

Minnesota Geospatial Advisory Council
United States National Grid Standard

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About the GAC

The mission of the Minnesota Geospatial Advisory Council (GAC) is to act as a coordinating body for the Minnesota geospatial community. The GAC is authorized by legislation passed in 2009 and reauthorized in 2014 Minnesota Statutes (16E.30, subd. 8). It represents a cross-section of organizations that include city, county, regional, state, federal and tribal governments as well as education, business and nonprofit sectors.

As part of this mission, the GAC works with the Minnesota geospatial community to define and adopt standards needed by the community. GAC standards are developed and proposed by geospatial community subject matter experts. The GAC's Standards Committee administers a process to ensure community-wide public review and input for any proposed standards.

The GAC does not mandate or enforce standards. It offers the standards as a resource to the community. Organizations may choose to adopt the standards and require their use internally.

Introduction

This standard describes a method for presenting the United States National Grid (USNG) in cartographic products. The USNG provides an efficient way to specify location information at different levels of detail anywhere in the United States. It can increase the usefulness and interoperability of printed maps and location-based services, such as global positioning systems (GPS). It is based on a universally defined geographic coordinate and grid system.

A number of different coordinate and grid systems can be used on printed maps and computer map displays in order to describe locations. When different systems are used on different maps; however, it is difficult for people to translate between them. Eliminating the need to translate has become particularly important during emergency response situations in which people need to communicate locations quickly, clearly and confidently. Widespread use of the USNG promises to provide a fast, unambiguous, repeatable way to communicate locations.

The USNG is based on a common geographic projection and rectangular grid system (Universal Transverse Mercator). It has practical advantages over using geographic coordinates (latitude, longitude). USNG location references correlate directly to field measurements. Therefore, distances can be accurately calculated between two locations easily, and the precision of locations and measurements can be maintained consistently across the state and across the nation. This is not true with geographic coordinates.

Purpose of this Standard

The purpose of this state standard is to encourage the use of the USNG on all appropriate map products in Minnesota and to specify how the USNG should be presented on maps when it is used. The USNG is intended to improve interoperability across all national jurisdictions especially in crisis situations. It is also intended to help people use location services such as GPS in conjunction with printed maps to find and communicate location information.

Applicability

This standard pertains to all developers, distributors, and users of map products within the State of Minnesota including government agencies, private organizations, and the general public. The USNG is of particular interest to the emergency management and response community.

This standard applies when the USNG is represented on hard-copy maps, implemented in digital maps, or used for identifying and communicating locations.

This standard does not apply to actual collection or storage of geospatial data. The USNG supplements other location-referencing systems, such as street addresses or latitude / longitude. It does not replace them.

Sources of this Standard

This standard implements the U.S. National Grid standard developed by the Federal Geographic Data Committee (FGDC), documented as FGDC-STD-011-2001. It can be found at:

https://www.fgdc.gov/standards/projects/FGDC-standards-projects/usng/fgdc_std_011_2001_usng.pdf

Compliance Notes

When organizations present the USNG on printed map products that claim conformance to this standard, they must be in compliance with [FGDC-STD-011-2001](#). (See compliance requirements on page 5 of federal standard.)

Compliance can be made easier through the development and implementation of organizational guidelines, training, and requirements for map products that implement the USNG.

Standard Requirements

This standard implements the Federal Geographic Data Committee's [U.S. National Grid standard](#) which defines the specifications of the USNG and describes how the grid is to be presented on map products.

Main features and specifications of the USNG

Equivalency with MGRS: In Minnesota, USNG coordinates are identical to the Military Grid Reference System numbering scheme, the geo-coordinate standard used by NATO militaries for locating points on the earth.

Basic Numbering: USNG basic coordinate values and numbering are identical to UTM coordinate values over all areas of the United States.

Referencing Scheme: The numbering scheme used in the USNG is alphanumeric and follows these rules:

Grid Zone Designation: First, the U.S. geographic area is divided into 6-degree longitudinal zones designated by a number and 8-degree latitudinal bands designated by a letter. Thus, each area is given a unique alphanumeric Grid Zone Designator (GZD).

The longitude zone numbers and latitude band letters for GZDs over the United States are taken from the global scheme of MGRS.

Example: **18S** Identifies a GZD.

100,000-meter Square Identification: Each GZD 6x8 degree area is covered by a specific scheme of 100,000-meter squares where a two-letter pair identifies each square.

Example: **18SUJ** Identifies a specific 100,000-meter square in the specified GZD.

Grid Coordinates: A point position within the 100,000-meter square shall be given by the UTM grid coordinates in terms of its Easting (E) and Northing (N). For specific requirements or applications, the number of digits will depend on the precision desired in position referencing. In this convention, they read from left with Easting first, then Northing. An equal number of digits are always used for E and N.

Examples:

- **18SUJ20** Locates a point with a precision of 10 km
- **18SUJ2306** Locates a point with a precision of 1 km
- **18SUJ234064** Locates a point with a precision of 100 meters
- **18SUJ23450647** Locates a point with a precision of 10 meters
- **18SUJ2345606479** Locates a point with a precision of 1 meter
- **18SUJ2345678906479498** Locates a point with a precision of 1 millimeter

Relationship to Datums: The standard datum for USNG coordinates is the North American Datum 1983 (NAD 83) or its international equivalent, the World Geodetic System 1984 (WGS 84).

Accuracy: Paper maps using the USNG are expected to conform to the National Map Accuracy Standards.

Precision: USNG provides a flexible numbering scheme to accommodate variable precision from tens of kilometers to sub-meter.

Notes:

When map products are designed or updated, the USNG should be considered as a location reference aid consistent with map products in other jurisdictions employing the same standard. Use of this standard by state and local governments, as well as by private companies, will result in maps that are interoperable. Since the USNG is a federal standard, locally produced maps employing this standard will be more effective for use by federal resources, most notably in disaster response events. The USNG should be further considered for defining map extents and index maps for map series, as well as grid cells for depicting field observations at varying resolutions, such as damage assessment and disaster recovery status.

References and Sources of More Information:

- [Federal Geographic Data Committee, United States National Grid standard, FGDC-STD-011-2001](#)
- [FGDC United States National Grid resource website](#)
- [United States National Map Accuracy Standards \(pdf\)](#)