

System Description

The Alaska Aerospace Development Corporation (AADC) has purchased three GPS repeaters from GPS Source (See Figure 1) and plans on installing them as described in this document. The purpose of these GPS repeaters is to allow AADC's government and commercial customers to test and verify their missile's onboard GPS receivers. In the past, these systems were tested by connecting an external antenna directly to their onboard GPS receivers and bypassing that receiver's own antenna. AADC wishes to facilitate a more realistic test of these onboard GPS receivers through the operation of the GPS repeaters within the assembly buildings located at the Kodiak Launch Complex (KLC).



Figure 1: GPSRKL12 Repeater Kit

Payload Processing Facility (PPF)

The PPF is clean room facility used by AADC's customers to checkout, assemble, fuel, and encapsulate their spacecrafts before integrating them with the boost vehicle at either the Integration Processing Facility or Launch Service Structure. The figures below show exterior and interior photos of the PPF:



Figure 2: PPF Exterior



Figure 3: PPF Interior

Within the PPF, the GPS repeater kit would be installed so that there is a single roof mounted antenna, a Low Noise Amplifier (LNA), a two way splitter, and two interior transmitting antennas (one in each bay).

An interior transmitting antenna is located in each of the two 40 ft x 60 ft processing bays per Figure 4 on the following page:

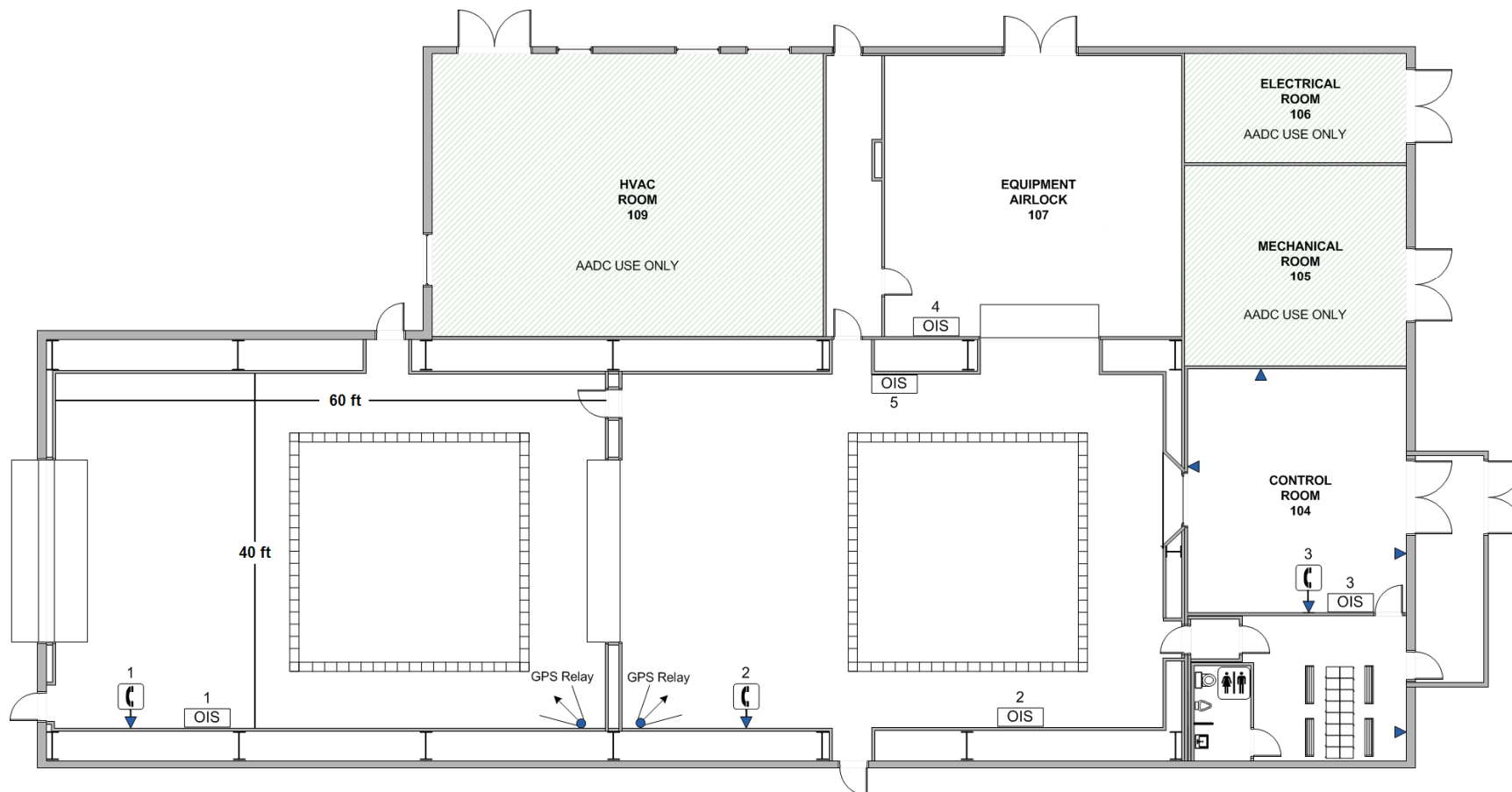


Figure 4: PPF Interior Antenna Locations

The GPS repeater kit has been roughed in at the PPF to verify cable lengths, to verify that the system is functional, and to take signal strength measurements for this report. To facilitate the functionality test and signal strength measurements, the GPS repeater was active for approximately 30 minutes and then shut off. The system will remain off until AADC has received authorization from the FCC to operate the system. The following figures show the two interior antennas in what is to be their final locations (each antenna approximately 13 ft high):



Figure 5: PPF Interior Antenna 1



Figure 6: PPF Interior Antenna 2

Table 1 shows the measurements taken for these two interior antennas during testing:

Antenna	At Device	Farthest Corner (70 ft)	100 ft Outside Building
Baseline (System Off)	-130 dbm	-130 dbm	-130 dbm
Antenna 1 (1575 MHz)	-120 dbm	-125 dbm	-130 dbm
Antenna 1 (1227 MHz)	-112 dbm	-120 dbm	-130 dbm
Antenna 2 (1575 MHz)	-122 dbm	-127 dbm	-130 dbm
Antenna 2 (1227 MHz)	-114 dbm	-122 dbm	-130 dbm

Table 1: PPF Signal Strength Measurements

Integration Processing Facility (IPF)

The IPF is the facility used by AADC's customer to checkout the boost vehicle before emplacement at the launch pad. The figures below show exterior and interior photos of the IPF:



Figure 7: IPF Exterior



Figure 8: IPF Interior

Within the IPF, the GPS repeater kit would be installed so that there is a single roof mounted antenna and one interior transmitting antenna.

An interior transmitting antenna is located in 55 ft x 95 ft processing bay per Figure 9 on the following page:

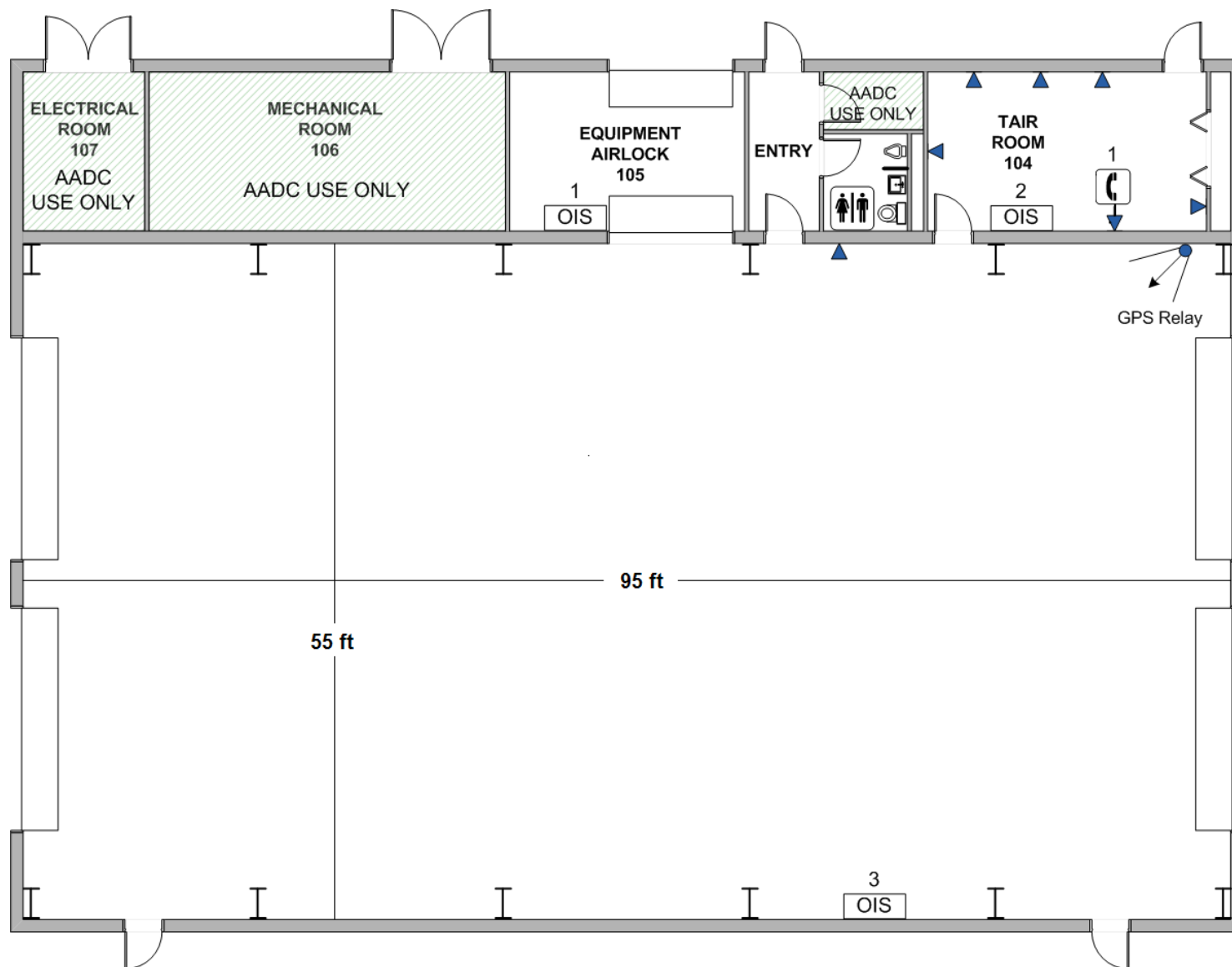


Figure 9: IPF Interior Antenna Location

The GPS repeater kit has been roughed in at the IPF to verify cable lengths, to verify that the system is functional, and to take signal strength measurements for this report. To facilitate the functionality test and signal strength measurements, the GPS repeater was active for approximately 30 minutes and then shut off. The system will remain off until AADC has received authorization from the FCC to operate the system. The following figures show the interior antenna in what is to be its final location (14 ft 6 in high):



Figure 10: IPF Interior Antenna

Table 2 shows the measurements taken for these two interior antennas during testing:

Antenna	At Device	Farthest Corner (100 ft)	100 ft Outside Building
Baseline (System Off)	-130 dbm	-130 dbm	-130 dbm
Antenna at 1575 MHz	-120 dbm	-130 dbm	-130 dbm
Antenna at 1227 MHz	-112 dbm	-130 dbm	-130 dbm

Table 2: IPF Signal Strength Measurements

Launch Service Structure (LSS)

The LSS is the facility used by AADC's customer to erect the boost vehicle, emplace the spacecraft atop the boost vehicle, and launch the missile. The figures below show exterior and interior photos of the LSS:



Figure 11: LSS Exterior



Figure 12: LSS Interior

Within the LSS, there are two structures. The exterior structure as seen in Figure 11 and an interior structure (not shown) used to provide temperature and humidity control within the LSS. The GPS repeater kit would be installed within the interior structure so that there is a single roof mounted antenna and one interior transmitting antenna.

An interior transmitting antenna is located in 18 ft x 19.5 ft processing bay per Figure 13 on the following page:

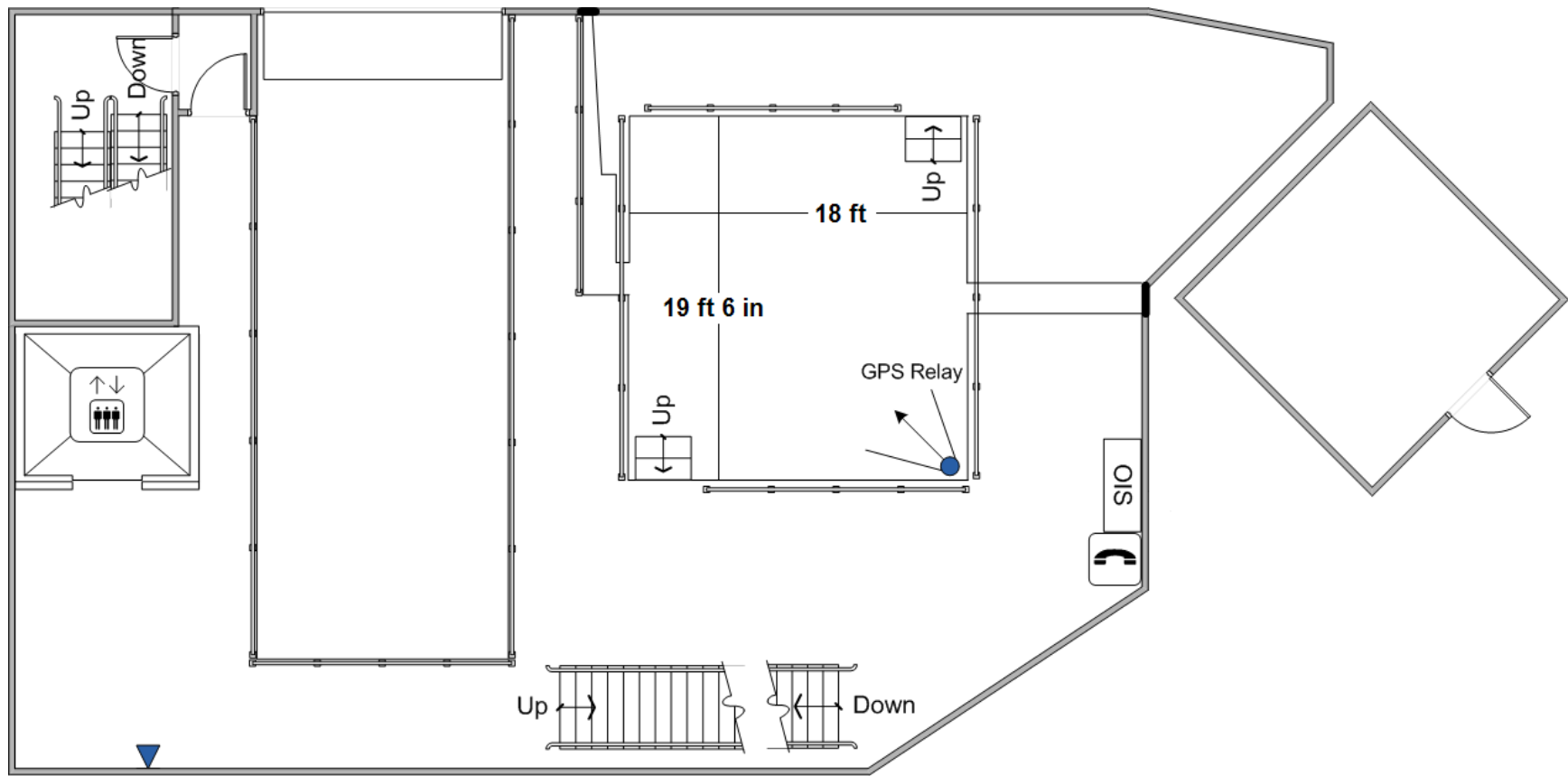


Figure 13: LSS Interior Antenna Location

The GPS repeater kit has been roughed in at the LSS to verify cable lengths, to verify that the system is functional, and to take signal strength measurements for this report. To facilitate the functionality test and signal strength measurements, the GPS repeater was active for approximately 30 minutes and then shut off. The system will remain off until AADC has received authorization from the FCC to operate the system. The following figures show the interior antenna in what is to be its final location (approximately 170 ft high):



Figure 10: LSS Interior Antenna

Table 3 shows the measurements taken for these two interior antennas during testing:

Antenna	At Device	Outside Interior Structure	100 ft Outside Building
Baseline (System Off)	-130 dbm	-130 dbm	-130 dbm
Antenna at 1575 MHz	-120 dbm	-130 dbm	-130 dbm
Antenna at 1227 MHz	-112 dbm	-130 dbm	-130 dbm

Table 3: LSS Signal Strength Measurements