

# **AIRPORT AUTHORITY COOK ISLANDS**

## **REQUEST FOR TENDER**

**FOR THE SUPPLY OF AN INSTRUMENT LANDING SYSTEM  
(ILS)**

**FOR**

**RAROTONGA INTERNATIONAL AIRPORT, COOK ISLANDS.**

**Reference No. 151602**



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## **SECTION 1**

### **INSTRUCTIONS TO TENDERERS AND TENDER CONDITIONS**

#### **1. INTRODUCTION**

The Airport Authority Cook Islands as the Purchaser (the Purchaser) is tendering for the Supply of an Instrument Landing System (ILS) for Rarotonga International Airport, Cook Islands (the Project) all in conformity with the following documents ('Tender Documents'):

- (a) This Request for Tender including:
  - (i) Section 1 Instructions to Tenderers and Tender Conditions with Attachments A, B and C
  - (ii) Section 2 The Performance Specification
  - (iii) Section 3 Tender Evaluation Criteria
  - (iv) Section 4 Terms and Conditions of Contract
- (b) Any Notices to Tenderers issued prior to the date of closing of Tenders

#### **2. CONTRACT WORKS OVERVIEW**

- 2.1 The scope of the Contract for the design, supply, installation, testing, commissioning, training, maintenance and defects liability of an Instrument Landing System for Rarotonga International Airport, in Rarotonga, Cook Islands, all in accordance with the attached Performance Specification.
- 2.2 It is a requirement of the Purchaser that the Tenderer clearly states in their Tender the Time for Delivery in Rarotonga of its offer of an Instrument Landing System from the Date of Award of the Contract ('the Commencement Date').

#### **3. CONFIDENTIALITY**

- 3.1 The Tender Documents together with all other information, Performance Specification and documentation whatsoever concerning the proposed Contract shall be kept strictly confidential by the Tenderer and shall not be disclosed to any third party except for the purpose of preparing a tender. Tenderers shall ensure that any such third parties also keep confidential any information disclosed to them.

#### **4. ACKNOWLEDGEMENT**

- 4.1 Tenderers are requested to acknowledge receipt of the Request for Tender by completing and returning the attached Acknowledgement Form forthwith to [ingamata@airport.gov.ck](mailto:ingamata@airport.gov.ck) (refer to Attachment A).

## **5. DISCREPANCIES, AMBIGUITIES AND FURTHER INFORMATION**

- 5.1 Should the Tenderer require any additional information or if the Tenderer is in any doubt as to the meaning of any of the Tender Documents then clarification should be addressed under the heading 'Requests For Clarification' during the tender period in writing from:

Mr Joseph Ngamata  
Chief Executive  
Airport Authority Cook Islands  
Telephone +682 25890  
Mobile +682 55890  
Email: [jngamata@airport.gov.ck](mailto:jngamata@airport.gov.ck)

- 5.2 No communication to Tenderers by the Purchaser or its employees, agents or consultants will be effective unless and until it has been either notified to all Tenderers under clause 6 or to one Tenderer under clause 7.

## **6. NOTICES TO TENDERERS**

- 6.1 Responses to 'Requests for Clarification' from a Tenderer under clause 5 for any further information for the tenderer or clarifications from the Purchaser will be issued in writing either to all tenderers by way of sequentially numbered Notices to Tenderers or to an individual Tenderer under clause 7.
- 6.2 It is the tenderer's responsibility to carry out any site visits necessary.

## **7. COMPETITIVE ADVANTAGE**

- 7.1 If a 'Request for Clarification' is solely as a consequence of a Tenderer's proposed methodology or equipment and is deemed to be of a commercially sensitive nature such information will be provided only to the requesting Tenderer and not to other Tenderers.
- 7.2 Tender proposals must be for **all** parts of the specification listed in Section 2. Proposals for parts only of the specifications will not be accepted.

## **8. NON-CONFORMING TENDERS**

- 8.1 Non-conforming tenders will be rejected by the Purchaser.

## **9. SUBMISSION OF TENDER**

- 9.1 All costs incurred by the Tenderer associated with preparing its Tender shall be borne by the Tenderer.
- 9.2 Tenders and any annotations or accompanying material shall be in English.
- 9.3 The tender shall comprise an original and five copies of:
- (a) The Form of Tender (as Attachment B)
  - (b) The Schedule of Information to be provided by the Tenderer with the Tender (refer Attachment C)
  - (c) Any interpretation or other statement by the Tenderer affecting the tender.

(d) Any alternative tender(s) or proposals

- 9.4 Tenders must be in hard copy only and sealed and marked 'Tender for the Supply of an Instrument Landing System for Rarotonga International Airport' and must be delivered to:

Airport Authority  
Tender 1, 2015  
Level 1, Control Tower Building  
Rarotonga International Airport  
Cook Islands

## **10. ELECTRONICALLY TRANSMITTED TENDERS**

- 10.1 Tenders received by electronic data transmission **will not** be considered by the Purchaser

## **11. CLOSING DATE AND TIME FOR TENDERS**

- 11.1 Tenders must reach the address noted in clause 9.4 by 4:00 pm on Monday 31st August 2015 (Cook Islands Time) or such later time as the Purchaser advises in accordance with clause 6. Any tenders received after the Closing Time will not be considered.
- 11.2 It is the Tenderer's sole responsibility to ensure that their tender reaches the address designated in clause 9.4 by the date and time specified.
- 11.3 Negotiations will not take place between the Purchaser and Tenderers during the advertising stage.
- 11.4 No gifts or entertainment of any nature will be permitted between the Purchaser and any tenderer throughout the tender process.

## **12. INTENTIONALLY LEFT BLANK**

## **13. TENDER VALIDITY**

- 13.1 The validity period for tenders shall be three (3) months from the closing date for tenders.

## **14. EVALUATION OF TENDERS**

- 14.1 Tenders will be evaluated based on the Tender Evaluation Criteria as set out in Section 3 – Tender Evaluation Criteria.
- 14.2 The Purchaser may, where it deems appropriate, request any Tenderer to clarify and/or adjust aspects of its tender and also reserves the right to negotiate with a preferred Tenderer or Tenderers after closing of tenders with a view to finalising contract arrangements.

- 14.3 Meetings with selected Tenderers may be required during the evaluation period and such meetings would be held in Auckland, New Zealand or Rarotonga, Cook Islands. The Purchaser may also require, at its sole discretion, to have the Tenderer's designated key people attend such meetings. The costs of attending such meetings will be borne by the Tenderer.
- 14.4 The Purchaser reserves the right to contact referees, competitors or customers to enquire on the ability and performance of the Tenderer and the quality and performance of 'the Goods' being proposed.

## **15. ACCEPTANCE OF TENDER**

- 15.1 The Purchaser does not bind itself to accept the lowest or any tender and reserves the right to accept none or any of the tenders at its sole discretion. The successful Tenderer will be advised in writing that its tender has been accepted.
- 15.2 Unsuccessful Tenderers will be advised in writing that they have been unsuccessful and advised who the successful Tenderer is. Unsuccessful Tenderers shall be provided with reasons for non-acceptance of their particular tender by the Purchaser
- 15.3 If the Tenderer is not satisfied with the process or the reasons given by the Supplier, the Tenderer can lodge a complaint with the Tender Committee using the Public Tender Complaints form from the Ministry of Finance and Economic Management Ministry – contact person Taina Iro – email [taina.iro@cookislands.gov.ck](mailto:taina.iro@cookislands.gov.ck). The Tender Committee's final decision and outcome will be provided in writing and will incorporate details of: assessments undertaken; and conclusions reached. If a Tenderer is not satisfied with the outcome, or the handling of the complaint they can refer this matter to the Ombudsman.

## **16. FORM OF CONTRACT AGREEMENT**

- 16.1 The successful Tenderer will be required to execute an agreement on the Form of Contract Agreement

## **17. TENDERER'S COSTS**

- 17.1 The Purchaser will not be responsible for or liable for or pay any expenses or losses which may be incurred by a Tenderer in connection with this tender process. No legal or other obligation shall arise between a Tenderer and the Purchaser in relation to the conduct or outcome of the tender process.

## **18. PROPRIETARY INFORMATION**

- 18.1 Tender Documents issued to Tenderers remain the property of the Purchaser. All Tender Documents shall be returned to the Purchaser immediately by any

Tenderers declining to tender and by unsuccessful Tenderers if requested by the Purchaser.

18.2 Unsuccessful tender submissions will be returned to Tenderers if requested.

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## ATTACHMENT A

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**CONTRACT FOR:   Supply of an Instrument Landing System for  
Rarotonga International Airport**

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### REQUEST FOR TENDER - ACKNOWLEDGEMENT FORM

The Chief Executive  
Airport Authority Cook Islands  
Email: [jngamata@airport.gov.ck](mailto:jngamata@airport.gov.ck)

We acknowledge receipt of your Request for Tender for the Supply of an  
Instrument Landing System for Rarotonga International Airport, Cook Islands

- (a)     We will be tendering,
- (b)     We will not be tendering for the following reasons:

.....

.....

and we return herewith the Invitation to Tender documents.  
(delete (a) or (b))

Signature: .....

Name: .....

Position: .....

Company: .....

Address: .....



## ATTACHMENT B

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**CONTRACT FOR: Supply of an Instrument Landing System for  
Rarotonga International Airport**

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### FORM OF TENDER

**TO:** The Chief Executive  
Airport Authority Cook Islands  
Rarotonga International Airport  
Rarotonga  
Cook Islands

1. Having examined the Request for Tender including the 'Tender Documents' for the Supply of an Instrument Landing System, we offer to carry out the Contract Works all in accordance with:
  - (a) the Request for Tender including:
    - (i) Section 1 Instructions to Tenderers and Tender Conditions with Attachments A, B and C
    - (ii) Section 2 The Performance Specification
    - (iii) Section 3 Terms and Conditions of Contract
    - (v) Notices to Tenderers No's .....
  - (b) the Schedule of Information Provided by the Tenderer with this Tender (as attached)

For the fixed lump sum of NZ\$.....  
(excluding GST/VAT) and as itemised in the following Price Schedule

Unit Description	Currency	Price
1 x dual Localiser equipment, antennas, monitors, cables and connections ex-factory		
1 x dual Glide-path equipment, antennas, monitors, cables and connections ex-factory		
1 x dual DME equipment, antennas, monitors, cables and connections ex-factory		
1 x Remote control and monitoring unit plus cables and connections ex-factory		
Tools, test equipment and spares ex-factory		
Shipping and associated costs from factory to onsite Rarotonga International Airport		
Onsite installation, civil works, communication reticulation, surveying, testing, flight inspection		

and commissioning		
Factory acceptance testing for 2 Cook Island Airport Authority representatives including airfares and per diems		
Other - please specify if applicable		
<b>Total</b>		

2. We agree that this tender is in conformity with the documents referred to in 1 (a) and 1 (b) above.
3. We agree to abide by this tender for the period specified in the Instructions to Tenderers which may be accepted at any time before the expiration of that period.

Dated this ..... day of ..... 2015

Signature: .....

Name: .....  
duly authorised to sign tenders on behalf of

Company: .....

## ATTACHMENT C

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**CONTRACT FOR:   Supply of an Instrument Landing System for Rarotonga  
International Airport**

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### **SCHEDULE OF INFORMATION TO BE PROVIDED BY THE TENDERER WITH THE TENDER**

#### **Information required to be provided by the Tenderer with the Tender**

1. Relevant experience in the manufacture/supply, design, installation, testing, commissioning, training, maintenance and defects liability service of materials, labour and equipment for an Instrument Landing System.
2. Past performance in meeting Purchaser's performance specification and delivery to time requirements in manufacture/supply, design, installation, testing, commissioning, training, maintenance and defects liability service of materials, labour and equipment for an Instrument Landing System (provide list of previous projects and referees)
3. Mandatory requirements of the Tender as set out in section 2.1 (a) to (g) of the Performance Specification to aid with evaluation of tenders
4. Any proposed variations/changes to the Performance Specification
5. Any proposed amendments to the Terms and Conditions of Contract including Payment Terms (Refer to Section 4 for Terms and Conditions of Contract) which will form part of the Contract Agreement along with a project plan, and details of the following to be incorporated into the same:
  - a. Base application;
  - b. Modifications;
  - c. Third party software;
  - d. Documentation;
  - e. Hardware;
  - f. Factory Site;
  - g. Delivery date
  - h. Installation date;
  - i. Training
6. Any warranties to be provided by the Tenderer
7. The key people are:  
Tenderer's Representative

Name of Person\_\_\_\_\_

Position in Company\_\_\_\_\_

Contact Details\_\_\_\_\_

8. Copy and details of Warranty/Guarantee offered by the Tenderer
9. The due date for completion of installation and commissioning of the Instrument Landing System ready for taking-over testing and inspection is \_\_\_\_\_ calendar days after Commencement Date.

## SECTION 2

### PERFORMANCE SPECIFICATION

## Technical Specifications – ILS/DME RWY 08

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### 1 General

#### 1.1 System Description

The Instrument Landing System is the standard terrestrial based navigation aid adopted by the International Civil Organisation for the provision of precision instrument approaches at aerodromes. The system consists of two elements;

- The localizer generating a VHF navigation signal normally from the up wind end of the runway that provides azimuth information with reference to the runway centreline.
- The glide-path generating a UHF navigation signal from adjacent to the runway touch point providing vertical information with reference to the nominated approach path angle (normally 3°).

In addition to the above navigation signals, ranging information is provided by either:

- Marker beacons located fixed distances from the runway which activate a visual and aural indication in the aircraft when they pass overhead.
- Distance Measuring Equipment (DME) providing continuous ranging information normally referenced to the runway touch down point.

The Cook Islands Airports Authority seeks a complete dual ILS/DME Category 1 system as a life cycle replacement to the current ILS/DME installed at Runway 08, Rarotonga International Airport.

#### 1.2 Equipment Configuration

The ILS facilities shall include localizer and glide path dual frequency with capture type capability components. Dual transmitters, and dual monitors, for both the glide path and localizer systems; and near field monitor (NFM) for the glide path shall be part of the equipment supplied by the Contractor.

Dual-transponder DMEs shall be provided in lieu of marker beacons and shall be co-located with the glide path installation.

A separate backup battery DC power supply shall be provided for each facility.

### 1.3 Design, Construction and Performance

All equipment supplied shall be: of state-of-the-art, solid state electronics, be of modular design and production with proven performance in existing installations elsewhere in similar climatic areas. The Tenderer shall provide examples of such existing installations with the tender. The Tenderer shall ensure that the ILS system performance meets the requirements detailed in this specification.

## 2 Acronyms and Abbreviations

In this specification, when the following acronyms and signs are used these are to be read and understood with the meanings attached to each.

°	degrees
%	percent
µA	micro-ampere
µV	micro-volt
A	Ampere
AM	amplitude modulation
C	Centigrade
CSB	Carrier side bands
dB	decibels
dBm	decibels per milliwatt
DDM	Difference in Depth Modulation
DME	Distance Measuring Equipment
FAA	United States Federal Aviation Administration
FM	frequency modulation
GP	Glide-path
Hz	hertz
ICAO	International Civil Aviation Organisation
LOC	Localizer
m	metres
mW	milliwatt
MHz	Mega hertz
OFZ	Obstacle Free Zone
OLS	Obstacle Limitation Surface
PPS	Pulse Per Second
RF	Radio Frequency
SBO	Side band only
UHF	Ultra High Frequency
V	Volts
VHF	Very High Frequency
W	Watt

## 3 Standards

The following standards are to be complied with respect to the manufacturing, installation and equipment operation:

- ICAO Annex 10 Aeronautical Telecommunications Volume 1

- New Zealand Civil Aviation Rules Part 171 Aeronautical Telecommunications Services -Operations and Certification
- ICAO Document 8071 Manual on Testing of Radio Navigation Aids Volume 1
- United States Order 8200 Flight Inspection Manual
- Cook Islands Energy Regulations 2006
- Australia/New Zealand Standard (AS/NZS 3000:2000) Wiring Rules

## **4 Site, Civil and Environment**

### **4.1 Site**

#### **4.1.1 Localizer**

The localizer array is mounted beyond the runway's eastern end and below the OLS and OFZ. Due to site constraints the existing Runway 08 localizer 9 element antenna array is mounted flush to the runway surface requiring a specifically designed "trench lip" to ensure minimum attenuation of the localizer signal. Tenderers are to detail how the special requirements and constraints of the sites will be managed.

#### **4.1.2 Glide-path**

The existing glide-path is located on the southern side of the runway. The narrower runway strip width of 210m and storm water drain on the southern edge of the strip and the existing glide-path towers are specifically designed to be frangible and of a relatively low height. This currently dictates that the current glide-path is configured as side band referenced transmitting through 2 antenna elements mounted on the tower.

Tenderers will refurbish the existing tower and detail how the special requirements and constraints of the site will be managed.

#### **4.1.3 DME**

The DME is to be located with the glide-path.

### **4.2 Equipment Shelters**

The existing localiser and glide path buildings are to be utilised. Purchaser will undertake any necessary renovation of these building and air conditioning systems to ensure compliance with the environmental and climatic considerations detailed in these specifications

### **4.2.1 Electric and Communication Site Reticulation**

#### **4.2.2 Electric**

The existing electrical connections at the sites from the airports electrical supply via underground cable back to the airport's power centre shall be utilised.

#### **4.2.3 Telecommunication**

The sites are to be provided with sufficient telecommunications circuits via underground fibre optic cable to ensure full monitoring, operations, control and external maintenance functions of all equipment can be achieved.

### **4.3 Climatic Protection General**

All external surfaces and components including the equipment building, masts, antennas, antenna coupling units and monitors shall be provided maximum protection from the tropical high humid and corrosive maritime climate.

## **5 Detailed Equipment Specifications**

### **5.1 ILS Localizer Facility**

#### **5.1.1 Radio Frequency**

The localizer equipment shall be capable of operation on any assigned frequency in the range 108.0 MHz to 111.975 MHz.

The offset between the course and clearance carrier frequencies shall be between 5 KHz and 14 KHz and equally spaced about the assigned frequency. The course and clearance frequencies shall be the same on both the main and standby transmitters. The frequency tolerance shall not exceed 0.002%.

The localiser equipment is to be commissioned to the frequency of 109.9 MHz.

#### **5.1.2 Carrier Modulations**

Both the course and clearance carriers shall be amplitude modulated with 90 Hz and 150 Hz tones. The carrier plus side bands (CSB) modulation depth of each tone shall be adjustable to set the value between 18% and 22% with a normal setup value of 20%  $\pm$  1%. The difference in depth of modulation (DDM) between the 90 Hz and 150 Hz tones - the CSB tone balance - shall be adjustable and be set to within 0.01%. Means shall be provided for displaying the modulation depths and the modulation balance values.



The tone frequencies shall be within 1.0% of the nominal values. The total harmonic content of the 90Hz tone shall not exceed 10%, with the second harmonic not exceeding 5%. The total harmonic distortion of the 150 Hz tone shall not exceed 10%.

Modulation of the carriers by mains power frequency or harmonics or any other unwanted components shall not exceed 0.5%. Any harmonics of the supply, or unwanted noise components that may inter-modulate with the 90 Hz or 150 Hz tones or their harmonics, shall not exceed 0.05% modulation depth.

The modulation tones shall be phase locked so that within the half course sector the demodulated 90 Hz and 150 Hz waveforms pass through zero in the same direction within  $10^0$ .

Means shall be provided for displaying the power and relative level of the CSB signal delivered from the transmitters to the antenna feed cable.

### **5.1.3 Identification**

#### **5.1.3.1 Modulation**

A keyed identification tone shall be provided. The tone frequency shall be 1020 Hz with a tolerance of  $\pm 50$  Hz. The depth of modulation on the course and clearance carrier shall be adjustable between the limits of 5% and 15%. Means shall be provided for displaying the Identification tone modulation depth value. An option of adding voice modulation in accordance with ICAO Annex 10 Volume I shall also be provided.

#### **5.1.3.2 Keying**

The identification signal shall employ the International Morse Code and consist of two or three letters. It shall be transmitted by dots and dashes at a speed of approximately seven words per minute. The dots shall have duration of 0.1 to 0.16 seconds. Dash duration should be typically three times that of the dot. The interval between dots and dashes shall be equal to one dot, and the interval between letters shall be not less than three dots. Means shall be provided for suppressing the identification signal as required during times when the localizer is not available for operational use.

A synchronized identification signal shall be supplied to the associated ILS DME co-located with the glide path facility. The DME identification signal sequence shall occur once during a 40 second period during which the Localizer identification shall be transmitted at least four times.

The equipment shall be commissioned with the operating identification of INO.

### **5.1.4 Side Band Only Signals**

Course and clearance side band only (SBO) signals audio phase locked (within  $10^0$ ) to the course and clearance carrier sideband signals shall be provided for the purpose of developing the navigation signal in space via the antenna system. Means shall be provided for displaying the relative level of the SBO signal values.

Provision shall be made for adjusting the radio frequency (RF) phasing between the CSB and SBO signals for both course and clearance.

## **5.2 Localizer Antenna and Course**

### **5.2.1 Configuration**

Configuration shall feature horizontally polarized broadside array with clearance embodied as part of the course array, or as a separate dedicated broadside array. The array shall operate over a frequency range from 108 MHz to 111.975 MHz with a voltage standing wave ratio (VSWR) of less than 1.2 and without, or minimal, onsite adjustment. The antenna array shall be a frangible structure and mounted at a height necessary to achieve the prescribed coverage complying with ICAO Annex 14 Aerodromes recommendations and requirements. The specific site issues for the Runway 26 installation detailed in 4.1.1 shall be accounted for.

### **5.2.2 Course Alignment**

The mean course line shall be setup to be within  $0.01^{\circ}$  with respect to the respective runway centreline. The stability of the system shall be such as to maintain the alignment within a displacement of 3 m with respect to the runway centreline at the ILS reference datum.

### **5.2.3 Displacement Sensitivity**

The nominal displacement sensitivity within the half course sector at the ILS reference datum shall be as close as practicable to a value of 0.00145 DDM/m.

The stability of the system shall be such as to maintain the displacement sensitivity within 10% of the nominal value.

### **5.2.4 Off Course Difference in Depth of Modulation**

#### **5.2.4.1 Linearity**

The increase in DDM shall be substantially linear with respect to angular displacement from the front course line up to an angle where the DDM reaches 0.180 (18%).

#### **5.2.4.2 Minimum Off Course Difference in Depth of Modulation**

From the angle at which the DDM value reaches 0.180 out to an angle of  $10^{\circ}$  with respect to the course line the DDM value shall not be less than 0.180.

From  $10^{\circ}$  out to  $35^{\circ}$  the DDM value should not be less than 0.180 (15%) unless stated in the proposal. However it shall not be less than 0.155.

### **5.2.5 Modulation Sum**

The sum of the modulation depths shall not exceed 60% or be less than 30% in any part of the localizer coverage.

### **5.2.6 Course Clearance Ratio**

Within the front course sector the ratio between the course and clearance carrier in the user airspace shall not be less than 10 dB.

### **5.2.7 Course Structure**

Bends in the course line structure shall not have amplitudes exceeding:-

- a. 0.031 DDM to Point A.
- b. 0.031 DDM decreasing at a linear rate to 0.005 DDM between Point A and Point B.
- c. 0.005 DDM from Point B to the ILS reference datum.
- d. 0.005 DDM from the ILS reference datum to Point D.
- e. 0.005DDM increasing at a linear rate to .010 DDM between Point D and Point E.

Bends shall be evaluated in accordance with the ICAO Annex 10 Volume I Attachment C paragraph 2.1.6

### **5.2.8 Vertical Polarization**

Vertical components of the radiation within a sector bounded by 0.02 DDM either side of the course line shall not exceed that which corresponds to a DDM error of 0.005 when an aircraft is in a roll attitude of 20° from the horizontal.

### **5.2.9 Coverage**

#### **5.2.9.1 General**

The localizer coverage sector shall extend from the centre of the localizer antenna system to distances of:-

- a. 25 NM within 10° of the front course line.
- b. 17 NM between 10° and 35° with respect to the front course line.

The field strength in these sectors shall not be less than 40 µV/m. This field strength value shall be achieved with the localizer operating at the low power alarm setting.

#### **5.2.9.2 Within 10NM**

The field strength when positioned on the glide path and within the localizer sector shall not be less than 100  $\mu\text{V/m}$  at a distance of 10 NM, increasing to 200  $\mu\text{V/m}$  at 6 m above the horizontal plane containing the threshold. From this point to a further point 4 m above the runway centreline, and 300 m from the threshold in the direction of the Localizer array, and thereafter at a height of 4 m along the length of the runway in the direction of the Localizer array, the field strength shall not be less than 100  $\mu\text{V/m}$ .

These field strength values shall be achieved with the localizer operating at the low power alarm setting.

### **5.3 Localizer Monitoring**

#### **5.3.1 Configuration**

The localizer shall be equipped with two independent monitors. Each monitor shall receive course alignment and displacement sensitivity (width) input signals derived from the antenna system (integral monitoring).

An independent Far Field Monitor is not required however the system shall be capable to be upgraded at a later date to provide FFM non-executive indication of the localizer alignment.

#### **5.3.2 Initiation of Monitor Action**

##### **5.3.2.1 Integral Monitor**

Monitor action shall be initiated if any of the following conditions are present:

- a. A shift in the mean course line equivalent to a displacement of more than 6 m with respect to the runway centreline at the ILS reference datum.
- b. A reduction of power output for either carrier to less than 80 % of normal.
- c. A change of displacement sensitivity by more than 17 % with respect to the nominal value.

##### **5.3.2.2 Far Field Monitor**

Not Applicable

### **5.3.3 Monitor Action**

#### **5.3.3.1 Integral Monitor**

The monitor system shall provide a warning to the designated control/monitoring points and cause one of the following to occur within 2 seconds:

- a. radiation to cease.
- b. removal of the navigation and identification signals from the carriers.
- c. reversion to a lower category if the reversion category is required.

Monitor action shall require agreement of an out of tolerance radiation from both monitors.

#### **5.3.3.2 Far Field Monitor**

Not Applicable

### **5.3.4 Changeover Time**

The time period to changeover transmitters following the detection of an out of tolerance condition shall be substantially instantaneous such as to have no adverse effect upon the aircraft auto pilot operation.

### **5.3.5 Restoration**

No attempts to restore the localizer to service shall be possible for a period of 20 seconds following total system shutdown.

## **5.4 Glide Path Facility**

### **5.4.1 Radio Frequency**

The equipment shall be capable of operation any assigned frequency from 328.6 MHz to 335.4 MHz.

The offset between the course and clearance carrier frequencies shall be between 4 KHz and 32 KHz and equally spaced about the assigned frequency. The course and clearance frequencies shall be the same on both the main and standby transmitters. The frequency tolerance shall not exceed 0.002%.

The glide path equipment is to be commissioned to the paired frequency of the localiser (109.9 MHz) of 333.8 MHz.

### **5.4.2 Carrier Modulations**

The Course carrier shall be amplitude modulated with 90 Hz and 150 Hz tones. The CSB modulation depth of each tone shall be adjustable to set the value between 37.5 % and 42.5 % with a normal setup value of  $40 \% \pm 1 \%$ . The DDM between the 90 Hz and 150 Hz tones - CSB tone balance - shall be adjustable and be set to within 0.01 %.

Means shall be provided for displaying the modulation depths and the modulation balance values.

The tone frequencies shall be within 1.0 % of the nominal values.

The total harmonic content of the 90 Hz tone shall not exceed 10 %, with the second harmonic not exceeding 5 %.

The total harmonic distortion of the 150 Hz tone shall not exceed 10 %.

Undesired frequency and phase modulation on the glide path signal shall be minimised. ICAO Annex 10 Volume I Navigation Systems, Attachment C. paragraph 2.15 refers.

The modulation tones shall be phase locked so that within the half course sector the demodulated 90 Hz and 150 Hz waveforms pass through zero in the same direction within  $10^\circ$ .

The clearance carrier shall be amplitude modulated with a 150 Hz tone. The nominal modulation depth of the 150 Hz tone shall be 80 %. The 150 Hz clearance audio shall be phase locked with the 150 Hz Course audio within  $10^\circ$ .

Means shall be provided for displaying the power and relative level of the CSB signal delivered from the transmitters to the antenna feed cable.

### **5.4.3 Side Band Only Signals**

Course SBO signals audio phase locked (within  $10^\circ$ ) to the course carrier sideband signals shall be provided for the purpose of developing the navigation signal in space via the antenna system. Means shall be provided for displaying the relative level of the SBO signal values.

Provision shall be made for adjusting the RF phasing between the CSB and SBO signals.

## **5.5 Glide Path Antenna and Course Path**

### **5.5.1 Configuration**

Configuration shall feature a horizontally polarized side band reference 2 element array with back radiation attenuated. Specific site considerations of the array's tower as detailed in 4.1.2 shall be accounted for.

The array shall operate over the 328.6 MHz to 335.4 MHz frequency range with a VSWR of less than 1.2 without adjustment. The array shall be located so as to provide a threshold crossing height (TCH) – also referred to as an achieved runway datum height – of between 15 m and 18 m. The TCH shall be established by flight inspection using methodology detailed in ICAO Doc. 8071 Manual on Testing of Radio Navigation Aids.

#### **5.5.2 Path Alignment**

The mean path, measured between Point A and Point B, shall be setup to be within  $0.02^\circ$  with respect to a nominal path angle of  $3^\circ$ . The stability of the system shall be such as to maintain the alignment within  $0.04^\circ$  with respect to the nominal path angle of  $3^\circ$ .

#### **5.5.3 Displacement Sensitivity**

The nominal displacement sensitivity shall correspond to a DDM of 0.0875 at angular displacements above and below the glide path of  $0.36^\circ \pm 0.06^\circ$ .

The stability of the system shall be such as to maintain the displacement sensitivity within 25 % of the nominal value.

#### **5.5.4 Below Path Difference in Displacement Modulation**

The DDM shall increase smoothly up to a value of 0.22 DDM. This value shall be achieved at an angle of not less than  $0.9^\circ$  with respect to the horizontal. If achieved at an angle above  $1.35^\circ$  the DDM value shall remain not less than 0.22 down to  $1.35^\circ$  or down to  $0.9^\circ$  if needed to safeguard the promulgated glide path intercept procedure.

#### **5.5.5 Change Reversal**

The performance of the glide path radiated signal shall pass the FAA standard flight check method explained in 8200 of evaluating the glide path change reversal.

#### **5.5.6 Course Path Structure**

Bends in the course line structure shall not have amplitudes exceeding:-

- a. 0.035 DDM to Point A.
- b. 0.035 DDM decreasing at a linear rate to 0.023 DDM between Point A and Point B.
- c. 0.023 DDM from Point B to the ILS reference datum.

Bends shall be evaluated in accordance with the ICAO Annex 10 Volume 1 Attachment C. paragraph 2.1.6.

## **5.5.7 Coverage**

### **5.5.7.1 General**

The glide path shall provide coverage over a sector extending  $8^{\circ}$  either side of the centreline of the glide path in the direction of the approach out to a distance of 10 NM. Coverage shall be provided at vertical angles from  $1.35^{\circ}$  up to  $5.25^{\circ}$  and down to  $0.9^{\circ}$  if needed to safeguard the promulgated glide path intercept procedure.

Coverage out to  $8^{\circ}$  does not imply that the glide path angle needs to be maintained within the requirements of paragraph 5.5.2 of this specification; the requirement is that between the edges of the localizer front course sector and out to  $8^{\circ}$ , full fly-up glide path DDM shall be received by aircraft preparing to intercept the ILS.

### **5.5.7.2 Field Strength**

The field strength within the coverage sector defined in paragraph 2.2.9 of this specification shall be not less than  $400 \mu\text{V/m}$ .

On the final approach segment the field strength shall not be less than  $400 \mu\text{V/m}$  down to a height of 15 m above the runway threshold.

This field strength value shall be achieved with the glide path operating at the low power alarm setting.

## **5.6 Glide Path Monitoring**

### **5.6.1 Configuration**

The glide path shall be equipped with two independent monitors. Each monitor shall receive path alignment and displacement sensitivity (width) input signals derived from the antenna system (integral monitoring).

Additionally, a path alignment signal shall be provide from a NFM antenna.

The NFM antenna shall be placed ahead of the glide path array in the direction of the approach and at a point where the upper/lower antenna phase is  $360^{\circ}$ .

### **5.6.2 Initiation of Monitor Action**

#### **5.6.2.1 Integral Monitor**

Monitor action shall be initiated if any of the following conditions are present:

- a. A shift in the mean glide path angle of plus  $0.3^{\circ}$  or minus  $0.225^{\circ}$  with respect to the nominal  $3^{\circ}$  glide path angle



- b. A reduction of power output for either carrier to less than 80 % of normal.
- c. A change of displacement sensitivity by more than 25 % with respect to the nominal value.

#### **5.6.2.2 Near Field Monitor**

Monitor action shall be initiated if a shift in the mean glide path angle of plus  $0.3^{\circ}$  or minus  $0.225^{\circ}$  with respect to the nominal  $3^{\circ}$  glide path angle is detected.

#### **5.6.3 Monitor Action**

The monitor system shall provide a warning to the designated control/monitoring points and cause radiation to cease within 2 seconds.

Monitor action shall require agreement of an out of tolerance radiation from both monitors.

#### **5.6.4 Changeover Time**

The time period to changeover transmitters following the detection of an out of tolerance condition shall be substantially instantaneous such as to have no adverse effect upon the aircraft auto pilot operation.

#### **5.6.5 Restoration**

No attempts to restore the glide path to service shall be possible for a period of 20 seconds following total system shutdown.

### **5.7 Glide Path Specific Equipment**

#### **5.7.1 Flight Check Equipment**

A set of attenuators with a 360degree phase cable, 90 degree phasing link and TNC elbows per glide path equipment is expected to be supplied by the contractor to ensure the equipment is capable of undergoing a complete FAA/ICAO flight check.

#### **5.7.2 Glide Path Safety Equipment**

A set of safety equipment shall be supplied and must be to a minimum standard of either the US, British or UK specification. The equipment supplied shall be approved prior to installation by the engineer and clearly stated in the proposal. It is expected to include such items as Harness, fixed rail or automatic rope grabbing mechanism and rail system.

## **6 ILS DME Specification**

### **6.1 DME Transponder**

The ILS-DME system shall be provided in lieu of ILS markers beacons.

The DME shall be co-located with the glide path with zero distance located at the glide path facility.

### **6.2 Radio Frequency**

The equipment shall be capable of operation any assigned frequency channel from 960 MHz to 1215 MHz, with X or Y decoding. The equipment shall be channelled according to the respective localizer VHF frequency as an associated facility.

In this application X channel decoding will be employed.

The frequency tolerance shall not exceed 0.002%.

The equipment shall be commissioned to operate on the paired frequencies associate with the ILS Localiser of 109.9 MHz (DME channel number 36X).

### **6.3 Transmitter Pulse Shape/Spectrum**

#### **6.3.1 Shape**

The pulse rise time (10% to 95%) shall be not greater than 3.0  $\mu$ sec.

The half height pulse width shall be nominally 3.5  $\mu$ sec with a tolerance of 0.5  $\mu$ sec.

The pulse decay time (95% to 10%) shall be nominally 2.5  $\mu$ sec but not exceed 3.5  $\mu$ sec.

The pulse amplitude between the 95% of the maximum pulse amplitude points on the leading and trailing edges shall not be less than 95%.

#### **6.3.2 Spectrum**

The spectrum of the radiated pulse modulated signal shall be such that the effective radiated pulse (ERP) contained in a 0.5 MHz band centred:

- a. 0.8 MHz with respect to the nominal transmit frequency is not greater than 200 mW and
- b. 2 MHz with respect to the nominal transmit frequency is not greater than 2 mW and
- c. Beyond 2 MHz the ERP diminishes monotonically.

### **6.3.3 Spurious Radiation**

Between-pulse spurious radiation shall be more than 80 dB below the peak pulse power level.

Out of band spurious radiation (10 MHz to 800 MHz, excluding 960 MHz to 1215 MHz) shall not exceed -40 dBm per one KHz of receiver bandwidth.

### **6.3.4 Transmitter Pulse Spacing**

The transmitted pulse spacing measured between the half height leading edge of the first pulse to the half height leading edge of the second pulse shall be 12 microseconds with a tolerance of plus and minus 0.25  $\mu$ sec.

### **6.3.5 Transmitter Pulse Repetition Frequency**

The transmitter shall be capable of continuous operation at a transmission rate of 2700 pulse pairs per second (PPS) with a tolerance of 90 PPS.

Random 'squitter' pulse pairs shall be added as required so that the average pulse repetition frequency (PRF) does not fall below a transmission rate of 700 PPS, except during identification transmission.

## **6.4 Transmitter Identification**

### **6.4.1 Pulse Pair Format**

During transmission of the Morse Code Identification the transmission shall comprise a series of paired pulses transmitted at a repetition rate of 1350 PPS.

In order to preserve a constant duty cycle an equalizing pulse pair shall be transmitted 100  $\mu$ sec (tolerance 10  $\mu$ sec) after each identity pulse pair.

### **6.4.2 Identification Keying**

The identification signal shall employ the International Morse Code and consist of two or three letters.

The identification signal shall be transmitted by dots and dashes at a speed of approximately seven words per minute. The dots shall have duration of 0.1 to 0.16 seconds. Dash duration should be typically three times that of the dot. The interval between dots and dashes shall be equal to one dot, and the interval between letters shall be not less than three dots.

Means shall be provided for suppressing the identification signal as required during times when the DME is not available for operational use.

When the associated localizer is in operation, a synchronized identification keying signal shall be supplied from the localizer to the DME in place of the DME identification

keyer. The synchronized DME identification keying signal shall occur once during a 40 second period during which the localizer identification is transmitted at least four times.

During the transmission of the DME identification characters, replies to aircraft interrogations shall be suppressed.

## **6.5 Traffic Capacity**

The DME shall be capable of handling at least 100 aircraft. Should the peak traffic in an area exceed 100 aircraft, the DME should be capable of handling that peak traffic.

## **6.6 Transmitter Load Limiting**

When the DME loading exceeds 90% of the maximum transmission rate the receiver sensitivity shall be reduced to limit replies so as to ensure the maximum permissible transmission rate is not exceeded. The range of sensitivity reduction available shall be at least 50 dB.

## **6.7 Accuracy**

The station delay shall be capable of being set at 50  $\mu$ sec and maintained at between 49.5 and 50.5  $\mu$ sec.

## **6.8 Receiver Sensitivity**

With a single interrogating signal having the correct pulse spacing and nominal frequency shall trigger the DME receiver if the peak power density at the antenna is at least -103 dBw/m<sup>2</sup>.

The corresponding DME reply efficiency shall be at least 70%.

## **6.9 Receiver Decoding**

The Receiver shall accept pulse pair signals having pulse duration of  $(3.5 \pm 0.5)$   $\mu$ sec, and a nominal pulse pair spacing of 12  $\mu$ sec.

For a pulse spacing change of up to 1  $\mu$ sec from the nominal value of 12  $\mu$ sec the receiver trigger sensitivity shall not be reduced by more than 1 dB.

The receiver shall reject pulse signals having pulse spacing 14  $\mu$ sec or greater and 10  $\mu$ sec or less.

## **6.10 Receiver Dynamic Range**

The performance of the DME shall be maintained over the range of signal levels represented by a minimum power density at the antenna of -103 dB/m<sup>2</sup> up to a maximum power density at the antenna of -22 dBw/m<sup>2</sup>

## **6.11 Receiver Band Width**

### **6.11.1 Minimum On Channel**

The minimum bandwidth shall be such that the trigger sensitivity shall not decrease by more than 3 dB when the total receiver drift is added to an incoming interrogator frequency drift of  $\pm 100$  KHz.

### **6.11.2 Adjacent Channel Rejection**

Signals greater than 900 KHz removed from the desired nominal frequency and having a power density at the antenna of  $-22$  dBw/m<sup>2</sup> shall not trigger the receiver.

## **6.12 Dead Time**

The DME shall be rendered inoperative for a period not exceeding 60  $\mu$ sec following decoding of a valid interrogation signal.

Means for adjustment of this dead time shall be provided.

## **6.13 Continuous Wave Rejection**

Means shall be incorporated to minimize desensitizing of the receiver from the reception of spurious on channel continuous wave (CW) transmissions.

## **6.14 Echo Suppression**

Means shall be provided minimizing the effect of multi path signal disturbance.

## **6.15 Recovery Time**

Recovery of the receiver sensitivity following the reception of a signal between 0 dB and 60 dB above the minimum sensitivity level shall occur within 8  $\mu$ sec.

The recovered level shall be within 3 dB of the minimum sensitivity level.

## **6.16 Antenna**

### **6.16.1 Features**

The DME antenna shall be a vertically polarized stacked dipole array having uni-directional coverage.

The antenna radiation shall be such as to provide coverage equal to that of the associated localizer facility.

The antenna shall operate over the 960 MHz to 1215 MHz frequency range with a VSWR of less than 2, and without need for adjustment.

The antenna shall be fitted with two sampling pickup probes for monitoring purposes.

#### **6.16.2 Antenna Mounting**

The DME antenna shall be either:

- mounted on a suitable frangible pole nearby the glide path mast. It shall have an Obstruction light mounted at the top, but be capable of tilting to allow easy access for maintenance.
- Mounted on the Glide Path mast

#### **6.17 Coverage**

The DME coverage shall be at least that of the associated localizer.

The peak pulse power density within the coverage area shall not be less than -89 dBw/m<sup>2</sup> under all operational weather conditions.

#### **6.18 Monitor**

##### **6.18.1 Configuration**

The DME shall be equipped with two independent monitors.

Each monitor shall interrogate and receive replies via probe pickups mounted inside the antenna radome.

##### **6.18.2 Initiation of Monitor Action**

Monitor action shall be initiated if any of the following conditions are present:

- a. A change in the station delay of greater than 0.5 µsec from the assigned setting of 50 µsec.
- b. The spacing between the first and second pulse differs from the nominal value of 12 µsec by more than 1 µsec.
- c. A fall of 3 dB or more in the transmitter peak power output.
- d. A fall of 6 dB or more in the receiver minimum trigger sensitivity; provided that this is not due to overload protection desensitization.

### **6.18.3 Monitor Action**

The monitor system shall provide a warning to the designated control or monitoring points and cause radiation to cease if the station delay deviates outside tolerance.

The monitor system shall provide a warning to the designated control/monitoring points if pulse spacing, power output or receiver sensitivity deviate outside the limits in previous paragraph 3.18.2 - Initiations of Monitor Action.

Monitor action shall require agreement of an out of tolerance radiation from both monitors.

### **6.18.4 Changeover Time**

The time period to changeover DME transponders following the detection of an out of tolerance condition shall occur within 10 seconds.

## **7 Remote Status and Control**

### **7.1 Locations**

The operational status of the ILS-DME together with aural presentation shall be provided at the following locations:-

- a. Airport control tower cab,
- b. Radio equipment room, and the
- c. Technical Services Maintenance Centre.

### **7.2 Status**

The display of equipment parameter values and aural presentation of the identification keying shall be provided at the radio equipment room and the Technical Services Maintenance Centre.

### **7.3 Control**

A facility reset function shall be provided at the following locations:-

- a. airport control tower cab,
- b. radio equipment room, and
- c. Technical Services Maintenance Centre.

## **7.4 Runway Interlock Facility**

A runway interlock function shall be provided in two points, Technical Services Maintenance Centre and Control Tower with a Master Key switch in the Technical Services Maintenance Centre providing master control to either the tower or Maintenance room. Functionality shall be provided to switch each facility off independent of the runway select switch. A red indicator panel shall indicate when the facility is switched off. The system shall be designed to ensure that loss of tower communications will not affect the system operation when control is switched to the Technical Services Maintenance Centre.

## **7.5 Interface Existing Control Status Display**

The status and reset should be able to be integrated on to the control tower cab's existing "SELEX" Remote Status Unit. If not compatible than an additional remote status unit is to be provided and installed.

# **8 Standby Battery Supply**

## **8.1 Endurance**

The backup supply shall be capable of supporting the operation of each localizer, glide path, ILS-DME, and any associated ancillary equipment for a period of eight hours.

The localizer, glide path and DMEs shall each have individual backup supplies.

Ancillary equipment may share back supply with one of the other equipment's.

## **8.2 Battery Type**

The battery shall be made up from a bank of series connected sealed non-venting type AGM cells or Gel cell.

## **8.3 Charging**

The DC supply unit shall be capable of operating the localizer equipment whilst at the same time charging the battery bank from a fully discharged condition or when the battery bank is disconnected for maintenance.

When fully charged the Battery bank shall be operated as a floating back-up across the DC supply input to the equipment as appropriate.

The DC supply unit shall have provision for battery bank capacity discharge testing.



## **8.4 Protection**

### **8.4.1 Mechanical**

Cell terminals and inter-cell straps shall be fitted with non-conductive covers. The rack assembly supporting the battery bank shall be constructed to contain the batteries, and be secured to the building for earthquake protection.

### **8.4.2 Electrical**

The positive output supply of the battery bank shall be protected by a circuit breaker mounted on the battery bank support rack.

## **9 Environment**

### **9.1 Indoors**

The systems should operate under the following indoor climatic conditions:

Ambient temperature:	-10°C to +50°C (allowing for short term peaks up to +55°C)
----------------------	------------------------------------------------------------

Relative humidity:	maximum of 95% in the range -10°C to +35°C and maximum of 60% above +35°C
--------------------	---------------------------------------------------------------------------

The contractor shall insure the inside temperature, door alarm, smoke alarm and obstruction light failure detector are reported to a nominated control point agreed by the Cook Islands Airport Authority.

### **9.2 Outdoors**

The systems should operate under the following outdoor climatic conditions:

Temperature range:	-10°C to +60°C
--------------------	----------------

Relative humidity:	0% to 100%
--------------------	------------

Wind load:	Continuous 140km/hr and gusts of 220km/hr
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Ice load:	sustained 5 cm
-----------	----------------

Hailstones:	up to at least 1 cm diameter without damage to antenna radomes.
-------------	-----------------------------------------------------------------

The contractor shall insure the outside temperature sensor is reported to a control point agreed by the Cook Islands Airport Authority.

### **9.3 Vermin Ingress Protection**

Facilities shall feature suitable provisions for prevention of vermin ingress.

## **10 Drawings and Documentation**

### **10.1 Drawings**

Supplier shall provide as-built drawings of:

- site layout
- equipment building

### **10.2 Survey Data**

Surveyed co-ordinates in WGS 84 and elevation in m above mean sea level of

- centre of Localizer antenna array
- DME antennas
- Glide path towers

### **10.3 Technical Manuals**

2 sets of hard copy and 1 electronic version of the following manuals

- Systems manuals
- Training manuals
- Spares/inventory manuals
- Maintenance manuals

## **11 Spare Parts**

### **11.1 Facilities Spares**

To support the ILS/DME facility, two (2) of each unique module, and/or printed circuit card used in the localizer, glide path, DME, battery charger and ancillary equipment shall be supplied as maintenance spares.

Additionally one each of each unique RF changeover relay, circuit breaker, plus one packet (5) each of unique fuses, surge limiting and components, shall be supplied as maintenance spares.

During the warranty period Facilities spares may be used by the Installation Engineer, and replaced by the contractor. At Final Acceptance, the spares shall be replenished to a full stock.

## **11.2 Remote Status and Control**

To support new remote status and control facilities installed, one (1) of each unique module, printed circuit card and display device used in the system shall be supplied as maintenance spares.

Additionally one packet (5) each of unique fuse and surge limiting components used shall be supplied as maintenance spares at each site.

During the warranty period Remote status and control spares may be used by the Resident Maintenance Engineer, and replaced by the contractor. At Final Acceptance, the spares shall be replenished to a full stock.

## **12 Test Equipment and Tools**

### **12.1 Built-in**

To the degree practicable, built-in test equipment (BITE) routines shall be provided for confirming satisfactory operation or otherwise of the various electronic sub-assemblies.

### **12.2 Supplementary**

A set of recommended test instruments to facilitate the setting up and maintenance of localizer, glide path and DME facilities shall be provided at each of the facility buildings.

For each localizer, a portable battery operated ILS test set shall be provided for conducting field and runway testing. Measured parameters shall include, Signal level dBm, DDM, and SDM.

#### **12.2.1 Analysis Computer**

A computer with LCD display shall be provided at each facility building for interfacing to the equipment's for parameter setup and storage of results. The Tenderer shall include all the necessary software required for this purpose **in the tender**. One (1) spare laptop computer with software shall be included for ILS/DME.

A portable storage medium shall be provided for carrying results off site for evaluation at the TSMCC.

Applicable software required for further processing such results offsite shall also be provided.

### **12.3 Tools**

The Contractor shall provide at each facility building a Tool kit containing all tools necessary to complete normal maintenance.

## 13 Staff Training

Training is to be provided for 3 maintenance technicians. Training is to consist of both formal classroom on the systems operations and practical maintenance, adjustment and fault rectification on the equipment.

## 14 Acceptance Testing and Flight Inspection

Factory and site acceptance testing will be performed to demonstrate compliance with all requirements of these specifications.

Flight inspection will be required in accordance with ICAO Document 8071 Manual on Testing of Radio Navigation Aids Volume 1, to validate the instrument flight procedures published utilising the ILS/DMEs and to demonstrate signal in space compliance with ICAO Annex 10 Volume 1.

## 15 Technical Specifications Compliance Matrix

Tenderers are to complete this compliance matrix and submit it with their tender documents. Any comments or clarifications from bidders shall follow this table with clear reference to the “Specification Reference” number.

Specification Reference	Specification	Tenderers Reference	Compliance Y/N	Tenderers Remarks if applicable
<b>1</b>	<b>General</b>	NA	NA	NA
1.2	Equipment configuration			
1.3	Design, construction performance			
<b>3</b>	<b>Standards</b>			
<b>4</b>	<b>Site Civil Environment</b>	NA	NA	NA
4.1.1	Localiser			
4.1.2	Glide path			
4.1.3	DME			
4.2	Equipment shelters			
4.3.1	Electric			
4.3.2	Telecommunications			
4.4	Climatic Protection			
<b>5</b>	<b>Detailed Equipment Specifications</b>	NA	NA	NA
<b>5.1</b>	<b>Localiser</b>	NA	NA	NA
5.1.1	Radio Frequency			
5.1.2	Carrier modulations			
5.1.3.1	Identification modulation			
5.1.3.2	Identification keying			
5.1.4	Side band only signals			
<b>5.2</b>	<b>Localiser antenna &amp; course</b>	NA	NA	NA
5.2.1	Configuration			
5.2.2	Course alignment			
5.2.3	Displacement sensitivity			
5.2.4	Off course difference depth	NA	NA	NA

	modulation			
5.2.4.1	Linearity			
5.2.4.2	Minimum off course difference in depth modulation			
5.2.5	Modulation sum			
5.2.6	Course clearance ratio			
5.2.7	Course structure			
5.2.8	Vertical polarisation			
5.2.9	Coverage	NA	NA	NA
5.2.9.1	General			
5.2.9.2	Within 10nm			
<b>5.3</b>	<b>Localiser Monitoring</b>	NA	NA	NA
5.3.1	Configuration			
5.3.2	Initiation monitor action	NA	NA	NA
5.3.2.1	Integral monitor			
5.3.3	Monitor action	NA	NA	NA
5.3.3.1	Integral monitor			
5.3.4	Changeover time			
5.3.5	Restoration			
<b>5.4</b>	<b>Glide path Facility</b>	NA	NA	NA
5.4.1	Radio frequency			
5.4.2	Carrier modulations			
5.4.3	Side band only signals			
<b>5.5</b>	<b>Glide path antenna and Course Path</b>	NA	NA	NA
5.5.1	Configuration			
5.5.2	Path alignment			
5.5.3	Displacement sensitivity			
5.5.4	Below path diff in displacement modulation			
5.5.5	Change reversal			
5.5.6	Course path structure			
5.5.7	Coverage	NA	NA	NA
5.5.7.1	General			
5.5.7.2	Field strength			
<b>5.6</b>	<b>Glide path monitoring</b>	NA	NA	NA
5.6.1	Configuration			
5.6.2	Initiation monitor action	NA	NA	NA
5.6.2.1	Integral monitor			
5.6.2.1	Near field monitor			
5.6.3	Monitor action			
5.6.4	Changeover time			
5.6.5	Restoration			
<b>5.7</b>	<b>Glide Path Specific Equipment</b>	NA	NA	NA
5.7.1	Flight check equipment			
5.7.2	Glide path safety equipment			
<b>6</b>	<b>DME Specification</b>	NA	NA	NA
6.1	DME transponder			
6.2	Radio frequency			
6.3	Transmitter pulse shape Spectrum	NA	NA	NA
6.3.1	Shape			
6.3.2	Spectrum			
6.3.3	Spurious radiation			
6.3.4	Transmitter pulse spacing			
6.3.5	Transmitter pulse repetition			

	frequency			
6.4	Transmitter identification	NA	NA	NA
6.4.1	Pulse pair format			
6.4.2	Identification keying			
6.5	Traffic capacity			
6.6	Transmitter load limiting			
6.7	Accuracy			
6.8	Receiver sensitivity			
6.9	Receiver decoding			
6.10	Receiver dynamic range			
6.11	Receiver band width	NA	NA	NA
6.11.1	Minimum on channel			
6.11.2	Adjacent channel rejection			
6.12	Dead time			
6.13	Continuous wave rejection			
6.14	Echo suppression			
6.15	Recovery time			
6.16	Antenna	NA	NA	NA
6.16.1	Features			
6.16.2	Antenna mounting			
6.17	Coverage			
6.18	Monitor	NA	NA	NA
6.18.1	Configuration			
6.18.2	initiation monitor action			
6.18.3	Monitor action			
6.18.4	Changeover time			
<b>7</b>	<b>Remote Status and Control</b>	NA	NA	NA
7.1	Locations			
7.2	Status			
7.3	Control			
7.4	Runway interlock			
7.5	Interface existing display			
<b>8</b>	<b>Standby Battery Supply</b>	NA	NA	NA
8.1	Endurance			
8.2	Battery type			
8.3	Charging			
8.4	Protection	NA	NA	NA
8.4.1	Mechanical			
8.4.2	Electrical			
<b>9</b>	<b>Environment</b>	NA	NA	NA
9.1	Indoors			
9.2	Outdoors			
9.3	Vermin ingress protection			
<b>10</b>	<b>Drawing and Documents</b>	NA	NA	NA
10.1	Drawings			
10.2	Survey data			
10.3	Technical manuals			
<b>11</b>	<b>Spares</b>			
11.1	Facility spares			
11.2	Remote status and control			
<b>12</b>	<b>Test Equipment and Tools</b>			
12.1	Built in			
12.2	Supplementary			
12.3	Analysis computer			
12.4	Tools			
<b>13</b>	<b>Staff Training</b>			
<b>14</b>	<b>Acceptance testing &amp; Flight Inspection</b>			

## SECTION 3

### TENDER EVALUATION CRITERIA

Tenderers will be evaluated on the following criteria:

- a. **Relevant Experience**  
The Tenderer shall provide details of relevant experience
  - Description of previous projects
  - Value of the previous projects
- b. **Past Performance;** Past performance will assess the tendering firms performance in completing past projects to time and to the quality standards required. References and satisfaction of previous clients regarding the management of the project, project outcome and reliability of equipment provided and after sales service will be used. The following information would be required of their past performances;
  - The name or names of projects undertaken with contact details and names of referees
  - Quality standards required, tender price, variations and final costs
  - Details of OHS&R records
- c. **Compliance** with Performance Specifications
- d. **Time** required from award to delivery to Rarotonga International Airport and accepted by the Purchaser.
- e. **Price:** The fixed lump sum price is the sum that the Purchaser would be required to pay to the Supplier for the work provided.
- f. **Terms and Conditions** offered.
  - Proposed Terms and Conditions as submitted with the Tender

#### Evaluation Criteria Scores

Tasks	Possible Score
Relevant Experience	10
Past Performance	5
Compliance with Performance Specification	10
Time Required from Award to Commissioning	5
Price	60
Acceptance of Contract Terms & Conditions Offered	10
<b>Total</b>	<b>100</b>

**SECTION 4**  
**TERMS AND CONDITIONS**

*[Supplier's name]*

**“Supplier”**

**and**

***The Airport Authority***

**“Client”**

---

**AGREEMENT FOR PROVISION OF AN INSTRUMENT  
LANDING SYSTEM**

---



DATED

2015

BETWEEN

(“Supplier”)

AND

Airport Authority

(“Client”)

## BACKGROUND

- A. The Client operates the Rarotonga Airport.
- B. The Client wishes to upgrade the landing systems at Rarotonga airport with a new instrument landing system.
- C. The Supplier has agreed to supply to the Client an information technology solution in accordance with the terms and conditions set out in this Agreement.

## AGREEMENT

### 1. DEFINITIONS

- 1.1 Unless the context otherwise requires, the following expressions shall have the following meanings:

“**Agreement**” means this agreement and the schedules attached to it or incorporated into it by reference;

“**Base Application**” means the software specified in part 1 of schedule 3 and includes any Revisions, but excludes source code;

“**Business Requirements**” means the Client’s business requirements for which it requires the Supplier to provide an information technology solution, attached as schedule 1;

“**Confidential Information**” means information which is or has been disclosed by one party to the other, but does not include any information that is:

- a. on receipt, in the public domain, or that subsequently enters the public domain without any breach of this Agreement;
- b. on receipt, already known by the party receiving it;
- c. if the use or disclosure is required by law (including under the Official Information Act 2008), Ministers or parliamentary convention,
- d. at any time after the date of receipt, received in good faith from a third party; or
- e. otherwise required by law to be disclosed;

“**Customised Software**” means the Base Application as customised by the Modifications, but excludes source code;

**“Delivery Date”** means the date specified as such in schedule 8;

**“Documentation”** means the documentation that is described in part 4 of schedule 3 and includes any documentation associated with any Revision;

**“Factory Acceptance Tests”** means such tests as the Client determines to be reasonably necessary to ensure that the Solution is acceptable;

**“Factory Site”** means the factory site specified in schedule 8;

**“Force Majeure Event”** means any event that is beyond the reasonable control of the party immediately affected by the event (including where the Supplier has failed to make due payment because of an event beyond its reasonable control). A Force Majeure Event does not include any risk or event that the party claiming could have prevented or overcome by taking reasonable care;

**“Hardware”** means the hardware (if any), including operating system and any other software required for the hardware to operate, to be supplied by the Supplier to the Client, as described in schedule 4;

**“Installation Date”** means the date specified as such in schedule 8;

**“Intellectual Property”** means copyright, patents, designs, trademarks, trade names, goodwill rights, trade secrets, confidential information and any other intellectual proprietary right or form of intellectual property;

**“Maintenance Plan”** means the maintenance plan attached as schedule 6;

**“Modifications”** means modifications to the Base Application, as specified in part 2 of schedule 3;

**“Project Plan”** means the project plan attached as part 1 of schedule 2;

**“Revision”** means any modification to the Base Application in the nature of an improvement made to correct program faults or other defects or to effect enhancements to the functionality of the Base Application;

**“Site”** means the site specified in schedule 8;

**“Solution”** means a solution comprising the Customised Software, Third Party Software and Hardware;

**“Specifications”** means the specifications for the Base Application and the Modifications attached as part 2 of schedule 2;

**“Third Party Software”** means the software (if any) specified in part 3 of schedule 3;

**“VAT”** means value added tax imposed under the Value Added Tax Act 1997;

**“Working Day”** means a day that is not a Saturday, Sunday or statutory holiday in Rarotonga, Cook Islands.

## **2. SCOPE**

- 2.1 The Supplier shall provide a solution to the Client that meets the Business Requirements. The Client shall pay the Supplier in accordance with the terms and conditions of this Agreement.

## **3. PRIME CONTRACTOR**

- 3.1 The Supplier is appointed by the Client as prime contractor to meet the Business Requirements, and the Supplier accepts such appointment.
- 3.2 Without limiting the Supplier's obligations under clause 3.1, the Client acknowledges that the Supplier shall provide the Solution.
- 3.3 The Supplier may engage subcontractors or third parties to enable the Supplier to provide the Solution and/or to perform its obligations under this Agreement.

## **4. DEVELOPMENT OF MODIFICATIONS**

- 4.1 The Supplier shall develop the Modifications in accordance with the Specifications and the Project Plan.
- 4.2 Either party may suggest changes to the Specifications in accordance with clause 10.

## **5. DELIVERY AND INSTALLATION**

- 5.1 The Supplier shall deliver the Customised Software, the Third Party Software, the Documentation and the Hardware to the Site on the Delivery Date.
- 5.2 The Supplier shall, on or before the Installation Date and at no additional charge, install the Hardware and install the Customised Software and the Third Party Software on the Hardware, at the Site.

## **6. FACTORY ACCEPTANCE**

- 6.1 The Supplier shall provide 30 days' notice to the Client of the availability of Factory Acceptance Tests.
- 6.2 The Client will notify the Supplier within 30 days as to whether it wishes to undertake Factory Acceptance Tests. If such notice is provided the Supplier must ensure that the Solution is available for the Client (or their delegation) to conduct reasonable tests at the Factory Site or some other site agreeable to the Client.

## **7. FINAL ACCEPTANCE**

- 7.1 The Client shall, within 14 days of the Installation Date, commence testing the Solution to ensure that the Solution performs in

accordance with the Specifications and meets the Business Requirements ("Acceptance Tests"). The Acceptance Tests shall be conducted during the period specified in the Project Plan.

- 7.2 The Client shall notify the Supplier of any failure of the Solution to pass the Acceptance Tests. On receipt of notice under this clause, the Supplier shall promptly remedy the failure and the Client shall then re-run the Acceptance Tests. Where the Client re-runs Acceptance Tests under this clause, the Client shall have the same time period for re-testing as the period specified for initial testing under the Project Plan and the Project Plan shall be extended accordingly.
- 7.3 Failure of the Solution to pass the Acceptance Tests within 1 month following the Acceptance Tests first being commenced under clause 7.1 shall be deemed to be a breach of this Agreement.
- 7.4 Receipt of notice from the Client that the Solution has passed the Acceptance Tests will constitute "Final Acceptance" for the purposes of payment in accordance with schedule 7.

## **8. HARDWARE**

- 8.1 The Hardware shall be supplied to the Client on the manufacturer's standard terms and conditions, a copy of which is included in the Documentation. Despite any provision to the contrary in the terms and conditions referred to in this clause, risk in the Hardware shall pass to the Client on Acceptance and title to the Hardware shall pass on payment in full for the Hardware. The Client shall on request from the Supplier sign all documentation as required by the manufacturer/distributor of the Hardware necessary to purchase the Hardware, provided that the Client may, following review of such documentation (including price and payment terms), elect to source hardware itself. The Supplier shall nevertheless have the same obligations to meet the Business Requirements as if the Supplier had sourced the Hardware, provided that the hardware sourced by the Client meets (or exceeds) the specifications of the Hardware.

## **9. LICENCE**

- 9.1 The Supplier grants to the Client a non-exclusive, perpetual licence to use:
  - a. the Customised Software and to make copies of the Customised Software for the Client's security, backup and archival purposes;
  - b. the Documentation.
- 9.2 The Supplier shall, at no additional charge, provide Revisions to the Client (and install each Revision if requested by the Client to do so) from time to time as and when they become available, but in any event at least every 12 months. All Revisions supplied to the Client must be compatible with the other components of the Solution and the Supplier shall, at its own cost, modify each

Revision to the extent necessary to achieve compatibility with the other components of the Solution.

## **10. CHANGE CONTROL PROCEDURE**

- 10.1 Before the Acceptance Tests are begun, either party may suggest a change to the Specifications ("Change Request"). A Change Request must contain a detailed and complete explanation of the proposed changes.
- 10.2 On receipt from the Client of a Change Request, or if the Change Request has been initiated by the Supplier prior to the Supplier acting on that Change Request, the Supplier shall provide to the Client an estimate in writing of the time and cost involved in implementing the Change Request ("Estimate").
- 10.3 The Client shall within seven days of receiving an Estimate advise the Supplier whether it wishes the Supplier to provide further details of the Change Request.
- 10.4 If the Client requests the Supplier to provide further details of the Change Request under clause 10.3 or following receipt to the Client's satisfaction of further details of the Estimate and/or a revised Estimate provided by the Supplier following negotiation under clause 10.5b, the Supplier shall provide to the Client (as applicable) with:
  - a. revised Specifications;
  - b. a revised Project Plan; and
  - c. a fixed price for the Change Request;which shall be signed off by both parties and the revised Specifications and revised Project Plan shall replace the existing Specifications and Project Plan.
- 10.5 If the Client, after having received an Estimate under clause 10.3, does not accept the Estimate, the Client may:
  - a. cease to pursue the Change Request, in which case the then existing Specifications and Project Plan shall continue to apply; or
  - b. request further details of, and/or negotiate, a revised Estimate.

## **11. TRAINING**

- 11.1 The Supplier will provided training to Client personnel in accordance with the specifications in schedule 5.

## **12. MAINTENANCE**

- 12.1 The Supplier will complete maintenance in accordance with the Maintenance Plan detailed in schedule 6.
- 12.2 The Client will pay for the maintenance services provide under clause 12.1 in accordance with the Maintenance Plan.

### **13. CLIENT OBLIGATIONS**

- 13.1 The Client shall prepare the Site in accordance with the reasonable instructions or directions of the Supplier, and provide access to the Site, for the installation of the Software.
- 13.2 The Client must provide the Supplier with full and safe access to the Site as is reasonably required by the Supplier.
- 13.3 The Client shall make available to the Supplier assistance, including personnel, information, facilities, services and equipment reasonably required by the Supplier for the performance of its obligations under this Agreement, provided that the Supplier gives reasonable notice to the Client of the assistance required.

### **14. CHARGES AND PAYMENT**

- 14.1 The Client must pay the Supplier the amounts specified in schedule 7 in accordance with the timing specified in schedule 7.
- 14.2 The Client may withhold payment of any part of an invoice issued by the Supplier if the Client genuinely disputes that the amount is owed.

### **15. PROTECTION OF INTELLECTUAL PROPERTY**

- 15.1 The Client acknowledges that the Supplier (or its suppliers) is the sole owner of all rights (including Intellectual Property rights) in the Customised Software and the Documentation supplied under this Agreement.
- 15.2 The Client must not, except as permitted by clause 9.1a, nor may it permit any other person to:
  - a. copy, alter, modify, reproduce, reverse assemble, reverse compile or enhance the Customised Software and/or the Documentation;
  - b. alter, remove or tamper with any trade marks, any patent or copyright notices, or any confidentiality, proprietary or trade secret legend or notice, or any numbers, or other means of identification used on or in relation to the Customised Software and/or the Documentation; or
  - c. do any act that would or might invalidate or be inconsistent with the Supplier's Intellectual Property rights.
- 15.3 The Supplier indemnifies the Client against any losses, costs, expenses, demands or liability whether direct, indirect, consequential or otherwise, and whether arising in contract, tort (including in each case negligence), or equity or otherwise, arising out of a claim by a third party alleging that use by the Client of the Customised Software or the Documentation by the Client is an infringement of that third party's Intellectual Property rights.

### **16. CONFIDENTIALITY, SECURITY AND PUBLICITY**

- 16.1 The parties recognise and acknowledge the confidential nature of the Confidential Information.

- 16.2 Neither party may use or disclose any Confidential Information other than:
- a. to its employees to the extent necessary;
  - b. with the express prior written consent of the other party; and
  - c. to its professional advisers.
- 16.3 Each party agrees to implement such security arrangements as may be necessary to ensure that the secrecy of the Confidential Information is preserved.
- 16.4 Neither party may advertise or publicly announce any matter relating to the existence or the contents of this Agreement without the other party's prior written consent.

## **17. WARRANTIES**

- 17.1 The Supplier warrants that:
- a. it owns the Intellectual Property in the Customised Software, that the Customised Software is original, that it does not infringe the Intellectual Property of any third party and that it has the right and authority to grant a licence to the Client to use the Customised Software;
  - b. the Customised Software shall be free from material defects and known errors and that any known errors shall be corrected before the Installation Date;
  - c. the Solution shall be properly installed and operate in accordance with the Specifications and the Business Requirements, including following the implementation of any Revisions;
  - d. it shall perform in accordance with the Project Plan;
  - e. the Documentation shall provide adequate instructions and detail to enable the Client to make proper use of the Solution;
  - f. any training to be supplied shall be sufficient to enable those employees of the Client completing such training to be provided with the knowledge to make full use of the Solution;
  - g. it has adequate insurance cover for all normal commercial risks, to ensure that any problems encountered by the Supplier shall not result in disruption to the efficient performance of this Agreement; and
  - h. it shall carry out its obligations with care, skill and diligence and shall employ personnel, techniques, methods, procedures and materials of a high quality and standard in accordance with best computing practice to ensure its obligations are discharged to the best professional standards.

## **18. TERMINATION**

18.1 Either party may terminate this Agreement immediately by notice in writing:

- a. upon the other party committing any breach of this Agreement that is incapable of remedy;
- b. upon the other party failing to remedy any breach of this Agreement that is capable of remedy within 30 days of notice of that breach having been given by the non-defaulting party to the other party; or
- c. upon the commencement of liquidation or the insolvency of the other party (except for the purposes of solvent amalgamation or reconstruction) or upon the appointment of a receiver, statutory manager or trustee of the other party's property or upon an assignment for the benefit of the other party's creditors or upon execution being levied against the other party or upon the other party compounding with its creditors or being unable to pay its debts in the ordinary course of business.

## **19. FORCE MAJEURE**

19.1 Either party may suspend its obligations to perform this Agreement if it is unable to perform as a direct result of a Force Majeure Event. Any such suspension of performance must be limited to the period during which the Force Majeure Event continues

19.2 Where a party's obligations have been suspended pursuant to clause 19.1 for a period of 30 days or more, the other party may immediately terminate this Agreement by giving notice in writing to that party.

## **20. ASSIGNMENT**

20.1 The Supplier shall not be entitled to assign its rights under this Agreement without the prior written consent of the Client.

## **21. FURTHER ASSURANCES**

21.1 The parties must each do all such further acts (and sign any documents) as may be necessary or desirable for effecting the transactions contemplated by this Agreement.

## **22. AMENDMENTS**

22.1 Except as specifically provided, no amendment to this Agreement will be effective unless it is in writing and signed by both parties.

## **23. WAIVER**

23.1 No exercise or failure to exercise or delay in exercising any right or remedy by a party shall constitute a waiver by that party of that or any other right or remedy available to it.

## **24. NON-MERGER**



- 24.1 The agreements, obligations and warranties contained in this Agreement shall not merge on completion of the transactions contemplated by it but will remain in full force until satisfied.

## **25. PARTIAL INVALIDITY**

- 25.1 If any provision of this Agreement or its application to any party or circumstance is or becomes invalid or unenforceable to any extent, the remainder of this Agreement and its application shall not be affected and shall remain enforceable to the greatest extent permitted by law.

## **26. NOTICES**

- 26.1 Any notice or other communication in connection with this Agreement shall be:
- a. in writing;
  - b. marked for the attention of the person specified in schedule 9 or any replacement person notified by the relevant party; and
  - c. left at the address or sent by prepaid post or facsimile to the address or facsimile number of the relevant party specified in schedule 9 or any replacement address or facsimile number notified by that party.
- 26.2 Notices or other communications are deemed received:
- a. if delivered by hand, on delivery;
  - b. if delivered by post:
    - (i) on the third day following posting if sent and received within the Cook Islands; and
    - (ii) on the tenth day following posting to or from an overseas destination.
  - c. if delivered by facsimile, on production of a transmission report by the machine from which the facsimile was sent in its entirety to the facsimile number of the recipient, specifying the correct number of pages sent, the date and time of transmission and that transmission was successful, provided that the onus of proving receipt shall be on the sender.

## **27. DISPUTE RESOLUTION**

- 27.1 Where any dispute arises between the parties concerning the circumstances, representations, or conduct giving rise to the Agreement, no party may commence any court or arbitration proceedings relating to the dispute unless that party has complied with the procedures set out in this clause 27.
- 27.2 The party initiating the dispute ("the first party") must provide written notice of the dispute to the other party ("the other party") and nominate in that notice the first party's representative for the

negotiations. The other party must within seven days give written notice to the first party naming the other party's representative for the negotiations. Each representative nominated shall have authority to settle or resolve the dispute.

27.3 If the parties are unable to resolve the dispute by discussion and negotiation within 14 days of receipt of the written notice from the first party, then the parties must immediately refer the dispute to mediation.

27.4 The mediation must be conducted in terms of the LEADR New Zealand Inc Standard Mediation Agreement. The mediation must be conducted by a mediator at a fee agreed by the parties. Failing agreement between the parties, the mediator shall be selected and his or her fee determined by the Chair for the time being of LEADR New Zealand Inc.

27.5 The place of mediation will be Auckland, New Zealand.

## **28. GOVERNING LAW**

28.1 This Agreement shall be governed by Cook Islands law, and the parties submit to the non-exclusive jurisdiction of the courts of the Cook Islands.

**EXECUTED** as an agreement

**SIGNED** on behalf of *[Supplier's name]*  
by its duly authorised signatory:

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Signature

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Signatory

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Position held

**SIGNED** on behalf of The Airport Authority  
by its duly authorised signatory:

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Signature

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Signatory

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Position held

## **SCHEDULE 1**

### **BUSINESS REQUIREMENTS**

*An instrument landing system for Rarotonga International Airport, Cook Islands which complies with international aviation standards.*

*[include any further business requirements]*

## **SCHEDULE 2**

### **PROJECT PLAN AND SPECIFICATIONS**

#### **Part 1: Project Plan**

*(To be attached)*

#### **Part 2: Specifications**

*(To be attached)*

## **SCHEDULE 3**

### **SOFTWARE AND DOCUMENTATION**

#### **Part 1: Base Application**

*[Specify base application]*

#### **Part 2: Modifications**

*[Specify modifications, may also need to detail any interfaces required]*

#### **Part 3: Third Party Software**

*[Specify third party software]*

#### **Part 4: Documentation**

*[Specify documentation]*

## **SCHEDULE 4**

### **HARDWARE**

*[Specify hardware]*

## **SCHEDULE 5**

### **TRAINING**

Training is to be provided for 3 maintenance technicians. Training is to consist of both formal classroom on the systems operations and practical maintenance, adjustment and fault rectification on the equipment.

*[Provide further details of dates, times and type of training]*

## SCHEDULE 6

### MAINTENANCE PROGRAMME

*[Specify maintenance programme]*

## SCHEDULE 7

### CHARGES AND PAYMENT

*The total amount payable by the Client is: [enter amount]*

*Payment will be by instalment as follows:*

Event	Percentage	Amount
On execution of this Agreement	10%	[enter amount]
On Factory Acceptance	40%	[enter amount]
On Final Acceptance	50%	[enter amount]

## SCHEDULE 8

### SITE, DELIVERY DATE AND INSTALLATION DATE

Site: *Rarotonga Airport, as directed by the Client.*

Factory Site: [Specify the location of the factory]

Delivery Date: *[Specify delivery date]*

Installation Date: *[Specify installation date]*

## SCHEDULE 9

### CONTACT DETAILS

	Client's Contact	Supplier's Contact
For the attention of:		
C.C.		

	Client's Contact	Supplier's Contact
<b>Delivery address:</b>		
<b>Postal address:</b>		
<b>Fax:</b>		
<b>Email:</b>		
<b>Phone:</b>		