A National States Geographic Information Council White Paper on the National Grid
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National Grid Awareness and Application

The growing reliance upon coordinated state, local and federal communications in the geospatial field has increased the need for universality and precision in the description of location information. In response to the need to communicate precise location coordinates across all levels of government the Federal Geographic Data Committee (FGDC) has established the United States National Grid (USNG). In order to provide its membership with an awareness and understanding of the USNG as a projection and data reference system the National States Geographic Information Council (NSGIC) has created this position paper.

The United States National Grid

The USNG is based on universally defined coordinate and grid systems and as a result can be easily extended for use world-wide as a universal grid reference system.

The USNG is a nonproprietary, alphanumeric point reference system based upon the Universal Transverse Mercator (UTM) projection. The UTM coordinates are overlaid upon the Military Grid Reference System (MGRS). These combined elements define the USNG. A complete USNG geoaddress provides a unique location value on the earth.

USNG specification defines how to present Universal Transverse Mercator (UTM) coordinates at various levels of precision. It specifies the use of those coordinates along with the grid system defined by the MGRS. Additionally; it addresses specific presentation issues such as grid spacing.

Many current GPS receivers, from recreational to survey-grade instruments, support and report positional information in a USNG format. The USNG specification, as well as information explaining how to use the USNG, can be found at http://www.fgdc.gov/usng/index.html.

Who's using USNG?

The Federal Emergency Management Agency (FEMA) supports the adoption of the USNG as a standard for horizontal reference mapping in the United States.

The FGDC Cadastral Subcommittee has endorsed the use of the USNG as a parcel and cadastral identification scheme. The USNG location identification system, when used as an identifier, provides a location with a method to generate a nationally unique identifier.

The USNG is included in the new URISA Address Standard.

The USNG has proven to be critical in supporting coordinated federal, state, and local relief efforts during emergency situations like Hurricane Katrina.

The USNG can be useful in routing first responders by E911 centers in remote and rural areas because it is supported by many handheld, GPS units.

Recommendations for State and Local Officials

State and local officials that may potentially interact with Federal or Military personnel in the course of their jobs (especially emergency management support personnel and first responders) need to remain aware of two fundamental issues.

1. It is critical that state and local users are aware of what projections and coordinate or grid referencing systems are available on their geospatial software and equipment, and what the settings and capabilities are. We also recommend learning how to use the conversion capabilities of those tools.

2. They should also be aware that Federal or Military personnel may request or supply location information in USNG coordinates. NSGIC strongly recommends, as state and local officials purchase geospatial software and equipment, that compatibility with the USNG be considered.

We encourage state and local personnel to look for or request software and tools that allow for native, on-the-fly, point coordinate conversion and display of the USNG whenever possible. We also recommend including USNG awareness and use as part of regular training and exercises. Finally, they should train all personnel to use the coordinate system and grid reference system conversion capability on their software and equipment.

Recommendations for Vendors and Developers

Geospatial software, application and tool developers are strongly encouraged to include native translation capabilities to and from the USNG Reference System as a requirement for their location based services and products. At minimum the ability to convert, input, locate and display USNG locations is increasingly critical to the states and local governments in support of public safety initiatives. Developers need to build in working conversion routines that automatically populate data fields with the correct USNG values. Developers also should consider the following capabilities as appropriate for their tools and applications.

1. Create a capability that will display the USNG coordinates of a location by selection of a point, input of a point, and/or mouse-over of a point.
2. Create a capability that allows the accurate location and display of an operator input point or list of points referenced to USNG coordinates, it must also highlight, center and zoom to location.
3. Allow for operator entry of the input USNG point(s) by standard, “word processing style” cut-and-paste methods.
4. Create a USNG display command that will allow the user to graphically overlay the USNG on their display screen (toggle on, off) for reference purposes and allow the user select the grid line spacing display level(1,000m, 500m, 100m, 50m, 10m, 1m).
5. Where given an address, return the USNG coordinates.
6. Locate the nearest address to a USNG coordinate pair.
7. These functions should be operational for display and conversion to/from all generally accepted reference systems in the US.

Multiple coordinate systems and reference grids have long been a reality of the geospatial world. The difficulty of system to system conversion and interoperability can be reduced in today’s digital environment. The potential for error will still exist, however, that probability will decrease as those who use geospatial services and equipment are adequately aware of the problem through proper training and education.

NSGIC is not advocating, at this time, that the USNG should be identified as ‘The National Reference System’. But, we do believe that USNG awareness is one of a number of map reading or geospatial skills that emergency personnel should have. We also recognize the widespread use of USNG in the federal environment as well as its increasing acceptance in location based services.

The USNG provides a seamless, common reference system upon which all first responders nation-wide may be trained. In the event of a disaster where national assets are deployed to assist local responders USNG will be the language used to communicate location. To enhance response times and minimize bottlenecks at critical and stressful times, we must provide useable location information in a consistent and uniform format to all first responders as quickly as possible. We owe it to our citizens in a time of need where seconds truly matter, to provide data to everyone in a usable format that will increase the likelihood of their safety and well being.