Technical Description

AGIVIS 2000
Runway Visual Range Transmissometer System

Features

- AGI patented TMX Transmissometer design
- White light source for high accuracy measurements
- Automatic zero and light source aging compensation
- Automatic window contamination compensation
- Positive Pressure housing proof against atmospheric effects and foreign body ingress
- Comprehensive software health monitoring diagnostics

Introduction

The AGVIS 2000 Runway Visual Range (RVR) system is based upon an AGI patented design Transmissometer. Field deployments since the 1990s have demonstrated excellent reliability with zero field failures. The system comprises the following modules:

- AGI TMX Transmissometer (transmitter and receiver pair)
- Integrated Field Site Electronic Units
- A Control Tower processor rack.

Figure 1Field Site Installation

Runway Visual range is a calculated parameter requiring inputs from external sources as well as the visibility measured by the Transmissometer. The two external sources are:

- The Pilots Illuminance Threshold (PIT)
- The Runway Lighting value in candelas

The PIT value is provided by an AGI designed Background Luminance Monitor (BLM), built into the Transmitter part of the Transmissometer. Runway Lighting Values (RLV) have very wide tolerance

bands due to the marked differences that can occur between fittings due to lamp ageing and lens contamination. On this basis the AGI system requires a percentage lighting value that equates to 100%, 30%, 10%, 3%, 1% and 0% of the maximum RLV.

AGIVIS Transmissometer

A patented AGI TMX rotating sensor head is the heart of the Transmissometer and is contained in a fiberglass housing. Inside the TMX head a white light source projects a beam of light to a reflector unit located 10m distant. The reflected light path provides an effective base line of 20m and is detected on its return to the TMX head by a photodiode fitted with a special eye response filter. Using a white light source provides the best accuracy for transmittance measurements, obviating measurement errors that can be caused by some atmospheric effects.
Three pairs of Sensor heads can be used for CAT 111B airports covering touch down, mid point and stop end zones.

The TMX design enables

- Automatic zero correction
- Automatic Light source aging compensation

Inside the TMX housing is the Field Site Electronics Unit (FSEU) which processes the output from the TMX sensor head. It also processes the values from the BLM and the RLV. Resulting RVR values are transmitted to a Control Tower processor rack.
Window contamination causing light degradation is factored into the processing algorithms. thus providing automatic window dirtying compensation.
The FSEU uses proactive software health checking routines that continuously check the hardware and software integrity. Any errors or faults are instantly relayed to the operations console in the control tower processor rack.

The Control Tower Processor Rack

The Control Tower Processor Rack has three functions

- To drive AGI RVR display modules
- Receive RVR data from the FSEUs
- Transmit BLM and RLV values to the TMX Transmissometer units
- A central station to monitor the Transmissometer and FSEU units.

The AGI IRVR display, is a microprocessor-controlled unit with a TFT display. The Processor rack can support up to 10 RS422 outputs to drive remote displays.

A laptop PC is used as the central station to remotely link to the Transmissometer units. As well as providing a link to the sensor units the laptop also contains additional system health checking routines.

System Monitoring

The system continuously monitors its performance using in built software routines. Any problems detected are sent to the Laptop in the Control tower rack. System alerts are graded from "advisory" (e.g. Dirty Optics) through to "alarms" which disable RVR reporting (e.g. BLM failure).
Addition Fault diagnosis is enabled as follows

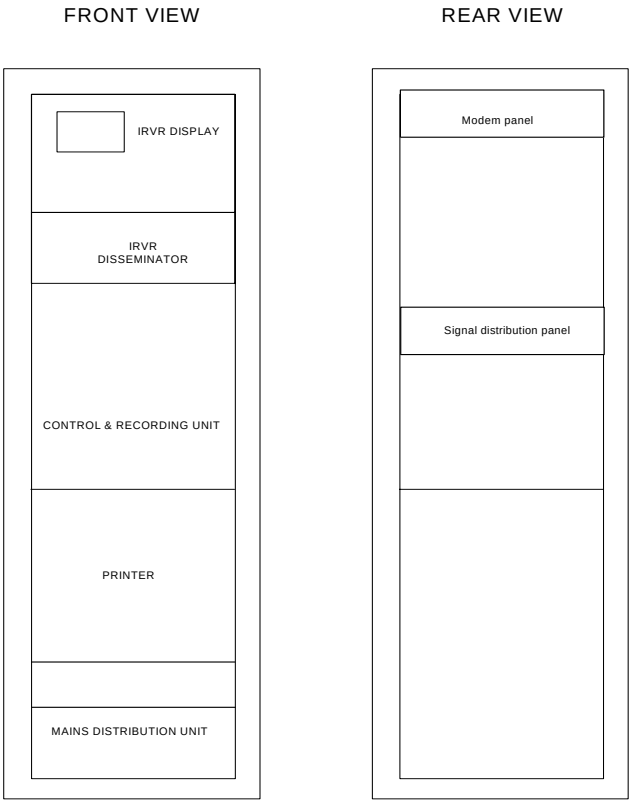
- A separate hand held terminal, enables a maintenance technician to communicate directly with the FSEU separately from the system. This terminal can command the units to carry out all the standard functions plus additional diagnostic routines.

- LED indicators are fitted to all modules at major signal nodes to enable at-a-glance signal tracing.

- The FSEU is a Line Replaceable Unit (LRU) which is brought back to the workshop for fault diagnosis and repair. This minimises system down time and enables work to be carried out in proper workshop conditions.

- Standard ASCII format is used for all messages which enables interrogation using standard equipment such as a VDU or printer.

Figure 2 Control Tower Rack



Technical Description

Technical Specification

Accuracy	
	±10m from 50m – 100m
	±25m from 400m - 800m
	±10% above 800m
EMC	
Emission Standard	EN 50081-1 part 1
Immunity Standard	EN 50082-2 part 2

System Physical Dimensions and Power

Field Site Sensor units	
TMX 1000 Transmissometer Housing	
Height:	1730 mm
Diameter	690 mm
Length	1110mm
Weight (including sensor)	50.5 Kg
Temperature Range	-30ºC - +50ºC
Relative humidity	0 - 100%
Environmental protection	IP 54
TMX 1000 Reflector Housing	
Height:	1570 mm
Diameter	690 mm
Length	1110 mm
Weight (including sensor)	35 Kg
Temperature Range	-30ºC - +50ºC
Relative humidity	0 - 100%
Environmental protection	IP 54

Control Tower Rack	
Height	2000 mm
Width	600 mm
Depth	650 mm
Temperature Range (Internal ambient)	0ºC - +30ºC
Relative humidity (non	0 – 95%
Power requirements	
TMX 1000 Transmissometer & reflector units	230V
	44 – 60Hz
Control Tower rack	230V
	44 – 60Hz

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