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New temperature controller for Hannibal in Las Campanas in 2015 April

Steven J. Hale

The University of Birmingham, Edgbaston, Birmingham B15 2TT

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THE UNIVERSITY OF BIRMINGHAM

High-Resolution Optical-Spectroscopy Group

School of Physics and Astronomy
The University of Birmingham
Edgbaston, Birmingham B15 2TT, United Kingdom
Telephone: +44-121-414-4551 FAX: +44-121-414-4601

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Abstract

A new temperature controller for Hannibal was installed. The mount RA motor was replaced. Some general maintenance was done on the weather sensors.

1 Introduction

Steven Hale visited Las Campanas from 2015 April 29 to May 11.

The visit, like the previous one [1], began with the dome completely offline. The temperature controller for Hannibal was not working, and the Pockels cell in Ivan has failed, and so the site was not operational.

A new-style temperature controller was installed, and some other general maintenance items were completed.

2 Temperature Controller

In 2015 March a heavy storm caused some power failures on the mountain. Additionally, a mouse made a short circuit in a transformer that powers the solar telescope. One of these problems caused a fault on Hannibal's temperature controller. The oven channel was stuck on full-heat and was not being correctly controlled.

On this visit, some basic tests were done on the old controller, but it did not appear to be a simple fix. Possibly there was no fault with the controller itself, but instead with the Wheatstone bridges inside Hannibal that produce temperature error signals.

Rather than spend too much time on this, it was decided to go ahead and install one of the new digital temperature controllers we have installed at our other sites. Hannibal also has thermocouples to detect the temperatures, in addition to thermistors that were used by the old controller via the Wheatstone bridges. The new controller uses only the thermocouples, and the old bridge circuits inside Hannibal are now redundant.

The new controller is one of our computer-controlled temperature controllers with five configurable inputs [2]. You should look at BTR335 for a generic description of the unit. Specific configuration items for Las Campanas are in BTR372 [3]. Both documents need to be consulted for complete information on the operation of the new controller.

An oven temperature scan was performed, figure 1. A temperature of 128°C appears to be optimal. This is 3°C higher than used previously.

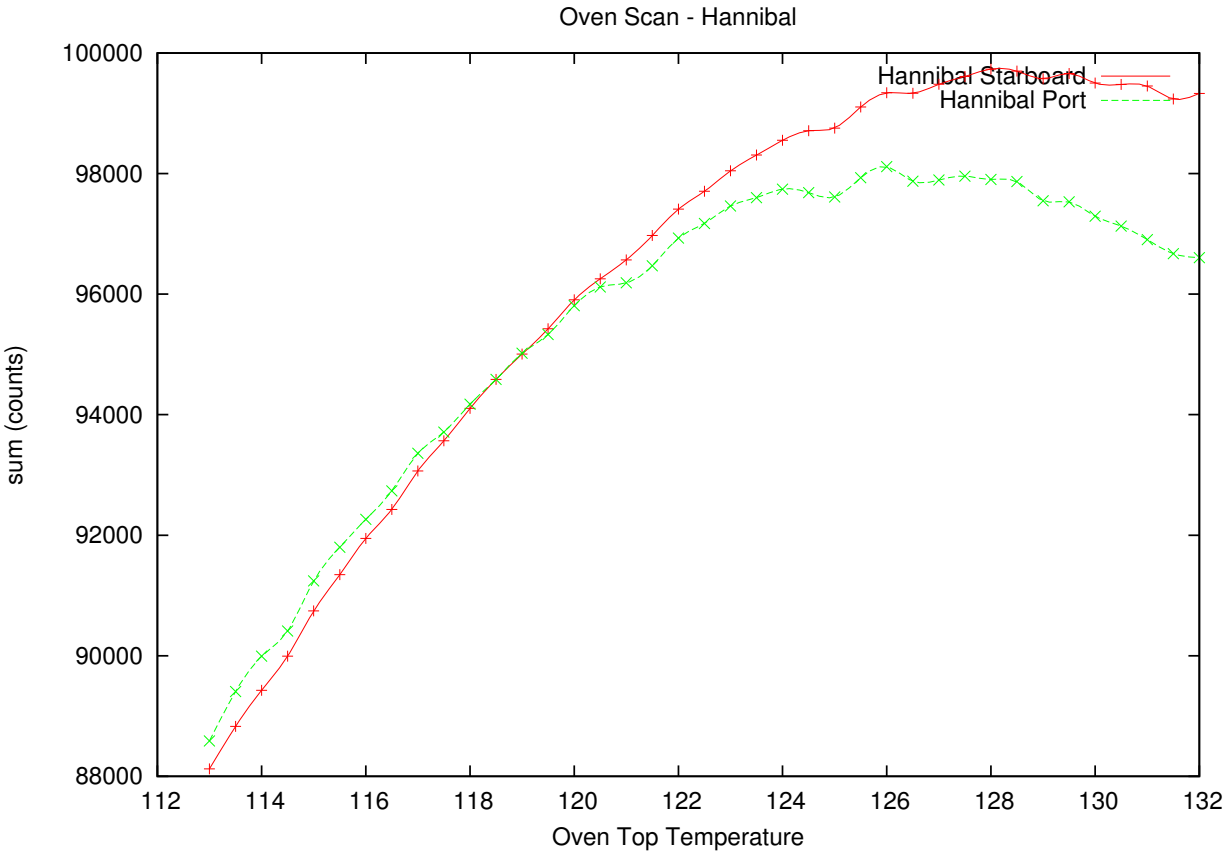

Figure 1: Hannibal oven temperature scan.

3 Weather Monitoring

The bearings in the anemometer were replaced. It now spins in just a light breeze, where before quite strong wind was required. No attempt was made to check if the weather module would actually trip at high wind speeds.

In 2014 September, the Vaisala DPD-12A rain detector failed. Luckily it failed on permanent-rain as opposed to allowing the dome to flood during a storm, as has happened at other sites. A new DRD-11A was sent out, but by the time it arrived Patricio Pinto had already repaired the DPD-12A. On this visit, the DRD-11A was returned to Birmingham.

Consideration was made to installing the new rain detector anyway, even though the old one was now working again, because it requires a modification to the weather module. The output of the detector changed between the DPD-12A and DRD-11A models. However, since the DPD-12A was working, and is repairable, it was decided to leave it in service. The DRD-11A is a completely sealed unit and can not be repaired, so in many ways the older version is better.

There is also a problem in that the new-style DRD-11A detector would shadow the cloud-detector when installed on the weather arm. This doesn't happen at our other sites. Perhaps the weather arm in Las Campanas is shorter — the cloud-detector is already slightly shadowed by the anemometer.

Both the rain sensor and the cloud detector were cleaned. The cloud coefficients were recalculated based on cloud data from 2015 May 3.

4 Mount RA Motor

There was some noticeable slop in the mount RA motor gearbox. The new motors were installed with the new guiding system in 2011 March [4]. We had hoped they would last longer than this. The spare motor and gearbox were installed, and the original motor brought back to Birmingham. Perhaps the gearbox can be repaired. Most likely the motor itself is fine.

The Declination motor was showing similar slop, but only one spare motor was available. The Declination motor and gearbox should be replaced on the next visit. Also, a new spare needs to be sent out.

References

[1] Steven J. Hale. Blind and mount controller repairs in Las Campanas in 2014 June. *BISON Technical Report Series,* Number 366, High-Resolution Optical-Spectroscopy Group, Birmingham, United Kingdom, July 2014.

[2] Ian Barnes and Brek A. Miller. A computer-controlled temperature controller with five configurable inputs. *BISON Technical Report Series,* Number 335, High-Resolution Optical-Spectroscopy Group, Birmingham, United Kingdom, May 2011.

[3] Steven J. Hale. The Hannibal temperature controllers. *BISON Technical Report Series,* Number 372, High-Resolution Optical-Spectroscopy Group, Birmingham, United Kingdom, May 2015.

[4] Brek A. Miller. The installation of a digital autoguider in Las Campanas in 2011 March. *BISON Technical Report Series,* Number 343, High-Resolution Optical-Spectroscopy Group, Birmingham, United Kingdom, May 2011.