

NIFA Navigation Event

Bad Elf GPS Data Logger Setup and Usage Instructions

Revised September 14, 2015

Setup:

1. Double check your Bad Elf inventory. Depending on your region, you should have received either 7 or 8 Bad Elf “kits,” consisting of 2 Bad Elfs in a Gladd storage container. Each kit is labeled, i.e, NIFA Bad Elf Kit 1, etc. Within each kit, the Bad Elfs are each numbered, i.e, NIFA 1-1, 1-2 for kit 1, NIFA 2-1, 2-2 for kit 2, and so on. Included in each storage container are 2 charging cables and a set of instructions for the Bad Elf unit itself. *****PLEASE MAKE SURE ALL CHARGERS, INSTRUCTIONS, ETC REMAIN WITH EACH KIT AS SHIPPED TO YOUR REGION*****
2. Using the charging cables included, be sure to charge each individual Bad Elf unit. A multiple port USB hub is recommended, or else plugging the units into any available USB port. While all of the Bad Elfs should have some residual charge remaining when you receive them, it is highly recommended that you charge them over night to ensure the units are fully charged before use. Be sure to allow sufficient time to accomplish this.
3. Bad Elf units are compatible with Apple iPad, iPhone and iPods using the Bad Elf app, free for download from the Apple store. It will be essential that at least one navigation judge, and preferably two have access to an Apple product to configure and download the units. These instructions are based on the use of an iPad, but should be similar for any of the compatible Apple devices.
 - a. Prior to competition, sync each Bad Elf unit via Bluetooth to each Apple device to be used. This is accomplished by turning on the Bad Elf using the button in the upper left hand corner (see figure 1 below.) Then, on your Apple device, touch the “settings” icon. Two columns should appear. In the left column, make sure Bluetooth is selected on by touching the word “Bluetooth,” then selecting making sure that the toggle switch next to the word “Bluetooth in the right column is moved to the right with a green background (see figure 2 below.) Under “Other Devices” you should see the name of any Bad Elfs which are turned on and emitting a Bluetooth signal, i.e, NIFA 1-1, etc. (also see figure 2 below.) Touch the name associated with the Bad Elf you are attempting to sync with. After a few seconds, your Apple device will show a message with a Bluetooth Pairing Request that references a 6 digit numeric code (see figure 3.) At the same time your Bad Elf should show a message showing a pairing request with the same 6 digit code. (see figure 4.) Press the pair button on the Apple device and click the accept button on the Bad Elf (lower left button, see figure 1.) After a few more seconds, the Bad Elf should show on your Apple device under “My Devices” (see figure 5) and if you push the Bluetooth button on the side of the Bad Elf, you will see a screen

saying Bluetooth at the top with the word “On” next to pairing enabled, along with the number of devices connected (see figure 6.)

- b. If a Bad Elf does not appear under “Other Devices,” it may have had the Bluetooth turned off. To correct this problem, press the middle Bluetooth button (see figure 1,) until you get to a screen with “Bluetooth” written across the top, similar to that shown in figure 6, but with Bluetooth showing off. Hold the middle Bluetooth button for approximately 3 seconds until the word “Enabled” shows on the Bad Elf screen. After a few seconds, the Bad Elf should show under “Other Devices,” and you can then proceed with the instructions shown in step 3a.
- c. Repeat instructions listed under 3a for each Bad Elf device to be used in competition, and for each Apple device to which the Bad Elf is to be paired (maximum of 2.)

Figure 1

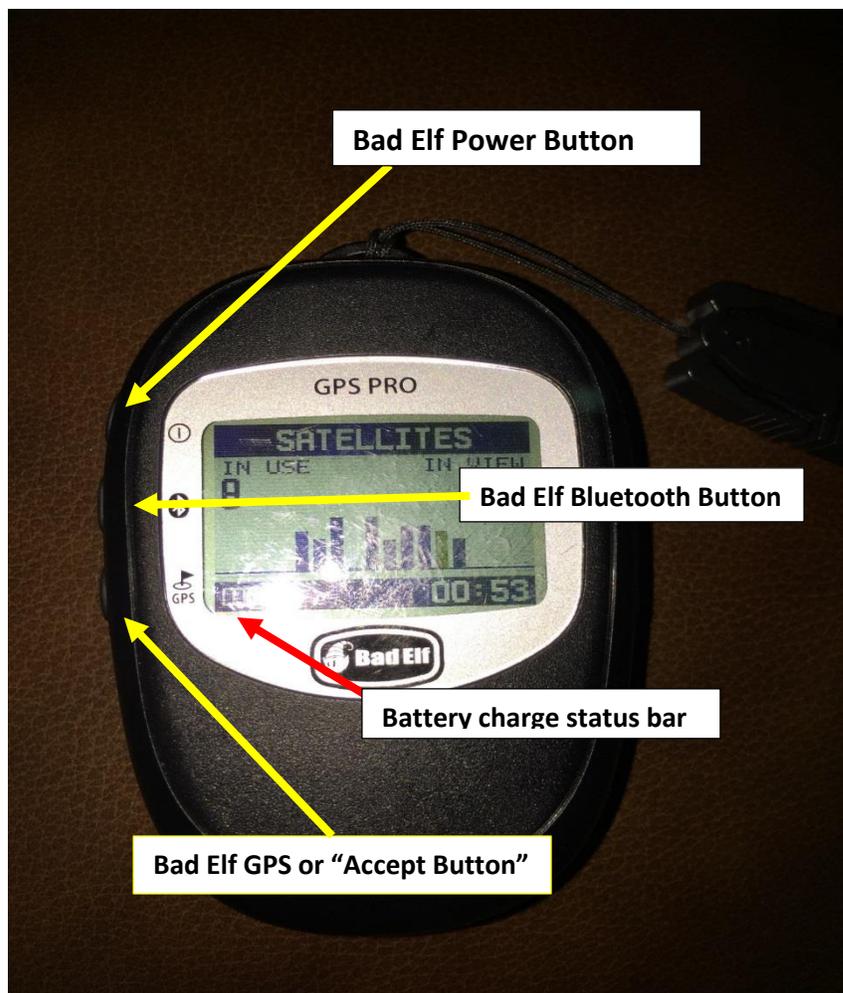


Figure 2



Figure 3

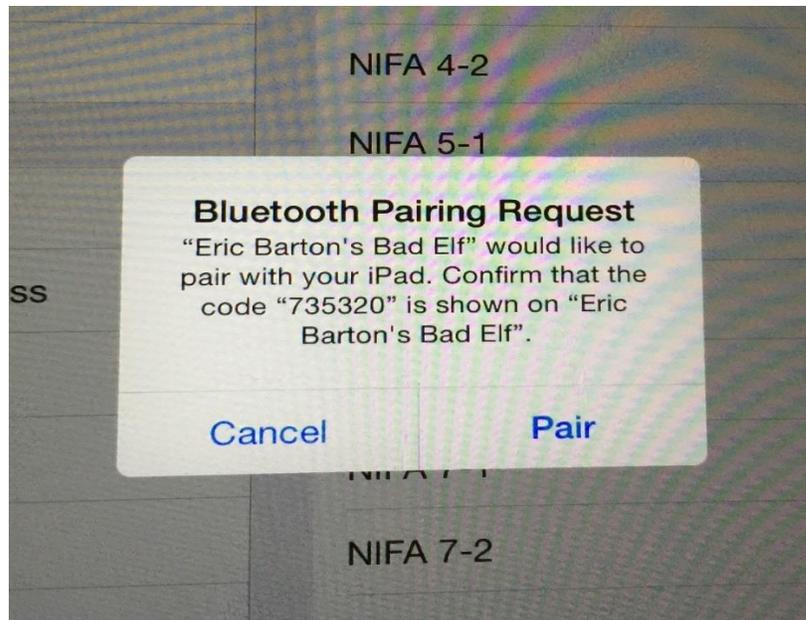


Figure 4

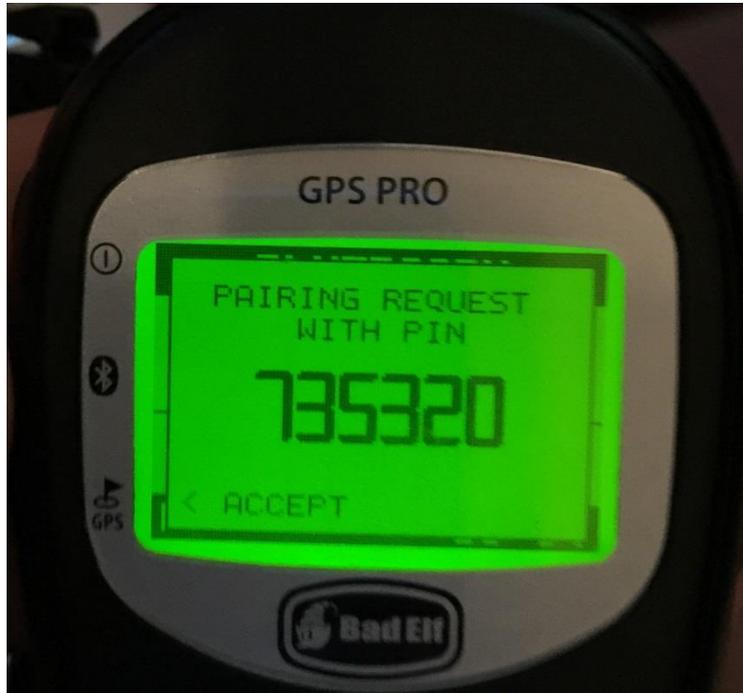
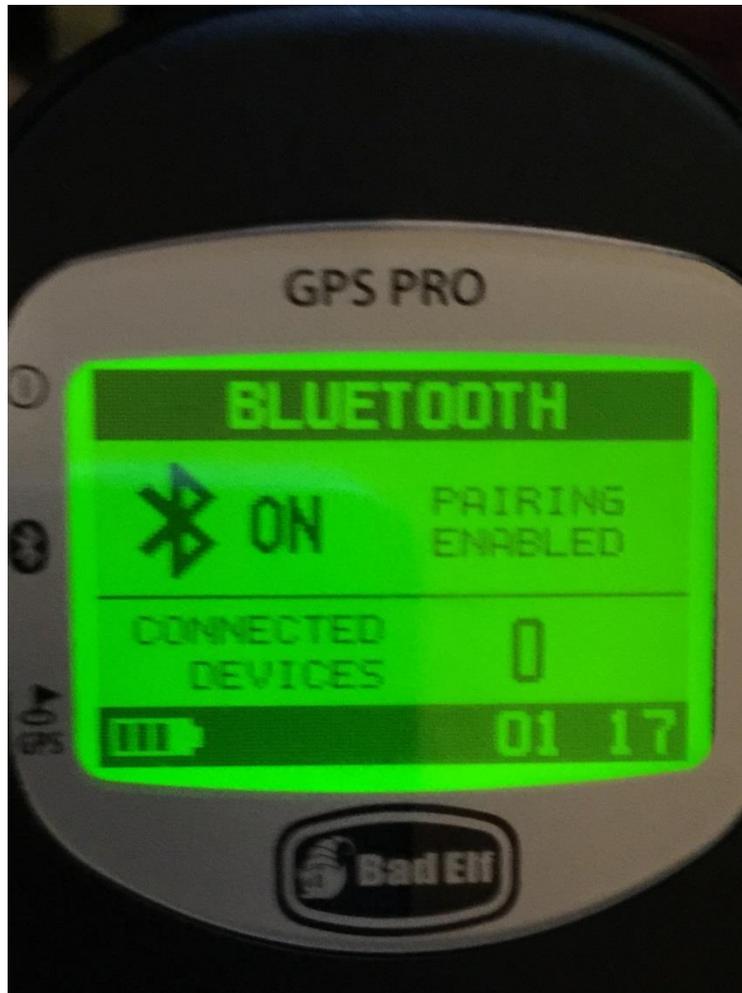


Figure 5



Figure 6



4. Once each Bad Elf is synced to your Apple device(s,) we need to configure both the Bad Elf app and the Bad Elf units. Open the Bad Elf app on one of your Apple devices. You need to be connected to the internet, preferably wi-fi, although a cellular connection will work. (NIFA not responsible for any data charges.) On the left side of your screen (see figure 7,) you should see a list of any Bad Elfs to which your iPad is connected (NIFA 1-1, etc,) as well as a notice saying how many trips are stored on this iPad, location icon showing your present position on a Google Maps type of background, a graphic showing how many satellites are currently being received, a learn more icon, an app settings icon and a troubleshooting icon. On the left side of the screen, select the first Bad Elf unit you want to configure. On the right side of the screen, Product Details will appear at the top. On the first line below this, the name of the Bad Elf, i.e, NIFA 1-1, will be shown. **UNLESS INCORRECT, DO NOT** change the name of the Bad Elf. Below this line, you should see the GPS Locked status (searching, locked, locked + WAAS, etc,) the UTC (or Z) time, battery status, percentage of trip storage free, and a data logging switch (should be “off” or to the left at this point.) Below those items will selection menus for Trip Storage, Product Information, Display Settings, Power Settings, Datalogger Settings, Bluetooth Settings and Advanced Settings.

- a. Starting on the left side of the screen, if any trips are showing stored on your iPad, it recommended you delete them to start the SAFCON with a clean slate.
- b. Select the location icon, a larger map should open up showing your present location on a satellite image along with current latitude, longitude, speed and altitude, make sure this information is consistent with your current location. If it is not, make sure the selected Bad Elf unit has a clear view of the sky and can receive GPS satellite signals. If necessary, turn off the Bad Elf, turn it back on and reconnect to the Apple device as specified in step 3.
- c. Select the app settings icon. When it opens, you will see a number of settings that can be changed under the App Settings heading on the right side of the screen (see figures 8, 9 and 10.) Below are the correct settings. If any of your settings are incorrect, just touch the item that needs to be updated and select the correct option.

Under Display:

Theme: Light or Dark is at user discretion
Sounds: On or Off at user discretion

Under Display Units:

Speed: Knots
Altitude: Feet
Distance: Nautical Miles
Accuracy: Feet
Coordinates: Select format dd mm.mmmm

Under Barometric Altimeter:

Altitude Source: GPS
Altimeter: in Hg
Pressure: in Hg

Under Map:

Map Mode: Satellite
Show Gauges: Select Off (Switch to left)

Under Trips:

Default Title: Date/Time
Route Color: Red

Under Trip Export:

GPX File: Select On (Switch to right)

KML File: Select On (Switch to right)

Altitude Source: GPS

Under Plug-In GPS:

Background Tracking: Off

Under More Info:

App Version: 3.0.2 (1058) **as of 14Sep15, not a changeable
Field

Release Notes: No setting, information only.

Bad Elf blog: No setting, links to the Apple app store.

Legal: Legal disclaimers and credits, no settings.

- d. Now it's time to check the settings on the Bad Elf units. If the Bad Elf is showing a firmware update available, go ahead and download and install the update. It will add a few minutes to the process, but helps to ensure that the equipment is completely up to date. If time does not permit, then you may skip this step.
- e. After completing any firmware updates, select the Trip Storage menu. When it opens, confirm that it reads NO TRIPS ON THIS BAD ELF. If any trips are present, select them and delete them from the Bad Elf.
- f. You may select product information if you wish to view it, however at this stage, there is nothing you need do with this menu selection.
- g. Select the display settings menu. When it opens, you will see a number of settings that can be changed under the Display heading on the right side of the screen (see figure 11.) Below are the correct settings. If any of your settings are incorrect, just touch the item that needs to be updated and select the correct option.

Speed: Knots

Altitude: Feet

Distance: Feet

Coordinates: dd mm.mmmm (your present position in this format)

Time Zone: UTC (Greenwich Mean Time)

Daylight Savings: Off (Selector switch to left) DO NOT COPY FROM I-DEVICE

Backlight: Momentary On

- h** Select the power settings menu. When it opens, you will see a number of settings that can be changed under the Power heading on the right side of the screen (see figure 12.) Below are the correct settings. If any of your settings are incorrect, just touch the item that needs to be updated, and select the correct option.

Auto-on with USB Power: No

Auto-off when idle: Never

- i** Select the datalogger settings menu. When it opens, you will see a number of settings that can be changed under the Datalogger heading on the right side of the screen (see figure 13.) Below are the correct settings. If any of your settings are incorrect, just touch the item that needs to be updated, and select the correct option.

Datalogging: Switch should be off, or to the left for now, later instructions will advise when to turn on.

Logging Rate: 30 per min (once every 2 seconds for compatibility with Expedien scoring program, may change in future)

Smart Filter: Driving (over 10mph/16kph) ***UNITS ORIGINALLY SHIPPED WITH FILTER SET TO FLYING. FILTER ELIMIATES ANY DATA POINTS BELOW 43 KNOTS. EXPEDIEN BEGINS SCORING AT 35 KNOTS WHEN THE CONTESTANT PASSES THE STARTING POINT. BECAUSE OF THIS, SETTING NEEDS TO BE CHANGED TO DRIVING TO AVOID POSSIBILITY OF STARTING POINT NOT BEING RECORDED DUE TO STRONG HEADWIND REDUCING GROUNDSPED ON TAKEOFF ROLL TO LESS THAN 43 KNOTS***

Auto-logging: Disabled

- j.** Select the bluetooth settings menu. When it opens, you will see a number of settings that can be changed under the Bluetooth heading on the right side of the screen (see figure 14.) Below are the correct settings. If any of your settings are incorrect, just touch the item that needs to be updated, and select the correct option.

Enabled on startup: Always

Pairing enabled: Always

Allow PIN 0000: Never

Auto-connect: No devices

Anonymous Pairing: No

Custom Bluetooth Name: Yes *****DO NOT CHANGE BLUETOOTH NAME*****

- k. Select the advanced settings menu. When it opens, you will see a number of settings that can be changed under the Bluetooth heading on the right side of the screen (see figure 15.) Below are the correct settings. If any of your settings are incorrect, just touch the item that needs to be updated, and select the correct option.

SBAS/WAAS/EGNOS: Enabled

ElfPort speed: 115200

Passcode Lock: Disabled

Flight Sim Mode: Detect Cable

- l. Repeat steps 4d through 4k for each Bad Elf to be used in competition.

- 5. After completing steps 1-4, power down each Bad Elf unit to conserve the battery. With Bluetooth enabled, Bad Elf advertises up to 16 hours of battery life. Even if it is less, this should be more than sufficient to run a typical NIFA navigation event. If, for some reason, your navigation event is spread over multiple days due to weather or other reasons, you should re-do step 1.

Figure 7

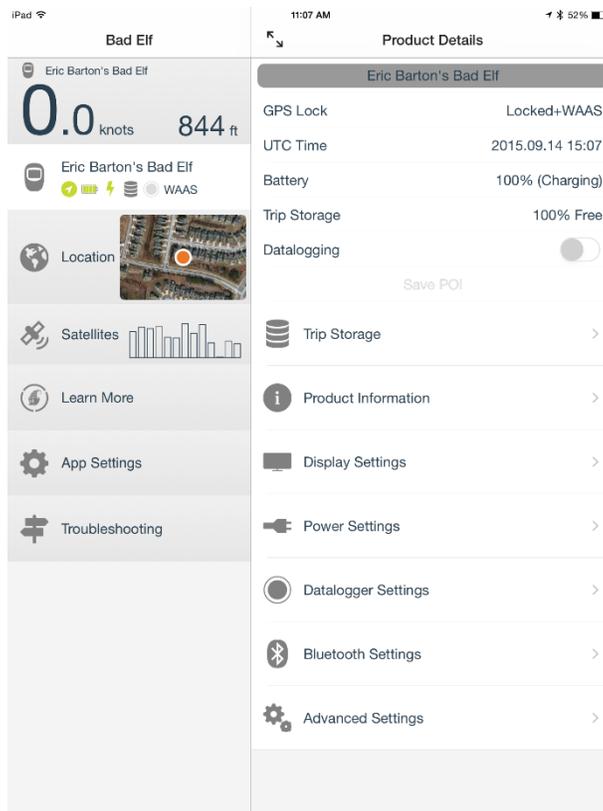


Figure 8

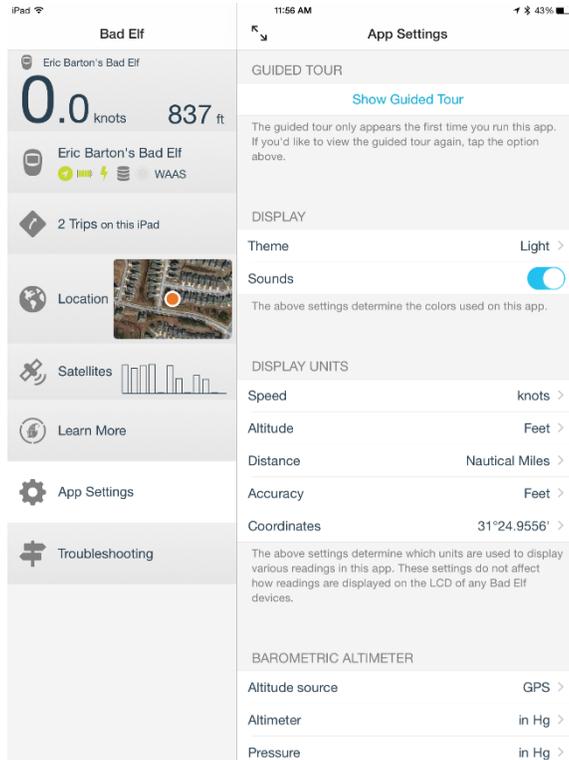


Figure 9

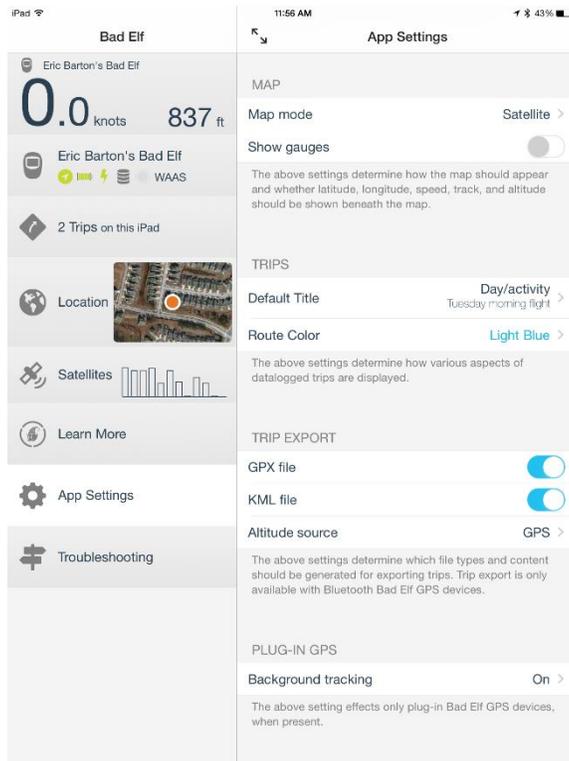


Figure 10

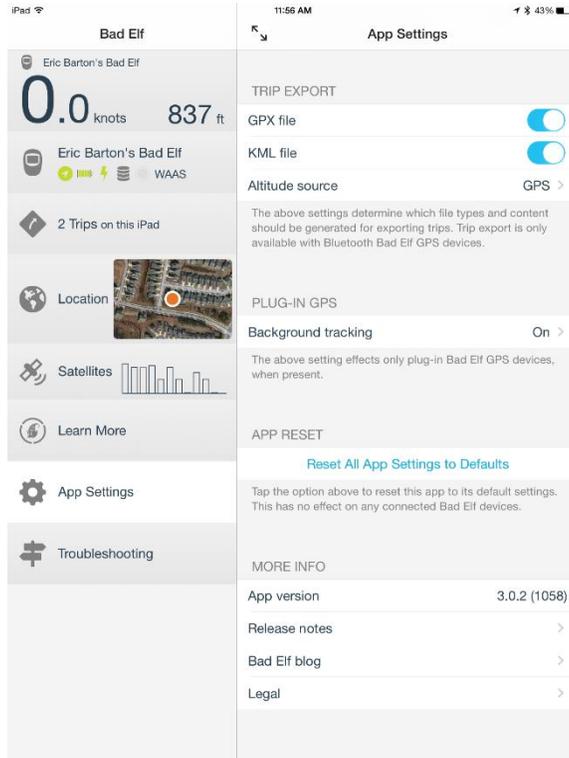


Figure 11

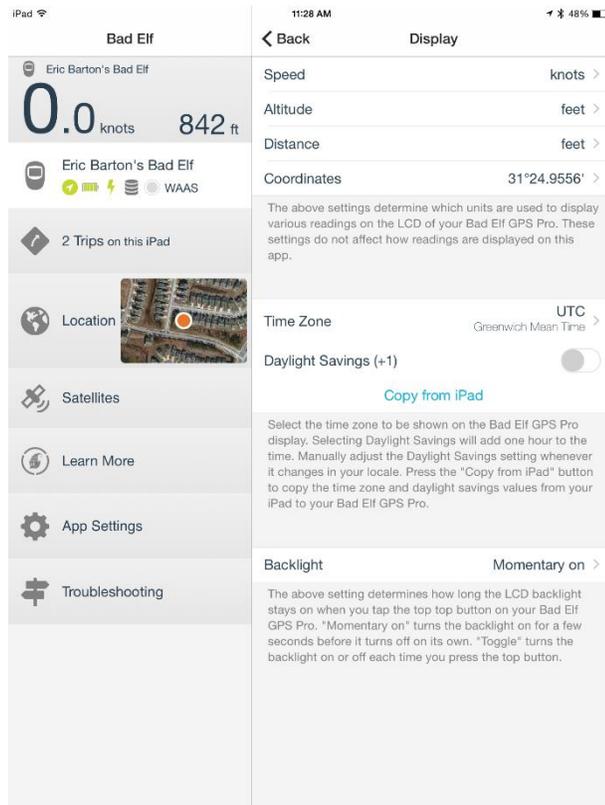


Figure 12

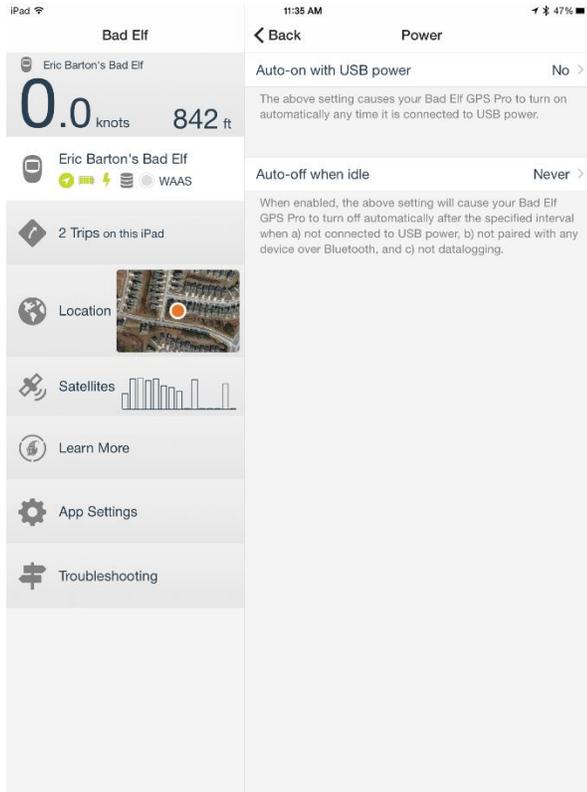


Figure 13

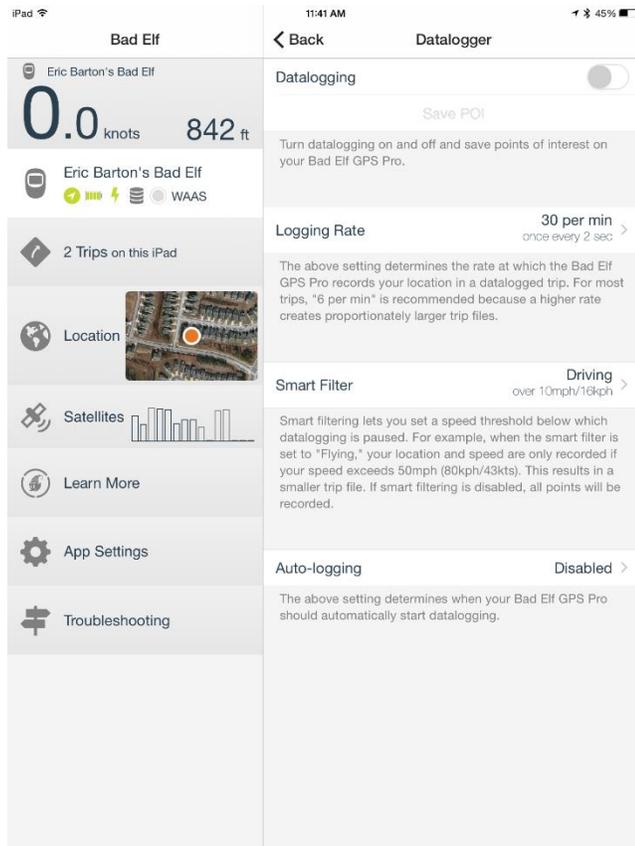


Figure 14

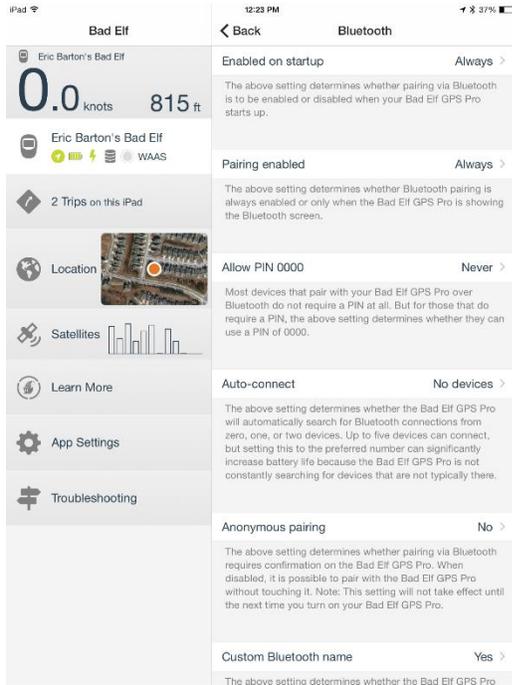
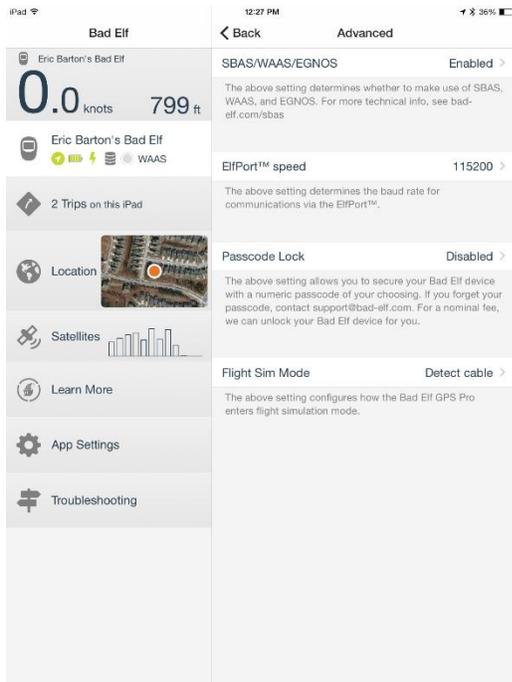


Figure 15



Aircraft Installation:

- 1.** Be sure to track which aircraft the kit number is being installed. This is best done using the navigation event heat sheet. Open the Gladd container and turn on both Bad Elfs, then if not already on, turn on your Apple device and go to “settings,” then “Bluetooth.” Within a short period of time, the Apple device should automatically connect to both Bad Elfs which will then appear under “My Devices.” If not, follow the instructions in steps 1a and 1b below:
 - a.** Sync each Bad Elf unit via Bluetooth to each Apple device to be used. This is accomplished by turning on the Bad Elf using the button in the upper left hand corner (see figure 16 below.) Check that the battery charge is at least 3 bars on the lower left corner of the Bad Elf screen as shown in figure 16. Then, on your Apple device, touch the “settings” icon. Two columns should appear. In the left column, make sure Bluetooth is selected on by touching the word “Bluetooth,” then selecting making sure that the toggle switch next to the word “Bluetooth in the right column is moved to the right with a green background (see figure 17 below.) Under “Other Devices” you should see the name of any Bad Elfs which are turned on and emitting a Bluetooth signal, i.e, NIFA 1-1, etc. (also see figure 17 below.) Touch the name associated with the Bad Elf you are attempting to sync with. After a few seconds, your Apple device will show a message with a Bluetooth Pairing Request that references a 6 digit numeric code (see figure 18.) At the same time your Bad Elf should show a message showing a pairing request with the same 6 digit code. (see figure 19.) Press the pair button on the Apple device and click the accept button on the Bad Elf (lower left button, see figure 16.) After a few more seconds, the Bad Elf should show on your Apple device under “My Devices” (see figure 20) and if you push the Bluetooth button on the side of the Bad Elf, you will see a screen saying Bluetooth at the top with the word “On” next to pairing enabled, along with the number of devices connected (see figure 21.)
 - b.** If a Bad Elf does not appear under “Other Devices,” it may have had it’s Bluetooth turned off. To correct this problem, press the middle Bluetooth button (see figure 16,) until you get to a screen with “Bluetooth” written across the top, similar to that shown in figure 21, but with Bluetooth showing off. Hold the middle Bluetooth button for approximately 3 seconds until the word “Enabled” shows on the Bad Elf screen. After a few seconds, the Bad Elf should show under “Other Devices,” and you can then proceed with the instructions shown in step 1a.
- 2.** Place both Bad Elfs back into their container and secure the lid. It is recommended, but not required, that you apply tape around the lid to prevent tampering. Place the container in the aircraft. For 4 seat aircraft, place the container in the backseat, making sure that nothing is on top of the container. For C150/152 or other two seat aircraft, place the container in the baggage area behind the pilots, again making sure that nothing is on top of it. Since the contestant flying the aircraft will likely be in the planning stage at this point, be sure to tell the safety observer to make sure that nothing is placed on top of the GPS containers to avoid blocking the GPS signal.

- 3.** On your Apple device, open the Bad Elf application. On the left side of the screen, you should see both Bad Elfs connected to your device, (see figure 22) with the GPS name (NIFA 1-1, etc) showing. Choose one of the Bad Elfs to start. On the right side of the screen, under the heading “Product Details,” the Bad Elf name will be shown. Below that is a line showing the GPS status. It will either show searching, locked or locked+WAAS. Locked means the GPS has locked onto satellites and determined its position. Either locked or locked+WAAS must be shown for the remainder of the installation process to take place. Generally, the Bad Elfs acquire their position quickly, so this should not be a problem. ***If the Bad Elf does not show the units locked within a reasonable period of time, usually less than a minute, it may be necessary to move the container somewhere else in the aircraft where it has a clearer view of the sky.*** The fifth line below the GPS name will show a toggle switch for data logging. Press this toggle switch so that it shows moved to the right with a blue background (see figure 22.)
- 4.** After toggling the data logging on, select the datalogger settings menu on the right side of the screen. Under the heading “Datalogger,” ensure that the toggle switch for data logging is showing on, to the right with a blue background. After this, touch the back button at the top of the screen.
- 5.** On the left side of the screen, select the location icon. A larger map should open up showing your present location on a satellite image along with current latitude, longitude, speed and altitude, make sure this information is consistent with your current location. If it is not, make sure the selected Bad Elf unit has a clear view of the sky and can receive GPS satellite signals. If necessary, turn off the Bad Elf, turn it back on and reconnect to the Apple device as specified in step 1.
- 6.** Below the location icon is the satellite icon. Select this icon and make sure that the Bad Elf is tracking a reasonable number of satellites and is giving a horizontal, vertical and positional accuracy readout.
- 7.** Repeat steps 3-6 for the second Bad Elf in the kit. After that, you are done with installation of that kit and can move to the next kit and aircraft.

Figure 16

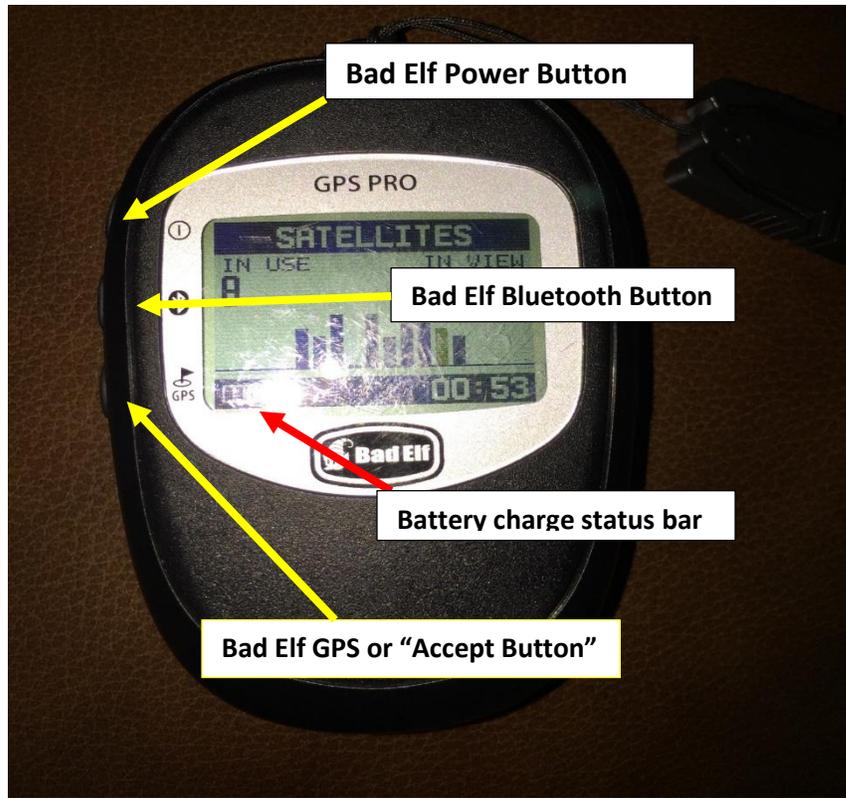


Figure 17

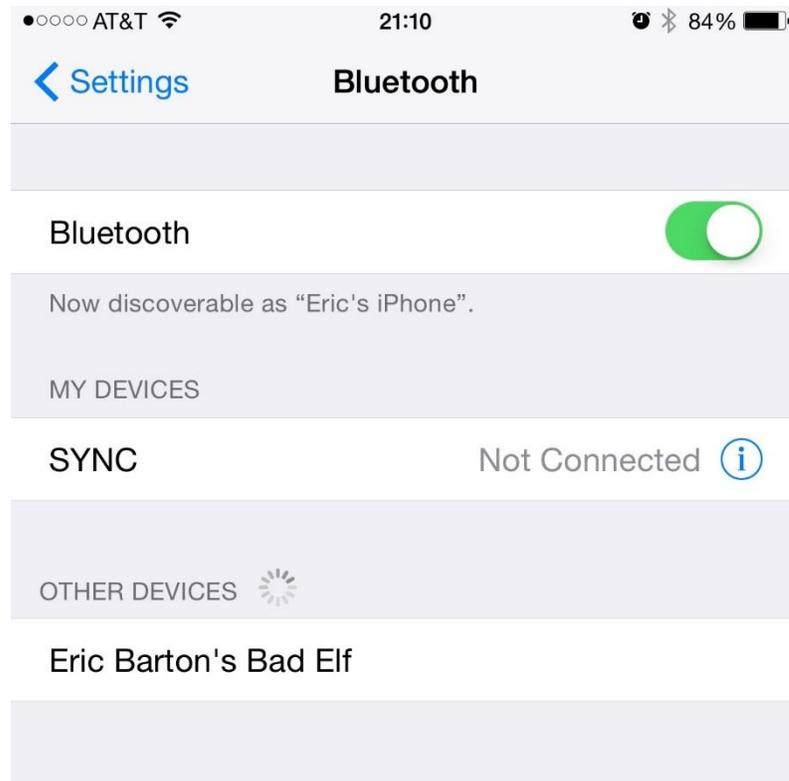


Figure 18

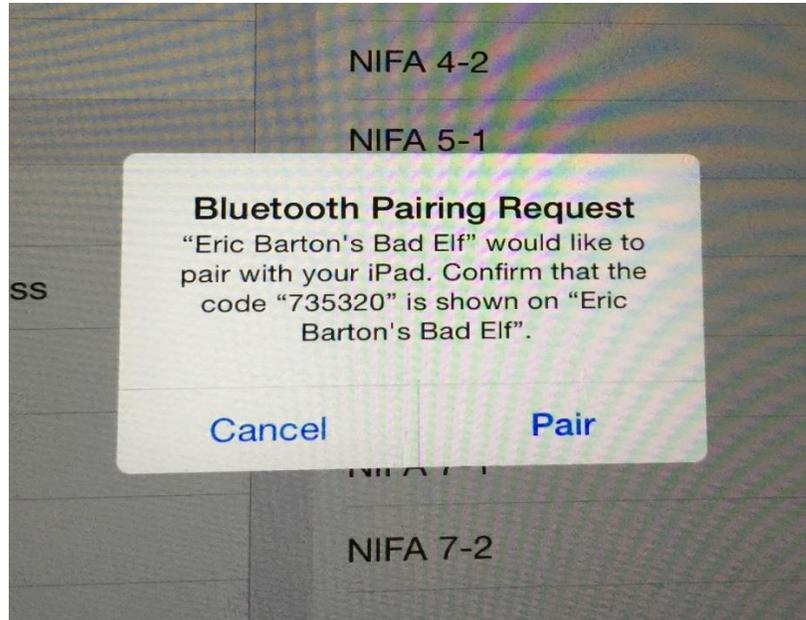


Figure 19

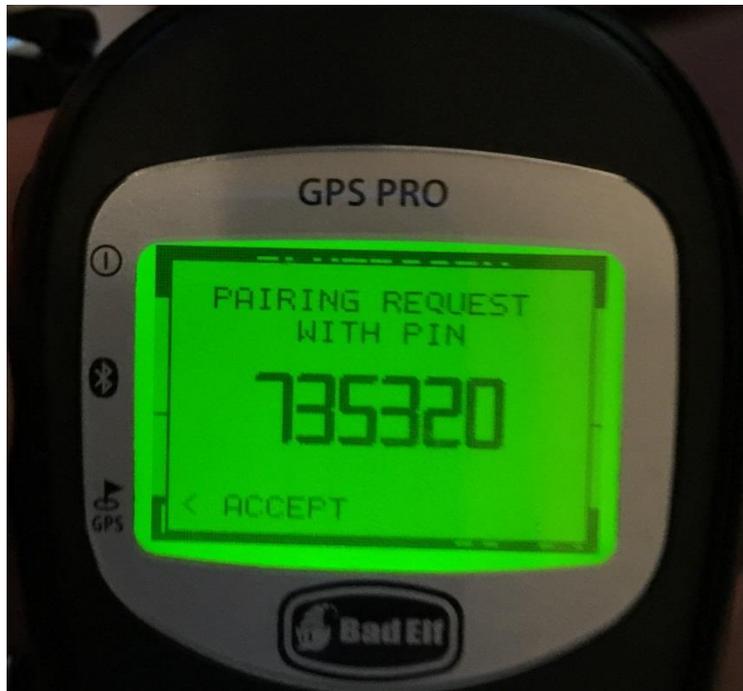


Figure 20



Figure 21

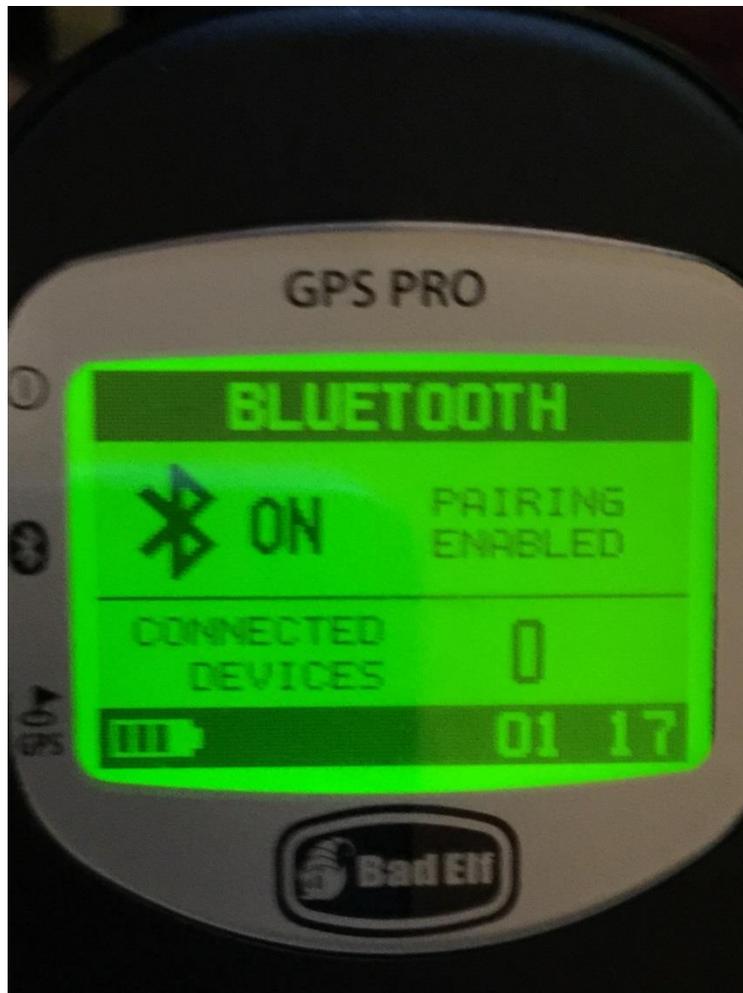
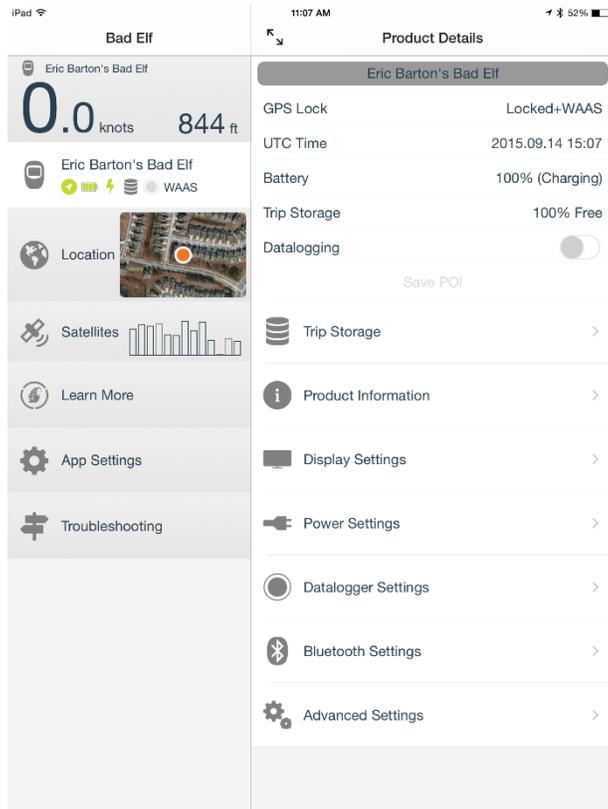


Figure 22



Recovery and Download:

1. After the aircraft has come to a complete stop and shut down with the beacon off, you can begin the download process. It is not necessary to remove the Bad Elf kit from the aircraft to download the data, it can be accomplished over Bluetooth.
2. Be sure to track which aircraft the kit number is being recovered/downloaded. This is best done using the navigation event heat sheet. Turn on your Apple device and go to “settings,” then “Bluetooth.” Tap to select the Bad Elf unit you wish to connect to and wait to see “Connected” next to the Bad Elf listed in “My Devices.” If there are multiple returning aircraft in the shutdown area, be sure you are connecting to the correct Bad Elfs in the aircraft (check the kit number) as there may be several in range of your device. If the Bad Elfs you are trying to download do not connect with your device, follow the instructions in steps 2a and 2b below:
 - a. Sync each Bad Elf unit via Bluetooth to each Apple device to be used. This is accomplished by turning on the Bad Elf using the button in the upper left hand corner (see figure 23 below.) Check that the battery charge is at least 3 bars on the lower left corner of the Bad Elf screen as shown in figure 23. Then, on your Apple device, touch the “settings” icon. Two columns should appear. In the left column, make sure Bluetooth is selected on by touching the word “Bluetooth,” then selecting making sure that the toggle switch next to the word “Bluetooth” in the right column is moved to the right with a green background (see figure 24 below.) Under “Other Devices” you should see the name of any Bad Elfs which are turned on and emitting a Bluetooth signal, i.e, NIFA 1-1, etc. (also see figure 24 below.) Touch the name associated with the Bad Elf you are attempting to sync with. After a few seconds, your Apple device will show a message with a Bluetooth Pairing Request that references a 6 digit numeric code (see figure 25.) At the same time your Bad Elf should show a message showing a pairing request with the same 6 digit code. (see figure 26.) Press the pair button on the Apple device and click the accept button on the Bad Elf (lower left button, see figure 23.) After a few more seconds, the Bad Elf should show on your Apple device under “My Devices” (see figure 27) and if you push the Bluetooth button on the side of the Bad Elf, you will see a screen saying Bluetooth at the top with the word “On” next to pairing enabled, along with the number of devices connected (see figure 28.)
 - b. If a Bad Elf does not appear under “Other Devices,” it may have had it’s Bluetooth turned off. To correct this problem, press the middle Bluetooth button (see figure 23,) until you get to a screen with “Bluetooth” written across the top, similar to that shown in figure 28, but with Bluetooth showing off. Hold the middle Bluetooth button for approximately 3 seconds until the word “Enabled” shows on the Bad Elf screen. After a few seconds, the Bad Elf should show under “Other Devices,” and you can then proceed with the instructions shown in step 2a.
3. On the left side of the screen, you should see both Bad Elfs connected to your device, (see figure 29) with the GPS name (NIFA 1-1, etc) showing.

4. **Steps 4-7 must be completed separately for each Bad Elf in the kit.** Now, it is time to download the GPS data. Choose the Bad Elf ending with -1 to start. On the right side of the screen, 5 lines below the Bad Elf name, select the datalogging switch to off (should be to the left with white background.) On the left side of the screen, under the GPS name, you should see a message in blue reading “Download 1 New Trip” (see figure 30.) Touch this message, the app will show a status bar on the right side of the screen as it downloads the trip from the GPS (see figure 31.) **NOTE: The Bad Elf app will ask if you want to delete the track from the Bad Elf once downloading is complete. DO NOT do this at this time. Instructions on when to delete the track from the Bad Elf will be specified in further steps.** Once the download is complete, the message on the left side of the screen should now show 1 trip on this iPad (this number will increase as you download more trips throughout the day.) Touch the message again, and a list of trips stored on the iPad will appear on the right hand side of the screen. Select the one you just downloaded (it will be named by the current date and time.) A plot of the contestant’s track will show, and if you’re connected to the internet it will show on a satellite image of the area. It is ok to allow the student to look at their plot if they wish. Above the image of the track is a grey box with the date/time stamp of the trip. Touch this box and it will allow you to create your own trip name (see figure 32.) Name the trip PXXXX where XXXX = the contestant’s identification number. *****PROPER NAMING IS ESSENTIAL***** You will need to obtain this information from the contestant as you are downloading. When you download the 2nd Bad Elf in the kit, you will need to name the trip SXXXX. As you re-name the trips, it will automatically save the updated trip names to the iPad.
5. Assuming everything downloaded ok, you now need to export the trip file from your Apple device so that it can be opened in a PC and imported into the Expedien scoring program. If you have internet access, either cellular or wifi in the download area, that is ideal, but not absolutely necessary. If you have internet connectivity in the download area, you can touch the upload icon in the upper right hand corner of the screen and select “Share via Email.” An e-mail will be auto-generated with a .gpx and .kml file attachment. Enter the e-mail address of whoever you need to send the downloaded files to (can be more than one person.) The recommended recipients would be the chief navigation judge, scorekeeper and chief judge, so be sure to have at least one, if not all, of those e-mail addresses ready prior to starting Hit send, then you will be returned to the figure 32 screen.
 - a. If internet access is not available in the download area, you can save the e-mails as drafts, and then send them once internet access becomes available. To do this, complete step 6 as described above. However, after entering your recipients, DO NOT, hit send, but touch “cancel” in the upper left hand corner of the screen. You will be given the choice of saving draft or deleting draft. Select “save draft,” the e-mail will be saved in your draft folder to be sent later and you will be returned to the figure 32 screen.
6. Once your file has been e-mailed and/or saved as drafts, you now need to clear the track off the Bad Elf. From the figure 32 screen where you left off in the last step, select the Bad Elf from the list on the left side of the screen. Select the trip on the list by touching the circle to the left of

the name, then touch delete in the lower right hand corner. You will be asked to confirm the deletion, click delete again, and you should see a message on the right side of the screen saying “No trips on this Bad Elf.” If you see this, you’re done with this step. Occasionally, the Bad Elf app doesn’t show this message, if this happens, shut down the Bad Elf app and re-start it, this usually clears the problem. *****DO NOT DELETE FROM APP AT THIS POINT. THE COPY ON THE APP IS THE ONLY BACKUP TO THE FILE WHICH YOU E-MAILED IN STEP 6. ONLY DELETE FROM THE BAD ELF APP AFTER THE NAVIGATION EVENT SCORING IS COMPLETE*****

7. After downloading of the kit is complete, Return the GPS kit to the installation judges to re-install in a different aircraft for a later departure. Nothing else needs to be done with the kit at this point, any further steps will be completed by the installation judges per their instructions above.

Figure 23

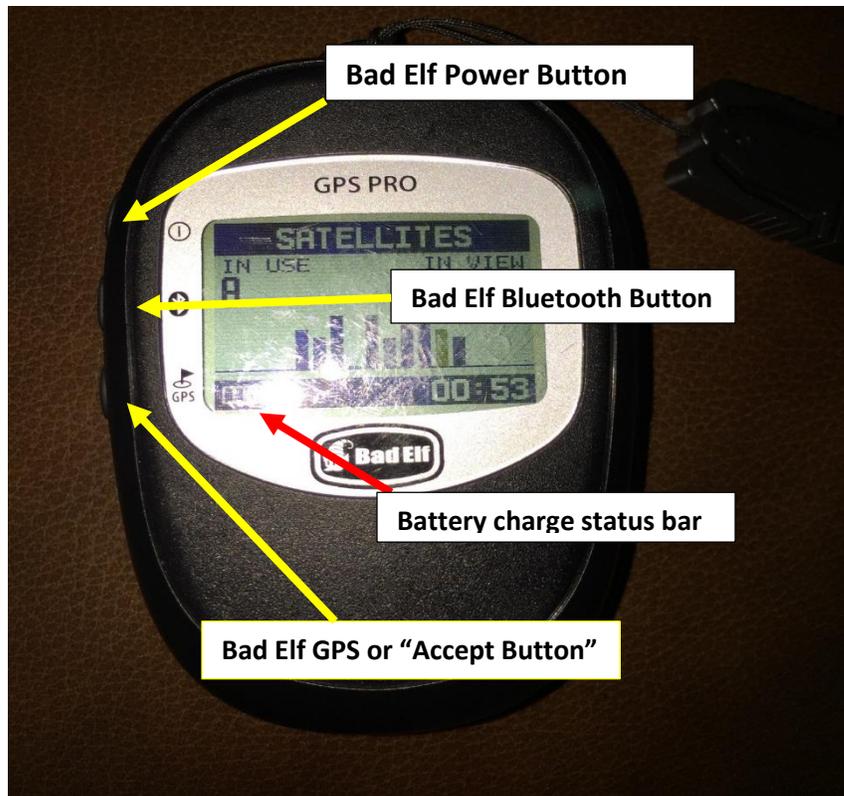


Figure 24



Figure 25

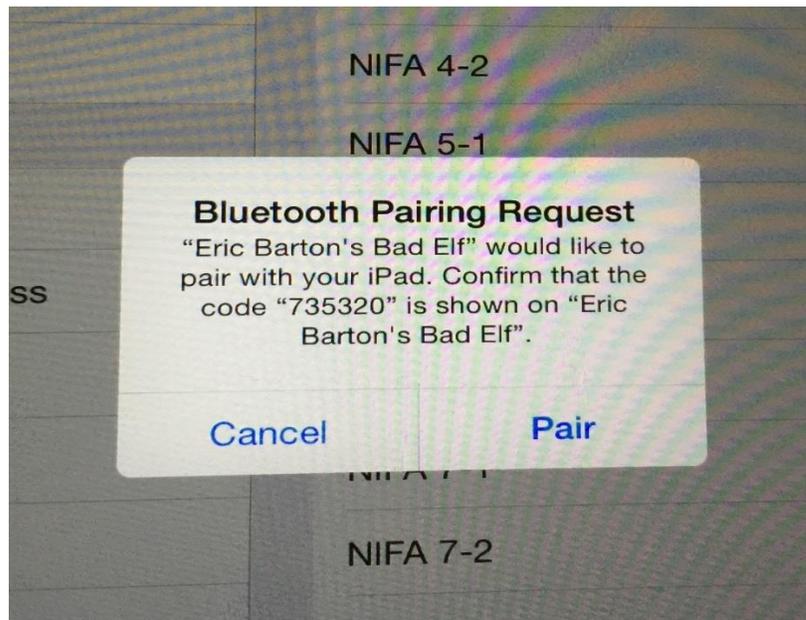


Figure 26

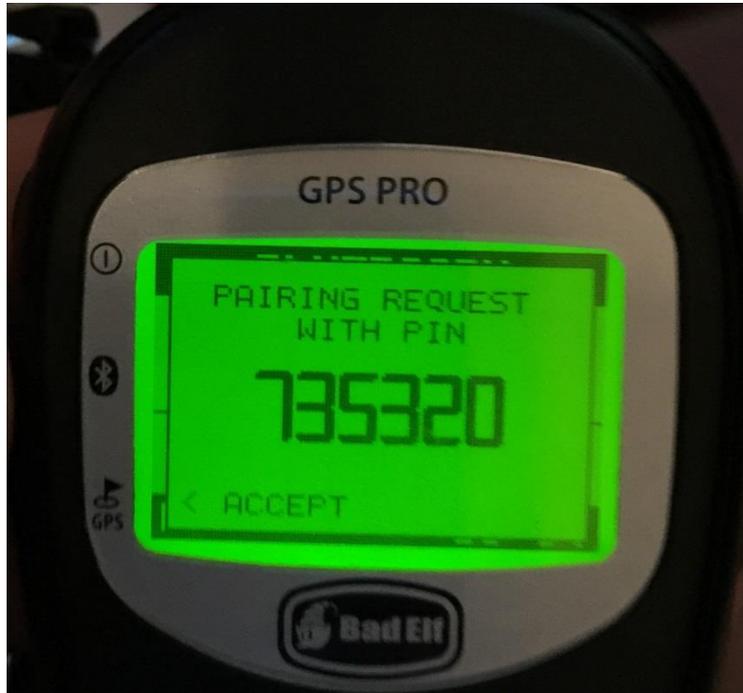


Figure 27



Figure 28

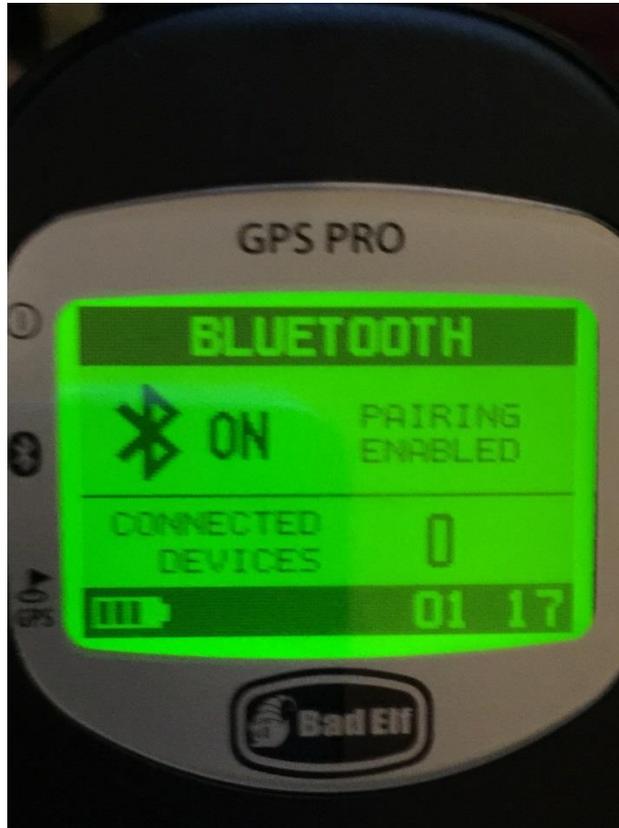


Figure 29

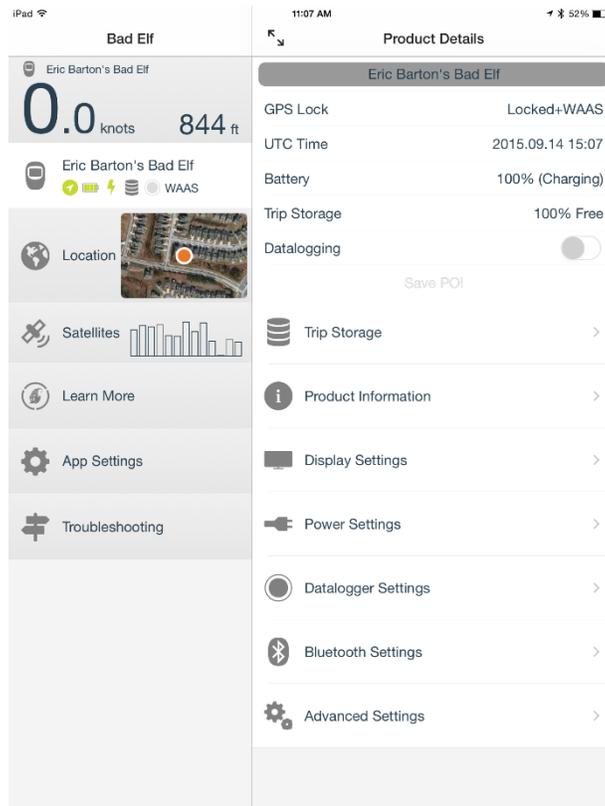


Figure 30

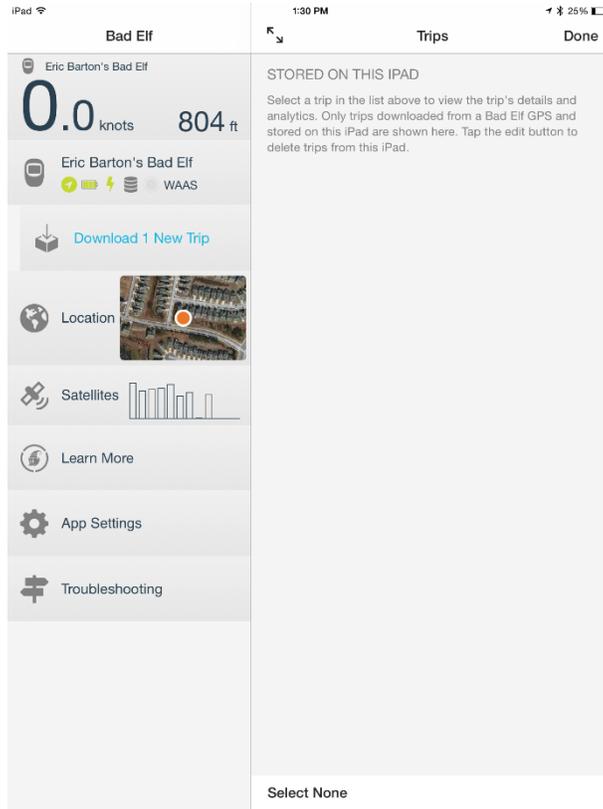


Figure 31

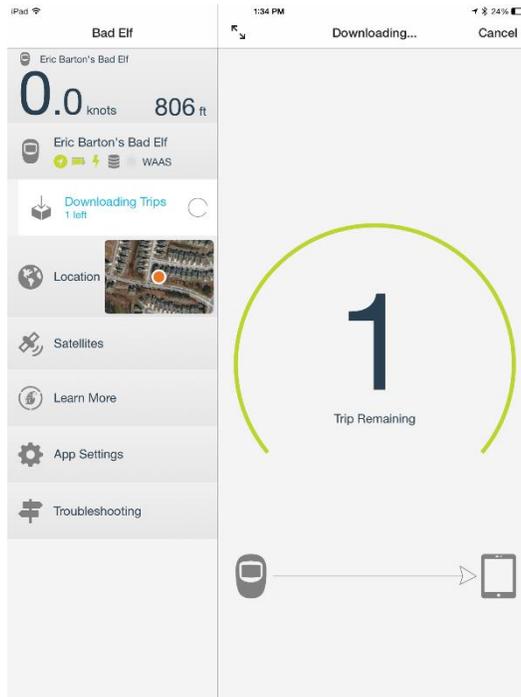
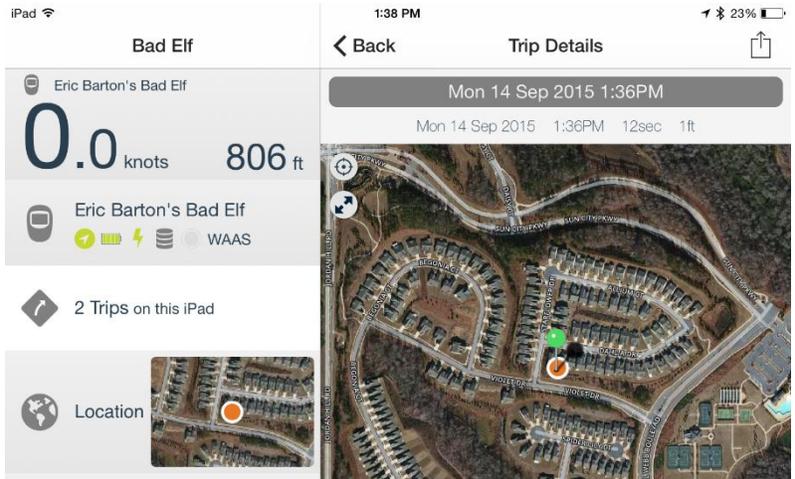


Figure 32



Scoring:

1. Bad Elf does not allow you to name the files that it sends as attachments when you export via e-mail. The Expedien scoring program requires a specific naming convention in order to read the data. Bad Elf exports 2 files, one with a .kml extension and one with a .gpx extension. Open each e-mail, download and save the .gpx file from each one to a folder of your choice. Do not worry that the file name is something unrecognizable to you.
2. Open a web browser and enter <https://nifa.aero/badelf>. You will be prompted to log into the nifa.aero website. If you do not already have a nifa.aero account, you will need to register and obtain one. Once logged in, a screen that says Bad Elf to Expedien Converter like that shown in figure 33 will appear.
3. Using the “Browse” button, select one of the .gpx files you saved in step 1, then click “Upload File.”
4. After the file is uploaded and converted, follow the instructions and right click the word “here” where indicated and then select “Save Link As”
5. The converter should return with a text file named PXXXX or SXXXX (remember the importance of the naming convention in Download/Recovery step 4? That name is what generates the text file name.)
6. Repeat steps 2-7 for each of the remaining gpx files you downloaded..
7. Run Expedien scoring as normal using the text files you just created.

Figure 33

