



# Compliance Component

## DEFINITION

<i>Name</i>	Global Positioning Systems (GPS)– Mapping Grade Receivers
<i>Description</i>	<p>Mapping Grade GPS receivers are recommended for agencies to collect data that will or may be used in a geographic information system (GIS) for mapping or analysis purposes. Mapping GPS receivers capture data of higher positional accuracy than recreational units and have post-processing differential correction capabilities. Mapping grade GPS equipment ranges from stand-alone handheld and backpack systems to hard-mounted receivers incorporated within other collecting or tracking equipment (i.e. automated vehicle location (AVL)). The more expensive mapping grade receivers are designed to collect and store large volumes of data, be used in extreme environmental conditions, and perform real-time differential correction of data.</p> <p>This guidance document is one of three such documents to help agencies and their staff evaluate the type of GPS receiver to use to collect feature location data. It presents several major issues to consider when comparing and ultimately selecting an appropriate GPS system.</p>
<i>Rationale</i>	<p>A program intending to collect the locations of real-world features must choose a receiver capable of capturing data that adequately support its business needs. The program's resources (i.e. staff, hardware, software) must also be sufficient to support the use and maintenance of the selected data collection system. Therefore, choosing the right data collection system for a specific project requires serious consideration of the following:</p> <ul style="list-style-type: none"> <li>• Anticipated uses of the feature location and attribute data to be collected</li> <li>• Program data accuracy requirements for the data to be collected</li> <li>• Available program resources to support data collection and processing activities</li> <li>• Type, number, and other characteristics of features to be located</li> <li>• Characteristics (e.g. rural vs. urban, remote vs. nearby) of the data collection site</li> <li>• The need to identify and use existing feature location or attribute data</li> <li>• The need to identify and use existing data collection procedures or standards</li> <li>• Type of feature attribute data to be collected</li> <li>• How the features to be located will be represented (e.g. points, lines, or areas)</li> </ul>
<i>Benefits</i>	<p>GPS data are used for many different resource / asset inventory, management, and tracking purposes. The benefits of using GPS to collect feature locations and attributes in the field include:</p> <ul style="list-style-type: none"> <li>• Capture more accurate field data for mapping and analysis</li> <li>• Collection of vertical data</li> <li>• Locate features not identifiable on maps, photographs, or other 'base' sources</li> <li>• Increase the efficiency of field data collection</li> <li>• Navigate to a site or feature of interest</li> </ul>

## ASSOCIATED ARCHITECTURE LEVELS

<i>Specify the Domain Name</i>	Information
<i>Specify the Discipline Name</i>	Geospatial Information Technology

<i>Specify the Technology Area Name</i>	Global Positioning System (GPS)
<i>Specify the Product Component Name</i>	
<b>COMPLIANCE COMPONENT TYPE</b>	
<i>Document the Compliance Component Type</i>	Guideline
<i>Component Sub-type</i>	
<b>COMPLIANCE DETAIL</b>	
<i>State the Guideline, Standard or Legislation</i>	<p><b>Mapping Grade GPS</b></p> <p><b>Primary Uses</b> – Resource and asset mapping; navigation  <b>Horizontal Data Accuracy</b> – 10 to 20 meters (no correction) with 0.5 to 3 meters (real-time or post-processing correction)  <b>Vertical Data Accuracy</b> – 2 to 9 meters (2 to 3 times less accurate than horizontal data)  <b>Differential Correction Options</b> – Post-processing with all receivers, with some receivers being capable of real-time corrections (includes the use of Wide Area Augmentation System (WAAS) or base stations)  <b>Type of Features Collected</b> – Points, lines, and areas  <b>Option to Load Custom Data Dictionary with Feature Attributes</b> – all receivers  <b>Option to Load Coordinate Systems, Projections, Datums / Spheroids</b> – all receivers  <b>Option for Navigation Using Waypoints</b> – all receivers  <b>Time required to ‘Lock on’ to Satellites before Collecting Data</b> – 2 to 5 minutes  <b>Number of Data Points Collected / Stored before Download Required</b> – 10,000 to 50,000 points  <b>Training Requirements</b> – Moderate  <b>Cost</b> - \$2,500 or more depending on equipment selected (receiver, software, cables, and accessories). Typical system costs are \$5,000 to \$6,000.</p> <p>In addition to these characteristics the following receiver characteristics and conditions should be evaluated prior to choosing the GPS for a particular project or application.</p> <p><u>It is recommended</u> that GPS receivers used within the state have the ability to track at least 6 channels (6 different satellites at a time).</p> <p><u>It is recommended</u> that GPS receivers be capable of utilizing the National Marine Electronics Association (NMEA) 0183 interface for output.</p> <p><u>It is recommended</u> that your mapping grade GPS receiver have a minimum of 250Kb of memory. This amount allows loading of a custom data dictionary and collection of approximately 9,000 points. At a rate of one point per second a receiver with 250Kb of memory can be expected to collect data continuously for 2 – 3 hours.</p>

<i>State the Guideline, Standard or Legislation</i>	<p><u>It is recommended</u> that the system purchased use a rechargeable battery as the main source of power. These batteries do have limited collection life that is tied to the type of collection being done and the receiver being used. They can be recharged during the day to extend their usefulness and can be recharged at night. Organizations need to consider durability, battery life, weight, and readability of GPS receivers before purchasing them.</p> <p><u>It is recommended</u> that the agency use a GPS data dictionary whenever possible to simplify data collection and standardize field data collection.</p> <p><u>It is also recommended</u> that your GPS units include software to convert the field data into ArcView shapefile format, AutoCAD DXF format, or other open geospatial data format in order to easily integrate with the state's GIS and Computer Aided Drafting (CAD) software suites.</p>		
<i>Document Source Reference #</i>	<p>Much of this documentation was extracted from the Wisconsin Department of Natural Resources white paper entitled: <b>Comparing Global Positioning System (GPS) Tools: <i>Selecting the right tool for the job!</i></b></p> <p>It is available at :  <a href="http://www.dnr.state.wi.us/org/at/et/geo/location/gps_info.html">http://www.dnr.state.wi.us/org/at/et/geo/location/gps_info.html</a></p>		
<b>Compliance Sources</b>			
<i>Name</i>	Missouri Department of Natural Resources, Geological Survey and Resource Assessment Division, Land Survey Program	<i>Website</i>	<a href="http://www.dnr.mo.gov/">http://www.dnr.mo.gov/</a>
<i>Contact Information</i>	State Land Surveyor		
<i>Name</i>	Missouri Department of Transportation	<i>Website</i>	<a href="http://www.modot.mo.gov">http://www.modot.mo.gov</a>
<i>Contact Information</i>	Geographic Information Systems Coordinator – MoDOT		
<b>KEYWORDS</b>			
<i>List Keywords</i>	Mapping, GPS, Global Positioning System, resource, accuracy, feature collection, points, lines, areas, positions, receiver, differential correction, WAAS, Wide Area Augmentation System, base station, location, way points, navigation, AVL, Automated Vehicle Location, horizontal accuracy, vertical accuracy,		
<b>COMPONENT CLASSIFICATION</b>			
<i>Provide the Classification</i>	<input type="checkbox"/> <i>Emerging</i> <input checked="" type="checkbox"/> <i>Current</i> <input type="checkbox"/> <i>Twilight</i> <input type="checkbox"/> <i>Sunset</i>		
<i>Sunset Date</i>			

## COMPONENT SUB-CLASSIFICATION

Sub-Classification	Date	Additional Sub-Classification Information
<input checked="" type="checkbox"/> <i>Technology Watch</i>	1-19-05	Selective availability, GPS modernization, Galileo, Blue Tooth
<input type="checkbox"/> <i>Variance</i>		
<input type="checkbox"/> <i>Conditional Use</i>		

### Rationale for Component Classification

<i>Document the Rationale for Component Classification</i>	Missouri Departments: Natural Resources, State Emergency Management Agency, Transportation, Conservation, Agriculture, Health and Senior Services, Highway Patrol, Public Safety, Water Patrol,
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### Migration Strategy

<i>Document the Migration Strategy</i>	
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### Impact Position Statement

<i>Document the Position Statement on Impact</i>	
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### CURRENT STATUS

<i>Provide the Current Status</i>	<input type="checkbox"/> <i>In Development</i> <input type="checkbox"/> <i>Under Review</i> <input checked="" type="checkbox"/> <i>Approved</i> <input type="checkbox"/> <i>Rejected</i>
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### AUDIT TRAIL

<i>Creation Date</i>	11/11/04	<i>Date Approved / Rejected</i>	02/08/05
<i>Reason for Rejection</i>			
<i>Last Date Reviewed</i>		<i>Last Date Updated</i>	
<i>Reason for Update</i>			