



**Project Identification Brief  
for**

**Upgrading of Faleolo International Airport Aviation  
Meteorological Observation System (AMOS)**

Submitted by the

**Ministry of Natural Resources, Environment and  
Meteorology**

With the support of

Samoa Airport Authority  
And  
Ministry of Works, Transport and Infrastructure  
(Aviation Division)

For the

**Cabinet Development Committee**

**1. Sector**

Meteorology and Aviation

**2. Executing Agency**

Ministry of Finance

**3. Implementing Agency**

Ministry of Natural Resources, Environment and Meteorology (MNREM)  
And the Samoa Airport Authority (SAA)

**4. Summary of Issues**

- i. Meteorological Sensor Equipment, Data Processing, Weather Office Display and Control Tower Display Units estimated at SAT\$738,000 to be funded by a donor;
- ii. Inspection, Installation, testing, training, aviation fees & accommodation estimated at SAT\$140,000 to be funded by a donor;
- iii. Spare parts, documentation and training manuals estimated at SAT\$274,000 to be funded by a donor;
- iv. Refurbishment of the SAA Old Control Tower Building to fully accommodate the Meteorology Aviation Services Office at an estimated cost of SAT\$50,000 to be funded by the Government;
- v. Draft a bill for implementation of aviation meteorology cost recovery for Cabinet approval

Both Ministries involved have identified the necessary personnel but a financial commitment has yet to be made. It is anticipated that combined donors would be able to get this project off the ground before the current instruments at Faleolo International Airport become obsolete and worn out.

**5. Background of the Project**

**This project is driven by the following grounds:**

- i. The deteriorating conditions of the different meteorological observation instruments currently used by the SAA and the MNREM are obsolete and outdated. These need to be replaced with newer models to keep up with the latest available technology for effective provision of reliable and critical information for the aviation sector.

ii. The increasing number of flights arriving and departing from Faleolo International Airport day and night demands special and sophisticated meteorological instruments for observation of cloud base level, visibility, thunderstorms and lightning detector sensors. These instruments are very costly for the Ministries to procure.

iii. To assure maximum safety at Faleolo International Airport and within Samoa airspace, it is critical to have both the SAA Airport Controller and the Meteorology Officer to view information from the same source at the same time from different locations. The two offices concerned currently employ different instruments resulting in different observations and information such as wind speed/direction and surface pressure being relayed to the airline pilots. Any flights bound for Faleolo International Airport had to get weather information from Samoa Meteorology Services via AIRWAYS about the current and expected weather conditions. A flight that is about 685 miles from Samoa can also get weather information from the Faleolo Control Tower. This practice raises a lot of concerns and complaints from airlines, as sometimes the information provided are completely different and inconsistent which can be confusing for the airline pilots in making critical decisions.

iv. The number of Special Weather Reports (SPECI) apart from hourly weather reports has increased in the last four years. There is a great need for new and up to date equipment in order to obtain fast, accurate and reliable meteorological data for Faleolo International Airport.

v. To ensure that the Faleolo International Airport fully complies with ICAO and WMO Quality Management System (QMS) for international aviation services and for the meteorology services to competently provide meteorological products to International Aviation services.

The aviation industry is one of the most significant users of meteorological services for many years, with no compensation for the services rendered. Airlines are paying millions of dollars to Meteorological Services in developed countries for provision of weather guidance products. The legal basis, policy, and guidance for cost recovery of meteorological services to aviation is covered in the Chicago Convention on International Civil Aviation (Article 15) Annex 3. This annex defines all services provided or arranged by the Designated Meteorological Authority. The MNREM is the sole Designated Meteorological Authority for Samoa. This means that MNREM has the sole rights in choosing the type of meteorological services to be provided by Samoa while Fiji and New Zealand Met offices carry out the rest of the required products where Samoa is incapable of producing it.

The SAA airport controller carried out the basic weather observations after a series of training by the staff of the Meteorology Division Weather Section

(previously Apia Observatory) until April 1997. When the Meteorology Division commenced its services at Faleolo International Airport in 1997, it relied on manual reading meteorological instruments while the SAA employed different analogue meteorological observation systems. This resulted in the two offices providing different values for the same meteorological elements at the same observation time. The purpose of having a meteorological observer at the Faleolo International Airport is to observe and record all weather elements on an hourly basis and non-schedule observations when a significant change in any weather element at the aerodrome and vicinity is detected. These observations data are passed onto the international meteorological network and onto AIRWAYS. It is a requirement for ICAO/ WMO to have a meteorology office at all international airports.

Currently, the Samoa Meteorology Services can only partially fulfil its services for the aviation industry due to lack of qualified staff in this area. There is a great need to fully establish Samoa's meteorology services to the aviation industry to comply with the ICAO/ WMO requirements and to ultimately assist the Ministry in its cost recovery purposes in the near future.

This project would facilitate one of the most fundamental areas of the aviation meteorological services for the aviation sector which includes high resolution quality data. This is also a step forward and an opportunity to develop Samoa's capacity through provision of all meteorological products required by the International Navigation for all flights landing and taking off from any Samoa airport.

The project would provide an Automated Meteorological Observation System (AMOS), a computer-based system that allows the aviation meteorological services at the airport to relay the most accurate weather information available, and to share the same information with SAA Control Tower at the same time. The installation of an AMOS at Faleolo International Airport facility allows for lower minimums on instrument approaches, increases operational safety and can make Faleolo International Airport more appealing to commercial operators. This system works first by collecting and verifying weather data from an array of sensors. The data is processed and disseminated through a computer based monitor at the aviation meteorology office in the old control tower and data can be viewed by the SAA airport controller in the new control tower. This weather information can be relayed to the departure terminal for pilot briefing on video display hooked directly to the AMOS system.

This is a continuation of a project proposal handed in by the Meteorology Division in 2004 while under the Ministry of Agriculture, Forests, Fisheries and Meteorology. The JICA Samoa Office has already funded and installed a new digital observation system for the Meteorology Division Weather Services section headquarters at Mulinuu, which was officially handed over to the Government of Samoa in September 2005. The original request also included upgrading of

meteorological observation systems for Faleolo International Airport and Maota Airport, but due to the high cost of Aviation Meteorology Observation Systems, the initial proposal was amended to a standalone digital observation system for the Meteorology Office head quarter at Mulinuu.

The Weather services section is partially serving the aviation sector through its 24-hour service, by conducting hourly and non-schedule weather observations at Faleolo International Airport and eight hours daily at Maota Airport mainly for Polynesian Airlines. This operation accounts for almost half of the total weather services section annual operational costs. However, about 8 percent is being recovered from route forecast issued for Polynesian Airlines. No compensation is received for observation data collected and passed on via Control Tower or AIRWAYS. In other countries for example, meteorology services are entitled to 10 or 15 percent of the total aircraft weights landing fee.

The cost recovery part of this project is closely connected to the government budget cutting and the revenue-earning scheme. Installation of the proposed AMOS system would enable the MNREM and SAA to recommend amendments to the current bill for the Government to include another 10 to 15 percent as an add-on to the current aircraft landing charges collected by the SAA with 10 percent of the total landing fee to be given to the MNREM. The AMOS system would add value to the hourly and non-routine weather observations at the Faleolo aerodrome as without these observations, other meteorological products with high values required by the aviation industry would not be produced and justified. The Samoa Aviation Act 1998, Part III (27, b), (29, xv, xviii) and Part IV (37) covers provision of aviation meteorological products for safety reasons and aviation charges. However, there is a need to amend this Act in order to facilitate a cost recovery for the local meteorology services.

This project is also expected to improve the data resolution for better scientific and technical knowledge.

## **6. Project Objective(s)**

- (i) To install Aviation Meteorological Observation System (AMOS) at Faleolo International Airport for the MNREM Meteorology Division and SAA Control Tower so that the two can share the same information at the same time, and for carrying out pilot briefing at the departure terminal;
- (ii) To refurbish the Old Control Tower to house the Aviation meteorology services and equipments;
- (iii) To enable MNREM to claim 10 percent of all aircraft landing fees for the services provided as a cost recovery measure. i.e. amendments to the existing legislation to allow the Government to add-on 10 to 15

percent on the current landing fees collected by the SAA for each aircraft type, and to accommodate the cost recovery plan for MNREM;

- (iv) To improve the quality of meteorological data for aviation services and to improve safety measures in order to meet the ICAO/WMO regulations for provision of meteorological data to the aviation sector;
- (v) To provide fast, accurate and reliable weather information at Faleolo International Airport.

## **7. Project Strategy**

The Project will deliver the following number of outputs. These outputs include:

- I. The replacement/upgrading of old weather observation system at Faleolo International Airport.
- II. Renovation of the Faleolo International Airport Old Control Tower building to include the cables and instruments display layout. The Government of through MNREM and SAA is responsible for renovation of the building structure.
- III. Installation of a stand alone automatic weather station at Maota Airport if funds permit.
- IV. Additional revenue to be earned by MNREM through provision of reliable meteorological observation data for aviation.

## **8. Project Implementation**

It is envisaged that this Project will commence as soon as possible as the current meteorological instruments at Faleolo International Airport are obsolete.

The SAA already houses the aviation meteorology office at Faleolo in its old Control Tower and Maota office in the Terminal building. SAA supports the development of the aviation meteorology services in Samoa and prioritises its concern for the safety of the public and the industry.

It is strongly recommended that the renovation work for the SAA Old Control Tower be completed before the AMOS system is installed.

## **9. Estimated Project Revenues/ Costs**

### **Income**

The income of this project will be derived from the following:

- i) Improved quality and increased resolution of weather observations data due to digital system;
- ii) Increased in the scientific and technical capacity of the labour force;
- iii) Aircraft pilots would directly access actual raw weather observation data and other meteorological products;
- iv) High possibility of substantial cost recovery from the 10 percent of total aircraft landing fees.

The type of instruments required has been decided based on an assessment and recommendation from the Meteorological Consultant (JICA Senior Volunteer) with support from the SAA and MNREM.

**Instruments Installation Costs**

i. Meteorological Sensor Equipments, data Processing, Weather office Display and Control Tower Display units	SAT\$738,000.00
ii. Inspection, Installations, testing, trainings, other fees	SAT\$140,000.00
iii. Spare Parts, documentation & Training Manuals	SAT\$274,000.00
<b>Total Capital Costs</b>	<b><u>SAT\$1,152,000.00</u></b>

The SAA supports the improvement of the meteorological services for the aviation sector by relocating the Weather Service office at Faleolo International Airport from the departure lounge to the Old Control Tower. It has also given a space for the Weather Service office at Maota Airport Terminal in Savaii.

**Refurbishment of Old Control Tower (Government of Samoa)**

- i) Renovation and installation of high capacity Air conditions = SAT\$50,000

**10. Project Justification**

- i) The current sets of meteorological instruments shared by the SAA and the MNREM Weather Service section at Faleolo International Airport are “obsolete” and in need of an “urgent replacement” condition;
- ii) There is a high possibility that the financial return from this project once completed with a Government approval of 10 to 15 percent increase of all aircrafts landing charges is quite substantial;
- iii) High quality weather records will help in minimising errors for short and

long term predictions, enhanced the efficiency of aviation operations, and will produce most accurate and reliable weather and climate information for scientific research.

## **11. Donor Funding**

### **Capital Costs Funding**

The first part of the project was completed in September 2005. A complete new set of up to date technology and high-resolution data observation system is currently in place at the Meteorology Office at Mulinuu. The instruments were purchased and installed by the Japanese company NEKEI Limited.

This proposal is a continuation of that project and it is strongly recommended the purchasing of Japanese made instruments as it is well known for its durable and easily replaceable parts.

The World Meteorological Organization (WMO) previously offered USD\$10,000 to assist with the procurement of a computer display system for Faleolo meteorology office for the current systems. However, due to the deteriorating conditions of the existing systems, it was recommended that this financial assistance be suspended until further requests.

## **12. Consultations with line Ministry**

Consultancies on this project have been carried out by JICA Senior Volunteer, Principal Scientific Officer Weather and the SAA Deputy General Manager and Technical Manager. It was taken into consideration the urgent need for meteorological instruments at Faleolo International Airport to be replaced as well as installation of an automatic weather station at Maota Airport.

On the technical side, there was a series of meetings and discussions between the MNREM and SAA on life span of instruments, operational and replacement costs for various meteorological instruments, data transportation method and displayed units. The discussions concluded that it is worth to upgrade the aviation meteorological observation systems as soon as possible to avoid further deterioration of current instruments.

On the policy side, the MNREM and MWTI Aviation Division had some discussions on the ICAO/WMO aviation meteorology regulations and Samoa aviation policy. The MWTI Aviation Division suggested that SAA and MNREM to have a single source of weather data information to avoid any mishaps.

This project is also in line with the newly introduced ICAO / WMO Quality Assurance System which requires certification of all operational activities and instruments at any international airport.

**13. Signature of Head Line Ministry**



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**CHIEF EXECUTIVE OFFICER, MNREM**

**14. Date**     **10 August 2006**