Introduction

A defrost unit consisting of a custom PCB within an enclosure is used to control a heating element in the event that the heat exchanger cooling coils become frosted up due a high humidity condition.. The defrost circuit will initiate a defrost cycle when there is a pressure differential between the front and the back of the heat exchanger coils. There is one unit installed for the mirror cooling heat exchanger and one unit installed for the dome air handling heat exchanger.

In addition to defrost PCB, the mirror cooling enclose unit also houses an i32 controller from Omega. This unit controls the glycol hydraulic actuator based on the thermocouple input to close the loop on mirror cooling airflow temperature.

An iServer unit, also from Omega, is used to connect the i32 controller to the network to allow for remote monitoring and temperature adjustment. This unit is also housed in the mirror cooling defrost enclosure.

Mirror Cooling Status

The following integration activities and checks have been made:

- Two 1500 watt heaters were installed in front of the heat exchanger.
- An air pressure switch was installed to measure the pressure differential from the front to back of the heat exchanger.
- A Thermocouple was installed in the air handling unit.
- The defrost enclosure was mounted which contains the defrost PCB, the i32 controller and the iServer unit.
- Consecutive defrost cycles were run over a two hour period by disconnecting the air switch input. The temperature was monitored with the installed thermocouple. The temperature did not rise above 80°C within the air handler unit over this two-hour period. This maximum temperature was reached after approximately twenty minutes.
- Temperature loop control was achieved with the i32 controller by setting the operational range on the actuator (6 to 9 volts) and by adjusting the proportional and integral terms.

To do:

- The iServer software needs to be written to facilitate web monitoring and control.
- A method or plan is needed to figure what to do with the water after it melts off of the exchanger coils.

Dome Air Handler Status

The following integration activities and checks have been made:

- The defrost unit was mounted and wired.
- A defrost cycle was initiated by disconnecting the air switch input. The system was observed to be operating properly.