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ATLAS CIS Tech Quarterly Report

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This report covers the activities of the Chicago CIS Techs from April - June 2021.

The maintenance team’s work has focused on the installation of isolation cooling valves

in the two long barrel partitions of Tile. These valves are individually controlled by

pneumatic actuators so as to allow the TileCal cooling system to bypass specific

drawers without shutting down an entire cooling loop of 8-12 drawers, which would

otherwise be necessary when hardware issues arise during Run 3. With cooling

experts, the CIS techs have replaced radiation-sensitive screws and tested the

performance and integrity for hundreds of valves. They installed 252 valves on 126

drawers - all 64 drawers on LBC and 62 drawers on LBA, where LBA 40 and 57

are still blocked by Cesium source garages.

The UChicago techs also connected all 252 valves to the cooling system as well as the

pneumatic system that will be used to actuate the valves. Operating on one sequential

loop of connected drawers at a time, circulation was shut off before the cooling hoses

were cut, drained, and connected to the direction-specific valves for each respective

drawer. To minimize the bending radius of the flexible hoses, length extensions were

often installed. During this process, internal pressure in the cooling

system was consistently monitored to ensure the absence of any leaks. The

maintenance team continues to monitor the time required to complete a PPV cycle,

which should be &gt;400 minutes for nominal performance.

Since the last quarterly report, three leaks originating from the valves were found. On

two of those occasions, one on LBC 14 in mid-April and the other on LBC 35 and 36 in

May, the UChicago techs used clamps to individually isolate each valve and identify the

source of the leak. The other leak was on LBC in late April and was more difficult to

isolate. The UChicago techs helped perform a comprehensive gas test to find the

source of the leak. This involved pumping N2 gas in each cooling loop return line and

using a gas detector around the valves to find the leak sources. Using this method, the

leaks were isolated to LBC 58 and 60 and those drawers were then re-fitted with new

valves.

Outside of the cooling valve installation, the Chicago technicians have continued to

address maintenance issues in the detector. In the last months, this work has primarily

consisted of replacing faulty digitizer boards, 3in1 cards, and the flvps power supplies.

These interventions, along with regular updates about the valve installation progress,

were presented and discussed weekly with the TileCal maintenance team.

The technicians also performed two CIS constant updates using TileCal Unified

Calibration Software (TUCS) macros. The April update used CIS calibration runs from

March 25-April 23 and affected 182 ADCs.The June update studied CIS runs from April

27 - June 1 and affected 214 ADCs. In both cases, the automated results of the CIS

constant updates were validated by examining the variation of CIS constants with time

for flagged or updated ADCs, which resulted in a number of recommended changes to

flags and constant values. High deviation and unstable channels were also examined,

cross-referencing CIS constant jumps with the laser calibration response over the past

months. The final results of the updates were presented the data quality and

maintenance teams and uploaded to on- and offline databases to be used in physics

analysis.

The Chicago techs also presented general overviews of the CIS system and updates on

recent activities during the TileCal Week Data Preparation, Performance, and

Calibration Session on Feburary 4 and to the Chicago ATLAS team on June 21.

The Chicago techs will spend the remainder of their last month in the program training

the new technicians, Dawit Belayneh and Katie Hughes, on all matters related to the

program. As part of that work, they will help test a new version of the TUCS software

used for CIS constant updates, and work to improve the documentation of the CIS

constant update procedure for future techs.