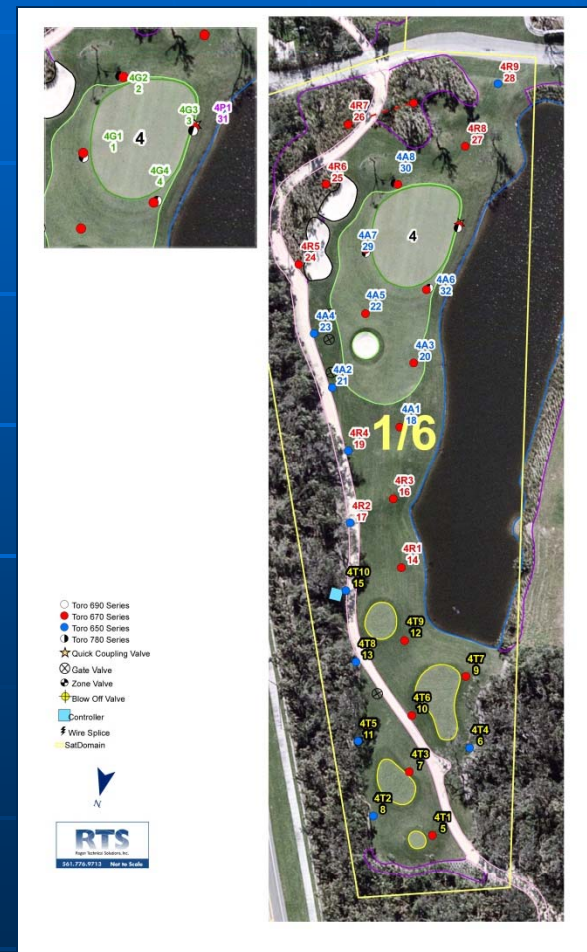


Chart Your Course: Guidelines for GPS Mapping

Dave Ragan

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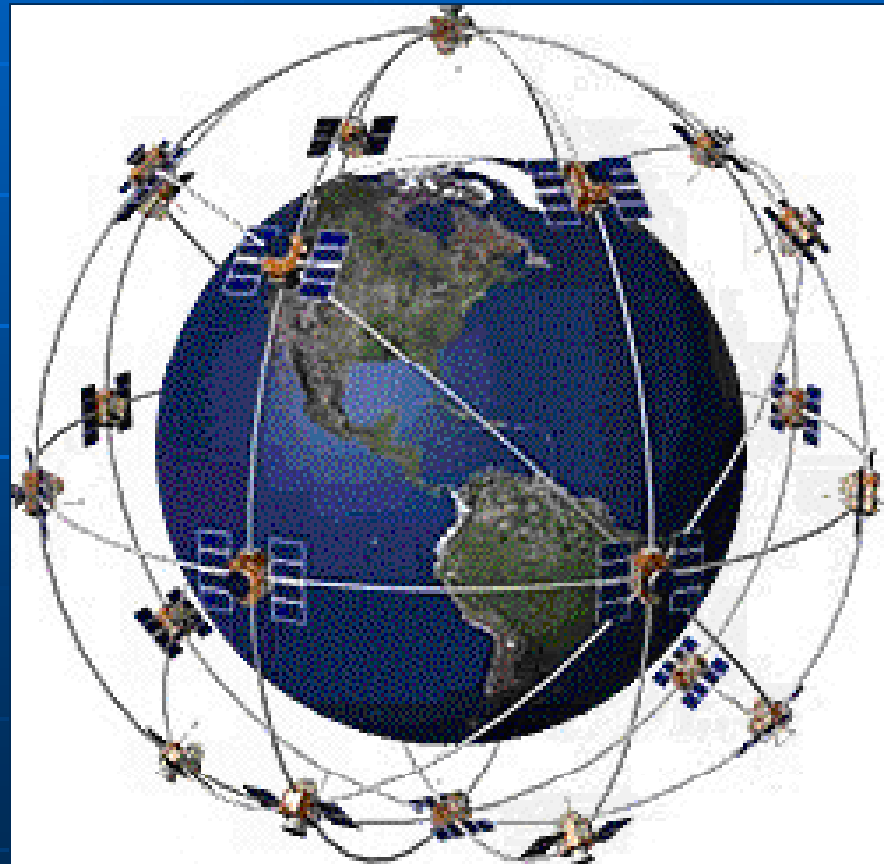
www.ragantechnical.com



GPS – What is it?

Combination of:

- Orbiting satellites



GPS – What is it?

Combination of:

- Orbiting satellites
- Ground-based stations



GPS Facility in Napa, California

GPS – What is it?

Combination of:

- Orbiting satellites
- Ground-based stations
- A Receiver and Software



Receivers and Accuracy

- Survey Grade
 - Sub-centimeter accuracy in horizontal and vertical planes
 - \$45,000+ for equipment and software
 - Required for topography mapping and grading and drainage control
 - Interpretation of data requires sophisticated software



Receivers and Accuracy

- Mapping Grade
 - Sub-meter accuracy in horizontal plane
 - \$6,000+ for equipment and software
 - Suitable for feature and irrigation mapping
 - Interpretation of data requires semi-sophisticated software



Receivers and Accuracy

- Recreational Grade
 - 5 to 15 meter accuracy in horizontal plane
 - \$100+ for equipment
 - Suitable for "location-based services"
 - Software is primarily used as a viewer
- Category also now includes GPS enabled smartphones and tablets

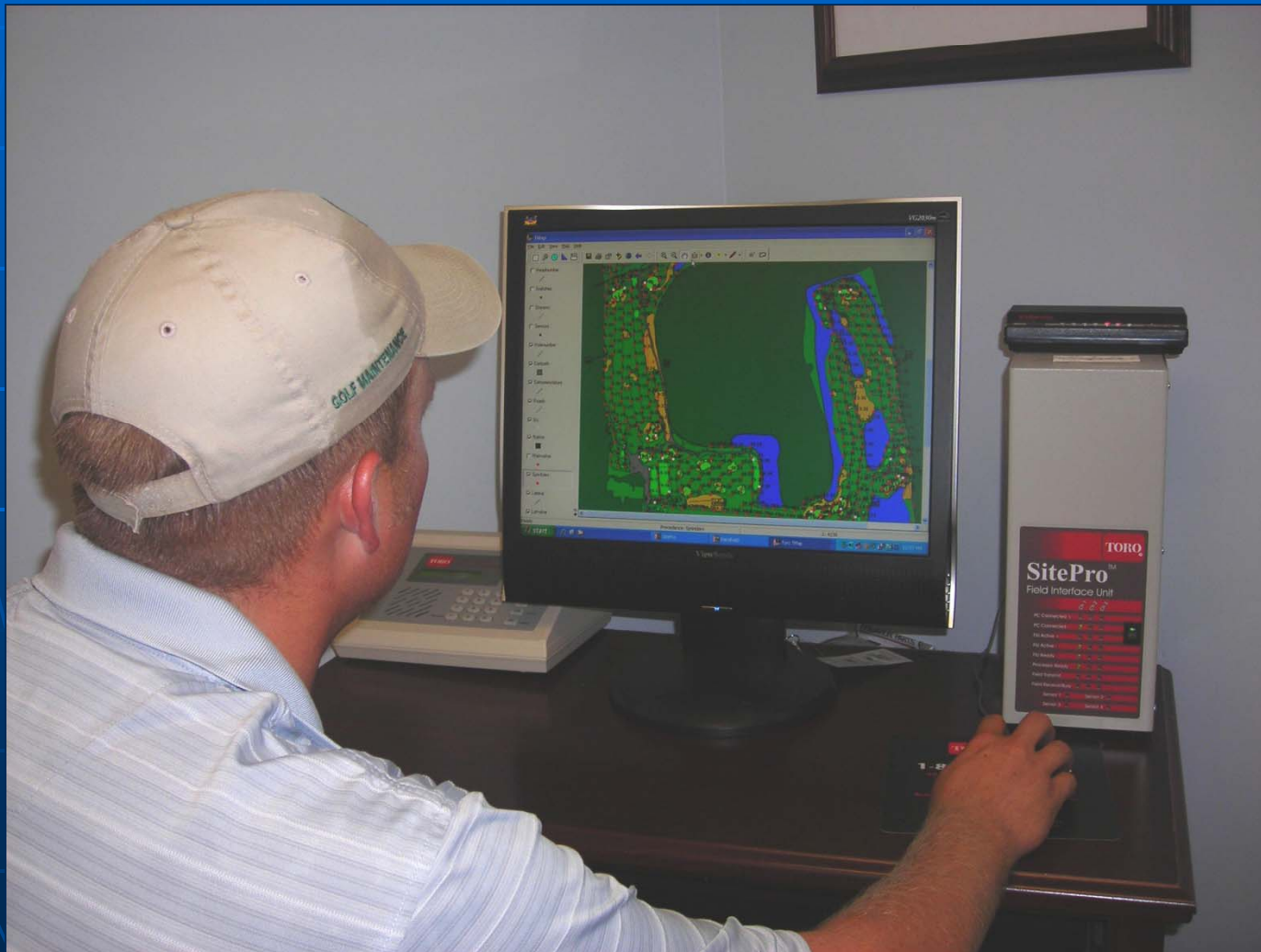


GPS – Can you own it?

- Survey Grade
 - \$45,000+
- Mapping Grade
 - \$6,000+
- Recreational Grade
 - Your smartphone or tablet!



Utilizing the GPS data you already have... your central control software map



Utilizing the GPS data that you already have... your central control software map

■ What is a shapefile?

- A universal map file format used in the Geographic Information Systems (GIS) and survey industries
- A mini “database” attached to a point, line, or polygon feature
- Consists of 3 to 7 separate files with an identical prefix name
 - Sprinklers.shp
 - Sprinklers.sbn
 - Sprinklers.dbf
- Designed for use with Windows PCs only

Utilizing the GPS data that you already have... your central control software map

- What is a projection file?
 - A file that describes which coordinate system a shapefile is using
 - Sprinklers.prj
 - There are hundreds of coordinate systems in use worldwide
 - Most U.S. and Canadian data is in NAD83 (North American Datum of 1983), in either feet or meters
 - All U.S. states have one or more NAD83 state projections, i.e. Florida East Feet. These are commonly known as "State Planes"

Utilizing the GPS data that you already have... your central control software map

■ What is an aerial survey?

- It is always taken “straight down” to the earth
- It has been “surveyed,” establishing its proper location on the earth in a selected projection
- Consists of 2 or 3 separate files with an identical prefix name, which includes a .tfw “world file”
 - Aerial.tif
 - Aerial.tfw
 - Aerial.prj
- Resolution quality described by “Ground Pixel Measurement,” i.e. feet/pixel or meters/pixel

“Oblique” Aerial Photo



“Ortho” Aerial Survey



Utilizing the GPS data that you already have... your central control software map

- Can I take my map to the course? Yes, but with limitations and 5 to 15 meter accuracy
 - Google Earth Mobile – Free!
 - Must convert your shapefiles to Google's .kml format
 - Uses Google's aerial imagery
 - You can set up a server link to your .kml files so your entire club staff can have access
 - iGIS - \$20 from iTunes store
 - Automatically converts shapefiles to iGIS format through a wi-fi connection to the host
 - Uses Google's aerial imagery
 - Allows you to sync location-based comments back to the host

Utilizing the GPS data that you already have... your central control software map

- Am I able to edit my maps on the course...
 - with my smartphone or tablet?
 - Not easily done at this time
 - Shapefiles are dependent on software tools found only in Windows PC operating systems
 - 5 to 15 meters is unacceptable for mapping pipe, valves, etc.
 - with a Mapping Grade GPS receiver?
 - Yes, with proper training and controls on data management
 - Have a knowledgeable shapefile and central control software expert on your team
 - Consider ArcPad as a low-cost and user-friendly software tool
 - Submeter accuracy is effective for mapping pipe, valves, etc.

Questions?

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