

West Castle MET Station Install Itinerary

February 9, 2015

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Task Summary

1. Download data all sites
2. Install HMP45
 - KIRA
 - RIKER
3. Adjust NRLite and other sensor angles
 - RIKER
4. Re-terminate coax at RIKER
5. Swap logger at RIKER
6. Re-terminate COAX at T-REX
7. Trouble shoot RF (time permitting)

Workflow

8:30 AM - Arrival

- Chris and Reed meet with Castle admin
 - Sign waivers and retrieve passes
 - Get at a Castle radio
 - Open IT rack room and Furnace room
 - Confirm time of T-Rex Lock-out
 - After lunch
- Get Toughbook and ladder
- Brief site meeting

9:30

KIRA – 1 and 2

- Reed/Chris will take ladder over to KIRA – This may need to be walked over if it does not fit in Chris' truck
- Reed will hook Toughbook to logger
- Download and validate data
- Installs HMP45 while data is downloaded
 - Whoever is free will assist with sensor install– pass tools etc
- Fill holes with spray foam

10:30

PREPARE FOR MID/UPPER MOUNTAIN WORK

- Head to lodge for a snack/early lunch and coffee
- Pack materials
- Discuss objectives and procedures

11:00

TRAVEL TO SPOCK

- Take red chair to top
- Ski over to SPOCK (and hike up to tower)

11:45

SPOCK

- Download data
- Check correctness
- Adjust sensors

12:15

TRAVEL T-REX

- Ski to T-Rex

12:30

T-REX

- Confirm LOCKOUT!!!
- Remove coax
- Take measurements for coax
- Climb down to terminate
- Adjust solar panel
- Remove rime
- Confirm with mountain that we are finished and no longer need lockout

14:00

MID-MOUNTAIN

- Eat food drink coffee!!
- Dig out enclosure
- Begin data download
- Drill hole
- Begin removal of
 - High Z coax
 - Lightning Arrest
- Check data and decide which sensors need adjustment
- Adjust sensors
- Wire HMP45
- Check RT temp and RT Humid for correctness
- Solder and connect coax
- Check RF connection

16:00

RETURN TO LODGE

- Ski to lodge
- Pack up tools

17:00

RF COMS- If time at the very least...

- Establish close range link
 - Is error in KIRA RF com setup? De-sensing?

Detailed Task Descriptions and Procedures

1. Download data from all sites

Using the Toughbook with loggernet, the data from each site shall be downloaded. Use the RT data to validate and verify that sensors are operating as expected.

Time: 15 mins per site

- I. Meet with administration to unlock 'IT rack room'
- II. Remove Toughbook laptop
- III. Download data and validate/verify correctness

Required materials

- Toughbook
- Serial Cable

2. Install HMP45 KIRA

Install the HMP45 on the valley tower. Adjust the logger code if necessary. Confirm correctness with separate temperature sensor.

Time: 30 mins

- I. Meet with administration to unlock 'Furnace room'
- II. Take large ladder over to KIRA
- III. Possible new hole for sensor wires
- IV. Install sensor, connect wires
- V. Fill hole with spray foam

Required materials

- Toughbook
- Serial Cable
- Small flathead screwdriver
- Sprayfoam
- HMP45
- Solar shield
- Ubolt with nuts and washers
- Zip ties
- Hole saw
- Drill with extra batteries

3. Adjust NRLite et al

The Sensors on RIKER have shifted position due to either snow loading or wind. Reposition them and make the necessary adjustments in the logger code. Guy wires should be checked.

Time: 1 hour

- I. NRLite may need to be rotated
- II. RMyoung, SR50A may need to be rotated
- III. Use compass and Leica Disto for the adjustments
- IV. Any changes to the sensors may require changes in the code ie) distance from ground to SR50A

Required materials

- Toughbook
- Serial Cable
- Wrench set
- Allen key set (metric and imperial)
- Small flathead screwdriver
- Philips Screwdriver

4. Install HMP45 RIKER

The HMP45 is already installed but needs to be wired into the datalogger. The enclosure will need to be dug out and a small hole drilled. After the sensor is connected the hole shall be sealed with sprayfoam. Adjust the logger code if necessary. Confirm correctness with separate temperature sensor.

Time: 30 mins

- I. Dig out environmental enclosure
- II. Drill new hole for sensor wires
- III. Install sensor, connect wires
- IV. Fill hole with spray foam

Required materials

- Toughbook
- Serial Cable
- Small flathead screwdriver
- Sprayfoam
- HMP45
- Solar shield
- Ubolt with nuts and washers
- Zip ties
- Hole saw
- Drill with extra batteries

5. Re-terminate coax at RIKER

The high impedance coax currently installed on the mid-mountain tower must be replaced with the correct gauge. The lightning arrest is currently at the bottom of the tower and MUST be installed within the enclosure.

Time: 1.5 hours

- I. Remove all high Z coax
- II. Dig out environmental enclosure
- III. Install lightning arrester in enclosure
- IV. Cut and terminate the high Z coax (6" - 12") to go from arrest to RF401
- V. Measure, cut, LM400 to go from antenna to arrest
- VI. Drill $\frac{1}{2}$ "- $\frac{3}{4}$ " hole in enclosure
- VII. Feed unterminated LM400 through hole and terminate
- VIII. Connect to arrester
- IX. Confirm operation
- X. RF strength test could be performed if time permits - see workflow

Required materials

- Toughbook
- Serial Cable
- Philips Screwdriver
- Large wire cutters
- Utility knife with extra blades
- Solder gun
- zipties
- 2 x LMR200 N-male
- 3 x LMR400 N-male
- 1 x LMR400 N-Female
- Crimpers
- Tape measure
- Hole saw
- Drill with extra batteries

6. Swap logger at RIKER

Time: 20 mins

The logger at RIKER has a low internal battery (again). This has proven to cause many issues such as incorrect sensor readings and data loss. A new logger with new battery will replace the current one.

- I. Ensure data has been downloaded
- II. Download current RIKER logger program
- III. Confirm wiring configuration
- IV. Swap out old logger for replacement
- V. Rewire
- VI. Send program
- VII. Confirm RT sensor data
- VIII. Confirm new battery still reads above 3 VDC

Required materials

- Toughbook
- Serial Cable
- Replacement logger with new internal battery

7. Re-terminate coax and adjust solar panel at T-REX

Time: 30 mins

- I. Request and confirm lockout from Jock - !THIS MUST BE DONE 24H PRIOR AND DAY OF!
- II. Cut high Z cable to go from arrest to RF401
- III. Arrest inside enclosure???? Might not be enough room
- IV. Cut and terminate LMR400 coax to go from arrest to antenna
- V. Adjust solar panel
- VI. RF strength test could be performed if time permits - see workflow

Required materials

- Toughbook
- Serial Cable
- Philips Screwdriver
- Wrench set
- Small flathead
- Large wire cutters
- Utility knife with extra blades
- Solder gun
- 2 x LMR200 N-male
- 3 x LMR400 N-male
- LMR 400 coax > 5'
- Crimpers
- Linux laptop (for RF trouble shooting if time permits-see workflow)

8. Test KIRA RF comms

A link will first be established with the two test RF401s in close range (2'). Once coms have been established the long range link will be tested.

- I. Remove serial loopback from RF401 "Node"
- II. Connect laptop 1 and 2 to RF401s "Base" and "node" via rs232 cables
- III. Connect both units to hand held antennas
- IV. Confirm and set RF401 RX/TX addresses (written on each device) through software commands.
- V. Establish close range link
- VI. Connect "node" to antenna on KIRA
- VII. Laptop 2 (connected to "Node") stays at KIRA
- VIII. Laptop 1 (connected to "Base") moves incrementally away towards lodge in vehicle. Testing coms at each increment

Required materials

- Toughbook
- Serial Cable
- Wrench set
- 2 x Linux laptop (1 Reed's, 1 will need to be installed on lab laptop)
- Scope or binoculars
- 2-way radios
- Webbing to secure ladder
- Harness

Preparation

- Test HMP45 in lab
- Install new battery for replacement logger
- Test replacement logger
- Prepare coax (eg. Terminate one end)
- Print RIKER wiring diagram
- Print KIRA wiring Diagram
- Test batteries for RF401 com test
- Fix the test coax connector

Materials & Equipment

<input type="checkbox"/>	QTY	Materials & Equipment
<input type="checkbox"/>	misc	Zipties
<input type="checkbox"/>	5	LMR200 N-MALE
<input type="checkbox"/>	6	LMR400 N-MALE
<input type="checkbox"/>	2	LMR400 N-FEMALE
<input type="checkbox"/>	1	Sprayfoam
<input type="checkbox"/>	1	HMP45
<input type="checkbox"/>	1	Solar shield
<input type="checkbox"/>	1	Ubolt
<input type="checkbox"/>	4	nuts and washers (ubolt)
<input type="checkbox"/>	1	Replacement logger
<input type="checkbox"/>	1	Sensor manuals
<input type="checkbox"/>		

Tools

<input type="checkbox"/>	Allen keys	<input type="checkbox"/>	Utility knife, extra blades
<input type="checkbox"/>	Crimpers	<input type="checkbox"/>	Webbing to secure ladder
<input type="checkbox"/>	Drill with extra batteries	<input type="checkbox"/>	Wrench Set
<input type="checkbox"/>	Harness	<input type="checkbox"/>	Multi-meter
<input type="checkbox"/>	Hole saw	<input type="checkbox"/>	2-way radios
<input type="checkbox"/>	Large wire cutters	<input type="checkbox"/>	Solder
<input type="checkbox"/>	Philips Screwdriver	<input type="checkbox"/>	Solder gun
<input type="checkbox"/>	Scope or binoculars	<input type="checkbox"/>	
<input type="checkbox"/>	Serial Cable	<input type="checkbox"/>	
<input type="checkbox"/>	Small flathead screwdriver	<input type="checkbox"/>	
<input type="checkbox"/>	Tape measure	<input type="checkbox"/>	

APPENDIX I

Data Download

NOTE: KIRA does not have enclosure port

1. Remove rime/snow from RS232 port on enclosure
2. Hook RS232 to port on side of enclosure
3. Open loggernet
4. Connect
5. Enter the custom data download menu via the 2nd button on mid top right
6. Ensure settings create new file and download ALL data
7. Ensure all files in the bottom dialog box are checked
8. Uncheck anything prepended with "RT_"
9. Click download