTHENTICATION

The original Tender shall be affixed with the Tenderer's company seal (if any) and manually signed by a person authorized to bind the Tenderer and a Power of Attorney indicating such authority shall be submitted with the Tender. Any correction, erasure or overwriting in the Tender shall be affixed with the Tenderer's company seal (if any) and initiated by the person signing the Tender.

6.3 ORGANIZATION

The Tender shall be organized at least in the following five (5) parts:

**Part 1 – Tender Security**

Tender Securities must meet the requirements detailed in Section B, Item 11 (TENDER SECURITY).

**Part 2 – Documents I (Tenderer Qualifications)**

a) A list of documents submitted in accordance with b) or c), d) and e) below

b) Where the Tenderer is an ordinary partnership or limited partnership

- certified copies of incorporation documents, affidavit or by-laws, showing managing partners list, authorized administrator, issued and certified by the competent authority no more than six (6) months prior to submission of the Tender.

c) Where the Tenderer is a limited company or limited public company

- certified copies of incorporation documents, affidavit or by-laws, showing managing directors list, authorized administrator, authorized signatory, current shareholders list, current memorandum, and company objectives issued and certified by the competent authority no more than six (6) months prior to submission of the Tender.

d) All Tenderers

- copy of Value Added Tax registration (if any).

e) Certificate of original manufacturer of the main Equipment proposed or a Certificate of the officially authorized agent in Thailand of the original manufacturer of the main Equipment proposed thereof.

(**NOTE:**

1. Please provide any documents to prove the Tenderer qualifications in accordance with Section A, Item 2.
2. In the case of non-Thai Tenderers, such documents must be certified by the Royal Thai Embassy or Thai Consulate in the Tenderer's home country. If there is no Royal Thai Embassy or Thai Consulate in the Tender's home country, documents certified by a Notary Public will be acceptable.)

**Part 3 – Documents II (General Documents)**

a) **A list of documents submitted** in accordance with b), c), d), e) and f) below

b) **Power of Attorney** (Submission) according to the form as given in **Appendix B-6** shall be affixed the **thirty (30)** baht value of duty stamps and provided with Copies of identity card or passport of the persons who act for and on behalf of the Company and the authorized representatives. In the case of a foreign Tenderer, such Power of Attorney (Submission) shall be certified by a Notary Public.

c) Letter of Intent Form for e-Auction according to the form as given in **Appendix B-7**

d) Three copies of **Three (3) Parties Agreement for Procurement by e-Auction** in the form prescribed in **Appendix B-8** to be signed by the Qualified Tenderer's authorized representative**,** AEROTHAI and e-Marketplace**.**

e) Evidence of sales and qualifications as detailed in Section B, Item 9 (EVIDENCE OF SALES AND QUALIFICATIONS).

f) Details of intended subcontractor for Construction as detailed in Section B, Item 10 (INTENDED SUBCONTRACTORS AND MANDATORY QUALIFICATION).

**Part 4 – Technical Proposal**

Technical Proposal for **A SUPPLY AND INSTALLATION OF FLIGHT INSPECTION SYSTEMS** shall meet the requirements detailed in Section F including its annexes, and shall be prepared in accordance with the provisions stipulated in Section B, Item 8 (TECHNICAL PROPOSAL).

**Part 5 – Other Documentation**

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6.4 The Tenderer shall provide one (1) original for Parts 1, 2, 3, 4 and 5. The Tenderer shall provide two (2) hard copies and one (1) set of soft files for Part 4. In any case where a Tenderer submits original documents but fails to provide the requisite number of copies as stipulated above then AEROTHAI shall obtain such copies and charge all expenses incurred in so doing to the relevant Tenderer

6.5 PACKAGING

Each part of the Tender as detailed in Item 6.3 above shall be placed in separate and sealed packages, each bearing the address given in Section A, Item 5.1. In addition, each package shall be clearly marked **"e-Auction Tender for A SUPPLY AND INSTALLATION OF ONE FLIGHT INSPECTION SYSTEM No. PI.GA.E /2560"** together with the relevant part number and title as given in Item 6.3 above.

## 7. VALIDITY OF TENDERS

7.1 The Tender shall remain valid no less than **one hundred and twenty (120) calendar days** from the e-Auction Date. Tenders must be firm and cannot be altered (except as allowed for in the Tender Document), withdrawn or resubmitted within such period, provided that, Section B, Item 17 (RESERVED RIGHT) must be fully observed and followed.

7.2 AEROTHAI may request Tenderers to extend the validity period of their Tenders and their Tender Security as and when necessary to complete the procurement exercise.

## 8. TECHNICAL PROPOSALS

The Technical Proposals shall meet the requirements as detailed in Section F Technical Specifications of the Tender Documents and shall meet the following conditions:

8.1 The structure of the Technical Proposals shall be in accordance with the structure of Technical Specifications as stipulated by AEROTHAI.

8.2 For Technical Specifications, Section F General Requirements and Annex A, B and C:

8.2.1 The Tenderers shall provide Summary of Compliance Statement in the format and sample example given below:

| AEROTHAI's Technical Specification, Section F General and Annex A, B, C Item No. | Tenderer's Compliance Statement (Note A.) | Reference to Supporting Evidence in Proposal |
|---|---|---|
| List each of AEROTHAI Specification Item Number and its heading here. | State Compliance or Non-Compliance here. | Specify the supporting evidence reference page in the technical proposal |
| (example 1) Item 1.2....[FE] | Compliance | Para 1.2 Page 20... |
| (example 2) Item 3.1... [CB] | Compliance | Brochure page..... |
| (example 3) Item 5.2... [NE] | Compliance | ---- |

**Notes:** A. The terms "Compliance" or "Non-Compliance" shall be used.

B. Any responded term or statement other than as provided in Note A above will be considered as "Non-Compliance".

8.2.2 The requirements for Supporting Evidence for each Specification Item of Section F, including its sub-items unless otherwise stated, shall be as follows:

8.2.2.1 For each Specification Item with **[FE]**, the Tenderers are required to fully describe the proposed equipment/system/solution and/or explain in details how the technical application in each part of the equipment/system/solution shall satisfy his Technical Proposal and meet the requirements of Technical Specifications, or simply to declare/provide/confirm certain information or reference, as appropriately required by the Specification Item. Such description and/or explanation may include:

- theories and/or principles;
- calculations;
- details of design approach;
- pictures, drawings, or diagrams.

8.2.2.2 For each Specification Item with **[CB]**, the Tenderers are required to submit the catalogue, brochure, user manuals and/or technical manuals of the proposed system/equipment with its specific model/option, including the summarized details of the submitted documents that shall meet the requirements of technical specifications.

8.2.2.3 For each Specification Item with **[NE]**, the Tenderers are **not** required to submit any supporting evidence. **NOTE:** Those Specification Items without any remark (no [FE], [CB], [NE]) may be assumed to be the same as with [NE], i.e. not required to submit any supporting evidence.

8.3 Strictly no prices or reference to price shall be in the Technical Proposal. Violation of this requirement will be reason for rejection of the Tenders.

## 9. EVIDENCE OF SALES AND QUALIFICATIONS

a) TENDERER shall provide creditable and referable evidence in the following details:

(1) FIS OEM is registered with ICAO ICASC (International Committee for Airspace Standards and Calibration) as FIS manufacturer.

(2) FIS OEM has experience of manufacturing FIS and delivering flight inspection aircraft for at least two (2) flight inspection systems or two (2) flight inspection aircraft, or has delivered a significant hardware or software updates on the key components of the flight inspection system to previously delivered systems for at least two (2) systems within four (4) years of the TENDER DATE.

(3) FIS OEM has been involved in presenting paper, analysis, research, and topics in an international meeting or seminar relating to flight inspection and its related technology or procedures within four (4) years of the TENDER DATE.

(4) INSTALLER has licensed engineers who are certified and approved by FAA/EASA for aircraft maintenance and modification capability applicable for AIRCRAFT and its registration.

(5) INSTALLER has licensed engineers who are experienced with the same level of turboprop aircraft and avionics modification as required under this TOR.

(6) FIS OEM has the required STC or DATA PACKAGE for installation of FIS onto the twin engines turboprop or jet aircraft of the similar performance to AIRCRAFT. In event that the DATA PACKAGE is required to be reproduced, the organization who will produce the DATA PACKAGE shall has experience of producing DATA PACKAGE applicable.

b) TENDERER shall provide following documents, which are extracted from the content of the TOR, to AEROTHAI as part of technical proposal for the purpose of TENDERER qualification evaluation:

(1) FI-AIRCRAFT delivery plan (process, turnaround time, and location) including Gantt chart presentation;

(2) List of name of involved parties in the delivery process with brief description;

(3) TENDERER company registration;

(4) FIS OEM company registration;

(5) INSTALLER company registration;

(6) TENDERER declaration letter confirming non-relationship status other opposing bidders;

(7) ICAO FIS manufacturer registration record for FIS OEM;

(8) Sale record or evidence of sale from FIS OEM;

(9) Paper and/or presentation material prepared for a presentation at an international meeting or seminar in a flight inspection related topic from FIS OEM;

(10) Adequate FAA/EASA approved engineer licenses and record of work of engineers by INSTALLER;

(11) Summarized STC or DATA PACKAGE for FIS installation, or record of DATA PACKAGE production in the past if the particular data package needs to be newly produced;

(12) Any technical descriptions, diagrams, equipment designs, list of procedures, or other technical materials for demonstrating FI-AIRCRAFT system and procedures as required in the TOR; and

(13) Compliance matrix of the TOR, showing TENDERER compliance and acceptance to each individual requirement in the TOR, with numbered references to all documents or evidences as applicable.

c) TENDERER shall meet all requirement under the TOR by submitting all required documents and evidence as necessary and confirm compliance to all requirements herein, including those conditions in case such TENDERER is awarded the contract and become CONTRACTOR under this procurement.

d) Despite the shortened and summarized list and details of certificates described above, it is TENDERER responsibility to ensure that the submitted certificates and documents under this section suffice the requirement above and its original requiring statement, and that requirement elsewhere that may or may not be included in the list above are met.

e) Full reference information shall be provided, together with reference company(ies) and/or person(s) (e.g. company name, system manager's name, telephone number and email address) and evidences of sale(s), such as purchasing contract(s) or purchase order(s) or letter(s) of reference from the purchaser(s), etc. In case of the officially authorized agent in Thailand, records of reference sale(s) of Flight Inspection System of the manufacturer for proving the past experience in local or overseas implementation can be provided.

## 10. INTENDED SUBCONTRACTORS AND MANDATORY QUALIFICATION

a) The Tenderer shall provide with his Tender full details, including but not necessarily limited to name, of any subcontractor whom he intends to appoint to

perform any aspect of the Activities, which includes the following as a minimum (if applicable):

(1) FIS OEM
(2) INSTALLER
(3) Organization who produces DATA PACKAGE
(4) Organization who certifies DATA PACKAGE to be used for aircraft modification
(5) Organization who certifies FIS installation and aircraft modification and issues airworthiness certification in according to aircraft registration
(6) Organization who ferries FI-AIRCRAFT

b) TENDERER shall provide TENDERER's, FIS OEM's, and INSTALLER's company registration, confirming that they have no juristic or other relationship with other TENDERER, FIS OEM, INSTALLER who is also proposing the TENDER.

## 11. TENDER SECURITY

11.1 The Tender shall be accompanied by Tender Security as required. The Tender Security may be furnished in any of the following forms:

a) Cash.

b) Cashier's Cheque, payable to **Aeronautical Radio of Thailand Limited** issued either on the Tender Submission Date or not more than three (3) days before such date.

c) A Letter of Guarantee issued by a bank in Thailand in the form given in **Appendix B-3**.

d) A Letter of Guarantee issued by Industry Financial Corporation of Thailand, finance company or security and finance company, which has been approved to operate the finance and guarantee business and is in the list circulated among all government agencies by the Bank of Thailand according to the form given in **Appendix B-3**.

e) Royal Thai Government Bond.

11.2 The Tender Security for A SUPPLY AND INSTALLATION OF FLIGHT INSPECTION SYSTEM is to be for the value of **Baht 5,756,425.00** (equivalent to Five (5) percent of the initial price) and to be valid no less than **days** from the Tender Submission Date **(from )**

11.3 Any Tender not accompanied by acceptable Tender Security will be rejected by AEROTHAI.

11.4 The Tender Security of the Successful Tenderer who offered the lowest total proposed Contract Price in the e-Auction will be retained and the Tender Securities of the other Tenderers shall be returned within **fifteen (15) days** without liabilities to AEROTHAI in respect of the e-Auction whatsoever, provided that such other Tenderers shall formally request return by the letter and the receipt.

11.5 The Tender Security of the Successful Tenderer will be returned upon the execution of the Contract and, against the presentation of the receipt and the letter of request from such Tenderer as well as acceptance by AEROTHAI of the Performance Security in accordance with the provisions of the Contract.

11.6 The return of all Tender Securities shall be made on a non-interest basis.

## 12. SUBMISSION OF TENDER DOCUMENTS

The Tenderer shall submit the Tender Documents to the Committee for e-Auction on **2017** between 9.00 a.m. and 11.00 a.m., Bangkok local time at Procurement and Inventory Control Department, 5th Floor, Administration Building, Aeronautical Radio of Thailand Limited.

12.1. The Committee for e-Auction will:

12.1.1 accept the Tender Documents, register them as evidence and sign and make a note on the envelope as to whom they belong.

12.1.2 check Tender Securities together with the financial officer, and have the financial officer issue a receipt to the person who submits the Tender envelope as evidence. If the Tender envelope is not correct, a note shall be made on the receipt and in the report. If the Tender Securities are letters of guarantee, copies of the letters of guarantee shall be sent by registered mail to the bank which issued such letters of guarantee for its acknowledgement.

12.1.3 receive documents and evidence according to the list of documents of the Tenderers including sample supplies, catalogs or drawings, and specifications (if any) and to note the report if it is incorrect.

12.2 The Committee for e-Auction will not accept a Tender if:

12.2.1 the Tenderer has not purchased the Tender Documents directly from AEROTHAI and/or

12.2.2 the Tender Documents have not been filled in or signed and/or

12.2.3 the Tenderer submits details different from the conditions stipulated in the Tender Documents and their differences cause any advantage or disadvantage to other Tenderers and/or

12.2.4 any correction, erasure or overwriting in the Tender Documents submitted has not been duly signed and stamped by an authorized person and/or

12.2.5 the Tenderer submits the Tender Documents after the expiry of the period of submission.

## 13. PRE-QUALIFICATION OF TENDERERS

13.1 General Qualification

The Committee for e-Auction will:

13.1.1 check the Tenderers qualifications, Tender forms, Tender Documents, sample, supplies, catalogs or drawings, and specifications.

13.1.2 examine the qualifications of all Tenderers in accordance with the Section A Item 2 (TENDERER QUALIFICATIONS).

13.1.3 disqualify any Tenderer(s) found to be in breach of the Regulations of the Office of the Prime Minister on Procurement' contained in Section A, **Appendix A-1** of the Tender Documents.

13.1.4 Any Tenderer disqualified in accordance with this provision shall have a right of appeal in accordance with Item 14.1 below

13.2 Technical Proposals Evaluation

13.2.1 The Technical Proposals of the Eligible Tenderers will be evaluated in compliance with AEROTHAI's requirements as detailed in Section F, Technical Specifications of the Tender Documents on a paragraph by paragraph basis, using the Summary of Compliance Statement and supporting evidence provided by the Tenderers in accordance with Section B, Item 8 (TECHNICAL PROPOSAL).

13.2.2 The Committee for e-Auction will ask for clarification from Tenderers as it deems necessary provided always that Tenderers shall provide the clarification(s) asked for without in any way changing or violating the substance of their Tender.

Such clarification may be sought either through correspondence or by a meeting as AEROTHAI may require. Any clarification shall be made within the time to be specified by AEROTHAI; otherwise the Tenderer will be either disqualified or his Tender evaluated accordingly at the sole discretion of AEROTHAI. In the case of meetings, the Tenderer shall be represented by persons with adequate specialized knowledge and full delegated authority in writing to make decisions for and on his behalf in order that clarifications may be fully discussed and appropriate decisions reached at each such meeting.

The Tenderer's response to any request for clarification made by AEROTHAI shall be signed by the same person as the original Tender, or an alternate with a similar Power of Attorney to that called for in **Section B Item 6.3 Part 3 Document II** above, and shall become part of his Tender.
The Tenderer shall be solely responsible for all consequences of any failure on his part in making clarifications as required and within the time specified by AEROTHAI.

13.2.3 Evaluation Criteria

All requirements in Section F, Technical Specifications are **MANDATORY**.

The Tenderer shall comply with all requirements or comply due to their proposed alternative solution (s) demonstrable to be equivalent to or better than the requirement(s) as specified in the Technical specification.

Any failure to meet the said requirements shall result in the failure of further evaluation;

**Any Qualified Tenderers shall pass the Evaluation Criteria above in order to be able to proceed with the e-Auction.**

13.3 Notification

The Committee for e-Auction will individually inform the Tenderers who have passed or failed the Pre-Qualification.

## 14. APPEALS AGAINST DISQUALIFICATION

14.1. Any Tenderer who is disqualified under the **Item 13 (PRE-QUALIFICATION OF TENDERERS)** above may appeal against such decision to the President of AEROTHAI within **three (3) days** of the notification of such decision by the Committee for e-Auction. The decision of the President of AEROTHAI in such matters shall be final.

14.2. Making such appeal shall result in postponement of the whole e-Auction process.

## 15. E-AUCTION

**The Qualified Tenderers shall perform as follows:**

15.1 Tenderers whose Technical Proposals have passed shall attend a training session on the e-Auction process, at a time and place to be advised at a later date. Tenderers will be assigned a User ID and a Password.

15.2 Before participating in the e-Auction, the Qualified Tenderers should clearly review the e-Auction documents to be provided by e-Marketplace and the Tender Documents.

15.3 The Qualified Tenderers shall submit **Power of Attorney (e-Auction)** affixed the **thirty (30) baht** value of duty stamps according to the form given in **Appendix B-9**

**In the case of a foreign Tenderer, Power of Attorney (e-Auction) shall be certified by a Notary Public.**

15.4 Initial price for bidding of A SUPPLY AND INSTALLATION OF ONE FLIGHT INSPECTION SYSTEM is **Baht 115,128,481.00**

15.5 Price shall be made on the same price basis, by considering the price including VAT, Tax, Duties and other operating cost.

15.6 Price proposal for bidding shall not exceed the initial price and must be evaluated and determined based on the total price only.

15.7 The Successful Tenderer whom AEROTHAI executes a Contract shall pay a fee to e-Marketplace at the amount of **Baht 30,000.-** (VAT included). Presentation of a receipt is required on the date of Contract execution.

15.8 Tenderers who are selected to participate in the e-Auction shall bid for **A SUPPLY AND INSTALLATION OF ONE FLIGHT INSPECTION SYSTEM** in accordance with AEROTHAI's requirements. AEROTHAI shall confiscate their Tender Securities or claim under such Tender Securities in the amount of two point five percent (2.5%) of the initial price for bidding from their banks in the following events:

a) The Qualified Tenderers do not assign or dispatch any of their authorized representative to register for e-Auction process on the designated time and place; or
b) Having registered, but do not log into e-Auction system; or
c) Having logged-in to the system, but do not bid at all or do not bid in accordance with AEROTHAI's requirements or bid higher or equal to initial price; or
d) Fail to execute their signature on Form Bor Kor 008- Last Bid Confirmation Form.

15.9 The Tenderers shall offer price with the minimum Bid not less than **Baht 200,000.-** per bid from the initial price of the procurement and the following Minimum Bid offers must be not less than Baht 200,000.- from the previous bid offered.

## 16. COST PROPOSAL

16.1 Price quotations will be proceeded via electronic auction **(_____ 2017)** at the

following e-Marketplace: **CAT Telecom Public Company Limited**, 99 Moo 3 Chaeng Watthana Road, Thung Songhong, Laksi, Bangkok, **THAILAND.**

16.2 A Successful Tenderer is to provide a full and complete Cost Proposal in accordance, both in content and format, with the requirements detailed in Section C of the Tender Documents within **three (3) days** from e-Auction Date or as otherwise requested by AEROTHAI.

16.3 The Cost Proposal will be checked for accuracy in numerical calculation. The Tenderer shall complete the Price Schedule given on Section C. Any Tender with an arithmetical mistake will be corrected on the basis of the estimated quantities of work given in the Bills of Quantities (BOQs) and the unit prices quoted by the Tenderer. Except in the case of Lump Sum Items, if a unit price is not quote in the Bills of Quantities for any Item but the total price of the Item is given, the unit price shall be determined by dividing the Tender amount of the Item by the quantity stated in the Bills of Quantities. Where a unit price only is stated in the Bills of Quantities (BOQs), the Tender amount for the Item shall be determined by multiplying the unit price by the estimated quantity.

## 17. RESERVED RIGHTS

17.1 AEROTHAI reserves the right to cancel the Invitation to Tender or reject any or all of the Tenders, based on its best interest, and is not bound to accept any of the Tenders, and Tender Security of any rejected Tender will be returned accordingly.

17.2 AEROTHAI reserves the right to accept, at its sole discretion, any minor error, irregularity, omission or disorder in a Tender, if it considers, based on its own interpretation, that the errors, irregularities, omissions or disorders are minor or immaterial.

17.3 AEROTHAI reserves the right to accept any Tender – including but not limited to the lowest – which it considers to be in its best interests.

17.4 AEROTHAI reserves the right to modify or amend any or all of the Tender Documents and notify the Tenderers in the form of an Addendum. Each Addendum shall be numbered sequentially as issued. The Tenderer will be notified of and provided with each Addendum sequentially as issued. All Addenda so issued shall form an integral part of the Tender Documents. The Tenderer should note that each Addendum

issued will be accompanied by a form of "Confirmation of Receipt of Addendum", which the Tenderer shall sign as instructed therein and return to AEROTHAI, no later than **two (2) working days** after the receipt thereof.

17.5 AEROTHAI reserves the right to accept or reject Tender in whole or in part.

17.6 AEROTHAI reserves the right to evaluate reservations in the Tender. Tenders containing major deviations or reservations will be rejected.

17.7 AEROTHAI shall not be liable to any claim regarding such waiver or rejection or any procedure of the evaluation of the Tender and not be bound to give any reasons for the decision to any Tenderer.

17.8 AEROTHAI reserves the right to review the total prices and purchase any part or all items proposed by the Successful Tenderer.

17.9 If the Successful Tenderer fails to enter into a contract or agreement with AEROTHAI within the time specified under the Tender Documents, the Committee shall consider the Tenderer who offered the next lowest proposed total Contract Price by e-Auction.

17.10 In case it appears that only one Tenderer has been passed the Pre-Qualification as Qualified Tenderer, AEROTHAI may, at its absolute discretion upon reasonable ground, proceed with procurement process without having to cancel the Tender.

17.11 Should a Tenderer either withdraw his Tender before the expiration of the validity period or extension thereof or, in the event that he has been selected as the Successful Tenderer, refuse or fail to execute the Contract within a period of **fifteen (15) days** of the Notice of Award of such selection or deposit the Performance Security in accordance therewith, then without prejudice to any other rights which AEROTHAI may possess, AEROTHAI shall confiscate the Tender Security and reject the Tender. In addition, AEROTHAI reserves the right to add the name of any such Tenderer to the "Black List" of persons excluded from Royal Thai Government procurement programs.

17.12 If the Successful Tenderer fails to enter into a contract within the time specified in accordance with Section B, Item 18 (AWARD OF CONTRACT), AEROTHAI shall confiscate the Tender Security and claim the Tenderer for any cost of damages may

occur. In addition, AEROTHAI reserves the right to add the name of any such Tenderer to the "Black List" of persons excluded from Royal Thai Government procurement programs.

17.13 AEROTHAI reserves the right to modify any of the conditions contained in the Contract provided always that such modification shall be in accordance with any Royal Thai Government requirements and/or related laws.

## 18. AWARD OF CONTRACT

Notwithstanding the provisions of Section B, Item 14 (APPEALS AGAINST DISQUALIFICATION), the Contract will be awarded as soon as practicable to the most satisfactory Tenderer by the issue of a formal Notice of Award. Within **fifteen (15) Calendar days** from the date of receipt of the Notice of Award, the Successful Tenderer shall be required to have in Bangkok, an authorized representative empowered to execute the Contract with AEROTHAI in the form as detailed in Section D-F of the Tender Document, and to furnish suitable Performance Security.

## 19. PERFORMANCE SECURITY

The Performance Security to be provided by the Successful Tenderer may be furnished in any of the following forms:

a) Cash;

b) Cashier's Cheque, payable to Aeronautical Radio of Thailand Limited issued either on the date of execution of the Contract or not more than **three (3) days** before such date;

c) A Letter of Guarantee issued by a bank in Thailand in the form given in **Appendix B- 4**; and;

d) A Letter of Guarantee issued by Industry Financial Corporation of Thailand, finance company or security and finance company, which has been approved to operate the finance and guarantee business and is in the list circulated among all government agencies by the Bank of Thailand according to the form given in **Appendix B- 4**;

e) Royal Thai Government Bond.

Such Performance Security for shall be for the amount(s) as stipulated in Section E, Condition 3 (PERFORMANCE SECURITY).

## 20. GOVERNMENT COMPLIANCE

20.1 If the Successful Tenderer thereof is a foreign company, each such company will be required to register and obtain a license (certificate) required to operate a business in the Kingdom of Thailand in accordance with the Alien Business Act B.E. 2542.

If the Contractor fails to submit a copy of such license (certificate) to AEROTHAI within **ninety (90) days** from the Signing Contract Date by any reason, AEROTHAI is entitled to terminate the Contract and confiscate Bank Guarantee(s). In this respect the Contractor hereby waives any claims against AEROTHAI whatsoever.

20.2 If the Tenderer's employees are foreigner, the Successful Tenderer shall procure all permits and licenses, such as work permits under Working of Aliens Act B.E. 2521 (1978), necessary and incidental to the due and lawful prosecution of the Activities under the Contract before the said employees commence the Activities in Thailand such as supervision of installation, training, etc. **AEROTHAI shall support only AEROTHAI documents incidental to work permits application.**

## 21. PREPARATION AND EXECUTION OF THE CONTRACT

**Two (2)** original copies of the Contract Documents will be prepared by AEROTHAI and will be submitted to the Successful Tenderer. The Successful Tenderer shall execute the Contract and submit both original copies to AEROTHAI along with Performance Security.
AEROTHAI will execute both copies, retain **one (1)** copy, and forward **one (1)** copy to the Contractor.

The Contractor shall provide **five (5)** copies of the Technical Proposal and other engineering data, special forms or other documents, which are required to be incorporated in the Contract to AEROTHAI.

## 22. LIQUIDATED DAMAGES

In the event that the completion of Activities is delayed for other than excusable causes beyond the Completion Date specified under the Contract, the Contractor

agrees to pay to AEROTHAI as liquidated damages starting from the date following the specified Completion Date up to the actual date of delivery of the Activities correctly and completely, in the following amount on each category:

a) two-tenths (0.2) percent per day of the total price of FIS (including its related Activities) which is not satisfactorily completed under Condition 27.2 (Certificate of Project Completion) within the specified Project Completion Date under the Contract.

## 23. INSURANCE

The Contractor shall provide the insurance in accordance with the provisions of Section E, Condition 34 (INSURANCE OF ACTIVITIES) and 36 (LIABILITY INSURANCE) as follows:

### 23.1 INSURANCE OF ACTIVITIES

The Contractor shall, so far as insurable by using his best effort and it own cost, insure in the joint names of AEROTHAI with Dhipaya Insurance Public Company Limited registered in Thailand against all loss or damage to the Activities from whatever cause including strike, riot, and civil commotion, arising during the performance under the Contract are covered up to the end of Warranty Period.

### 23.2 LIABILITY INSURANCE

The Contractor shall carry insurance, at his own cost, with Dhipaya Insurance Public Company Limited registered in Thailand for:

a) all workmen and employees employed on the project;
b) Third Party.

**********

## Form of Request for Clarifications

Ref. No.: Name of project/XX
To: Aeronautical Radio of Thailand Ltd.
Re: Project name

Dispatch Date: Day/Month/Year
From: Name of Tenderer
Subject: Specific topic

| Item No. | Tender Document ref.(e.g. Section and Condition no.) | Question/clarification Required | AEROTHAI Response |
|---|---|---|---|
| | | | |

Signed _____

Page no. ___ of total ___ pages

Name _____

Position _____ (Authorized Representative)

INTENTIONALLY LEFT BLANK (Not Applicable)

**FORM OF LETTER OF GUARANTEE**

**(Tender Security)**

No. _____ Date: _____

We, _____ (Name of Commercial Bank in Thailand) hereby establish this Letter of Guarantee in favour of Aeronautical Radio of Thailand Ltd. (hereinafter called AEROTHAI) as follows:

(1) As (Name of Tenderer) has submitted a tender for _____against Invitation to Tender No. PI.GA_____ /2016 for _____by e-Auction No PI.GA.E 58/2558 dated_____whereby (Name of Tenderer) has to deposit with AEROTHAI earnest money as Tender Security in respect of the terms and Conditions of the Invitation to Tender and the Instructions to Tenderers in the amount equivalent to_____(figure)_____(in words)_____), we agree unconditionally to irrevocably guarantee as primary obligator, the payment to AEROTHAI on its first demand, without whatsoever right of objection on AEROTHAI's part and without its first claim on (Name of Tenderer) in the amount of _____(figure) _____(____(in words)_____) in the event that (Name of Tenderer) fails to sign the relative Contract on being notified of the award of said Contract, or fails to submit the required Performance Security within the time limit specified in the Tender Documents, or withdraws his tender before the expiration of the validity period or extension thereof, or does not abide by any other Conditions of the Invitation to Tender or Instructions to Tenderer under which the Tender Security must be confiscated.

(2) This Letter of Guarantee is valid as from _____ up to _____ and we will not cancel our guarantee within this specified period.

(3) If the (Name of Tenderer) extends the period of validity of the tender, we will extend the validity of this guarantee by an equal period without delay on being notified.

IN WITNESS WHEREOF, we (Name of Commercial Bank) have caused these presents to be signed by our authorized representative and our corporate seal to be hereinto affixed.

(Signed) _____ Guarantor
(.....)
(Signed) _____Witness
(.....)
(Signed) _____Witness
(.....)

## FORM OF LETTER OF GUARANTEE
## (Performance Security)

No. _____ Date: _____

(1) As (Name of the Contractor) has entered into a Contract for _____with AEROTHAI under Contract no._____ whereby (Name of the Contractor) has to deposit with AEROTHAI earnest money as performance security for the proper and faithful performance of the Contract in the amount of (____figure____) (_____in words_____) equivalent to_____ % (____figure____) of the Contract Price (insert other reference as appropriate), we agree unconditionally to irrevocably guarantee as primary obligator, the payment to AEROTHAI on its first demand, without whatsoever right of objection on our part and without its first claim on (Name of the Contractor) in the amount of not exceeding _____(____figure____) (_____in word_____) in the event of any damages, liquidated damages (penalty), expenses or if any obligations expressed in the above-mentioned Contract have not been fulfilled by (Name of the Contractor).

(2) This Letter of Guarantee shall be valid and in full force and effect from the date of execution of the above-mentioned Contract until .....(the date of the completion of Activities including the warranty period under the Contract). We shall in no event withdraw this Letter of Guarantee for any reasons so far as the period stipulated under the Contract.

(3) If, at any time in the course of the performance of the Contract, AEROTHAI grants a time extension or allows (Name of the Contractor) to deviate from any Conditions of the Contract without our knowledge, it shall be deemed that such grants shall have been made with our consent. The validity of the Performance Security shall be extended accordingly.

IN WITNESS WHEREOF, we (Name of Commercial Bank) have caused these presents to be signed by our authorized representative and our corporate seal to be hereinto affixed.

(Signed)_____Guarantor
(.....)

(Signed) _____Witness

(.....)

(Signed) _____Witness

(.....)

## APPENDIX B-5 FORM OF BANK GUARANTEE (Advance Payment)

### FORM OF BANK GUARANTEE
### (Advance Payment)

No. _____ Date: _____

WHEREAS, (Name of Contractor) has entered into a Contract with Aeronautical Radio of Thailand Ltd. (hereinafter called AEROTHAI) to undertake _____ as per Contract No._____ executed on___(hereinafter referred to as "the Contract")_____. Whereby (Name of Contractor) is entitled to an advance payment of (figure) ( in words ) which is equivalent to ___percent (__%) of items defined in the Contract.

WHEREAS (Name of Contractor) wishes to draw the said advance payment of ( figure ) ( in words ) from AEROTHAI against presentation of a Bank Guarantee for the same amount.

NOW THEREFORE, by this Letter of Guarantee, we (Name of Commercial Bank in Thailand) Business Address No. _____ hereby agree to guarantee to AEROTHAI under the Conditions set below:

1. We hereby guarantee repayment of the advance money received by (Name of Contractor) to the extent of (__figure___) (___ in words ___).

2. If (Name of Contractor) is required to refund advance money stated in clause 1 above to AEROTHAI in a case where (Name of Contractor) acts contrary to or fails to act in accordance with the Contract thereby resulting in failure to meet, or in breach of the Contract, or any of the Conditions attached thereto, or if (Name of Contractor) is required to refund the said advance money to AEROTHAI in any other case we hereby agree to repay the said advance money in the full amount of (__figure __) (_ in words ___) or the outstanding amount thereof, to AEROTHAI within seven (7) days from the receipt of written request to do so from AEROTHAI, without the necessity of previous request to (Name of Contractor) for repayment of the same without whatsoever right of objection on our part.

3. If, at any time in the course of the execution of the Contract AEROTHAI grants a time extension, or allows the Contractor to deviate from any terms and conditions of the Contract without our knowledge, it shall be deemed that such grants shall have been made with our consent.

4. We shall in no event withdraw this Guarantee for any reason so far as (Name of Contractor) is still liable to AEROTHAI under the Contract.

IN WITNESS WHEREOF, we (Name of Commercial Bank in Thailand) have caused these presents to be signed by our authorized representative and our corporate seal to be hereinto affixed.

(Signed)_____Guarantor
(_____)

(Signed)_____Witness
(_____)

(Signed)_____Witness

## APPENDIX B-6 FORM OF POWER OF ATTORNEY (Submission)

## FORM OF POWER OF ATTORNEY

## (Submission)

We, (name of company), a corporation duly registered and existing under the laws of_____ having its head office at _____ (hereinafter called the "Company"), represented by.....acting for and on behalf of the Company, hereby execute this Power of Attorney for the following purposes :

1. The Company appoint, constitute and authorize (name of the authorize representative) to be the true and lawful agent and attorney-in-fact of the Company (hereinafter called the "Authorized representative") to do, execute and perform all or any of the acts and things, as stated in clause 2 below, relating to AEROTHAI's Announcement of Invitation to Tenderer No.PI.GA...../2017 for.....by e-Auction No. PI.GA.E /2560 dated.....

2. The Authorized representative shall be entitled to act on the followings:

- sign, seal, initial and certify any documents pertaining to the Tender Documents (if any)
- submit the Tender Documents to the Committee for e-Auction on designated date, time and place; and
- give explanations and/or clarifications related to our Tender Documents to the Committee for e-Auction; and
- sign, initial, certify, and deliver any documents and/or related amendments pertaining to the aforesaid Tender Documents; and
- sign, seal, initial and certify any documents pertaining to the Contract and amendments, exhibits, schedule and/or related attachments and do all acts and things whatsoever necessary and proper to execute the Contract and/or its amendments.

3. The Company hereby ratify and confirm whatsoever the Authorized representative under the Power of Attorney may lawfully do and/or cause to be done by virtue thereof as if those acts and things have been done by us and with our full responsibility.

**IN WITNESS WHEREOF** , this Power of Attorney has been duly executed on this ____day of _____ , 2016

Signed _____the Company
(_____)

Signed _____ Authorized representative
(_____)

Signed _____Witness
(_____)

Signed_____Witness
(_____)

## LETTER OF INTENT FORM FOR E-AUCTION

To President

1. We, (name of Tenderer), a corporation duly registered and existing under the laws of - _____ having its head office at (address) (hereinafter called the "Tenderer"), represented by.....acting for and on behalf of the Company, undersigned the Tender having carefully considered the e-Auction Tender Documents No. PI.GA.E 58/2558 together with additional documents and hereby accept the terms and condition contained in such Tender Documents. We certify that we are fully qualified as prescribed in Section A, Item 2 (TENDER QUALIFICATIONS)

2. We hereby offer and propose to perform the Activities in accordance with all the terms, conditions and specifications described therein.

3. The Tender shall remain valid in accordance with the provisions of Section B, Item 7 (VALIDITY OF TENDERS) of the Tender Documents.

4. We guarantee to complete the Activities within four hundred eighty (480) days from the Signing Contract Date.

5. If we are selected as the Successful Tenderer, we certify to perform the following;

   5.1 enter into a Contract in the form given in Section D and Section E of the Tender Documents with AEROTHAI within the time specified.

   5.2 furnish the Securities according to Section B, Item 19. (PERFORMANCE SECURITY) AND BANK GUARANTEE (ADVANCE PAYMENT))

   If we fail to do so, we agree that AEROTHAI shall confiscate the Tender Security and claim under such Tender Security from its bank for any damages incurred and also agree that the Committee for e-Auction will consider the Tenderer who offered the next lowest proposed total contract price by e-Auction or AEROTHAI may announce a new e-Auction.

6. We hereby agree that AEROTHAI shall not be bound to accept this offer as well as not to be responsible for any claims and expense which may occur for our participation in this e-Auction.

7. We hereby agree that any documents and related information which have been submitted and delivered to AEROTHAI for evaluation and consideration shall be treated as the property of AEROTHAI.

8. We have carefully examined all our Tender Document submitted for this e-Auction and acknowledge that AEROTHAI shall not be responsible for any error or omission.

9. We offer and submit our Tender Document for this e-Auction in good faith, without fraud or illegal collusion with any Tenderer or among Tenderers who offer and submit the Tender Documents in this e-Auction.

Submitted on this ..... 2016.

Signed..... on behalf of ..... (Tenderer's Name)

By..... (Signatory's Name)

..... (Signatory's Position)

in the presence of ..... (Witness's Signature)

By ..... (Witness's Name)

---

## THREE PARTIES AGREEMENT FOR PROCUREMENT BY E-AUCTION

This Agreement is made between the following parties:

Aeronautical Radio of Thailand Limited (AEROTHAI). By _____, as Chairman of the Committee for e-Auction, hereinafter referred to as "AEROTHAI", of the first part and _____, represented by _____, hereinafter referred to as "the e-Marketplace Service Provider", and of the second part, and _____ , represented by _____, hereinafter referred to as "the Qualified Tenderer" of the third part.

All parties hereby agree to accept the conditions and practice for the conduct of e-Auction as follows:

### 1. Objectives and Scope

AEROTHAI wishes to tender by e-Auction, according to the terms and conditions of Tender Document or Announcement of Invitation to Tender No. PI.GA____/2017 for _____by e-Auction No.PI.GA.E /2560 dated _____

The e-Marketplace Service Provider wishes to offer his service for the conduct of e-Auction and agrees to proceed according to the conditions for such service, as set out in Conditions for Service by e-Auction under Regulations of the Office of the Prime Minister On Procurement by e-Auction B.E. 2549 (2006).

The Qualified Tenderer wishes to bid, according to the terms and conditions of Tender Document or Announcement of Invitation to Tender Ref. No. PI.GA_____/2017 for _____by e-Auction No. PI.GA.E /2560 dated _____and hereby agrees to participate the online bidding on the stipulated date, time and place and to abide by the aforementioned Regulations.

### 2. Other Conditions

**Duty of the Qualified Tenderer**

(1) The Qualified Tenderer shall participate the online bidding on the designated date, time and place by sending not more than three (3) authorized representatives. These authorized representatives shall not be replaced but any of those may be discharged by any reason. AEROTHAI shall confiscate the Tender Security of the Qualified Tenderer whose authorized representative/s do not participate on the designated date, time and place.

(2) The Qualified Tenderer shall strictly review AEROTHAI's e-Auction Tender Document and shall also strictly comply with all the terms and conditions thereof. Prior to the online bidding date, the Qualified Tenderer shall practice himself on trial with the e-Marketplace Service Provider's process and method of the online bidding, as shown in the website www.gprocurement.go.th.

**Confiscation of Tender Security**

AEROTHAI shall confiscate Tender Security of the Qualified Tenderer or claim under such Tender Security in the amount of two point five percent (2.5%) of the initial price for bidding from his bank in the following events:

(1) the Qualified Tenderer does not send his authorized representative to register for e-Auction process on the designated time and place; or
(2) having registered, but does not log into e-Auction system; or
(3) having logged-in to the system, but does not bid at all or does not bid in accordance with AEROTHAI's requirements or bid higher or equal to initial price; or
(4) fail to execute his signature on Form Bor Kor 008 Last Bid Confirmation Form

**e-Auction Fee**

The Qualified Tenderer, who is selected as the Successful Tenderer by AEROTHAI, shall pay a fee to the e-Market Service Provider, at the amount of *Bht ..... (Baht .....),* (inclusive of VAT). This sum shall be paid on a lump sum in full within thirty (30) days from the receipt of invoice from the e-Marketplace Service Provider.

**Appeal**

In the case of the Qualified Tenderer does not agree with the decision of AEROTHAI, he may appeal against such decision to the Committee in Charge of Electronic Procurement (CCEP) within three (3) days of the notification date. The said Committee shall complete its consideration within thirty (30) days and during this said period; the e-auction process may not be continued.

However, in the case of the appeal launched by the Qualified Tenderer is related to the system or to the bidding details of the e-Marketplace Service Provider, the latter shall submit data from central data base of the log file and his summary report only to AEROTHAI.

**Reservation of Rights by the e-Marketplace Service Provider**

The Qualified Tenderer, who wishes to submit his bid during the last stage of the bidding period, shall be done at least one (1) minute prior to its ending in order to allow sufficient time for the bidding data to enter into the server.

Details of the bidding together with the time recorded on central data base in the log file shall only be used as evidence of the bid.

All the three (3) parties acknowledge and agree to abide by the conditions of this agreement, including all related documents and Appendices i.e. Document for e-Auction, etc. They hereby affix their signatures, with corporate seal (if any), as evidence and they affirm to participate in the e-auction on the stated date and time.

Signed.....AEROTHAI
(.....)
Chairman, Committee for e-Auction

Signed.....e-Marketplace Service Provider
(.....)

Signed.....the Qualified Tenderer
(.....)

## FORM OF POWER OF ATTORNEY
## (e-Auction)

We, (name of company),a corporation duly registered and existing under the laws of _____having its head office at _____(hereinafter called the "Company"), represented by_____ acting for and on behalf of the Company, hereby execute this Power of Attorney for the following purposes :

1. The Company appoints, constitutes and authorizes (name of authorized representative___ and/or __ (name of authorized representative ___and/or __(name of authorized representative ___to be the true and lawful agent and attorney-in-fact of the Company (hereinafter called the "Authorized representative") to do and perform all and any of the acts and things, as stated in clause 2 below, relating to AEROTHAI's Announcement of Invitation to Tenderer Ref. No. PI.GA_____/2017 for _____by e-Auction No PI.GA.E /2560 dated_____

2. The Authorized representative shall be entitled to act on the following:

- register for e-Auction process on the designated date, time and place; and
- enter (log) into e-Auction System; and
- bid in accordance with the terms and conditions of the said e-Auction Tender Document of AEROTHAI; and
- individually sign or jointly sign, seal, initial, certify and deliver any documents and/elated amendments pertaining to the aforesaid e-Auction process.

3. The Company hereby ratify and confirm whatsoever the Authorized representative under the Power of Attorney may lawfully do and/or cause to be done by virtue thereof as if those acts and things have been done by us and with our full responsibility.

**IN WITNESS WHEREOF**, this Power of Attorney has been duly executed on this _____ day of _____, 2017.

Signed _____ the Company
(  )
Signed _____Authorized representative
(  )
Signed _____ Witness
(  )
Signed _____ Witness
(  )

SECTION C

FORM OF TENDER AND PRICE SCHEDULE

# LIST OF CONTENTS

## 1. UNDERTAKING BY TENDERER

1.1 The undersigned Tenderer having carefully examined the Tender Documents hereby offers and proposes to perform the Activities in accordance with all the provisions and conditions described therein.

1.2 All relevant sections of the Price Schedule as shown in Section C, Item 2 (PRICE SCHEDULE) below are to be completed without any omission or qualification.

1.3 The Tender shall remain valid in accordance with the provisions of Section B, Item 16 (COST PROPOSAL) of the Tender Documents.

**2. PRICE SCHEDULE**

| ITEM | DESCRIPTION | QUANTITY | UNIT PRICE (THB) | TOTAL PRICE (THB) |
|---|---|---|---|---|
| (1) | FIS Main Console | | | |
| (2) | FIS Aux Console | | | |
| (3) | FIS Ground Equipment | | | |
| (4) | FIS Positioning Reference System | | | |
| (5) | FIS Spare Parts | | | |
| (6) | FIS Installation & Related Aircraft Work | | | |
| (7) | FIS & Aircraft Certification | | | |
| (8) | Training | | | |
| (9) | Manuals | | | |
| (10) | Others | | | |
| | TOTAL included associated Training, Manuals and Others as applicable | | | |
| | VAT | | | |
| | GRAND TOTAL | | | |
| | PRICE IN WORDS | | | |

Remarks : Validity Period 120 days
Warranty Period 2 years

NOTE:

1. The Successful Tenderer is to provide full and complete Cost Proposal in accordance with, both in content and format, with the requirements detailed in Prices Schedule and detailed drawings together with BOQs. Within three (3) days from e-Auction Date or as otherwise requested by AEROTHAI.

2. Prices for items marked **"DDP (Site)"** should be quoted on a Delivered Duty Paid (Name of destination) basis, and also include the cost of unloading at Site in accordance with AEROTHAI's requirements and such subsequent movement as may be necessary in order to fully comply with the requirements of the Contract.

3. "Delivered Duty Paid (Name of destination)" shall have the meaning assigned by INCOTERMS 2010 but without prejudice to the requirements of any other provisions of the Contract which shall be deemed to have precedence.

4. In the event of any discrepancy between an Item's "Price in Words" and "Price in Figures" the former shall take precedence and be deemed to represent the Tenderer's intention.

5. The price(s) quoted for Installation shall include all costs and/or changes of unloading, movement and storage of Equipment, utility and other related expenses as applicable and as may be necessary or is required to perform installation.

6. The price(s) quoted for Technical Training shall include all costs at a minimum of the requirements detailed in Section E, Condition 20 (TECHNICAL TRAINING) and Section F.

7. The Tenderer is to propose the type and level of items to be held as initial spare parts including, where appropriate, any specific requirements detailed in the Tender Documents. Each item is to be priced separately and crossed referenced to standard price lists if available. AEROTHAI reserves the right to purchase all, any or none of the spare parts so proposed by the Successful Tenderer and in any of these events neither the unit price of individual spare parts nor the prices of any other item shall be effected.

8. The Tenderer is to provide a complete list of the items to be included under each heading. Each item is to be priced separately and crossed referenced to standard price lists if available. AEROTHAI reserves the right to purchase all, any or none of the said items proposed by the Successful Tenderer and in any of these events neither the unit price of individual items nor the prices of any other item shall be affected.

**********

SECTION D

FORM OF CONTRACT

# LIST OF CONTENTS

## FORM OF CONTRACT

## CONTRACT FOR A SUPPLY AND INSTALLATION OF ONE FLIGHT INSPECTION SYSTEM

This Contract is executed and delivered this _____ day of _____ in Bangkok, Thailand between AERONAUTICAL RADIO OF THAILAND LTD. represented by..... ..... , President of Aeronautical Radio of Thailand Ltd., hereinafter called "AEROTHAI", and..... represented by....., hereinafter called the "Contractor".

AEROTHAI and the Contractor mutually agree as follows:

### 1. CONTRACT DOCUMENTS

The following documents are attached to this Contract and are incorporated and made an integral part of this Contract, as though fully written out and set forth herein:

A. i Conditions of Contract

ii Technical Specifications

iii Supplementary Documentation

iv Any official responses to Requests for Clarification or modifications and amendments through official Addenda issued by AEROTHAI

B. Tenderer's response to the Tender Documents dated _____ as amended by (if appropriate):
i. Tender and Price Schedule .....
ii. etc. .....

C. Drawings:

D. Supplementary Notice(s):
.....
.....
.....
.....

E. Attachments:

.....

.....

All of the foregoing documents, together with this Contract, are referred to herein as the "Contract Documents." Also incorporated into this Contract, and made part hereof, are all codes, designations, standards, standard specifications, and similar materials which are referred to in the Tender Documents and the Tenderer's response thereto.

It is intended that Conditions of Contract serves as general conditions, and Technical Specifications define the specific requirements and conditions particular to this Contract. Headings and sub-sections within each Contract Documents may be repeated but their contents may serve its intended purposes and provide complete non-conflicting requirements in overall. It is Contractor's responsibility to ensure all terms and requirements within the whole of Contract Documents are met.

In case of discrepancy or conflict between any of the Contract Documents, the Contract shall prevail over all other Contract Documents. The Conditions of Contract shall prevail over all other Contract Documents except this Contract. In case of discrepancy or conflict between any of the Contract Documents, then the Contractor shall accept the determination made by AEROTHAI and shall not claim from AEROTHAI any expense or compensation which arises therefrom.

## 2. OBLIGATION OF THE CONTRACTOR

The Contractor agrees to:

a) perform efficiently and faithfully all of the Activities and services and to furnish all of the equipment and materials described in the Contract Documents, and to supply and to provide all equipment, materials, supplies, goods, labor, installation and other things requisite for or incidental to the successful completion of the Activities and in carrying out all duties and obligation imposed by the Contract Documents.

b) complete all Activities within **the Project Completion Date of four hundred eighty (480) days from the Signing Contract Date or two hundred forty (240) days from the date of AEROTHAI Notice to Receive the Aircraft from AEROTHAI's premise to begin the installation work, whichever comes after.**

**3. OBLIGATION OF AEROTHAI**

AEROTHAI agrees, subject to the terms and conditions of the Contract Documents, to pay to the Contractor the "Contract Price", consisting of the following:

.....

.....

**4. NOTICES**

All notices called for under the terms of the Contract shall be effective only at the time of receipt thereof and only when received by the parties to whom they are addressed at the following addresses:

AEROTHAI : The Inspection Committee
Aeronautical Radio of Thailand Ltd.
102 Ngamduplee, Tungmahamek,
Sathon, Bangkok 10120
THAILAND
Tel : 66 (0) 2 287 8727, 66 (0) 2 285 9764
Fax : 66 (0) 2 2874733
e-mail address : chumnan.ru@aerothai.co.th
mitree.nim@gmail.com, suthep.ch@aerothai.co.th

Contractor: To be inserted at the time of the Contract

Such notices shall be in the English language or the Thai language as may be agreed upon by the Parties and served by sending by registered post, or delivering by hand. They can also be sent by facsimile or e-mail provided that the same shall be promptly confirmed in writing served in the same manner as aforementioned.

**5. INTEGRATION**

AEROTHAI and the Contractor agree that this Contract including the Contract Documents, expresses all of the agreements, understandings, promises, and covenants of the parties, and that it integrates, combines, and supersedes all prior and contemporaneous negotiations, understandings, and agreements, whether written or oral, and that no modification or alteration of this Contract shall be valid or binding on either party, unless expressed in writing and executed with the same formality as this Contract, except as may otherwise be specifically provided in the Contract Documents.

## 6. APPLICATION FOR BUSINESS LICENSE

The Contractor who is a foreign company will be required to register and obtain a license (certificate) required to operate a business in the Kingdom of Thailand in accordance with the Alien Business Act B.E. 2542.

If the Contractor fails to submit a copy of such license (certificate) to AEROTHAI within ninety (90) days from the Signing Contract Date by any reason, AEROTHAI is entitled to terminate the Contract and confiscate Bank Guarantee(s). In this respect the Contractor hereby waives any claims against AEROTHAI whatsoever.

## 7. COUNTERPARTS

This Contract is executed in two identical counterparts: one for AEROTHAI, and one for the Contractor.

Both parties have read and understood all terms and conditions of this Contract and hereto append their respective signatures and affix their seals (if any) in the presence of witnesses.

| | |
|---|---|
| AEROTHAI | Contractor |
| By ..... | By ..... |
| (.....) | (.....) |
| President | |
| Witness ..... | Witness ..... |
| (.....) | (.....) |

# SECTION E

# CONDITIONS OF CONTRACT

## LIST OF CONTENTS (1)

## LIST OF CONTENTS (2)

## 1. DEFINITIONS AND INTERPRETATION

### 1.1 DEFINITIONS

Wherever the following terms are used in the Contract (as hereinafter defined) they shall have the meaning assigned to them except where the context requires otherwise for example those specific terms and meaning in Section F: including General Requirements, Annex A,B and C.

| | |
|---|---|
| "Activities" | means the totality of activities and/or works to be performed by the Contractor, consisting of supply and delivery of Equipment, if applicable), installation, tests, commissioning (if applicable), training, documentation and other services in order to fully and satisfactorily complete all his duties and obligations under the Contract. |
| "Addendum or Addenda" | means additional contract provision (s) issued in writing by AEROTHAI. |
| "AEROTHAI" | means Aeronautical Radio of Thailand Ltd., having its Head Office at Tungmahamek, Sathon, Bangkok, Thailand, and its authorized representative or representatives. |
| "Contract" | means the contract between AEROTHAI and the Contractor for the Activities dated_____ together with the Contract Documents, and any amendment thereof (if any) |
| "Contract Documents" | means documents specified in the Contract as forming integral part of the same. |
| "Contractor" | means the juristic person or persons, firm or company whose Tender has been accepted by AEROTHAI and who agrees to accomplish the Activities for AEROTHAI and includes the Contractor's personal representatives, legal successors, and permitted assignees. |
| "Contract Period" | means the time agreed for completion of the Activities. |
| "Contract Price" | means the sum designated as such in the Contract, subject to such additions thereto or deductions therefrom as may be made under the provisions of the Contract. |

| | |
|---|---|
| "day (s)" | means a calendar day or consecutive calendar days unless otherwise specified. |
| "Engineer" | means the Engineer designed by AEROTHAI to monitor the Works in the Contract or other Engineer appointed from time to time by AEROTHAI and notified in writing to the Contractor to act as Engineer for the purposes of the Contract. |
| "Equipment" | means any product, system, equipment, software, material or spare parts defined as such in the Technical Specifications (Section) to be supplied, delivered and installed or otherwise provided by the Contractor under the Contract as stipulated in Condition 51 (Scope of Supply). |
| "Force Majeure" | means any event, the happening or pernicious results of which could not be prevented even though a person against whom it happened or threatened to happen were to take such appropriate care as might be expected from him in his situation. |
| "Project Completion Date" | means the date by which the Contractor is to have demonstrated to AEROTHAI's satisfaction after completion of the whole of the Activities including all Contractor's duties and obligations as prescribed in Condition 27 (Certificate of Project Completion) have been fully completed in accordance with the Contract. |
| "site" | means the actual place where the Equipment delivered and installed, and other elements of the Activities performed |
| "Subcontractor" | means any person, corporation, company, partnership or firm (other than the Contractor) to whom any part of the Contract has been sublet with the consent of AEROTHAI, by the Contractor. |
| "Temporary Works" | means work camp and/or Site offices as to be provided by the Contractor |

"Tender" means an offer to perform the Activities submitted in response to the relevant Invitation to Tender issued by AEROTHAI.

"Work(s)" means part of the Activities to be performed by the Contractor under the Contract

"DDP(Site)" means "Delivered Duty Paid (Name of destination)" shall have the meaning assigned by INCOTERMS 2010 but without prejudice to the requirements of any other provisions of the Contract which shall be deemed to have precedence.

1.2 INTERPRETATION

(a) Words importing the singular only also include the plural and vice versa where the context requires.

(B) The heading to any provision shall not affect the interpretation thereof.

1.3 LANGUAGE AND NUMBERS

All drawings, designs, specifications, manuals, name plates, markings, operating instructions, statements, schedules, notice documents, user interfaces and all written communications between AEROTHAI and the Contractor, concerning the Contract, shall be in the English language or Thai language as may be agreed between the parties, unless otherwise stipulated in the Contract, and in the metric system of weights and measures, unless otherwise specified.

## 2. INTENT OF CONTRACT DOCUMENTS

All of the Contract Documents are complementary, and what is called for by one element thereof shall be binding as if called for by all. In the case of any discrepancy between any of the Contract Documents, or any defective description or ambiguity, the matter shall be promptly submitted to AEROTHAI, which shall promptly make a determination in writing. Any adjustment by the Contractor without this determination shall be at the Contractor's own risk and expense. In all cases of discrepancy, defective description, or ambiguity, the interpretation given by AEROTHAI shall be binding on the Contractor.

## 3. PERFORMANCE SECURITY

3.1 The Contractor shall, at the time of executing the Contract, deposit with AEROTHAI a Performance Security for the due and proper performance of the Contract in the amounts of ten (10) percent of the total price of the Contract

The Performance Security shall also insure payment of any obligations, damages, Liquidated damages, or expenses for which the Contractor may become liable to AEROTHAI.

3.2 The Performance Security shall be payable in Baht.

3.3 Unless and until an official receipt is issued with respect to the Performance Security, AEROTHAI shall not be responsible for any such Performance Security lodged under this Condition. Failure to deposit Performance Security at the time specified in this Condition shall be a breach of the Contract, and AEROTHAI may, at its absolute discretion, cancel the Contract without liability.

3.4 The Performance Security shall be released after the expiry of the appropriate Warranty Period (s) or at such later time as the Contractor has discharged all his obligations to AEROTHAI under the Contract. The Contractor shall maintain the validity of the Performance Security accordingly.

**4. INFORMATION CONCERNING THE SITE**

4.1. It shall be the responsibility of the Contractor to obtain complete and accurate information concerning the Site and/or a hosting platform or structure that the Activities may be carried out upon, and any equipment at present installed thereon, and the Contractor will ensure that the Equipment complies with any local by-law and other legal requirements. Inadequate or inaccurate information, including information given in good faith by AEROTHAI in the Contract Documents or otherwise, will not be accepted as a reason for the Contractor avoiding all or any of his responsibilities under the Contract or as the basis for any adjustment to the Contract Price.

4.2 Any relevant information held by AEROTHAI shall be made available to the Contractor on request. Visits to the Site, and/or a hosting platform or structure that the Activities may be carried out upon, by the Contractor's engineers, other representatives or agents shall be permitted, subject to prior arrangement with AEROTHAI.

## 5. MASTER PROGRAMME

The Contractor shall provide AEROTHAI separately a complete and full detailed GANTT or other internationally accepted scheduling chart (the "Master Programme") for Overall Project subject to mutual agreement **within 15 days from the Signing Contract Date.**

Such Master Programme shall contain a tentative schedule for all works to be performed by the Contractor, for example as applicable, the Activities for each Site comprising of production, delivery of equipment, installation, testing, and other activities which shall be completed **within the Project Completion Date.**

Such Master Plan and any individual plan shall be updated periodically in order to reflect accurate information.
Not later than sixty (60) days before commencement of each testing, the Testing Procedure for FAT shall be submitted to AEROTHAI for approval.

## 6. COMMENCEMENT TIME AND TIME OF COMPLETION

All Activities shall be completed **within the Project Completion Date of four hundred eighty (480) days from the Signing Contract Date or two hundred forty (240) days from the date of AEROTHAI Notice to Receive the Aircraft from AEROTHAI's premise to begin the installation work, whichever comes after.**

## 7. RESPONSIBILITY FOR DESIGN

The Contractor shall be solely responsible for the adequate designs including shop-drawings, if applicable, as well as coordinated functioning of all Equipment supplied under the Contract. AEROTHAI's design requirements are as stated elsewhere in the Contract Documents and the Contractor shall conform to the best engineering practice for the operating conditions specified.

## 8. IMPORT LICENSE/ RADIO COMMUNICATION EQUIPMENT REGISTRATION

8.1 If an Import License is required for the Equipment to be supplied under the Contract, the Contractor must obtain the relevant Import License before shipment can be made. Any fine or expenses caused by unauthorized shipment will be the Contractor's sole responsibility.

8.2 In the case of the importation of radio communication equipment, which has not previously been imported into Thailand, the following original documents are required for a Type Approval Test before an Import License will be issued by the Office of National Telecommunications Commission:

a) Catalog;
b) Technical Specification;
c) Operation Manual and Maintenance or Service Manual; and
d) Circuit Diagram.

8.3 The radio communication equipment shall be registered from the Office of National Broadcasting and Telecommunications Commission before the System Completion Date.

8.4 In all cases where export licenses are required for the export of the Equipment and Service, obtaining any such licenses shall be the responsibility solely of the Contractor.

8.5 In event that and end user certificate and/or completed DSP-83 form is required for the services of this contract, AEROTHAI shall provide the purchase order or other document appropriately required to allow the contractor to apply for the export license, and the contractor shall ensure within its reasonable control for successful export. Time taken for AEROTHAI to provide necessary documentation for export shall be exempted in considering liquidated damages. Failure of the export permits, or withdrawal/termination of a required export permit by the said exporting state, if proven to be clearly beyond control of the contractor, shall relieve the contractor of its obligations without liability for any consequential losses. In such case, the contractor shall provide work around measures and remain responsibility under services until completion.

## 9. SHIPPING

9.1 If any Equipment to be delivered to AEROTHAI according to the Contract is to be carried by sea on a route where Thai vessels are in carriage service and have space available according to a Notification issued by the Ministry of Transport, the Contractor must make arrangements for the shipment of such Equipment to Thailand by Thai vessels or vessels which enjoy rights similar to Thai vessels, unless permission

has been obtained from the Marine Department before such Equipment is carried by non-Thai vessels.

9.2 In delivering Equipment according to the Contract, the Contractor must submit two (2) copies of the Bill of Lading to AEROTHAI at least fifteen (15) days before the arrival of each shipment at the Port of Bangkok showing that the Equipment is carried by Thai vessels or vessels which enjoy rights similar to Thai vessels. In cases where such Equipment is not carried from abroad by a Thai vessel or vessels which enjoy rights similar to Thai vessels, the Contractor must submit evidence to AEROTHAI showing either that permission has been obtained from the Marine Department allowing the carriage of Equipment by non-Thai vessels or that payment of a special fee has been made due to the non-carriage of Equipment by Thai vessels according to the Mercantile Marine Promotion Act B.E. 2521.

9.3 In cases where the Contractor does not submit to AEROTHAI either of the type of evidence mentioned in the preceding clause of this Condition, but nevertheless desires to make delivery of such Equipment to AEROTHAI in advance without receiving payment for such Equipment, AEROTHAI is entitled to take delivery of such Equipment and shall pay the price for such Equipment when the Contractor has properly fulfilled the aforesaid requirements.

## 10. SHIPPING DOCUMENTS

At least fifteen (15) days before the arrival of each shipment of Equipment at a port in Thailand, the Contractor shall submit to AEROTHAI at least the following shipping documents:

a) two (2) copies of clean-on-board Bill of Lading or Air Waybill as the case may be;
b) six (6) copies of Contractor's detailed invoice;
c) three (3) copies of Manufacturer's Inspection Certificate;
d) six (6) copies of packing list;
e) two (2) copies of insurance policy; and
f) three (3) copies of Certificate of Origin.

## 11. QUALITY OF THE EQUIPMENT

11.1 The Contractor guarantees that the Equipment to be furnished shall be of a quality not below than that stipulated in the Technical Specifications, and be brand new and never before used elsewhere, except as required during normal manufacture and testing.

11.2 The above Equipment which are computers and/or hardware and/or software may be replaced by the Equipment whether in whole or in part with same or better quality and technology without additional cost whatsoever and is also subject to a prior written approval from AEROTHAI.

11.3 If the price of the replacement Equipment is lower than that of the Equipment as specified under the Contract, the Contractor shall refund the price difference to AEROTHAI.

## 12. OWNERSHIP OF EQUIPMENT

12.1 Intentionally Left Blank

12.2 The property in all Equipment and other related equipment and parts shall pass to AEROTHAI **upon the Project Completion Date.** In the event that the Equipment has been delivered prior to AEROTHAI's authorization but cannot be installed, the Contractor shall be responsible for maintenance, related expense and insurance stating AEROTHAI as the beneficiary.

12.3 The Contractor shall be responsible for effecting full insurance coverage in respect of all Equipment until such time, and condition and coverage as shall be accepted by AEROTHAI. A copy or copies of the appropriate insurance policy(ies) and the receipt(s) for payment of the current premium(s) shall be provided to AEROTHAI within thirty (30) days of execution of the Contract.

## 13. ASSIGNMENT AND SUBLETTING

13.1 The Contractor shall not assign the Contract or any part thereof, or any benefit or interest therein or there under without the prior written consent of AEROTHAI. Provided that the Contractor may transfer any monies due or become due under the

Contract in favor of his bankers without the written consent of AEROTHAI but he shall notify AEROTHAI of such transfer within fifteen (15) days.

13.2 The Contractor shall not sublet the whole of the Activities. Except where otherwise provided for by the Contract, the Contractor shall not sublet any part of the Activities without the prior written consent of AEROTHAI. Such consent, if given, shall not relieve the Contractor from any liability or obligation under the Contract and he shall be liable for the defaults and neglects of any Subcontractor, his agents or workmen as the case may be.

## 14. CONSTRUCTION OF BUILDING AND UTILITIES

INTENTIONALLY LEFT BLANK (Not Applicable)

## 15. GENERAL OBLIGATIONS FOR CONSTRUCTION OF BUILDING & UTILITIES

INTENTIONALLY LEFT BLANK (Not Applicable)

## 16. CARE OF WORK

From the commencement of the Works until the date stated in the Certificate of Project Completion for the whole of the Works pursuant to Condition 26 (CERTIFICATE OF PROJECT COMPLETION) hereof the Contractor shall take full responsibility for the care thereof. When AEROTHAI has issued a Certificate of Project Completion in respect of the Permanent Works the Contractor shall cease to be liable for the care of the Permanent Works from the date stated in the Certificate of Project Completion and the responsibility for the care of the Works shall pass to AEROTHAI. Provided that the Contractor shall take full responsibility to complete any outstanding work as specified in Condition 27 (CERTIFICATE OF PROJECT COMPLETION) hereof. In the case of damage, loss or injury shall happen to the Works, or to any part thereof, from any cause whatsoever, and the cause due to the design of the Works for which the Contractor is not responsible, while the Contractor shall be responsible for the care thereof the Contractor shall, at his own cost, repair and make good the same, so that at completion Works shall be in good order and condition and in conformity with every aspect with the requirements of the Contract.

## 17. MATERIAL AND WORKMANSHIP

17.1 All Material and workmanship shall be of the kinds described in the Contract and in accordance with the Engineer's instructions and shall be subjected from time to time to such tests as the Engineer may direct at the place of manufacturer or fabrication, or on the Site or at such other place or places as may be specified in the Contract, on at all or any of such places. The Contractor shall provide such assistance, instruments, machines, labor and materials as are normally required for examining, measuring and testing any work and the quality, weight of quantity of any material used and shall supply samples of materials before incorporating in the Works for testing as may be selected and required by the Engineer.

17.2 All samples shall be supplied by the Contractor at his own cost if the supply thereof is clearly intended by or provided for in the Contract.

17.3 The cost of making any test shall be borne by the Contractor if such test is clearly intended or provided for in the Contract and, in the case only of a test under load or if a test to ascertain whether the design of any finished or partially finished in the Contract in sufficient detail to enable the Contractor to price or allow for the same in his Tender.

17.4 If any test is ordered by the Engineer, which is either:

a) not so intended or provided for, or
b) (in the cases above mentioned) not so stated, or
c) though so intended or provided for, is ordered by the Engineer to be carried out by an independent person at any place other than the Site or the place of manufacture or fabrication of the materials tested. Then the cost of such test shall be borne by the Contractor, if the test shows the workmanship or materials not to be in accordance with the provisions of the Contract or the Engineer's instructions.

## 18. KEEP SITE CLEAN

INTENTIONALLY LEFT BLANK (Not Applicable)

## 19. REMOVAL OF IMPROPER WORK AND MATERIALS

INTENTIONALLY LEFT BLANK (Not Applicable)

## 20. TECHNICAL TRAINING

20.1 The technical training programme shall be covered all FIS operation and maintenance subjects. It shall be consisting of class room for duration between 10 to 20 working days, flight training for 40 flight hours and on-job training for 10 working days. The on-job-training shall be conducted after final acceptance processes has been done and conducting while usual flight inspection schedule which determined the date and location by Aerothai. The cost of fuel during on job training shall be under responsibility by Aerothai. The Contractor shall be responsible for instructor(s) accommodation.

20.2 The On-the-job training shall be conducted at AEROTHAI hangar or any facility within Thailand.

20.3 The Contractor shall provide a course syllabus and a Training Plan not later than **sixty (60)** days before the training starts.

20.4 The Training Plan shall describe the objectives, pre-requisites, duration and approach for training involved with the delivered system (both hardware and software).

20.5 To ensure a good standard of training, the Contractor shall provide instructors who are fully trained in Instructional Techniques and qualified for training the required topics.

20.6 Course syllabus, training plan and Instructors shall be agreed by a mutual consent between AEROTHAI and the Contractor.

## 21. INSTALLATION

21.1 The Contractor shall be solely responsible for the proper installation and configuration, including certification as appropriate, of the Equipment as part of the Activities under this Contract.

21.2 The Contractor shall provide all labor, material, tools, utility charges, and other things that are or may be required by the Contractor to perform under the Contract.

21.3 Such schedule shall be adequately detailed and fully synchronized with the Master Program for the Contract.

21.4 The Contractor shall be solely responsible for the provision of sufficient quantities of suitably qualified and experienced supervisory personnel, know-how, documentation, tools and such other persons and materials as may be necessary for the proper installation.

21.5 If the installation of any Equipment is not completed in accordance with the schedule provided by the Contractor due to delay in the delivery of Equipment, the Contractor shall continue to supervise the installation so affected until it is completed at no additional cost whatsoever to AEROTHAI.

21.6 AEROTHAI reserves the right to observe the installation and configuration of the Equipment as part of the Activities under this Contract.

## 22. THE CONTRACTOR'S EMPLOYEES

22.1 Employees of the Contractor and/or Subcontractors employed in the performance of Activities and services under the Contract shall, at all times, be identified and recognized as the employees of the Contractor and/or Subcontractors, under its administrative control, and shall at no time be identified as employees of AEROTHAI.

22.2 The Contractor and/or Subcontractors shall obtain and furnish necessary security clearances, personal passports, visas, work permit and all other necessary documents for personnel performing services under the Contract. AEROTHAI will issue such documents as are necessary to assist in obtaining permission from the authorities in Thailand for foreign personnel to perform the Activities under the Contract.

22.3 At all times covered by the Contract, the Contractor and/or subcontractors shall exercise complete control over their employees. The Contractor and/or Subcontractors and their employees shall conform to all applicable local laws, regulations and ordinances and shall promptly correct any violations called to their attention.

22.4 The Contractor and/or Subcontractors shall be responsible for the professional and technical competence of their employees and will try their best to select and employ only those persons who in their judgment will be reliable, competent and who will comply with local laws, customs and conform to a high standard of moral and ethical conduct.

22.5 The Contractor and/or Subcontractors agree, upon written request by AEROTHAI, to terminate the employment in Thailand of any of their employees performing Activities under the Contract, if AEROTHAI considers that such termination is necessary to protect the interests of AEROTHAI. The Contractor and/or Subcontractors shall bear all the expenses necessary for such termination of employment and shall provide replacement for any such personnel, at their own expense, within specified time to be notified by AEROTHAI.

## 23. DIRECTIONS AND INSTRUCTIONS

Directions and instructions given verbally to the Contractor's personnel by AEROTHAI or its designated personnel shall be binding upon the Contractor, provided that they are confirmed in writing within seven (7) days.

## 24. ALTERATIONS, ADDITIONS AND OMISSIONS

AEROTHAI shall make any variation of the form, quality or quantity of the Activities or any part thereof that may, in his opinion, be necessary; and for that purpose that, AEROTHAI shall have power to order the Contractor to do and the Contractor shall do any of the following:

a) increase or decrease the quantity of any Activities included in the Contract,
b) omit any such Activities,
c) change the character or quality or kind of any such Activities,
d) change the levels, lines, positions and dimensions of any kind necessary for the completion of the Activities.
e) Execute additional work of any kind necessary for the completion of the Activities.

And no such variation shall in any way vitiate or invalidate the Contract, but the value, if any, of all such variations shall be taken into account in ascertaining the amount of the Contract Price.

24.1 No such variation shall be made by the Contractor without and order in writing of AEROTHAI. Provided always that the powers of AEROTHAI under this Condition shall be subject to the prior written approval of the AEROTHAI.

24.2 All extra or additional work done or work omitted by order of the Engineer shall be valued at the rates and prices set out in the Contract if, in the opinion of AEROTHAI,

the same shall be applicable. If the Contract does not contain any rates or prices shall be agreed upon between AEROTHAI and the Contractor. In the event of disagreement AEROTHAI shall fix such rates or prices as shall, in his opinion, be reasonable and proper.

## 25. EQUIPMENT PRE-INSPECTION

AEROTHAI is entitled to inspect all materials and equipment during manufacture, fabrication, or tests prior to preparation for shipment, and to witness any or all tests, at any times and places during the Contract Period. The Contractor shall notify AEROTHAI at least sixty (60) days in advance when and where the materials or equipment will be inspected and tested. The making of any inspection or witnessing of any test, shall in no way relieve the Contractor of the responsibility for equipment and/or materials meeting all of the requirements of this Contract.

## 26. ACCEPTANCE, INSPECTION AND TESTING

26.1 The Equipment shall be subject to at a minimum to the tests detailed in Condition 26.2 – 26.3 below. The tests shall be performed by the Contractor at his own expenses whatsoever and, if desired, be witnessed by AEROTHAI Inspection Committee. If the installed Equipment, components or materials fail to meet the Contract requirements due to the fault of the Contractor, the Contractor will be given an opportunity to rectify or replace so as to conform but without prejudice to the Contract Period or Completion Date.

26.2 The FAT shall be performed on the Equipment to ensure compliance with the requirements of the Contract. The Contractor shall be responsible for the set up of equipment as well as the provision of all tests, gears and instruments in order that the FAT can be performed and completed in an expedient manner. The FAT shall be witnessed by AEROTHAI Inspection Committee. The test results must be shown to fulfill the requirements of the Contract and, if satisfactory, AEROTHAI Inspection Committee will endorse the FAT result in respect of the Equipment tested.

26.3 If any test result(s) which must be performed at the factory is not satisfactory, the Contractor shall be responsible for any additional expense incurred for AEROTHAI to participate in the new FAT.

## 27. CERTIFICATE OF COMPLETION

Upon completion of the Activities, AEROTHAI shall issue Certificates as follows:

27.1 Intentionally Left Blank

27.2 Certificate of Project Completion

After the whole of the outstanding Activities have been fully completed as prescribed by the Contract, the Contractor shall give a notice to that effect to AEROTHAI accompanied by an undertaking to maintain his warranty obligations of the mentioned Equipment. Such notice and undertaking shall be in writing and shall be deemed a request by the Contractor for AEROTHAI to issue a Certificate of Project Completion in respect of the activities. AEROTHAI shall within fifteen (15) days of the date of delivery of such notice, either issue to the Contractor a Certificate of Project Completion stating the date on which, in its opinion, the Activities were fully completed in accordance with the Contract, or give instructions to the Contractor specifying all the work which, in its opinion, requires to be done by the Contractor before the issue of such Certificate of Project Completion.

For the purpose of this Condition, the Activities will be considered to be fully complete when all obligations of the Contractor except warranty have been fulfilled. The decision of AEROTHAI with respect to what constitutes the full completion shall be final and not subject to question by the Contractor.

When the Certificate of Project Completion is issued to the Contractor, the liability of the Contractor to pay liquidated damages under Condition 44 (Liquidated Damages) shall cease but, however, the Contractor shall still be liable to pay for any expenses actually and necessarily incurred by AEROTHAI during the performance of the outstanding Activities remained in the Contract.

## 28. TERMS OF PAYMENTS

Each payment shall take place upon presentation of a correct and fully itemized invoice and such other documents as may be required by AEROTHAI.

Details of payment terms are described in Section F.

For any Advance Payment of fifteen (15) percent of total price of contract required by this Contract, the Bank Guarantee (Advance Payment) shall be issued by a bank in Thailand for an amount equivalent to the Advance Payment. Such Bank Guarantee shall be in the form stipulated and valid from the date of receipt of the Advance Payment up to the date of issuance of the Certificate of Project Completion by AEROTHAI.

The said Bank Guarantee (Advance Payment) shall be released after the Certificate of Project Completion has been issued by AEROTHAI and until Contractor's duties and obligations under the Contract have been fulfilled (excluding Warranty).
Each payment shall be made by way of **Telegraphic Transfer** to the Contractor's account in accordance with the complete documents as to be submitted by the Contractor to AEROTHAI for approval.

**VAT and/or Withholding tax shall be deducted from each payment at the rate prescribed by Thai laws. The Contractor shall be responsible and pay for any stamp duties arising out of this Contract. (if any)**

Upon receipt of each payment, the Contractor shall furnish a cash receipt singed by the Contractor or by the receiver to AEROTHAI by hand or by registered mail sent to AEROTHAI within seven (7) days.

## 29. INTELLECTUAL PROPERTY RIGHTS AND CONFIDENTIALITY

29.1 The Contractor shall hold harmless and indemnify AEROTHAI from all costs that may occur due to intellectual property rights infringement or alleged intellectual property rights infringement from use of any patented inventions, copyrighted or uncopyrightable compositions, registered designs, articles, devices, appliances, processes, manufactured, delivered, etc. by the Contractor in carrying out the Activities, including their being used or being at the disposal of AEROTHAI. The Contractor shall, at his own cost, defend all claims, suits and actions against AEROTHAI, provided the Contractor is notified not later than thirty (30) days after the receipt by AEROTHAI of notice of institution of any such suit or claim and the Contractor is given full power and authority thereto.

Upon the performance of the Activities, if the Contractor is required under this Contract to provide AEROTHAI with any license to use any of the Contractor's or third party's software(s), copyright and/or other intellectual properties, the

Contractor shall grant and/or provide to AEROTHAI the perpetual and royalty-free licenses of same in the legal form(s) acceptable to AEROTHAI.

The Contractor shall use all legal intellectual property rights in performing the Activities as required herein.

In performing of the Activities, the Contractor shall not make any copy, or duplication, or do any act or thing which may be deemed as infringement of any intellectual property rights of a third-party.

29.2 Unless otherwise expressly provided herein, the Contractor, its employees, representatives, and subcontractors shall keep strictly confidential any and all of AEROTHAI's trade secret and information, which may be obtained by the Contractor (whether directly or indirectly) in the course of or as a result of the discharge of its obligations under this Contract, including all information given to AEROTHAI by the Contractor (whether directly or indirectly) in pursuance of its obligations hereunder. The aforesaid confidential information shall also include all communication messages made via telephones, facsimiles, or other devices, whether verbally or in writing (hereinafter referred to as the "Information"). The Information shall be treated by the Contractor, its employees, representatives, and subcontractors as strictly confidential and shall not be disclosed by any of them to any third party without obtaining prior written consent from AEROTHAI.

29.3 Upon the termination of this Contract, the Contractor shall return all documents, materials, things, and all type of media, which contain the Information, to AEROTHAI immediately.

29.4 All the provisions contained in this Condition 28 shall survive after the termination of this Contract.

## 30. TAXES AND DUTIES

The Contractor shall be responsible for all taxes, duties, fees or other expenses of whatsoever nature incurred in Thailand or other countries in supplying the Equipment and performing Activities under the Contract.

## 31. COMPLIANCE WITH LAW AND REGULATIONS

31.1 The Contractor shall give all notices and pay all fees required to be given or paid by any law or any regulation, if any local or other duly constituted authority in relation to the execution of the Works and by the rules and regulations of all public bodies and companies whose property or rights are affected or may be affected in any way by the Works.

31.2 The Contractor shall conform in all respects with the provisions of any such laws as aforesaid and the regulations or by-laws of any local or other duly constituted authority which may be applicable to the Works and with such rules and regulations of public bodies and companies as aforesaid and shall keep the Employer indemnified against any penalty and liability of every kind for breach any such statute, Ordinance or Law, regulation or by-law.

## 32. NON-DISCLOSURE

The Contractor agrees not to communicate, disclose, or use in advertisements, publicity or sales promotion, any photographs or other reproductions of the Activities covered by the Contract, or a description of the size, dimensions, quantity or quality, or other information concerning the Activities, except as provided for elsewhere in the Contract without the prior written permission of AEROTHAI.

## 33. FAILURE TO MEET REQUIREMENTS

33.1 AEROTHAI shall have the right at any time to require the Contractor to make any changes in the Activities covered by the Contract, which may be necessary to make the Activities conform to the requirements of the Contract, without additional cost to AEROTHAI.

33.2 Any defects in the Equipment or other failure to meet the requirements of the Contract, due to the fault of the Contractor, including errors and omissions on the part of the Contractor, which are disclosed prior to final payment or prior to acceptance by AEROTHAI after completion of all tests, whichever occurs at a later date, shall be corrected entirely at the expense of the Contractor. The time used for any correction or replacement of the Equipment shall not be taken by the Contractor as an excuse for an extension of the Completion Date.

## 34. INSURANCE OF ACTIVITIES

Without limiting his obligations and responsibilities under Condition 35 hereof, the Contractor shall, so far as insurable by using his best effort and at his own cost, insure in the joint names of AEROTHAI and the Contractor against all loss or damage to the Activities from whatever cause including strike, riot, and civil commotion, arising during the performance under this Contract and in such manner that AEROTHAI and the Contractor are covered for the period stipulated in Condition 16. (CARE OF WORKS) hereof and are also covered during the Warranty Period and for any loss or damage occasioned by the Contractor in the course of any operations carried out by him for the purpose of complying with his obligations under Condition 41 (WARRANTY) hereof:

a) the Activities for the time being executed to the estimated current value thereof, or such additional sum as may be specified together with the Equipments or materials for incorporation in the Activities at their replacement value;
b) The other things brought on to the Site by the Contractor to the replacement value of such other things.

Such insurance shall be affected with Dhipaya Insurance Public Company Limited registered in Thailand, and in terms approved by AEROTHAI, whose approval shall not be unreasonably withheld, and the Contractor shall, whenever required, produce to AEROTHAI the policy or policies of insurance and the receipts for payment of the current premiums.

## 35. DAMAGE TO PERSONS AND PROPERTY

The Contractor shall, except if and in so far as the Contract provides otherwise, indemnify and save harmless AEROTHAI against all losses and claims in respect of injuries or damage to any person or material or physical damage to any property whatsoever which may arise out of or in consequence of the execution and maintenance of the Activities and against all claims, proceedings, damages, costs, charges and expenses whatsoever in respect of or in relation thereto except any compensation or damages for or with respect to:

a) The permanent use or occupation of premises by the Equipment or any part thereof which is not caused or contributed to by the fault of the Contractor, his agents or his employees;
b) The right of AEROTHAI to execute the Activities or any part thereof on, over, under, in or through any land;

c) Injuries or damages to persons or property solely resulting from any act or neglect of AEROTHAI or its employees.

**36. LIABILITY INSURANCE**

36.1 Without in any way limiting the Contractor's obligations and responsibilities under Condition 35 above the Contractor shall carry insurance, at his own cost, with Dhipaya Insurance Public Company Limited registered in Thailand as follows:

a) For all workmen and employees employed on the Activities. This insurance shall cover against all liabilities of the Contractor, including those of any Subcontractors, in respect of any damages or compensation payable according to the law in consequence of any accident or injury to any workman or other person in the employment of the Contractor or any Subcontractors.

b) For Third Party
Before commencing the execution of the Activities for, the Contractor (but without limiting his obligations and responsibilities under Condition 34) shall insure against damage, loss or injury which may occur to any property (including that of AEROTHAI) or to any person (including any employee of AEROTHAI) by or arising out of the execution of the Activities or in the carrying out of the Contract. Such insurance shall be effected with an insurer and on terms approved by AEROTHAI (whose approval shall not be unreasonably withheld) for at least Baht 3,000,000.00 (Three Million Baht) for Bodily Injury and Baht 3,000,000.00 (Three Million Baht) for each site, for Property Damage in respect of any one accident or series of accidents arising out of any one event and the Contractor shall, whenever required, produce to AEROTHAI the policy or the policies of insurance and the receipts of payment of the current premiums.

36.2 If the Contractor shall fail to effect and keep in force the insurance referred to in Condition 36.1 hereof, or any other insurance which he may be required to effect under the terms of Contract, then and in any such case AEROTHAI may effect and keep in force any such insurance and pay such premium as may be necessary for that purpose and from time to time deduct the amount so paid by the AEROTHAI as aforesaid from any monies due or which may become due to the Contractor, or recover the same as a debt due from the Contractor.

## 37. SUSPENSION OF THE ACTIVITIES

AEROTHAI may suspend at any time, in whole or in part, the Activities called for by the Contract in a reasonable time. The Contractor may be entitled to reimbursement for any actual, reasonable, and necessary expenses caused by any such suspension.

## 38. COMPLETION OF ACTIVITIES

All the Activities agreed upon in the Contract, comprising of satisfactory completion and delivery and installation and other services and all tests necessary to fully demonstrate compliance with Contract requirements, shall be completed within four hundred eighty (480) days from the Signing Contract Date.

## 39. EXTENSION OF TIME

39.1 Should the Contractor be delayed in the completion of the Activities by any act or neglect of AEROTHAI, or of any employee of AEROTHAI or by any other contractor employed by AEROTHAI or by Force Majeure or by any causes which the Contractor is not responsible, then an extension of time sufficient to compensate for the delay will be granted by the Employer. Provided that AEROTHAI is not bound to take into account any act or circumstance by which the Contractor claims to have delayed unless the Contractor has within fifteen (15) days after such act or circumstance has arisen, submitted to AEROTHAI full and detailed particulars of any extension of time to which he may consider himself entitled in order that such submission may be investigated at the time. No claim for extension of time will be considered by the Engineer and AEROTHAI unless full and detailed particulars are submitted to the Engineer before expiry of the time stipulated in the Contract for completion of the Activities.

Extension of time will not be granted for delayed caused by unfavorable hydrological and climatic conditions, unsuitable subsurface or ground conditions, inadequate construction force, or labor, or inadequate budget or the failure of the Contractor to place orders for equipment or materials sufficient in advance to ensure delivery when needed.

39.2 Should the amount of extra or additional work of any kind referred to in these Conditions of Contract be such as fairly to entitle the Contractor an extension of time for the completion of the Works, the Employer shall determine the length of such extension and shall notify the Contractor accordingly.

The Contractor shall not be entitled to claim for expenses or any damages incurred from the delay in the completion of Activities by Force Majeure or any event beyond the control of AEROTHAI.

## 40. CANCELLATION OF OR DECREASE IN PENALTY

The cancellation of or decrease in the amount of a penalty for the Contractor or an extension to the Project Completion Date (if acceptable by AEROTHAI) shall be at AEROTHAI's sole and absolute discretion, and be based on the number of days of the actual occurrence only in the following cases :

a) the event arising from AEROTHAI's fault or mistake;
b) force majeure;
c) the event occurring as a result of any act for which neither party is liable under law.

The Contractor shall notify AEROTHAI of any such aforesaid event within 15 days of its end. If the Contractor fails to notify AEROTHAI within the specified time, the Contractor cannot raise the event as grounds for cancellation of or decrease in penalty, or extension to the Completion Date thereafter, except in the case of Condition 40 a) or where there is clear evidence that AEROTHAI is well aware of the matter from the beginning.

## 41. WARRANTY

41.1 Warranty of Equipment

41.1.1 The Contractor warrants that all Equipment supplied under the Contract shall be free from all or any defects due to faults in materials, design, fabrication, production, supervision of installation or any other cause for which the Contractor is responsible under the Contract or otherwise fails to meet the performance expectations stated by the Contractor for a period of two (2) years from the ~~System~~ Project Completion

Date stated in the Certificate of Project ~~System~~ Completion in accordance with the provisions of Condition 27 (CERTIFICATE OF COMPLETION).

41.1.2 In the event that the Equipment or any part or component or board thereof becomes defective or fails to meet the performance expectations within the Equipment Warranty Period, the Contractor will instantly repair or replace defective Equipment not later than thirty (30) days of receiving notice from AEROTHAI. Such timescale shall also apply to the return to AEROTHAI in a functioning state of any Equipment or any part or component or board thereof removed from its original location for repair or replacement.
Meanwhile AEROTHAI shall remedy the defect or correct the failure to ensure continuity in the Equipment's operations.

41.1.3 Should the Contractor fail to carry out his obligations under 41.1.2, then AEROTHAI may remedy the defect or correct the failure to meet the agreed level of Guaranteed Performance, or have such remedies or corrected by a third party, at the Contractor's expense.

41.1.4 The Warranty Period in respect of any Equipment shall be suspended on the date of AEROTHAI' s reporting of the defect or failure to meet the agreed level of Guaranteed Performance and shall recommence on the date of AEROTHAI's acceptance of the Contractor's remedy or correction thereof.

## 42. OPERATION OF UNSATISFACTORY EQUIPMENT

If the operation or use of the Equipment proves to be unsatisfactory to AEROTHAI, AEROTHAI shall have the right to operate and use such Equipment until it can be taken out of service for correction by the Contractor of such latent defects, errors, or omissions and for replacement in whole or in part if correction is unsuccessful or unfeasible.

## 43. DEFAULT

43.1 If the Contractor:

a) fail to commence and carry out the Activities or part thereof in accordance with the Contract; or

b) refuse or fail to complete the Activities or part thereof within the time(s) specified in the Contract or any authorized variation of such time(s); or

c) commit any breach of or fail to comply with or observe the provisions of the Contract or any of them; or

d) notify AEROTHAI in writing that he is unable or unwilling to complete the Activities; or

e) become insolvent or bankrupt or make an arrangement or composition with his creditors or, being a corporation, go into liquidation whether compulsory or voluntary (except for the purpose of reorganization); or

f) himself or by any person on his behalf, give or offer any money or benefit or forbearance to any employee of AEROTHAI and/or any employee of AEROTHAI's consultant who has duties or responsibilities in connection with the acceptance of the Tender or the making of the Contract or the execution of the Activities; then, in any of such events, the Contractor shall be in default under the Contract. If the Contractor shall be in default, the Contractor shall be liable to AEROTHAI for all damages, liquidated under the terms of the Contract and otherwise, including increased Activities cost and increased administration cost, suffered by AEROTHAI as a result of the Contractor's default. All such damages may be recovered by AEROTHAI from the Contractor in the Courts of Thailand, or, without prejudice to that right, by remittance from the Contractor or from any Performance Security deposited, or after use of the property and materials of the Contractor for completion of the Activities, as provided in the Contract, such property and materials may be sold and the proceeds applied to any remaining obligation of the Contractor. AEROTHAI may exercise any or all of the foregoing rights to the extent necessary to satisfy the full amount of any obligations of the Contractor, and if any balance remains owing to AEROTHAI, it may be collected by suit against the Contractor.

43.2 Should the Contractor be in default under the Contract, AEROTHAI may at its option:

a) suspend payments under the Contract which may be continued until the default has been rectified; or

b) terminate the Contract, in which case a written notice shall be served on the Contractor and the termination shall be effective from the date on which the notice is served. AEROTHAI may terminate the Contract whether any Activities under the Contract remains to be executed or not, or whether the time limit for the completion of the Activities has expired or not, termination of the Contract shall not vitiate the Contract, but shall terminate the Contractor's right to

proceed with the Activities and to release AEROTHAI from future obligations on its part of the Contract and shall not relieve the Contractor from liability in damages for his default or prejudice any rights of AEROTHAI.

**44. LIQUIDATED DAMAGES**

44.1 In the event that the completion of Activities is delayed for other than excusable causes beyond the Project Completion Date specified under the Contract, the Contractor agrees to pay to AEROTHAI as liquidated damages starting from the date following the specified Project Completion Date up to the actual date of delivery of the Activities correctly and completely, in the following amount on each category:

a) two-tenths (0.2) percent per day of the total price of each individual FIS (including its related Activities) which is not satisfactorily completed under Condition 27.2 (Certificate of Project Completion) within the specified Project Completion Date under the Contract.

All such liquidated damages may be recovered by AEROTHAI from the Contractor in the manner provided in Condition 43 (Default). Termination of the Contract by AEROTHAI for the default of the Contractor shall not relieve the Contractor from liability for liquidated damages under this condition accruing until such time as AEROTHAI may reasonably procure the materials and services elsewhere. The Contractor shall not be liable for liquidated damages in the event of delays caused by Force Majeure.

44.2 In cases where the Contractor is unable to comply with the Contract, and is consequently subject to the liquidated damages provided for in the Contract, and if the amount of the liquidated damages exceeds ten (10) percent of the value of the Contract Price, AEROTHAI shall proceed to terminate the Contract, except where the Contractor has agreed to pay the liquidated damages to AEROTHAI without any conditions whatsoever, in which case AEROTHAI may, at its absolute discretion, grant such relaxation with regard to the termination of the Contract as may be deemed necessary.

44.3 If AEROTHAI has not yet terminated the Contract and considers that the Contractor is unable to continue its performance of the Contract, or the liquidated damages amount exceeds the ceiling, AEROTHAI is entitled to terminate the whole or part of this Contract, as AEROTHAI may deem it appropriate and may exercise the right under Condition 45 (AEROTHAI's Right After Termination of the Contract). In addition,

if AEROTHAI notified the Contractor after the specified Completion Date in the Contract that AEROTHAI demands the payment of the liquidated damages, AEROTHAI shall also be entitled to the liquidated damages up to the date of termination of the Contract.

44.4 The payment or deduction of liquidated damages shall not relieve the Contractor from his obligation to complete the Activities, or from any other obligation or liabilities under the Contract.

**45. AEROTHAI'S RIGHT AFTER TERMINATION OF THE CONTRACT**

In case AEROTHAI terminates the Contract under Condition 44.1, the Contractor agrees to let AEROTHAI confiscate the security by claiming against the Bank issuing the performance security in whole or in part as may be deem advisable by AEROTHAI. Besides, the Contractor shall be liable to pay all damages to AEROTHAI, and if AEROTHAI procures the Equipment/Activities from another person in whole or in part, especially for those falling short as the case may be, within a period of sixty (60) days from the date of termination, the Contractor agrees to reimburse the extra cost over and above those stipulated in the Contract.

**46. FORCE MAJEURE**

46.1 The Contractor shall not be in default under the Contract because of any delays in completion of the Activities, which delays are caused by Force Majeure, provided that the Contractor shall notify AEROTHAI in writing of the cause of any such delay within thirty (30) days from the beginning thereof; or within such further period as AEROTHAI may allow for the receipt of such notice. On receipt of any such notice, AEROTHAI shall promptly ascertain the facts and the extent of the delay and shall extend the Contract Period when, in the opinion of AEROTHAI, the delay is caused by Force Majeure or the findings of fact justify an extension. AEROTHAI's decision shall be binding on the Contractor.

46.2 If the Contract is terminated as Force Majeure, the Contractor shall be paid by AEROTHAI, in so far as such amount or items have not already been covered by payments on account made to the Contractor for all Activities correctly executed prior to the date of termination at the rates and prices provided in the Contract, provided always that against any payments due from AEROTHAI under this Condition, AEROTHAI shall be entitled to be credited with any outstanding balances due from the Contractor for advance payment and any other sums which at the date of

termination were recoverable by AEROTHAI from the Contractor under the terms of the Contract.

**47. SERVICE LIFE**

The Equipment shall be designed to have a service life of at least **ten (10)** years.

**48. ON-GOING SUPPORT AND PROVISION OF SPARE PARTS**

48.1 The Contractor shall provide full operational and technical support and ensure the availability of Spare Parts for a minimum period of **ten (10)** years from the date of execution of the Contract in respect of all Equipment supplied under the Contract.

48.2 The Contractor shall provide support for repair and/or replacement of system equipment and provide additional equipment and spare parts for direct purchase by AEROTHAI, including the supply of documentation dealing with the improvements and modifications to the basic operating system and equipment, during the service life of the Equipment.

**49. LAW OF THE CONTRACT**

The Contract shall be governed by and construed in accordance with the Laws of the Kingdom of Thailand.

**50. DOCUMENTATION**

50.1 Contractor shall provide all documents as required by Section F.

50.2 The documents shall be provided in both hard copies (paper) and flash drive (in document formats, such as Adobe Acrobat, Microsoft Word or Microsoft Visio formats) before the Project Completion Date.

**51. SCOPE OF SUPPLY**

Contractor shall supply and furnish the Activities as required by Section F.

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# SECTION F

# GENERAL REQUIREMENTS

# LIST OF CONTENTS

# TECHNICAL SPECIFICATIONS
# FOR
# A SUPPLY AND INSTALLATION OF ONE FLIGHT INSPECTION SYSTEM

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## GENERAL REQUIREMENTS

## ITEM 1. INTRODUCTION

1.1 AEROTHAI intent to purchase one (1) flight inspection system (FIS) and acquire service on FIS installation including aircraft modification on AEROTHAI's King Air 350 to become a flight inspection aircraft with flight inspection capability for conventional navigational aids, radar, performance-based navigation, and automatic dependent surveillance-broadcast. Details of flight inspection system specifications and aircraft modification and delivery requirements, including all other terms and conditions, are described in this Technical Specifications (TECHSPECS) and its incorporated annexes, which shall be fully complied with at no extra cost to AEROTHAI.

## ITEM 2. TECHNICAL SPECIFICATIONS DOCUMENTS AND DEFINITIONS

### 2.1 TECHNICAL SPECIFICATIONS DOCUMENTS

2.1.1 The TECHSPECS, constituting Section F of Tender Documents for A SUPPLY AND INSTALLATION OF ONE FLIGHT INSPECTION SYSTEM, consists of:

(1) This document;
(2) **ANNEX A : FIS SPECIFICATIONS**;
(3) **ANNEX B : INTENTIONALLY LEFT BLANK**
(3) **ANNEX C : AIRCRAFT MODIFICATION REQUIREMENTS** with **ATTACHMENT**

### 2.2 TECHSPECS DEFINITIONS

2.2.1 Unless stated otherwise in its contents, terms and abbreviations used in the TECHSPECS and other incorporated documents are described for details for the purpose of this TECHSPECS as follows:

(1) “FIS OEM” abbreviates for “Flight Inspection System Original Equipment Manufacturer”, which refers to the manufacturer who produces the FIS under the TECHSPECS, and may also be INSTALLER too;

(2) “INSTALLER” refers to aircraft repair station or organization who has the required approval and capability and will install FIS on AIRCRAFT and perform necessary aircraft modifications if necessary, and may also be FIS OEM too;

(3) “TENDERER” refers to the juristic person professionally in the business relating to flight inspection system and flight inspection aircraft delivery, who is bidding for the provision of FI-AIRCRAFT under the TECHSPECS, and if successfully bid for this TENDER shall be the party signing contract with AEROTHAI;

(4) “CONTRACTOR” refers to the successful TENDERER who signs the contractor with AEROTHAI for the provision of FI-AIRCRAFT under the TECHSPECS, and shall only be FIS OEM;

(5) “AIRCRAFT” refers to AEROTHAI’s King Air 350 aircraft which is the base/platform aircraft to be installed with FIS to become FI-AIRCRAFT under this TECHSPECS;

(6) “FIS” abbreviates for Flight Inspection System and refers to the flight inspection system which is manufactured by FIS OEM and will be installed and delivered as FI-AIRCRAFT under the TECHSPECS;

(7) “BASIC FIS MODULE” refers to a module or modules within or forming a part of FIS which is for flight inspection of conventional navigational aids and radar, which includes peripheral equipment, positioning reference system, and others that are essential for flight inspection of conventional navigational aids and radar;

(8) “FI-AIRCRAFT” refers to flight inspection aircraft with flight inspection system installed as per specifications and requirements under the TECHSPECS, and is ready for delivery to AEROTHAI for inspection and acceptance;

(9) “DATA PACKAGE” refers to engineering data package used for installation, testing and airworthiness certification of FIS on AIRCRAFT, including other necessary aircraft/avionics modifications required under the TECHSPECS;

(10) “FAT” abbreviates for Factory Acceptance Test, which is for testing and inspection purpose for FIS prior to installation and integration into FI-AIRCRAFT;

(11) “SAT” abbreviates for Site Acceptance Test, which is for testing and acceptance purpose for FI-AIRCRAFT upon completion of FIS installation, necessary modifications, approval by FAA/EASA, and delivery to AEROTHAI;

(12) “TENDER” refers to the package of information containing details of TENDERER’s qualification, technical proposal, and other related information/proposal.

(13) “TENDER DATE” refers to the date which the tender shall be submitted to AEROTHAI for the bid under the TECHSPECS;

2.2.2 All terms and abbreviations used in this TECHSPECS are for the purpose of describing the requirements. TENDERER may use their own names or terms, associated with their products and models, or others as appropriate, provided that they are clear and without ambiguities.

## ITEM 3. QUALIFICATIONS AND CERTIFICATES

### 3.1 TENDER QUALIFICATIONS

3.1.1 TENDERER shall provide the delivery plan, describing the process of FIS production, installation, aircraft modification and certification, and other important process. The plan shall specify the process, turnaround time, and location in each and all processes, and also presented in a Gantt chart format, showing related work progress and aircraft status, including registration number. [FE]

3.1.2 TENDERER shall provide name and brief details of involved parties in each process, which includes the following as a minimum, as applicable : [FE]

(1) FIS OEM
(2) INSTALLER
(1) Organization who produces DATA PACKAGE
(2) Organization who certifies DATA PACKAGE to be used for aircraft modification
(3) Organization who certifies FIS installation and aircraft modification and issues airworthiness certification in according to aircraft registration
(4) Organization who ferries FI-AIRCRAFT

3.1.3 TENDERER shall provide TENDERER’s, FIS OEM’s, and INSTALLER’s company registration, confirming that they have no juristic or other relationship with other TENDERER, FIS OEM, INSTALLER who is also proposing the TENDER. [FE]

3.1.4 TENDERER shall provide creditable and referable evidence in the following details: [FE]

(1) FIS OEM is registered with ICAO ICASC (International Committee for Airspace Standards and Calibration) as FIS manufacturer.

(2) FIS OEM has experience of manufacturing FIS and delivering flight inspection aircraft for at least two (2) flight inspection systems or two (2) flight inspection aircraft, or has delivered a significant hardware or software updates on the key components of the flight inspection system to previously delivered systems for at least two (2) systems within four (4) years of the TENDER DATE.

(3) FIS OEM has been involved in presenting paper, analysis, research, and topics in an international meeting or seminar relating to flight inspection and its related technology or procedures within four (4) years of the TENDER DATE.

(4) INSTALLER has licensed engineers who are certified and approved by FAA/EASA for aircraft maintenance and modification capability applicable for AIRCRAFT and its registration.

(5) INSTALLER has licensed engineers who are experienced with the same level of turboprop aircraft and avionics modification as required under this TECHSPECS.

(6) The facility for installation of FIS, including the related infrastructure such as airport systems and runway characteristics, shall be of the satisfactory standard and condition that can serve the normal operation of the AIRCRAFT, in particular taking off and landing, adequately and safely.

(7) INSTALLER shall be an Authorized Service Center, which is authorized by the original manufacturer of the AIRCRAFT.

(8) FIS OEM has the required STC or DATA PACKAGE for installation of FIS onto the twin engines turboprop or jet aircraft of the similar performance to AIRCRAFT. In event that the DATA PACKAGE is required to be reproduced, the organization who will produce the DATA PACKAGE shall has experience of producing DATA PACKAGE applicable

3.1.5 TENDERER shall meet all requirement under the TECHSPECS by submitting all required documents and evidence as necessary and confirm compliance to all requirements herein, including those conditions in case such TENDERER is awarded the contract and become CONTRACTOR under this procurement.

## 3.2 TENDER PROCESS

3.2.1 The procurement process of the service under this TECHSPECS and TENDERER's instruction shall be in accordance with the main structure of Tender Document.

## 3.3 TENDER CERTIFICATES

3.3.1 TENDERER shall provide following documents, which are extracted from the content

of the TECHSPECS, to AEROTHAI as part of technical proposal for the purpose of TENDERER qualification evaluation: [FE]

(1) FI-AIRCRAFT delivery plan (process, turnaround time, and location) including Gantt chart presentation;
(2) List of name of involved parties in the delivery process with brief description;
(3) TENDERER company registration;
(4) FIS OEM company registration;
(5) INSTALLER company registration;
(6) TENDERER declaration letter confirming non-relationship status other opposing bidders;
(7) ICAO FIS manufacturer registration record for FIS OEM;
(8) Sale record or evidence of sale from FIS OEM;
(9) Paper and/or presentation material prepared for a presentation at an international meeting or seminar in a flight inspection related topic from FIS OEM;
(10) Adequate FAA/EASA approved engineer licenses and record of work of engineers by INSTALLER;
(11) Summarized STC or DATA PACKAGE for FIS installation, or record of DATA PACKAGE production in the past if the particular data package needs to be newly produced;
(12) Any technical descriptions, diagrams, equipment designs, list of procedures, or other technical materials for demonstrating FI-AIRCRAFT system and procedures as required in the TECHSPECS; and
(13) Compliance matrix of the TECHSPECS, showing TENDERER compliance and acceptance to each individual requirement in the TECHSPECS, with numbered references to all documents or evidences as applicable.

3.3.2 Despite the shortened and summarized list and details of certificates described above, it is TENDERER responsibility to ensure that the submitted certificates and documents under this item suffice the requirement above and its original requiring statement, and that requirement elsewhere that may or may not be included in the list above are met.

## ITEM 4. DETAILED REQUIREMENTS

### 4.1 CONCEPT OVERVIEW

4.1.1 Base aircraft is standard King Air aircraft, except some additional/optional aircraft

avionics and parts. [FE]

4.1.2 FI-AIRCRAFT shall be fully capable of flight inspection for conventional navigational aids, radar, PBN, ADS-B, GBAS and equipped with all required support system as necessary. [FE]

4.1.3 FIS of FI-AIRCRAFT shall be of modular design and can easily be removed and reinstalled. [FE]

4.1.4 FIS shall be upgradable for additional functionality and capability in the future without technical difficulty, long downtime, nor major modification cost. [FE]

4.1.5 STC for FIS installation and related aircraft modification, shall be certified by EASA or FAA as applicable, and later validated by Department of Civil Aviation (DCA Thailand). All work done and aircraft modification in accordance with the above mentioned STC and the final airworthiness status of the complete flight inspection aircraft shall be certified by DCA Thailand. [FE]

## 4.2 SCOPE OF WORK

The scope of work under CONTRACTOR's responsibility shall be as follows:

4.2.1 CONTRACTOR shall be responsible for production of FIS in accordance with technical specifications and requirements described in this TECHSPECS, and in particular **ANNEX A "FIS SPECIFICATIONS"**. [FE]

4.2.2 CONTRACTOR shall be responsible for ferry of AIRCRAFT from AEROTHAI's facility to INSTALLER's location and shall take delivery of AIRCRAFT from AEROTHAI, within 15 days from the date of AEROTHAI Notice to receive the Aircraft at AEROTHAI 's premise, whichever comes after. CONTRACTOR shall remain sole responsibility of aircraft safety and insurance until delivery and final acceptance of FI-AIRCRAFT by AEROTHAI. [FE]

4.2.3 CONTRACTOR shall be responsible for installation of FIS on AIRCRAFT in accordance with design and requirements described in **ANNEX A**, including this TECHSPECS. For the purpose of on-the-job training/witness experience, CONTRACTOR shall ensure that AEROTHAI personnel have access and permission to observe/ witness the installation of FIS onto AIRCRAFT including any other related modification and/or wiring. The above requirement is on the basis that such training/witness experience will be in such manner

that it will not disrupt the work being carried out by the CONTRACTOR under this TECHSPECS. [FE]

4.2.4 If applicable and required, CONTRACTOR shall be responsible for modification and upgrade of AIRCRAFT and their avionics in accordance with the requirements described in this TECHSPECS, either as a result of flight inspection requirements from **ANNEX A** or explicitly stated in **ANNEX C "AIRCRAFT MODIFICATION REQUIREMENTS"** (if any). [FE]

4.2.5 CONTRACTOR shall provide to AEROTHAI a summarized FIS installation and certification plan, which describes involved parties, order and process of the related activities, in particular the production of documents and submission for authority approval. [FE]

4.2.6 CONTRACTOR shall be responsible for acquiring or producing STC or DATA PACKAGE for FIS installation and aircraft modification (if required). [FE]

4.2.7 CONTRACTOR shall be responsible for (1) successful certification of FIS STC and/or Data Package issued by FAA or EASA as applicable and to be validated by DCA Thailand; and (2) successful certification of FIS installation and aircraft modification including the final airworthiness status of the complete flight inspection aircraft issued by DCA Thailand. [FE]

4.2.8 CONTRACTOR shall be responsible for ferry of FI-AIRCRAFT from INSTALLER's location to AEROTHAI's facility and shall be responsible for demonstration of aircraft performance and flight inspection capability, including in-flight training. [FE]

4.2.9 CONTRACTOR shall be responsible for AEROTHAI's successful aircraft related application with DCA Thailand, including registration (if required), airworthiness, and flight inspection aircraft capability approval and use, under the terms and requirements by DCA Thailand. Due to the local authority requirement, such above application may involve AEROTHAI as applicant. Nonetheless this shall not relieve CONTRACTOR from its responsibility for supplying and supporting any documents and information and the successful application in overall. [FE]

4.2.10 CONTRACTOR shall be responsible for delivery all deliverables and documents, including revision and/or recertification as applicable, described in this TECHSPECS. [FE]

4.2.11 CONTRACTOR shall be responsible for provision of all training described in this TECHSPECS. [FE]

4.2.12. CONTRACTOR shall provide monthly report describing plan, progress, and status of work to be carried out. [FE]

4.2.13 Taking the time of delivery of AIRCRAFT to FIS OEM or INSTALLER into consideration, CONTRACTOR shall deliver the completed flight inspection aircraft within four hundred eighty (480) days after the contract signing, or two hundred forty (240) days from the date of AEROTHAI Notice to receive the AIRCRAFT from AEROTHAI's premise to begin the installation work, whichever comes after. [FE]

4.2.14 CONTRACTOR shall provide appropriate insurance coverage for FIS and its parts throughout the delivery process, and for AIRCRAFT from the moment it is delivered to FIS Installer until final acceptance of the flight inspection aircraft. [FE]

4.2.15 CONTRACTOR shall be responsible for cost and activities required to complete the scope of work mentioned above, including specifically aircraft fuel for ferry, test flight, flight demonstration, in-flight training, and final acceptance process, as well as pilot license validation by DCA Thailand, immigration administration, flight dispatching, etc.

## 4.3 FLIGHT INSPECTION SYSTEM REQUIREMENTS

### 4.3.1 Overview

(1) Summary of flight inspection capability of FIS are as per table below. In event of conflicts or inconsistencies between documents, **ANNEX A "FIS SPECIFICATIONS"** shall prevail. Nonetheless any requirements stated in this main TECHSPECS shall be effective, even if they are not restated in separate annexes. [FE]

| Capability | FIS Capability |
|---|---|
| Conventional Navaids | ILS (CAT 1, 2, 3), VOR, DME, MRK, NDB, PAPI, VHF |
| Conventional Radar | Radar (PSR, SSR, SSR Mode A, C, S) |
| PBN | SID/STAR, APV Baro (RNP APCH with BARO-VNAV), APV SBAS (RNP APCH with SBAS), RNP AR APCH, GBAS |
| ADS-B | ADS-B |
| Upgrade Provision | CPDLC |

(2) Functionalities of FIS shall be with user-friendly and include ability to receive, process, real-time display on FIS display and printout, record in database in ASCII format such that can be processed by normal commercial program such as Microsoft Office, upload/download in and out of FIS; and allow simulated rerun on FIS display and printout, and transferable to process and print on normal office computer for analysis and reporting purpose (collectively referred to by "FI Functions"). [FE]

(3) Capability and FI Functions shall be in accordance with ICAO standards as described in ICAO Annex 10 and Annex 14 and other related ICAO Document (Doc). [FE]

(4) FIS shall be configurable for units and tolerances including calculation method in accordance with ICAO and FAA standards. [FE]

4.3.2 Basic Flight Inspection Requirements

(1) FIS capability for flight inspection of conventional navaids and radar includes: ILS (CAT 1, 2, 3), VOR, DME, MRK, NDB, PAPI, VHF, Radar (PSR, SSR, SSR Mode S). [FE]

(2) FI Functions of FIS for flight inspection of conventional navaids and radar, as applicable, shall be in accordance with ICAO Doc 8071 Volume 1 and 3. [FE]

(3) Equipments and FI Functions for conventional navaids and radar flight inspection shall receive, process, display, and record – in real-time – the following ILS parameters and units (referred to as "ILS Parameters"), as minimum: [CB]

(a) Localizer Course Sector Width, in Degree (Note: Localizer course sector width shall be measured by any two (2) selectable flight profiles: (i) arc crosses profile through localizer front course; and (ii) approach profile on the edges 150 μA left and right of localizer course (Off set Approach).)

(b) Average Localizer Modulation Level, in %

(c) Minimum Clearance Within Sector 2 (150 Hz), in μA/Degree

(d) Minimum Clearance Within Sector 1 (150 Hz), in μA/Degree

(e) Minimum Clearance Within Sector 1 (90 Hz), in μA/Degree

(f) Minimum Clearance Within Sector 2 (90 Hz), in μA/Degree

(g) Course Structure – Z1, in μA@NM

(h) Course Structure – Z2, in μA@NM

(i) Course Structure – Z3, in μA@NM

(j) Course Structure – Z4, in μA@NM

(k) Course Structure – Z5, in μA@NM

(l) Vertical Polarization Effect, in μA@NM

(m) Symmetry, in % (Note: Percent of symmetry of the 90 Hz Side.)

(n) Localizer Course Alignment Accuracy, in μA

(o) RF Field Strength, in μV, dBm, μV/Meter (Note: RF Field Strength unit shall be selectable.)

(p) Course Alignment Shift to 150 Hz for Monitor Reference Setting, in μA

(q) Course Alignment Shift to 90 Hz for Monitor Reference Setting, in μA

(r) Average Glide Slope Modulation Level, in %

(s) Glide Path Angle, in Degree (Note: Measured by approach flight profile.)

(t) Glide Path Sector Width, in Degree (Note: Glide path sector width shall be measured by any two (2) selectable flight profile: (i) level run profile; and (ii) Approach profile on the edges 75 μA above and below glide path (Off set Approach).)

(u) Upper Half Sector Width (90 Hz), in Degree

(v) Lower Half Sector Width (150 Hz), in Degree

(w) Clearance Below Path at 0.3 θ° Elevation, in μA

(x) Clearance Below Path at 0.45 θ° Elevation, in μA

(y) Clearance Above Path at 1.75 θ° Elevation, in μA

(z) Structure Below Path, in Degree (Note: Elevation angle at -190 μA interception point.)

(aa) Glide Path Angle, in Degree (Note: Measured by level run flight profile.)

(bb) Path Structure – Z1, in μA@NM

(cc) Path Structure – Z2, in μA@NM

(dd) Path Structure – Z3, in μA@NM

(ee) Symmetry, in % (Note: Percent of symmetry of the 90 Hz Side.)

(ff) RF Field Strength, in μV, dBm, μV/Meter (Note: RF Field Strength unit shall be selectable.)

(gg) DME Accuracy, in NM

(hh) DME RF Field Strength, in μV, dBm, μV/Meter (Note: RF Field Strength unit shall be selectable.)

(ii) Actual Reference Datum Height, in Feet.

(jj) Outer Marker Beacon Width, in Meter

(kk) Middle Marker Beacon Width, in Meter

(ll) Inner Marker Beacon Width, in Meter

(4) Equipments and FI Functions for conventional navaids and radar flight inspection shall receive, process, display, and record – in real-time – the following VOR parameters and units (referred to as "VOR Parameters"), as minimum: [CB]

(a) Average 30 Hz AM, in % (Note: Both radial in/out bound and orbit flight profile shall be presented.),

(b) Average 9960 Hz AM, in % (Note: Both radial in/out bound and orbit flight profile shall be presented.),

(c) Average 9960 Deviation Ratio (Note: Both radial in/out bound and orbit flight profile shall be presented.),

(d) Roughness/Scalloping, in Degree @ NM,

(e) Bends, in Degree @ NM,

(f) Vertical Polarization Effect, in Degree @ NM,

(g) Radial Alignment Error, in Degree,

(h) RF Field Strength, in μV, dBm, μV/Meter (Note: RF Field Strength unit shall be selectable.),

(i) Flight Level (MSL) Altitude: Starting Point and Termination Point, in Feet,

(j) Distance: Starting Point and Termination Point, in NM,

(k) Orbit Alignment Error, in Degree,

(l) Orbit Direction,

(m) Orbit Alignment Error Spread, in Degree,

(n) Orbit Maximum Radial Error for 10 Degree Segment, in Degree,

(o) Orbit Mean Radial Error for 10 Degree Segment, in Degree, and

(p) DME Accuracy, in NM, and

(q) DME RF Field Strength, in μV, dBm, μV/Meter (Note: RF Field Strength unit shall be selectable.).

(5) TENDERER shall describe the principle of FI Functions and breakdown of equipment that assembles into FIS, and further show that the program and equipment are adequate, sufficient and able to perform flight inspection of conventional navaids and radar, as applicable. [FE]

(6) TENDERER shall describe how FI-AIRCRAFT perform flight inspection of conventional navaids and radar in each principle procedures as applicable, and further show that design and composition of program and equipment of FIS is consistent of the described flight inspection procedures, as applicable. [FE]

4.3.3 PBN Flight Inspection Requirements

(1) FIS capability for flight inspection of PBN includes: PBN SID/STAR, APV BARO (RNP APCH with BARO-VNAV), APV SBAS (RNP APCH with SBAS), GBAS and PBN RNP AR APCH. [FE]

(2) FI Functions of FIS for PBN flight inspection shall be in accordance with ICAO Doc 8071 Volume 2 and ICAO Doc 9613, FAA order 8200.1C regarding RNAV, RNP, ABAS,SBAS, GBAS and appropriate FAA orders, as applicable. [FE]

(3) Equipments and FI Functions for PBN flight inspection shall receive, process, display, and record the following GNSS parameters (referred to as "GNSS Parameters"), as minimum: [CB]

(a) Cross track distance / XTKER / ATKER / WPDE,
(b) Active way-point,
(c) Distance to active way-point / Bearing to active way-point,
(d) No. of satellites visible / No. of satellites tracked,
(e) Minimum carrier-to-noise density ratio for each satellite being visible during each leg,
(f) HDOP / VDOP,
(g) HFOM / HIL,
(h) RAIM alarm / RAIM warning flag,
(i) Date and time (UTC or GPS),
(j) GNSS position,
(k) Positioning system position data / Positioning system time / Positioning system status,
(l) Receiver interference flag (if available from receivers),
(m) Spectrum analyzer measurements (display and printout only), and
(n) VOR/DME signal level.

(4) Equipments and FI Functions for PBN flight inspection in APV SBAS shall, for each section as applicable, receive, process, display, and record the following SBAS solution and related parameters (referred to as "SBAS Parameters"), as minimum: [CB]

(a) UTC time and date,
(b) Maximum & minimum number of SV,
(c) Position Dilution of Precision (PDOP) Average,
(d) Maximum Observed Horizontal Dilution of Precision (HDOP),
(e) Position,

(f) Altitude,
(g) Actual and calculated Vertical Protection Level (VPL) and Horizontal Protection Level (HPL),
(h) Maximum Observed Vertical Dilution of Precision (VDOP),
(i) FAS – CRC,
(j) FAS - GP Angle,
(k) FAS – TCH,
(l) FAS – Course Alignment,
(m) FAS – Data Link (Coverage),
(n) GND Speed,
(o) Max/min Alt,
(p) Flight Path plotted with FMS & GNLU data,
(q) It shall also allow the setting of Horizontal Alert Level (HAL) and Vertical Alert Level (VAL), and also log time and location where Horizontal/Vertical Alert Level is less than Horizontal/Vertical Protection Level,
(r) PRN of SBAS
(s) SBAS Channel.

(5) Equipments and FI Functions for PBN flight inspection in GBAS shall, for each section as applicable, receive, process, display, and record the following GBAS solution and related parameters (referred to as "GBAS Parameters"), as minimum: [CB]

- UTC time and date,
- Maximum & minimum number of SV,
- Position Dilution of Precision (PDOP) Average,
- Maximum Observed Horizontal Dilution of Precision (HDOP),
- Position,
- Altitude,
- Actual and calculated Vertical Protection Level (VPL) and Horizontal Protection Level (HPL),
- Maximum Observed Vertical Dilution of Precision (VDOP),
- DATA Content
  - Type1 Massage
  - Type 2 Massage (GBAS Related Data)
  - Type 4 Massage (FAS Data)
- Data Link Coverage
- GND Speed,

- Max/min Alt,
- Flight Path plotted with FMS & GNLU data,
- It shall also allow the setting of Horizontal Alert Level (HAL) and Vertical Alert Level (VAL), and also log time and location where Horizontal/Vertical Alert Level is less than Horizontal/Vertical Protection Level,
- PRN of GBAS, and
- GBAS Channel.

(6) FIS shall acquire and record altitude information either from FIS own Barometric Altimeter or interfaced from aircraft to process SBAS and GBAS 3-D solution. [FE]

(7) FIS shall acquire GPS signal from FIS own GPS receiver or interfaced from aircraft' GPS receiver. [FE]

(8) FIS GPS receiver, GBAS receiver and antenna shall be in compliance with international standards (FAA TSO (Technical Standard Order), FAA AC (Advisory Circular), RTCA (Radio Technical Commission for Aeronautics), etc.) as applicable and required for each specific use above, in particular: [CB]

(a) TSO C145/C146 and SBAS requirement for GPS receiver, and
(b) TSO C190 and SBAS LPV requirement for GPS antenna.
(c) TSO C161a for GBAS positioning and navigation Equipment.
(d) TSO C162a for GBAS VHF Data Broadcast Equipment

(9) TENDERER shall describe the principle of FI Functions and breakdown of equipment that assembles into FIS for PBN function, and further show that the program and equipment are adequate, sufficient and able to perform flight inspection of PBN. [FE]

(10) TENDERER shall describe how FI-AIRCRAFT perform flight inspection of PBN in each procedures in particular all the different type of approach procedures, and further show that design and composition of program and equipment of FIS is consistent of the described flight inspection procedures. [FE]

(11) TENDERER shall recommend the procedure and method to evaluable and test the FIS functionality (excluding aircraft performance) for PBN APV SBAS and RNP AR. The recommendation shall be done by reference from other operator/ service provider, including referable to applicable standards, to show existing technology/ method for SBAS and GBAS flight inspection as used by others. AEROTHAI reserves the right to review the recommendations and finalize the testing and acceptance process for FIS functionality for PBN

APV SBASand RNP AR and GBAS at contract signing as reasonably appropriate. [FE]

4.3.4 ADS-B Flight Inspection Requirements

(1) FIS capability shall include ADS-B flight inspection. [FE]

(2) FI Functions of FIS for ADS-B flight inspection shall be consistent with principles, considerations, and guidance on flight inspection of ADS-B and surveillance system specified by ICAO or other respectable organization. TENDERER shall also provide reference to such principles, considerations, and guidance. [FE]

(3) Equipments and FI Functions for ADS-B flight inspection shall be DO-260A compliance as applicable, and cover the following ADS-B parameters (referred to as "ADS-B Parameters"), as minimum: [CB]

(a) Time,
(b) Altitude,
(c) Track Angle,
(d) Ground Speed,
(e) Position including integrity limits (horizontal and vertical) and its accuracy (FoM),
(f) Vertical Velocity,
(g) N/S and E/W Velocity,
(h) Estimated Position Uncertainty (EPU),
(i) Radio Height,
(j) True Track Angle,
(k) Selected Heading,
(l) Magnetic Heading,
(m) True Heading,
(n) Wind Speed,
(o) Wind Direction,
(p) Inertial Vertical Speed,
(q) Height Above the Ellipsoid,
(r) A/C Registry,
(s) GPS Status, and
(t) NIC/NAC/SIL values.

(4) General principle of flight inspection function and capability for ADS-B shall include the followings as minimum: [FE]

(a) Inspect RF coverage check;
(b) Display and Record ADS-B massages associated with GPS time stamp that is broadcasted from FI-Aircraft at the sampling interval set by AEROTHAI as desired;
(c) Use datalink transfer technology of the Mode S Extended Squitter (1090ES) type as minimum;
(d) Acquire differential truth trajectory system (differential GPS) and compare current aircraft position between information provided by aircraft ADS-B signal and such truth system;
(e) Recording of ADS-B signal shall include GPS time stamp at each sampling interval;
(f) FIS shall have validation source for position and time including other GNSS information from GPS receiver; and
(g) FIS shall have validation source for height from FIS own Altimeter, or interfaced from aircraft's altimeter..

(5) TENDERER shall describe the principle of FI Functions and breakdown of equipment that assembles into FIS for ADS-B function, and further show that the program and equipment are adequate, sufficient and able to perform flight inspection of ADS-B. [FE]

(6) TENDERER shall describe how FI-AIRCRAFT perform flight inspection of ADS-B in each procedures in particular the consideration on extent of cover, cone of silence, and areas of interference, and further show that design and composition of program and equipment of FIS is consistent of the described flight inspection procedures. [FE]

(7) TENDERER shall recommend the procedure and method to evaluable and test the FIS functionality for ADS-B. The recommendation shall be done by reference from other operator/ service provider, and referable to applicable standards. AEROTHAI reserves the right to review the recommendations and finalize the testing and acceptance process for FIS functionality for ADS-B at contract signing as reasonably appropriate. [FE]

4.3.5 Design Criteria

(1) Modularity: TENDERER shall describe architecture and concept in designing the hardware and equipment for FIS, and further show that such design and composition is in accordance with all requirements below: [FE]

(a) FIS shall be in a modular design, and shall be well organized and separated into part(s) of reasonable size and weight, as appropriate.
(b) PBN and ADS-B related equipment that are belong to FIS for is capability of PBN and ADS-B flight inspection shall be subpart within the rack/module or separate module on their own but share the same peripheral equipment.

(2) Location and Interface: TENDERER shall describe the design and how the FIS is located and connected/ interfaced on AIRCRAFT, and further show that the FIS location and connection shall be as follows: [FE]

(a) FIS shall be securely installed in the cabin of AIRCRAFT, and fastened on the aircraft seat rail.
(b) FIS shall be located and positioned such that pose no obstacle to the crew movement inside the aircraft and between cockpit and aircraft entrance.
(c) Most interface and connection between FIS and its parts and with aircraft system shall be kept within airframe structure and only with some remaining connection tidily kept without obstacle to crew movement and operation inside the aircraft or being exposed to damage by external objects or the crew itself.
(d) All requirements on location and connection above shall apply to other equipment such as Auxiliary System as applicable.

(3) Easy Removal-Installation: TENDERER shall describe the design and how the FIS is removed and installed on aircraft with ease, and further show that the FIS removal and installation shall be as follows:
(a) FIS shall be of the easy removal design such that: [FE]

(i) FIS and its parts can easily be removed from aircraft;
(ii) upon removal of FIS and its parts, remaining connection and interface that has to remain intact with aircraft are kept tidily;
(iii) passenger seats can be reinstalled and close-to-original transport configuration cabin layout can be restored; and
(iv) FIS removal and passenger seats reinstallation above is done by AEROTHAI trained operator and together within two (2) hours after the FIS removal begins.

(b) FIS shall be of the easy installation design such that: [FE]

(i) FIS and its parts can easily be reinstalled on aircraft;
(ii) upon installation of FIS and its parts, FIS and FI-AIRCRAFT will be fully operational and ready for use with at most a quick parameter setting but without major calibration requirement; and
(iii) FIS installation and prior passenger seats removal above is done by AEROTHAI trained operator and together within two (2) hour after passenger seats removal begins.

(c) All requirements on easy removal and installation above shall apply to other equipment such as Auxiliary System as applicable. [FE]

4.3.6 Positioning Reference System

(1) FIS shall have positioning reference system which consists of a Digital Radio Telemetering Theodolite System (DRTT) and a Differential GPS with RTK technology (DGPS/RTK). [FE]
(2) TENDERER shall describe components and equipments used FIS and those used for the ground equipment that are used for positioning reference with DRTT and DGPS/RTK, and further show that the components and equipments are adequate, sufficient and able to use DRTT and DGPS/RTK for positioning reference for flight inspection. [FE]

4.3.7 FIS and all its flight inspection related system for FIS shall be as per flight inspection system specification and technical requirements as described in **ANNEX A**.

4.3.8 In event of conflicts or inconsistency relating to flight inspection system specification between any documents, **ANNEX A** shall prevail. Nonetheless any requirements stated in this main TECHSPECS shall be effective, even if they are not restated in separate annexes.

## 4.4 AIRCRAFT MODIFICATION REQUIREMENTS

4.4.1 FI-AIRCRAFT shall have total airframe time increased no more than fifty (50) hours not including ferry time for the first delivery to INSTALLER and the last delivery back from INSTALLER to AEROTHAI for final acceptance.

4.4.2 Airframe time and engine time shall all be the same, i.e. the aircraft has never flown without other engine(s) installed.

4.4.3 FIS installation on AIRCRAFT and all required aircraft modification shall be carried out in accordance with the FAA/EASA certified STC and/or Data Package with all supporting technical data and documentations available such that upon successful FI-AIRCRAFT final acceptance AEROTHAI can apply for airworthiness certification from DCA Thailand without difficulties. CONTRACTOR shall provide all support, both in technical information and administrated coordination, reasonably required to assist such DCA Thailand approval process. [FE]

4.4.4 CONTRACTOR shall deliver all loose equipment, including passengers seats normally removed for flight inspection aircraft configuration, for FI-AIRCRAFT to AEROTHAI together with FI-AIRCRAFT delivery.

4.4.5 Aircraft parts, equipments and avionics, including all other related details shall be as per aircraft specification and technical requirements as described in **ANNEX C "AIRCRAFT MODIFICATION SPECIFICATIONS"**. In event of conflicts or inconsistency relating to aircraft specification between any documents, **ANNEX C** shall prevail. Nonetheless any requirements stated in this main TECHSPECS shall be effective, even if they are not restated in separate annexes.

## ITEM 5. UPGRADE PROVISION

### 5.1 BASIC UPGRADE

5.1.1 Any software upgrade and development, if available by the respective manufacturer during the warranty period, shall be provided to FIS unless it is proven only possible with additional hardware/ equipment upgrade or changes from the status at final acceptance. [FE]

### 5.2 CPDLC UPGRADE

5.2.1 FIS and any associated module/ part shall have upgrade provision for CPDLC such that particular FIS hardware and equipment, including software upgrade, can be upgraded to include FIS-specific CPDLC flight inspection/ validation capability in the future without conflicts or limitations from current FIS technology and design, and also without technical difficulty, long downtime, nor major modification cost. TENDERER shall include recommendation for a possible CPDLC flight inspection/ validation procedure based on this FIS upgrade provision and existing FI-AIRCRAFT aircraft. [FE]

5.2.2 TENDERER shall also provide, in a form technical analysis or proposal, a complete aircraft-FIS CPDLC solution (a flight inspection aircraft with full CPDLC flight inspection/

validation capability including corresponding procedures) for AEROTHAI. Such CPDLC solution is ideally, if possible, based on FI-AIRCRAFT or King Air 350 aircraft, but if it is proven to be beyond economically feasible, a different base aircraft may be recommended. [FE]

**5.3 RNP AR UPGRADE**

5.3.1 TENDERER shall provide, in a form technical analysis or proposal, a complete aircraft-FIS RNP AR (U.S. SAAAR) solution (a flight inspection aircraft with full RNP AR flight inspection/ validation capability including corresponding procedures) for AEROTHAI. Such RNP AR solution is ideally, if possible, based on FI-AIRCRAFT or King Air 350 aircraft, but if it is proven to be beyond economically feasible, a different base aircraft may be recommended. [FE]

**5.4** Note: All upgrade provisions and recommended solutions are for separate future upgrade, and shall not be mistaken as included as part of the delivery cost under this project.

**ITEM 6. ACCEPTANCE CRITERIA**

**6.1 FIS FAT**

6.1.1 CONTRACTOR shall provide the following documents and certificates to AEROTHAI when production of FIS is completed:

(1) FIS OEM Factory Build Specification, showing the newly manufactured status of FIS;
(2) FIS System Description, showing the summary of flight inspection capability;
(3) FIS Component List, showing all main components of hardware and equipments that assembles FIS;
(4) FIS OEM Certificate of Product Quality Assurance, showing the production of FIS has been through the quality assurance process;
(5) General photograph, showing the completed production of FIS;
(6) Summarized FIS installation and certification plan, which describes involved parties, order and process of the related activities, in particular the production of documents and submission for authority approval;
(7) DATA PACKAGE for installing FIS on AIRCRAFT and subsequent testing and certification, which consists of the original STC and related information as per below example, but taking the consideration and requirement of approving

authority for such aircraft modification and final airworthiness certification as priority:

(a) Compliance Summary with Compliance Record,
(b) Drawings,
(c) Wiring Diagram,
(d) Structural Stress Analysis,
(e) Electrical Load Analysis,
(f) Interface Test Plan,
(g) Electromagnetic Interference Test Plan,
(h) Radio Frequency Interference Test Plan, and

(8) Other related documents and information as applicable; and
(9) Summarized update of delivery plan and progress of FI-AIRCRAFT.

6.1.2 AEROTHAI shall consider the evidence and completion of requested documents and certificates above as part of FIS FAT process, but by no mean it constitutes any partial acceptance of FI-AIRCRAFT nor will imply AEROTHAI obligation for any payment other than what stated in Term of Payment below.

## 6.2 FI-AIRCRAFT SAT (FINAL ACCEPTANCE)

6.2.1 Aircraft Demonstration: CONTRACTOR shall be responsible for all cost and activities to arrange the flight test demonstration of FI-AIRCRAFT with AEROTHAI personnel onboard to witness the function and performance of aircraft and installed system. The test procedure and test period shall be based on standard practice for general aircraft test flight and for the purpose of accepting a purchase, in particular testing procedure related to particular system and equipment installed in addition to standard factory configuration, or flight inspection related cockpit equipment, but subject to safety consideration.

6.2.2 FIS Functionality Demonstration: CONTRACTOR shall arrange functionality demonstration of FIS with AEROTHAI personnel present to witness the main flight inspection functions and procedures as follows:

(1) General control and operation of FIS on ground;
(2) For Conventional Navaids and Radar:

(a) Demonstrate, with actual flight, that FIS can perform flight inspection of conventional navaids and radar, as applicable, at any location in

Thailand, and also demonstrate that all ILS Parameters and VOR Parameters are received, processed, displayed and recorded in real-time as per TECHSPECS Item 4.3.2(4) and 4.3.2(5) above, respectively;

(b) Compare ILS/DME flight inspection at Don Meuang Airport and any other location in Thailand, and demonstrate that such flight inspection result, in particular the approach procedure, as acquired by DRTT and DGPS/RTK, are consistent with each other, and thus showing ILS/DME flight inspection can be done with DGPS/RTK; and

(c) If required by AEROTHAI, the above flight inspection result shall also be compared and be consistent with result achieved by AEROTHAI existing flight inspection aircraft using DRTT.

(3) For PBN:

(a) Demonstrate, with actual flight and applicable charts provided by AEROTHAI, that FIS and FI-AIRCRAFT can perform flight inspection of PBN SID/STAR and APV BARO at Don Meuang Airport, and also demonstrate that all GNSS Parameters are received, processed, displayed and recorded as per TECHSPECS Item 4.3.3(3) above;

(b) Demonstrate, subject to SBAS and GBAS availability, on ground with associated ICAO standards and guidance as accompanying reference, that FIS has all required controls and functions necessary for validating APV SBAS and GBAS and for receiving, processing, displaying and recording all SBAS and GBAS Parameters as per TECHSPECS Item 4.3.3(4) above;

(c) Demonstrate, on ground with associated ICAO standards and guidance as accompanying reference, that FIS has all required controls and functions necessary for validating RNP AR APCH;

(d) If required by AEROTHAI, more demonstration of function and capability of all PBN flight inspection above shall be conducted based on procedures and methods as reasonably requested by AEROTHAI and accompanied by ICAO standards.

(4) For ADS-B:

(a) Demonstrate, on ground with associated ICAO standards and guidance as accompanying reference, that FIS has all required controls and functions necessary for ADS-B flight inspection and for

receiving, processing, displaying and recording all ADS-B Parameters as per TECHSPECS Item 4.3.4(3) above;

(b) If required by AEROTHAI, more demonstration of function and capability of ADS-B flight inspection shall be conducted based on procedures and methods as reasonably requested by AEROTHAI and accompanied by ICAO standards.

6.2.3 Removal / Installation Demonstration: CONTRACTOR shall arrange the demonstration of FIS removal/installation as follows:

(1) Demonstrate how FIS is removed from AIRCRAFT, by preparing FI-AIRCRAFT in a full configuration for flight inspection (with FIS installed and ready for use) and removing FIS from AIRCRAFT and installing passenger seats onto AIRCRAFT to become normal transport configuration, demonstrating the compliance with the design criteria above;

(2) Demonstrate how FIS is installed onto AIRCRAFT, by preparing FI-AIRCRAFT in a transport configuration (without FIS installed but full seating arrangement) and removing passenger seats from AIRCRAFT and installing FIS onto AIRCRAFT to become flight inspection configuration and ready for flight inspection use, demonstrating the compliance with the design criteria above; and

6.2.4 Documents and Publications:

(1) CONTRACTOR shall provide all documents and publications listed in TECHSPECS Item 7.4 as part of final acceptance.

(2) Summarized report of delivery of FI-AIRCRAFT, including key dates for important milestones and accompanying records and evidences as necessary

6.2.5 Final Acceptance Certificate: Upon complete fulfillment of all demonstration, testing, provision of documents, and all requirements, AEROTHAI's authorized personnel or committee shall proceed with internal process for acceptance approval and subsequent AEROTHAI signing of Final Acceptance Certificate (or other similar purposed certificate as stated elsewhere), which will be provided to CONTRACTOR and shall constitute final acceptance of the provision of FI-AIRCRAFT under this TENDER.

6.2.6 In any observation, demonstration, inspection, acceptance processes, including training, that may involve AEROTHAI and its personnel, shall include provision, reservation, or allocation as necessarily required for DCA Thailand and its personnel also.

## ITEM 7. OTHER REQUIREMENTS

### 7.1 WARRANTY

7.1.1 CONTRACTOR shall be responsible for aircraft and equipment insurance throughout the delivery process until successful final acceptance.

7.1.2 CONTRACTOR shall provide list of all aircraft parts and equipments that were a result of aircraft modification with original manufacturer's warranty period (with starting and expiring date explicitly shown) for each item, and also ensure that all of such parts are under the original manufacturer's warranty as normally applicable.

7.1.3 CONTRACTOR shall ensure AEROTHAI's entitlement to manufacturer's warranty of FIS part including all related ground and other equipment shall also be based on its respective standard manufacturer's warranty.

7.1.4 In addition to manufacturer's warranty on specific parts and equipments, CONTRACTOR shall also provide warranty on the design, material, technical performance, and workmanship related to this production and delivery of FI-AIRCRAFT to the level and figures proposed and achieved at the time of final acceptance for a period of two (2) years after final acceptance.

7.1.5 In addition to the abovementioned warranty requirements and to avoid keep stock of spare parts, there shall be separate warranty covering the total period of total five (5) years for the main components of FIS that their failure leads to complete disruption or prevent the FIS from performing its intended flight inspection functions and purposes, for example but not limited to computer board, GPS sensors, DGPS/DRTT data link equipment, etc.

7.1.6 In event of the repair/replacement of parts and components of FIS under warranty, CONTRACTOR shall provide necessary actions to ensure FIS is fully operational within fifteen (15) days after notification of failure, not including any custom/license/permit process that may be required, whether for example, by providing temporary parts during the repair period, or by providing a permanent replacement parts which are proven to be new but the same parts, or better.

7.1.7 Contractor shall provide all maintenance at AEROTHAI during the said warranty period.

## 7.2 TRAINING

7.2.1 CONTRACTOR shall be responsible for all cost and activities to arrange the operation and maintenance training, specific for FIS under this TENDER, for flight inspection pilots and engineers provided by FIS OEM or other equivalently adequate instructor. Such training course shall be designed to enable the trainees to gain the knowledge and skill necessary to operate the proposed flight inspection aircraft and to operate FIS its full capabilities.

7.2.2 The course shall be arranged to cover both classroom and in-flight training that are specific to FI-AIRCRAFT FIS and in compliance with ICAO standards as applicable, as follows:

(1) Class room training course for maximum 8 trainees of FIS maintenance, troubleshooting, operation, and procedures training course at FIS OEM's facility, which covers (i) maintenance, troubleshooting, and calibration for FIS, auxiliary system, ground equipment, position reference system; (ii) operation, control, and capability of FIS and related equipment; and (iii) flight inspection procedures, for a classroom of FIS maintenance technician, FIS operator, ground and calibration personnel, and flight inspection pilots as applicable and appropriate, who are familiar with flight inspection process, for the total course duration of at least ten (10) working days but no longer than twenty (20) working days. FIS OEM shall make sure that adequate and necessary tools and equipments required for such maintenance and troubleshooting training/ demonstration are appropriately available during the training session. The travelling and accommodation cost are under responsibility by AEROTHAI.

(2) In-flight FIS operation and procedures training in Thailand, for the duration of at least forty (40) hours. CONTRACTOR shall be responsible for all cost and activities to arrange In-flight training as mentioned above, including aircraft fuel.

7.2.3 In attending the training session and/or witnessing FIS production/ installation process at FIS OEM facility, AEROTHAI shall be responsible to its own personnel expenses (travel, accommodation, living expenses, per diem, etc., if any), while CONTRACTOR shall be responsibility for all other costs and expenses.

## 7.3 SPARE PARTS

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## 7.4 DOCUMENTATIONS

7.4.1 CONTRACTOR shall provide following documents and publications as part of delivery:

(1) Aircraft Documents: Certain aircraft documents that may be involved with CONTRACTOR's performance of FIS installation and aircraft modification, including revision and/or recertification as necessary. Following new aircraft related documents or revision / attachment to an existing documents, in any and as applicable, shall be provided:

(a) Revised Component Part List as a result of aircraft modification,
(b) FAA/EASA approved Airplane Flight Manual Supplement as a result of aircraft modification,
(c) Updated Summary of Compliance on Airworthiness Directives and Service Bulletins as a result of aircraft modification,
(d) Revised Weight & Balance Report as a result of FIS installation and aircraft modification,
(e) Revised Electrical Load Analysis as a result of FIS installation and aircraft modification,
(f) Revised Electromagnetic Interference (EMI) Calibration as a result of FIS installation and aircraft modification,
(g) Revised Aircraft Component List as a result of aircraft modification,
(h) Electronic Publication System (REPS) CD or other format/media which is proven to serve the same contents, purpose and use as the REPS CD, including the following manuals for new / additional system and equipment which are available and applicable as a result of aircraft modification: component maintenance manual, wiring diagram manual, maintenance manual, parts manual, circuit board manual, and structural inspection and repair manual, and
(i) One (1) set of hardcopy of maintenance manual, wiring diagram manual, avionics wiring diagram manual, diagnostic avionics manual (avionics trouble shooting manual) for new / additional system and equipment which are available and applicable as a result of aircraft modification.

(2) FIS Documents:

(a) One (1) set of hardcopy and one (1) set of CDROM for each of Overhaul Manual, and Maintenance/ Operation Manual for all FIS equipments.

(b) One (1) set of hardcopy and one (1) set of CDROM for each of Operator's Manual, including the complete operating procedures, control and display functions, of FIS.

(c) One (1) set of hardcopy and one (1) set of CDROM for each of Hardware Maintenance and Installation Manual, showing the system hardware breakdown, failure diagnosis and rectification, maintenance procedures, etc. These manuals shall include:

(i) System description, including hardware,
(ii) Operational instructions,
(iii) Hardware block diagrams,
(iv) Wiring diagrams,
(v) Calibrations and maintenance procedures,
(vi) Parts lists,
(vii) Preflight and post-flight check lists, and
(viii) Installation drawings and identified location for each parts.

(d) One (1) set of hardcopy and one (1) set of CDROM for each of Overhaul Manual, Maintenance/Operation Manual for all equipment.

(e) One (1) set of hardcopy and one (1) set of CD-ROM for each of written procedure and interface description of fabricate cabling, test panels, etc., for Ground Calibration Laboratory facilities.

(f) One (1) set of hardcopy and one (1) set of CD-ROM for FIS installation and removal manual.

(3) Data Package: Certified and approved DATA PACKAGE for installing FIS on AIRCRAFT and all related modification, which consists of the original STC and related information as per below example, but taking the consideration and requirement of approving authority for such aircraft modification and final airworthiness certification as priority:

(a) Compliance Summary with Compliance Record,
(b) Drawings,
(c) Wiring Diagram,
(d) Structural Stress Analysis,
(e) Electrical Load Analysis,

(f) Interface Test Report,
(g) Electromagnetic Interference Test Report,
(h) Radio Frequency Interference Test Report,
(i) Weight & Balance Report, and
(j) Proof of EASA/FAA certification on the DATA PACKAGE.

(4) Commercial Invoice for FIS and all work carried out under this TENDER
(5) Other related documents and information as applicable

**7.5 COSTS AND PAYMENTS**

7.5.1 The provision of FIS and all work carried out under this TECHSPECS shall be by a turnkey method, whereby the total sum of payment to be paid by AEROTHAI for the delivery of FIS and all work carried out by CONTRACTOR which includes taxes and customs payable in Thailand, but excluding any costs and expenses incurred from AEROTHAI personnel.

7.5.2 Prior to contract signing, CONTRACTOR shall submit ten percent (10%) performance security in the form and content approved by AEROTHAI, which shall be effective throughout the delivery process and the two (2) year contract warranty.

7.5.3 Terms of payments for the total sum of provision of FIS and all work carried out under this TECHSPECS is as follows:

(1) Payment Term 1: Fifteen percent (15%) of contract price, payable upon contract signing.
(2) Payment Term 2: Seventeen percent (17%) of contract price, payable upon completion of FIS production and successful FAT.
(3) Payment Term 3: Thirty Four percent (34%) of contract price, payable upon completion of FIS installation onto AIRCRAFT including any necessary aircraft modification, and completion of all related airworthiness approval on aircraft, FIS, and its installation by DCA Thailand.
(4) Payment Term 4: Thirty-four percent (34%) of contract price, payable upon completion of AEROTHAI approved final acceptance and AEROTHAI signing of Final Acceptance Certificate (or other similar purposed certificate as stated elsewhere), which including all demonstration, testing, provision of documents, and all requirements stated in the TECHSPECS Item 6.2.5 above.

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# TECHNICAL SPECIFICATIONS
# FOR
# A SUPPLY AND INSTALLATION OF ONE FLIGHT INSPECTION SYSTEM

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## ANNEX A : FIS SPECIFICATIONS

## PART 1. GENERAL

### 1.1 SCOPE

1.1.1 This annex states the detailed requirements for the fully automatic Flight Inspection System to be used on the flight inspection AIRCRAFT. The“FIS” within this annex shall be including console, airborne navigational receivers, communication (airborne / ground) equipment, radio telemetry system (airborne / ground), auxiliary system, and position reference system.

1.1.2 This annex forms a part of the Technical Specifications (TECHSPECS) or Section F of the Tender Document for A SUPPLY AND INSTALLATION OF ONE FLIGHT INSPECTION SYSTEM.

1.1.3 All requirements below shall be complied with at no extra cost to AEROTHAI, except for future upgrade provision or specifically stated elsewhere.

### 1.2 STANDARDS

1.2.1 FIS shall comply with ICAO standards as described in ICAO Annex 10 and Annex 14 and other related ICAO Document (Doc), such as Doc 8071 Volume 1, 2, 3, and Doc 9613, as applicable. [FE]

1.2.2 FIS shall also comply with FAA standards as described in US FAA Order 8200.1. [FE]

1.2.3 FIS shall be configurable for units and tolerances including calculation method in accordance with ICAO and FAA standards. [FE]

1.2.4 All equipment, receivers, transceivers, sensors, or other related system shall comply with the requirements and standards (for example, FAA TSO (Technical Standard Order), FAA AC (Advisory Circular), RTCA (Radio Technical Commission for Aeronautics), etc.) as applicable and required for its specific use described in the TECHSPECS. [FE]

1.2.5 FIS manufacturer shall be registered with ICAO as FIS manufacturer. [FE]

## 1.3 CERTIFICATION

1.3.1 FIS including all its parts to be installed on the AIRCRAFT shall be designed, manufactured, inspected, installed, and certified in accordance with the standards of the responsible airworthiness authority approved manufacturer's design, production, maintenance, certification organization and responsible airworthiness authority, as applicable. [FE]

1.3.2 FIS installation including its related necessary AIRCRAFT modification shall be carried out through an STC process, approved by EASA/FAA/DCA Thailand, as applicable. [FE]

1.3.3 Related standards and approval shall be stated through a FAA 8130-3 or EASA Form 1 or other equivalent document released by the manufacturer. [FE]

# PART 2. FLIGHT INSPECTION FUNCTIONS

## 2.1 CAPABILITY

2.1.1 FIS shall have the following flight inspection and validation capability as minimum: [FE]

- Instrument Landing System (ILS) CAT I, II and III
- ILS Associated Approach Markers (MKR)
- VHF Omni-directional Range (VOR)
- Distance Measuring Equipment (DME)
- Co-located ILS/DME (ILS/DME)
- Co-located VOR/DME (VOR/DME)
- Non-Directional Beacon, Locator (NDB)
- Radar
- Primary Surveillance Radar (PSR)
- Secondary Surveillance Radar (SSR) with Mode A/C/S capability
- Precision Approach Radar (PAR)
- Instrument Flight Procedures (SID/STAR)
- GPS Non Precision Approach (GPS NPA)
- Visual Approach Aids
    - Precision Approach Path Indicator (PAPI)
    - Visual Approach Slope Indicator (VASI)
- VHF Communications (VHF COMM)
- VHF Direction Finder (VHF/DF)

- Performance Base Navigation Validation (PBN)
  - PBN SID/STAR
  - RNP APCH
  - RNP APCH with BARO-VNAV (APV BARO)
  - RNP APCH with SBAS (APV SBAS), with SBAS system appropriate for use in Thailand and within Asia/Pacific region as minimum as available but extendable/ configurable for other SBAS system such as WAAS, EGNOS, etc.
  - RNP AR APCH
- Automatic Dependent Surveillance-Broadcast (ADS-B)
- Ground Based Augmentation (GBAS)
- Other support function and capabilities, such as in-flight calibration of flight inspection receivers, Radio Frequency Interference (EMI) detection via integrated Advanced Spectrum Analysis functions, and Oscilloscope measurements

## 2.2 PROCEDURES

2.2.1 FIS shall have capability adequate and sufficient for all procedures as per ICAO standards. [FE]

2.2.2 Flight inspection system functions shall be divided into five (5) major categories: [FE]

- Commissioning
- Periodic Inspection
- Site Evaluation
- Special
- Surveillance/Monitoring

2.2.3 FIS operation and procedures shall be designed to handle any of the five (5) categories above with specific tests and ground adjustments being covered by appropriate annotation on the system display unit. [FE]

2.2.4 Inspection and calibration capabilities shall conform, as applicable to the following en-route and terminal air traffic control and landing facilities. [FE]

2.2.5 FIS shall support the following flight procedures as applicable, unless an alternative proposed procedures are shown to be more efficient and be compliant with related standards: [FE]

- LLZ: Approach, Offset Approach (left, right) at ±75 μA and ±150 μA,

Partial Orbit

- GP: Approach, Level Run, Offset Approach (above, below) at ±75 μA
- MKR: Approach
- PAR: Approach, Partial Orbit
- RNAV/RNP Instrument Flight Procedures, including PBN and SBAS: Any flight procedure
- SSR, ADS-B: Any flight procedure
- VGSI (VASI/PAPI): Approach, Step Down (Multiple Path Transition), Level Run, Partial Orbit
- VOR, DME, NDB, VHF: Orbit CW, CCW, Radial In-, Out-, Dual Radial
- GBAS: Approach, Partial Orbit and any required procedure stated in ICAO and FAA documents

2.2.6 FIS shall be capable of performing the multi inspection tasks simultaneously, such as localizer alignment/ structure and glide slope angle/ structure inspection with DME and Marker during one (1) approach, en-route radial inspection for two (2) VOR facilities at same time. [FE]

## PART 3. FLIGHT INSPECTION EQUIPMENT

### 3.1 AVIONICS AND SYSTEM

3.1.1 VOR/ILS Receiver: Dual modern digital VOR/ILS Receivers of Air Transport category shall be TSO issued by FAA or ETSO with required flight inspection parameters such as bearing accuracies, signal strength and all needed modulation level, shall be dedicated to the flight inspection computer. issued by EASA certification. They both shall share the same localizer and glide slope antenna. These receivers shall be tuned automatically by the FI Computer. [FE][CB]

3.1.2 DME Interrogator: Dual modern DME Interrogator shall be designed as at least three (3) channel scanning DME, such as DME-442 or part of multimode receivers or comparable or better, shall be automatically tuned via the ARINC 429 digital bus by the FI Computer. All DME data shall also be outputted on the ARINC 429 bus to the FI Computer. [FE][CB]

3.1.3 Marker Beacon Receiver: Dual Marker Beacon Receiver, such as RA-NAV D1500 or part of multimode receivers or comparable or better, shall receive and demodulate RF signals transmitted from Marker Beacons on the ground. The Marker Beacon Receiver shall supply AGC and Marker light signals to the system. Marker receiver sensitivity and self test shall be controlled at the operator's console. [FE][CB]

3.1.4 Marker Beacon Indicator: There shall be Marker indicator lamps, whether displayed separately by its individual unit installed in the operator's console or displayed on VDU, to indicate passage over the outer, middle, or inner Marker. [FE][CB]

3.1.5 ADF Receiver: Single ADF Receiver, such as ADF-462 or comparable or better, shall supply magnetic bearing to the RMI and to the FI Computer and shall also supply an AGC signal to FI Computer for determination of ground station signal strength. [FE][CB]

3.1.6 VHF Communication Transceiver: Single VHF Communications Transceiver, such as VHF-422 or comparable or better, shall be dedicated to FIS. Receiver AGC and audio output shall be transmitted to the FI Computer. [FE][CB]

3.1.7 GBAS Receiver: It shall be Rockwell Collins GNLU 930 or comparable or better.It shall be able to serve for GBAS flight inspection as per ICAO Doc 8071 Vol II requirement which including VDB signal strength and/or parameter for coverage inspection on both horizontal and vertical polarization transmitted from VDB ground station, (VHF data link) and shall be able to provide the navigation signal/message and guidance information to display on FI-AIRCRAFT's flight display. If GBAS receiver is not available in FI-AIRCRAFT's standard avionic. The GBAS Receiver installed in FIS shall be able to interface and submit the relevant information to FI-AIRCRAFT's flight director or auto-pilot system to maneuver FI-AIRCRAFT which is suitable for performing GBAS flight inspection procedure.

3.1.8 GPS Sensor:

(1) The GPS receiver with GPS antenna shall be installed for use as position reference system. It shall have its own antenna and neither is shared with those of the standard avionics. It shall be used to compute AIRCRAFT range, bearing and distance to a facility used for the computation of flight inspection results and for displaying on the flight inspection real time screens. It will be the model which has 24 channels, dual frequency with DGPS and RTK capability. It shall be compatible with the SBAS system. [FE][CB]

(2) The Installation of interfacing between Flight Inspection System and both GPS4000S#1 and GPS4000#2 which are part of AIRCRAFT' s standard avionic system shall be implemented to share the particular information which are required for GNSS/PBN and ADS-B flight inspection /validation. [FE][CB]

3.1.9 DGPS/DRTT Receiver: Dual on-board telemetries modules with difference receiving frequency configuration in UHF band shall be installed in FIS, the first telemetry module shall be used for receiving RF signal/data from DGPS/RTK ground reference and the second telemetry module shall be used for receiving the RF signal/data from Theodolite. Both shall

be able to operate at same period without interfering to each other. The decoded output data from both onboard telemetries shall be able to observe availability of telemetries signal either visual or audio indication.
To optimize flight inspection procedure by comparing the flight inspection result using both ground reference (DGPS/RTK and Theodolite) the flight inspection software, especially ILS/DME and PAPI procedure, shall be designed to provide both flight inspection result using both DGPS/RTK and Theodolite as ground reference in one single flight. [FE][CB]

3.1.10 Flight Inspection result transmitter: The down Link telemetry module shall be able to real time transmit for at least selectable five parameters of ILS/DME and VOR/DME flight inspection to display and record on computer located on ground. The transmitting frequency of down Link telemetry can be shared with either the DGPS data link or Theodolite telemetry frequency or any other frequency which shall not interferes to any other telecommunication device.

3.1.11 Console Flight Instruments: The console shall consist of CP Meter, RMI, CDI, whether displayed separately by its individual unit or displayed on VDU, which shall provide heading, bearing and course deviation information as minimum. It shall be possible for the operator to select the source of displayed information from VOR, LOC, Glide slope, ADF and RNAV. [FE][CB]

3.1.12 Flight Deck Switches and Indicators: Flight deck switches and indicators shall interconnect to the AIRCRAFT systems as described in the following paragraphs: [FE][CB]

(1) Pilot/Copilot Event: The pilot/copilot event switch shall be provided. This switch shall be normally open, momentary push-button configuration.
(2) CDI Annunciators: One (1) set of illuminated annunciators shall be provided on the cockpit instrument panel. The annunciators shall provide status as follows: either Localizer or Glide Slope offset is selected.
(3) Course Deviation Indicator (CDI): A CDI shall be provided either in form of physical CDI installed in the cockpit instrument panel or a course indication integrated in AIRCRAFT's standard flight display. The CDI shall interface with the FI computer and shall display course deviation information specific to each flight inspection profile. The CDI shall be used during the flight inspection mission only, and shall be dedicated to FIS operation.

3.1.13 ILS Offset Control/Annunciators: ILS offset control shall be selected by the flight inspection software or Pilot/Copilot using switch panel in cockpit. . ILS offset control shall provide the pilot with steering information that allows flying centered needle (on the cockpit located FIS CDI) while maintaining a specified distance offset from localizer or glide

slope center line. There shall be annunciator installed in the cockpit to alert the pilot whether localizer or glide slope offset has been selected: localizer (left or right 75 μA, 150 μA); glide slope (above or below 75 μA). In case of ILS offset switch located in the cockpit there shall be annunciator on the VDU to alert the Operator whether localizer or glide slope offset has been selected. [FE][CB]

3.1.14 Event Pushbuttons: There shall be event pushbuttons to allow the pilot, copilot, and flight inspection panel operator to signal the occurrence of events to the Graphic Recorder as required. [FE][CB]

3.1.15 Audio Control Panel (ACP): The ACP shall provide receiver audio and switching control for communication and navigation audio signals. Provisions shall be made for pilot, copilot, and flight inspection panel operator intercommunication, audio filter and speaker/headphone volume control, selection of COMM, INT and HOT MIC Function. The deliverable audio system shall include one (1) each of headset-microphone, handheld microphone with PTT switch. The selected audio shall be able to record into electronic media and later playback by FI computer or offline computer. [FE][CB]

3.1.16 Flight Inspection System Antennas: As far as possible, a separate antenna package shall be installed for FIS in order to preclude the possibility of any effects on the AIRCRAFT navigation systems caused by operation of FIS. FIS antennas shall be high standard type and be placed in the optimum reception location on the AIRCRAFT. Each antenna cable shall feed through an Antenna Switching System, which will permit test equipment to be connected for calibration and maintenance purposes. The antenna gain, pattern and RF attenuation within the RF path system shall be taken to FIS software for high accuracy of RF field strength measurement. Broadband antenna shall be available for particular and wider selection of RF frequency range (HF through VHF and UHF band for spectrum analyzer) through the antenna switching. The GPS antenna and associated equipment shall be installed at lower part of AIRCRAFT fuselage for purpose of detecting the radio frequency propagated from ground which can be interfered GPS radio frequency.[FE][CB]

3.1.17 Shared AIRCRAFT Avionics: FIS shall be interface with the AIRCRAFT Radio Altimeter, FMS, ATC Transponder, Magnetic Heading, Air Data Computer, audio/intercom systems and other AIRCRAFT systems, as required. [FE][CB]

3.1.18 The additional flight inspection display in cockpit panel: The list of flight inspection procedure shall be displayed in flight inspection display which installed in cockpit panel. The calculated flight inspection profile shall be displayed and inputted to fight director or autopilot system to maneuver AIRCRAFT by autopilot mode. The flight inspection display

itself and installation with associated data package shall be part of supplement type certificate (STC) of flight inspection system which is issued by EASA or FAA.

3.1.19 On-board Test Equipment: The following equipment shall be provided in FIS [FE][CB]

(1) Oscilloscope: Single Digital Storage Oscilloscope, two (2) Channel with frequency not less than 100 MHz bandwidth, shall be provided for examination of selected flight inspection signal also the wave form of DGPS/RTK and DRTT data received from onboard telemetries. The Oscilloscope device shall be the model which can be operated even without interfacing to peripheral equipment like external display and/or keyboard. It shall has own display and command key/knob located on its front panel and shall be mobility form factor that can move to use in the laboratory using alternate current (Vac) electrical power source. [FE][CB]

(2) Spectrum Analyzer: Single Spectrum Analyzer, standard frequency range of 9 KHz to 6.0 GHz or better, shall be provide with RF demodulation capability to allow user to demodulate signals over the full frequency range of the spectrum analyzer and identify signal disturbances from radio stations or signal reflections. The spectrum analyzer device shall be the model which can be operated even without interfacing to peripheral equipment like external display and/or keyboard. It shall has own display and command key/knob located on its front panel and shall be mobility form factor that can move to use in the laboratory using alternate current (Vac) electrical power source. [FE][CB]

(3) Signal Generator (s) : Single Modern Signal Generator shall be provided for calibration of—FIS VOR/ILS, Marker, ADF, GBAS VDB and Comm. Flight inspection receivers.The signal generator shall be computer-controlled to allow automatic and manual calibration checks for VOR/ILS, Marker and Comm to be performed on board the AIRCRAFT for ADF to be performed while AIRCRAFT parking on ground. [FE][CB]

3.1.20 Navigation Sensors Calibration: All equipment requiring routine calibration, such as VOR/ILS receivers, DME transponders, Marker Receivers, Signal Generator etc., including standard AIRCRAFT avionics which may also be used for flight inspection such as SSR transponder(s) and ADF receivers, etc., shall be calibrated and certificated prior to delivery. The full calibration reports (containing particular calibration data as recommended by FIS manufacturer) of all equipment as list below, as minimum, shall be delivered at the time of the FIS delivery. [FE][CB]

(1) VOR/ILS Receivers

(2) DME Interrogators
(3) Marker Receivers
(4) ADF Receiver
(5) VHF Transceiver
(6) SSR Transponder
(7) GBAS Receiver (VHF Data link)
(8) NAV-Com Signal Generator
(9) Transponder/DME Test Set

3.1.21 ILS Parameters Requirements:

(1) FIS capability for ILS shall cover (receive, process, display, and record in real-time) the following ILS parameters and units as minimum: [CB]

- Localizer Course Sector Width, in Degree (Note: Localizer course sector width shall be measured by any 2 selectable flight profiles: (i) arc crosses profile through localizer front course; and (ii) approach profile on the edges 150 μA left and right of localizer course (Off set Approach).
- Average Localizer Modulation Level, in %
- Minimum Clearance Within Sector 2 (150 Hz), in μA/Degree
- Minimum Clearance Within Sector 1 (150 Hz), in μA/Degree
- Minimum Clearance Within Sector 1 (90 Hz), in μA/Degree
- Minimum Clearance Within Sector 2 (90 Hz), in μA/Degree
- Course Structure – Z1, in μA@NM
- Course Structure – Z2, in μA@NM
- Course Structure – Z3, in μA@NM
- Course Structure – Z4, in μA@NM
- Course Structure – Z5, in μA@NM
- Vertical Polarization Effect, in μA@NM
- Symmetry, in % (Note: Percent of symmetry of the 90 Hz Side.)
- Localizer Course Alignment Accuracy, in μA
- RF Field Strength, in μV, dBm, μV/Meter (Note: RF Field Strength unit shall be selectable.)
- Course Alignment Shift to 150 Hz for Monitor Reference Setting, in μA
- Course Alignment Shift to 90 Hz for Monitor Reference Setting, in μA
- Average Glide Slope Modulation Level, in %

- Glide Path Angle, in Degree (Note: Measured by approach flight profile.)
- Glide Path Sector Width, in Degree (Note: Glide path sector width shall be measured by any 2 selectable flight profile: (i) level run profile; and (ii) Approach profile on the edges 75 μA above and below glide path (Off set Approach).)
- Upper Half Sector Width (90 Hz), in Degree
- Lower Half Sector Width (150 Hz), in Degree
- Clearance Below Path at 0.3 θ° Elevation, in μA
- Clearance Below Path at 0.45 θ° Elevation, in μA
- Clearance Above Path at 1.75 θ° Elevation, in μA
- Structure Below Path, in Degree (Note: Elevation angle at -190 μA interception point.)
- Glide Path Angle, in Degree (Note: Measured by level run flight profile.)
- Path Structure – Z1, in μA@NM
- Path Structure – Z2, in μA@NM
- Path Structure – Z3, in μA@NM
- Symmetry, in % (Note: Percent of symmetry of the 90 Hz Side.)
- RF Field Strength, in μV, dBm, μV/Meter (Note: RF Field Strength unit shall be selectable.)
- DME Accuracy, in NM
- DME RF Field Strength, in μV, dBm, μV/Meter (Note: RF Field Strength unit shall be selectable.)
- Actual Reference Datum Height, in Feet
- Outer Marker Beacon Width, in Meter
- Middle Marker Beacon Width, in Meter
- Inner Marker Beacon Width, in Meter

3.1.22 <u>VOR Parameters Requirements:</u>

(1) FIS capability for VOR shall cover (receive, process, display, and record in real-time) the following VOR parameters and units as minimum: [CB]

- Average 30 Hz AM, in % (Note: Both radial in/out bound and orbit flight profile shall be presented.)
- Average 9960 Hz AM, in % (Note: Both radial in/out bound and orbit flight profile shall be presented.)

- Average 9960 Deviation Ratio (Note: Both radial in/out bound and orbit flight profile shall be presented.)
- Roughness/Scalloping, in Degree @ NM
- Bends, in Degree @ NM
- Vertical Polarization Effect, in Degree @ NM
- Radial Alignment Error, in Degree
- RF Field Strength, in μV, dBm, μV/Meter (Note: RF Field Strength unit shall be selectable.)
- Flight Level (MSL) Altitude: Starting Point and Termination Point,in Feet
- Distance: Starting Point and Termination Point, in NM
- Orbit Alignment Error, in Degree
- Orbit Direction
- Orbit Alignment Error Spread, in Degree
- Orbit Maximum Radial Error for 10 Degree Segment, in Degree
- Orbit Mean Radial Error for 10 Degree Segment, in Degree
- DME Accuracy, in NM
- DME RF Field Strength, in μV, dBm, μV/Meter

(Note: RF Field Strength unit shall be selectable.)

3.1.23 PBN Requirements:

(1) Procedure database shall be created on an offline computer with appropriate software/ program and be loaded onto FIS using USB interface. [FE]

(2) FIS shall provide automation support for waypoint and segment validation such that it at most requires operator's one (1) -click confirmation of specific procedure details (such as waypoint name) at each passing waypoint or segment. [FE]

(3) PBN procedure validation result shall be reported for overall summary and for each its individual segments or profiles, with each segmental maxima, minima and averages, as applicable. [FE]

(4) FIS capability for PBN (including RNP AR) shall cover (receive, process, display, and record) the following GNSS parameters as minimum: [CB]

- Cross track distance / XTKER / ATKER / WPDE,
- Active way-point,
- Distance to active way-point / Bearing to active way-point,
- No. of satellites visible / No. of satellites tracked,
- Minimum carrier-to-noise density ratio for each satellite being visible during each leg,

- HDOP / VDOP,
- HFOM / HIL,
- RAIM alarm / RAIM warning flag,
- Date and time (UTC or GPS),
- GNSS position,
- Positioning system position data / Positioning system time/ Positioning system status,
- Receiver interference flag (if available from receivers),
- Spectrum analyzer measurements (display and printout only), and
- VOR/DME signal level.

3.1.24 SBAS Requirements:

(1) FIS shall include appropriately adequate equipment for the required use of SBAS validation. Such SBAS receiver shall be TSO 145/146 and is configurable to different SBAS satellites appropriate for use in Thailand and within Asia/Pacific region as minimum, and further extendable/ configurable for other SBAS system such as WAAS, EGNOS, etc. [FE]

(2) FIS shall be able to select and record specific received SBAS satellite messages, and record SBAS results, including timestamp, SBAS 3-D navigation solution, and HPL and VPL. [FE]

(3) FIS shall be able to make SBAS assessment against different APV HPA and VPA criteria, including “Stanford Plots” availability assessment, System performance continuity assessment, and Calculation of HPE and VPE using truth trajectory data for position error computation. [FE]

(4) FIS capability for performing SBAS inspection and associated instrument flight procedure shall be cover allrequirementwhich stated in DOC 8071 Volume 1 and FAA Order 8200.1C.[FE]

(5) FIS capability for SBAS shall cover (receive, process, display, and record) the following SBAS parameters as minimum: [CB]

- UTC time and date,
- Maximum & minimum number of SV,
- Position Dilution of Precision (PDOP) Average,
- Maximum Observed Horizontal Dilution of Precision (HDOP),
- Position,
- Altitude,
- Actual and calculated Vertical Protection Level (VPL) and Horizontal Protection Level (HPL),
- Maximum Observed Vertical Dilution of Precision (VDOP),

- FAS – CRC,
- FAS - GP Angle,
- FAS – TCH,
- FAS – Course Alignment,
- FAS – Data Link (Coverage),
- GND Speed,
- Max/min Alt,
- Flight Path plotted with FMS & GNLU data,
- It shall also allow the setting of Horizontal Alert Level (HAL) and Vertical Alert Level (VAL), and also log time and location where Horizontal/Vertical Alert Level is less than Horizontal/Vertical Protection Level,
- PRN of SBAS, and
- SBAS Channel.

3.1.25 GBAS Requirements:

(1) FIS shall include appropriately adequate equipment for the required use of GBAS validation. Such GBAS receiver shall be complied with required TSO standard. [FE]

(2) FIS shall be able to select and record specific received GBAS data link coverage, GBAS navigation massage, and record GBAS results, including timestamp, GBAS 3-D navigation solution, and HPL and VPL. [FE]

(3) FIS capability for performing GBAS inspection and associated instrument flight procedure shall be cover all requirements which stated in DOC 8071 Volume 1 and FAA Order 8200.1C.[FE]

(4) The following parameters shall be receive, process, display, and record as minimum: [CB]

- UTC time and date,
- Maximum & minimum number of SV,
- Position Dilution of Precision (PDOP) Average,
- Maximum Observed Horizontal Dilution of Precision (HDOP),
- Position,
- Altitude,
- Actual and calculated Vertical Protection Level (VPL) and Horizontal Protection Level (HPL),
- Maximum Observed Vertical Dilution of Precision (VDOP),
- DATA Content
  - **Type 1 Massage**

- Type 2 Massage (GBAS Related Data)
- Type 4 Massage (FAS Data)

- DATA Link Coverage,
- GND Speed,
- Max/min Alt,
- Flight Path plotted with FMS & GNLU data,
- It shall also allow the setting of Horizontal Alert Level (HAL) and Vertical Alert Level (VAL), and also log time and location where Horizontal/Vertical Alert Level is less than Horizontal/Vertical Protection Level,
- PRN of GBAS, and
- GBAS Channel.

3.1.26 ADS-B Requirements:

(1) FIS shall be able to acquire differential truth trajectory system (differential GPS) and compare and record the current AIRCRAFT position between information provided by AIRCRAFT ADS-B signal transmitted by Extended Squitter (1090ES) and such truth system . [FE]

(2) FIS capability for ADS-B shall be DO-260A compliance as applicable, and cover (process, display, and record) the following ADS-B parameters as minimum: [CB]

- Time,
- Altitude,
- Track Angle,
- Ground Speed,
- Position including integrity limits (horizontal and vertical) and its accuracy (FoM),
- Vertical Velocity,
- N/S and E/W Velocity,
- Estimated Position Uncertainty (EPU),
- Radio Height,
- True Track Angle,
- Selected Heading,
- Magnetic Heading,
- True Heading,
- Wind Speed,
- Wind Direction,
- Inertial Vertical Speed,
- Height Above the Ellipsoid,

- A/C Registry,
- GPS Status, and
- NIC/NAC/SIL values.

## 3.2 OPERATION FUNCTION

3.2.1 Keyboard and Trackball: The keyboard shall feature standard alpha-numeric keys and can be used for all operational functions as well as for typing alphanumeric information into the system. Trackball shall be located close to keyboard and comfortable to use under condition of normal operational AIRCRAFT. [FE][CB]

3.2.2 Visual Display Unit (VDU): VDU shall be a state-of-the-art high resolution, flat panel color display. The visual display size shall be clear and comfortable for flight inspection panel operator. It shall display avionics relative to the facility under inspection in real time both text and graphics simultaneously. It is preferable for the VDU with a capability for displaying in graphic format. VDU shall be capable of displaying real time inspection data in text and/or graphic representation. [FE][CB]

3.2.3 Flight Inspection (FI) Computer: FI Computer System shall comprise of at least two (2) separate processor units: (i) Realtime computer for providing all realtime interface to appropriate devices that are necessary flight inspection function; and (ii) Human-machine interface computer for operator control and interface to external peripheral devices. Such integrated system shall be packaged in a form suitable for mounting in FIS, with a USB or similar modern storage media access for facility data base upload to the computer system and also for duplicated flight inspection data to re-run at ground support computer. [FE][CB]

3.2.4 System Software:

(1) FIS software shall maintain and control all flight inspection and operator interface function. Furthermore, it shall derive and present the required flight inspection results data. [FE][CB]

(2) The system software shall be user-friendly and the procedures for flight inspection, analyzing and evaluating the flight inspection data shall be based on ICAO Document 8071 and also FAA Order 8200.1 U.S. Standard Flight Inspection Manual and have been optimized for use with FIS. [FE][CB]

(3) The FIS software design and operated efficiency shall agree with the flight inspection time optimizing concept. The FIS software and associated application which running on FI computer shall be reliable, stable operation and realtime reaction with controlling from user while the all application are running on the FI computer. [FE][CB]

(4) FIS software shall support 10 Hz sampling rate for data acquisition from the navigation sensors and position reference system. [FE][CB]

(5) The realtime flight inspection data shall be processed and simultaneous presented on the VDU for both alpha-numerical and graphical trace with zoom function to enable a detailed inspection of selected graphical trace area. Additional, the graphical trace area shall draw the tolerance limit line for suitable assessment of flight inspection result such as tolerance limit line for glide slope path structure in each zone etc. [FE][CB]

(6) The flight inspection data shall be recorded in Data Storage Unit (DSS) and available for rerun, re-print, display and analyze by offline computer, and is downloadable from FIS through USB interface. [FE][CB]

(7) It shall also handle such tasks as all receivers tuning receiver calibrations and receivers error correction. [FE][CB]

(8) The facility database shall be able to create or modify by FI computer onboard and multiple offline computer. The database creation or modification by different offline computers shall be able to merge into single file package then uploading to FI computer later. [FE][CB]

(9) The reprocessing (without repeating of flight) of flight inspection result function shall be available when the correction of GPS coordinates in facility database was made.

(10) The operator can select either ICAO or FAA or Local Inspection criteria for facilities under Inspections. [FE][CB]

(11) The software shall be capable of indicating whether the FI Computer, selected FIS dedicated avionics, and associated interfaces are operational at system start-up, and capable of operational verification (self test) for the avionics receivers/transceivers (e.g. NAV, MKR, ADF, DME, etc.) should be completely automatic in that the Pass/Fail status for the cited avionics equipment shall be indicated directly by the FI Computer without any operator evaluation or analysis. [FE][CB]

(12) It shall also permit monitoring of all input/output quantities that interface to the central FI Computer for more detailed analysis and troubleshooting, including support for FI VOR/ILS receiver calibration, facility data base management, and embedded training system. [FE][CB]

(13) The summary of flight inspection result shall be displayed continuously on the VDU while flight procedure is progressing then can be printed out when finished the flight. [FE][CB]

(14) At least five parameters of ILS/DME and VOR/DME flight inspection result in form of graphic and/or text shall be selectable and real time transmitting to ground receiver to display and record on computer. The computer shall be implemented with the appropriate software application to allow ground

maintenance personnel observing the flight inspection result transmitted from FIS onboard.

(15) The ILS/DME and PAPI flight inspection software shall be able to record the position fixing information concurrently transmitted from individual DGPS and DRTT ground transmitter and also shall process the flight inspection result using position fixing information from both DGPS and DRTT ground reference without repeat the run. [FE][CB]

3.2.5 Data Storage System (DSS): Data Storage System (DSS): DSS shall be latest model which has the capacity in total to store the flight inspection mission data not lesser than 300 hours and consist of a high performance flash drive or an equivalent solid state unit, with no constant moving part, for continues operation under all normal conditions for the AIRCRAFT (e.g. shock, vibration, pressure, temperature, etc.). The DSS shall have a capacity enough for storing and retrieving all flight inspection and mission data, loading operational program software and data base information. [FE][CB]

3.2.6 Graphic Recorder: Onboard Graphic Recorder shall be in a form of color printer for recording inspection parameters, oscillographic recorder, a hard copy reproduction of the text pages of the VDU screen, Oscilloscope screen, Spectrum Analyzer screen. [FE][CB]

3.2.7 Moving Map: For improved operator situation awareness, FIS function shall include commercially available moving map software, such as a Jeppesen JeppView Moving map, capable of showing approach plates. [FE][CB]

3.2.8 Recording and Reporting Function:

(1) All necessary flight inspection parameters, recordings and summarized results shall be available for reporting and investigating purpose in accordance with ICAO and FAA standards. [FE][CB]

(2) Where applicable, in particular for PBN procedure validation, flight inspection result shall be reported for overall summary and for each its individual segments or profiles, with each segmental maxima, minima and averages, as applicable. [FE][CB]

## 3.3 TECHNOLOGY AND DESIGN

3.3.1 Design

(1) FIS shall be designed to make use of the latest technology and to possess the capacity for upgrading to take advantage of new developments. [FE]

(2) Computerized and digital method of data acquisition, signal analysis, control and presentation shall be incorporated. All relevant signal parameters shall be interfaced directly to FIS computing system. FIS shall be a modern, computerized system designed for the acquisition, recording, processing, analysis, display, and reporting of flight inspection data. [FE]

(3) FIS shall be modular design, such that each component operates, as far as possible, independently to the others and can be moved at ease. [FE]

(4) Essential processing units of FIS shall be Line Replaceable Units (LRU), such that a fault in one component can be easily rectified by quick removing and testing that unit without affecting the operational capabilities of the remaining units. [FE]

(5) FIS and all other systems shall be of modern design, material, and production method such that it is considered strong but lightweight and contributes little increase to the total AIRCRAFT weight, and thus is possible for a mission with at least nine (9) personnel (included are pilots, flight inspection operators, engineers, and/or observers) and necessary ground equipment (such as positioning system) onboard of flight inspection AIRCRAFT. [FE]

(6) FIS and all other systems shall be considered fully solid state such that no continuously moving mechanical parts are used in the equipment, exception for internal mechanism which may be necessary for its functions. [FE]

(7) FIS computer, equipment, software and its language, operating system, and all its interfaces and connections shall comply with relevant industrial standards for professional aviation equipment and avionics. [FE]

(8) FIS total console/equipment shall take up space equivalent to two (2) standard passenger seats as maximum. [FE]

(9) FIS main operator console shall be located such that operator is facing forward towards direction of AIRCRAFT flight. [FE]

(10) FIS and other equipments shall be securely installed in the cabin of AIRCRAFT, and fastened on the AIRCRAFT seat rail. [FE]

(11) FIS and other equipments shall be located and positioned such that pose no obstacle to the crew movement inside the AIRCRAFT and between cockpit and AIRCRAFT entrance. [FE]

(12) Most interface and connection between FIS and its parts and with AIRCRAFT system shall be kept within airframe structure and only with some remaining connection tidily kept without obstacle to crew movement and operation inside the AIRCRAFT or being exposed to damage by external objects or the crew itself. [FE]

(13) FIS and other equipments can be of easy removal and installation such that the time taken from start of FIS removal to passenger seats reinstallation

back to transport configuration is within two (2) hours, and vice-versa for time taken from start of passenger seats removal to FIS reinstallation. [FE]

(14) After interchanging between flight inspection configuration to transport configuration, all connection and interface that has to remain intact with AIRCRAFT shall be kept tidily. [FE]

(15) Upon reinstallation of FIS and other equipment back to the AIRCRAFT, FIS and the flight inspection AIRCRAFT shall be fully operational and ready for use with at most a quick parameter setting but without major calibration requirement. [FE]

3.3.2 Service Life & Serviceability

(1) Equipment shall have service life at expected period for at least ten (10) years from delivery. [FE]

(2) Equipment shall be with the stability of the system and its components such that it does not require regular readjustments within the expected operative life, except flight inspection receivers which have to be calibrated/ adjusted regularly to flight inspection tolerances. [FE]

3.3.3 Power

(1) FIS shall operate at power requirements and rates from power supply normally and safely provided by or convertible from AIRCRAFT power. [FE]

(2) FIS power supply shall be under control of pilot, distributed through adequately protected by circuit breakers, and can be automatically disconnected from AIRCRAFT main power supply in any emergency events experienced by the AIRCRAFT. [FE]

(3) Other ground or laboratory equipments shall operate at power supply provided by normal AIRCRAFT hangar facility. [FE]

(4) If an inverter is required for FIS power supply, such FIS inverter shall be a separate inverter from that used for AIRCRAFT power supply. [FE]

3.3.4 Ambient and Environment

(1) FIS and all its equipment, including electrical and electronic components and ground or laboratory equipments, during operation or non-operation mode, shall follow standard industrial practices with adequate preventive control and be suitable and fully protected against all ambient conditions, including operating temperature, storage temperature, humidity, static charges, salty atmosphere, attitude, entry of dust or water, etc., that may be experienced

during AEROTHAI normal, proper, continuous flight inspection operation in Thailand and neighboring counties nearby. [FE]

## 3.4 UPGRADE

3.4.1 Minor Software Modifications

(1) Minor and custom modifications of FIS philosophies and software and program from manufacturer standard design found necessary during the delivery of FI-AIRCRAFT in order to meet the specific local operational requirements of AEROTHAI, in particular the way of presentation of flight inspection result during flight and post flight reporting, shall be carried out as per AEROTHAI requests base on local operational requirements but limited to requirements stated in applicable ICAO and FAA standards stated herein. [FE]

(2) Any software upgrade and development, if available by the respective manufacturer during the warranty period, shall be provided to AEROTHAI unless it is proven only possible with additional hardware/ equipment upgrade or changes from the status at final acceptance. [FE]

3.4.2 Future Upgrade Provision

(1) FIS and any associated module/ part shall have upgrade provision for its particular hardware and equipment to increase capability for CPDLC and TACAN flight inspection in the future without conflicts or limitations from current FIS technology and design, and also without technical difficulty, long downtime, nor major modification cost. [FE]

# PART 4. SUPPORT SYSTEM

## 4.1 POSITIONING REFERENCE SYSTEM

4.1.1 To achieve the required FIS accuracy established by ICAO and FAA, a ground based position reference system will be used to determine the AIRCRAFT position during flight inspection runs. The ground reference system shall be a Digital Radio Telemetering Theodolite System (DRTT) in semiautomatic mode and a GPS/DGPS/RTK in automatic mode, at least ILS, VOR/DME, PAPI and VASI facilities. [FE][CB]

4.1.2 These systems will be used for ILS calibration and shall consist of the following components.

(1) One (1) set of the Telemetering Theodolite shall use a bent-axis telescope having a minimum twenty-one (21) X-power main telescope, a minimum four (4) X-power wide angle finder telescope viewed through the eyepiece, accuracy azimuth and elevation better than 0.002 degrees, cross hair and LCD readout night illumination. It shall have an LCD angle display, including Adjustable Height Tripod, Carrying Case, and Accessories (Internal Battery, Waterproof Canvas Cover, Sunshade, adjusting Pins, Spanner Wrench, Accessory Tool, Screw Driver and Instruction Manual). [FE][CB]

(2) One (1) set of the UHF Theodolite Telemetric Transmitter shall accept digital azimuth and elevation data from the theodolite and transmit them shall be housed in a rugged, waterproof. The internal rechargeable battery and external power (12V D.C. or 220V A.C., 50 Hz) shall be available with automatic selectable for proper condition of power source. The set shall include Antenna, Antenna Tripod, and Antenna Carrying Case. The radio frequency transmitted from UHF Theodolite Telemetric Transmitter shall be different to the radio frequency of UHF DGPS/RTK transmitter to avoid the radio interference to each other. The unit shall contain the capability to detect and indicate the failure of transmitting information for assisting the ground equipment operator or airborne FIS operator to indentify the cause of losing information reception on the airborne FIS part. [FE][CB]

(3) A DGPS/RTK reference transmitter shall be provided UHF data link for updating AIRCRAFT position in the flight inspection system. This ground reference unit shall be housed in a ruggedized, waterproof combination carry case. The internal rechargeable battery and external power (12V D.C. or 220V A.C., 50 Hz) shall be available with automatic selectable for proper condition of power source for power. The set shall include the GPS Antenna, Antenna Tripod, and Antenna Carrying Case. It shall also be capable of being power from an external source and contain recharging capability for charging its internal battery when powered externally. The unit shall be easy to use with no require the ground operator entering any coordinate (Lat/Lon/High) data to the DGPS/RTK unit at setting site. Its transmitter power output shall be sufficient to perform flight inspection at the outer range extremes specified for a normal ILS approach run. The unit shall contain the capability to detect and indicate the failure of transmitting information for assisting the ground equipment operator or airborne FIS operator to identify the cause of losing information reception on the airborne FIS part. [FE][CB]

(4) Three (3) sets of portable VHF transceiver, RF power output not less than 8 watts, frequency 118.0 MHz to 135.95 MHz shall be provided. The transceiver shall be housed in ruggedized case and shall operate with either 220V A.C. or self-contained battery. [FE][CB]

## 4.2 GROUND SYSTEM

4.2.1 Ground support systems shall include FIS Receiver Calibration and Maintenance Systems, to be operated in the calibration laboratory, which is capable of individually calibrating the VOR/ILS, DME, SSR Transponder, Marker, ADF and VHF COMM receiver that are either partially removed from FIS onboard of the AIRCRAFT to the calibration laboratory or connecting the cable between Ground Support System and FIS on board for the system calibration. [FE][CB]

4.2.2 Offline computer and appropriate software/program shall be available for use in calibration laboratory for pre-flight preparation (including facility or database creation, adjustment and FIS upload) and post-flight process (including complete flight rerun and reproduction of flight inspection result). Transfer of database and data between FIS and offline computer shall be done via USB interface. [FE][CB]

4.2.3 The Ground support systems shall consist of at least following component :[FE][CB]

(1) A set of real time Computer which has the same design and functionality as onboard FI computer and it shall be able to replace the existing onboard FI computer when required.
(2) A set of Human-machine interface computer which has the same design and functionality as onboard Human-machine interface computer and it shall be able to replace the existing computer onboard when required.
(3) A VOR/ILS, Maker, ADF, VHF Signal Generator.
(4) A Transponder/DME Test Set.
(5) A Spectrum Analyzer. (It can be same unit which installed on onboard FIS. There is no required to delivery another physical Spectrum Analyzer but GSE shall design for properly installing the Spectrum Analyzer which equipped on onboard FIS).
(6) An Oscilloscope. (It can be same unit which installed on onboard FIS. There is no required to delivery another Oscilloscope but GSE shall design for properly installing the Oscilloscope which equipped on onboard FIS).

(7) Necessary testing equipment that is required for calibrating all VOR/ILS, Marker, ADF, VHF and SSR transponder for all appropriate parameters which are described in ICAO document.

(8) A Color Printer

(9) A Laptop Computer with appropriate software/program shall be available for use at remote location for pre-flight preparation and post flight process.

(10) A license application software for displaying and recording a reception of summary flight inspection result transmitted from FIS onboard to install on any personnel computer without number of installing limitation.

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TECHNICAL SPECIFICATIONS

FOR

A SUPPLY AND INSTALLATION OF ONE FLIGHT INSPECTION SYSTEM

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ANNEX B : SECONDARY FIS SPECIFICATIONS

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# TECHNICAL SPECIFICATIONS
# FOR
# A SUPPLY AND INSTALLATION OF ONE FLIGHT INSPECTION SYSTEM

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## ANNEX C : AIRCRAFT MODIFICATION REQUIREMENTS

### PART 1. GENERAL

### 1.1 SCOPE

1.1.1 This annex states the additional off-factory aircraft or avionics modification requirements that may explicitly arise in addition to the flight inspection requirements in order to complete the primary and secondary flight inspection aircraft as stated in the main Tender Document.

1.1.2 This annex and its attachments form a part of the Technical Specifications (TECHSPECS) or Section F of the Tender Document for A SUPPLY AND INSTALLATION OF ONE FLIGHT INSPECTION SYSTEMS.

1.1.3 All requirements below shall be complied with at no extra cost to AEROTHAI, except for future upgrade provision or specifically stated elsewhere.

### 1.2 STANDARDS

1.2.1 All parts and equipments, including the Aircraft, shall comply with airworthiness certification requirements based on EASA/FAA/DCA Thailand regulation, as applicable, at the time of modification. [FE]

1.2.2 All equipment and system shall comply with the requirements and standards (for example, FAA TSO (Technical Standard Order), FAA AC (Advisory Circular), RTCA (Radio Technical Commission for Aeronautics), etc.) as applicable and required for its specific use described herein. [FE]

### 1.3 CERTIFICATION

1.3.1 All parts and equipments relating to aircraft modification under this annex shall be designed, manufactured, inspected, installed, and certified in accordance with the standards of the

responsible airworthiness authority approved manufacturer's design, production, maintenance, certification organization and responsible airworthiness authority, as applicable. [FE]

1.3.2 All parts and equipments and the aircraft modification process shall be carried out through an STC process, approved by EASA/FAA/DCA Thailand, as applicable. [FE]

1.3.3 Related standards and approval shall be stated through a FAA 8130-3 or EASA Form 1 or other equivalent document released by the manufacturer, as applicable. [FE]

## PART 2. DETAILED SPECIFICATIONS

2.1 CONTRACTOR shall ensure that both AIRCRAFT meet the following avionics requirements and standards:

(1) TDR Switch: SSR transponder (TDR-94D) power optimization switch for SSR flight inspection requirement as describe in Doc 8071 Volume III appendix A item 2.5 shall be installed in the cockpit. [CB]

2.2 CONTRACTOR shall ensure that both AIRCRAFT undergo wiring/rewiring, removal installation, adjustment, modification, certification and other related processes necessary to deliver the final flight inspection aircraft as required under this TENDER are included in the service.

2.3 For references, avionics listing and specific avionics requirements of AIRCRAFT, which will be included as part of purchase contract for AIRCRAFT currently taking place in parallel, is described in **ATTACHMENT 1** "AVIONICS LISTING OF KING AIR 350".

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# TECHNICAL SPECIFICATIONS
# FOR
# A SUPPLY AND INSTALLATION OF ONE FLIGHT INSPECTION SYSTEM

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## ATTACHMENT 1 TO ANNEX C : AVIONICS LISTING OF KING AIR 350

| Avionics Items | Remark |
|---|---|
| 1. Flight Display System - Pro Line 21 system with two AFD-3010 and one AFD-3010E adaptive flight displays (pilot's PFD, MFD and copilot's PFD); incorporates an Engine Indicating (EI) system<br>2. COM 1 - Collins VHF-4000 transceiver (118.000 to 136.975 MHz with 8.33 KHz increments), tuning through CDU or Collins RTU-4220<br>3. COM 2 - Collins VHF-4000 transceiver (118.000 to 136.975 MHz with 8.33 KHz increments), tuning through CDU or Collins RTU-4220<br>4. NAV 1 - Collins NAV-4000 VOR/LOC/GLS/ADF/Marker Beacon receiver, tuning through CDU or RTU<br>5. NAV 2 - Collins NAV-4000 VOR/LOC/GLS/ADF/Marker Beacon receiver, tuning through CDU or RTU<br>6. AHRS - dual Collins AHC-3000 attitude heading reference system including dual FDU-3000 flux detector units, slaved and DG heading modes are provided<br>7. GPS - GPS-4000S WAAS GPS with FMS 4.0 software enabling LPV approach capability, or better so long as it meets TSO C145/C146 and SBAS requirement. GPS ANT: Comant CI-429-200 or better so long as it meets TSO C190 and SBAS LPV requirement.<br>8. DBU - DBU-5000 database unit for navigation database loading<br>9. ADC - dual Collins ADC-3000 air data computers (RVSM capable)<br>10. ADF 1 - Collins NAV-4000 with ADF, including antenna<br>11. ADF 2 - Collins NAV-4000 with ADF, including antenna (Option Code: 4040)<br>12. Transponders - dual Collins (Mode S) TDR-94D Diversity Transponder with Flight ID, (ATC/Mode S/ADS-B) or better so long as it meets TSO C112 standard.<br>13. Transponder ATC Ident button on pilot's and copilot's control wheels<br>14. DME 1 - Collins DME-4000 with DME information displayed on PFD's<br>15. DME 2 - Collins DME-4000 with DME information displayed on PFD's (Option Code: 4040)<br>16. Audio system - dual dB 700/dB 800 systems<br>17. CVR - L3 Communications FA2100-1020 Solid-State Cockpit Voice Recorder (SSCVR) with 120 minute recording time<br>18. Flight Guidance System - dual Collins FGC-3000 flight guidance computers, single autopilot system, yaw damper with display from the CDU-3000<br>19. FMS - Collins FMS-3000 flight management system with FMS 4.0 version software | As per aircraft purchase contract, and undergoing production |