

## Executive Summary

### U.S. National Grid Supporting Public Safety, Commerce, and the General Public

**Background.** The Federal Geographic Data Committee's U.S. National Grid (USNG) standard provides a nationally consistent *language of location* that has been optimized for local applications.

- All street maps use a standard set of street names and addresses to locate places. The USNG does not replace this practice; it supplements it. The USNG expands the utility of street, and other, maps by adding several powerful features: It provides a grid reference system that is seamless across jurisdictional boundaries; it provides the foundation for a universal map index; it describes point-locations on appropriately gridded paper and digital maps; it allows geopositioning using Global Positioning System (GPS) receivers; and it supports Worldwide Web map portals that link digital maps and GPS data.
- USNG may be the only unambiguous way to describe locations when the end-user is operating either in an area away from an established road network, or in an area impacted by a natural disaster where road signs have been destroyed.
- Private citizens, public agencies, and commercial enterprises can use USNG. It has obvious applications in navigation, public safety response (e.g., police, fire, rescue, National Guard), and web-enabled directions to businesses and other public/private facilities.
- USNG is a Presentation Standard. It does not replace data storage formats for either Geographic Information Systems (GIS) or the State Plane Coordinate System (SPCS) for engineering and survey applications.
- USNG is an alpha-numeric point reference system that has been overlaid on the Universal Transverse Mercator (UTM) numerical grid. Every modest size home in a discrete area can be described using 8-digits (e.g., 1234 5678). By adding a two-letter prefix (e.g., XX 1234 5678), the location is identified regionally (state-wide). This alpha-numeric designator can be used today with many consumer GPS receivers costing less than \$100.
- The Army National Guard has been trained to use the USNG format. Additionally, USNG and the Military Grid Reference (MGRS) values are identical when referenced to WGS 84 or NAD 83 datum; therefore, state National Guard units can integrate seamlessly with their federal counterparts when joint responses are warranted.
- Additional information: [www.fgdc.gov/usng](http://www.fgdc.gov/usng)

# Reading US National Grid (USNG) Coordinates: “Read right, then up.”

Information Sheet 1 in this series.

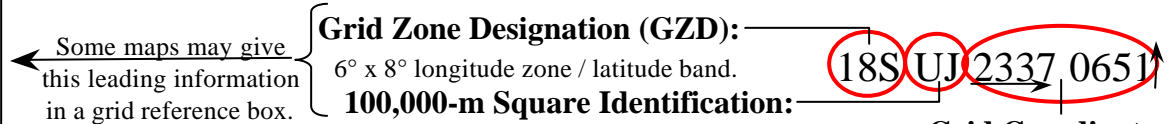
FGDC-STD-011-2001

From [www.fgdc.gov/usng](http://www.fgdc.gov/usng)

The example below locates the Jefferson Pier at USNG: 18S UJ 23371 06519.

U.S. National Grid	
100,000-m Square ID	
UJ	<sup>43</sup> 00
UH	
Grid Zone Designation	
18S	

A USNG value has three components.



“Read right, then up.”

- Grid lines are identified by **Principal Digits**. Ignore the small superscript numbers like those in the lower left corner of this map.

## Reading USNG Grid Coordinates.

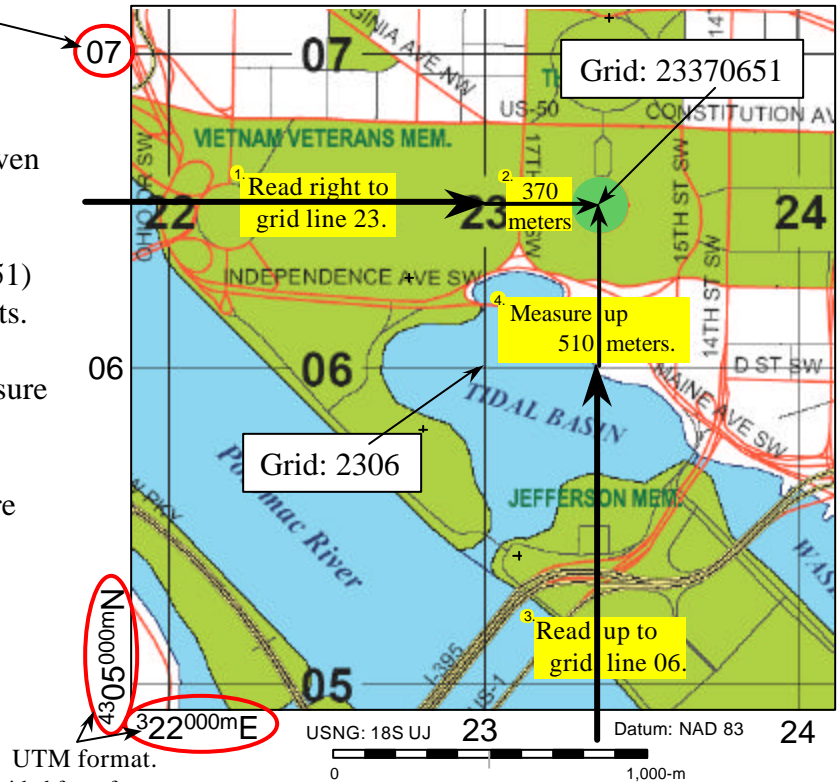
- Coordinates are always given as an even number of digits (i.e. 23370651).

- Separate coordinates in half (2337 0651) into the easting and northing components.

<sup>1</sup>- Read right to grid line 23. <sup>2</sup> Then measure right another 370 meters. (Think 23.37)

<sup>3</sup>- Read up to grid line 06. <sup>4</sup> Then measure up another 510 meters. (Think 06.51)

Grid:	Examples:
228058	FDR Memorial: +
231054	George Mason Memorial: +
2338 0710	Zero Milestone: +
2275 0628	DC War Memorial: +
213017	Ft. Scott Park:



Ignore the small UTM superscript numbers that are provided for reference purposes.

UTM numerical values are best suited for determining direction and distance as in surveying. USNG alpha-numeric values are best suited for describing particular locations because they can be given as only grid coordinates and with only the precision required for a particular task.

Users determine the required precision. These values represent a point position (southwest corner) for an area of refinement.	Four digits:	23 06	Locating a point within a 1,000-m square.
	Six digits:	233 065	Locating a point within a 100-m square (football field size).
	Eight digits:	2337 0651	Locating a point within a 10-m square (modest size home).
	Ten digits:	23371 06519	Locating a point within a 1-m square (parking space size).

A modest size home can be found or identified in a local area with only an 8-digit grid. → Full USNG: 18S UJ 2337 0651 - World wide unique.  
 Without Grid Zone Designation (GZD): UJ 2337 0651 - Regional areas.  
 Without GZD and 100,000-m Square ID: 2337 0651 - Local areas.

This illustrates how USNG coordinates can be used in a phone directory or advertisement like a universal map index value. Unlike classic atlas grids (i.e. B3), these can be used with any paper map using the national grid and in web map portals such as the Washington, DC GIS (<http://dcgis.dc.gov>) or The National Map (<http://nmviewogc.cr.usgs.gov/viewer.htm>)

They can also be used in consumer GPS receivers to directly guide you to the location. This is especially beneficial at night, in heavy traffic, or after major disasters when street signs are missing.

Point of Interest	Street Address	USNG Grid: 18S UJ	Telephone: (202)
Subway Sandwich & Salads	2030 M St., NW	2256 0826	223-2587
Subway Sandwich & Salads	430 8th St., SE	2698 0567	547-8200
Subway Sandwich & Salads	3504 12th St., NE	2740 1120	526-5999
Subway Sandwich & Salads	1500 Benning Rd, NE	2815 0757	388-0421

# US National Grid (USNG) Coordinates: *World wide context.*

Information Sheet 2 in this series.

FGDC-STD-011-2001

From [www.fgdc.gov/usng](http://www.fgdc.gov/usng)

The example below locates the Jefferson Pier at USNG: 18S UJ 23371 06519.

U.S. National Grid	
100,000-m Square ID	
UJ	43 00
UH	
Grid Zone Designation	18S

A USNG value has three components.

Some maps may give this leading information in a grid reference box.

**Grid Zone Designation (GZD):**  
6° x 8° longitude zone / latitude band.

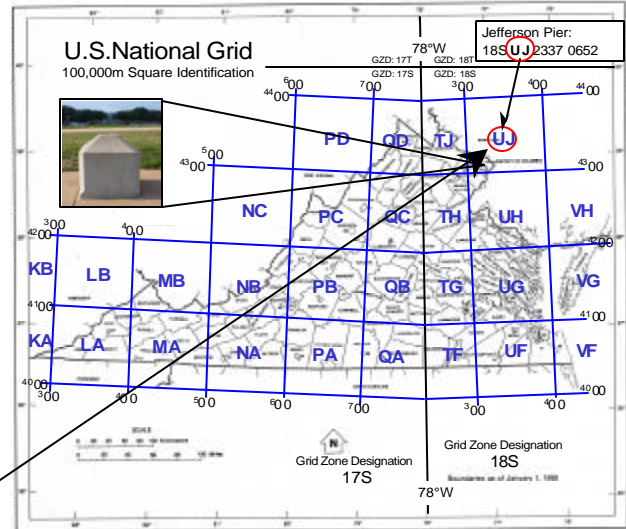
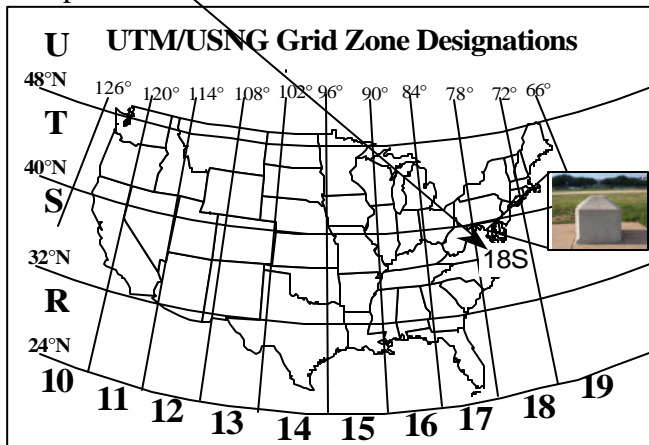
**100,000-m Square Identification:**

18S UJ 2337 0651

**Grid Coordinates:**  
Read right, then up

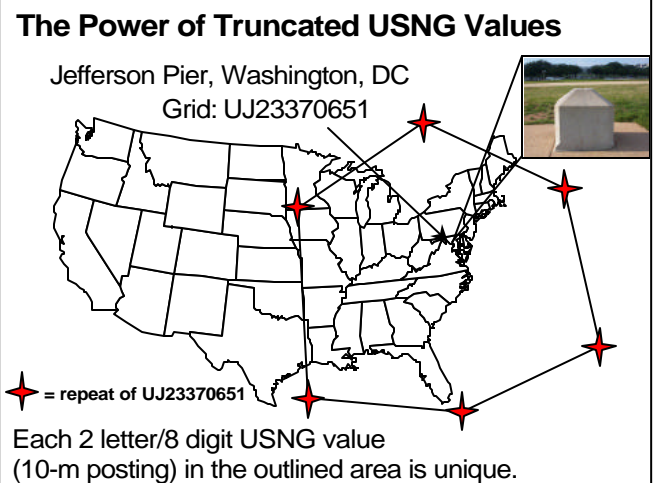
*“Read right, then up.”*

USNG values have three components as seen above. The GZD gives a USNG value world-wide context with 60 longitudinal zones each 6° wide. Zones 10 - 19 cover the conterminous US as seen below left. Zones are divided into 8° latitudinal bands. Together these make up Grid Zone Designations (GZD). Example: 18S



100,000-m Square Identifications  
Example: UJ

GZDs are further subdivided into large squares with 100,000-m Square Identifications. In this example, the Jefferson Pier is located in UJ. These squares are organized and lettered so they do not repeat themselves but every 18°, which is approximately 1,000 miles in the mid-latitudes. The illustration at right depicts how far one must go before the letters UJ repeat. This ensures a given value such as UJ 2337 0651 is unique out of the entire state it is located in, as well as all surrounding states.



In general, people can use the grid coordinates alone--for example: 233 065. Although the same numbers recurs about every 60 miles, normally that will cause no problem when the general location is understood. This is similar to the way you would tell someone only the last digits of a phone number when the area code is obvious. If there is a possibility of confusion include the letter pair too--for example: UJ 233 065. A letter pair recurs about every 1000 miles, so even in a disaster relief project there will be no other point with those coordinates in a local area. Full USNG coordinates such as 18S UJ 233 065 are worldwide unique. Typically a GPS or other electronic device requires coordinates in that form since unlike a human it doesn't intuitively understand the general location from context. You should always give full coordinates whenever abbreviated coordinates might not be clear or when listing them on letterhead, a business card or advertisement.

# Example Points of Interest (POI) Map Index: Washington, DC

Edition: December 28, 2005

This POI Map Index provided for demonstration purposes. Grid values obtained from Washington, DC  
GIS web site: [dcatlas.dcgis.dc.gov/mar/](http://dcatlas.dcgis.dc.gov/mar/)

#	Point of Interest	Street Address	USNG Grid: 18S UJ	Telephone: (202)
1	National Geographic Society	1145 17 <sup>th</sup> St., NW	2327 0823 233082	857-7000
2	Armed Forces Retirement Home Building 5	Randolf St, NW	2546 1199	
3	National Postal Museum	2 Massachusetts Ave., NE	2585 0739 259074	633-5555
4	National Building Museum	401 F St., NW	2503 0736 250074	272-2448
5	DC World War Memorial	Independence Ave. SW	2276 0628	
6	President Franklin Delano Roosevelt	Pennsylvania Ave., NW	24502 06903	
7	Subway Sandwich & Salads	3801 Nebraska Ave NW, Nebraska Ave Complex, Bldg 14	1935 1213	362-8992
8	Subway Sandwich & Salads	5028 Wisconsin Ave NW	1947 1390	686-9870
9	Subway Sandwich & Salads (Per Subway web site.)	Federal Bldg #2, Box 2029, Food Court, Washington DC	204 042	(703) 920-7916
10	Subway Sandwich & Salads	800 21st Street NW, Marvin Center Loading Dock	2247 0766	994-1801
11	Subway Sandwich & Salads	2033 K St NW	2255 0801	833-1363
12	Subway Sandwich & Salads	2030 M St NW	2256 0826	223-2587
13	Subway Sandwich & Salads	2010 P St NW	2265 0871	530-0698
14	Subway Sandwich & Salads	2469 18th St NW	2296 1013	667-2251
15	Subway Sandwich & Salads	1129 18th St NW	2298 0822	862-9840
16	Subway Sandwich & Salads	1776 G St NW	2299 0743	898-0520
17	Subway Sandwich & Salads	1666 K St NW	2327 0789	223-8720
18	Subway Sandwich & Salads	1444 I St NW	2373 0775	289-4301
19	Subway Sandwich & Salads	1401 K St NW	2377 0796	898-5784
20	Subway Sandwich & Salads	1100 New York Ave NW	2418 0771	289-7709
21	Subway Sandwich & Salads	1201 Tuckerman Street NW	2431 1513	291-7800
22	Subway Sandwich & Salads	709 H St., NW	2462 0762	842-2273
23	Subway Sandwich & Salads	406 1st St., SE	2604 0590	547-7827
24	Subway Sandwich & Salads	430 8th St., SE	2698 0567	547-8200
25	Subway Sandwich & Salads	3504 12th St NE	274 112	526-5999
26	Subway Sandwich & Salads	1213 Brentwood Rd NE	2752 0980	529-8206
27	Subway Sandwich & Salads	1412 Good Hope Rd SE	2781 0387	889-5888
28	Subway Sandwich & Salads	1500 Benning Rd NE, Hechinger Mall	2815 0757	388-0421
29	Subway Sandwich & Salads	3950 Minnesota Ave NE	3090 0687	398-3222
30	Subway Sandwich & Salads	4518 Benning Rd SE	3203 0624	575-2889

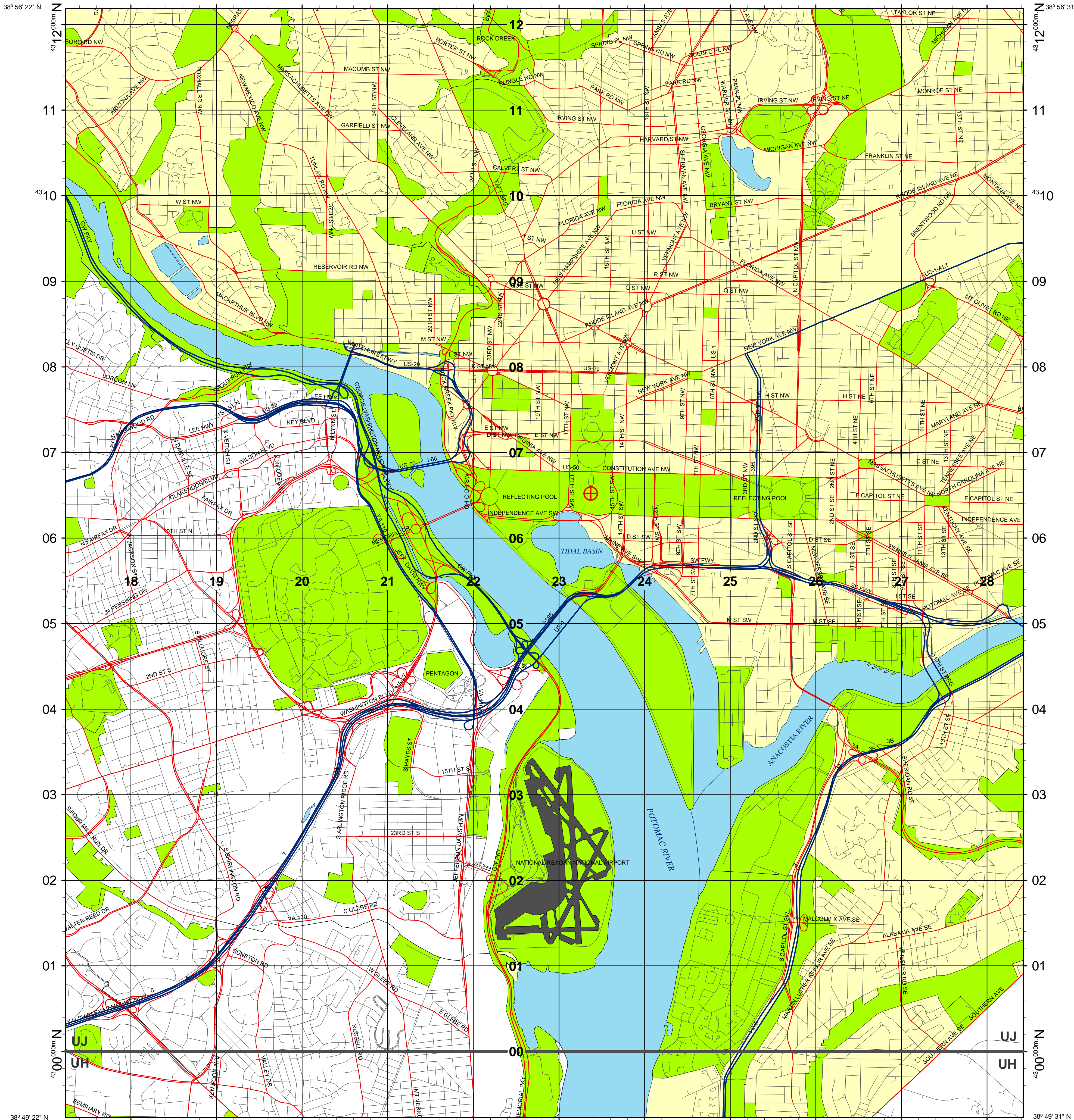
Inclusion of any specific commercial POI in this example list does not imply endorsement by any government organization.


# Washington, DC

(USNG Demonstration Map)

76° 58' 47" W

77° 6' 31" W

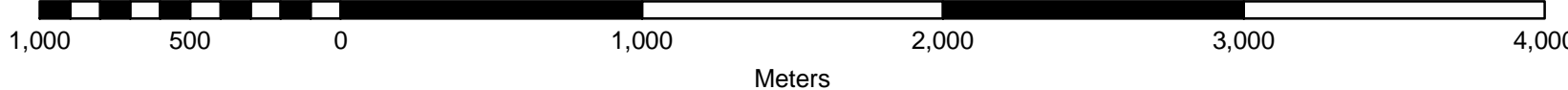


Jefferson Pier in Washington, DC   
18S UJ 2337 0652

1000-meter grid, US National Grid  
North American Datum 1983  
Grid Zone Designation 18S  
100,000-m Square Identification: UJ, UH

U.S. National Grid	
100,000-m Square ID	
UJ	4300
UH	
Grid Zone Designation	18S

Scale:  
1:24,000 (printed size: 21 x 27 inches)  
1:61,000 (printed size: 8.5 X 11 inches)



2006 G-M Angle  
9° 30' W (169 mills)

Grid Convergence  
1° 17' (23 mills)

To convert a grid azimuth to a magnetic azimuth add G-M angle.

To convert a magnetic azimuth to a grid azimuth subtract G-M angle.



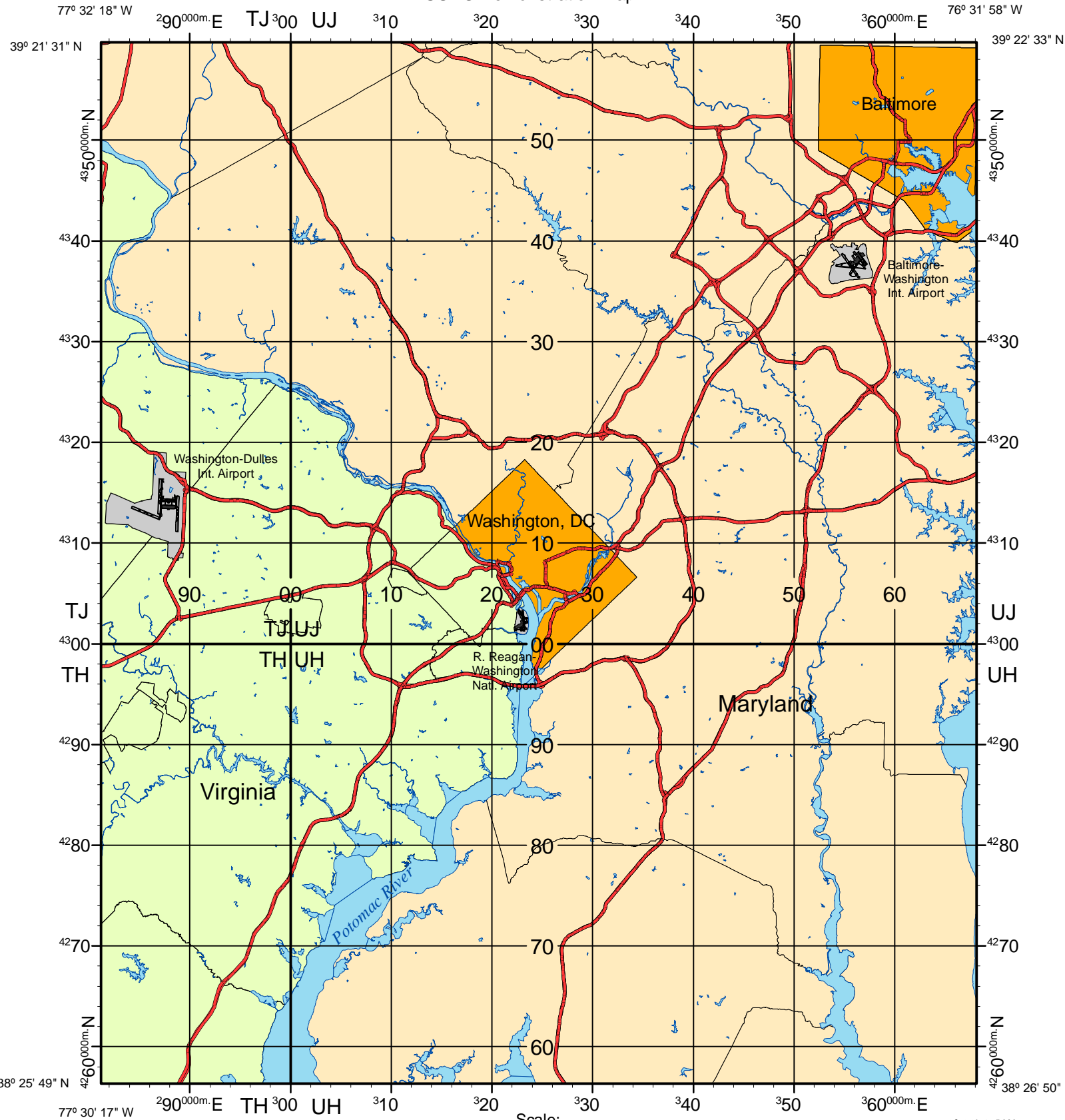
National Geospatial-Intelligence Agency  
Coordinate Systems Analysis Team (CSAT, SNAC)  
St. Louis, MO  
314.263.4171

For additional information:  
see [www.fgdc.gov/usng/index.html](http://www.fgdc.gov/usng/index.html)

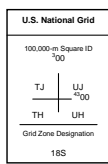
Washington, DC\_USNG\_Demo\_V3

# WASHINGTON, DC and VICINITY

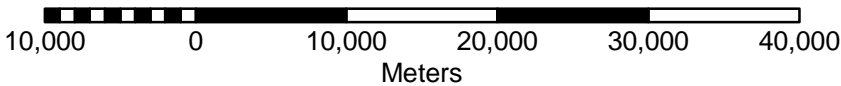
USNG Demonstration Map



10,000-m GRID, US NATIONAL GRID  
 NORTH AMERICAN DATUM 1983  
 GRID ZONE DESIGNATION: 18S  
 100,000-m SQUARE IDENTIFICATIONS:  
 TJ, UJ, TH, UH

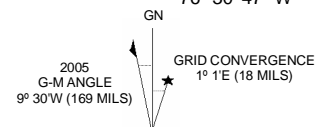


Scale:  
 1:500,000



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 SOURCE NGA (CSAT), ST. LOUIS, MO

For additional information:  
 see [www.fgdc.gov/usng/index.html](http://www.fgdc.gov/usng/index.html)



TO CONVERT A GRID AZIMUTH TO A MAGNETIC AZIMUTH ADD G-M ANGLE  
 TO CONVERT A MAGNETIC AZIMUTH TO A GRID AZIMUTH SUBTRACT G-M ANGLE