

# Turbulence Tower Entries



## Photos of dinged tower

Gordon Maclean posted on Aug 25, 2014

Found these photos of the damage to the tower. The tower was fixed on Nov 6, 2009, <https://wiki.ucar.edu/x/DhAFaw> <https://wiki.ucar.edu/x/DhAFaw>

- [turbtower](#)



## Naked Tower

Chris Golubieski posted on Aug 26, 2013

August 17, 2013 All remaining brackets, booms and deer stands have been removed from Turb Towers. What remains is a beacon, two levels of lightning protection.

- [turbtower](#)



## Turb Tower Vist 9282012

Chris Golubieski posted on Oct 03, 2012

September 28, 2012 Chris and Lisa All equipment has been removed from the Turbulence Tower. Three sonics, two Licors, five TRHs, barometer, 4-comp, dsm, ALL cables (except eth), batteries, charger. Things that we kept there were all TRH booms, barometer boom, three sonics booms, CSAT electronic plates (3), 4-comp boom WITH mounting plate and deer stand. Gear that is in EOL: Five TRHs, two sonic booms, three CSAT electronic plates, 4-comp, barometer, three batteries, power cable and splitters....

- [turbtower](#)
- [sonics](#)
- [trh](#)
- [pressure](#)
- [dsm](#)
- [licor](#)



## Turb Tower Site Visit 9252012

Chris Golubieski posted on Sep 26, 2012

September 25, 2012 Afternoon Chris and Lisa Replaced barometer with another barometer. Do not know serial number on new unit. It is coming in but not parsed the same. Removed sonic at 8m and 30m.

- [pressure](#)
- [sonic](#)
- [turbtower](#)



## Summary of Licor deployments and failures

Gordon Maclean posted on Sep 04, 2012

From my reading of the logbook, the licors were at these heights, starting at the given dates: level Nov 18, 2009 Dec 2, 2009 Feb 2, 2010 Mar 29, 2011 Apr 12, 2011 Oct 14, 2011 Dec 15, 2011 Jun 26, 2012 Aug 15, 2012 2 0813 1163 removed all, calibration 1166 1166 removed all, fire danger 0813 7 1166 1166 1166 0813 16 1167 1167 1167 1163 failed Oct 2, 2011 1167 failed Nov 6, 2011 0813 1164 failed Aug 23,...

- [turbtower](#)
- [licor](#)



## 16m Licor out since Aug 23

Gordon Maclean posted on Sep 04, 2012

According to <https://wiki.ucar.edu/x/HwCIBg> <https://wiki.ucar.edu/x/HwCIBg>, the 16m licor is SN1164. [http://www.eol.ucar.edu/isf/projects/BEACHON\\_SRM/isfs/qcdata/plots/2012/08/23/licor\\_20120823.png](http://www.eol.ucar.edu/isf/projects/BEACHON_SRM/isfs/qcdata/plots/2012/08/23/licor_20120823.png) On Aug 23 18:48:30, the diag initially dropped from a good value of 249 to 118-121. 2012 08 23 18:48:30.5894 0.1001 49 249\t0.07072\t12.6021\t0.05373\t415.742\t19.45\t76.2\t\n 2012 08 23 18:48:30....

- [licor](#)
- [turbtower](#)



#### [Site Visit to Turb Tower 08172012](#)

[Chris Golubieski](#) posted on Aug 30, 2012

August 17, 2012 10:00am - 1:30pm MDT Three batteries installed at Turbulence Tower. Four component was installed and working. New TRH 2m top plate. New 2m sonic (CSAT0536) was installed to replace odd sonic.

- [radiation](#)
- [sonic](#)
- [turbtower](#)



#### [Site Visit 08152012](#)

[Chris Golubieski](#) posted on Aug 30, 2012

August 15, 2012 10:30am - 3:00pm Putting freshly calibrated sonics (CSATs) on turbulence tower with Licors, TRHs and barometer. The four-component radiation did not get mounted due to a mount missing. System was check with just a charger powering instruments but then shut off due to missing batteries. Everything looks good but the 2m sonic. Guy tensions were checked. Remember: Batteries, radiation mounting plate, radiation instrument, boom and electronics box. 45m: CSAT0537,...

- [turbtower](#)



#### [Updated kernel with small interrupt mod](#)

[Gordon Maclean](#) posted on Aug 23, 2012

Aug 23, 11:30 am Installed a new kernel with one small difference in the PC104 interrupt handling. If the PC104 interrupt handler is called, and it sees no bits set in the pending value, then it goes ahead and call handlers for all unmasked PC104 interrupts (which in manitou's case is just one, IRQ 3). This logic was also in the patched 2.6.16 kernel. It counted these "spurious" interrupts and from time to time, complained about them. The new code doesn't log any complaints....

- [data-system](#)
- [turbtower](#)



#### [Upgraded data system software, reduced licor interrupts](#)

[Gordon Maclean](#) posted on Aug 20, 2012

The data system was re-installed on Aug 15. It is the same hardware (CPU, serial cards, usb disk, enclosure and interface panels) as before. The Linux kernel has been upgraded, from 2.6.16 to 2.6.35. This kernel has PPS support, so an extra patch was not needed to get the PPS from the GPS. It also does not have the bug where executables could not be run from compact flash. Therefore they are not copied to ram disk at bootup....

- [data-system](#)
- [li7500](#)
- [turbtower](#)



#### [Tower Equipment Stripped](#)

[Chris Golubieski](#) posted on Jun 28, 2012

June 26, 2012 11:00am - 2:05pm MDT Removal of all sensors on the Turbulence Tower today. Sonics, Licors, TRHs, pressure, four-component, batteries and dsm. Cables have remained on tower. Kept beacon on also. Since we left cables on tower we had to mark cables on the dsm side so we know what instrument it was and which port. This was our organization codes using colored paper clips, zip ties and electrical tape. All levels have a sonic, TRH and Licor which are bundled together....

- [turbtower](#)
- [trh](#)
- [sonic](#)
- [pressure](#)
- [licor](#)



#### [TRH 012 \(30m\) fan out](#)

[Gordon Maclean](#) posted on Jun 27, 2012

Gordon Jun 27, 2012 After removing the sensors and data system, we're testing the set up back in Boulder, to see if we can duplicate the problem of not being able to sample 5 licors. In setting up the test, noticed that the fan on TRH012 does not run, but the TRH does output data. Checking the data archive, that unit is data id 1,420, which was the 30 meter TRH. Will check with Chris in case he noticed whether the fan was running when he removed the sensor....

- [turbtower](#)
- [trh](#)



#### Sensors and DSM removed from tower

Gordon Maclean posted on Jun 27, 2012  
Jun 26, 2012

- [turbtower](#)
- [data-system](#)



#### Turbulence tower outage

Edward (Ned) Patton posted on Jun 08, 2012

The entire turbulence tower was down from May 31 until June 8. During this time, we were able to ping the datalogger but unable to log in. Richard Oakes from the USFS cycled the power on the datalogger at about 2pm on June 8, which restored access to the system. All sensors came happily back to life, with the exception of the 2m LiCor that Gordon was able to resuscitate via sending ASCII commands to the sensor....

- [turbtower](#)
- [sonic](#)
- [communication](#)
- [co2](#)



#### Network Switch

Edward (Ned) Patton posted on Apr 01, 2012

The turbulence tower data had not been updating since March 17. A site visit by Ned found that the network issue preventing communication was associated with the 5-port Linksys/Cisco switch located in the waterproof power enclosure at the tower. Cycling the power on the switch brought back the network.

- [turbtower](#)
- [communication](#)



#### Site Visit 12-15-2011

Chris Golubieski posted on Dec 21, 2011

Who: Ned, Christopher When: December 15, 2011. Arrived 9:51am, Departed 12:00pm Removed Licor (sn 1176) from 15m. Note, by Gordon, Jul 13, 2012: There is no sn1176. I think this must have been unit sn1167, which according to the log entry of 4/12/2011, was installed at 15m. When removing this sensor due to bad chopper motor, it was not running. Rebooted sensor and heard the chopper motor in the head and it sounded bad....

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- [licor](#)
- [trh](#)



#### 15 m Li-COR out of service from November 6, 2011 to December 15, 2011

Edward (Ned) Patton posted on Dec 15, 2011

15 m Li-COR (sn1176) dropped out of service on November 6, 2011. Note, by Gordon, Jul 13, 2012: There is no sn1176. I think this must have been unit sn1167, which according to the log entry of 4/12/2011, was installed at 15m. The diagnostic value dropped to 215 indicating that Bit 5 signaled that the instrument's chopper motor failed. There was an indication a number of hours earlier that the chopper motor was beginning to fail, see: <http://www.eol.ucar...>

- [turbtower](#)
- [licor](#)
- [li7500](#)



#### Fix bug in tee\_tty of GPS data, new NIDAS code

Gordon Maclean posted on Dec 09, 2011

Gordon, Dec 9 3:15 pm Since Dec 1 22:50 UTC the DSM log file (/var/log/isfs/adam.log) has error messages that the GPS pseudo-terminal device, /var/tmp/gps\_ptty0, does not exist. Apparently the tee\_tty process died at that time. tee\_tty reads the GPS ASCII messages on /dev/ttyS3, and writes them to two pseudo-terminals /dev/gps0 (read by NTP) and /var/tmp/gps\_ptty0 (read by dsm). I'm not sure why tee\_tty died, but decided that this was an opportunity to upgrade the NIDAS software on this system....

- [turbtower](#)
- [data-system](#)



#### Disabled kernel warning messages on the console

Gordon Maclean posted on Oct 24, 2011

The "spurious" IRQ messages are annoying when one is logged onto the system console at the tower. They are logged at a priority of "warning". They should have a lower priority, like debug, or info, unless the number/sec is above some threshold. Until that change is made, I'll disable them on the console, by setting the "-c 4" option in klogd, which then suppresses messages of warning and lower, which are numeric values 4-8. 3-0 are priorities from error to emerg....

- [turbtower](#)
- [data-system](#)



#### Site visit - Licor 7500s - batteries

Gordon Maclean posted on Oct 14, 2011

Oct 14, 2011 Arrived: 9am MDT Departed: 11am MDT ChrisG and SteveS are on site to diagnose the sick licor 7500 at 16m and add the two licors that were at the CWEX11 project. Chris could not hear the motor spinning on the 16m Licor 7500. A power cycle did not bring it back. While removing it, when the unit bumped against something, the motor started up, but was much more noisy than usual. It will be brought back for repair. Installed SN 1167 at 16 meters, and 0813 at 7 meters....

- [turbtower](#)
- [licor7500](#)



#### 16m Licor sick, 2m soaked

Gordon Maclean posted on Oct 08, 2011

The data from the Licor at 16 meters went bad on Oct 2, while our system was not reachable over the network. [http://www.eol.ucar.edu/isf/projects/BEACHON\\_SRM/isfs/qcdata/plots/2011/10/02/co2\\_20111002.png](http://www.eol.ucar.edu/isf/projects/BEACHON_SRM/isfs/qcdata/plots/2011/10/02/co2_20111002.png) [http://www.eol.ucar.edu/isf/projects/BEACHON\\_SRM/isfs/qcdata/plots/2011/10/02/co2\\_20111002.png](http://www.eol.ucar.edu/isf/projects/BEACHON_SRM/isfs/qcdata/plots/2011/10/02/co2_20111002.png) The Idiaq averages went from the typical 248-255 range to around 216. [http://www.eol.ucar.edu/isf/projects/BEACHON\\_SRM/isfs/qcdata/plots/2011/10/02/licor\\_20111002.png](http://www.eol.ucar.edu/isf/projects/BEACHON_SRM/isfs/qcdata/plots/2011/10/02/licor_20111002.png) [http://www.eol.ucar.edu/isf/projects/BEACHON\\_SRM/isfs/qcdata/plots/2011/10/02/licor\\_20111002.png](http://www.eol.ucar.edu/isf/projects/BEACHON_SRM/isfs/qcdata/plots/2011/10/02/licor_20111002.png)

- [turbtower](#)
- [licor](#)



#### Network down, back up

Gordon Maclean posted on Oct 06, 2011

We have not been able to reach the turbulence tower data system since Sep 29. We could ping the RAL server in the seatainer from Boulder. Andy Gaydos logged into the server and could not ping the data system: 192.168.100.202. So either the data system or the network between the seatainer and the tower was down. On Oct 6 I was able to ssh to the DSM. So somebody fixed the problem, or perhaps a fiber->copper transceiver reset itself.</->...

- [turbtower](#)
- [data-system](#)
- [network](#)



#### Summary of Data System Timekeeping

Gordon Maclean posted on Sep 06, 2011

Monitoring the accuracy of the system clock on a real-time data acquisition system provides useful information about the performance of the system. Hence this long discussion. Data System Clock, NTP and GPS The data system at the Manitou Forest Observatory (aka, the DSM) uses a GPS receiver and the NTP (Network Time Protocol) software to set the system clock, which, in addition to the normal uses of a system clock, is used to time-tag the data samples....

- [turbtower](#)



#### Updated 5 minute statistics in NetCDF

Gordon Maclean posted on Aug 18, 2011

The 5 minute statistics of data from the turbulence tower, for the entire dataset, Jul 8 2009 to the present have been recomputed, and written to the NetCDF files. The new values incorporate the following changes: In each 20 Hz sample from a CSAT3 sonic, if any of the CSAT diagnostic bits are non-zero, then the values for that sample (u,v,w,tc) are marked as missing, and not added to the 5 minute statistics....

- [turbtower](#)
- [licor](#)
- [sonic](#)



#### Check delay setting of Licors

Gordon Maclean posted on Aug 15, 2011

Aug 15, 11:10 MDT Logged into the DSM and checked that the Licor 7500 delay parameter was set to 0 on all units. Shut down the data process, and used minicom. Do "(Outputs ?)" to query the, and "(Outputs (BW 10))" to resume the licor output. Conclusion: all Delay values were set to 0, as they should be. adn minicom ttyS2 ctrl-A w (enable line wrap) ctrl-A e (enable echo) ctrl-A f (send break) (Outputs ?) (Outputs (BW 10)) ctrl-A q (quit minicom) aup ttyS2,...

- [turbtower](#)
- [licor](#)



#### Site Visit 07-29-2011

Chris Golubieski posted on Aug 01, 2011

Arrived: 10:12am MDT Departed: 1:45pm MDT Ned and I did a couple of chores on this visit. First, we fixed the 43M sonic. It seemed to be the port on the Emerald Card. Switched 43M sonic from port16 to port20. Ned updated the xml. Second, we replaced two 15M cable from 43M Licor with a 30M cable. When we did this we noticed interrupts on the dsm. Having unplugged the battery charger for the laptop to talk with dsm,...

- [sonic](#)
- [dsm](#)
- [turbtower](#)



#### 43m sonic out

Gordon Maclean posted on Jul 13, 2011

Ned noticed a drop out of data from 43 meters on Jul 10. [http://www.eol.ucar.edu/isf/projects/BEACHON\\_SRM/isfs/qcdata/plots/20110711/plots\\_all.shtml](http://www.eol.ucar.edu/isf/projects/BEACHON_SRM/isfs/qcdata/plots/20110711/plots_all.shtml) [http://www.eol.ucar.edu/isf/projects/BEACHON\\_SRM/isfs/qcdata/plots/20110711/plots\\_all.shtml](http://www.eol.ucar.edu/isf/projects/BEACHON_SRM/isfs/qcdata/plots/20110711/plots_all.shtml) I logged into the manitou data system on Jul 13, and tried to resurrect it. I tried rserial, minicom and powering the sonic off and on: eio 16 0 eio 16 1 rs 16 Got nutt'in The licor is working....

- [turbtower](#)
- [sonic](#)



#### 43m RH bad

Gordon Maclean posted on Jun 03, 2011

RH at 43m has been bad for a while. Looking back through the plots, looks like it failed the night of Apr 25 during a period of near 100% RH. [http://www.eol.ucar.edu/isf/projects/BEACHON\\_SRM/isfs/qcdata/plots/20110425/trh\\_20110425.png](http://www.eol.ucar.edu/isf/projects/BEACHON_SRM/isfs/qcdata/plots/20110425/trh_20110425.png) [http://www.eol.ucar.edu/isf/projects/BEACHON\\_SRM/isfs/qcdata/plots/20110425/trh\\_20110425.png](http://www.eol.ucar.edu/isf/projects/BEACHON_SRM/isfs/qcdata/plots/20110425/trh_20110425.png) trh\_20110425.png

- [turbtower](#)
- [trh](#)



#### bungled data event

Gordon Maclean posted on May 24, 2011

The plot of GPSdiff\_max for May 22, 2011 shows a maximum value of around 25 seconds between 11:05 and 17:00 UTC, indicating something went haywire with the data collection during those times. Looking at the downloaded data, it appears that data stopped coming in on the Diamond serial ports at 11:05, and resumed at 17:00. There is not a large gap in data from the 3 sensors that are sampled on the Viper serial ports, but they show large time tag delta-Ts, followed by many small delta-Ts,...

[1 Comment](#) ·

- [turbtower](#)
- [data-system](#)



#### Tower Visit 04-12-2011

Chris Golubieski posted on Apr 13, 2011

Arrived: 10:30am MDT Departed: 11:20am MDT Kurt and I installed three LiCors on turbulence tower at heights of 2M, 15M and 45M. TRHs were installed on all levels. New GPS was added and old Garmin was removed. LiCor heights: 2M-1166 15M-1163 45M-1164

- [licor](#)
- [gps](#)
- [trh](#)
- [turbtower](#)



#### [Licor 7500 settings](#)

[Gordon Maclean](#) posted on Apr 12, 2011

Apr 12, 11:32 am The output format and reporting rate of the 3 Licor 7500s that were re-installed today had been reset during the calibration procedure to generate verbose output, with labels. To save archive space, we configure the units for a terse output, without labels, at 10 Hz. To setup the Licors for the format that our data system expects, do the following from the data system login prompt: shut down the data process and run minicom on the Licor port (ttyS2=2m, ttyS7=7m, ttyS11=16m,...

- [turbtower](#)
- [licor7500](#)



#### [LiCors Calibration 04-05-2011](#)

[Chris Golubieski](#) posted on Apr 07, 2011

Calibration process for LiCors 7500s. I calibrated all five LiCors. Calibration included post cal, desiccant change, spot check, zero/span. I used N2 tank which went through a scrubber of Ascarite II and Drierite to give the zero for both CO2 and H2O. Post-Cal conditions were checking zeros, span and dew point. Spans included for CO2 were a bottle of 394.611ppm and 378.867ppm. For H2O I used the Thunder Scientific, humidity chamber, set at 25C at 80%RH. Dew point was equal to 21.31C....

- [licor](#)
- [turbtower](#)



#### [Post cal results on TRH](#)

[Steven Semmer](#) posted on Apr 05, 2011

The TRH sensors went through a post cal check before re-calibration. Here are the results. Temperature: Tested over the range of -30 to 30. It has been almost 1 year since these sensors were calibrated Beachon\_040111.jpg Relative Humidity: Tested over 10% to 90% at temperatures 25, 10, -3 Beachon\_033011\_RH.jpg

- [turbtower](#)
- [trh](#)



#### [Licor 7500, TRH removed](#)

[Steven Semmer](#) posted on Apr 05, 2011

The Licor 7500 and TRH sensors were removed on 3/29. They will be re-calibrated and re-installed in about 2 weeks.

- [licor](#)
- [trh](#)
- [turbtower](#)



#### [LiCors and TRHs Removed 03-29-2011](#)

[Chris Golubieski](#) posted on Mar 30, 2011

So sorry. This is a redundant log entry. First entry was in the main Manitou Log entry page. Attendees: Chris, Kurt and Ned. Arrived at 11:25am Departed at 1:15pm Removed LiCors and TRHs at all heights. The LiCors were at the following heights. 2m: s/n 1163 7m: s/n 1166 15m: s/n 1167 45m: s/n 1164 We unplugged main power to all LiCors in the battery boxes. Replaced both outside GFI outlets. Both outlets were blown. Power back to both outlets. Beacon back on.

- [turbtower](#)
- [licor](#)
- [trh](#)
- [licor7500](#)
- [co2](#)



#### [Updated NIDAS software, NTP server](#)

[Gordon Maclean](#) posted on Oct 14, 2010

Installed the latest version of nidas (revision 5771M) today, with the new process running at 19:49 UTC. The new nidas has some improvements in the serial handling efficiency. Don't see any effect on the number of "spurious interrupts" though. Also restarted ntp daemon. Added a "server ral" entry in /etc /ntp.conf so that we can compare our local GPS time source with the ral server. ntpq -p shows good agreement (-8....

- [data-system](#)
- [turbtower](#)



#### 7m TRH intermittent

Gordon Maclean posted on Oct 06, 2010

Data from the 7m TRH has been intermittent for more than a month. Here's a typical dropout, where the unit quits reporting, then 15 hours later comes alive, with startup messages: 2010 10 02 14:07:54.4656 0 40 \x00\x00\r Sensor ID16 data rate: 1 (secs)\n 2010 10 03 05:28:49.2103 5.525e+04 29 \r\ncalibration coefficients:\r\n 2010 10 03 05:28:49.2517 0.04144 21 Ta0 = -4.042937E+1\r\n 2010 10 03 05:28:49.2827 0.03095 21 Ta1 = 1.022852E-2\r\n 2010 10 03 05:28:49.3134 0....

- [turbtower](#)
- [trh](#)



#### repl 7m trh sensor, cables, re-tensioned tower

Kurt Knudson posted on Aug 20, 2010

7/22/10 re-tensioned all guy wires using transits to plumb tower. replaced 7m and 15m trh cables, as well as 7m trh sensor

- [turbtower](#)
- [trh](#)
- [data-system](#)
- [datasystem](#)



#### 2m Licor working again

Gordon Maclean posted on Jul 18, 2010

The Licor 7500 at 2m has not been reporting for a while. Looking at /proc/tty/driver/serial for port 2 indicates that no characters have been received since the last reboot. As of Jul 18 the system uptime is 19 days. Did "rs 2" to talk to the port. After sending carriage a return the 7500 responds with ^M(Error (Received TRUE))\n So, it is alive and responding, just not sending data. Sent it a configuration command, setting the BW and RS232 parameters,...

- [turbtower](#)
- [licor7500](#)



#### Turbulence tower data system clock behind by 1 second from May 4 - Jun 11

Gordon Maclean posted on Jul 15, 2010

The turbulence tower data system clock was behind by 1 second from May 4 to Jun 11. If sub-second absolute time-tag accuracy of the data samples is a not a concern, then you can ignore this log message. Otherwise, here are the gory details... The data system was replaced on the turbulence tower on May 4. The new system is running a new version (4.2.6p1) of the NTP (network time protocol) service. NTP on the data system is configured to use the attached GPS (Garmin 25-HVS) as a reference clock....

- [turbtower](#)
- [data-system](#)



#### 7m TRH sick

Gordon Maclean posted on Jul 12, 2010

The 7m TRH has been sick since about Jun 23. It looks like a bad RS232 connection. The data is good for periods of time, then garbage. Here's a bit of data where it was in a and out: data\_dump -A -i 1,220 manitou\_20100627\_120000.dat | more 2010 06 27 13:44:10.4165 22.59 20 \xfc\xfe1\xfe~3f\x04984\xe02929\r\n 2010 06 27 13:44:12.0258 1.609 26 \xfc\xfe10.\xf08\xe088\xee33 4985 2929\r\n 2010 06 27 13:44:13.6407 1.615 29 T\xde\xfe8?\xfe10.08 88....

- [trh](#)
- [turbtower](#)



#### Sapflow sensors installed near turbulence tower (May 13, 2010)

harley posted on Jun 17, 2010

On May 13, two sapflow sensors were installed on each of 12 trees approx. 50 m SE of the turbulence tower. Heat flux data will be downloaded at approx. 2-week intervals, and anyone interested in the data should contact Jia Hu (jiahu@ucar.edu). At some point, heat fluxes will be converted to sapflow data and available to help constrain water flux measurements made at the turbulence tower. Sometime in the next couple of weeks,...

- [turbtower](#)



#### Site visit May 28, 2010 - 16m TRH

[Edward \(Ned\) Patton](#) posted on May 28, 2010

16m TRH has been missing since May 21, 2010 and acting up since as early as May 11. Upon arrival, there was no fan operating on the 16m TRH. Determined that the coupling between the 5 and 15m cables going to the 16m TRH had taken on water and/or was corroded. Replaced 15m cable (upper section) of the cabling to the 16m TRH due to the corrosion. Bottom 5m cable should be replaced too. Kurt taped the current coupling and inserted a drip loop. Should be ok for a while....

- [turbtower](#)
- [trh](#)



[Site visit May 4 \(network outage, TRHs, tower\)](#)

[Gordon Maclean](#) posted on May 05, 2010

Karl Schwenz, Chris Golubieski, Gordon Maclean Objectives: Diagnose and fix reason that system has been offline for last few days (no data in Boulder after April 27). Replace data system box in order to take the old box back to Boulder for a tuneup. Replace top TRHs which have not been working well. Add new radiation shields. Replace barometer with external unit. Make anti-climb door easier to latch. Arrived at site, May 4 10:30. Chris climbed tower and replaced the TRH transducer/PIC units,....

- [turbtower](#)
- [network](#)
- [trh](#)



[16m TRH acting up](#)

[Gordon Maclean](#) posted on Apr 13, 2010

TRH at 16 meters has had sporadic problems since Apr 8 07:00 MDT. Over Apr 10,11 and 12 it seems to come alive in the warmest part of the day, (at temps over 10C) and then fails as the temp falls in the evening. See plot below. Here is a dump of some recent data (times in GMT). Looks like the processor is getting reset, printing out its calibration information when it boots. Perhaps the power is dropping out? Corroded connection? data\_dump -i 1,320 -A manitou\_20100411\_000000....

- [turbtower](#)
- [trh](#)



[TRH at 30m bad data](#)

[Gordon Maclean](#) posted on Mar 16, 2010

The TRH at 30m is acting up. Here is the data when it goes bad: data\_dump -i 1,420 -A manitou\_20100314\_120000.dat | more 2010 03 14 13:17:07.8073 0.82 31 TRH013 -4.18 88.21 3565 2887\r\n 2010 03 14 13:17:08.6281 0.8208 31 TRH013 -4.17 88.21 3566 2887\r\n 2010 03 14 13:17:09.4474 0.8194 31 TRH013 -4.19 88.21 3564 2887\r\n 2010 03 14 13:17:10.2680 0.8206 31 TRH013 -4.17 88.21 3566 2887\r\n 2010 03 14 13:17:11.0874 0.8194 31 TRH013 -4.17 88....

- [turbtower](#)
- [trh](#)



[Site visit for CNR1, TRH](#)

[Gordon Maclean](#) posted on Mar 12, 2010

Ned Patton, Sylvain Dupont, Gordon Maclean March 12, 2010, 9:15 MST arrived at tower Plan: correct problem of spotty CNR1 data, replace TRH fan at 2 meters rserial on port 19 showed no CNR1 data. Power cycled CNR1 by unplugging/replugging. No data. Switched CNR1 cable to port 5 (2 meter TRH's port). CNR1 works on that port. Changed config to use unused port 14 as the CNR1 port. CNR1 also works on that port. Power on port 19 looked OK, and TRH worked on that port....

- [turbtower](#)
- [trh](#)
- [radiation](#)



[Verify licor connections](#)

[Gordon Maclean](#) posted on Feb 04, 2010

On Feb 4, logged into system from Boulder to verify the serial numbers of the licors: port SN assumed height 2 1163 2m. Moved from port 14, 30m on Feb 2 7 1166 7m 20 (was 17) 1167 16m 14 now disconnected 11 1164 43m This agrees with the configuration previous to Feb 2, and the changes of Feb 2: move of the 30m unit (SN1163) to 2m, and the move of the cable from the 16m unit (SN1167) from port 17 to port 20 on the new data system box....

- [turbtower](#)
- [licor7500](#)





#### Site visit, move licor, diagnose sampling issue, dead TRH fan

Gordon Maclean posted on Feb 04, 2010

Feb 2, 2010: Patton, Golubieski, Maclean on site at 10:30 MST Planned tasks: Move Licor 7500 from 30 meters to 2 meters Investigate why data system can't sample 4 7500's at 20 Hz Measure guy tensions Noticed a high-pitch sound from a TRH fan. Chris determined it was the 16m TRH. The propeller had come off the shaft, and was not repairable. Swapped the 16m and 2m TRHs, so that it will be easy for someone to replace the low unit....

- [licor7500](#)
- [trh](#)
- [turbtower](#)
- [pressure](#)



#### Adjusting Licor 7500 sampling and baud rates

Gordon Maclean posted on Dec 02, 2009

The 2m licor connected to /dev/ttyS2 was removed today, and the licors at 16 and 43 meters were reconnected to ports /dev/ttyS17 and /dev/ttyS11 by a BEACHON helper. By checking the serial numbers, with the (Coef ?) command, and comparing against the earlier LICOR log entry, we could determine remotely what unit is connected to what port. Note that the licors at 16 and 43 meters are switched from the previous configuration....

- [turbtower](#)
- [co2](#)
- [licor7500](#)



#### Licors Installed on Turb.Tower, problems continue

John Militzer posted on Nov 19, 2009

18Nov09 Site Visit: CG, KK, JM - Purpose: Install 5 Licor 7500's - Power: We rearranged the power / batteries to accomodate the licors. A high current /trickle/equalize battery charger was connected directly to the battery chain and not through the solar/battery charge by using the last 'external battery' amp connector....

[1 Comment](#)

- [turbtower](#)
- [licor7500](#)



#### Li7500 calibrations

Steve Oncley posted on Nov 13, 2009

Here are my notes from this week on the first servicing we've ever done on our Li7500s. Note that S/N 0813 and 1166 came back from LiCor this summer after being repaired (from lightning damage), so no service was performed on them. The following all was done using LiCor's software (installed on the Aspire). Before service: S/N Last Cal CO2 zero CO2 span H2O zero H2O span AGC 0813 Didn't read 1163 24 Oct 06 0.8697 0.9968 0.8468 0.9946 49% 1164 24 Oct 06 0.8883 1.017 0.8601 0....

- [co2](#)
- [licor7500](#)
- [turbtower](#)



#### Increased sampling rate of 43m Licor 7500 from 10 to 20Hz

Gordon Maclean posted on Nov 09, 2009

Nov 9, 12:30 MST. Per Steve Oncley, increased the sampling rate of the Licor 7500 at 43 meters. It is the only unit connected right now. Commands to change the sampling rate: # shut down data process adn # adn powers off port 17, power it back on. eio 17 1 # start minicom # The default baud rate of minicom on that port is 9600, which is what the 7500 # uses after it is sent a break. To set it to 9600 explicitly, use ctrl-A pe. # Use ctrl-A minicom commands to turn on local echo (e),...

- [turbtower](#)
- [licor7500](#)



#### Tower splint, reinstall TRHs, install CNR1, Licors

Gordon Maclean posted on Nov 06, 2009

On site: Golubieski, Semmer, Militzer, Maclean. Dave Gochis was also at the tower site, installing soil sensors. Installed splint at ding in tower upright. Reinstalled TRH transducers in ventilation units at all levels. Started installing Licor 7500's. At 43 meters, S/N 1167, port ttyS17. Measured total power draw at data system, prior to and after unit 1167 was installed: Power Add'l Power without 43m 7500 13.0 V 1.4 A 18.2 W with 43m 7500 12.6 V 3.0 A 37.8 W 19....

- [turbtower](#)

- [trh](#)
- [pressure](#)
- [network](#)
- [power](#)
- [licor7500](#)
- [datasystem](#)
- [radiation](#)



#### [Pressure port covered](#)

[Gordon Maclean](#) posted on Oct 19, 2009

On the Oct 15 visit, Kurt noticed that the inlet of the barometer pressure port had been taped over, though the tape had peeled back and was no longer covering the inlet hole. Pressed the tape back down, but it probably won't stay. It was probably taped on Oct 1 when the TRHs were removed in anticipation of a controlled burn. So since Oct 1, the pressure data should not be trusted.

- [turbtower](#)
- [pressure](#)



#### [Connected AC power and fiber network](#)

[Gordon Maclean](#) posted on Oct 15, 2009

Oct 14. Arrived on site 10:55 MDT. Kurt Knudson and Gordon Maclean (EOL) and Fabian Guerrero and Armando Cisneros from CISL/NETS. Installed DC power supply in the power/network enclosure at turbulence tower. It is charging one battery for the beacon and two batteries for the data system and sensors. Removed solar panels and other batteries from the site. Fabian and Armando terminated and tested the fibers, installed fiber patch panels at the tower enclosure and in the seatainer,...

- [turbtower](#)
- [network](#)
- [power](#)



#### [power installation completed](#)

[Edward \(Ned\) Patton](#) posted on Oct 15, 2009

Paul Painter from Green Mountain Falls Electric completed the installation of the electrical enclosure at the turbulence tower, and the connecting of the power cables at either end on October 7. So, line power should now be available at the turbulence tower. The service should be 5 kVa, there should be two circuits each with outlets inside the enclosure and water proof outlets outside the enclosure.

- [turbtower](#)
- [power](#)



#### [power and data cables installed](#)

[Edward \(Ned\) Patton](#) posted on Oct 06, 2009

Power cable and data cables between the walk-up and turbulence towers were trenched into position on Monday, October 5 2009. Connections at either end of the cables will be completed shortly.

- [turbtower](#)
- [power](#)
- [data](#)



#### [October 1, 2009](#)

[Chris Golubieski](#) posted on Oct 02, 2009

Mostly Sunny. Cold and breezy. Karl and I inspected "ding" in tower. Nothing was resolved of what could've done this dent. There's not paint/led/copper transfer for a bullet/arrow. It almost looks like someone tried to hang something over wrenched it. ?? TRH's sensors were removed and taken back to NCAR. Some of them were VERY dusty. I kept shields and cables all plugged in and at their heights. However, I did remove all TRH port fuses....

- [turbtower](#)
- [trh](#)
- [power](#)
- [sonics](#)



#### [16m TRH out](#)

[Gordon Maclean](#) posted on Sep 21, 2009

The 16 meter TRH did not survive the power outages on Sep 16. It was running fine up to the 03:20 am dropout but has just given a few sporadic points since. I logged into the manitou system and tried rserial to port 11 (rs 11), but got nothing back.

- [trh](#)
- [turbtower](#)



#### [Power outages](#)

[Gordon Maclean](#) posted on Sep 21, 2009

The data system at manitou died at around 03:20 am MDT on Sep 16, and came back at 8:30 am. It died again at 10:34 pm Sep 16 and came up at 8:30 the next morning. Looks like we're not getting enough solar charging. It has stayed up since Chris G swapped batteries on Sep 18.

- [power](#)
- [turbtower](#)



[Sept 17, 2009](#)

[Chris Golubieski](#) posted on Sep 18, 2009

Stopped by the 45m tower and noticed a fire line that has been scratched around the tower and anchors. The line comes about five feet from anchors and approx. seven feet from solar panels. Looked a little close if the burn gets out-of-hand. Also swapped NDAQ and beacon batteries. The batteries on beacon were around 13V while the NDAQ were at 11V....

- [turbtower](#)



#### [Turbulence Tower GPS Coordinates](#)

[Edward \(Ned\) Patton](#) posted on Sep 02, 2009

N 39°06.045' W 105°06.319' 2385m elevation

- [turbtower](#)



#### [2m sonic boom azimuth](#)

[Edward \(Ned\) Patton](#) posted on Aug 29, 2009

246° GPS unit was set to true north. Used the ACD/BEACHON Magellan GPS from the Chemistry trailer. Should be confirmed due to potential operator error.

- [turbtower](#)
- [sonics](#)



#### [T.2m replaced](#)

[Steven Semmer](#) posted on Aug 21, 2009

Andy Turnipseed replaced the 2m TRH on Wednesday. So far so good.

- [turbtower](#)
- [trh](#)



#### [RH.2m still bad](#)

[Gordon Maclean](#) posted on Aug 14, 2009

TRH015, installed at 2m on Aug 12 18:51 UTC also reports incorrect humidities. Its cutoff is around 45%. Above 45% the reported humidity is anti-correlated with the 4 other sensors - looking more like a temperature. In this plot, the night of Aug 11-12 shows the problem with unit 013, and the next night shows the problem with 015: [http://www.eol.ucar.edu/isf/projects/BEACHON\\_SRM/isfs/qcdata/plots/20090812/trh\\_20090812.png](http://www.eol.ucar.edu/isf/projects/BEACHON_SRM/isfs/qcdata/plots/20090812/trh_20090812.png)

- [turbtower](#)
- [trh](#)



#### [replaced 2m TRH sensor](#)

[Alex Guenther](#) posted on Aug 13, 2009

replaced 2m TRH sensor at 11:50 MST on August 12 Added by maclean: Old unit was TRH013, new is TRH015. Here's a data\_dump: 2009 08 12 18:51:00.1002 0.839 30 TRH013 28.47 13.81 6804 506\r\n 2009 08 12 18:51:00.9311 0.8308 30 TRH013 28.43 13.73 6800 504\r\n 2009 08 12 18:51:01.7703 0.8392 30 TRH013 28.34 13.59 6791 501\r\n 2009 08 12 18:51:09.4970 7.727 3 \x00\r\n 2009 08 12 18:51:10.7516 1.255 17 \r Sensor TRH015\r\n 2009 08 12 18:51:10.7625 0....

- [turbtower](#)
- [trh](#)



#### [RH.2m bad after Jul 30](#)

[Gordon Maclean](#) posted on Aug 07, 2009

RH at 2m went walkabout on about Jul 30 02:30 MDT. After that time it disagrees with the other RH's above ~60%. This looks like what we saw in ASP09. This may have happened during a rain event - the sonic diagnostic flags were high during that time. [http://www.eol.ucar.edu/isf/projects/BEACHON\\_SRM/isfs/qcdata/plots/20090730/trh\\_20090730.png](http://www.eol.ucar.edu/isf/projects/BEACHON_SRM/isfs/qcdata/plots/20090730/trh_20090730.png)

- [turbtower](#)
- [trh](#)



#### [CSAT parameters](#)

[Gordon Maclean](#) posted on Aug 04, 2009

The following dump of CSAT sonic parameters is from /var/log/isfs/manitou\_BEACHON\_SRM\_csat3.log on the data system. It was generated on Jul 17 when the data acquisition process was last started. These serial numbers agree with Chris' sensor height blog entry. {{ ##### csat3: manitou:/dev/ttyS1 SN1124 3.0f time: 2009 07 17 19:42:24 ET= 20 ts=i XD=d GN=212a TK=1 UP=5 FK=0 RN=1 IT=1 DR=102 rx=2 fx=038 BX=0 AH=1 AT=0 RS=1 BR=0 RI=1 GO=00000 HA=0 6X=3 3X=2 PD=2 SD=0 ?...

- [turbtower](#)
- [sonics](#)



#### [Sensor Heights](#)

[Chris Golubieski](#) posted on Jul 28, 2009

BEACHON Heights and Sensors \*Note: The heights were from top of boom to top of plate. 42.86m CSAT 0677 TRH 29.90 m CSAT 0672 TRH 16.06m CSAT 0673 TRH 7.42m CSAT 1120 TRH 2.04m CSAT 1124 TRH

- [turbtower](#)
- [sonics](#)
- [trh](#)



#### [Turbulence Tower Guy-Wire Tensions](#)

[John Miltzer](#) posted on Jul 28, 2009

BEACHON Tower Guy-Wire Tensions (lbs).....THIS SHOULD BE AN ON-GOING LOG Inner to Outer.....

- [turbtower](#)
- [tensions](#)
- [beachon](#)



#### [Wifi network to Turbulence Tower](#)

[Gordon Maclean](#) posted on Jul 24, 2009

Jul 17, 2009 Installed AP24, 802.11 access point on walkup tower, just above the 11th section. Ethernet IP: 192.168.100.202, Wireless IP: 192.168.12.251. Borrowed 100 ft white cat 5 cable in server seatainer for the run from the network switch in the seatainer up the tower. Installed a Patton Model 570 ethernet surge protector in the seatainer. I believe it was installed between the white cable coming from the tower and the AP24 power injector. ...

- [turbtower](#)
- [network](#)
- [walkuptower](#)
- [beachon](#)