

# Tracking Technology

By Chuck Shultz

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## ***Part 3 – Bringing It Together***

What if we could take the two technologies I've talked about so far (HD Video and GPS) and put them together? The ideal way to do that is similar to the technology used on football game broadcasts. They superimpose a yellow line across the screen to highlight the marker for the first down. They can do this because they know the exact position of the camera, the exact direction the camera is oriented in, and exactly where the ground is.

It would nice if some day we had a unit that combines the hi-def camera image with a GPS with a resolution down to the inches, rather than 30 feet. The unit would record video, synchronized with data that describes the position and orientation of the camera. Combine all of that with details about the surface, and it should be possible to superimpose the line of the track onto the video.

## ***Until Then...***

Well, given that we don't have that technology at hand (at least, not yet), the next best way to display what we've gathered on camera and from the GPS would be in two windows – one for the video and a separate one for the track. I'm thinking of writing such a PC program; let's call it the *Tracking Organizer*. Its job would be to:

- Read in and play video files,
- Read in the GPS files to make a Track Map, and display them in a window over top of the terrain. Three dimensional terrain maps are available from the Jet Propulsion Laboratory website ( <http://onearth.jpl.nasa.gov/> ).
- Play the video in sync with an icon that moves across the dog's track map showing the dog's position,
- Collect and display notes about each track, and
- Create web pages using the track map and notes.

I've shown a user interface for such a program in the picture below: On the left is a menu bar, video player and player controls, on the right is the track map, track notes and file notes.



A couple of other things this program should be able to do.

- Provide an easy way to synchronize points on the video with points on the track map.
- Provide a way to edit the tracks (or portions of tracks) on the track map to compensate for the 30 foot accuracy of the *ForeRunner*.
- Provide a way to zoom in and out of the video and the track map.
- Provide a way to adjust the viewing angles of the 3-D track map.
- Allow icons to be placed on the Track Map, such as *flags*, *articles*, *food drops* and *notes*.
- When reaching a *notes* icon on the track, pop up the notes. Similarly, highlight *flags*, *articles* and *food drops* when the dog reaches those items.
- Click on a spot on the Track Map and the video will jump to that point. Similarly, go forward or backward on the video controls and the Track map icon moves with it.
- Make the windows sizeable.
- Provide reports of the number of tracks run, distances covered, averages, all the things a tracker needs to see. Be able to associate different dogs with different tracks and get reports by dog.

This program could perform another useful task, it could create DVDs or BluRay disks of the tracks. Not only could it use the video captured while running the track, but it should also be possible to create an insert on the video of the track map, again showing an icon move across the track that represents the dog's position in sync with the video.

DVDs have a feature called alternate angle, which allow a different view of the same action. Using this feature, it should be possible to make the map optional, such that sometimes you could play the DVD with just the video, other times you could play it with the moving track map displayed.



### ***It Pays to Accessorize***

An interesting thing about the *ForeRunner 305* is that it comes with a heart rate monitor that straps around the jogger's/cyclist's chest. The monitor wirelessly transmits the wearer's pulse to the *ForeRunner*, so that it can be displayed later on the *Garmin Training Center* software.

For tracking, I envision a meter that would attach to the lead and read how much tension is on the lead. The meter would wirelessly transmit its readings to the *ForeRunner*, using the same techniques as their heart rate monitor. In turn, the software I described above could color code the track map to show when the dog or handler was pulling and when the lead was relaxed. What would be even more helpful would be a way to differentiate between tension created by the dog and that by the handler.

By using these numbers, the software could compute what percent of the time the dog is pulling nearby and in the same direction as the track. And it could count maybe how many corrections you issued on-track. What would be useful would be a reliable measurement of how the dog is doing.

With some study of these results in real tracking situations, I believe the program could be set up to recommend training tips, based on the nature of the dog's movements over the track. It could recommend, say, more food drops, or exercises designed to improve starts or turns. This kind of feedback could make the program very useful to trackers, especially ones who have to train on their own.