



0239-EX-PL-2001

Detect the Difference

November 1, 2001

Federal Communications Commission
c/o Mellon Bank
Attn: Mellon Client Service Center
500 Ross Street, Room 670
Pittsburgh, PA 15262-0001
(888) 225-5322

*Amendment of
259 PL
2141*

Reference Item #1.: Sensis Corporation: Helicopter in-flight Tracking System (HITS) Exhibits, 16 October 2001, electronic filing reference number is 0236-Ex-PL-2001.

To whom it may concern,

Enclosed you will find a revision for the previously submitted data of reference item #1. This correspondence contains a revision to item #3 below. To indicate the areas that were modified I placed an asterix (*) after the exhibits.

1. FCC Form 422 – Application for new or modified radio station authorized under part 5 of FCC rules – experimental radio service (other than broadcast)
2. FCC Form 159 – Remittance Advice
3. Exhibit attachment, 14 pages, Exhibits 1 through 9B
 - a. Exhibit #1 – Unit Description* (typo correction only)
 - b. Exhibit #2 – Modulating Signal
 - c. Exhibit #3 – Modulating Signal
 - d. Exhibit #4 – Bandwidth
 - e. Exhibit #5 – Bandwidth
 - f. Exhibit #6 – Locations*
 - g. Exhibit #7 – Background, Principle of Operation, and System Description
 - h. Exhibit #8 – Unit Model Numbers*
 - i. Exhibit #9A – Survey Location Summary*
 - j. Exhibit #9B – Antenna Locations*
3. Antenna Associates specification sheet for the AS-177B/UPX omnidirectional antenna, 2 pages.
4. dBsystems specification sheet for the 5100A DME omnidirectional antenna, 4 pages.

The primary reason for these system changes were to improve the HITS coverage area performance. For this system, a way to improve coverage area performance can be achieved by increasing the number of Reference Transmitter (RX) Units that are distributed so that the other remote units can reliably receive their system time reference.

I hope this data will provide you with the necessary data to begin an initial. I appreciate your willingness to work with us on this matter and will be available if any questions should arise during your assessment. Please feel free to contact me at 315-445-5033 anytime.

Best Regards,

Joe Stevens
Program Manager

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(5033)

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www.sensis.com

Exhibit # 1

The Receive/Transmit (R/T) units transmit on a frequency of 1030 MHz. The actual peak RF output, of the 1030 MHz signal, before including cable loss and antenna gain is +57.7 dBm. The transmitter will be operated with a DME antenna model 5100A from dB Systems. (See attached document for the antenna specification). Considering that the DME antenna has + 8 dBi gain and the cable loss is 2.5 dB, the total Effective Radiated Power (ERP) is equivalent to +63.2 dBm.

The Reference Transponder (RX) units transmit on 1090 MHz. Similarly, the peak RF output, of the 1090 MHz signal, before considering antenna gain and cabling loss is +54 dBm. The antenna employed with the Reference transponder units is a DME model 5100A dB Systems, which has 8 dBi of gain. The cabling loss is 2.5 dB. Considering the gain and cable loss, the total EPR is +59.5 dBm.

Table 1 identifies the peak transmit power and ERP for each unit type.

Our system can also dynamically calculate the minimum power needed to reach each target and subsequently interrogate at that power level up to the peak power of the unit. Therefore, actual ERP may be lower for some locations when a reduced transmit power level is calculated by the system.

TABLE 1: Particulars of Operation

UNITS	Frequency (A)	Power	
		(B)	(C)
RECEIVE/TRANSMIT (R/T)	1030 MHz	57.7 dBm	63.2 dBm
REFERENCE TRANSPONDER (RX)	1090 MHz	54 dBm	59.5 dBm

67.7 RP
1.208 kW (ERP)
545 W (ERP)

Exhibit # 2

Modulating Signal

The 1030 MHz signal is pulse and phase modulated for Secondary Surveillance Radar interrogations, both ATCRBS and Mode S types, in accordance with ICAO Aeronautical Telecommunications Annex 10. The main RF exciter portion of the Transmitter Module # 1 (TM1) is purchased from Honeywell. It is a subassembly of the TPA-81A TCAS processor, made by Honeywell, which is a certified by the FAA.

Exhibit # 3

Modulating Signal

The Reference Transponder, 1090 MHz signal is pulse modulated for Secondary Surveillance Radar replies Mode S types, in accordance with ICAO Aeronautical Telecommunications Annex 10

Exhibit # 4

Necessary Bandwidth

Complete signals in space are specified in ICAO Aeronautical Telecommunications Annex 10, section 3.8.2.2, which is reproduced here for convenience. The necessary bandwidth is not derived for this application, but taken from this document.

TABLE 2: Radiation Spectrum

Frequency Deviation (from Carrier)	Maximum Power Below Carrier
0 – 4 MHz	0 dB
4 – 6 MHz	6 dB
6 – 8 MHz	11 dB
8 – 10 MHz	15 dB
10 – 20 MHz	19 dB
20 – 30 MHz	31 dB
30 – 40 MHz	38 dB
40 – 50 MHz	43 dB
50 – 60 MHz	47 dB
> 60 MHz	50 dB

Exhibit # 5

Necessary Bandwidth

Complete signals in space are specified in ICAO Aeronautical Telecommunications Annex 10, section 3.8.2.1., which is reproduced here for convenience. The necessary bandwidth is not derived for this application, but taken from this document (See Radiation Spectrum table above).

Exhibit # 6

Table 3 shows the location of operation as well as the equipment type for the deployed units.

TABLE 3: Location of Operation

#	Location	Latitude	Longitude	Config.	DME Antennas
Receive/Transmit R/T, 1030 MHz signal					
1	EUGENE ISLAND 189	28 44.884 N	91 22.090 W	R/T	1
2	EUGENE ISLAND 224	28 34.925 N	91 46.059 W	R/T	1
3	EUGENE ISLAND 51	29 14.197 N	91 41.037 W	R/T	1
4	PECAN ISLAND	29 37.637 N	92 22.407 W	R/T	1
5	VERMILION BAY	29.40.250 N	91.54.850 W	R/T	1
6	SHIP SHOAL 300	28 14.530 N	91 07.570 W	R/T	1
7	SOUTH MARSH ISLAND 174	28 05.166 N	91 52.522 W	R/T	1
8	SOUTH MARSH ISLAND 275	29 04.777 N	92 08.095 W	R/T	1
10	VERMILION 178	28 52.681 N	92 28.629 W	R/T	1
11	VERMILLION 315	28 17.616 N	92 17.611 W	R/T	1
Reference Transponder, 1090 MHz signal					
1	EUGENE ISLAND 296	28 20.613 N	91 32.294 W	RX	1
2	PERRY	29 55.313 N	92 11.628 W	RX	1
3	SOUTH MARSH ISLAND 213	29 26.488 N	92 03.664 W	RX	1
4	SOUTH MARSH ISLAND 58	28 40.432 N	92 05.729 W	RX	1
5	NEW IBERIA	30.02.080 N	91.47.560 W	RX	1

Table 3: Location of Operation (Cont.)


Reference Transponder, 1090 MHz signal					
6	EUGENE ISLAND 158	28.48.850 N	91.44.332 W	RX	1
7	EUGENE ISLAND 296	28.20.613 N	91.32.294 W	RX	1

South Marsh Island 130A 28.17.92N 92.00.723W

Exhibit # 7**Background**

The National Aeronautics and Space Administration (NASA) has initiated activities leading to near-term deployment of the Helicopter In-flight Tracking System (HITS). The U.S. Department of Transportation (DOT), Volpe National Transportation Systems Center (Volpe Center) is supporting NASA in managing HITS installation and operation, and in assessing its effectiveness. The purpose of HITS is to measure and display three-dimensional position, velocity, and identification information for all properly equipped aircraft observed on or near the coverage area. HITS provides target information to its own display units, as well as to coverage area target information display and control systems. A set of HITS Remote Units (RU) provides the target signal reception capability in the system, as well as target interrogation capability.

Principle of Operation

HITS is based on commercially-available equipment which forms the ground segment of a dual technology multilateration and Automatic Dependent Surveillance – Broadcast (ADS-B) aircraft tracking system. Multilateration utilizes signals from Air Traffic Control Radar Beacon System (ATCRBS) (Modes A and C) and Mode S transponders, and requires no changes in current aircraft equipment. Three or more ground stations measure the time-of-arrival (TOA) of the same transponder message. Aircraft horizontal position is determined by joint processing of the TOA measurements at a central location. Only one message need be received in an update interval for accurate position determination. Aircraft identity and barometric altitude are determined by decoding the information in transponder messages.

HITS will also operate with signals from ADS-B Mode S extended squitter transponders now being considered for approval in the National Airspace System (NAS). When ADS-B signals are received, HITS develops a target report by decoding the transponder message, which contains aircraft identity and Global Positioning System (GPS) position or velocity. When an ADS-B message is received at three or more HITS ground stations, a multilateration target report is also generated. By virtue of its dual technology capability, HITS thus facilitates the eventual transition to ADS-B surveillance.

System Description

In an operational configuration, the HITS system consists of several Receive/Transmit (R/T) units, along with several receive-only (RO) units, a central Processing Station (CPS), several reference transponders (RX), and modems linking the R/T and RO units to the CPS. The R/T units interrogate ATCRBS and Mode S equipped aircraft while. The RO units receive replies from ATCRBS and Mode S transponders that were elicited from other interrogators while also processing returns from ADS and Mode S squitters. The RT and RO units are placed at the surveyed sites to provide target detection throughout a desired coverage volume. The RX units transmit Mode S reference replies to the R/T and RO units. Transmissions from the RXs are processed the same as those from aircraft, and the calculated position is compared to the known surveyed location, allowing calibration adjustment. The RX units are placed at surveyed locations so that long squitters transmitted by the RX units can be detected by the RTs and ROs, and used to calibrate the system. The CPS accepts reply data from the RO and R/T units to generate target reports and tracks. This subsystem also generates the interrogation sequence for the R/T units specifying power level and mode of the interrogation.

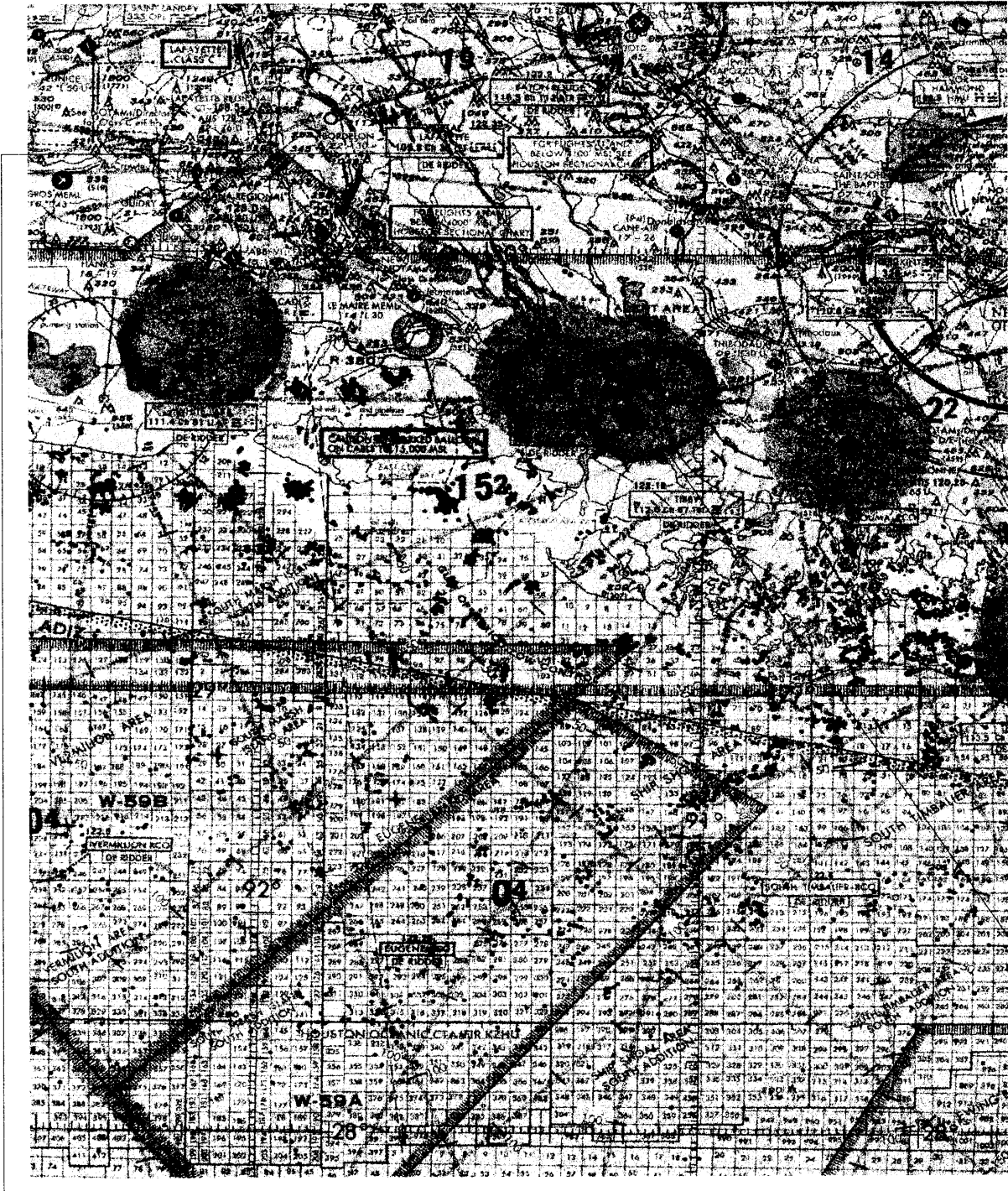
These systems are deployed at various facilities located in the Gulf of Mexico and Southern coastal region of Louisiana to provide Helicopter and fixed wing aircraft detection and tracking throughout this region.

Exhibit # 8

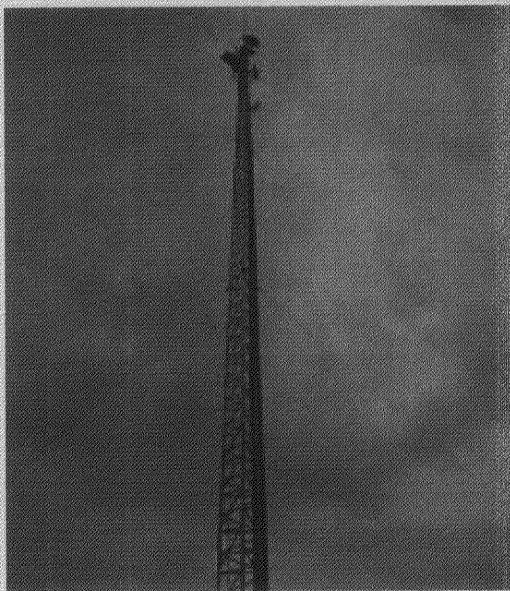
<u>Unit</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u># of Units</u>
R/T	Sensis Corporation	100-007735-G001	10
RX	Sensis Corporation	100-008083-G001	7

Exhibit # 9A – Survey Location Summary

Figure 1 – HITS Equipment Installation Locations



Perry - Is located approximately 20 miles southwest of Lafayette, 15 miles north of Intracoastal City. The mast at this location is estimated to be 300 ft. in height. The antennas would be mounted on exiting communication tower, with obstruction lights.



Pecan Island - Is located approximately 40 miles southwest of Lafayette. The mast at this location is estimated to be 500 ft. in height. We should be able to mount an antenna on exiting communication tower, with obstruction lights.

