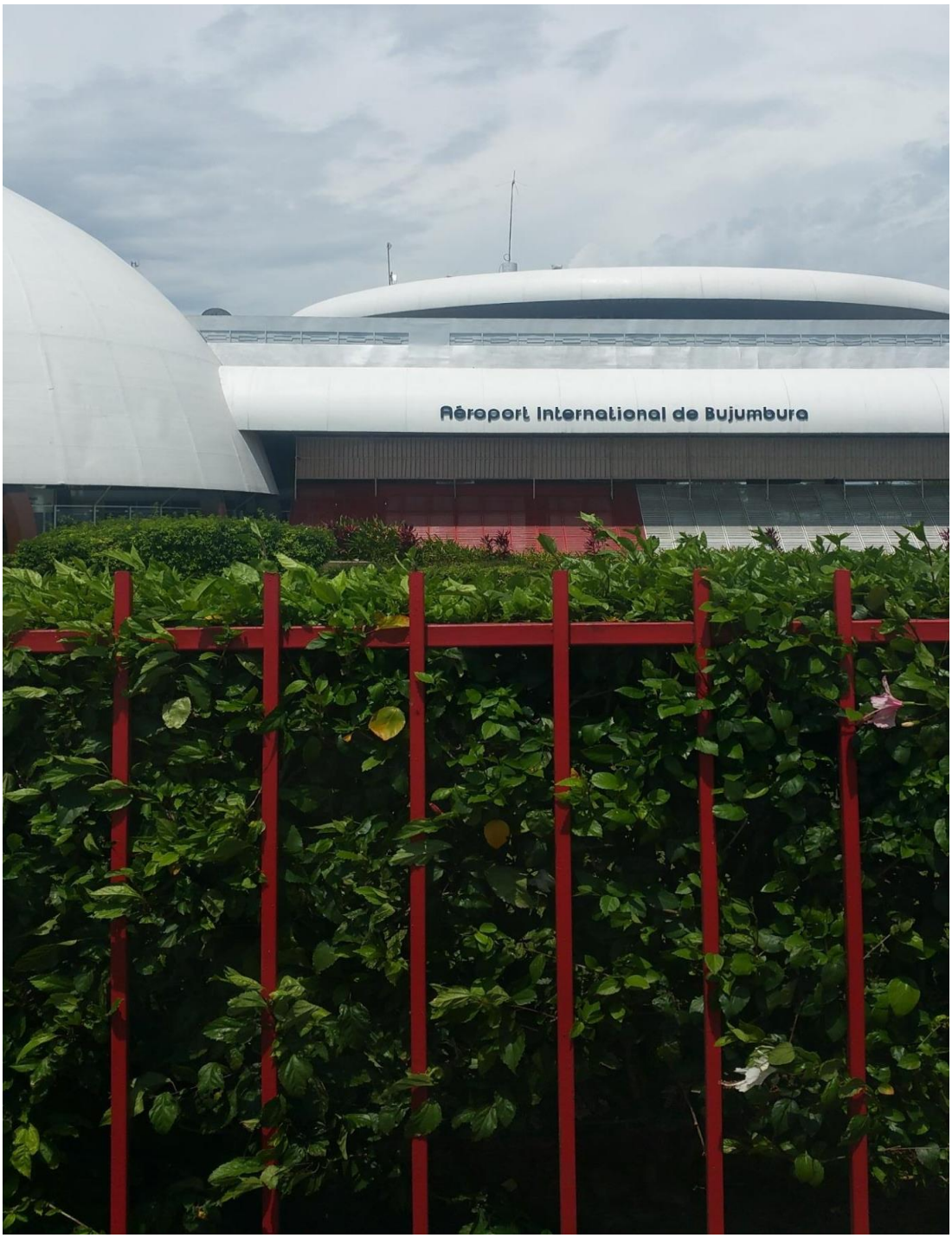
WIS DESIGN BURUNDI INTRNATIONAL AIRPORT



Bujumbura - Bugarama Radio Site Replacement & System Upgrade

Quotation Number:
QU-901 BUR ATC-0419 V1.0

Project Objective:
Bugarama Radio Air to Ground replacement with connecting MW Link to Bujumbura

Customer Name:
Burundi Civil Aviation Authority

Customer Reference: Bugarama-Bujumbura System

Document revision log

01	16.Apr.19	First issue	Ishmael	Imad
Rev	**Issue Date (DD.MM.YY)**	**Reason for Issue**	**Author**	**Approval**

INTRODUCTION LETTER

Dear Sirs,

WIS Inc is pleased to present our Design Solution for Burundi Remote Radios.

We do believe that our offer is in line with your expectations and requirements. We also hope to be selected as your preferred supplier for this project and are looking forward to the opportunity working with you once again helping you meeting your safety standards.

This offer contains several sections as per table of contents on page 3.

Should you require any additional information or clarification, please do not hesitate to contact the undersigned.

Yours sincerely,

Imad Ishmael
President

ABOUT JOTRON

The Jotron Group has evolved into one of the most respected names in the ATC and Coastal Communications sectors since the founding of Jotron AS in 1967.

In 1974, Jotron entered the ATC Communication market with the launch of the 5000 series VHF receiver. This was quickly followed in 1975 by the development of the innovative Low Level Modulation technology and the launch of the 5000 series VHF transmitter. This was the world's first product to incorporate the new technology, which is now used by all radio manufacturers.

AIR TRAFFIC CONTROL (ATC)

Since the first contract for Air Traffic Control (ATC) radios in 1974, Jotron has supplied more than 15,000 radios to the ATC market, over 90% of which have been for export markets.

Serving the world of airspace communication for over 40 years, Jotron now offers a state-of-the-art range of high-performance VHF and UHF aeronautical band radios for both civil and military ATC purposes.

Designed to surpass today's demanding standards for audio communications, the radios also incorporate the latest technology required for tomorrow's demands for digital data transmission modes, including full voice over IP functionality. The range's unique modular architecture offers the most compact radio system configuration possible, with increased reliability and simplified installation, inspection and maintenance.

Now established as the provider of choice for modern air traffic control systems, Jotron offers both standard and tailor-made solutions, incorporating parts and accessories from blue chip suppliers to the global market.

COASTAL RADIO SYSTEMS

Our range of costal radios are based on the same advanced VHF radio for ATC and feature full voice over IP functionality according to the latest ED137 standard.

RICOCHET RECORDING AND REPLAY

Ricochet is world-leading in synchronized recording and replay within civil and military ATC as well as marine markets. Ricochet is a fully integrated recorder for all types of voice data, radars, cameras and displays that are recorded for synchronized replay. Ricochet has been used in ATC with great success for more than 15 years, and today there are more than 400 Ricochet recording systems installed across the world.

Jotron's Ricochet captures, replays and analyses all data, ready to deliver the total scenario when reconstruction of an incident is imperative. The recording solution assists investigatory work - as well as search and rescue operations – and is also of huge benefit to air traffic controllers, supervisors and management for training and quality improvement purposes.

Our global customers now include civil and military aviation authorities, airport operators, airlines and offshore and onshore Oil and Gas companies.

SOLUTIONS OFFERED

The requested system is for a direct replacement of current installation consisting of ARCmk2 operator position in Bujumbura. In the current setup the ARC operates a Jotron TR7550 radio located at Bugarama using 4-wire E&M via an analog radio link and Jotron APM modems. A Jotron DRC remote controller also form part of the system. The DRC is capable of frequency and output power change on the radio and of reading the radio BITE information.
All equipment at Bugarama is 24-volt DC only, while Bujumbura has mains voltage with 24-volt DC backup in cabinet equipment.

General

Jotron will offer replacement of all radio and operator equipment with modern ED137 IP based equipment. Replacement of the new microwave link will be the responsibility of the customer.

No requirement has been made towards recording/logging of the equipment. It is possible to record the radio and operator position using VoIP. Due to sufficient bandwidth it is possible to record the audio straight of the radio. In this case the RRC7700 operator position will forward the incoming VoIP to the recorder. The RRC7700 also has a VoIP output with overlaid microphone and speaker audio. If the existing recorder system only has analogue capability, WIS offers VoIP to analogue converters. Pricing is available on request.

A completely new Ricochet Recorder System for VoIP is listed as an option.

SYSTEM DESCRIPTION:

Bugarama Subsystem

Two transceivers in main/standby on a single antenna is offered for Bugarama radio site. The switching of antenna and between main and standby radio is handled by the ACU3 and is fully automatic based on radio alarm state. The ACU has a built in PTT counter and will swap between main and standby radios at regular interval to ensure the same amount of usage hours on both systems. A radio in alarm state will never be selected and all switching is fully automatic and does not require any user intervention.

The transceivers will occupy the same amount of space as the current system. Each receiver and transmitter have its own LAN interface so a total of four LAN cables must attach to the new radio Link. WIS has included a DC-operated, DIN rail mounted LAN switch with enough ports to take the outputs of these transceivers.

Although there is no AC power at Bugarama, a Jotron PSU-7007 is included. The transmitter output power is slightly de-rated unless the full 28-volt DC is provided. The PSU-7007 has a DC-DC converter that ensures that the 24-volt supply is stepped up to 28 v-volts and hence a full 50W transmitter output power is available. There is no de-rating of receiver performance at 24 volts so Rx may be supplied directly from the DC-distribution system.

For reference WIS has included 50 meters of ½ inch coax together with a lightning protector and jumper cables with new antenna from Procom.

Operator RRC7700 Subsystem

The operator position will be an RRC 7700 touchscreen-based system. The touchscreen is offered with a flex-arm for mounting. It may also be flush mounted in desks. The microphone interface and speaker are 3HU tall, same height, but slightly wider compared to the as the ARC it replaces.

Typically, the one LAN cable will connect to a switch located in the equipment cabinet.

Equipment Cabinet Subsystem

We will install the DC powered LAN switch with PSU in the cabinet at the communication room. The LAN switch has dual DC supply, and both will be wired to the existing DC subsystem in the communication cabinet.

One LAN interface connect to the new provided Microwave link equipment, one to the RRC in the tower, one to the RCMS laptop computer and finally one to the recorder system (if applicable).

As a much more advanced alternative to the DRC in the current system, WIS is quoting a laptop with RCMS pre-installed.

Optional Recorder

An IP based recorder is listed as an option. An eight channels recorder is quoted. The quote includes everything required for installation in to an existing 19" cabinet (minimum 800mm deep), including speaker, 1HU Keyboard and monitor console, GPS time server (can be removed if other NTP time source is available). It is also possible to add analogue interface to the recorder. Pricing is available on request.

The recorder comes with software and licensing for one external replay station. The software is intended for installation on hardware provided by the customer.

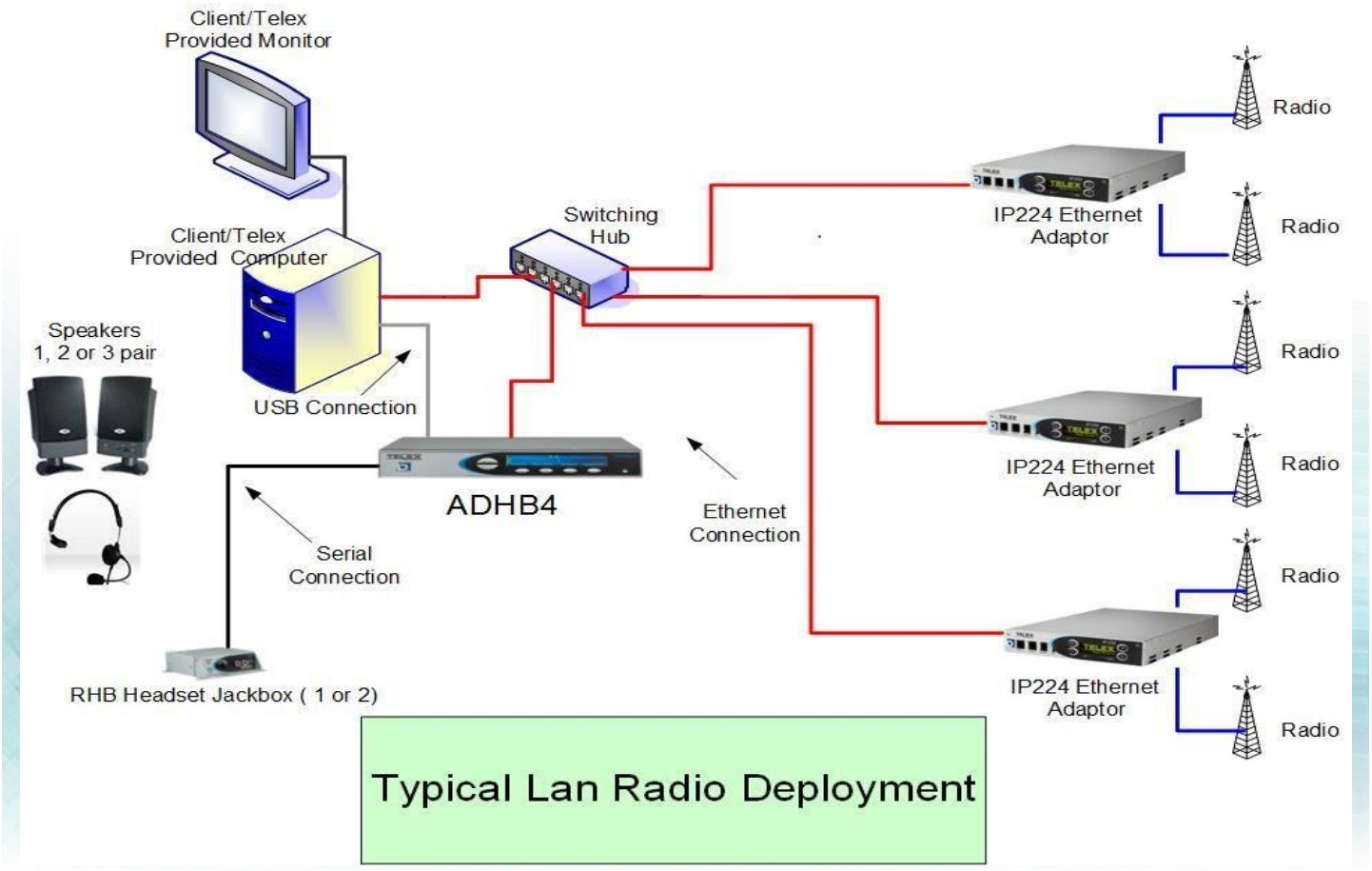
The recorder hardware is a HP DL20 with RAID hard-disks and dual power supply for maximum reliability.

Installation / Services

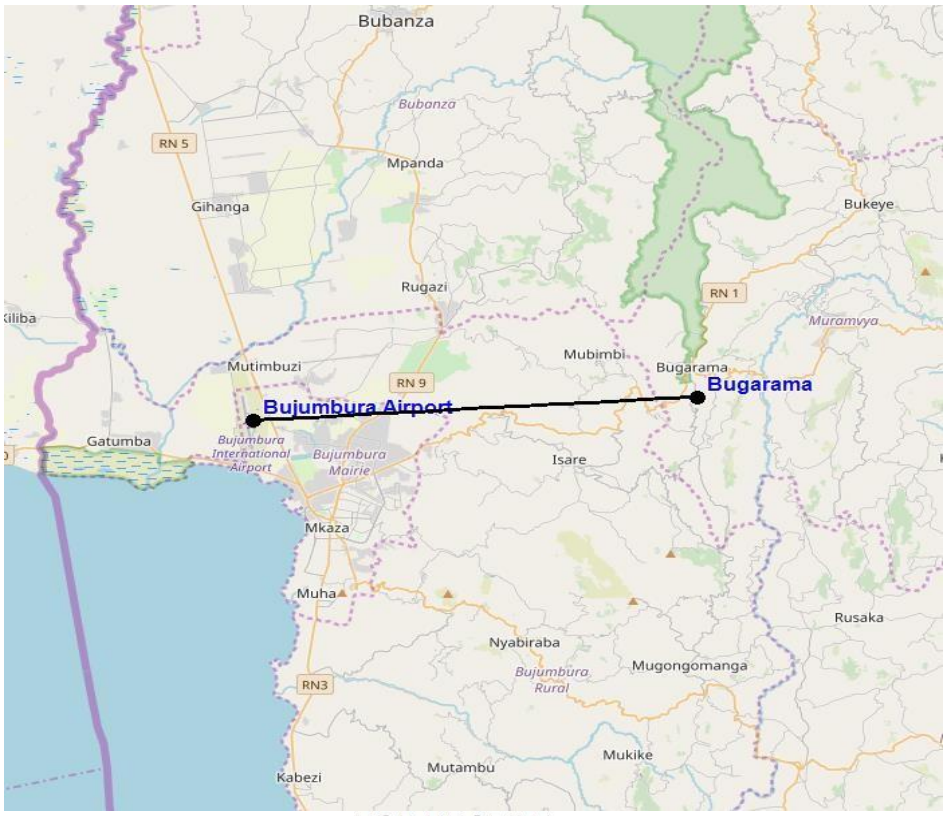
All equipment is shipped preconfigured and tested in accordance with the customers IP plan. Quote includes Project Management, Engineering, configuration, testing and logistics cost.

Also offered is 2 days of FAT and 3 days of factory training as options. Warm lunch and local transport between hotel and Jotron/WIS premises are included. Other expenses including accommodation and allowances is the responsibility of the customer.

NETWORK DESIGN:



LINK PLAN:



HOP PROFILE