

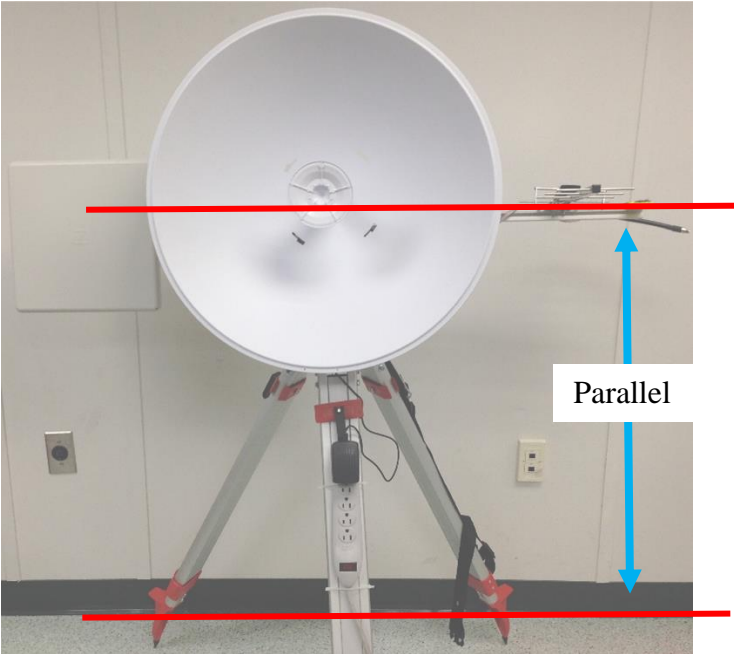
Checklist for Eclipse Payload Power Up and Testing

Reference Table	
IMEI #	
Arduino COM Port #	
Maestro COM Port #	
RFD900 COM Port #	


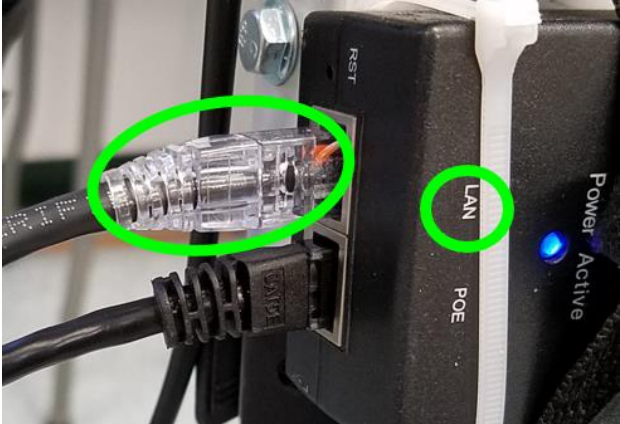
Name _____

Team # _____

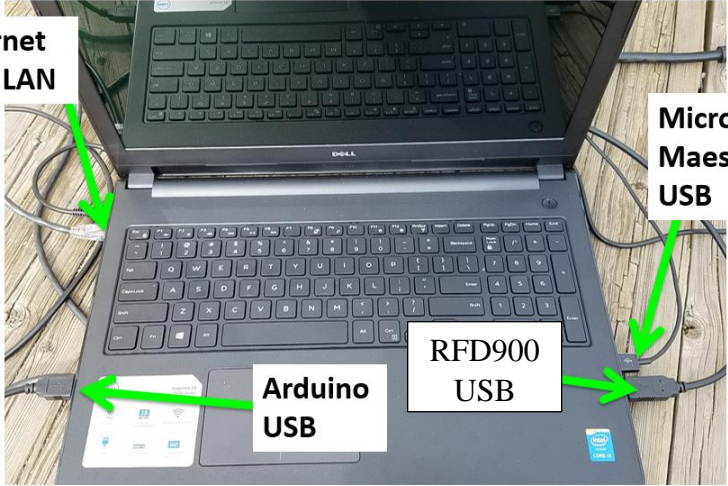
Checklist for Eclipse Payload Power Up and Testing

Step #	Ground Station		Done?
GS 1	Firmly plant the three feet of the tripod in/on the ground while using the bubble level to ensure that the baseplate is parallel to the ground.		

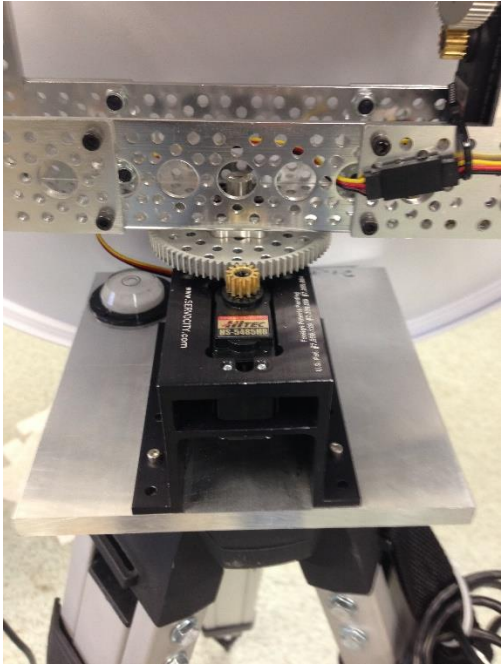
Checklist for Eclipse Payload Power Up and Testing

GS 2	Plug the power strip into the outlet that you are using and verify that the LED in the switch is on. Nothing should be plugged into it yet.		
GS 3	Connect one end of the Ethernet cable to the LAN port on the Power adapter.		

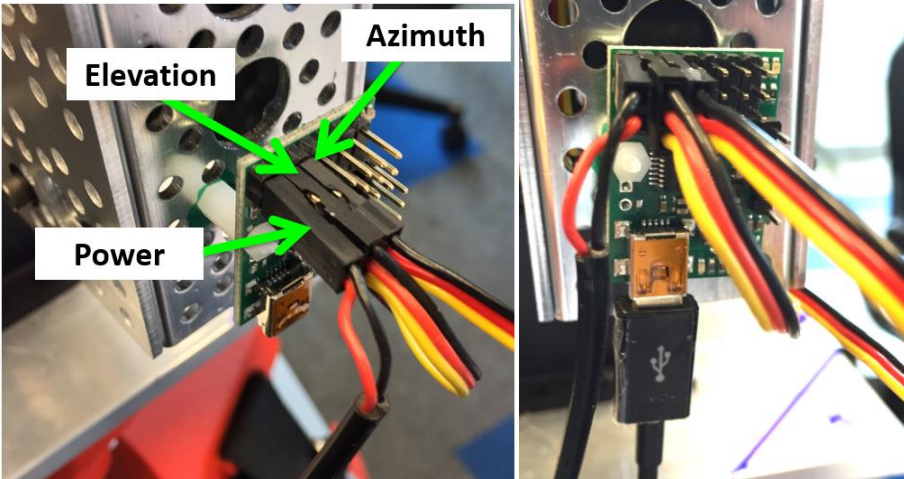

Checklist for Eclipse Payload Power Up and Testing

GS 4	<p>Plug into the computer the:</p> <ol style="list-style-type: none">1. Other end of the Ethernet cable2. the Arduino USB3. the Micro Maestro USB4. the RFD900 USB <p>NOTE: The computer charger doesn't need to be plugged in but it is recommended.</p>		
GS 5	Power on the laptop		


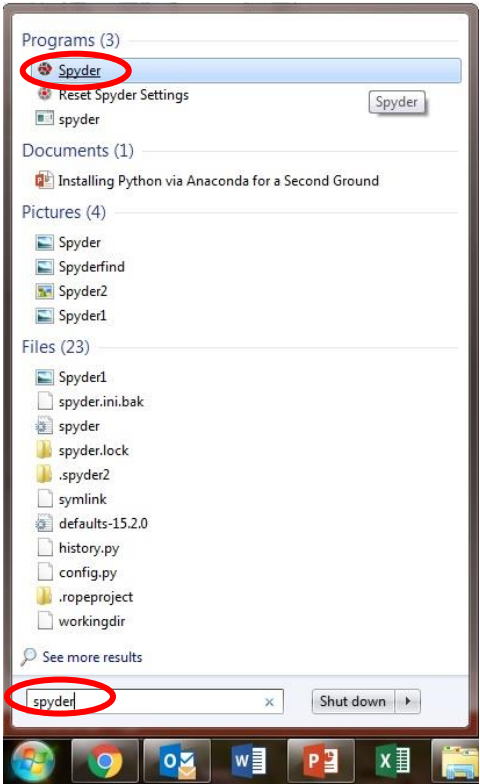
Checklist for Eclipse Payload Power Up and Testing

GS 6	<p>Align the dish with the baseplate so that when the servos are powered the ground station doesn't swivel around to find zero.</p> <p>NOTE: The ground station will move slightly if centered, and a lot if not centered so watch out!</p>		
GS 7	<p>Use a compass to align the front of the baseplate to point in one of the 4 cardinal magnetic directions.</p>		

Checklist for Eclipse Payload Power Up and Testing

<p>GS 8</p>	<p>Make sure that the Micro Maestro power transformer and both servos are plugged into the Micro Maestro board.</p>		
<p>GS 9</p>	<p>Plug the power transformer into the power strip. NOTE: The ground station will automatically move to zero so be sure to watch out!</p>		

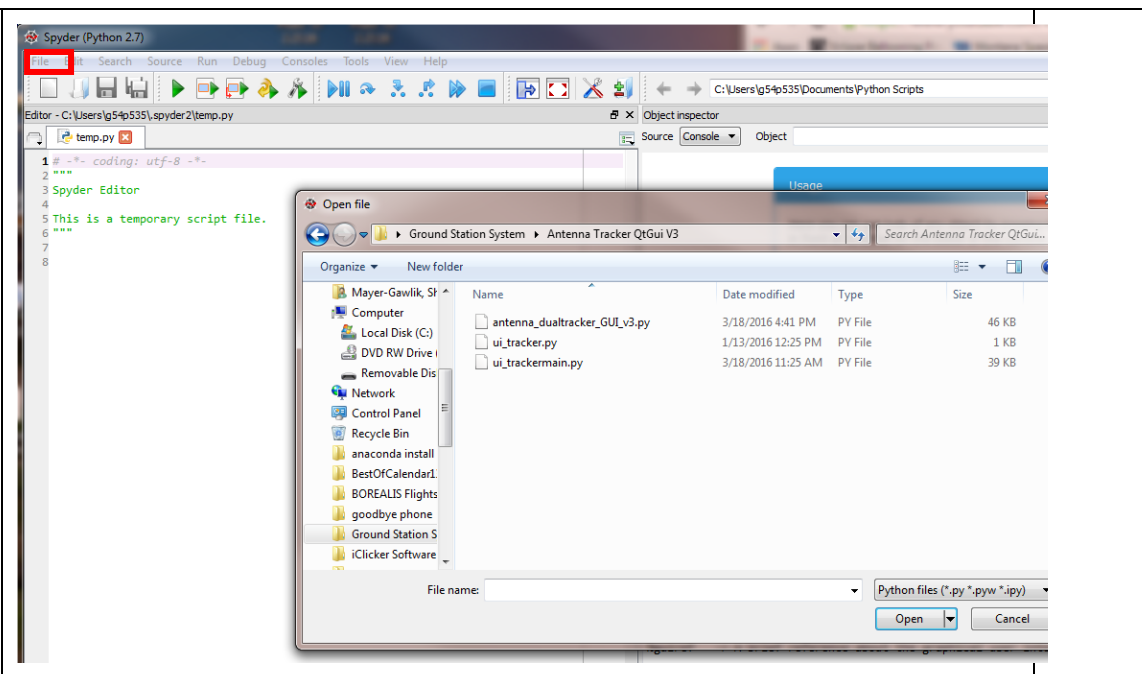
Checklist for Eclipse Payload Power Up and Testing

GS 10	Pause here and finish the Iridium payload steps (IP 1- IP 10) before continuing.		
GS 11	On the ground station laptop open the start menu, search for and open the “ Spyder ” application.		

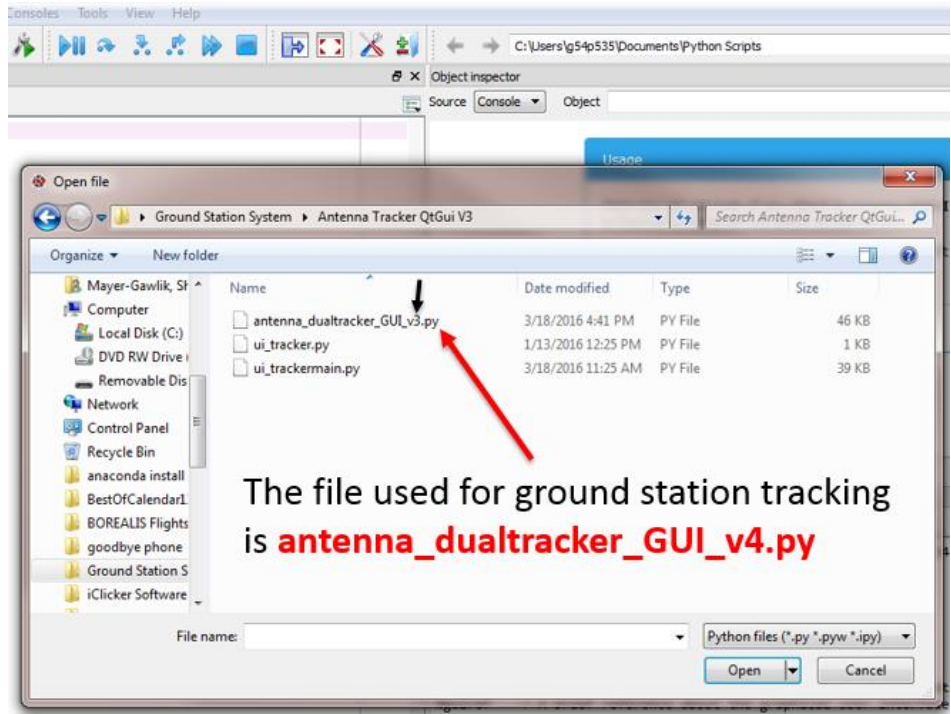
Checklist for Eclipse Payload Power Up and Testing

GS 12

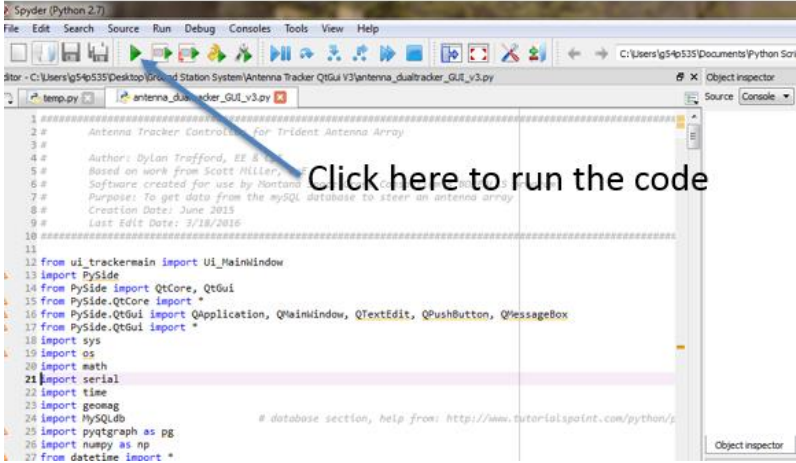
Once it opens go to **“File”** → **“Open”**



Checklist for Eclipse Payload Power Up and Testing

GS 13	Open the file called “ antenna_dualtracker_GUI_v4.py ”	 <p>The file used for ground station tracking is antenna_dualtracker_GUI_v4.py</p>	
GS 14	Your Ground Station Laptop should already have this set, but if you are using a new computer or if you are having problems check this setting. “Tools -> Preferences -> Consoles -> External Modules -> PyQt Libraries ->” Change from “Default” to “PySide”		

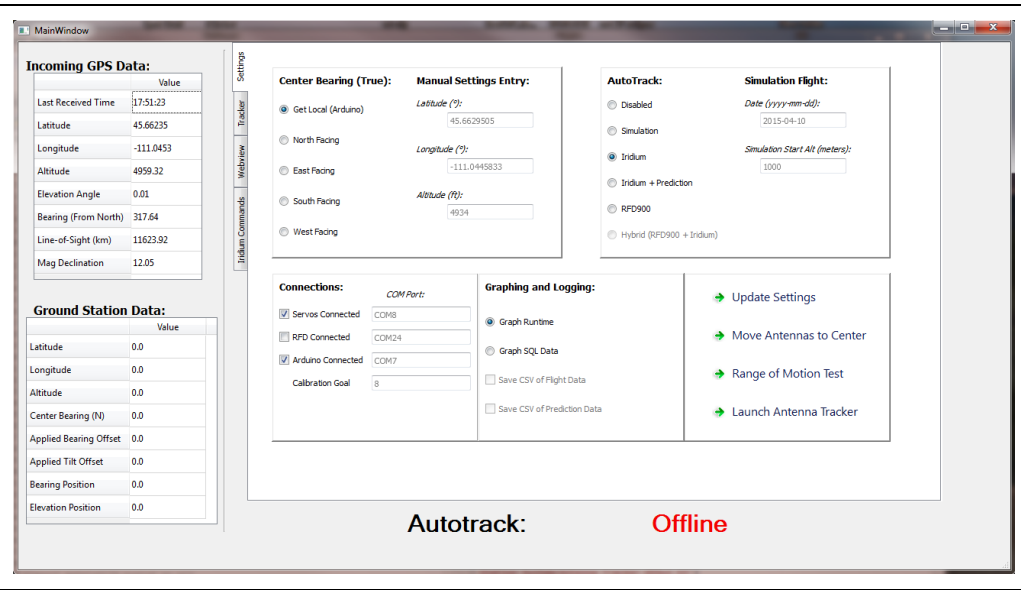
Checklist for Eclipse Payload Power Up and Testing

<p>GS 15</p>	<p>Click on the “Play” button in the upper left to start the program.</p>	 <p style="text-align: center;">Click here to run the code</p>	
<p>GS 16</p>	<p>If Spyder gives you an error or GUI doesn't open there are a few common errors.</p>	<ol style="list-style-type: none"> 1. OperationalError: (2003, “Can’t connect to MySQL server on ‘153.90.202.51’ (3306)”) <ul style="list-style-type: none"> • Check your internet connection • Make sure you have the MySQLdb package installed (see python and packages installation instructions) <ul style="list-style-type: none"> • Download the MySQLdb .whl file from https://pypi.python.org/pypi/mysqlclient • Open Anaconda Prompt and install the .whl file with the following Anaconda Prompt command: pip install mysqlclient-1.3.7-cp27-none-win_amd64.whl (make sure you are in the right folder with the .whl file, c:\Users\BOREALIS GS\Desktop\mysql> for example) • Server may not be active (contact Montana Space Grant) 2. Make sure PyQtgraph package is installed (see python and packages installation instructions) <ul style="list-style-type: none"> • Open Anaconda Prompt and use the command: “pip install pyqtgraph” 	

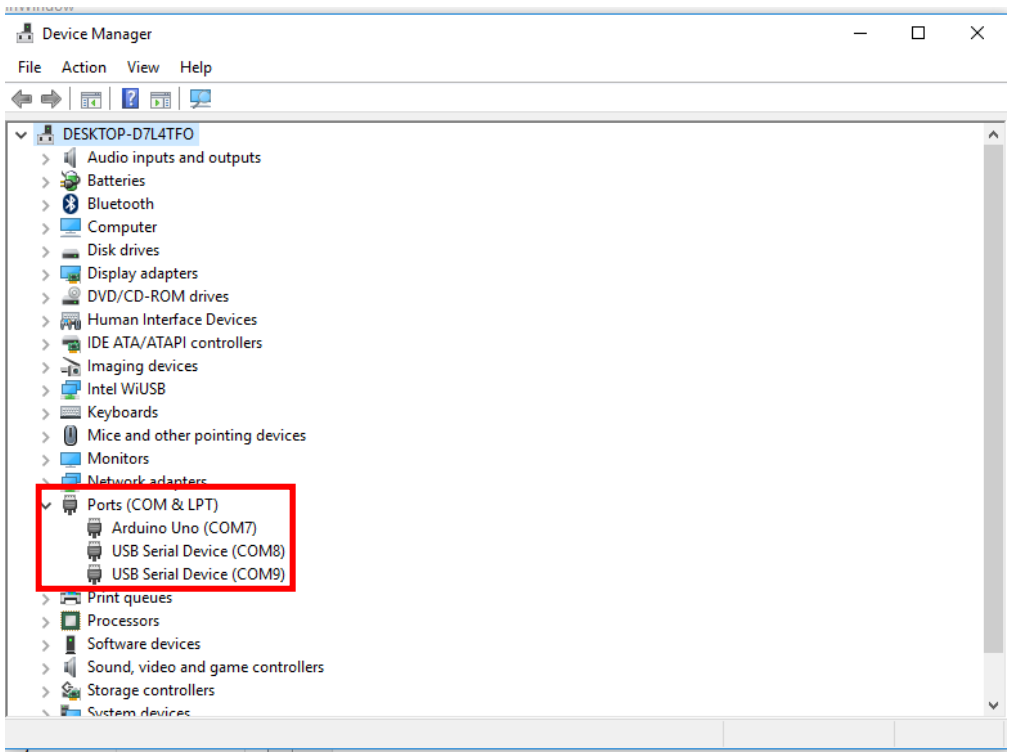




Checklist for Eclipse Payload Power Up and Testing

GS 17



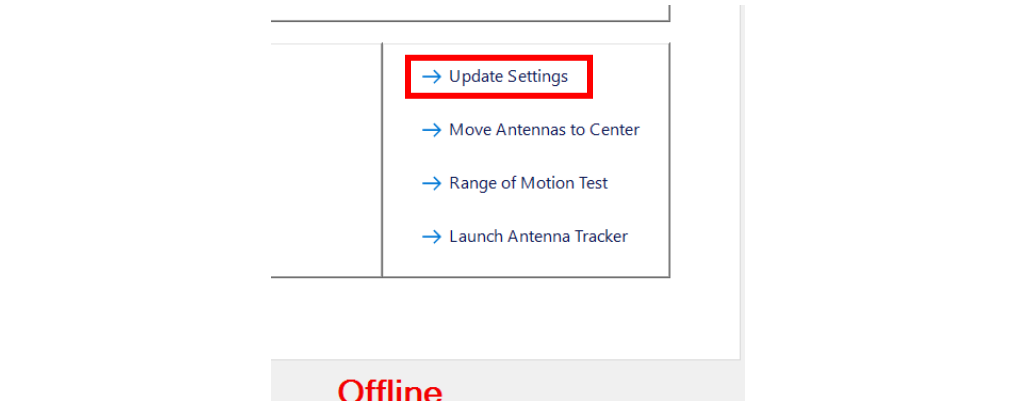
If there were no errors then the tracking and calibration GUI should pop up.



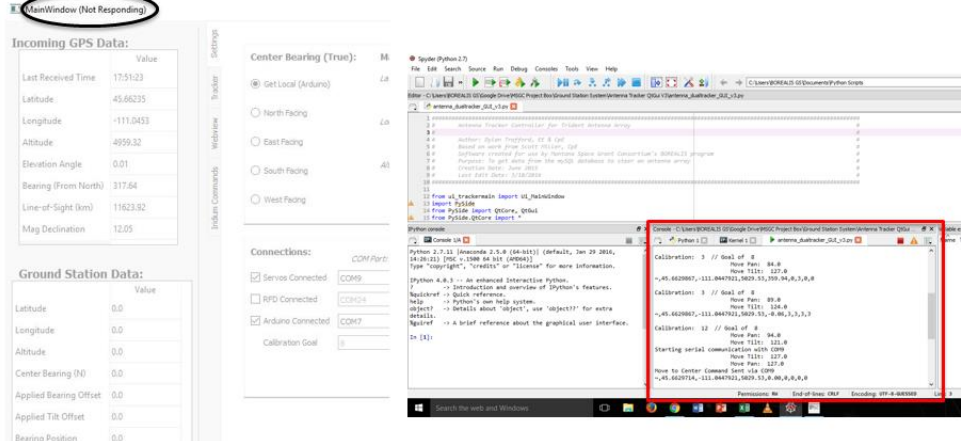
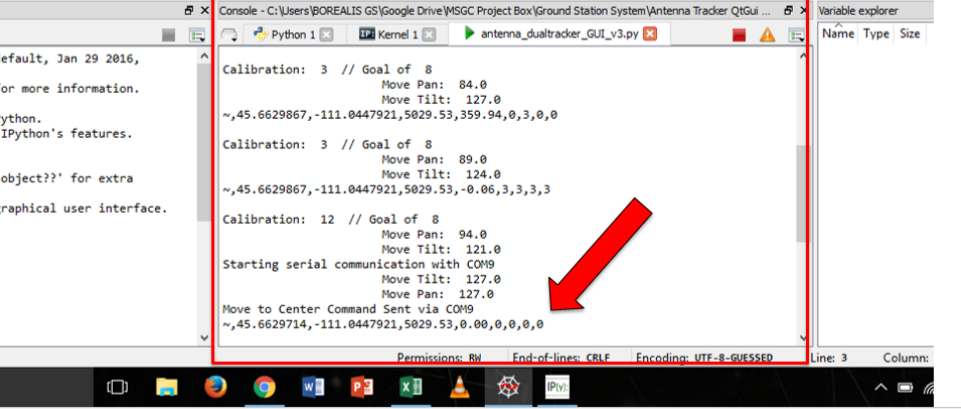
Checklist for Eclipse Payload Power Up and Testing

<p>GS 18</p>	<p>On the ground station laptop open Device Manager and open the “Ports (COM & LPT)” drop down menu.</p>		
<p>GS 19</p>	<p>Record the COM port numbers of the Arduino and the Micro Maestro. NOTE: In this case the Arduino is on COM7 and the maestro is on COM8</p>	<div style="text-align: center;">  Ports (COM & LPT)  Arduino Uno (COM7)  USB Serial Device (COM8)  USB Serial Device (COM9) </div>	

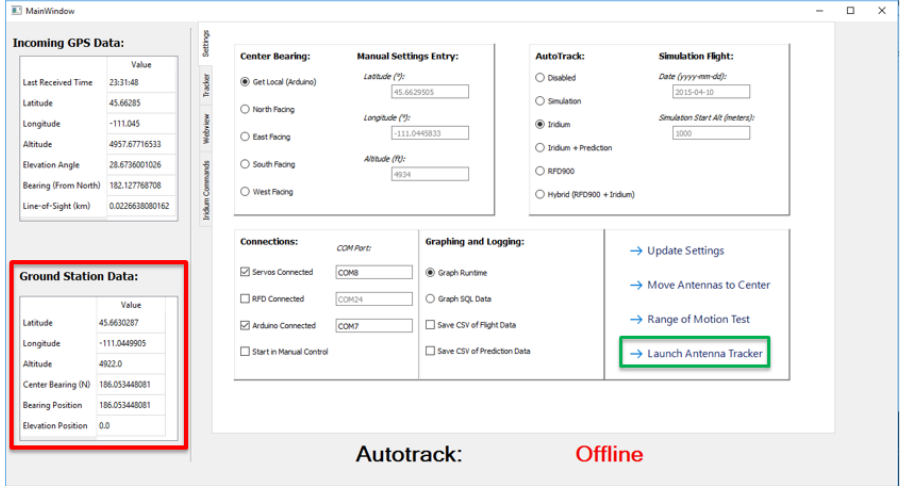
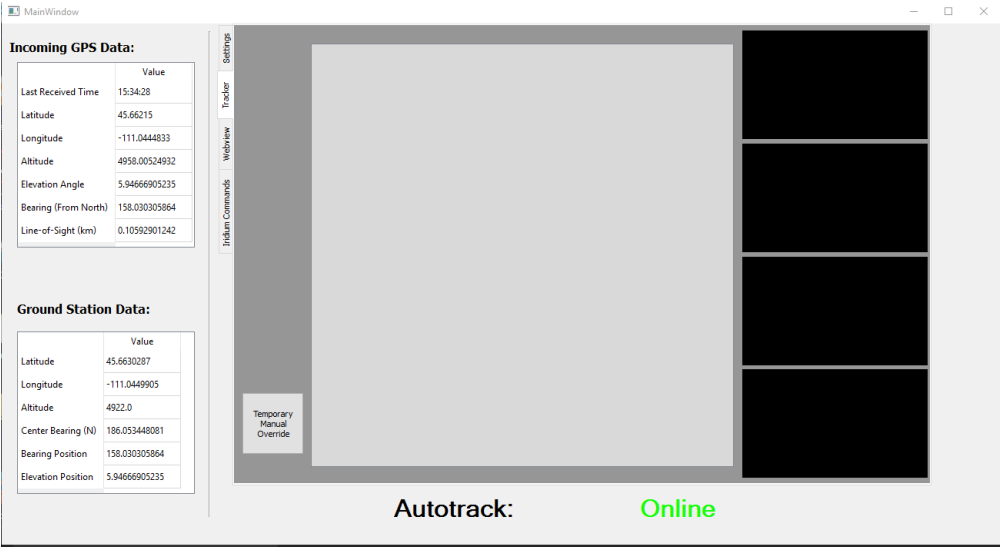
Checklist for Eclipse Payload Power Up and Testing

<p>GS 20</p>	<p>Back in the GUI edit the COM ports for “Servos Connected” (where the maestro is plugged in) and “Arduino Connected” (where the Arduino uno is plugged in)</p>		
<p>GS 21</p>	<p>The next step will cause the ground station to move so be sure to clear it of all obstructions and that no cords will get tangled or cut.</p>		
<p>GS 22</p>	<p>Click on “Update Settings” to start the auto calibration.</p>		


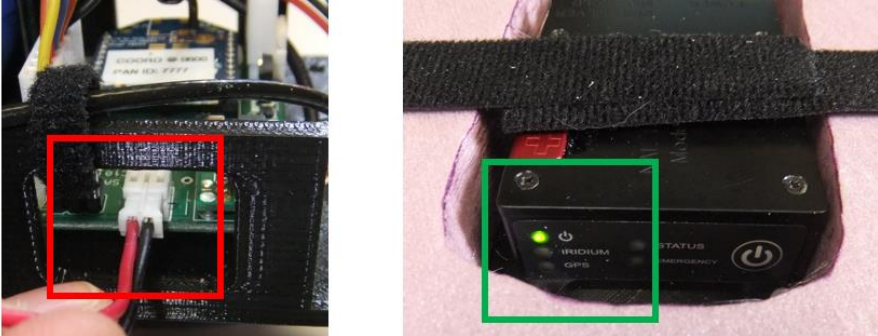
Checklist for Eclipse Payload Power Up and Testing

<p>GS 23</p>	<p>If the GUI freezes up after clicking on “Update Settings” then check the Spyder console.</p>		
<p>GS 24</p>	<p>Should you notice a string of zeros below the “Move to Center Command Sent via COM9” then the IMU has lost its calibration. Eventually this will time out and the GUI will return to normal and you can click on “Update Settings” again.</p>		

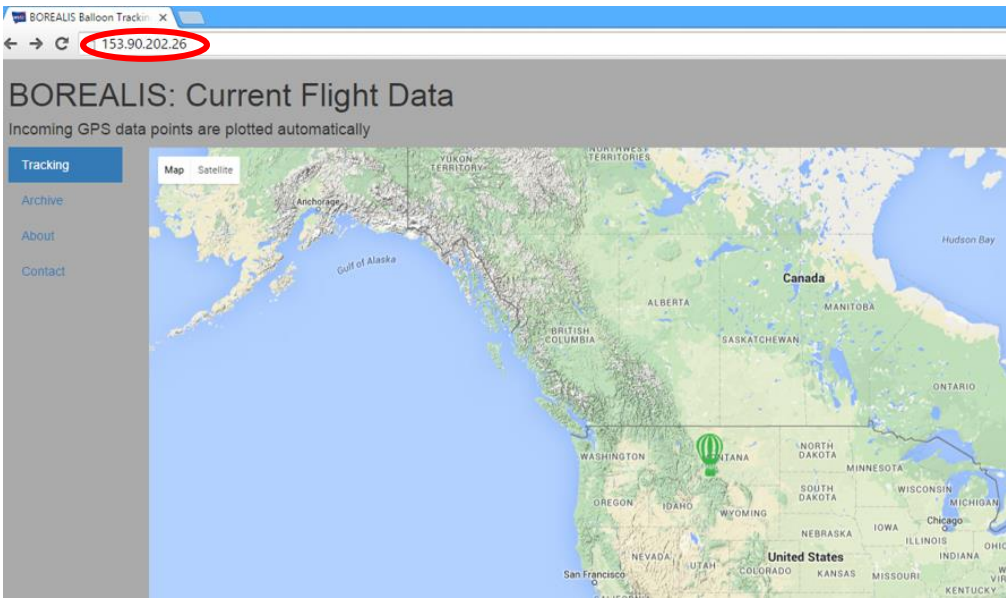
Checklist for Eclipse Payload Power Up and Testing

<p style="text-align: center;">GS 25</p>	<p>If there were not any issues then check under “Ground Station Data” to make sure that the antenna will point where you think it should, specifically the “Bearing Position” and the “Elevation Position”. If these look correct then click on “Launch Antenna Tracker”.</p>	 <p style="text-align: center;">Autotrack: Offline</p>	
<p style="text-align: center;">GS 26</p>	<p>If all works then the GUI should update and the antenna should be pointing at the Iridium payload.</p>	 <p style="text-align: center;">Autotrack: Online</p>	
<p style="text-align: center;">GS 27</p>	<p>Congratulations, the ground station is ready for the launch!</p>	<p>Verified by: _____ and _____</p>	

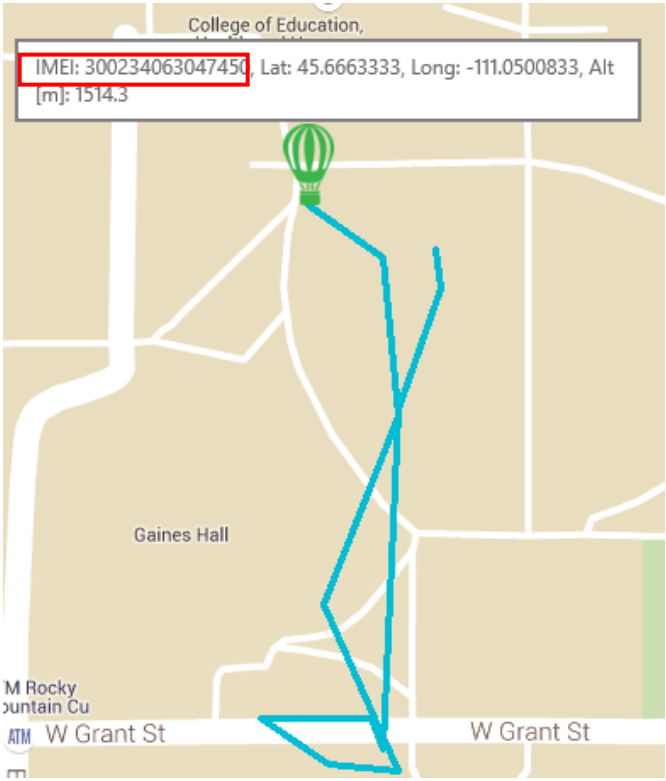
Checklist for Eclipse Payload Power Up and Testing

Step #	Iridium Payload		Done?
IP 1	Record the IMEI number on the side of the Iridium modem.		
IP 2	Power on the Iridium modem by plugging in the lithium battery to the Iridium OCCAMS board. The green LED on the Iridium modem should turn on.		

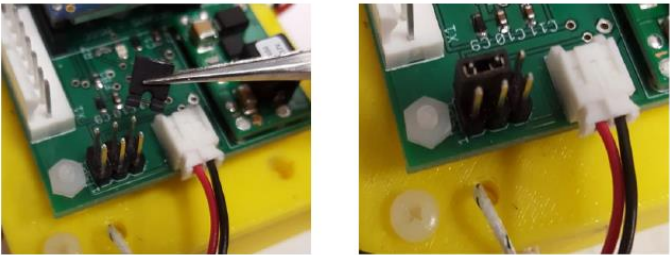


Checklist for Eclipse Payload Power Up and Testing

<p>IP 3</p>		<p>Iridium Flashing = 1-2 bars connection Solid = 3-5 bars connection Off = No Connection found (0 bars)</p> <p>GPS Flashing = 2D Connection Solid = 3D Connection Off = No GPS Fix</p> <p>Status Flashing or off = Modem isn't responding due to no Iridium or GPS lock Solid = Modem successfully sent the last packet</p>	
<p>IP 4</p>	<p>Verify that the website is receiving the correct GPS data by opening a browser (chrome, firefox, etc.) and going to the following address:</p> <p>153.90.202.26</p>	 <p>The screenshot shows a web browser window titled 'BOREALIS Balloon Tracking'. The address bar contains '153.90.202.26', which is circled in red. The page content includes the heading 'BOREALIS: Current Flight Data' and a sub-heading 'Incoming GPS data points are plotted automatically'. Below this is a navigation menu with 'Tracking' selected, and a map of North America. A green balloon icon is plotted on the map over the central United States, specifically in the area of Montana and Wyoming. The map shows state and provincial boundaries, including Alaska, British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, and the United States.</p>	




Checklist for Eclipse Payload Power Up and Testing

<p>IP 5</p>	<p>Zoom in on the map to get a better picture of where your balloon is.</p> <p>NOTE: You can tell which balloon is which by hovering over the balloon icon with your mouse and looking at its IMEI number.</p>		
<p>IP 6</p>	<p>Both the Iridium OCCAMS and the cutdown OCCAMS need to be reset at the same time!</p>	<p>After being reset the timer will count up to 4 hours before it stops working. If the board is turned off while the timer is running then the timer only pauses, POWERING OFF THE BOARD DOES NOT RESET THE TIMER! When the board is powered on again the timer will start counting up from the point that it left off at.</p>	

Checklist for Eclipse Payload Power Up and Testing

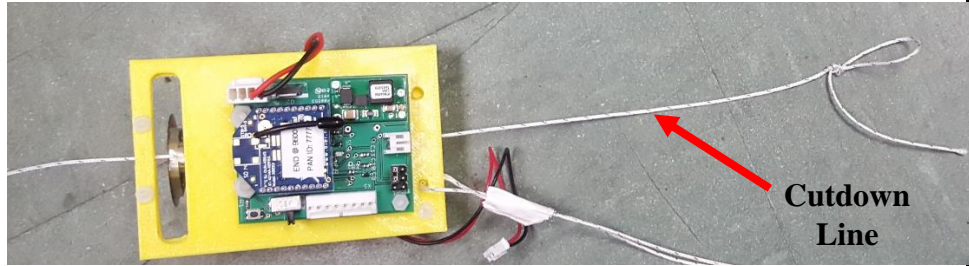
<p>IP 7</p>	<p>Reset the onboard timer by first moving the shunt jumper to the reset position.</p>	<div style="text-align: center;"> <p>Reset Position</p>   </div>	
<p>IP 8</p>	<p>Move the slide switch to the reset position.</p>	<div style="text-align: center;">  <p>Reset Position</p> </div>	

Checklist for Eclipse Payload Power Up and Testing


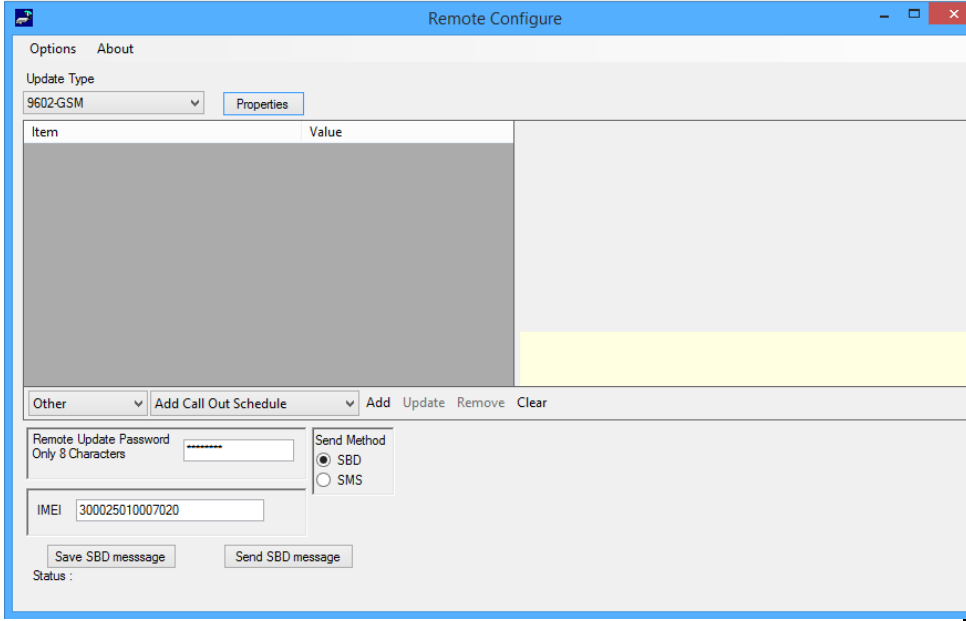
<p>IP 9</p>	<p>Return the slide switch to the off position and the shunt jumper to the normal position.</p>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Off Position</p> </div> <div style="text-align: center;"> <p>Normal Position</p>   </div> </div>	
<p>IP 10</p>	<p>Place the Iridium payload 20 feet away from the ground station.</p> <p>NOTE: You don't need to do this for an actual flight, only when testing.</p>		
<p>IP 11</p>	<p>Congratulations, the Iridium payload is ready for launch!</p>	<p>Verified by: _____ and _____</p>	

Checklist for Eclipse Payload Power Up and Testing

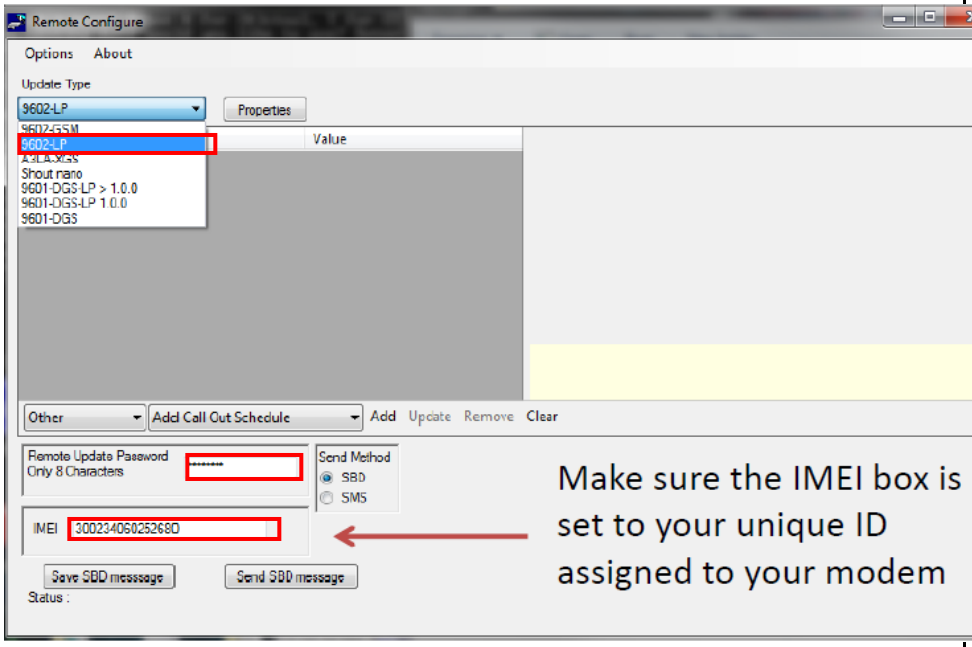
Step #	Cutdown Payload	Done?
<p>CP 1</p>	<p>If it is not all ready, then feed the cutdown line through the cutdown payload.</p> <p>NOTE: The cutting blade should be attached but COVERED! You don't want to cut the cord yet or yourself ever.</p>	
<p>CP 2</p>	<p>Power on the cutdown payload by plugging in the lithium battery. The red LED will flash and there will be a beep.</p>	



Checklist for Eclipse Payload Power Up and Testing

<p>CP 3</p>	<p>Loop the cutdown line out of the way of the still covered blade.</p>		
<p>CP 4</p>	<p>If you have already made the idle and cutdown commands then skip to step CP 11.</p>		
<p>CP 5</p>	<p>Start the “Remote Configure” application on the ground station laptop.</p>		

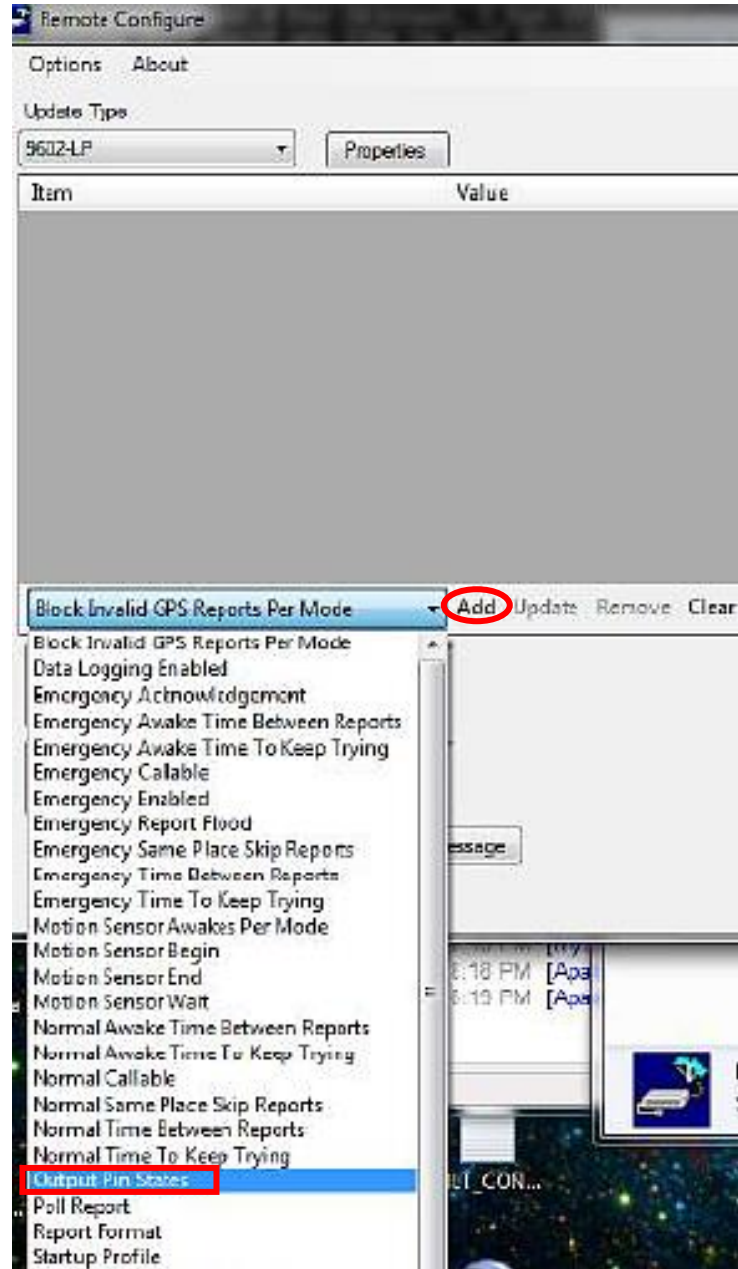
Checklist for Eclipse Payload Power Up and Testing

<p>CP 6</p>	<p>Under “Update Type” select “9602-LP” from the drop down menu. The default password (12345678) should already be put in, change this only if you are using a different password. Lastly, put in the IMEI # of your modem.</p>	 <p>Make sure the IMEI box is set to your unique ID assigned to your modem</p>
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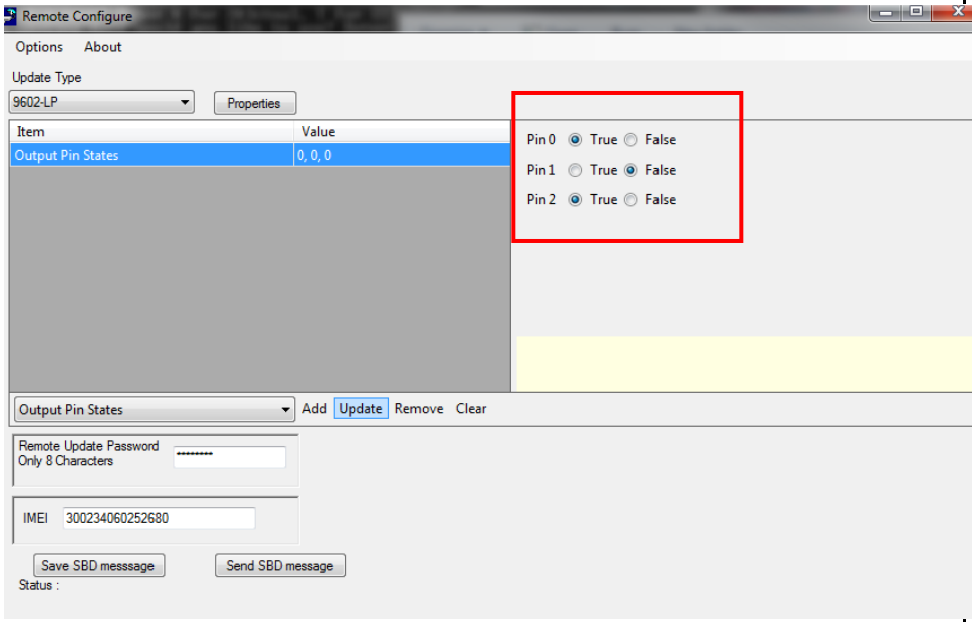
Checklist for Eclipse Payload Power Up and Testing

CP 7

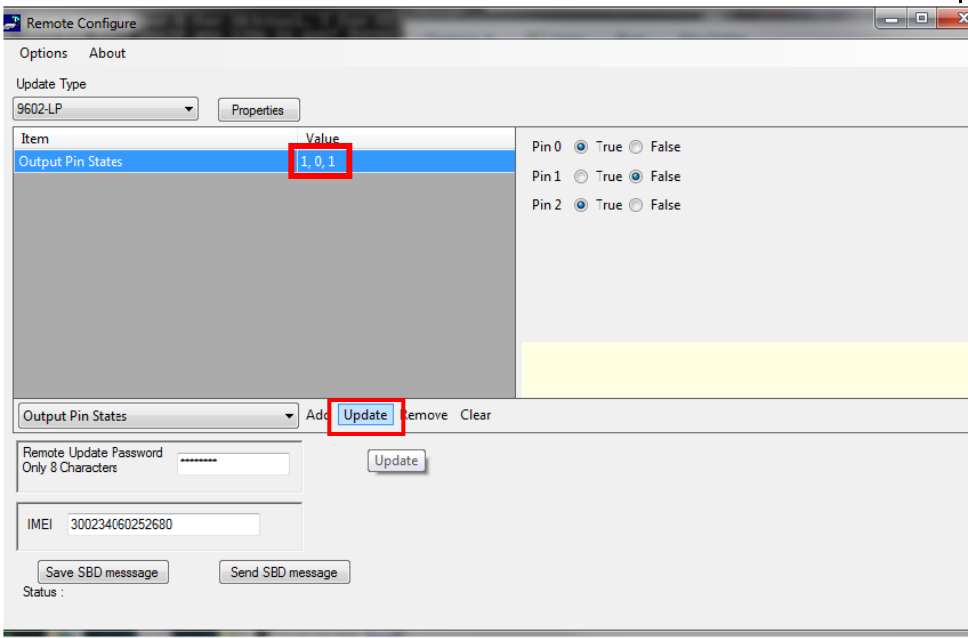
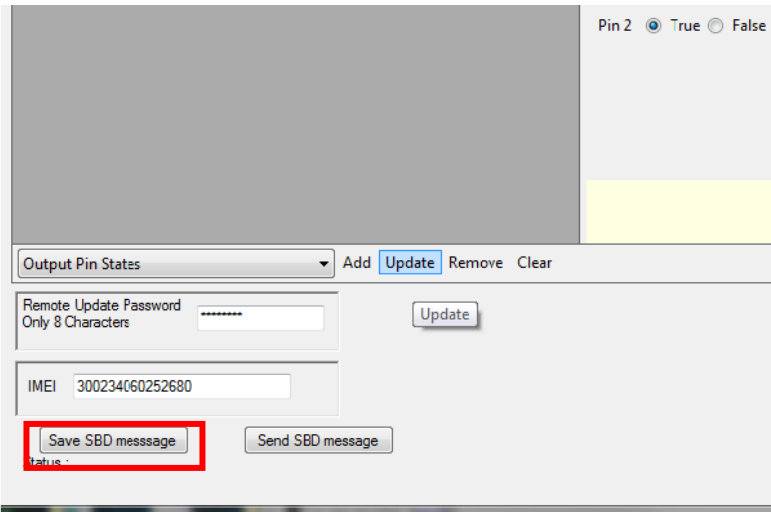
In the drop down menu select “**Output Pin States**” and then click on “**Add**” to add the item to the packet.



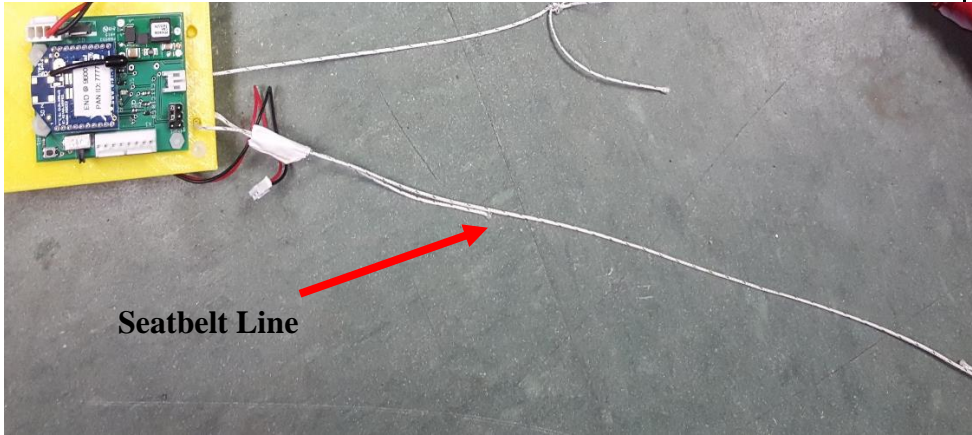
Checklist for Eclipse Payload Power Up and Testing

CP 8	Here you can change the states that the command will set the three output pins to.	 <p>The screenshot shows the 'Remote Configure' application window. The 'Update Type' is set to '9602-LP'. A table lists 'Output Pin States' with a value of '0, 0, 0'. A red box highlights the configuration for three pins: Pin 0 (True selected), Pin 1 (False selected), and Pin 2 (True selected). Below the table are buttons for 'Add', 'Update', 'Remove', and 'Clear'. At the bottom, there are fields for 'Remote Update Password' and 'IMEI' (300234060252680), along with 'Save SBD message' and 'Send SBD message' buttons.</p> <table border="1"><thead><tr><th>Item</th><th>Value</th></tr></thead><tbody><tr><td>Output Pin States</td><td>0, 0, 0</td></tr></tbody></table> <p>Pin 0 <input checked="" type="radio"/> True <input type="radio"/> False Pin 1 <input type="radio"/> True <input checked="" type="radio"/> False Pin 2 <input checked="" type="radio"/> True <input type="radio"/> False</p>	Item	Value	Output Pin States	0, 0, 0
Item	Value					
Output Pin States	0, 0, 0					

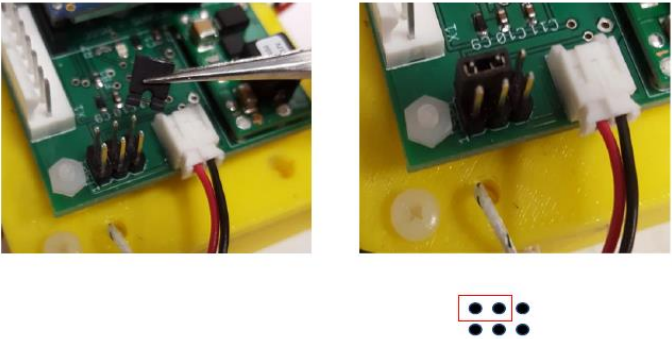

Checklist for Eclipse Payload Power Up and Testing

CP 9	Clicking on “ Update ” will change the pin values.	 <p>The screenshot shows the 'Remote Configure' window. At the top, there are 'Options' and 'About' tabs. Below them is the 'Update Type' dropdown set to '9602-LP' and a 'Properties' button. A table with two columns, 'Item' and 'Value', is visible. The row 'Output Pin States' is selected, and its value '1, 0, 1' is highlighted with a red box. To the right of the table are three radio button groups for 'Pin 0', 'Pin 1', and 'Pin 2', each with 'True' and 'False' options. Below the table is a control bar with a dropdown menu set to 'Output Pin States', and buttons for 'Add', 'Update', 'Remove', and 'Clear'. The 'Update' button is highlighted with a red box. Below this are fields for 'Remote Update Password' (with a masked input) and 'IMEI' (with the value '300234060252680'). At the bottom are buttons for 'Save SBD message' and 'Send SBD message', and a 'Status:' label.</p>
CP 10	Click on “ Save SBD message ” to save the command as a .sbd file.	 <p>This screenshot is a close-up of the bottom portion of the 'Remote Configure' window. It shows the 'Remote Update Password' field (masked with asterisks) and the 'IMEI' field containing '300234060252680'. The 'Save SBD message' button is highlighted with a red box. Other visible elements include the 'Update' button, the 'Send SBD message' button, and the 'Status:' label.</p>





Checklist for Eclipse Payload Power Up and Testing

CP 11	The only two commands that you will be using are idle (000) and cutdown (001). You need to create a .sbd file of both commands.	<p style="text-align: center;"><u>Idle</u></p> <p style="text-align: center;">Pin 0 = False Pin 1 = False Pin 2 = False</p> <p style="text-align: center;"><u>Cutdown</u></p> <p style="text-align: center;">Pin 0 = False Pin 1 = False Pin 2 = True</p>	
CP 12	Send an email with the primary cutdown .sbd (001) command as an attachment to the Iridium payload.	<p>Set data@sbd.iridium.com as recipient.</p> <p>Set the subject line of the email to the IMEI number of modem (on side of modem and written above).</p> <p>Attach the .sbd file that you made earlier.</p>	
CP 13	Send an email with the idle .sbd (000) command attached to the Iridium payload so that all 3 command bits are reset to zero and verify that the blade stops spinning.		
CP 14	Attach the seatbelt line to both the cutdown payload and the parachute.		
CP 15	Move the blade arm out of the way of the cutdown cord.		

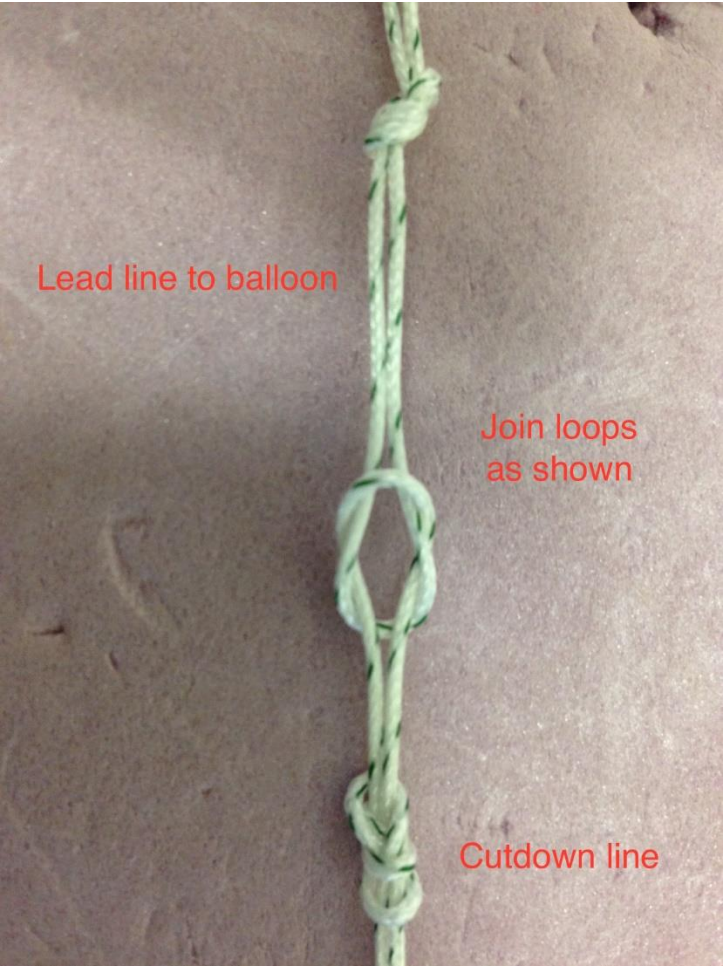
Checklist for Eclipse Payload Power Up and Testing

<p>CP 16</p>	<p>Both the Iridium OCCAMS and the cutdown OCCAMS need to be reset at the same time!</p>	<p>After being reset the timer will count up to 4 hours before it stops working. If the board is turned off while the timer is running then the timer only pauses, POWERING OFF THE BOARD DOES NOT RESET THE TIMER! When the board is powered on again the timer will start counting up from the point that it left off at.</p>	
<p>CP 17</p>	<p>Reset the onboard timer by first moving the shunt jumper to the reset position.</p>	<p>Reset Position</p> 	
<p>CP 18</p>	<p>Move the slide switch to the reset position.</p>	 <p>Reset Position</p>	

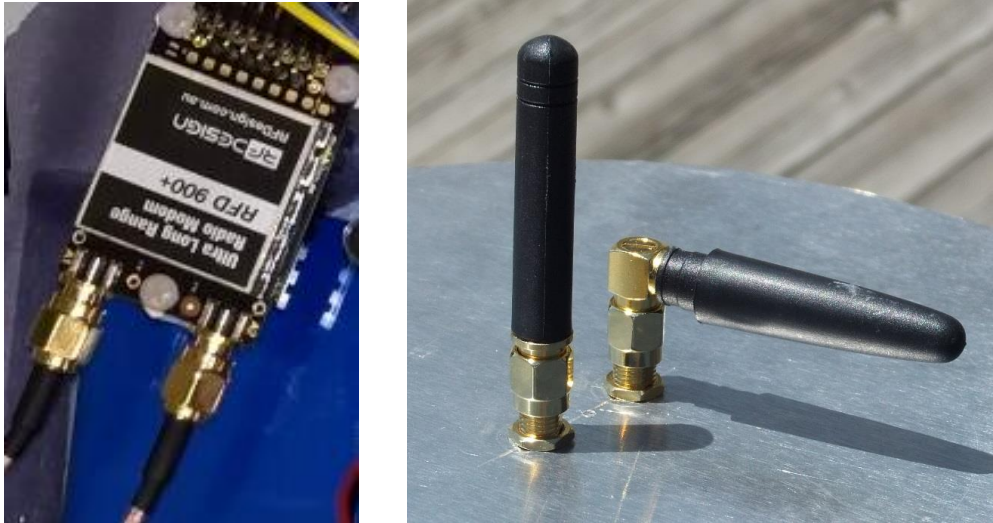

Checklist for Eclipse Payload Power Up and Testing

<p>CP 19</p>	<p>Return the slide switch to the off position and the shunt jumper to the normal position.</p>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Off Position</p> </div> <div style="text-align: center;"> <p>Normal Position</p>   </div> </div>	
<p>CP 20</p>	<p>Seal up the cutdown payload</p>		

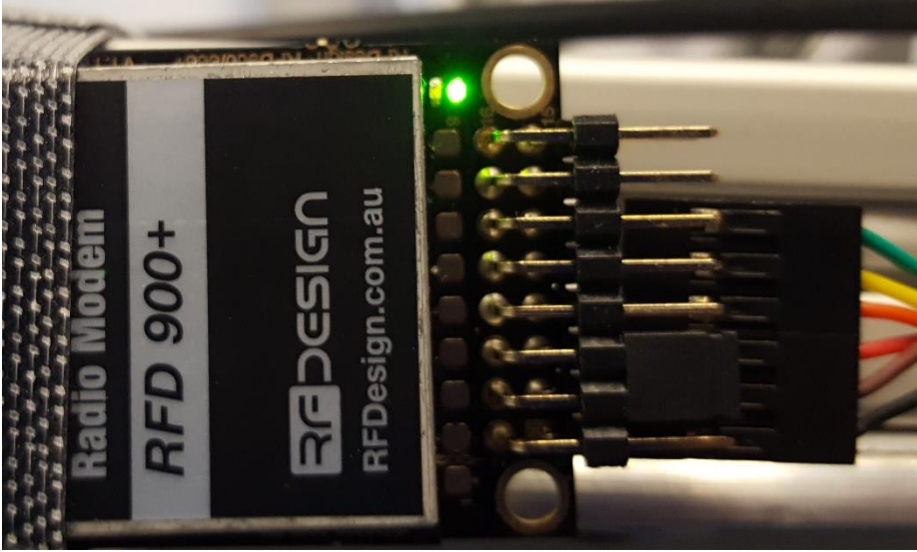
Checklist for Eclipse Payload Power Up and Testing

<p>CP 21</p>	<p>Attach one end of the cutdown cord to the parachute line and the other end to the flight string.</p>		
<p>CP 22</p>	<p>Congratulations, the cutdown payload is ready for launch!</p>	<p>Verified by: _____ and _____</p>	

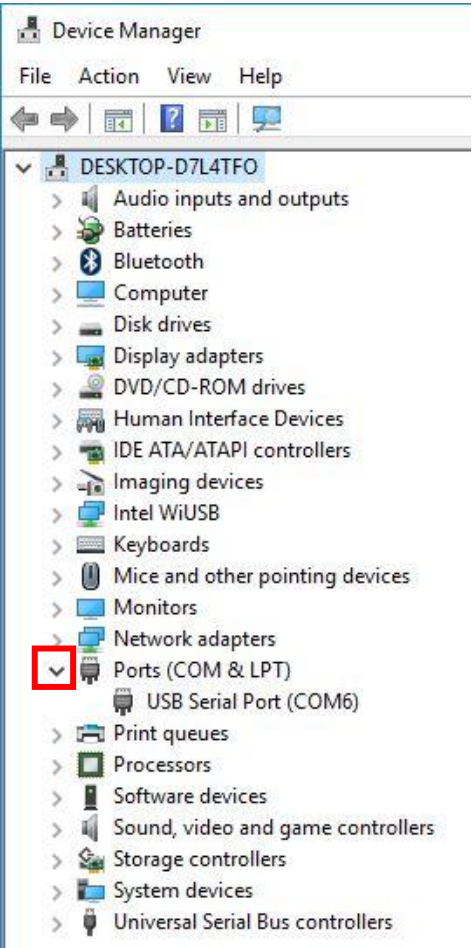
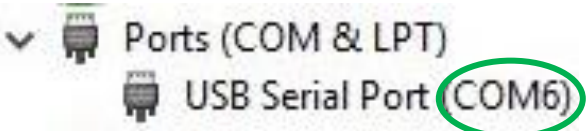
Checklist for Eclipse Payload Power Up and Testing

Step #	Still Image Payload		Done?
SI 1	<p>Check that both antennas are plugged into the modem and screwed into the ground plate before turning the payload on.</p> <p>NOTE: The still image payload should already be sealed up and structurally ready for flight.</p>		
SI 2	<p>Turn on the still image payload by turning the power switch to the ON position.</p> <p>NOTE: Make sure the still image payload is on and running BEFORE the RFD ground station program is running.</p>		

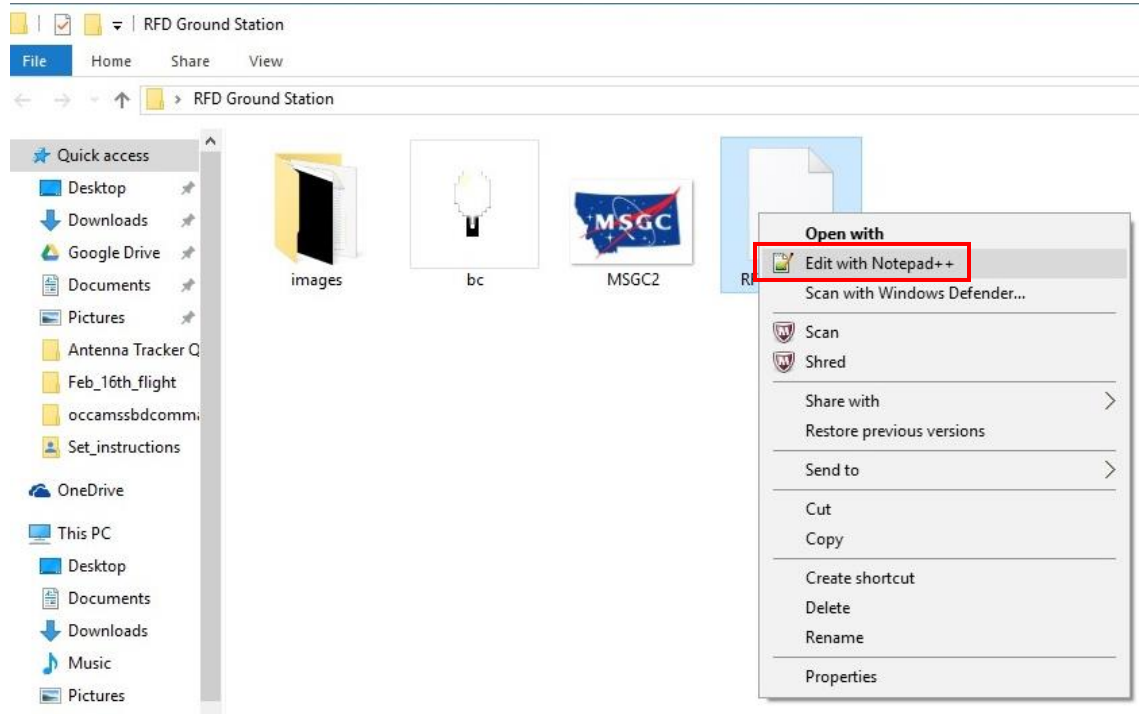
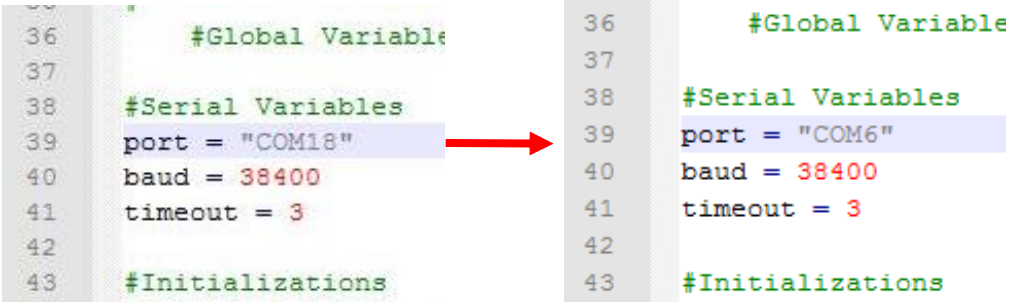
Checklist for Eclipse Payload Power Up and Testing

<p>SI 3</p>	<p>Power on the ground station RFD900 receiver by plugging the USB cable from the ground station modem into the laptop.</p>			
<p>SI 4</p>	<p>If the two RFD900 modems are connected to each other then you may move on to the next step. If the two modems are not connected to each other then unplug the USB cable in step SI 3, turn off the image payload (see below) and go back to step SI 1.</p>	<p><u>Solid light</u> Both modems are connected to each other</p>	<p><u>Blinking or unsteady light</u> The modems are not properly connected</p>	

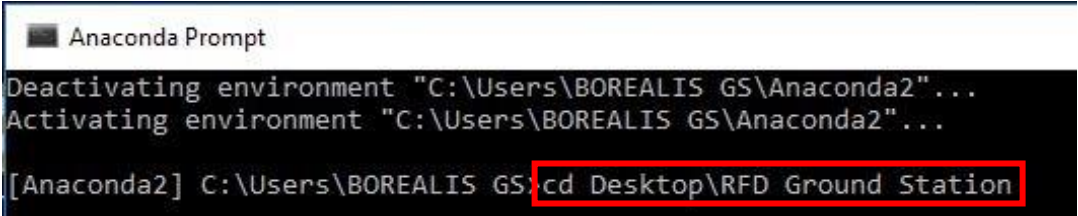
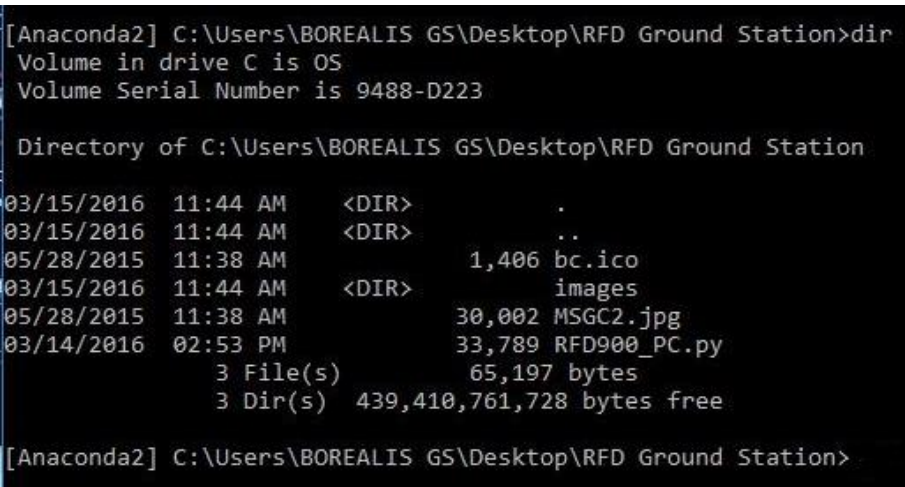
Checklist for Eclipse Payload Power Up and Testing

<p>SI 5</p>	<p>On the ground station laptop open Device Manager and open the “Ports (COM & LPT)” drop down menu.</p>		
<p>SI 6</p>	<p>Record the COM port number.</p>		


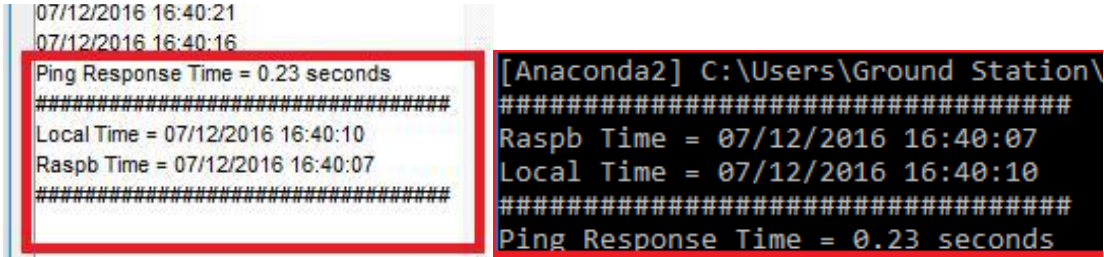
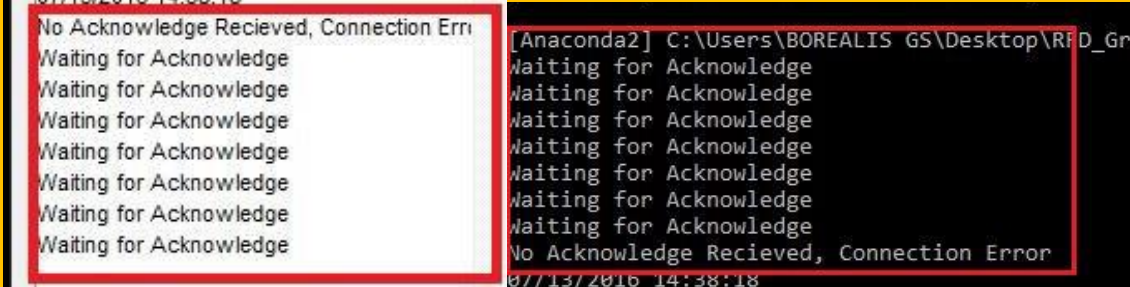
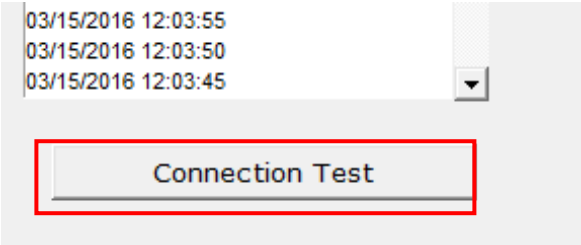
Checklist for Eclipse Payload Power Up and Testing

<p>SI 7</p>	<p>From the laptop desktop open the “RFD Ground Station” folder. Right click on the file called “RFD900_PC.py” and click on “Edit with Notepad++”</p>		
<p>SI 8</p>	<p>In Notepad++ at line 39, edit “port = “COM18”” to the port number you found in Device Manager and recorded earlier (Example: COM18→COM6)</p>		
<p>SI 9</p>	<p>Save the changes and close Notepad++</p>		

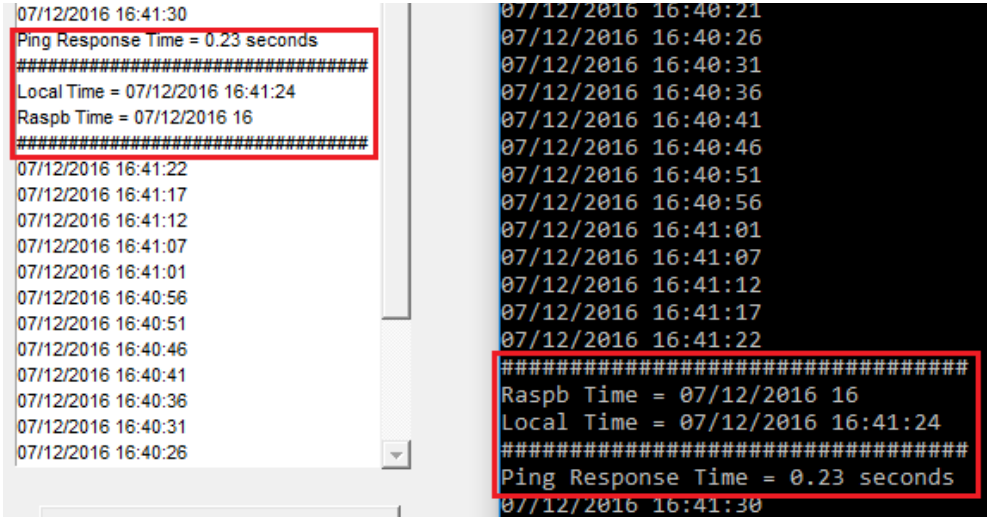
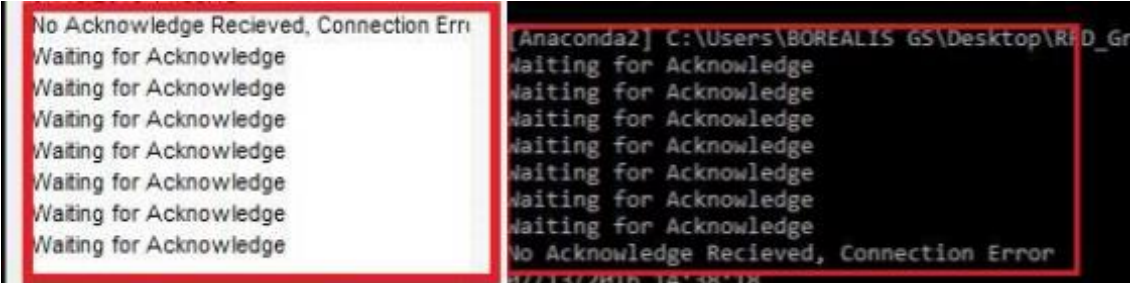
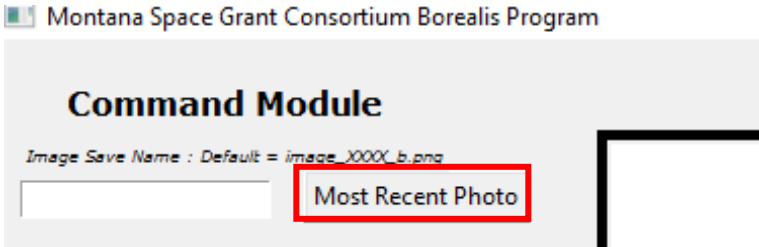
Checklist for Eclipse Payload Power Up and Testing

<p>SI 10</p>	<p>Open the “Anaconda Prompt” program and something similar to the following will be displayed: “[Anaconda2] C:\Users\BOREALIS GS>” Type in “cd Desktop\RFD Ground Station” and then hit [ENTER].</p> <p>NOTE: Yours will be slightly different because your computer has a different name.</p>	 <p>The screenshot shows a terminal window titled 'Anaconda Prompt'. It displays the following text: 'Deactivating environment "C:\Users\BOREALIS GS\Anaconda2"...', 'Activating environment "C:\Users\BOREALIS GS\Anaconda2"...', and '[Anaconda2] C:\Users\BOREALIS GS> cd Desktop\RFD Ground Station'. The command 'cd Desktop\RFD Ground Station' is highlighted with a red rectangular box.</p>	
<p>SI 11</p>	<p>Type in “dir” and hit [ENTER] to list all of the contents of the folder.</p>	 <p>The screenshot shows the output of the 'dir' command in the Anaconda Prompt. The text displayed is: '[Anaconda2] C:\Users\BOREALIS GS\Desktop\RFD Ground Station>dir', 'Volume in drive C is OS', 'Volume Serial Number is 9488-D223', 'Directory of C:\Users\BOREALIS GS\Desktop\RFD Ground Station', a list of files and directories with their dates, times, and sizes, and '[Anaconda2] C:\Users\BOREALIS GS\Desktop\RFD Ground Station>'. The list includes: '03/15/2016 11:44 AM <DIR> .', '03/15/2016 11:44 AM <DIR> ..', '05/28/2015 11:38 AM 1,406 bc.ico', '03/15/2016 11:44 AM <DIR> images', '05/28/2015 11:38 AM 30,002 MSGC2.jpg', '03/14/2016 02:53 PM 33,789 RFD900_PC.py', '3 File(s) 65,197 bytes', and '3 Dir(s) 439,410,761,728 bytes free'.</p>	

Checklist for Eclipse Payload Power Up and Testing

<p>SI 12</p>	<p>Finally, to start the still image GUI type in “python RFD900_PC.py” and hit [ENTER]</p>		
<p>SI 13</p>	<p>A Blank RFD GUI will start up. If you see both time stamps in the GUI and a ping time in Anaconda then the two radios are connected and you can skip to step SI 14.</p>	 <p style="text-align: center;">GOOD</p>	
<p>SI 14</p>	<p>If it says “Waiting for Acknowledge” and “No Acknowledge Received, Connection Error” when the GUI opens then the two radios are not connected. Go back to step SI 4.</p>	 <p style="text-align: center;">BAD</p>	
<p>SI 15</p>	<p>To verify that the ground station is indeed connected to the still image payload click in the “Connection Test” button.</p>		

Checklist for Eclipse Payload Power Up and Testing

<p>SI 16</p>	<p>If the connection test was successful then you will see a ping time and two time stamps in both the GUI and Anaconda.</p>	 <p>The screenshot shows two panels. The left panel is a GUI window with a scrollable text area containing the following text: 07/12/2016 16:41:30, Ping Response Time = 0.23 seconds, #####, Local Time = 07/12/2016 16:41:24, Raspb Time = 07/12/2016 16:41:22, and a list of timestamps from 07/12/2016 16:41:22 down to 07/12/2016 16:40:26. The right panel is a terminal window with a black background and white text, showing a list of timestamps from 07/12/2016 16:40:21 down to 07/12/2016 16:41:30, followed by Raspb Time = 07/12/2016 16:41:22, Local Time = 07/12/2016 16:41:24, and Ping Response Time = 0.23 seconds.</p>	
<p>SI 17</p>	<p>If the connection test was unsuccessful then the GUI and Anaconda will say “Waiting for Acknowledge” and “No Acknowledge Received, Connection Error”</p>	 <p>The screenshot shows two panels. The left panel is a GUI window with a scrollable text area containing the text: No Acknowledge Recieved, Connection Err, and a list of 'Waiting for Acknowledge' messages. The right panel is a terminal window with a black background and white text, showing the path [Anaconda2] C:\Users\BOREALIS_GS\Desktop\Ri_D_Gr, followed by a list of 'Waiting for Acknowledge' messages and a 'No Acknowledge Recieved, Connection Error' message.</p>	
<p>SI 18</p>	<p>To request the most recent picture taken click on the “Most Recent Photo” button.</p>	 <p>The screenshot shows a GUI window titled 'Montana Space Grant Consortium Borealis Program' with a sub-window titled 'Command Module'. Below the title, it says 'Image Save Name : Default = image_XXXX_b.png'. There is a text input field and a button labeled 'Most Recent Photo' which is highlighted with a red box.</p>	

Checklist for Eclipse Payload Power Up and Testing

SI 19

While the most recent image is being downloaded “(Not Responding)” will be displayed at the top of the window and the anaconda window will show how many bits (in 10,000 bit increments) have been downloaded.

Montana Space Grant Consortium Borealis Program (Not Responding)

Command Module

Image Save Name : Default = image_XXXX_b.png
Most Recent Photo

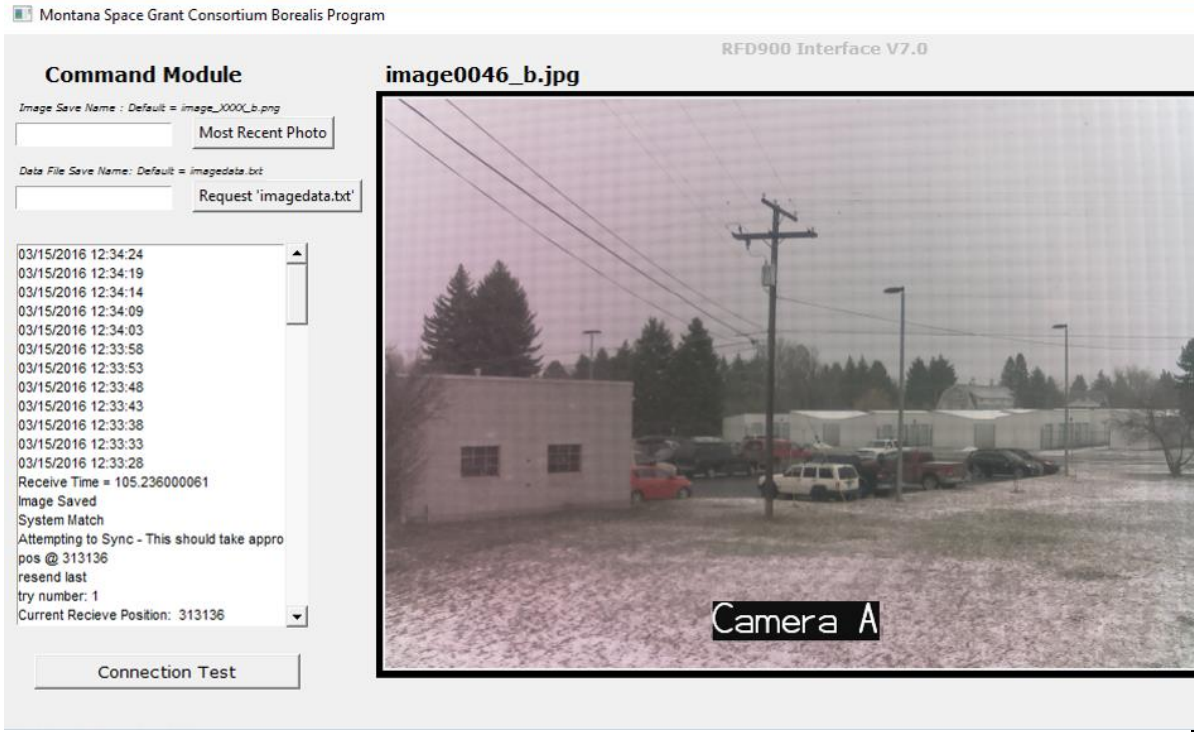
Data File Save Name: Default = imagedata.txt
Request 'imagedata.txt'

```
03/15/2016 12:31:39
03/15/2016 12:31:34
03/15/2016 12:31:29
03/15/2016 12:31:24
03/15/2016 12:31:19
03/15/2016 12:31:14
03/15/2016 12:31:09
03/15/2016 12:31:04
03/15/2016 12:30:59
03/15/2016 12:30:54
03/15/2016 12:30:49
03/15/2016 12:30:44
03/15/2016 12:30:39
03/15/2016 12:30:34
03/15/2016 12:30:29
03/15/2016 12:30:24
Ping Response Time = 0.23 seconds
#####
Local Time = 03/15/2016 12:30:18
Raspb Time = 03/15/2016 12:3
```


Connection Test

```
Current Recieve Position: 90000
Current Recieve Position: 100000
Current Recieve Position: 110000
Current Recieve Position: 120000
Current Recieve Position: 130000
Current Recieve Position: 140000
```

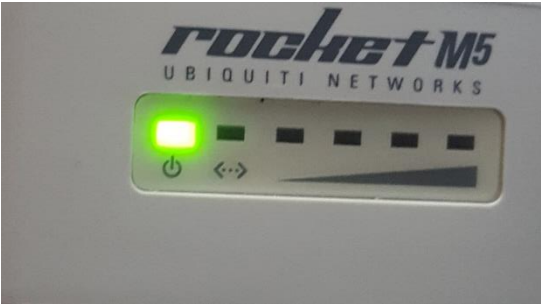


Checklist for Eclipse Payload Power Up and Testing

<p>SI 20</p>	<p>Once the most recent image has been downloaded, the GUI will update and display the image.</p>	 <p>The screenshot shows the 'Command Module' interface for the 'Montana Space Grant Consortium Borealis Program'. It includes fields for 'Image Save Name' (default: image_XXXX_b.png) and 'Data File Save Name' (default: imagedata.txt), with buttons for 'Most Recent Photo' and 'Request 'imagedata.txt''. A scrollable list of timestamps from 03/15/2016 12:34:24 to 12:33:28 is shown, followed by status messages: 'Receive Time = 105.236000061', 'Image Saved', 'System Match', and 'Attempting to Sync - This should take approx @ 313136 resend last try number: 1 Current Recieve Position: 313136'. A 'Connection Test' button is at the bottom. On the right, a photo titled 'image0046_b.jpg' shows a snowy field with buildings and trees, labeled 'Camera A'.</p>
<p>SI 21</p>	<p>Congratulations, the still image payload is working and is ready for launch!</p>	<p>Verified by: _____ and _____</p>

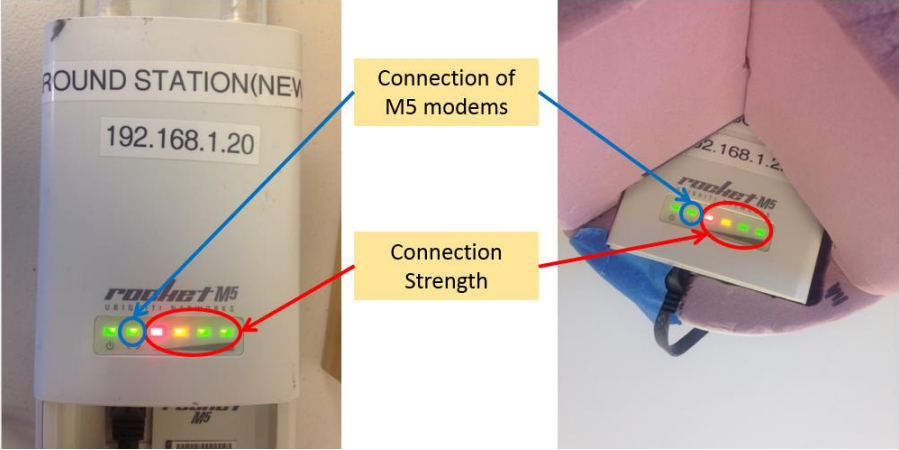

Checklist for Eclipse Payload Power Up and Testing

Step #	Video Payload		Done?
VP 1	Check that both antennas are screwed into the modem before turning the payload on.		

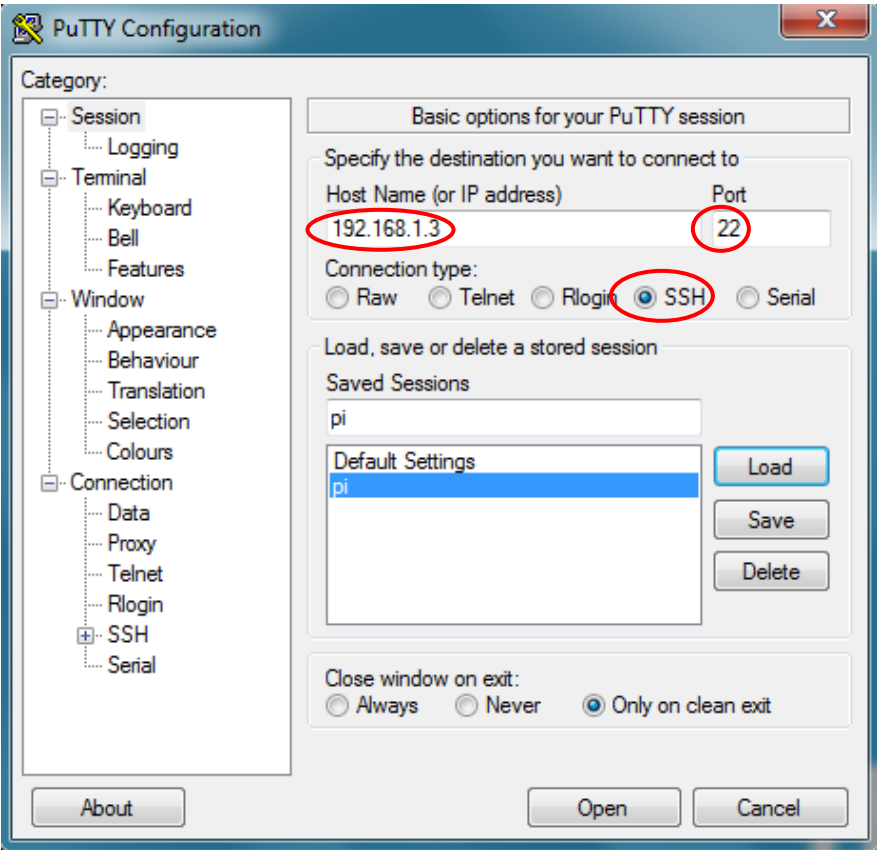
Checklist for Eclipse Payload Power Up and Testing

VP 2	<p>Turn on the video payload by turning the power switch to the ON position.</p> <p>NOTE: The video payload should already be sealed up and structurally ready for flight.</p>		
VP 3	<p>Verify that the system is on with the green power LED if it is accessible.</p>		
VP 4	<p>Power on the ground station M5 modem by plugging the POE converter into the power strip on the side of the ground station. The green power LED should light up on the ground station modem.</p>		

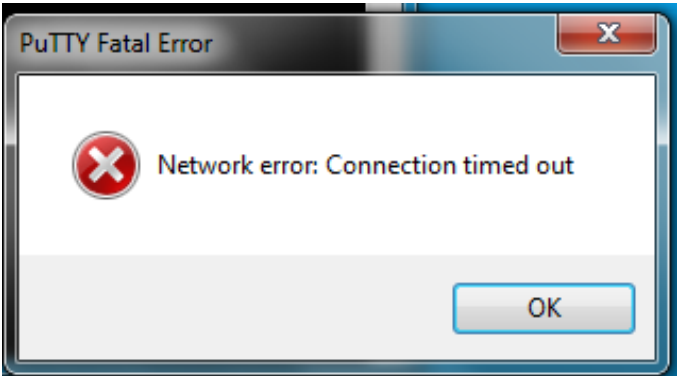

Checklist for Eclipse Payload Power Up and Testing

<p>VP 5</p>	<p>Check the connection status of the ground station and video payload M5 modems.</p>		
<p>VP 6</p>	<ol style="list-style-type: none"> 1. Modem is powered 2. Modem is connected to another modem 3. Weak connection 4. Medium connection 5. Good connection 6. Strong connection <p>If the two modems are not connected then unplug the POE converter, turn off the video payload and go back to step VP 1.</p>		

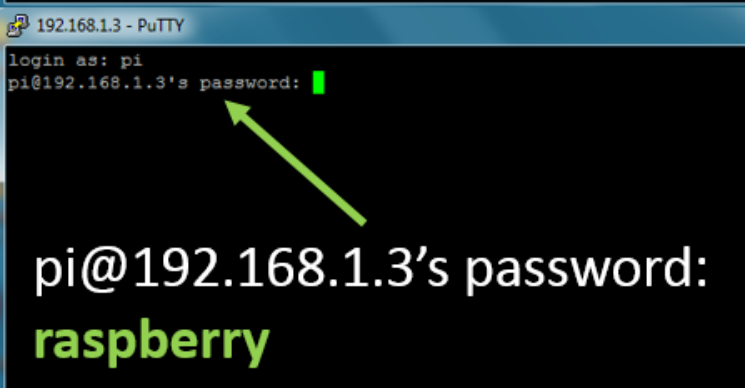
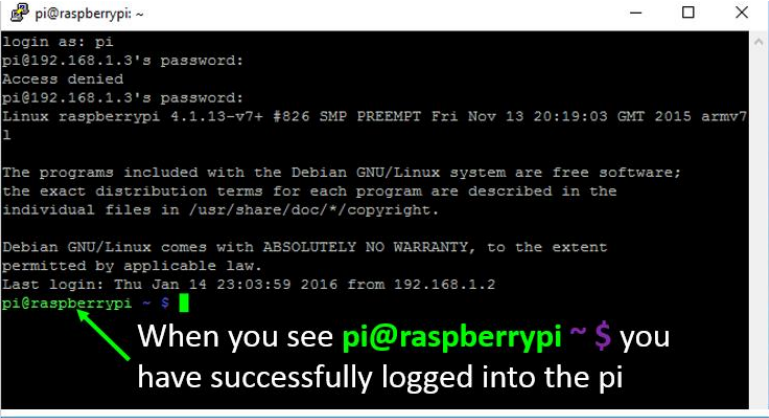
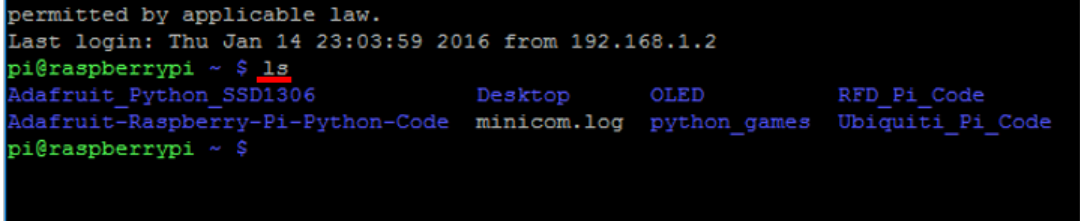
Checklist for Eclipse Payload Power Up and Testing

VP 7	<p>On the ground station laptop start putty.exe and enter/verify the connection type, the IP address and the port number and then click on Open.</p> <p>Connection type: “SSH” IP address: “192.168.1.3” Port: “22”</p>	 <p>The screenshot shows the PuTTY Configuration dialog box. The 'Category' list on the left has 'SSH' selected. The 'Basic options for your PuTTY session' section contains the following fields and options:</p> <ul style="list-style-type: none">Host Name (or IP address): 192.168.1.3Port: 22Connection type: SSH (selected)Close window on exit: Only on clean exit (selected) <p>Buttons at the bottom include 'About', 'Open', and 'Cancel'.</p>	
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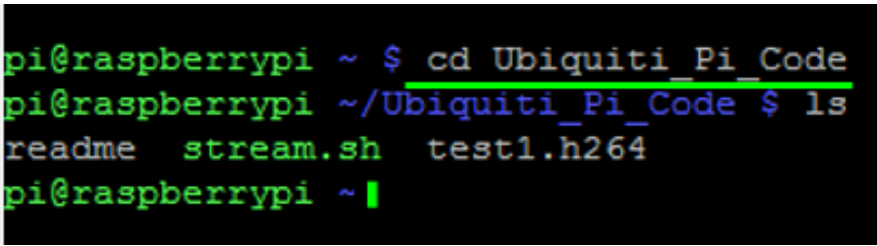
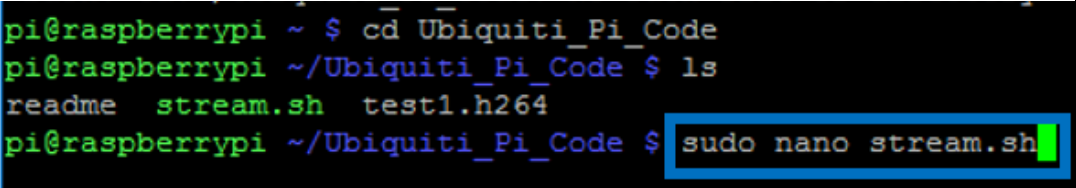
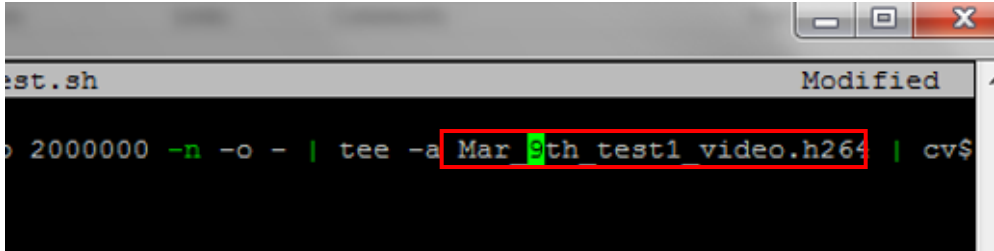
Checklist for Eclipse Payload Power Up and Testing

<p>VP 8</p>	<p>If you get the error: PuTTY Fatal Error “Network error: Connection timed out”, then proceed to the next step. If you don’t get an error then skip to step VP 12.</p>		
<p>VP 9</p>	<p>Go back to step VP 6 and check that both modems are connected.</p>		
<p>VP 10</p>	<p>If both modems are connected then check to see if the pi has an sd card.</p>	<ol style="list-style-type: none"> 1. Open the start menu and type in “cmd” and click on “Command Prompt”. 2. Type in “Ping 192.168.1.3” to see if the pi and the laptop are on the same network. 3. If it says “Reply from 192.168.1.3” then the pi has an sd card installed. 	
<p>VP 11</p>	<p>Go back to step VP 7 and try PuTTY again.</p>		
<p>VP 12</p>	<p>At the prompt that says “login as:” type in “pi” and hit [ENTER].</p>		

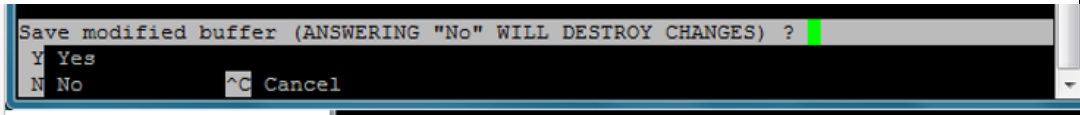
Checklist for Eclipse Payload Power Up and Testing

<p>VP 13</p>	<p>When prompted for a password type in “raspberry” and hit [ENTER].</p> <p>NOTE: Nothing will appear as you type in the password, this is normal.</p>	 <p>A screenshot of a PuTTY terminal window titled '192.168.1.3 - PuTTY'. The terminal shows the login process: 'login as: pi', 'pi@192.168.1.3's password:'. A green arrow points to the password field. Below the terminal, the text 'pi@192.168.1.3's password: raspberry' is displayed in green.</p>	
<p>VP 14</p>	<p>Once logged in to the pi you should see “pi@raspberrypi~\$”</p>	 <p>A screenshot of a terminal window titled 'pi@raspberrypi: ~'. It shows the login process: 'login as: pi', 'pi@192.168.1.3's password:', 'Access denied', 'pi@192.168.1.3's password:', 'Linux raspberrypi 4.1.13-v7+ #826 SMP PREEMPT Fri Nov 13 20:19:03 GMT 2015 armv7l'. Below this, it shows the Debian GNU/Linux system information and the prompt 'pi@raspberrypi ~ \$'. A green arrow points to the prompt. Below the terminal, the text 'When you see pi@raspberrypi ~ \$ you have successfully logged into the pi' is displayed in green.</p>	
<p>VP 15</p>	<p>Type in “ls” (lower case L and lower case S) and then hit [ENTER] to list the available files and directories.</p>	 <p>A screenshot of a terminal window showing the output of the 'ls' command. The prompt is 'pi@raspberrypi ~ \$'. The output is: 'Adafruit_Python_SSD1306 Desktop OLED RFD_Pi_Code', 'Adafruit-Raspberrypi-Python-Code minicom.log python_games Ubiquiti_Pi_Code'. The prompt 'pi@raspberrypi ~ \$' is shown at the bottom.</p>	

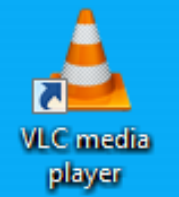
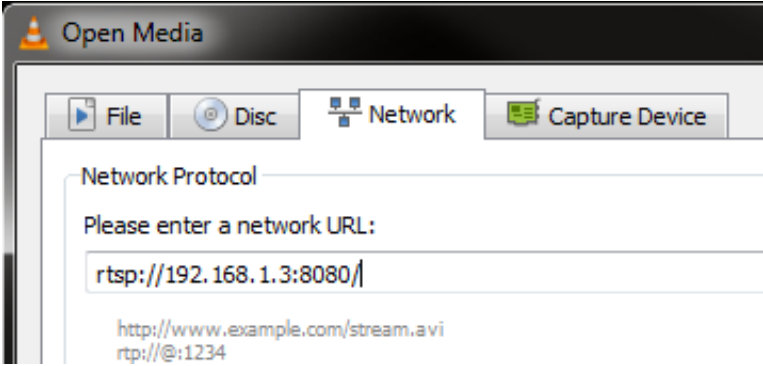
Checklist for Eclipse Payload Power Up and Testing

<p>VP 16</p>	<p>Type in “cd Ubiquiti_Pi_Code” and then hit [ENTER] to navigate into the Ubiquiti_Pi_Code directory and then type in “ls” and hit [ENTER] again to see all of the files in this directory.</p>	 <pre> pi@raspberrypi ~ \$ cd Ubiquiti_Pi_Code pi@raspberrypi ~/Ubiquiti_Pi_Code \$ ls readme stream.sh test1.h264 pi@raspberrypi ~ ! </pre>	
<p>VP 17</p>	<p>In order for the video payload to work we need to change the file name where the onboard files will be stored. Type in “sudo nano stream.sh” and then hit [ENTER]</p> <p>NOTE: you will be editing the command so be careful what you change!</p>	 <pre> pi@raspberrypi ~ \$ cd Ubiquiti_Pi_Code pi@raspberrypi ~/Ubiquiti_Pi_Code \$ ls readme stream.sh test1.h264 pi@raspberrypi ~/Ubiquiti_Pi_Code \$ sudo nano stream.sh </pre>	
<p>VP 18</p>	<p>Using the right arrow key move the cursor to the right just past “ tee -a” and change the file name to something like:</p> <p>May_18th_test1_video.h264 OR Aug_21st_flight4_video.h264</p> <p>Once the name is changed hit [CTRL]+[X] to save and exit the editor.</p>	 <p>The screenshot shows a nano editor window with a terminal window in the background. The terminal shows a command: <code>tee -a Mar 9th test1 video.h264 cv\$</code>. The file name <code>Mar 9th test1 video.h264</code> is highlighted with a red box.</p>	

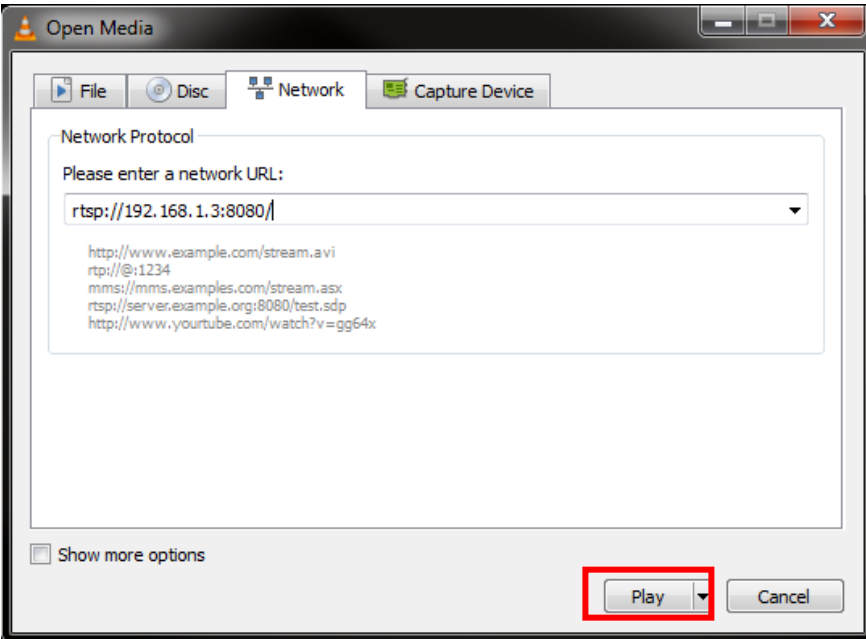
Checklist for Eclipse Payload Power Up and Testing

VP 19	When prompted to save the modified buffer type “y” and then hit [ENTER]			
VP 20	Next when it says “ File Name to Write: stream.sh ” simply hit [ENTER] to keep the file name the same.			
VP 21	Type in “ls”. If “ stream.sh ” is not green then type in “ sudo chmod +x stream.sh ” to make the file a script that can be run.	<pre> berrypi ~/Ubiquiti_Pi_Code \$ ls stream.sh test1.h264 Good </pre>	<pre> berrypi ~/Ubiquiti_Pi_Code \$ ls stream.sh test1.h264 Bad </pre>	
VP 22	Finally type in “ ./stream.sh ” and then hit [ENTER] to begin streaming live video.	<pre> -bash: cd: /Ubiquiti_Pi_Code: No such file or directory pi@raspberrypi ~ \$ cd Ubiquiti_Pi_Code pi@raspberrypi ~/Ubiquiti_Pi_Code \$ ls readme stream.sh test1.h264 pi@raspberrypi ~/Ubiquiti_Pi_Code \$ sudo nano stream.sh pi@raspberrypi ~/Ubiquiti_Pi_Code \$ <u>./stream.sh</u> </pre>		
VP 23	Place the video payload 20 feet away from the ground station. NOTE: You don’t need to do this for an actual flight, only when testing.			

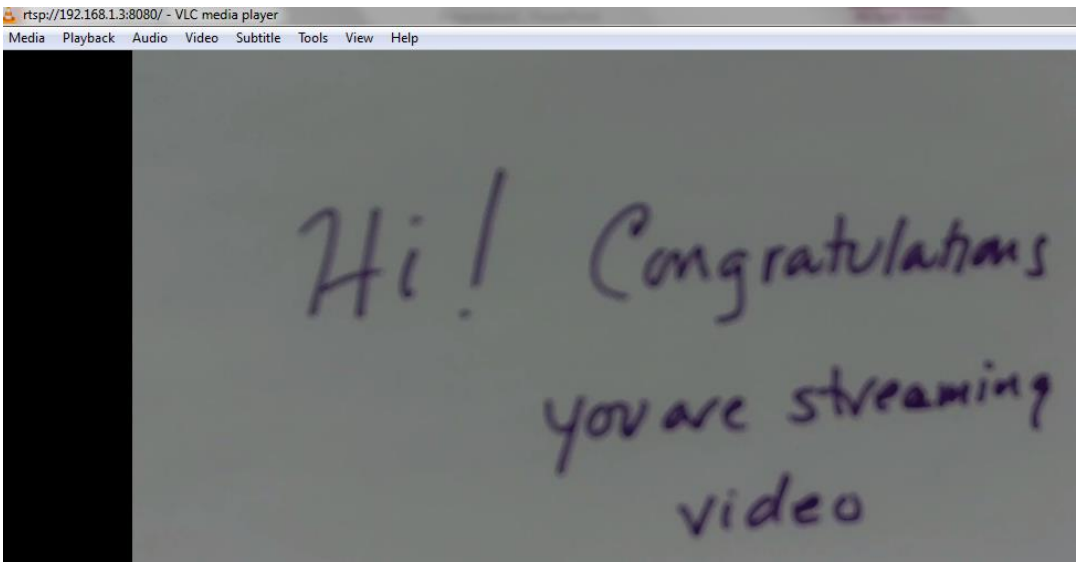
Checklist for Eclipse Payload Power Up and Testing

VP 24	Open VLC media player		
VP 25	<p>Click on the play button to open the “Open Media” window. Under the “Network” tab enter the following URL:</p> <p>“rtsp://192.168.1.3:8080/”</p>		

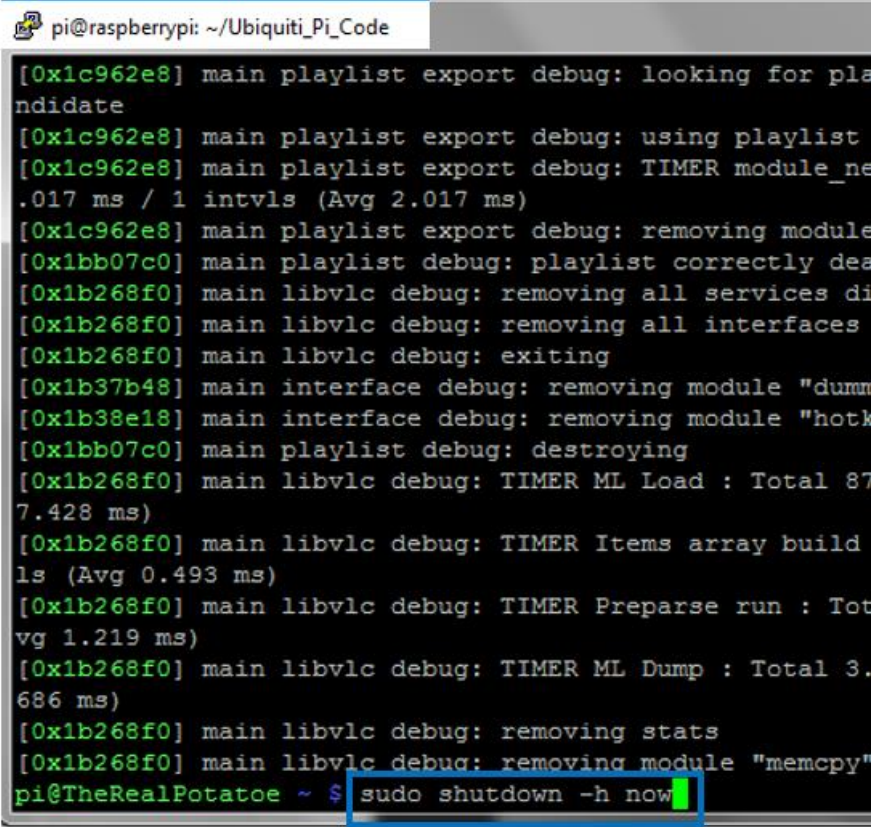
Checklist for Eclipse Payload Power Up and Testing

VP 26	Click on the “ Play ” button.		
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Checklist for Eclipse Payload Power Up and Testing

<p>VP 27</p>	<p>You should see live video being streamed.</p>	 <p>The screenshot shows a VLC media player window titled 'rtsp://192.168.1.3:8080/ - VLC media player'. The menu bar includes 'Media', 'Playback', 'Audio', 'Video', 'Subtitle', 'Tools', 'View', and 'Help'. The video content is a dark grey background with the text 'Hi! Congratulations you are streaming video' written in a purple, chalk-like font. A black vertical bar is visible on the left side of the video frame.</p>	
<p>VP 28</p>	<p>Congratulations, the video payload is streaming video and is ready for launch!</p>	<p>Verified by: _____ and _____</p>	

Checklist for Eclipse Payload Power Up and Testing

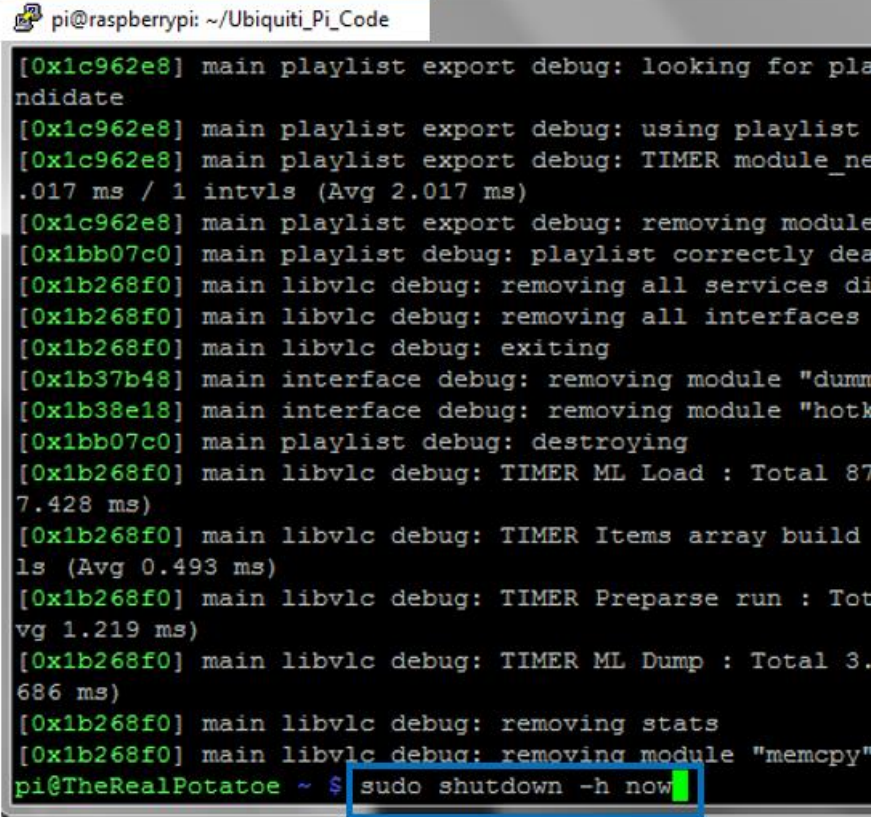
Step #	Shutting down the Video Payload Pi		Done?
VS 1	If not already logged in, use PuTTY to log into the pi as described in steps VP 7 – VP 11		
VS 2	Hit [CTRL]+[C] to stop streaming		
VS 3	Type in “ sudo shutdown –h now ” to shutdown the pi.	 <pre> pi@raspberrypi: ~/Ubiquiti_Pi_Code [0x1c962e8] main playlist export debug: looking for pla ndidate [0x1c962e8] main playlist export debug: using playlist [0x1c962e8] main playlist export debug: TIMER module_ne .017 ms / 1 intvls (Avg 2.017 ms) [0x1c962e8] main playlist export debug: removing module [0x1bb07c0] main playlist debug: playlist correctly dea [0x1b268f0] main libvlc debug: removing all services di [0x1b268f0] main libvlc debug: removing all interfaces [0x1b268f0] main libvlc debug: exiting [0x1b37b48] main interface debug: removing module "dum [0x1b38e18] main interface debug: removing module "hotk [0x1bb07c0] main playlist debug: destroying [0x1b268f0] main libvlc debug: TIMER ML Load : Total 87 7.428 ms) [0x1b268f0] main libvlc debug: TIMER Items array build ls (Avg 0.493 ms) [0x1b268f0] main libvlc debug: TIMER Preparse run : Tot vg 1.219 ms) [0x1b268f0] main libvlc debug: TIMER ML Dump : Total 3. 686 ms) [0x1b268f0] main libvlc debug: removing stats [0x1b268f0] main libvlc debug: removing module "memcpy" pi@TheRealPotatoe ~ \$ sudo shutdown -h now </pre>	

Checklist for Eclipse Payload Power Up and Testing

VS 4	You can now safely turn the power switch to the off position.		
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Step #	Shutting down the Image Payload Pi		Done?
IS 1	If not already logged in, use PuTTY to log into the pi.		
IS 2	Hit [CTRL]+[C] to stop the camera.		

Checklist for Eclipse Payload Power Up and Testing

<p>IS 3</p>	<p>Type in “sudo shutdown –h now” to shutdown the pi.</p>	 <pre> pi@raspberrypi: ~/Ubiquiti_Pi_Code [0x1c962e8] main playlist export debug: looking for pla ndidate [0x1c962e8] main playlist export debug: using playlist [0x1c962e8] main playlist export debug: TIMER module_ne .017 ms / 1 intvls (Avg 2.017 ms) [0x1c962e8] main playlist export debug: removing module [0x1bb07c0] main playlist debug: playlist correctly dea [0x1b268f0] main libvlc debug: removing all services di [0x1b268f0] main libvlc debug: removing all interfaces [0x1b268f0] main libvlc debug: exiting [0x1b37b48] main interface debug: removing module "dum [0x1b38e18] main interface debug: removing module "hotk [0x1bb07c0] main playlist debug: destroying [0x1b268f0] main libvlc debug: TIMER ML Load : Total 87 7.428 ms) [0x1b268f0] main libvlc debug: TIMER Items array build ls (Avg 0.493 ms) [0x1b268f0] main libvlc debug: TIMER Preparse run : Tot vg 1.219 ms) [0x1b268f0] main libvlc debug: TIMER ML Dump : Total 3. 686 ms) [0x1b268f0] main libvlc debug: removing stats [0x1b268f0] main libvlc debug: removing module "memcpy" pi@TheRealPotatoe ~ \$ sudo shutdown -h now </pre>	
<p>IS 4</p>	<p>You can now safely turn the power switch to the off position.</p>	