Exhibit 1 - Product Description

SRT-2000

The SAT-2000 Satellite Communications System, an all solid-state aircraft earth station (AES) that operates as part of the SATCOM system, is designed to be compatible with the INMARSAT AERO-I services. The SAT-2000 system consists of the SRT-2000 Satellite Data Unit and IGA-2000 Intermediate Gain Antenna. The SRT-2000 is a multi-channel receiver-transmitter that provides both voice and data channel to its users. The IGA-2000 Intermediate Gain Antenna allows the SAT-2000 to transmit and receive data and voice traffic efficiently; the diplexer/low noise amplifier is integrated into the antenna to improve system performance and reduce the number of line replaceable units (LRU).

Aero-I is intended for medium and short-haul airliners, but is also suitable for aircraft in the long-haul market, which fly mainly within the spot beam coverage. The use of a smaller system allows the SAT-2000 to take advantage of the spot beam feature of the Aero-I satellites to provide the benefits of telephony, fax, and real-time data communications. The SAT-2000 system has a 25 W high power amplifier (HPA) that supports up to six channels (1 data - 5 voice) within the spot beams.

1.1 SRT-2000 Satellite Receiver-Transmitter

The SRT-2000 transmits and receives packet mode data to/from the data link system (ACARS or CMU), and receives and transmits circuit mode services (voice) in analog form to/from the flight crew headphones and microphones via the audio management unit(AMU). Additionally, the SRT-2000 receives and transmits circuit mode data (voice, FAX, or PC MODEM) from passengers via an ARINC 746 compatible cabin telephone unit (CTU). Support of secure voice using STU-III compatible telephones is also available with the installation of an optional Cabin Interface Unit (CIU-906). The system also includes interfaces to optional on-board maintenance systems (CMC, CFDS, etc.) for system fault annunciation.

The SRT-2000 incorporates the ARINC 741 defined functions of the high power amplifier, RF unit (RFU), beam steering unit (BSU), and satellite data unit (SDU) into a single 8 MCU unit that weighs less than 35 lbs.

Figure 1.1 SRT–2000 Satellite Transmitter/Receiver

The SDU function of the SRT-2000 is the interface to all other aircraft systems. It contains all data processing functions, modems and channel tuning synthesizers including a voice CODEC (coder-decoder) and synthesizer pair for each voice channel.

The RFU function converts the broadband intermediate frequency (IF) from the SDU portion to L-band frequency before the signal is applied to the HPA function of the SRT-2000. The RFU function also accepts an amplified L-band signal from the low noise amplifier (LNA)/Diplexer and down converts it to the IF used by the SDU function.

The HPA function amplifies the signal for transmission. The HPA function feeds a measurement of the actual power transmitted back to the SDU function. The SDU function uses this measurement for power management.

The SRT-2000 also contains a 10.24-MHz high stability reference (HSR). The HSR generates high precision injection frequencies and digital clocks from this reference.

1.2 Equipment Specifications

CHARACTERISTIC	SPECIFICATION
Physical	
Size	8 MCU
Weight	Less than 35 LB (6-channels)
Electrical	
Input Power	97 to 134 VAC, 400 @ 40 Hz, single phase or + 28 VDC
Receiver input	
Frequency range	1530 - 1559 MHz
VSWR	2:1 max over input frequency range, 50 Ohms nominal
Transmitter output	
Frequency range	1626.5 to 1660.5 MHz
Output level	25 watts (maximum)

1.3 Hardware Overview

The block diagram below shows the function partitioning of the SRT-2000.

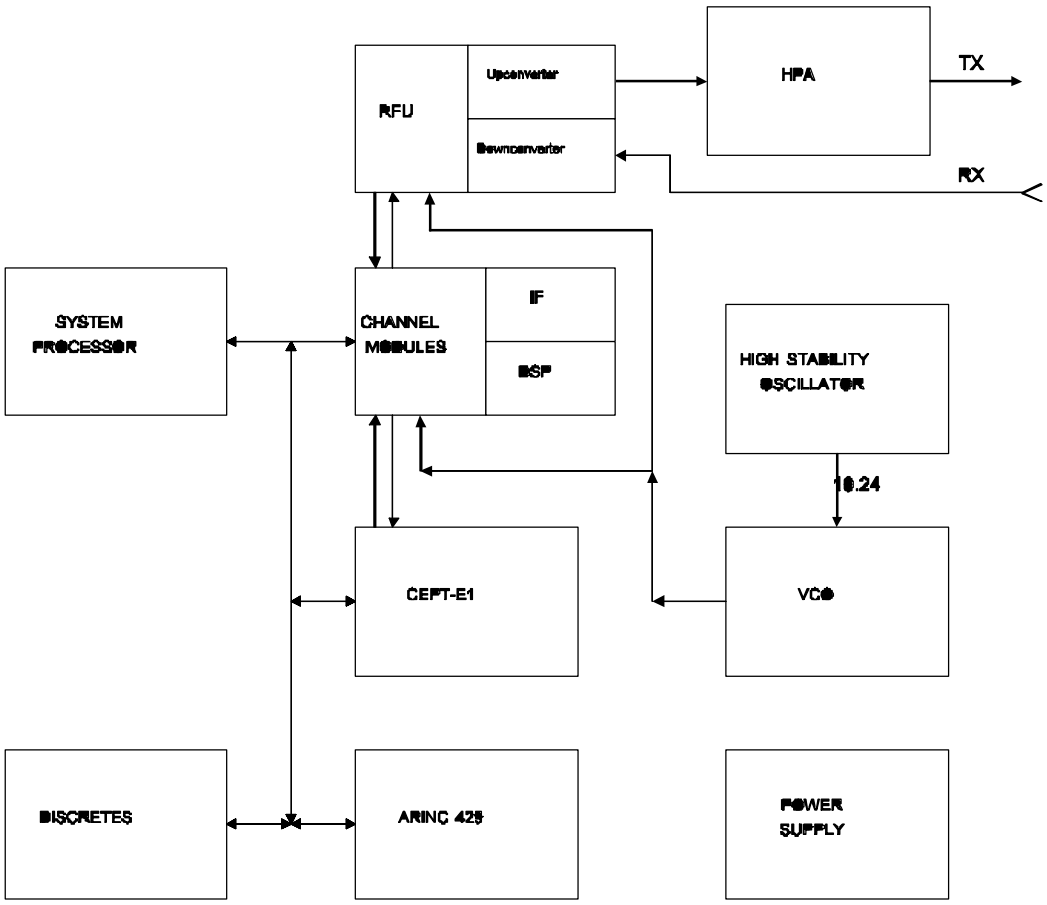

Figure 1.3 SRT–2000 Functional Block Diagram

1.4 Mechanical

The SRT-2000 is housed in an 8-MCU-size unit with mounting requirements according to the ARINC 600 specification. The front panel contains a standard ARINC 615 dataloader connector and a set of LEDs to indicate unit and system status. It also contains a “self-test” button and corresponding LED indicators for active operator maintenance. Electrical connections are made through an ARINC 761 compliant, ARINC 600 rear connector.

The unit consists of a power supply module, RFU module, HPA module, HSR, system processor, ARINC 429/Discrete input/output module, and channel modules. The functions are partitioned into logical functions on circuit cards. The removable, plug-in circuit cards mate with a sideboard interconnect card. The circuit cards are all connected together via a system address bus and system data bus. The design of the unit architecture specifically allows many of the processing functions to be accomplished digitally by the microprocessors and associated memory circuits.

1.5 System Processor Module

The system processor maintains the same architectural design as the SDU-906 Satellite Data Unit. It provides high-level system processing and controls communications with all slave processors; it can reset or reprogram any of the slave processors. In addition to processing the signal strength and amplitude information to support the RFU module, the system processor performs the following functions: (1) power control and attenuator control functions; (2) data control and routing; (3) user interfacing for selection of system parameters; and, (4) antenna steering and pointing computations. The system processor accesses all memory-mapped devices in the other modules as if those devices were located in the system processor module. It interfaces to the other modules in the unit through a 24-MHz multiplexed address/data bus. Through this bus, the system processor communicates with the CEPT function, the ARINC 429 function, and the DSPs of each channel module.

One interface is common to all the modules. The system processor does not allow the other processors to run until after the SRT-2000 is reset and releases the other processors from reset after it has been determined that the other processors have valid software loaded.

1.6 ARINC 429 Module

The ARINC 429 module provides the communication data-handling interface between the SRT-2000 and the aircraft system units. The transmitters and receivers handled by the ARINC 429 module are listed in the table below.

Rear Connector ARINC 429 Inputs/Outputs

SIGNAL	TYPE	PIN	SPEED	SIGNAL	TYPE	PIN	SPEED
CMU 1	429 IN	MP1G/1H	HIGH	CR TALK	429 IN	MP12A/12B	HIGH
A-C ID	429 IN	MP4A/4B	HIGH	IRS 2	429 IN	MP6C/6D	HIGH
SCDU 1	429 IN	MP3C/3D	LOW	DATA LDR	429 IN	MP7A/7B	HIGH
CPDF	429 IN	MP1E/1F	LOW	CMU 1/2	429 OUT	MP1J/1K	HIGH
SCDU 2	429 IN	MP3E/3F	LOW	SCDU 1/2/3	429 OUT	MP3J/3K	HIGH
SCDU 3	429 IN	MP8J/8K	LOW	CPDF	429 OUT	MP9A/9B	LOW
CMU 2	429 IN	MP3G/3H	HIGH	DATA LDR	429 OUT	MP7C/7D	HIGH
BTP BSU	429 IN	MP7G/7H	LOW	CFDS	429 OUT	MP4E/4F	LOW
BSB BSU	429 IN	MP7J/7K	LOW	CR TALK	429 OUT	MP12C/12D	HIGH
FMC 1	429 IN	MP12G/12H	LOW	MCTL	429 OUT	MP4G/4H	HIGH
FMC 2	429 IN	MP12J/12K	LOW	SPARE 1	429 IN	MP8C/8D	LOW
CFDS	429 IN	MP4C/4D	LOW	SPARE 2	429 IN	MP6G/6H	LOW
IRS 1	429 IN	MP6A/6B	HIGH	SPARE 1	429 OUT	MP9C/9D	LOW

1.7 CEPT-E1 Module

The CEPT-E1 module controls the interface to the cabin telecommunications unit (CTU), accepts analog voice from the cockpit and encodes or decodes the signal and routes it to a channel module.

1.8 Channel Module

The channel modules are each capable of managing a single channel of communications with the GES. Each channel module is capable of handling P-, R-, T-, and C-channels. All channel modules can be operational at the same time, providing up to six simultaneous channels. The channel modules consist of an intermediate frequency (IF) section and a digital signal processing (DSP) section. The IF section converts the IF to baseband, and the baseband to IF, as well as provide gain controls. The DSP section of each channel module contains 3 Digital Signal Processors. The Modulator DSP performs the scrambling, forward error correction (FEC), interleaving and RF modulation functions for the transmitted data. The Demodulator DSP performs the RF demodulation, descrambling, and de-interleaving functions for the received data. The DSP section also contains a DSP that performs the voice coder/decoder function and supports INMARSAT TIF functions in support of FAX and PC data transmission.

1.9 RFU Module

The RFU module consists of a downconverter and an upconverter. The downconverter converts the receive signal from L-band frequency (1530 - 1559 MHz) to an intermediate frequency (234.24 - 277.24 MHz). The upconverter converts the transmit signal from the intermediate frequency (141.74 - 175.74 MHz) to an L-band frequency (1626.5 - 1660.5 MHz).

1.10 HPA Module

The HPA module amplifies the modulated L-band carrier from the RFU module for transmission to the satellites.

1.11 HSR Module

The high stability reference (HSR) module provides the frequency source for all synthesizers and local oscillators. The high stability reference (HSR) section provides the very accurate 10.24-MHz clock to the channel modules through the voltage-controlled oscillator (VCO) block.

1.12 VCO Module

The VCO receives the 10.24-MHz signal and generates phase locked 10.24-MHz, 1.68-MHz, 160-kHz, and 66.56-MHz outputs used as references by other modules.

1.13 Discrete Module

The discrete function block processes all the discrete inputs and outputs (external and internal). The system processor directly controls the discrete function block. Additionally, the discrete function block includes analog-to-digital converters (A/Ds) used for temperature and power monitoring.

1.14 Power Supply

The power supply provides the power to all of the internal cards and modules. The power supply also supplies power to the external antenna and LNA/Diplexer. All of the power lines that come into or leave the SRT-2000 have the appropriate filtering and isolation to meet EMI requirements.

1.15 Rear Auxiliary Board

The rear auxiliary board converts the strap inputs at the rear connector into a serial data stream that is input to the system processor. The system processor drives the signals controlling this operation.

1.16 Sideboard

The sideboard interconnect board provides the interconnect wiring between the circuit cards and modules contained within the SRT-2000.

1.17 Rear Interconnect Module

The rear interconnect module provides the interconnect wiring between the SRT-2000 rear connector and the circuit cards and modules contained within the SRT-2000.

1.18 Front Panel

The front panel contains labeled LEDs that indicate the detected faults within the SAT-2000 system. These faults include SDU FAULT, ANT FAULT, CHANNEL MODULE, CEPT ACTIVE, SYS AVAILABLE and SYS TEST PASS.