Your Albuquerque International Balloon Fiesta® Garmin® Dakota 10

Introduction

The 2013 Albuquerque International Balloon Fiesta ® pilot gift is a Garmin® **Dakota 10** GPS receiver. If you are not already familiar with using GPS units in flight, learning to use this unit during Fiesta may add an unnecessary distraction especially during Mass Ascension Saturday.

Some of you may already use the Garmin **Dakota 10** unit in BFA competition flights, or you may use some other GPS, or features on your cell phone or a tablet. If you are not familiar with using a GPS, I hope to give you some information on your Fiesta Garmin **Dakota 10** unit and provide you some suggestions as to how you might use it during Fiesta and flying elsewhere. I have tried to include a lot of pictures and screen shots to make it easy to become familiar with the GPS receiver.

The Garmin Dakota 10

The Garmin **Dakota 10** is a rugged, palm-sized navigation device with touchscreen navigation, a high-sensitivity GPS receiver, and is supplied with a worldwide base map. Compared to similar handheld GPS units, it has a relatively large sunlight-readable 2.6" color touchscreen display, is dust and waterproof, and shock resistant.

The **Dakota 10** has about 850 MB of internal memory for recording individual positions (waypoints), and whole paths (tracks) of where you have traveled (including your altitude).

One of the great things about this unit is that additional maps can be added to the unit. The current Fiesta PZ (prohibited zone) map has already been added to your unit.

If you remember to turn it off after each flight, it will run for about 20 hours on two AA alkaline batteries. That should be plenty for Fiesta! However, you will get even better performance if you use Lithium Ion or rechargeable Nickel metal hydride batteries.

What the Dakota 10 can do for you

There are a lot of useful things that the Dakota 10 can do for you. Some of these are even useful for ballooning! Perhaps the most useful is that during flight, it can display your position on a map of the local area. (The Fiesta unit has the 2012 PZ map already loaded on it.) In addition to the Prohibited Zones and Sensitive Areas, the Fiesta map also provides the locations of the targets and weather stations and some airspace information. When you leave Fiesta and fly in your local area, similar local information can be uploaded to your Dakota 10.

In addition to displaying the map, the Dakota 10 receiver can also display a summary of your current travel using the **Trip Computer**. The default configuration of the **Trip Computer** using the **Recreational** Profile displays your Mean Sea-Level Elevation and current speed among other things. What's really useful is that you can customize this display to have information important to you at a glance.

The Dakota 10 can also record your flight path. It will record position and elevation with a time stamp. You can then plot or review your flight path later: How close did you get to the target? What altitude did you cross the Rio Grande? What was your speed upon landing?

There are a lot of other features available on the Garmin **Dakota 10**. All of the features are accessible from the **Main Menu**; however, since there are a lot of features they have been spread across multiple screens. The features are shown above are in the default order to the right. Touch the arrow keys to move through the menu choices. In fact, the navigation is done by touching the screen where the icon is. The order of the application icons on the screens can be changed. Touch the battery and signal strength meter to see which satellites are visible as well as your horizontal accuracy (vertical accuracy is typically worse).

Additional (Pre-Fiesta) Information

If you still want to learn about your new GPS you could read the manual at the link provided in a previous Fiesta letter (http://static.garmincdn.com/pumac/Dakota_OM_EN.pdf). There is a quick start guide (http://static.garmincdn.com/pumac/Dakota_QSM_EN.pdf) available as well.

The Garmin quick start guide tells you how to:

- **Put in the batteries:** This has been done for you.
- **Set the battery mode:** This also has been done for your alkaline batteries – setting the battery type will get the optimum lifetime for that type of battery.
- **Turn it on and off:** The button is towards the top of the right hand side.
- **Adjust the screen brightness:** Tap the on/off button on the side of the case and then touch the **Plus** or **Minus**. The lightbulb will be filled to show the relative brightness you have selected.
- **Lock the screen:** Tap the on/off button and then touch **Lock Screen**.

- **Acquire GPS signals:** Go Outside and Turn it on. (Honest, it really says that!)
- **View a Map:** Turn it on and touch the map icon on the main menu. Once the map is displayed you can change the scale by touching the up and down arrows on the screen. To change position you can drag the map with your finger.

- **View the Compass:** Select the compass from main menu. You cannot calibrate the compass on the Garmin Dakota 10.
- **Additional Features:** Like:
    - Retrieving information about specific locations (not available on the supplied Fiesta map),
    - Marking your current location (a waypoint),
    - Editing and managing waypoint information (adding or changing names and data or even deleting them),
    - Using the **trip computer** (*more on that in later*),
    - Setting up navigation routes to a point (really, what intersection will you turn at?), and
    - Recording and Clearing your current track (*more on this later too*).

Garmin has training videos (http://www8.garmin.com/learningcenter/training/dakota/index.html) available on-line. You may find the first three videos useful for ballooning. I don't think you will find the other videos particularly useful, unless you use this unit for other activities, like GeoCaching.

Setting up the Dakota 10 prior to use in-flight

Before you ever get out to the field, there are a few things that you might want to do to make your **Dakota 10** unit more useful for ballooning. The batteries have already been installed and the correct battery setting has been selected. Most other settings are already properly set. However, there are still a few things that should be checked. There are also a number of things you'll want to do before each flight.

Things to set up and check before your first flight

Lanyard and Belt Clip

One of the things that the quick start manual doesn't tell you is to put the lanyard on. Insert the small loop of the lanyard through the slot on the bottom of the unit, then poke the long part of the lanyard through the exposed part of the small loop, and finally pull it through and tight. With such a long lanyard, you can make a similar loop around a basket upright, through a tank handle, or some other way that is convenient for you.

There are after-market mounts that you may wish to consider to keep the unit secure, handy, but out-of-the-way.

Fiesta also supplies a belt clip that you can slide onto the back of the unit. I think the belt clip is a little tricky to remove. Once you take the belt clip out of the package, take a look at the end away from the hinge. The back side of the belt clip has a little ridge that will fit into a slot on the back of the **Dakota 10** and hold the clip in place. Near that end is a little shoehorn-like flare. To remove the belt clip, grasp the unit firmly in one hand; pry out on the shoe horn end up with your other hand, and gently slide the clip in the direction of the shoehorn.

Calibration and corrected GPS signals

Some other GPS units have specialized altimeters, compasses and other sensors that may require calibration for the most accurate performance possible. The **Dakota 10** relies solely on GPS information so you will not need to (***and cannot***) calibrate your **Dakota 10** GPS receiver.

However, your **Dakota 10** GPS receiver has Wide Area Augmentation System (WAAS) and European Geostationary Navigation Overlay Service (EGNOS) capability. These systems augment the standard GPS signal to increase accuracy and reliability (particularly at more Northern latitudes). We have a WAAS station here in Albuquerque which will greatly increase the elevation accuracy of the **Dakota 10**.

To turn on WAAS and EGNOS, from the Main Menu, select **Setup** (the wrench), and then **System**, then **GPS** (if it says Normal or Demo), and then **WAAS/EGNOS**. You will need to touch the return and exit icons in the lower left hand corners to return **Main Menu**.

Ensure Track Recording is on

To ensure that your unit will record your track, touch the setup icon, then **Tracks**, then **Track Log**, and then **Record.**

You have two choices to record your track. You can select **Record**, and your track will be recorded but won't show up on the map. You can display the track later or download it to a computer for further

analysis. The better choice is to have the unit record the track and leave a trace of your path on the map by selecting **Record, Show On Map**. Selecting **Do Not Record** shuts off track recording until you change your preference.

Things to do before each flight

With the settings above, the Garmin **Dakota 10** will record information every time you turn it on. However, you probably want it to give you information specific to your current flight. Although there are ways of extracting portions of data for specific times, it's easiest if you set some things up prior to each flight.

Resetting the Trip Computer and Current Track

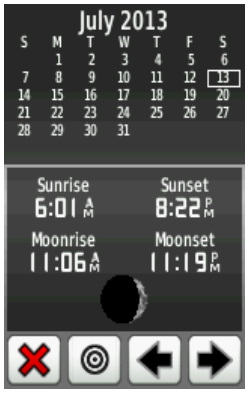
By default, the **Trip Computer** displays your current speed, average speed, maximum speed, trip odometer and other helpful information. The Dashboard on the **Trip Computer** in Recreational Profile mode displays the current mean sea-level elevation (altitude) as calculated by the GPS unit.

A Track is a recording of the path that you have traveled. This can be displayed on the current map. It can also be saved for analysis later. You should ensure that the Track recording is on (see "Ensure Track recording is on" above).

Fortunately, you can reset both the **Trip Computer** and the **Current Track** on the same page. From the **Main Menu**, touch **Setup** icon (the wrench), and then **Reset**. On this screen you will need to select **Reset Trip Data** (it will ask you to confirm it by selecting **Yes**). You will then need to select **Clear Current Track** (it will ask you to confirm it by selecting **Yes**).

Sun and Moon

Before your flight, you may want to know local sunrise or sunset time. The **Dakota 10** unit will calculate local sunrise and sunset times for your current location. However, it does not take terrain features into account. For instance, the shadow cast by Sandia Peak is not considered for the Albuquerque International Balloon Fiesta field and the **Dakota 10** will provide you with an earlier sunrise than we actually see on the Fiesta field.

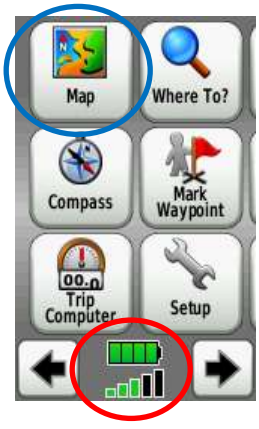


Calculator

The **Dakota 10** also has a built-in calculator accessible from the main menu. You can use this for your total your passenger weight for load calculations prior to flight. (This would work well with the AAAA weight and altitude calculator.)

Using the Dakota 10 in flight

There are several features that you might find useful in flight. But like any tool, it can be distracting, so remember that your primary task is to fly the balloon – safely. This is a general purpose GPS receiver, with features for the general public; not balloonists. Consequently, there are a number of features that may not be useful in flight. To get to useful features from the **Main Menu**, select the appropriate icon. If the icon is not visible, scroll the **Main Menu** to the right or the left by using the arrow keys on the bottom of the screen. What follows are some of the items that you may find useful in flight.



Signal Strength and Accuracy

Touching the signal strength area of the Main Menu display will bring up the constellation view and current horizontal accuracy of your unit (the vertical accuracy is typically less). The accuracy will change based on the number of visible satellites and the quality of their signals.

Map

To display the map from the **Main Menu**, select the **Map** icon. The **Map** icon feature is in the upper left hand corner of the first **Main Menu** screen.

You can change the scale (displayed at the top of the screen, identified as Zoom range on the image to the right), by touching the Zoom buttons. Please be aware that the AIBF PZ map is not available at all zoom levels.

Your current location is indicated by the blue arrow; the head is pointing in the direction, or course, you are currently traveling. To display a different location on the map, touch the map and drag your finger across the display to move the map. Touching the return arrow at the bottom left hand corner of the map will return the map to be centered about your current location.

Touching the map just once will display latitude, longitude and distance from where you are to where you touched the map. It may also display a 'map pin' at that location (which is useful if you want to save that point as a Waypoint for later reference). Some pre-programmed places on the map may have additional information that may be displayed as well. (The 2012 Fiesta Map loaded onto your Dakota 10 does not have this additional information). The map is the only place where you can drag your finger on the display.

To return to the **Main Menu**, close the map by touch the **X** icon in the lower left hand corner of the screen. If the return arrow is displayed, touch that corner until all map locations have been closed.

The way the map is displayed can be customized (see Customizing your **Dakota 10** for Ballooning). Some information on the map may have additional details you can see if you touch the screen at that feature.

Trip Computer

The **Trip Computer** displays your current speed, average speed, maximum speed, trip odometer and other helpful information. The **Dashboard** in the **Recreational Profile** displays the current mean sea-level elevation as calculated by the GPS unit, the current distance traveled, and the time to sunrise or sunset. Other profiles will display different information in the **Dashboard**.

Trip Computer

The fields in main body of the **Trip Computer** can be customized. (See Change the Trip Computer.)

Compass

The electronic **Compass** can be selected from the **Main Menu** as well. Your current direction of travel will always be at the top of the compass. If you have selected a route, the arrowhead will be pointing to your *next* destination.

There are two types of **Compass** displays (Bearing and Course), depending on how you may have set up your **Dakota 10**. The Compass display can be customized to display specific information in the dashboard at the top of the unit as well as navigation information.

Stopwatch

You can use your **Dakota 10's Stopwatch** feature to record flight time. This is also accessible from the main menu. It will record split times as well (you can use this for

length of hops, time on specific tank, etc.). It is pretty useful that leaving the stopwatch page, leaves the timer running.

Using the Dakota 10 after your flight

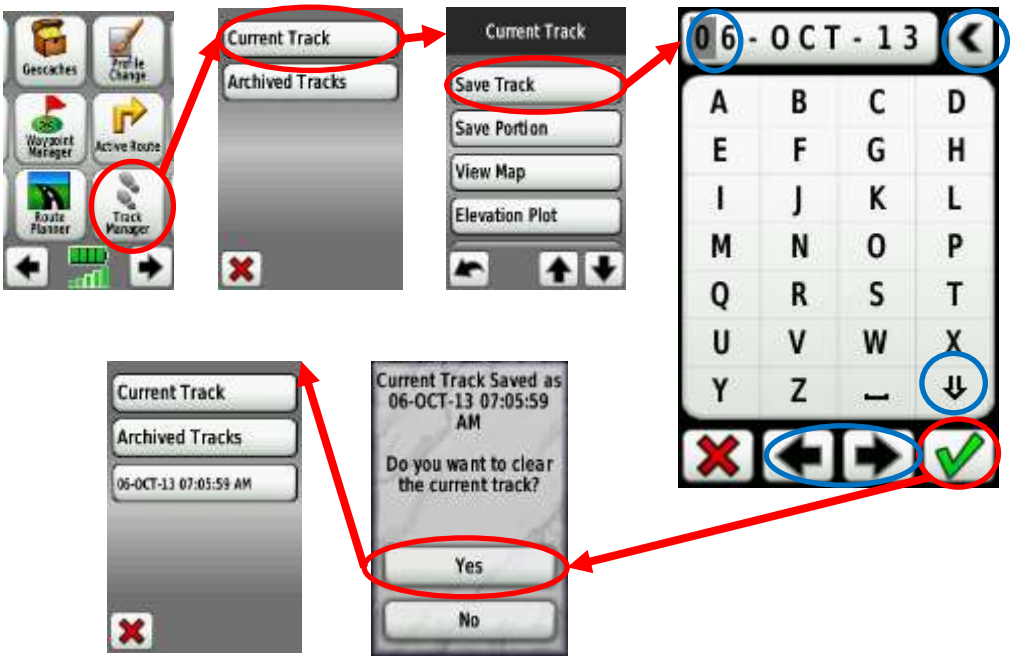
When you have safely completed your flight, you should save your current track. You can then analyze your flight later at your convenience. Depending on the data fields you have in your **Trip Computer**, you may be able to use information displayed there.

Saving your current track

Once you are done with the flight, you can save your track. This track will include position, time, and altitude information along the path you flew. To save the track from the **Main Menu**, select **Track Manager**, then **Current Track**, then **Save Track**. When you save your track you will be given the opportunity to rename the Track from the default of the date and time to something you may find more useful (e.g., Uncle Bob's Birthday Flight).

Once you've saved the track you will be asked if you want to clear the current track. I usually do and select "**Yes**." That resets the "Current Track" and leaves your recently named track as it was. But, maybe you want to record each segment or hop, then select "**No,**" and it will add to the end of the track saved so far.

Editing the path name may take some getting used to. The "<" symbol in the upper right hand corner



will delete the entire name if the 'cursor' highlight is to the extreme left; otherwise it erases the character to the left. Numbers and symbols can be found by pressing the left or right arrows at the

bottom of the screen. Lower case letters are available with the down pointing arrow above the green check mark. The green check mark will begin the save process.

Once your path has been saved, you can then connect your Dakota 10 to a computer and transfer the track file to a computer. The file will have the name you gave it (e.g., Uncle Bob's Birthday Flight) with the extension GPX.

A GPX interchange file format describing tracks, routes, and waypoints. This common file format can be used by different programs and GPS manufacturers. A GPX file is a text file in XML format. You can view it and edit it in a text editor, spreadsheet, or specialized programs. The only file name and association conflict I have found might be with Guitar Pro, which not a problem if you don't write guitar music.

Analyzing your flight path

Once a flight path has been saved as a Track, you can do a few things with it. Perhaps the most useful is to view it on a map. If you have multiple Tracks displayed, you can assign a color to each Track.

Another of the available tools is the ability to review the elevation plot profile of your flight path (Track). You can touch any point on the profile line to display time, date and elevation at that point. On the side and bottom of the elevation plot, there will be a scale showing the distance between the horizontal and vertical lines of the grid. You can touch these scales to change how much of your profile is shown. However, it will not give you altitude above the local terrain.

Extreme Values

After the flight, you can look at the **Trip Computer**. Depending on how you have customized your display, you can find your maximum speed and the amount of time that you were moving, and the total time for that flight. Unfortunately, there is no maximum altitude field in the **Dakota 10 Trip Computer**. For that, you will need to use separate analysis tools as described in either of the Analyzing your flight sections.

You can reconfigure the **Trip Computer** to have it show the most appropriate information you consider useful for ballooning. The data at the top of the **Trip Computer** is based on the **Trip Computer** profile, which is not the same as your personal settings profile. I find Recreational Dashboard seems to have the most useful information; but you can use any of the others you find suitable and even change the individual data fields to meet your needs. Customizing the **Trip Computer** is described later in this document.

Analyzing your flight (Using BaseCamp)

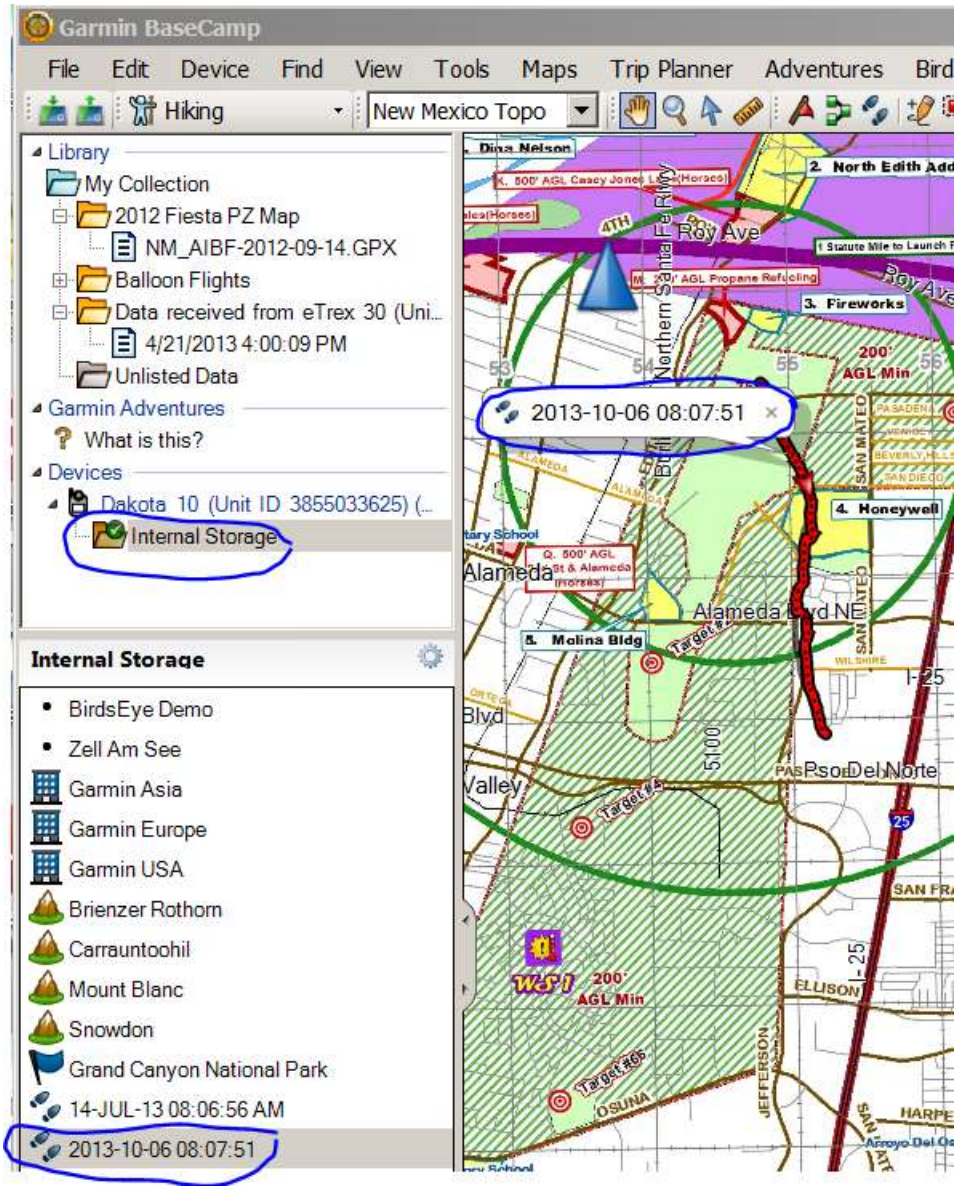
There are a couple ways you can take a look at your flight data. The easiest is to use Garmin's BaseCamp program. BaseCamp is a Garmin program that communicates directly with your Dakota 10 device. It can automatically download and display tracks and waypoints. It is available from Garmin as a free download (http://www.garmin.com/en-US/shop/downloads/basecamp). It also allows users to plan and manage trips, routes, tracks, and waypoints between the computer and compatible devices. One of the most important features is that it also detects and provides updates for the **Dakota 10**'s operating

system and maps you have update subscriptions to. (Some of the Garmin supplied maps have a life-time update. Some Garmin maps are the "current version" only and you will need to purchase updates to these separately.)

According to Garmin, the BaseCamp program can:

- Display some topographic maps in 2D or 3D renderings with elevation profile
- Rotate maps to any orientation
- Support geotagged photos and geocaching.
- Compatible with Google Earth
- Print full page color maps

Installing the BaseCamp software is pretty typical. Go to the Garmin link above and follow the directions for your computer. The only file conflict I have found is with **Guitar Pro 6** – I would not anticipate any other conflicts using the program.



Although there is no BaseCamp manual, Garmin provides training videos at the following link: http://www8.garmin.com/learningcenter/training/basecamp/index.html. The second video is pretty close to what we are doing here (except for turning a path into a route). The Organizing Data might be useful for ballooning, but I don't think the other tutorials are useful at all.

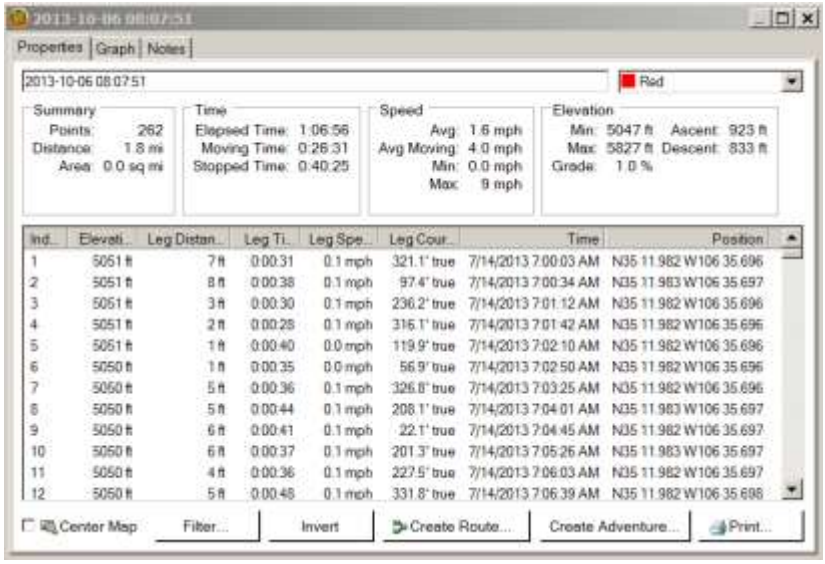
A few moments after you plug your **Dakota 10** into the computer and start the BaseCamp program, the device will be recognized. There are

three windows in BaseCamp. The largest is the map (this one is showing an uploaded Fiesta 2012 PZ map which must be transferred to the BaseCamp program). The top left window shows devices and libraries. The bottom left window shows a detailed listing of the selected item from the upper left window.

The **Dakota 10** is shown in the devices near the bottom of the top left window. In the bottom window you can see the items in the Internal Storage of the **Dakota 10** unit.

The name of the track is shown on the map as a speech bubble associated with the specific track in the map window. The default BaseCamp map is not as detailed as I would like. However, you can copy maps from your **Dakota 10** device into BaseCamp or from BaseCamp onto your GPS device. This is how you can load your local flying area topography maps into your device after Fiesta.

Double-clicking on the title bubble or the name of the saved track in the lower left window brings up the details of your flight path, as shown below. You can analyze and manipulate your flight path on this.



You are able to edit individual track points. For instance, if your crew chief turned on the **Dakota 10** unit early, you may have 20 minutes of nearly stationary time on the unit before your flight began; these points can be eliminated by selecting them and deleting them. The data shown here indicates that this was probably the case for this flight track. Also, check that the track points define are all recorded on the same day.

Also notice the summary information at the top of the pop-up window. You can see the length of the flight, maximum altitude, and average and maximum speeds. These may be useful things to record in your log book.

If you click the graph tab it will bring up the plot shown in the second window below. For this flight it shows the MSL altitude in green, and the speed (in miles per hour) in blue with respect to straight line distance from the launch site.

The elevation profile describes the mean sea level elevation, not the altitude above the local terrain. The terrain plot can give you an idea of your altitude hold skills.

Back on the Properties tab, there is a Print button at the bottom right so that you can print the current path. Be careful! Check the settings. Unless you change things, the program will print out EVERY track point and there will be hundreds!!

The BaseCamp program has some other great features; like updating your device (if you need it), transferring maps, and archiving flight paths as tracks. Unfortunately, the ability to analyze your flight is a little bit limited. For more detailed analysis, consider saving your flight path track file and using other tools.

Analyzing your flight (Using Windows and GPS Visualizer Web site)

In addition to using Garmin's Base Camp program; you could save the flight path file and use other more sophisticated tools to perform the analysis or plotting. This part of the document describes how to save the file to your personal computer and then use the GPS Visualizer web site to look at your flight path or profile. There are other tools available.

Saving your flight path to a computer

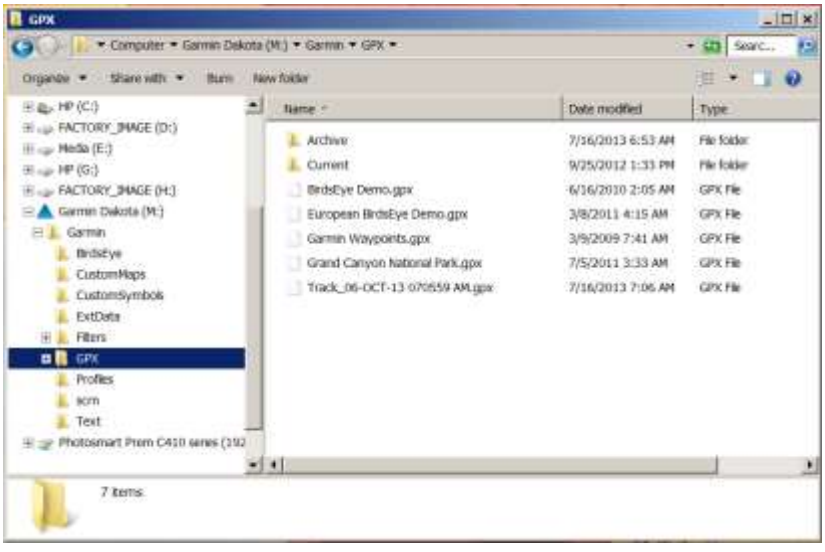
Saving your flight path data file is pretty straightforward: plug the Dakota 10 into your computer, find the track file, and then copy it to your computer. Here's how to do it:

- Using the cable provided, plug the small plug[1] into the Dakota 10 receiver. It doesn't matter if the receiver is off or on, but I leave it off. You don't have to remove the belt clip from the back (although it might be a little awkward if you have large fingers).
- Plug the flat USB plug[2] into your computer's USB port.
- Wait while your computer recognizes the receiver as a USB storage drive. Like many USB devices, you may need to install drivers, accept or decline to reformat the unit and so on.
- Once the unit is recognized as a drive, open the folder and navigate to where the GPX files are stored. Copy the ".GPX" file to your computer.

Here is what it looks like on my computer running Windows 7.

You are looking for the GPX sub-directory under the Garmin directory under the removable device.

Now copy the GPX file to some favorite location on your computer for further analysis. The desktop is a



[1] USB Type mini B male connector
[2] USB Type A male connector

handy place, the installation of BaseCamp created a MyGarmin directory, or you may have a directory where you keep your pictures and records for individual flights.

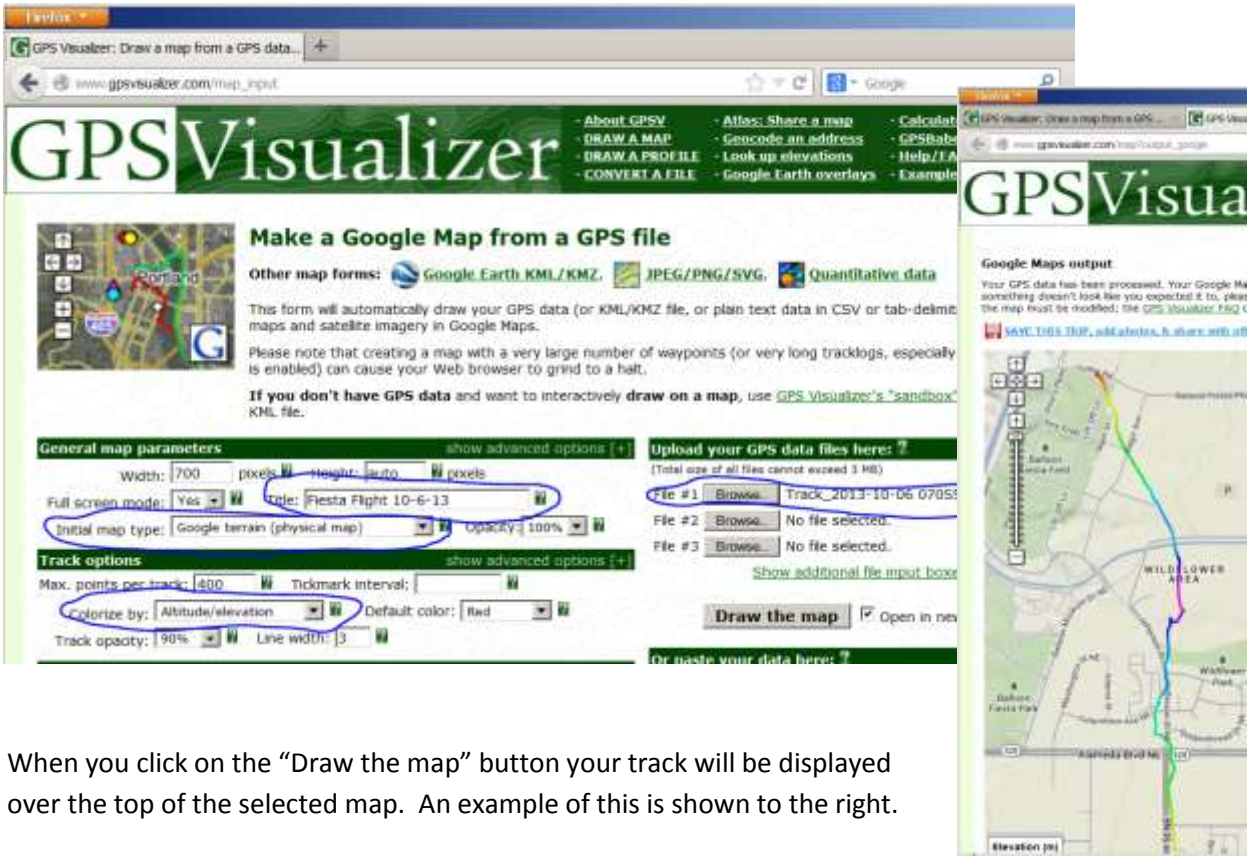
Analyzing your flight path using GPS Visualizer

Now that you have the flight data, the next step is to analyze the flight. Although there are plenty of tools and web sites to do this, one excellent web site is GPS Visualizer. You can upload your ".GPX" file to http://www.gpsvisualizer.com/ to plot the track and vertical profile.

Mapping

- On the main page, select DRAW A MAP

- Select the following options on the Draw a map page:
  - Title the Map (e.g., Flight from Fiesta Field)
  - Set Initial Map type (My best results are with Google Terrain physical map)
  - Set Colorize by (Altitude/Elevation, and Speed are the two I find most useful)
  - Select Browse button to the load GPX file you copied to your computer.
  - Click on Draw the Map button to see the map (it will take a few moments)



When you click on the "Draw the map" button your track will be displayed over the top of the selected map. An example of this is shown to the right.

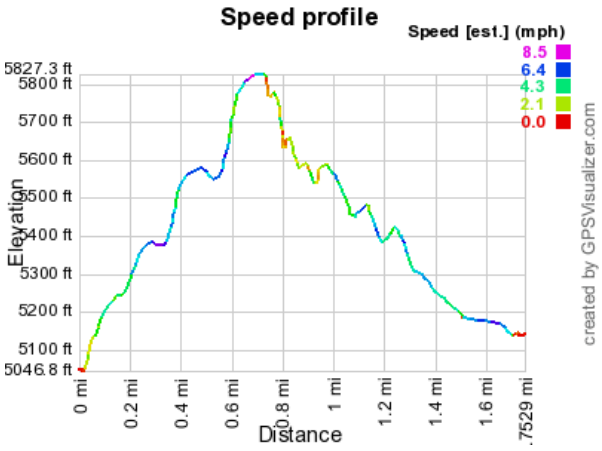
You can easily experiment with different colorization schemes. You may also find that you need to 'clean up' your track file because it may contain extra track data (Did you remember to clear the current track after you saved it?).

You may find selecting the JPEG/PNG/SVG link provides better map images and more flexible analysis. Unit conversions into feet and miles per hour are possible with the image-based maps. Although the Google terrain map is not available in that when making images, I have had reasonable results using the US: DEMIS street-level map. Like the general mapping tab, approach you can also change colorization parameter to other interesting values, like speed.

In either case, once the map has been created, you can save it. Use the download link. If you select the SAVE THIS TRIP link, you will be re-directed to another web site (Every Trail) which is aimed at hikers or other terrestrial bound adventurers.

Elevation Plots

In addition to plotting your path and looking at your speed or altitude or other factors along your path, another interesting analysis tool that you can use is the Profile feature. Using this technique, you can plot altitude versus distance or time from the take-off point, and analyze it on a number of parameters. A plot of altitude versus distance from take-off point with color for speed at location might look like the image to the right.



You can use this plot to evaluate your skills on maintaining a specific altitude. Note: this does not show terrain elevation, so you do not know your AGL altitude. As with the map, this plot can be saved as an image for later reference.

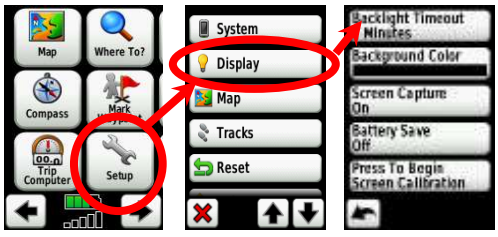
Customizing your Dakota 10

There are a few things that you can do to make your Garmin **Dakota 10** especially useful.

Display Behavior

Mentioned in the Quick Start Reference was that the lock screen and brightness are accessible by a short press of the power on/off button on the side of the case.

One of the slightly annoying features I have found is that the display will blank to save battery life. During the flight, I'd rather have the screen stay as visible as possible for as long as possible. The amount of time the screen is illuminated is controlled in the **Display** section



of the **setup** feature.

On the **Display** setup page you can also set the background to be black – this is supposed to provide a slight performance increase with LCD driven displays. You can also toggle the **Battery Save** option **off** and **on**, trading battery life for display readability.

The screen capture feature is also controlled from this page. When you turn it on, any subsequent press of the on/off button on the side of the case will save a picture to the `Garmin\scrn` directory. (This is how I made the images for this document.) This feature resets itself to **Off** every time you turn the **Dakota 10** off. Perhaps this is to avoid conflict with the lock screen and brightness menu which is also activated when you quickly press and release the power button on the side of the case.

Startup.txt

Another very important thing you should consider is changing the **`startup.txt`** file in the Garmin directory on your Dakota 10 receiver. You should put your name and/or contact information in the startup file. That will give the honest person a chance to be able to contact you if you should lose your Dakota 10 receiver. You must have the startup screen pause for a while so that information can be displayed (sorry, this will increase the amount of time required to start using the Dakota 10 once you power it up). An example of a modified **`startup.txt`** file is shown here:

```
<!-- Edit this file to display a message while your unit is powering on               -->
<!-- Allow one full power cycle after editing for your message to be updated          -->

<!-- Set the display number to the minimum number of seconds your message is displayed -->
<display = 6>

<!-- Type your message on the next line -->
If found, please call or text
1+505-555-1212
```

Connecting the **Dakota 10** to your computer to transfer files is covered in Saving your Flight path to a computer.

Disabling unneeded maps

There are a lot of maps provided on your Dakota 10 that are neither necessary nor all that useful for ballooning in the United States. These can be disabled or removed. Disabling them may improve startup and search times. Deleting them may free up memory on the receiver.

To disable a map, go to the **Setup Page -> Maps -> Map Information, Select Map**. On this page you can use up and down arrows to select maps. Once you select a map, you can disable it. That does not delete the map; but it may speed up startup, load, and search performances. Consider disabling the following maps:

- BirdsEye Select Kompass Switzerland
- BirdsEye Select EIRE (Ireland)
- BirdsEye Select Great Britain
- BirdsEye Select Kompass Austria + East Alps

There may be others that you can disable as well. You can reactivate these maps on your unit at any time by going through the same sequence, selecting the map, and then enabling it.

Contact Garmin regarding deleting maps from the device.

Loading new Maps

Unfortunately, the details on the Garmin provided US maps are limited to interstate and major US highways. Much more detailed maps are available for purchase directly from Garmin (http://www.garmin.com/en-US/maps-accessories/), through third party sources (e.g., GPS City www.gpscity.com or GPS Store www.thegpsstore.com, etc.), or from public sources (I use GPS File Depot www.gpsfiledepot.com and encourage a donation if you use their maps).

The commercially available maps are easy to load into the BaseCamp software and then to your device. The instructions are clear and complete for the free topography maps from GPS File Depot. Other than saying it can be done, I will not go further here.

The **Dakota 10** can be used in the chase truck as well. Turn-by-Turn road routing is available on optional (separately purchased) maps. However, audible instructions are not available on the **Dakota 10**. Maps with the routing information are available from commercial sources.

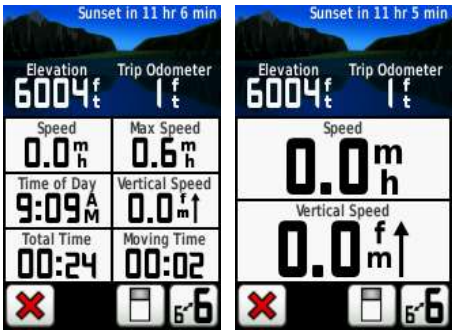
Change the Trip Computer

As you saw earlier, the **trip computer** has a bunch of information displayed on it. Every field in the lower part (below the Dashboard) can be configured. The different **Trip Computer** profiles control which Dashboard data and format is displayed. It would be nice if the **Dashboard** (the top of the display) could be modified, but you're stuck with whatever that **Trip Computer** profile provides. However the subsequent data fields can have any six of the data fields below (with my favorite fields highlighted):

- Accuracy of GPS
- Battery Level
- Bearing
- Course
- Distance to Destination
- Distance to Next
- Elevation
- ETA at Destination
- ETA at Next
- Glide Ratio
- Glide Ratio to Destination
- GPS Signal Strength
- Heading
- Location (Lat/Long)
- Odometer
- Off Course
- Pointer
- Speed

- Speed – Maximum
- Speed – Moving Average
- Speed – Overall Average
- Sunrise
- Sunset
- Time of Day
- Time to Destination
- Time to Next
- To Course
- Trip Odometer
- Trip Time – Moving
- Trip Time – Stopped
- Trip Time – Total
- Turn
- Velocity Made Good
- Vertical Speed to Destination
- Vertical Speed
- Waypoint Destination
- Waypoint at Next

To change a data field; bring up the **Trip Computer**, touch the data field you wish to change, and select the data field from the above list. You will now want to save your profile if you wish to keep this configuration. (See ***Setting Profiles***)



You can do the same for the large number version (bottom right hand corner of the display). My **Trip Computer** displays are current set as shown. You may find a better arrangement.

Change the Main Menu order

You will use some of the applications and features more than others. It is possible to move the ones that you will use the most to the first of the main menu pages. To change the order start with the **Setup**, scroll through the menu choices until you can select **Main Menu**. Once you have selected the main menu, you will see all the features of the main menu. Scroll through the menu functions until you see the one you want to move to the front. Select that menu choice (it will turn blue), use the arrow key to move to the page you want, and select the feature you wish to replace (they will swap places).

You can delete items as well. After being deleted, they will show up as grey icons on the last page of menu items. You can put them back into the menu sequence at any time.

I recommend keeping the following features on the first main menu screen.

- Map
- Setup, and
- Trip Computer

Other features you might consider to move up in the sequence include:

- Track Manager
- Compass
- Stopwatch
- Calculator
- Calendar
- Mark Waypoint
- Waypoint Manager
- Sun and Moon rise
- Profile Change

My menu page sequence currently looks like this:

Setting Profiles

Profiles are collections of settings (data fields, units of measurement, etc.) that apply to specific uses of your GPS receiver (automotive, recreational, etc.). These can be set up so that you do not have to change multiple settings.

Initially, the profile most useful for ballooning is the "Recreational" profile. However, this is not perfect – we needed to ensure that Track Recording and the WAAS feature was enabled and probably customized the Trip Computer and maybe some other features. Although you could save the Recreational profile, you could also create a Ballooning profile. **Main Menu -> Setup -> Profile -> <Create New Profile>** (which is at the very bottom of the list). It will save the current profile. And then you can rename the profile, by selecting the new profile (probably called Profile 6 or something like that) and then editing the name. I have named it **Ballooning**. You can also move the profile up the list by selecting the profile name and then selecting Move Up.

Unfortunately, these modified profiles do not modify the dashboard for the **Trip Computer**.

If you make changes to your profile that you'd like to save; Go to the profile menu on the main menu and select the name of your current profile. It will update the current profile and then re-load it.

Limitations

Although the **Dakota 10** is a good GPS Receiver, it has some drawbacks. Here are my concerns (not necessarily in any particular order):

The display is small. Many phones have displays that are twice to three times as large. (On the other hand, the **Dakota 10** has half again as large a display as the Garmin **eTrex 30** GPS receiver I use.)

The default maps do not provide turn-by-turn routing. Unfortunately, those maps are not free. This makes the **Dakota 10** of limited use in a chase truck trying to get to a specific location, like driving to where the balloon has landed.

When the accuracy is displayed, only the horizontal accuracy is considered. The vertical accuracy is typically less accurate than the horizontal accuracy. Although Garmin makes other units for flight with much higher vertical position accuracy, these are considerably more expensive and even less appropriate for Ballooning than the **Dakota 10**. However, the vertical (and therefore overall) accuracy can be increased with an accurately set barometric altimeter. Unfortunately, since the altimeter sensor can be 'spoofed' to provide incorrect readings, units with this capability are not appropriate for competition. Also, remember that the GPS is recording MSL elevation and not height above ground.

The list of data available on the **Trip Computer** is not as complete as other Garmin GPS units. For example the Garmin **eTrex 30** has a Maximum Elevation. Sink-rate and an audible alarm warning would be really useful.

In addition to an altimeter, other sensors that would enhance the utility of this unit would include a thermometer and an electronic compass. The ability to use the Russian GLONASS (if they can keep from blowing up replacement satellites), the Chinese COMPASS, or the European Galileo (once it becomes operational) would greatly enhance accuracy and usability.

Although not a problem with the GPS unit, the provided Fiesta map does not have proximity alerts. Typically proximity alerts may be made for school zones or other areas where additional caution should be exercised and your speed monitored closely. These are very much like standard waypoints or points of interest, but allow the GPS receiver unit to give you fair warning you are nearing such a place. Proximity alerts and audible alarms for PZs would be a good thing.

Further Information

Garmin Dakota 10 Quick Start Guide: http://static.garmincdn.com/pumac/Dakota_QSM_EN.pdf

Garmin Dakota 10 User Manual: http://static.garmincdn.com/pumac/Dakota_OM_EN.pdf

Garmin GPS Training Videos: http://www8.garmin.com/learningcenter/training/dakota/index.html

Garmin BaseCamp: http://www.garmin.com/en-US/shop/downloads/basecamp

Garmin BaseCamp Training Videos: http://www8.garmin.com/learningcenter/training/basecamp/index.html

GPS Visualizer:	http://www.gpsvisualizer.com/
Garmin Maps:	http://www.garmin.com/en-US/maps-accessories/
GPS City (GPSs and Maps):	www.gpscity.com
GPS Store (GPSs and Maps):	www.thegpsstore.com
GPS File Depot (Maps):	www.gpsfiledepot.com
How a GPS works:	www.physics.org/article-questions.asp?id=55
GPX File Format:	http://www.topografix.com/gpx.asp