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Newsletter #93, August 6th 2019

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Engineering reports are back! (Richard Dekany and Reed Riddle)

Cryostat thermal anomaly addressed

“After many weeks of routine operation, the engineering team addressed an unexpected thermal anomaly in the ZTF camera cryostat beginning on July 27, 2019. The operations team reported the instrument heating up, and investigation determined the window heater was not communicating and locking up when a telnet was attempted. COO engineer Justin Belicki traveled to Palomar to investigate the window heater and found there was a condition that could cause the window heater microcontroller (which handles communications, control of the heater, and heater measurements) to get stuck inside a while loop, which would leave the heater on as well as lock out communications.

The fault was subsequently determined to be caused by a failure in the pulse counting circuit, which was used to monitor/measure the power delivered to the window. As the microcontroller wasn't seeing saw those pulses, the count inside the while loop never increased. Without a timeout, this caused the microcontroller to lock out communications.

Justin implemented a temporary solution, bypassing the dependence on the pulse counting circuit and instead used the microcontroller clock to set duty cycle. This has successfully brought the window heater back under remote control, which in turn restored overall thermal control and a return to nominal operations. To full restore diagnostic function, the team will need to update the window heater code and validate accurate delivered power telemetry.”

Shutter wellness visit

“As part of ZTF bi-annual preventative maintenance, routine inspection of the exposure shutter revealed that the controller's emergency stop bulkhead connector had disconnected from the controller body and was hanging by wires (the screws holding it in place fell out). The controller was duly replaced with the spare to maintain operations, while the original will receive have new screws/nuts with applied Loctite. Additionally, the shutter's Rexroth servo controller was placed onto the ZTF network and can now be accessed remotely for diagnostic purposes/monitoring. This will allow the engineering team to remotely monitor torque/velocity/position data and thus regularly gauge the mechanical health of the shutter outside our regular inspection cadence.”

Power continuity improvements

“Due to continuing intermittent facility power interruptions at Palomar this summer, a Universal Power System (UPS) system is under development for the P48 which will bridge over the minor power interruptions. It won't allow the system to survive a long power outage, but it will allow time for a clean shutdown and powering off the hardware, as well as protect the hardware from power surges better than the current setup.”

ROS to expand sensor diagnostics

“The next ROS update will focus on reworking the sensor monitoring system. The entire system developed more organically than expected, and the software is not able to handle each sensor item individually, nor give ROS sufficiently granular insight into sensor problems. The software also has trouble operating when one of the hardware items fails to start properly, as all of the sensors are managed as a group. ROS will be modified to allow individual reading and control of all sensor hardware subsystems in parallel, which will increase reliability and allow ROS to fix items individually and keep running whenever there is a sensor fault while informing the operations team of the error.”

DQA (Andrew Drake)

Work has continued on reducing systematics and improving absolute photometry of ZTF. Corrections have now been determined for g and r-band observations in order to remove the slight magnitude bias in ZTF PSF photometry, correct the residual systematic spatial structure within each quadrant, and reduce offsets between ZTF and PS1 photometry in all fields. These photometric corrections are expected to be included in a future edition of the ZTF matchfiles. Further information is available [here](#).

News from working groups

Machine Learning: “We have started work on collecting features for light curve analysis. Eric's slides are available on the wiki. Please contact him if you have any unusual features to contribute. We will soon have a template in which the features can be incorporated. This week we will discuss analysis of ten ZTF fields for variability, and on plans for the hackathon during the Sep. ZTF meeting. If you have an idea for the hackathon, or want to present something during a weekly meeting, please get in touch.”

EM/GW and Neutrino counterparts: “(1) On the GW side, a new LIGO/Virgo trigger occurred, labelled S190728q, Although the event is likely another binary black hole merger, an early classification suggested the presence of a gap-mass companion. The event was followed up with ZTF and DECam (with observations led by the DES team). Several transients were discovered with ZTF, DECam, and other surveys, but none was proven to be the optical counterpart, so far. The data analysis is still on-going. (2) We have followed up on the IceCube gold alert IceCube-190730A, which had a signalness of 67%. The gamma-ray blazar PKS 1502+106 was found within the neutrino error circle, but was not in an active gamma-ray state during the neutrino arrival time. We obtained target-of-opportunity observations for two

fields covering the 90% confidence region 8 hours after the neutrino detection. No interesting counterpart candidates were identified. The blazar was detected, but not found in active state. We continue to monitor the neutrino error region.”

The papers corner:

Please keep us updated about your submitted/published papers, they will be advertised here.

Please send Joy Painter, the Astronomy Librarian at Caltech, links to papers as soon as they are published. They will be kept track of [here](#).

September 3-5: ZTF fall collaboration meeting, [registration closing soon](#)

Please [register](#) at your earliest convenience:

Registration will close August 15.

The meeting website is [here](#); please visit it for travel and hotel information.

Please let Eric Bellm know if you have any questions.

Reminders:

- PublicAlerts: There is a [link](#) to the alerts archive on the [website](#)!
- Please help us keeping track of all the available softwares! A preliminary list is available on the [twiki](#). Let us know if you are building a software which you think could benefit (or be relevant to) a large portion of the collaboration.
- **ZTF general slack channel**: Please join through this [link](#)!
- If you want to get access to the **ZTF data** via the IRSA interface, please request data access to the communication coordinators: ztf.communication.coordinators@gmail.com
- **Archive GUI** now ready! The interactive image search, filtering and visualization tool is now ready ().
- The **ZTF Twitter account** is now active! <https://twitter.com/ztfsurvey> Re-tweet @ztfsurvey!
- To use the **url shortener**(e.g. during telecons, talks, in emails), navigate to <http://zwicky.tf/shorten> (username: ztf password:16chips) and type in the URL you want shortened.
- The **Wiki page** is active! Check it out at <http://zwicky.tf/wiki>. To request access, please email us at ZTF.communication.coordinators@gmail.com

“August is like the Sunday of summer” – Anonymous

Have a great and productive week!

Thomas and Maayane