



Datums and Tools to Connect Geospatial Data Accurately

Pamela Fromhertz

Colorado State Geodetic Advisor

National Geodetic Survey

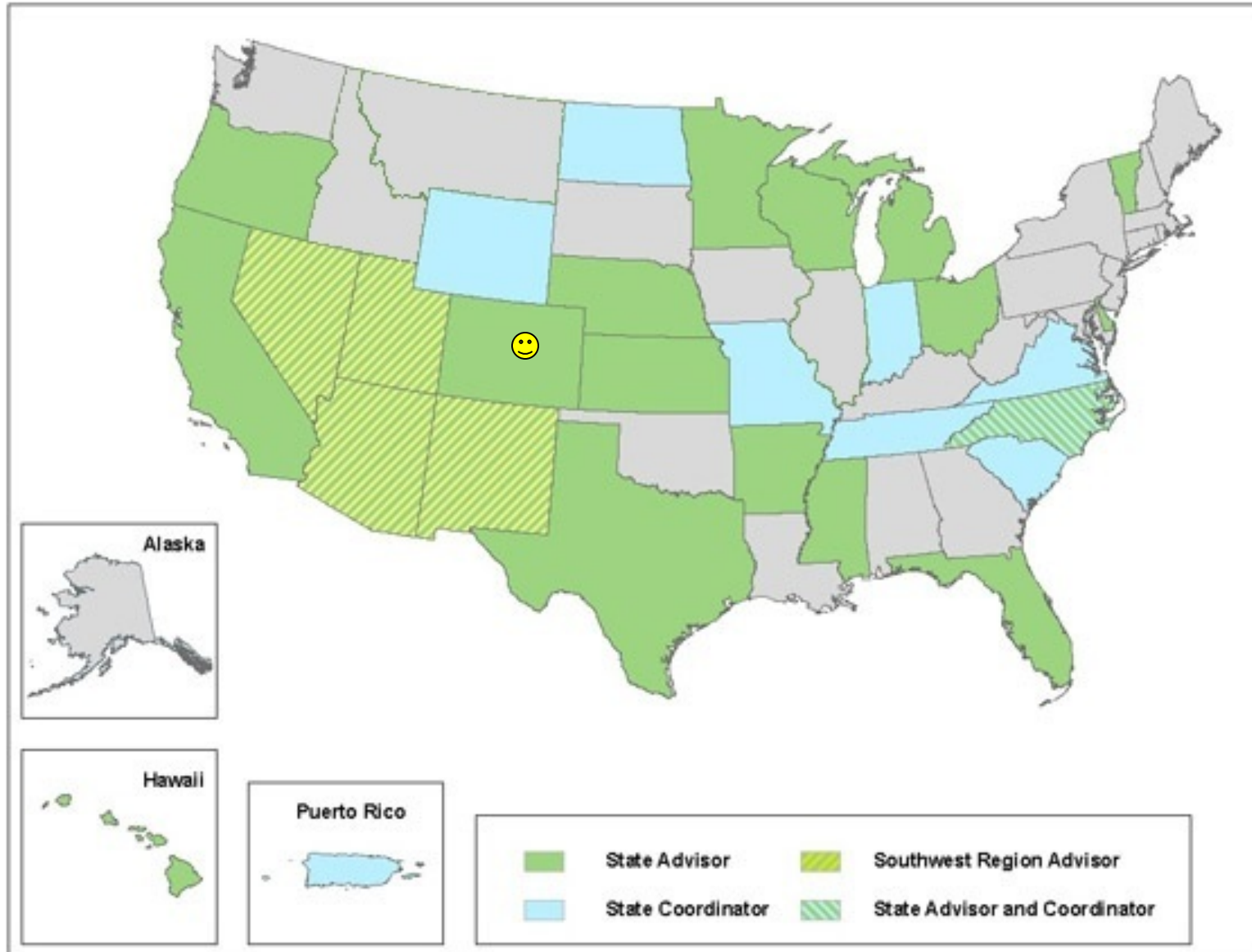
National Oceanic and Atmospheric Administration

Agenda

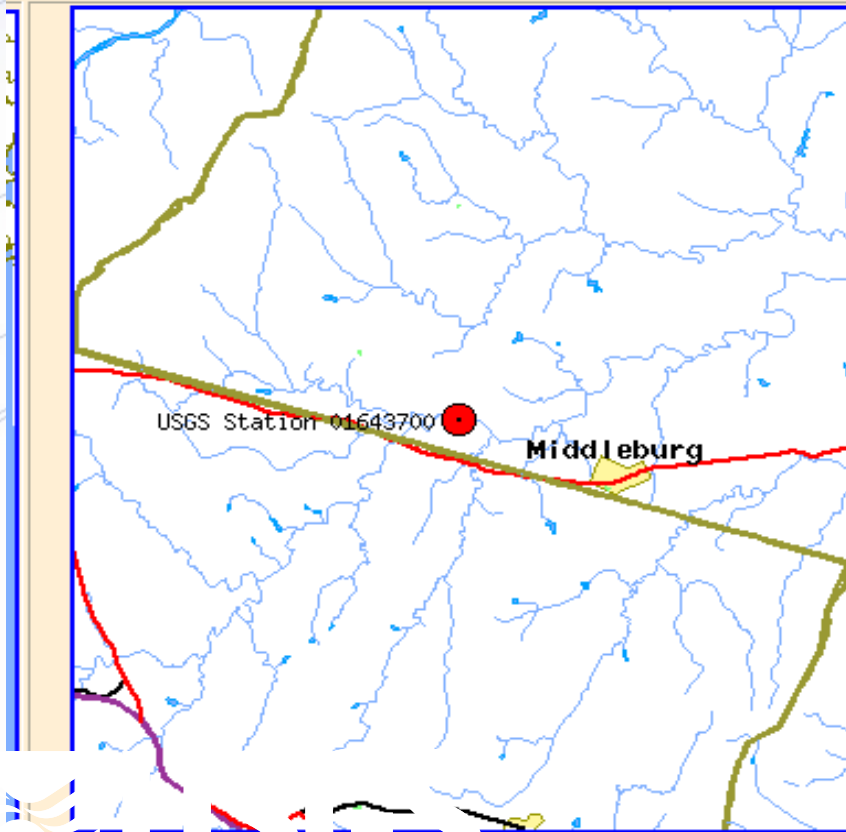
- What is a Datum
- GPS - Accuracy
- NGS - National Spatial Reference System
- **MetaData**
- Tools
 - DS-World
 - CORS
 - OPUS
- New Datums

CHANGE
IMPROVEMENTS

NGS Advisor Program



Problem



USGS Site Map for USGS 01643880 BEAVERDAM CREEK AT RT 734 NEAR MOUNTVILLE, VA - Microsoft Internet Explorer

Address: http://waterdata.usgs.gov/nwis/hwmap/site_no=01643880&agency_cd=USGS

Loudoun County, Virginia
Hydrologic Unit Code 02070008
Latitude 39°02'15.8", Longitude 77°43'20.1" NAD83
Drainage area 47.2 square miles
Gage datum 307.03 feet above sea level NAVD88

Location of the site in USA

Site map

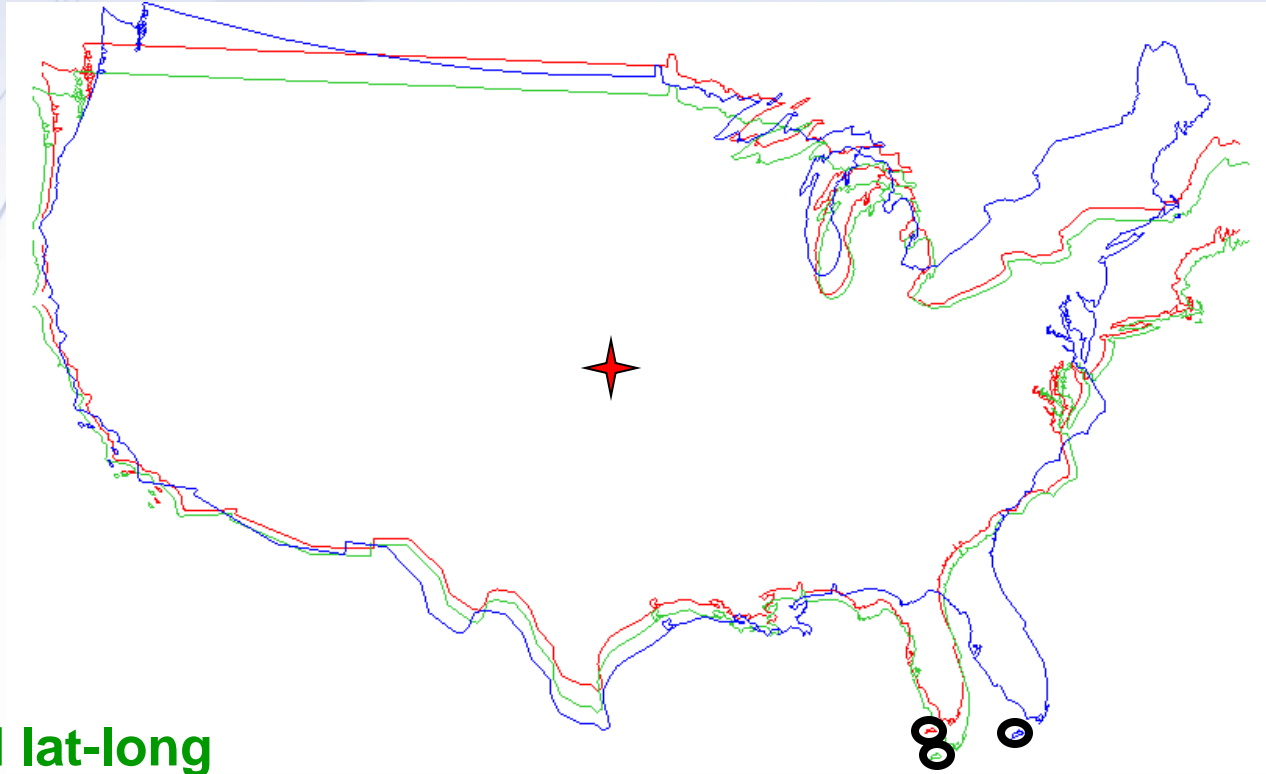
USGS Station 01643880

USGS Station 01643880

Maps are generated by US Census Bureau TIGER Mapping Service.

start James S. Johns - Info... USGS Site Map for US... Microsoft PowerPoint... Google Earth 9:53 AM

Three projections centered at 39° N, 96 ° W



Unprojected lat-long

Lambert Conformal Conic

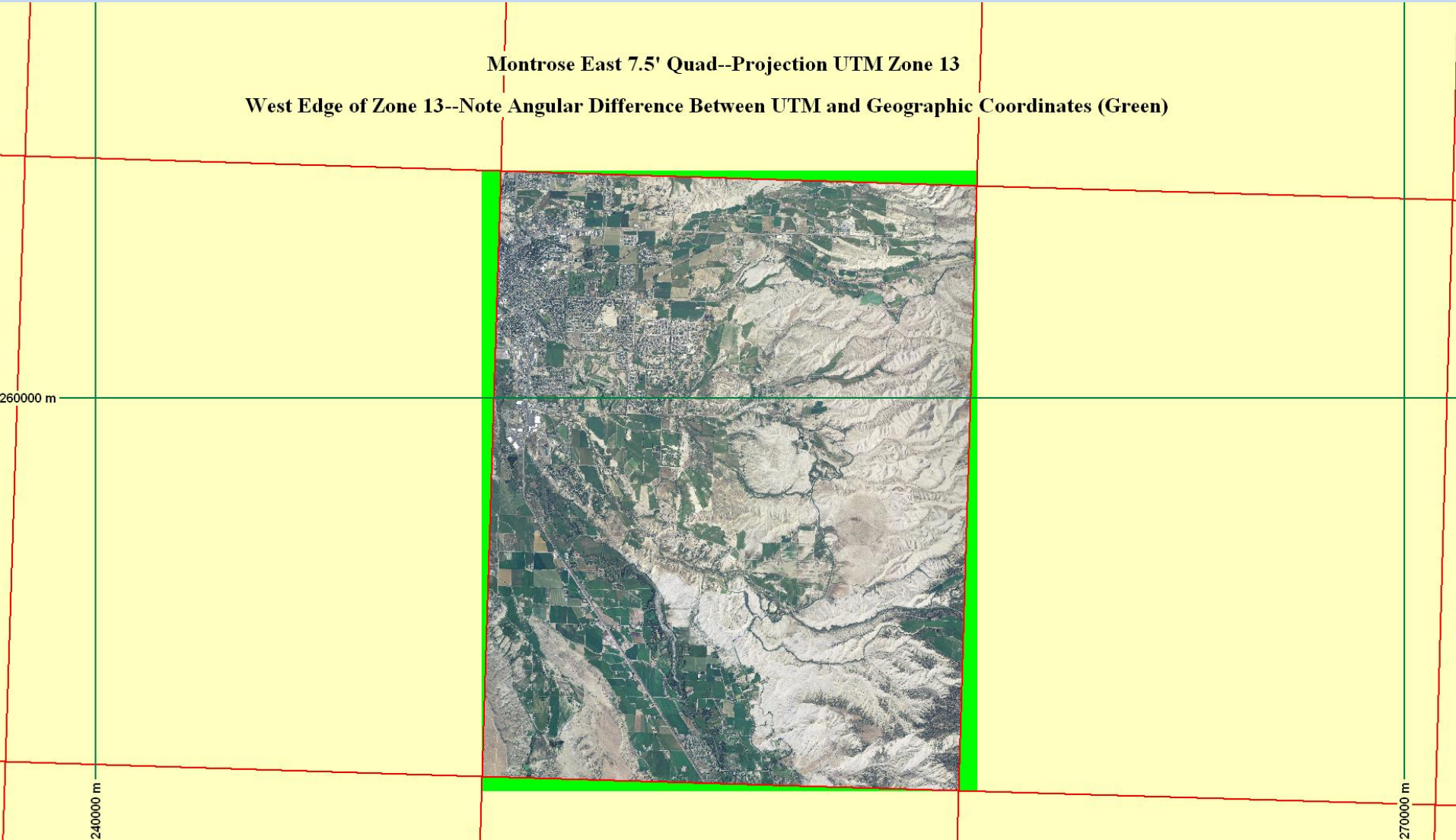
Mercator

**What is the
x,y of Key
West, FL?**

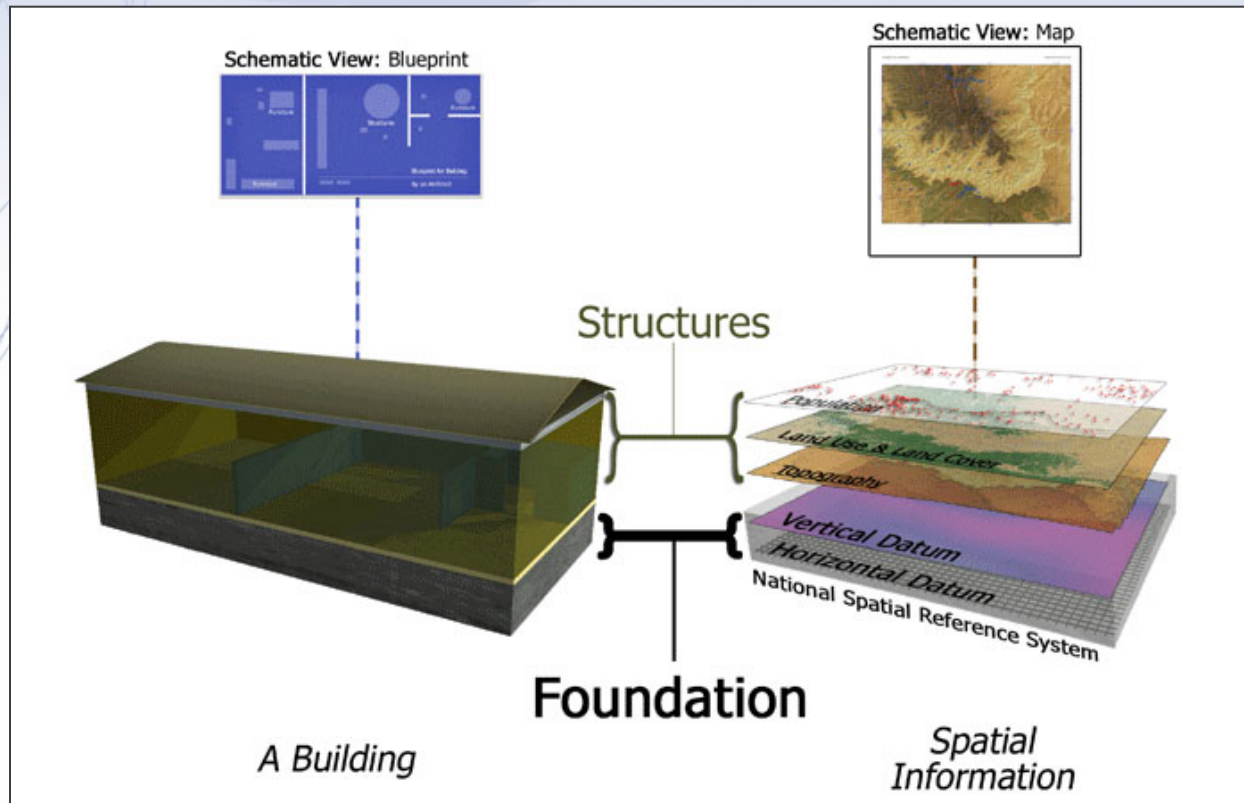
UTM Grid to Ground Differences

Montrose East 7.5' Quad--Projection UTM Zone 13

West Edge of Zone 13--Note Angular Difference Between UTM and Geographic Coordinates (Green)

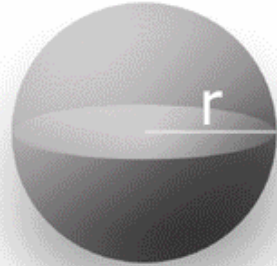


Datums



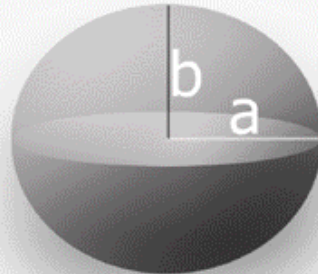
A mathematical and geometric concept that serves as a foundation or starting point for mapping, surveying, engineering based on realization of actual geospatial data points.

Geodetic Reference Surfaces



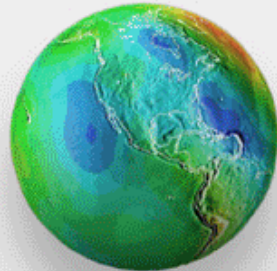
Sphere

A beachball globe



Ellipsoid
(Oblate Sphere)

Mathematical best fit to Earth's surface...
used for defining Latitude and Longitude



Geoid

Modeled best fit to "sea surface"
equipotential gravity field
used for defining Elevation

Geodetic Datums

Horizontal

2-D (Latitude and Longitude) (e.g. NAD 27, NAD 83 (1986))

Vertical/Geopotential

1-D (Orthometric Height) (e.g. NGVD 29, **NAVD 88**, Local Tidal)

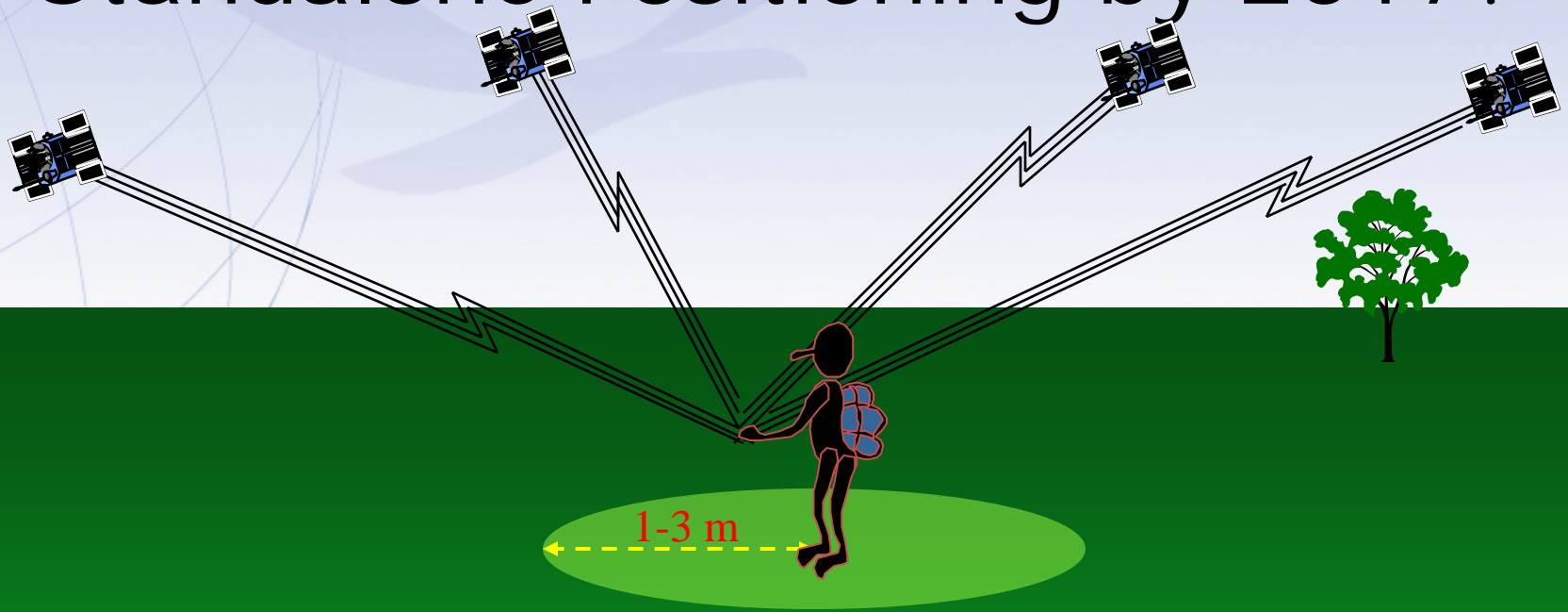
Geometric

3-D (Latitude, Longitude and Ellipsoid Height)
Fixed and Stable(?) - Coordinates seldom change
(e.g. NAD 83 (1993), **NAD 83 (2007, 2011)**)

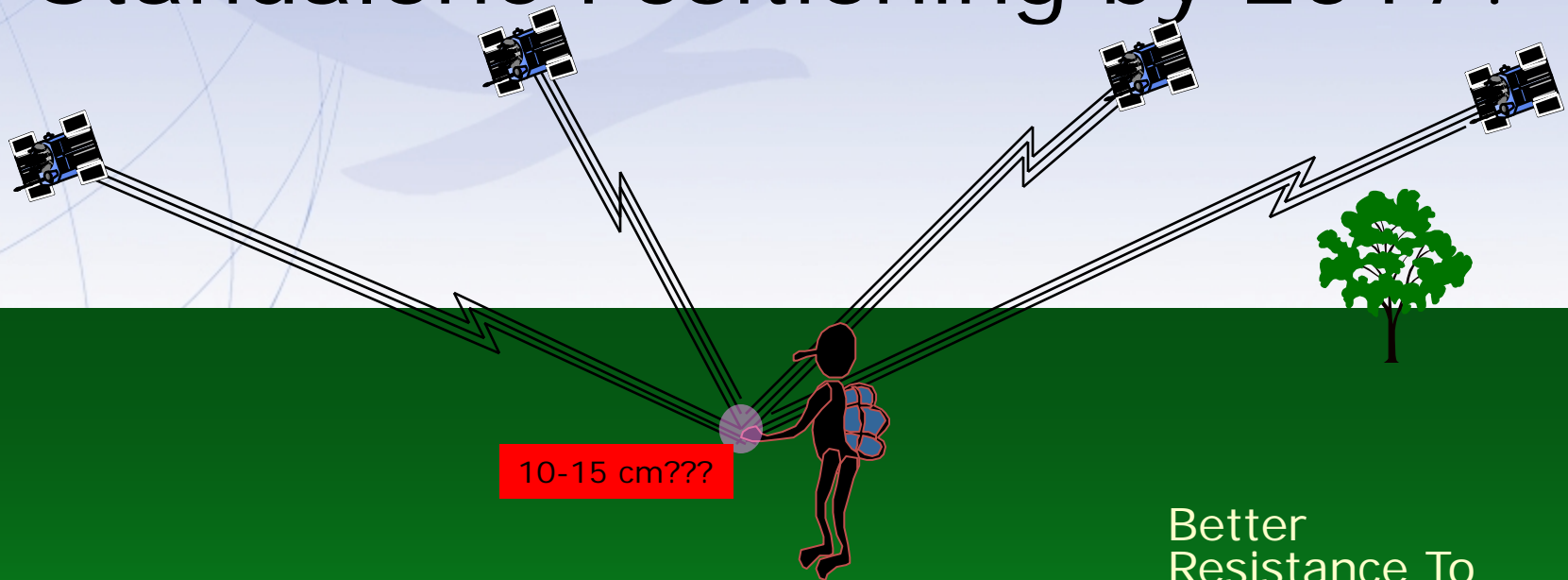
also

4-D (Latitude, Longitude, Ellipsoid Height, Velocities)
Coordinates change with time
(e.g. NAD 83, ITRF00, ITRF05, IGS08)

Standalone Positioning by 2017?



Standalone Positioning by 2017?



10-15 cm???

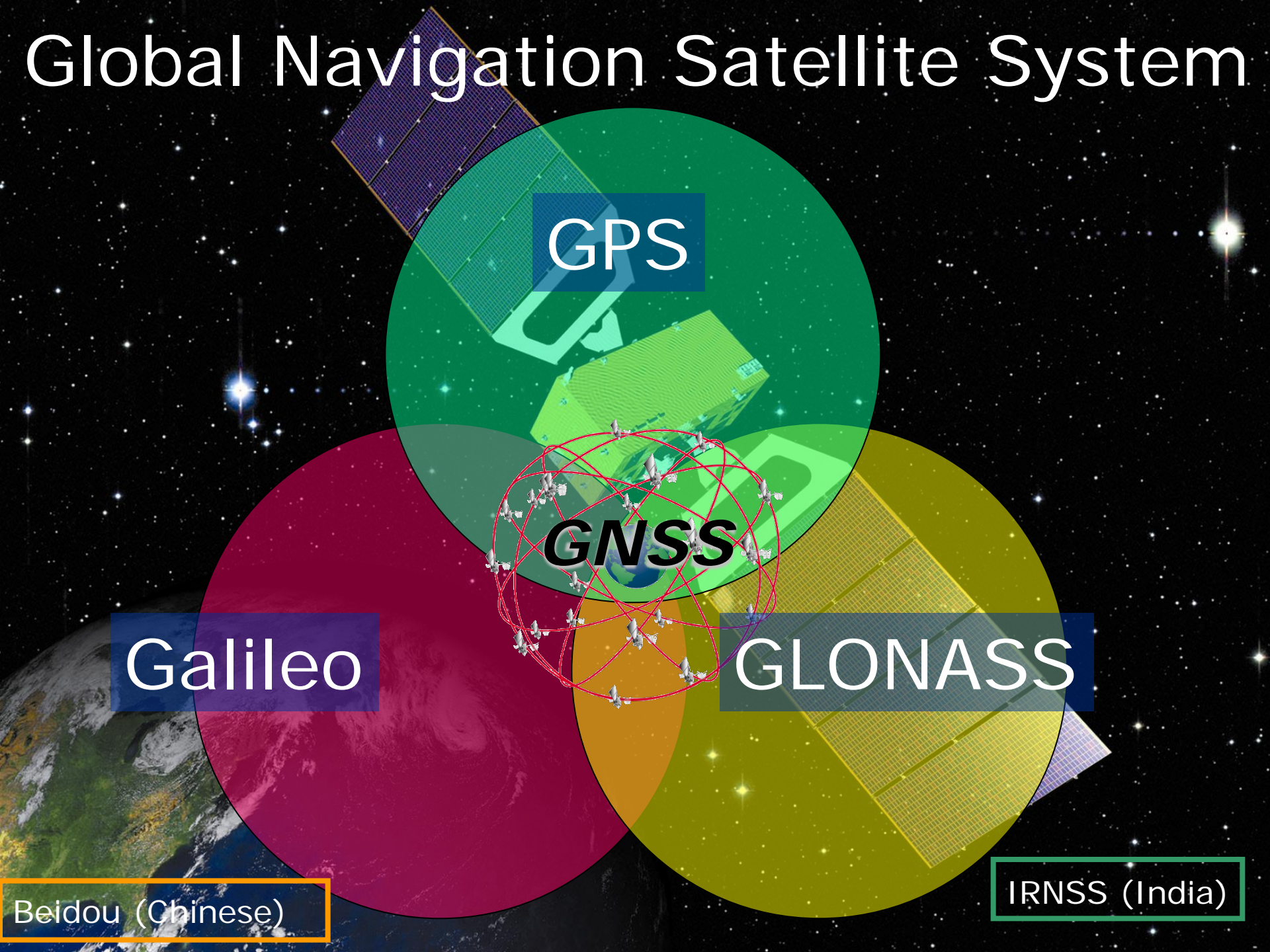
- C/A Code on L1
- C/A Code on L2
- New Code on L5

Better
Resistance To
Interference

Faster
Ambiguity
Resolution

GPS Modernization

Global Navigation Satellite System



GPS

GNSS

Galileo

GLONASS

Beidou (Chinese)

IRNSS (India)

GPS Receiver Grades

- Recreational Grade

 - \$100-\$1000

 - 1-10 meters



- Mapping

 - \$2,000-\$6,000

 - submeter - 3 meter



- Survey Grade

 - \$10,000 +

 - 5mm – 2 cm



Autonomous GPS Accuracy

GPS Receiver Datum
NAD83

HDOP <= 1.0
HDOP <= 2.0
HDOP > 2.0
Display@15sec

Reference Latitude-Longitude
1,844m 35:08:04.59 N 106:29:30.92

25 hrs @ 1 fix/15 sec = 6,000 fixes

Weighted Mean Latitude-Longitude
1,844m 35:08:04.56 N 106:29:30.93

Mean Fix: 0.8m @ 212 deg

Mouse Pointer Latitude-Longitude
35:08:04.92 N 106:29:31.23 W

50% of fixes w/in 1.8m

68% of fixes w/in 2.4m

95% of fixes w/in 4.2m

99% of fixes w/in 5.7m

Now: SVs AURA HDOP EPE UTC
GPS port closed

MA: Count AURA HDOP EPE Drift
31 5m 1.3 4.9m 4m/min

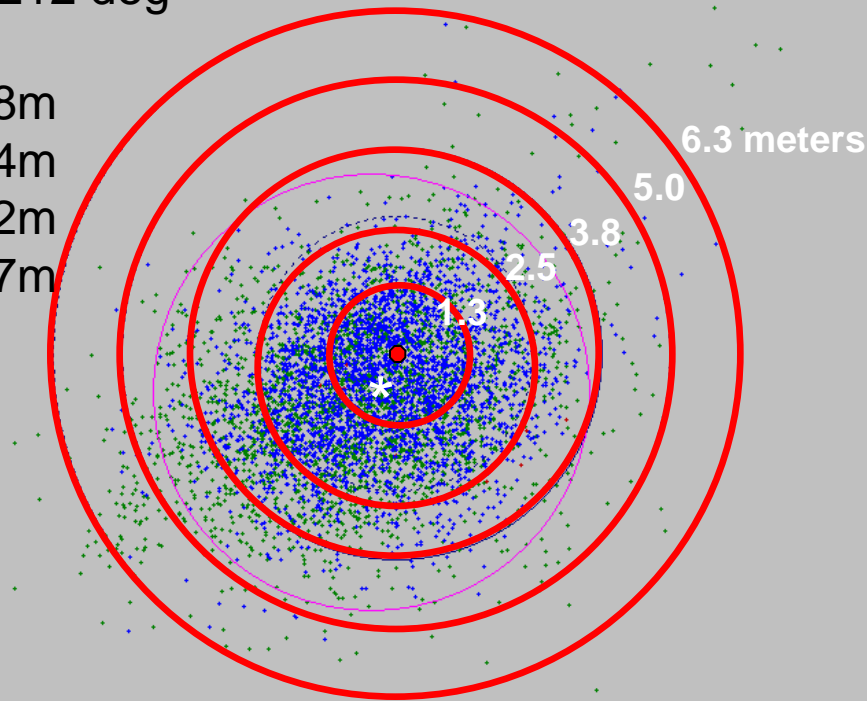
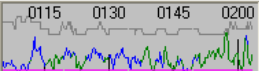
MA: Time 97% 94% 68% 48%
01:00 3.2m 3.2m 2.9m 2.7m

All: Count AURA HDOP EPE Drift
6,000 6m 1.1 4.7m 5m/min

All: Time 99% 95% 68% 50%
1:00:59:54 5.7m 4.2m 2.4m 1.8m

UTC Date Distribution by HDOP
4/13/2006 54% 46% 0%

SVs/Position Error (Scale Max: 10m)



GPS Receiver Datum
NAD83

HDOP <= 1.0
HDOP <= 2.0
HDOP > 2.0
Display@15sec

Reference Latitude-Longitude
1,844m 35:08:04.59 N 106:29:30.92

Weighted Mean Latitude-Longitude
1,844m 35:08:04.56 N 106:29:30.93

Mouse Pointer Latitude-Longitude
35:08:04.92 N 106:29:31.23 W

Reference to: Pointer Now Mean
13m@323° 3.4m@207° 0.8m@212°

Now: SVs AURA HDOP EPE UTC
GPS port closed

MA: Count AURA HDOP EPE Drift
31 5m 1.3 4.9m 4m/min

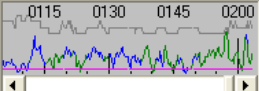
MA: Time 97% 94% 68% 48%
01:00 3.2m 3.2m 2.9m 2.7m

All: Count AURA HDOP EPE Drift
6,000 6m 1.1 4.7m 5m/min

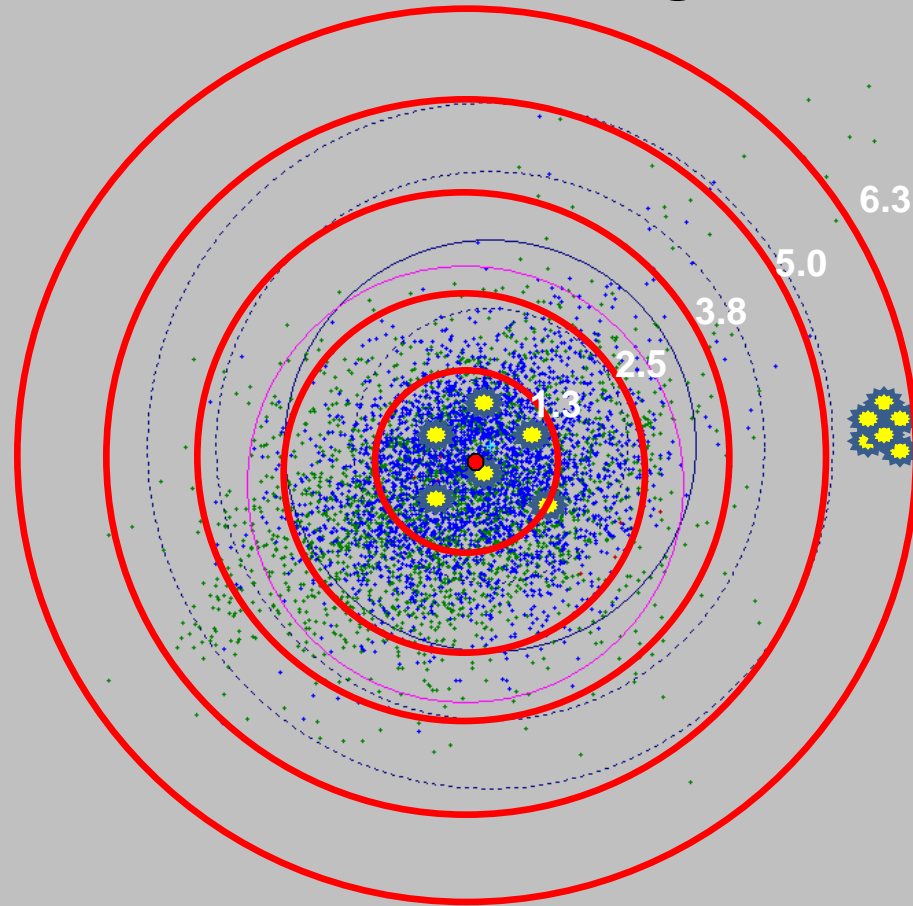
All: Time 99% 95% 68% 50%
1:00:59:54 5.7m 4.2m 2.4m 1.8m

UTC Date Distribution by HDOP
4/13/2006 54% 46% 0%

SVs/Position Error (Scale Max: 10m)



Accuracy



6.3 meters

5.0

3.8

2.5

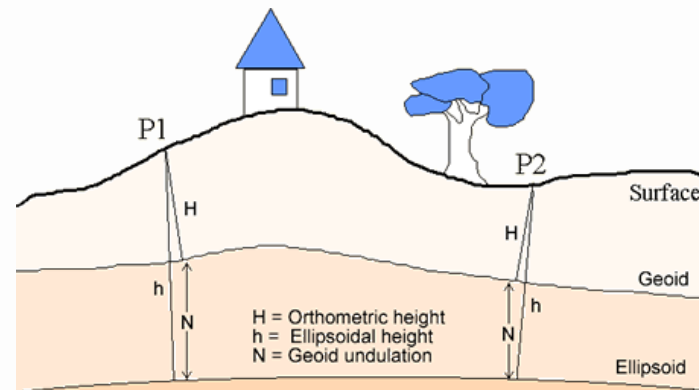
1.3

Precision

National Geodetic Survey Mission

To define, maintain and provide access to the National Spatial Reference System (NSRS) to meet our Nation's economic, social and environmental needs.

- Latitude
- Longitude
- Height
- Scale
- Gravity
- Orientation
- Time Variations



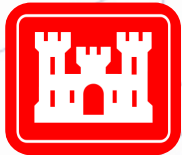
The NSRS Supports



Nautical charts, among many other geospatial applications
National Oceanic and Atmospheric Administration



Flood zones for the National Flood Insurance Program
Emergency Response Imagery
Federal Emergency Management Agency



Levee Safety Program to determine levee heights and positions
United States Army Corps of Engineers



Topographic Maps and interior water data for the nation
United States Geological Survey



NSRS gravity data for the **geospatial mission of NGA**
National Geospatial-Intelligence Agency



Aeronautical Data Quality Assurance
Federal Aviation Administration

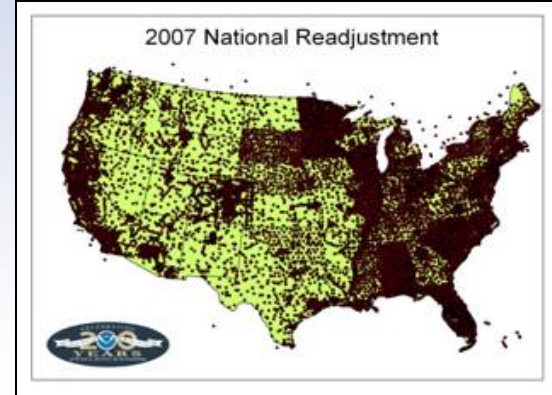
The NSRS has evolved



1 Million
Monuments
(Separate
Horizontal and
Vertical Systems)



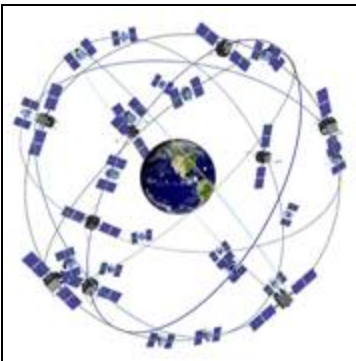
70,000
Passive Marks
(3-Dimensional)



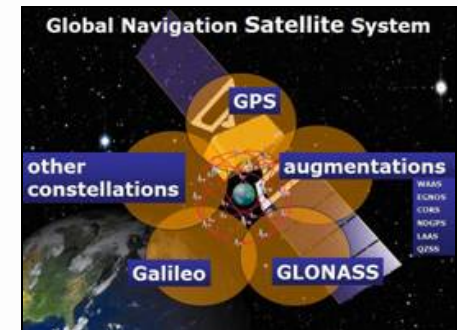
Passive Marks
(Limited Knowledge of
Stability)



1,800+ CORS
(Time Dependent System
Possible;
4-Dimensional)



GPS CORS → GNSS CORS



NGS

National Spatial Reference System(NSRS) Improvements

NETWORK	TIME SPAN	NETWORK ACCURACY	LOCAL ACCURACY
NAD 27	1927-1986	10 meters	(1 part in 100,000)
NAD83(86)	1986-1990	1 meter	(1 part in 100,000)
NAD83(199x)* HARN	1990-2007	0.1 meter	B-order (1 part in 1 million) A-order (1 part in 10 million)
NAD83(NSRS2007) (CORS)	2007 - 2011	0.01 meter	0.01 meter
NAD83(NSRS2007) (CORS)	2011 -	0.01 meter	0.01 meter

* CO was completed and adjusted in 1992

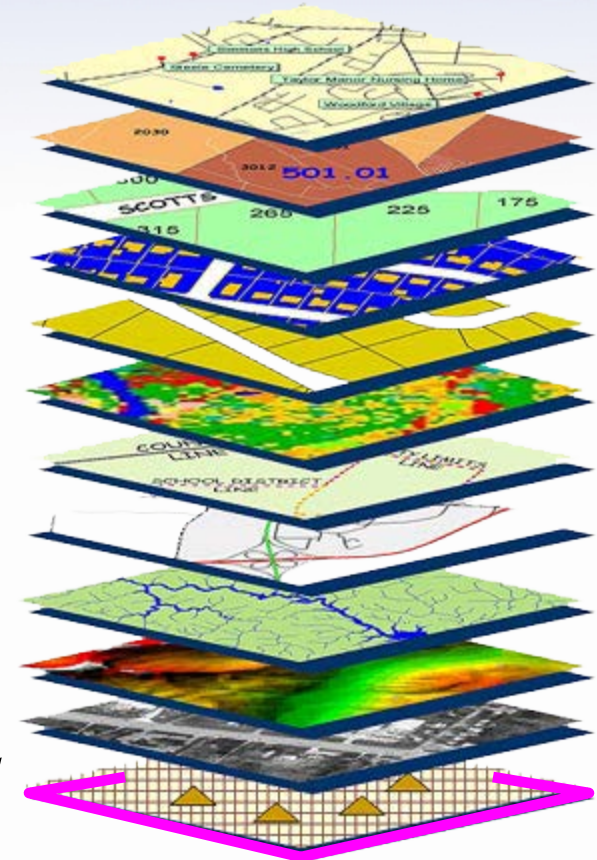
Accurate positioning begins with *accurate* coordinates

Geodetic control (the NSRS) is the foundation for all geospatial products.

Without Geodetic Control as a "base map" layer, GIS applications will not work properly



Source: Zurich-American Insurance Group



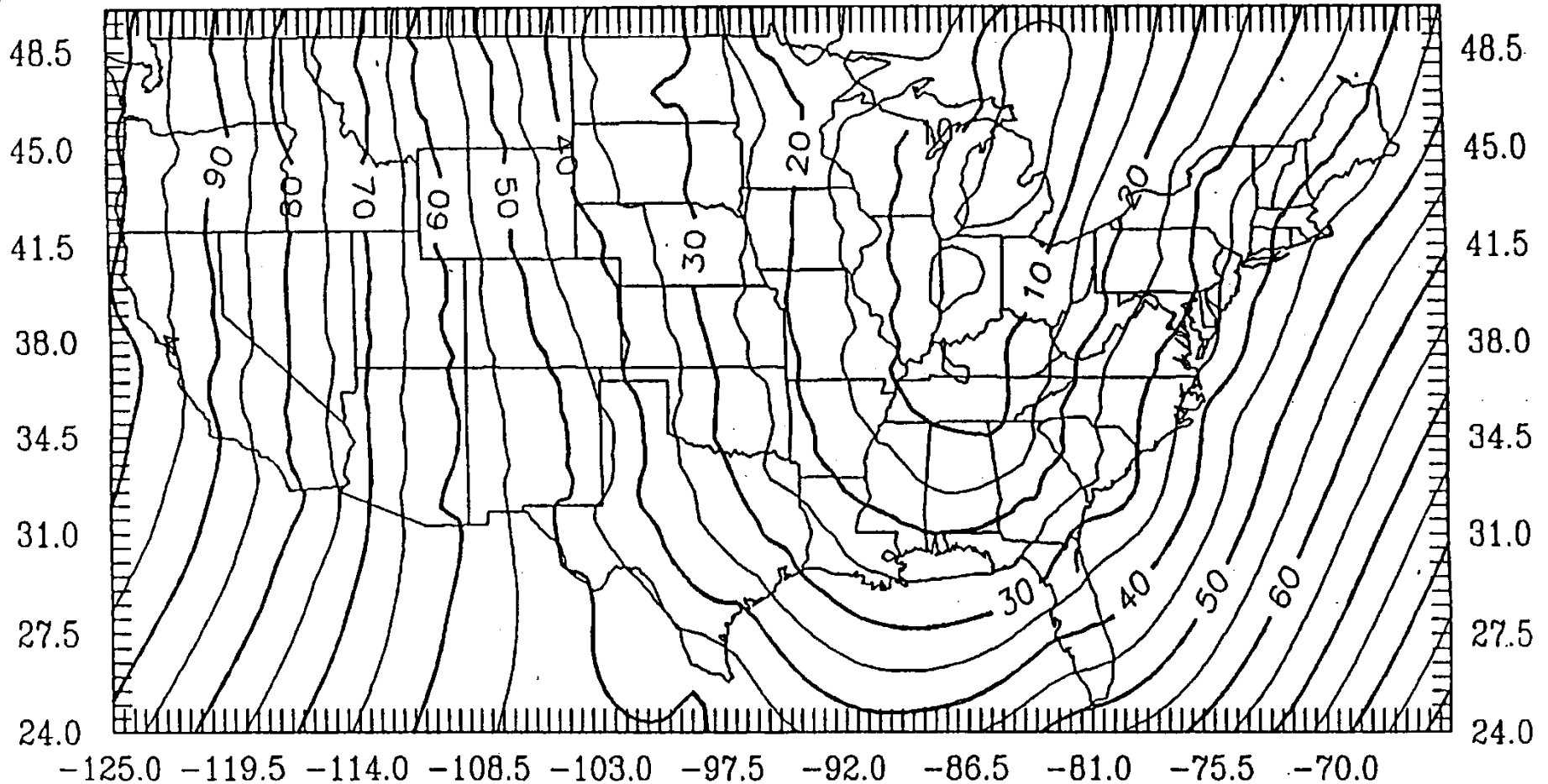
Same point different datum's = different lat/long's



Datum Differences NAD 27 – NAD 83

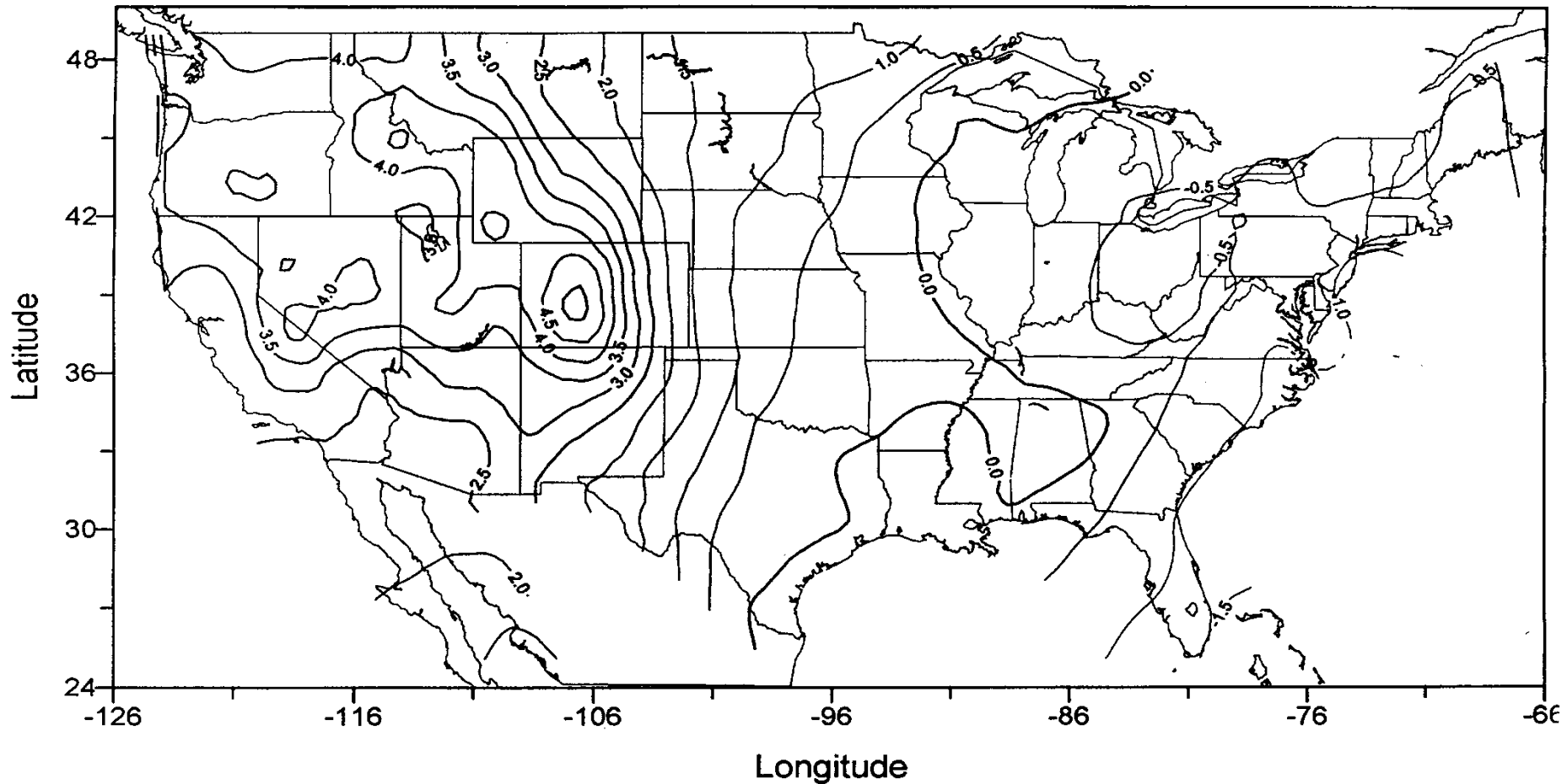
MAGNITUDE OF DATUM SHIFT (METERS)

-125.0 -119.5 -114.0 -108.5 -103.0 -97.5 -92.0 -86.5 -81.0 -75.5 -70.0

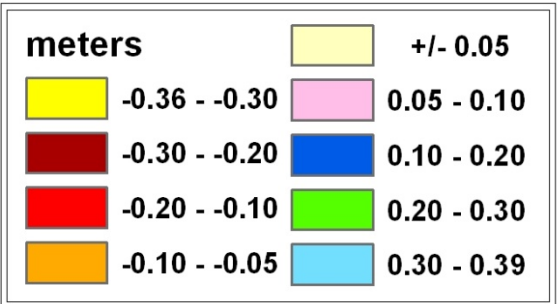
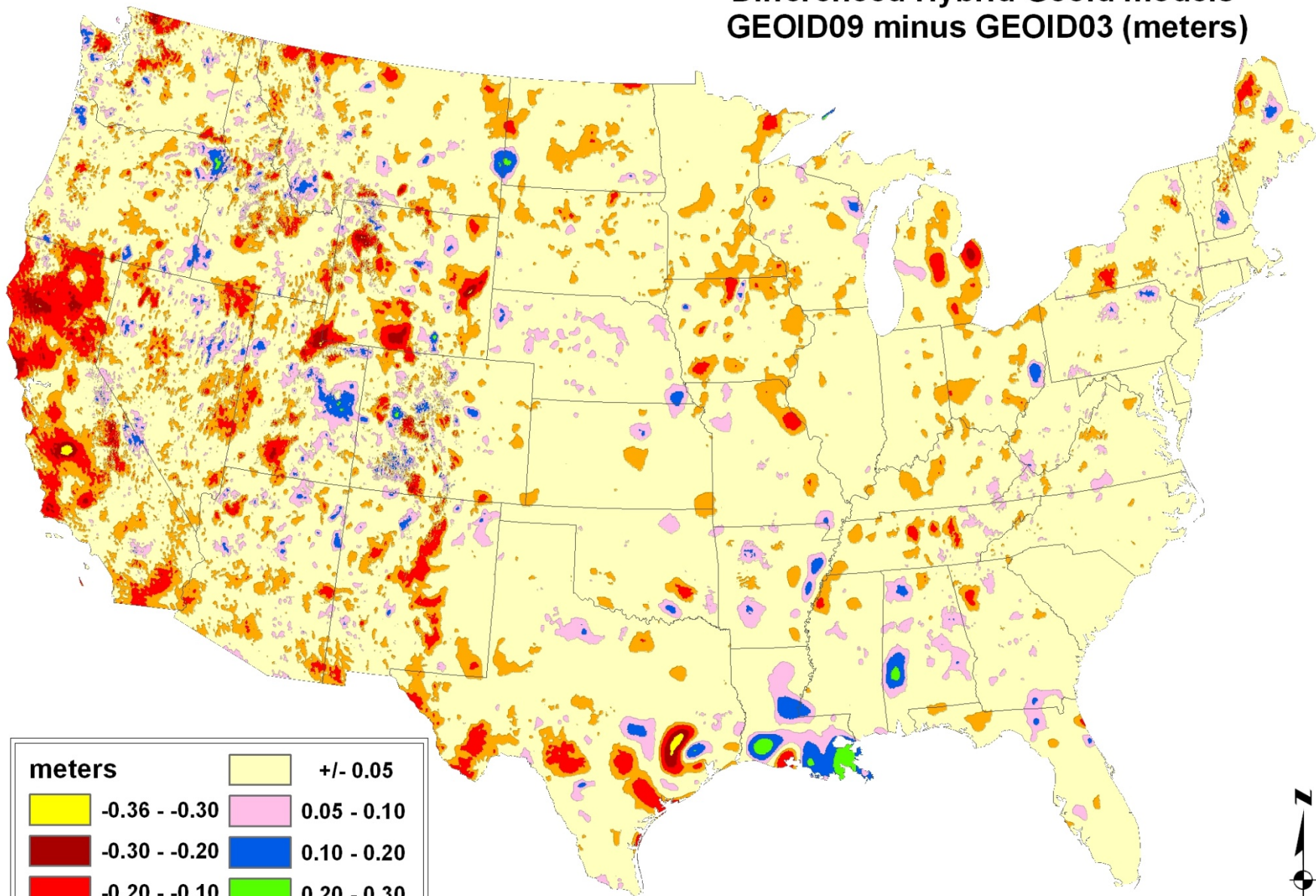


Datum Difference NGVD 29 – NAVD 88

NAVD88 - NGVD29 (feet)



Differenced Hybrid Geoid models GEOID09 minus GEOID03 (meters)



-1.18 ft to +1.28 ft



Datum Differences On Average in COLORADO

DRAFT

	Meters	Feet
Horizontal		
NAD 27-NAD 83	40-57	131-187
NAD 83 (1986) - HARN	0.2-0.6	0.66-1.97
HARN - NAD 83 (2007)	0.02	0.06
NAD 83 (2007) - NAD 83 (2011)	0.02-0.04	0.06-0.13
NAD 83 (2011) - New Datum (2022)	1.3 - 1.4	4.3 - 4.6

DRAFT

Vertical		
Orthometric Heights		
NGVD 29- NAVD 88	0.46 - 1.5	1.5 - 5.0
NAVD 88 - New Datum (2022)	0.5 - 0.75	1.6 - 2.5

DRAFT

NAVD 88- NAD 83 ellipsoidal height	18	60
------------------------------------	----	----

DRAFT

Geoid Models		
Geoid 96 - Geoid 99		
Geoid 99 - Geoid 03	0.02-1.3	0.06-4.3
Geoid 03 - Geoid 09	-0.05-(+)0.05	-0.16-(+) 0.16
Geoid 09- Geoid 12		

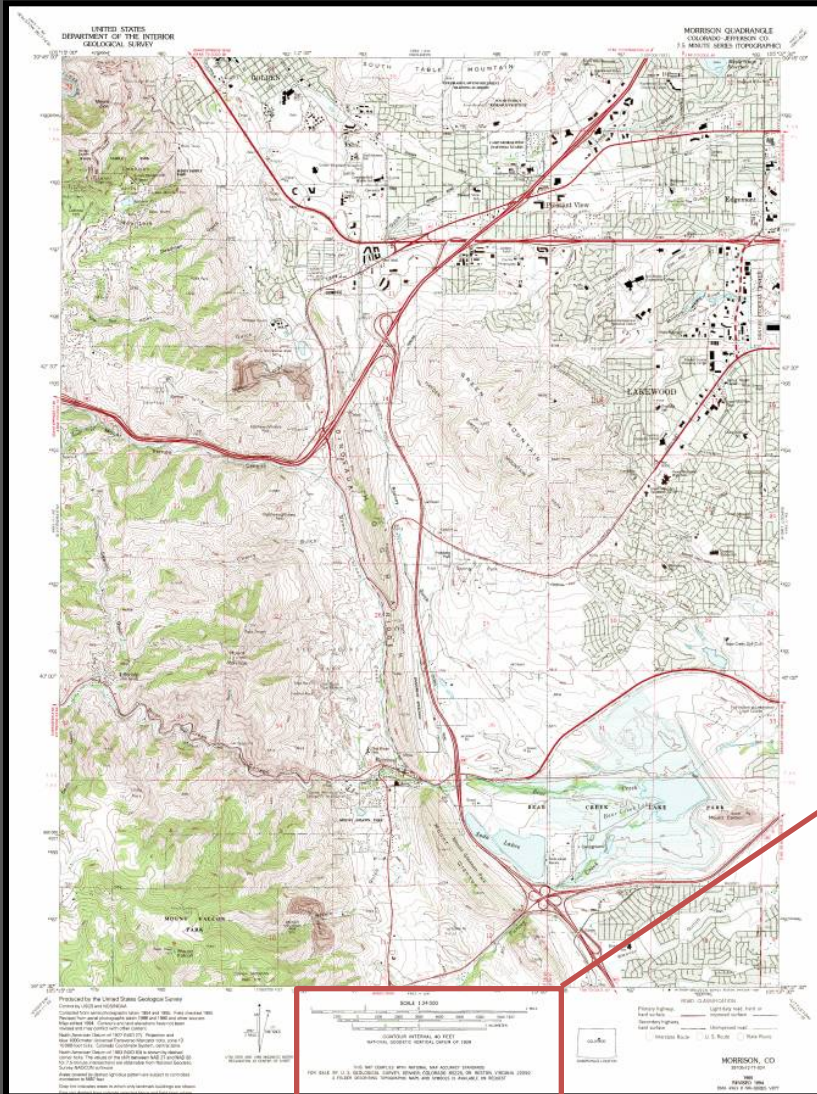
Morrison, CO Quad

1994 7.5-minute Topographic Map

Horizontal datum = NAD27

Projection = UTM Zone 13

Contours = 1955 vintage



30" 105°15' 00" 479 480

Produced by the United States Geological Survey
Control by USGS and NOS/NOAA

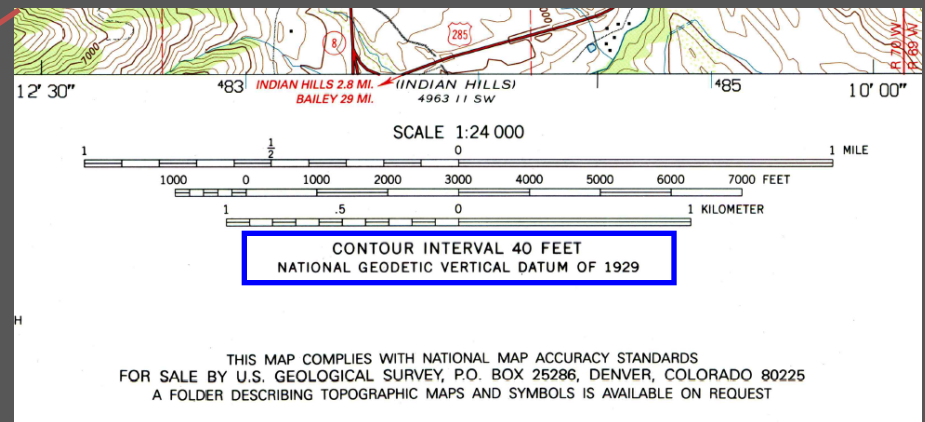
Compiled from aerial photographs taken 1954 and 1955. Field checked 1965
Revised from aerial photographs taken 1988 and 1990 and other sources
Map edited 1994. Contours and land elevations have not been revised and may conflict with other content

North American Datum of 1927 (NAD 27). Projection and blue 1000-meter Universal Transverse Mercator ticks, zone 13
10000-foot ticks: Colorado Coordinate System, central zone
North American Datum of 1983 (NAD 83) is shown by dashed corner ticks. The values of the shift between NAD 27 and NAD 83 for 7.5-minute intersections are obtainable from National Geodetic Survey NADCON software

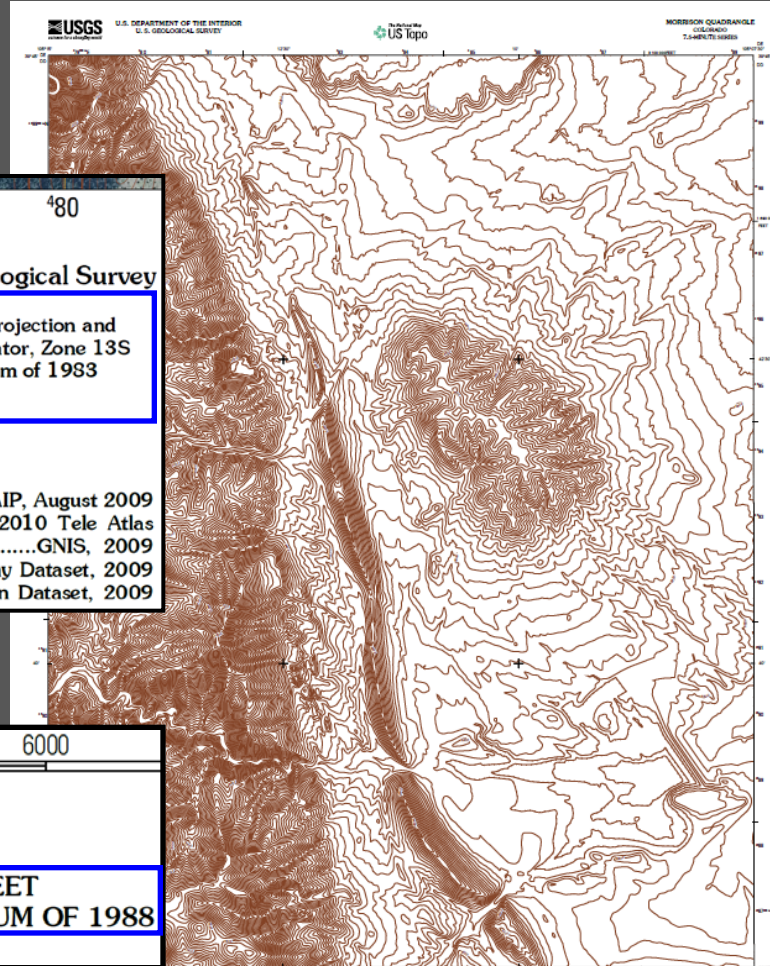
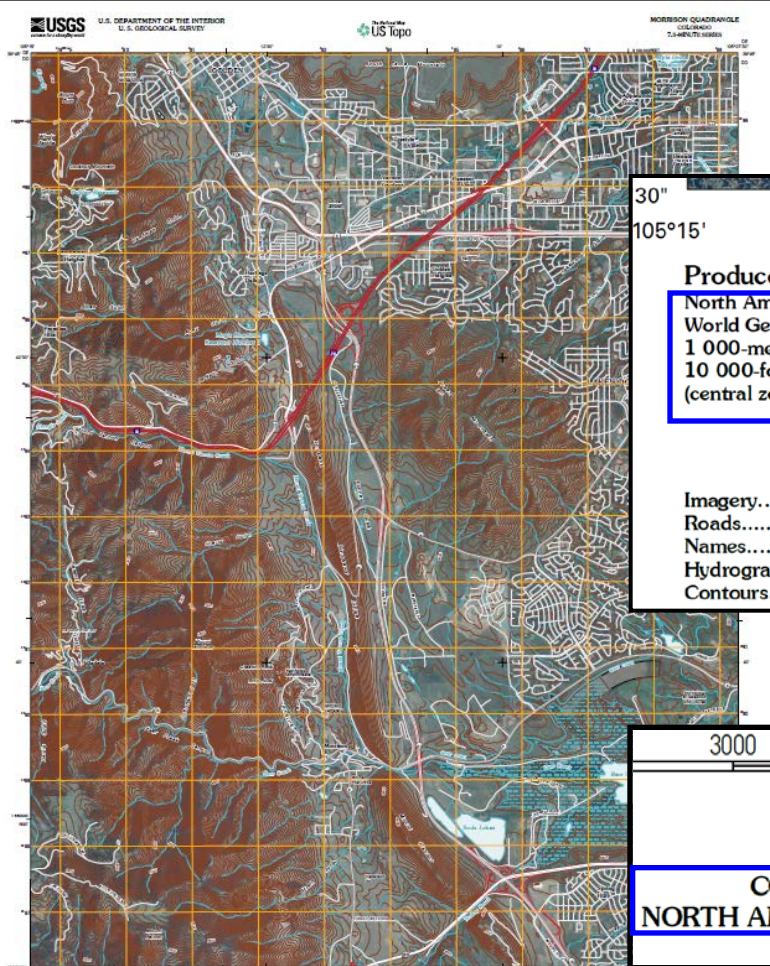
Areas covered by dashed light-blue pattern are subject to controlled inundation to 5667 feet

Gray tint indicates areas in which only landmark buildings are shown
Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

Vertical datum = NGVD29



2011 US Topo Map



30" 479 480
105°15'

Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGSS84). Projection and
1 000-meter grid: Universal Transverse Mercator, Zone 13S
10 000-foot ticks: Colorado Coordinate System of 1983
(central zone)

Imagery.....NAIP, August 2009
Roads.....©2006-2010 Tele Atlas
Names.....GNIS, 2009
Hydrography.....National Hydrography Dataset, 2009
Contours.....National Elevation Dataset, 2009

3000 4000 5000 6000
FEET

CONTOUR INTERVAL 40 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

Produced by the United States Geological Survey
Scale 1:24 000
Morrishon, CO
2011

Produced by the United States Geological Survey
Scale 1:24 000
Morrishon, CO
2011

Are NAD 83 & WGS 84 The Same?

NO

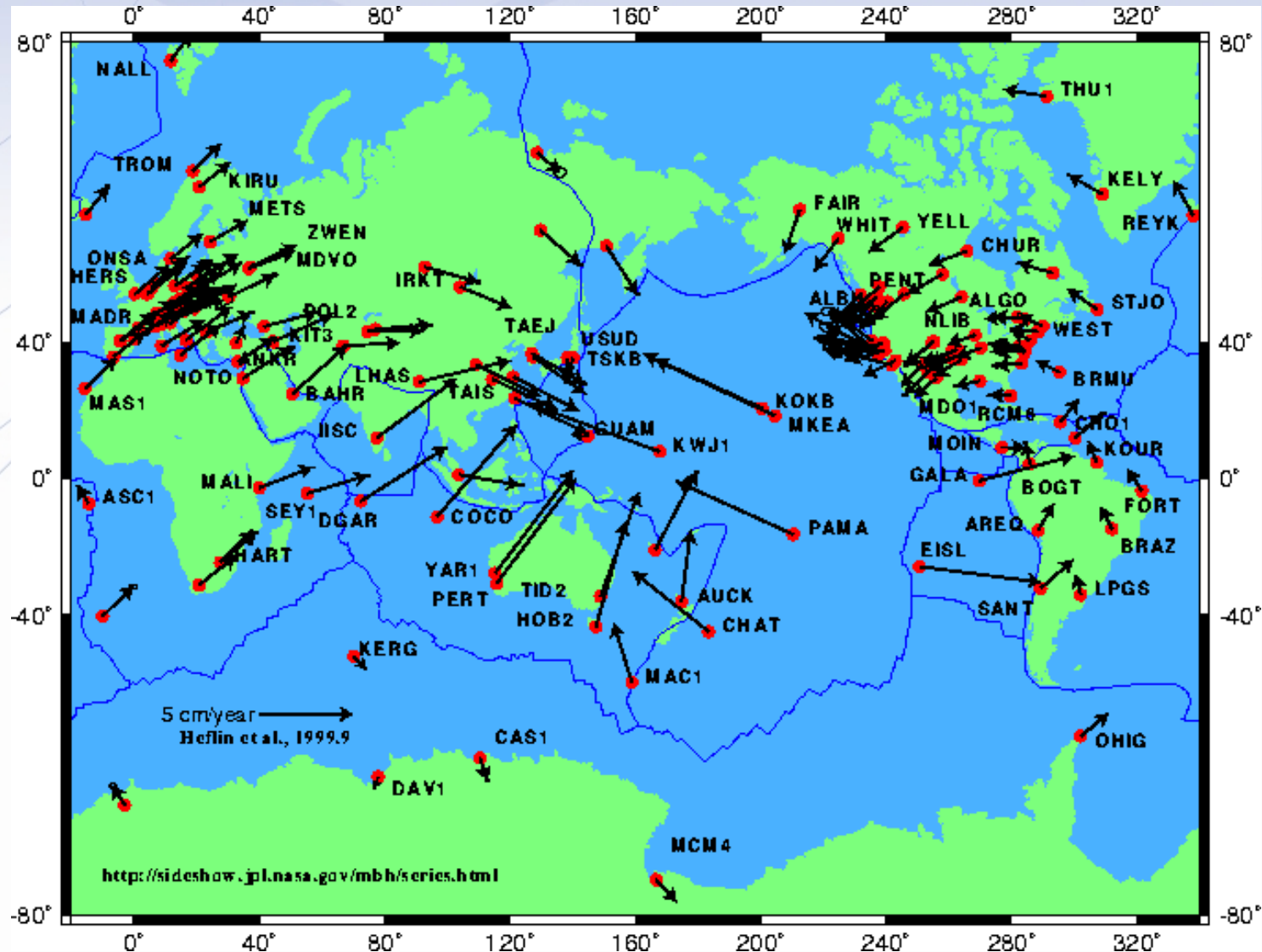
but for your application is it significant?

If requirements are *greater* than 3m
then *Yes*

If requirements are *less* than 3m then
No

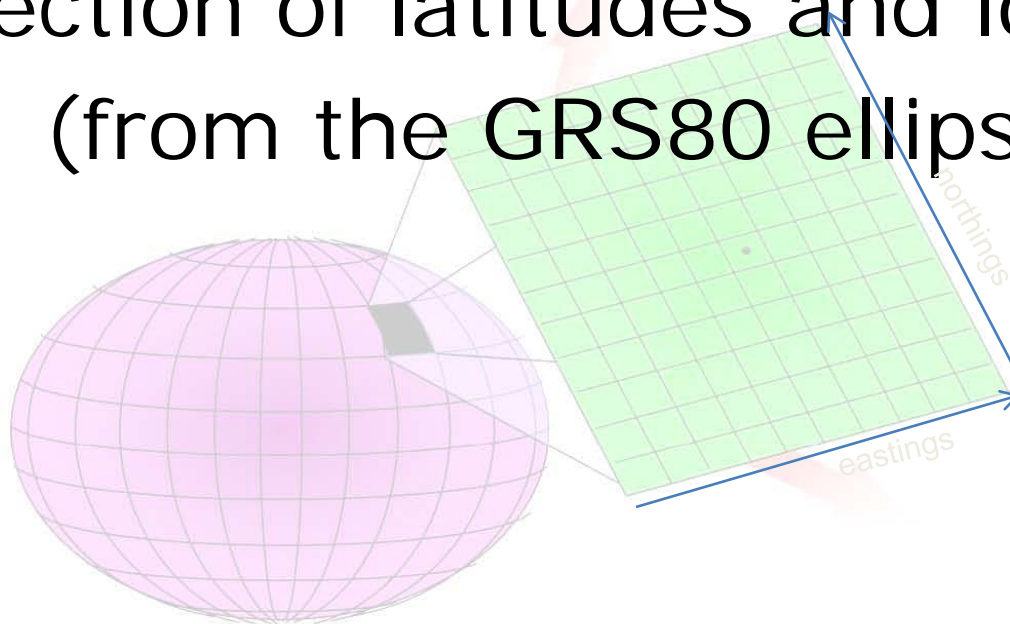
Federal Register Notice: Vol. 60, No. 157, August 15, 1995, pg. 42146
"Use of NAD 83/WGS 84 Datum Tag on Mapping Products"

Tectonic Motions



State Plane Coordinates

State plane coordinates are the projection of latitudes and longitudes (from the GRS80 ellipsoid)



To a flat mapping surface that is usually defined by state law

Plane Coordinate Conversion Tools

State Plane Coordinates

GPPCGP (NAD 27 only)

SPCS83 (NAD 83 only)

<http://www.ngs.noaa.gov/TOOLS/spc.shtml>

UTM

UTMS (Both NAD 27 & NAD 83)

<http://www.ngs.noaa.gov/TOOLS/utm.shtml>

Both

CORPSCON (Both NAD 27 & NAD 83)

<http://crunch.tec.army.mil/software/corpscon/corpscon.html>

www.ngs.noaa.gov

www.geodesy.noaa.gov



National Geodetic Survey

Positioning America for the Future

- NGS Home
- About NGS
- Data & Imagery
- Tools
- Surveys
- Science & Education
-
- Search



September 17, 2012

Announcements

NOTICE: NGS Update, September 11, 2012

GEOID12A Model Released

The National Geodetic Survey has released the **GEOID12A model**. Analysis of the underlying control data was completed and a number of corrections made to the original data used in making GEOID12. Changes impacted regions in the states of Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Wisconsin. GEOID12A is now available for production and use.

NOTICE: September 12, 2012

NGS requests your patience while updating the "bluebooking" process. New requirements are necessary in the Bluebooking process for GPS projects. NGS requests that while the **adjust guidelines** are being updated **submission of all GPS projects be postponed** until the new processes are posted. A notice will be posted here when this is accomplished.

The National Geodetic Survey Improves the National Spatial Reference System with Simultaneous Major Product Releases

In the first week of July, NOAA's National Geodetic Survey (NGS) released the results of three major improvements to the National Spatial Reference System (NSRS). The NSRS is the consistent coordinate system that defines latitude, longitude, height, scale, gravity, and orientation throughout the United States and its territories...[more](#)

Trial Version of the New NOAA Shoreline Data Explorer (Continuously Updated Shoreline Product only) is now Available:

NRC Highlights Importance of NGS Products...



NGS Public News Subscription Service

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www.ngs.noaa.gov

www.geodesy.noaa.gov

Most Popular

Contact Us

CORS

Survey Mark Datasheets

Geodetic Tool Kit

NAD 83(2011) epoch 2010.00

OPUS

LOCUS

Publications

Geodetic Advisors

Storm Imagery

UFCORS

Upcoming Events

Height Modernization



Height Modernization

- faster
- cheaper

Differential
Leveling
(Orthometric HT)

GNSS
(Ellipsoid Ht)

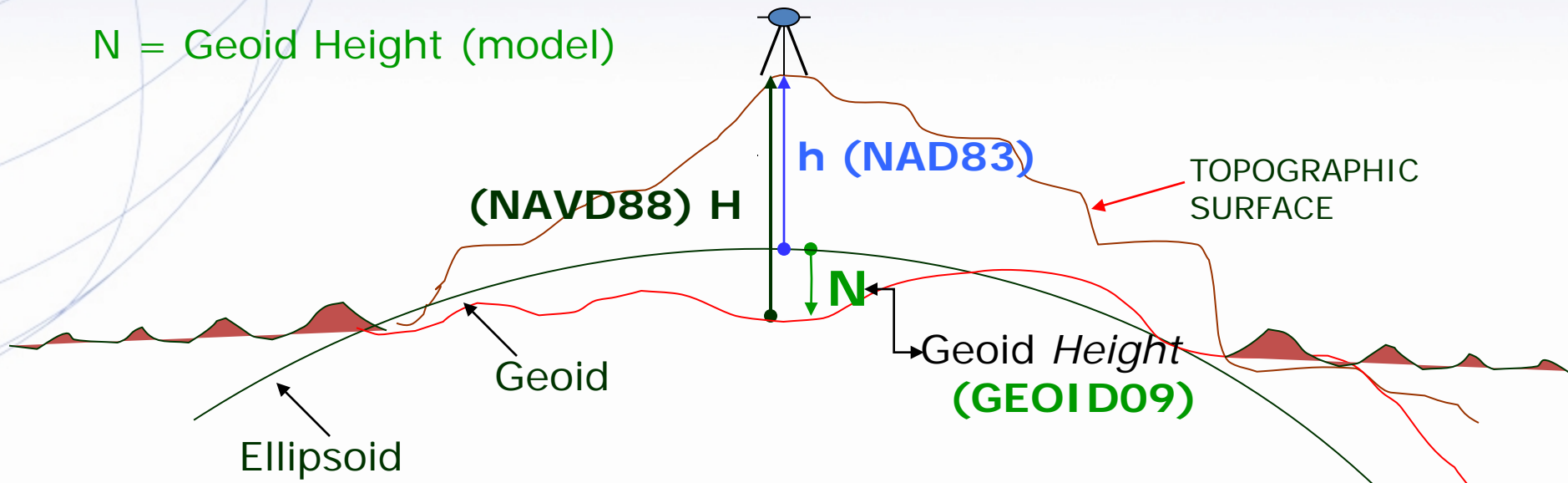
Ellipsoid, Geoid, and Orthometric Heights

H = Orthometric Height (leveling)

h = Ellipsoidal Height (GPS)

N = Geoid Height (model)

$$H = h - N$$



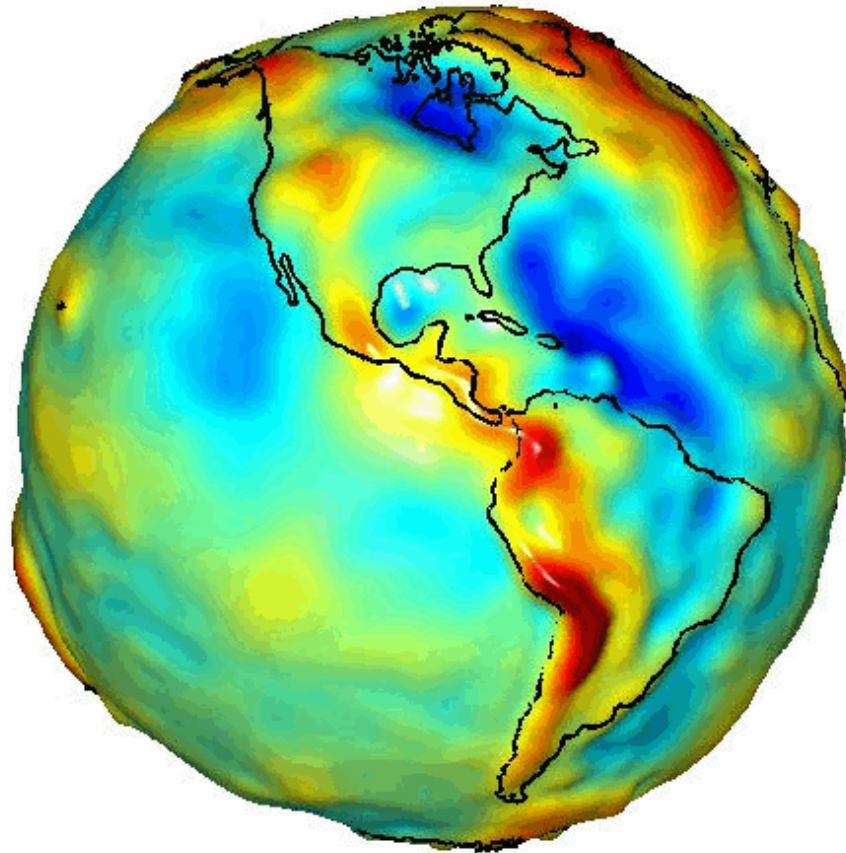
TRANSPORTATION

$$1660.6 = 1643.354 - (-17.23^*) \text{ METERS}$$

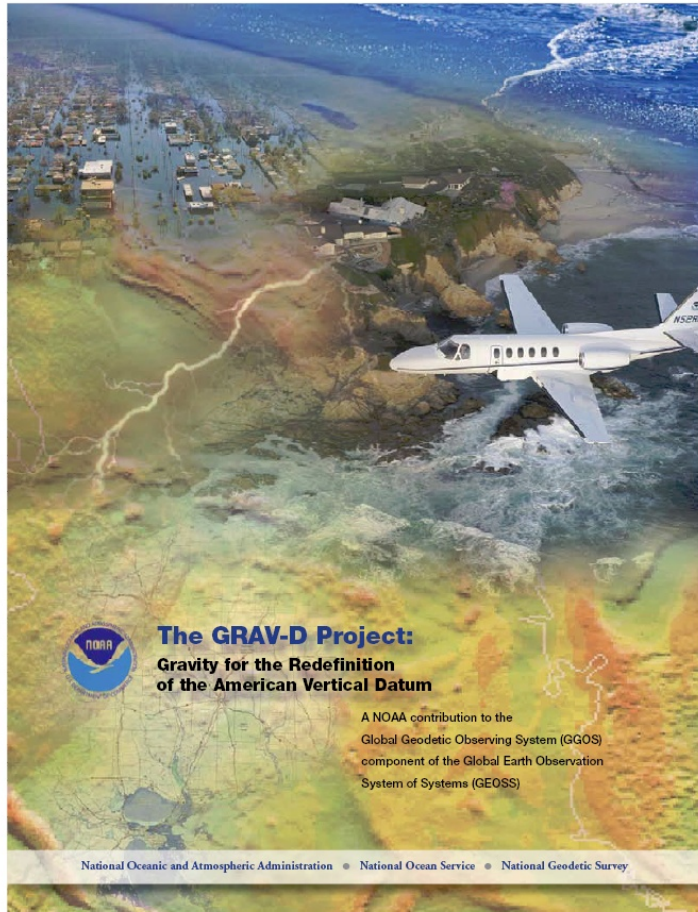
$$1660.6 = 1643.4 + 17.2$$

*56.53 feet

Exaggerated view of the Earth's Gravity Measure.



Gravity for the Redefinition of the American Vertical Datum (GRAV-D)



- Replace the Vertical Datum of the USA by 2022 (at today's funding) with a **gravimetric geoid accurate to 1 cm**
- Orthometric heights accessed via GNSS accurate to 2 cm
- Three components of project:
 - Airborne gravity survey of entire country and its holdings
 - Long-term monitoring of geoid change
 - Partnership surveys

***Gravity and Heights are
inseparably connected***

Metadata

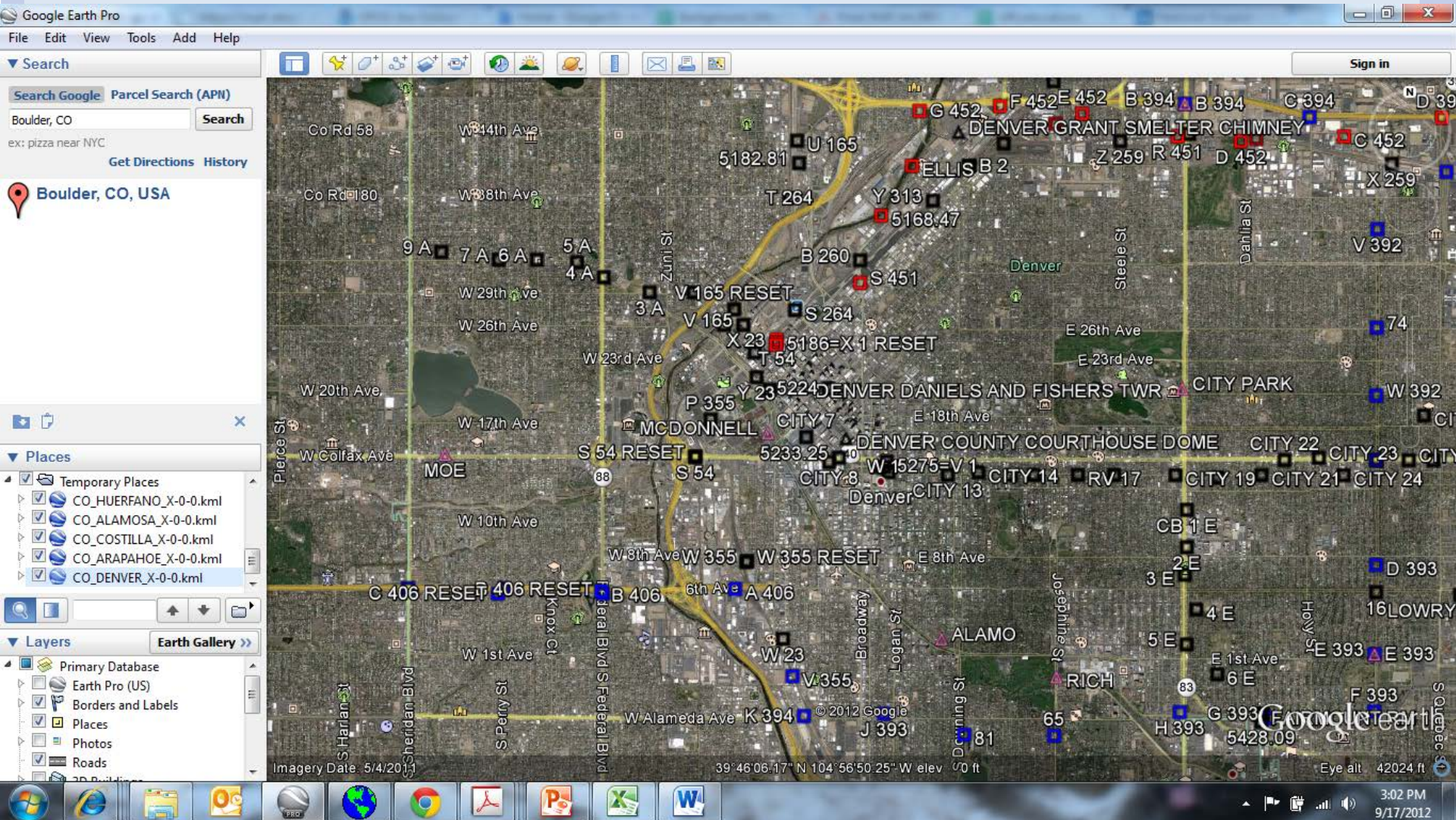
For instance:

- ✓ What is the Source of the Data?
- ✓ What is the Datum/Adjustment Epoch?
- ✓ What are the Field Conditions?
- ✓ What Equipment was used, especially what Antenna?
- ✓ What firmware was in the receiver and collector?
- ✓ What redundancy, if any, was used?

"DSWorld" Software Program

- Highly rated new NGS software tool
- Developed to search the NGS database
- Easy to learn/use
- Multiple search options available
- Displays search results using Google Earth

Geodetic Control

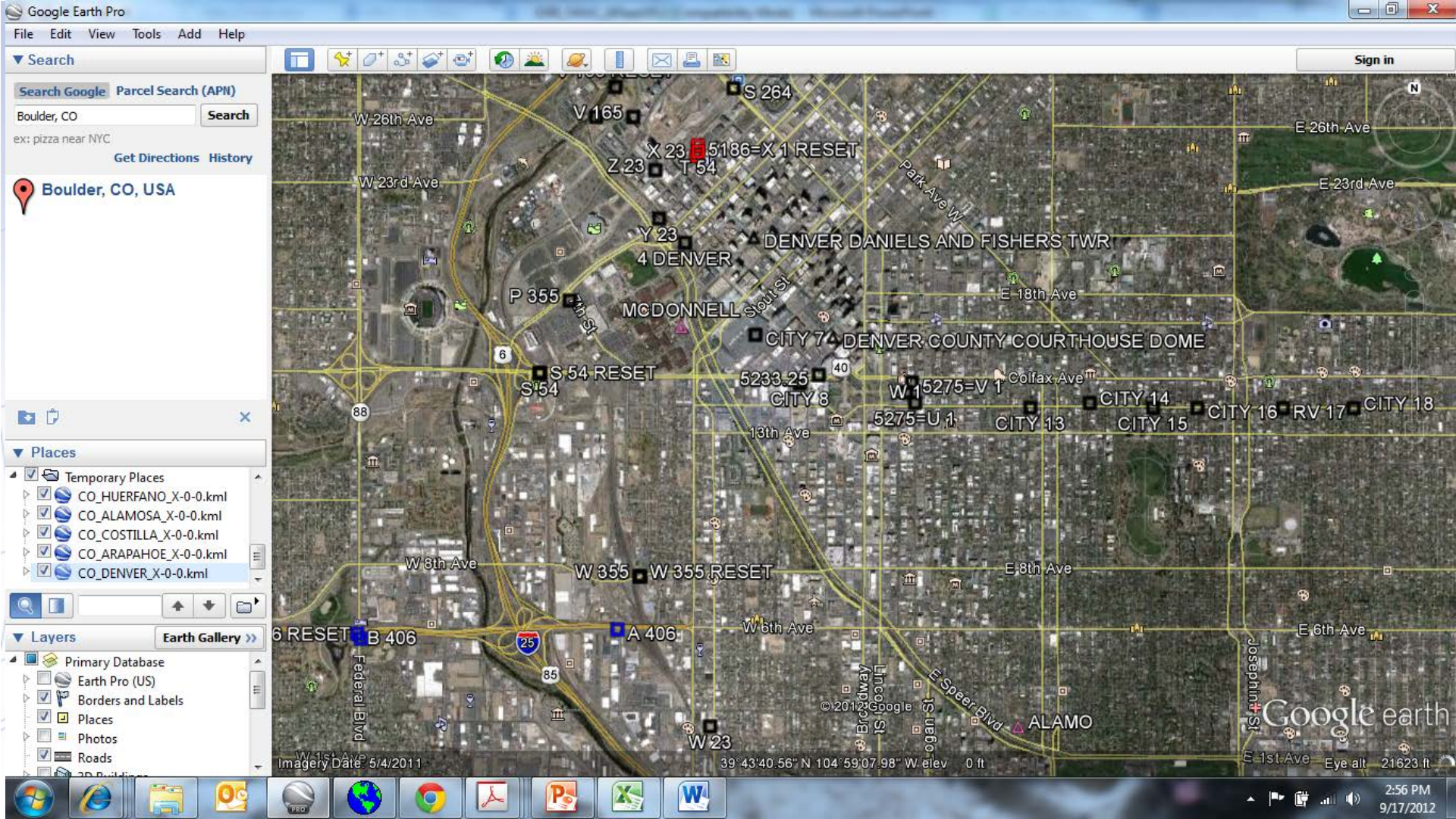


Triangles – Horizontal Control

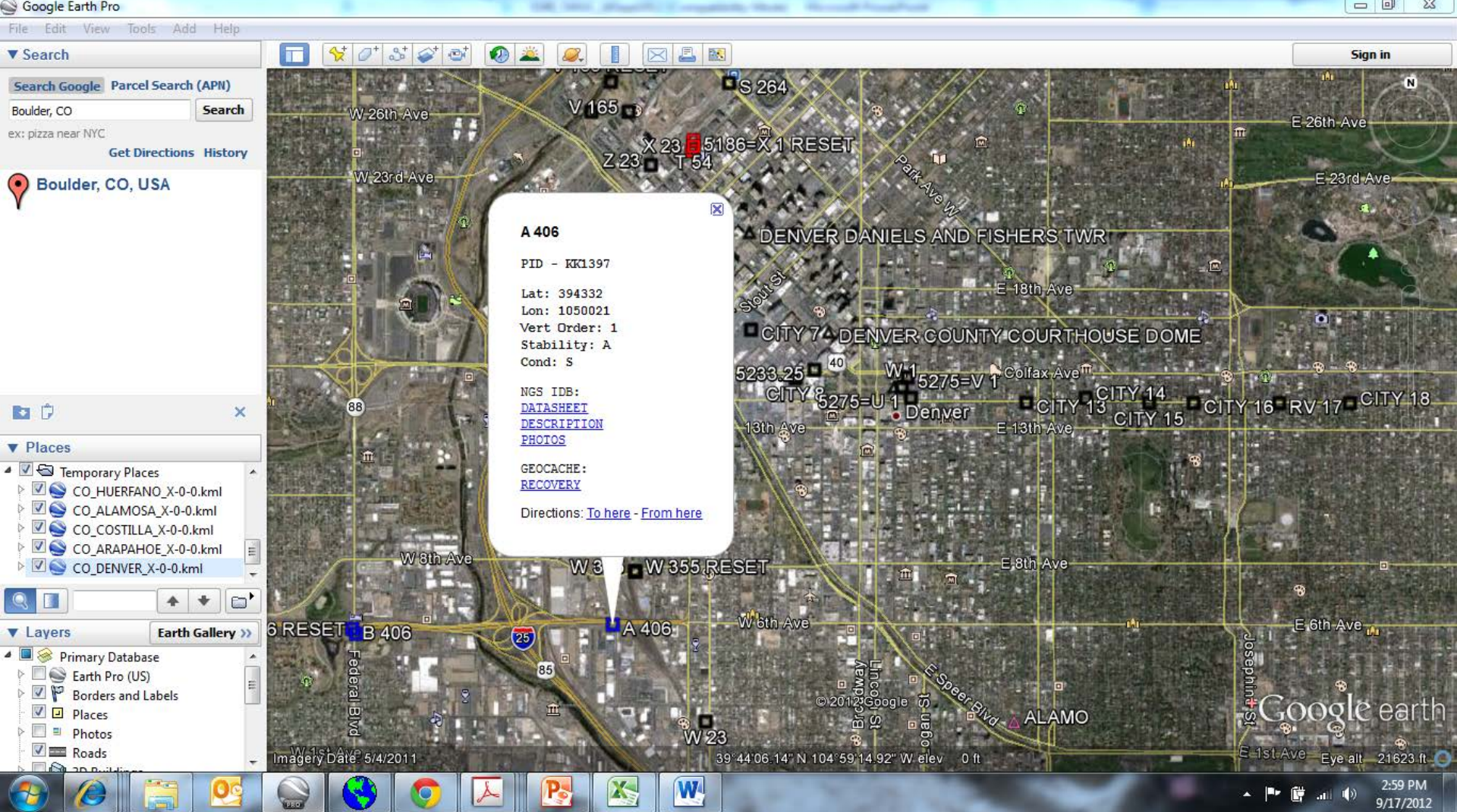
Blue – First Order

Squares – Vertical Control

Red – Second Order



Squares – Vertical Control
Black - Third Order



Datasheets	Recovery
Photos	Directions
Descriptions	

The NGS Data Sheet


See file [dsdata.txt](#) for more information about the datasheet.

```

PROGRAM = datasheet95, VERSION = 7.89.4
1      National Geodetic Survey,  Retrieval Date = SEPTEMBER 17, 2012
KK0356 *****
KK0356 DESIGNATION - CITY 7
KK0356 PID - KK0356
KK0356 STATE/COUNTY- CO/DENVER
KK0356 COUNTRY - US
KK0356 USGS QUAD - ENGLEWOOD (1997)
KK0356
KK0356 *CURRENT SURVEY CONTROL
KK0356
KK0356 *-----*
KK0356* NAD 83(1986) POSITION- 39 44 33. (N) 104 59 44. (W) SCALED
KK0356* NAVD 88 ORTHO HEIGHT - 1591.873 (meters) 5222.67 (feet) POSTED
KK0356
KK0356 GEOID HEIGHT - -17.07 (meters) GEOID12A
KK0356 DYNAMIC HEIGHT - 1590.35 (meters) 5217.7 (feet) COMP
KK0356 MODELED GRAVITY - 979,615.7 (mgal) NAVD 88
KK0356
KK0356 VERT ORDER - * POSTED, Code B , SEE BELOW
KK0356
KK0356.The horizontal coordinates were scaled from a topographic map and have
KK0356.an estimated accuracy of +/- 6 seconds.
KK0356.
KK0356.The orthometric height was determined by differential leveling
KK0356.and adjusted by the NATIONAL GEODETIC SURVEY in 1992.
KK0356
KK0356.* This is a POSTED BENCH MARK height. Code B indicates a distribution
KK0356.rate of 1.1 thru 2.0 mm/km.
KK0356
KK0356.The dynamic height is computed by dividing the NAVD 88
KK0356.geopotential number by the normal gravity value computed on the
KK0356.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
KK0356.degrees latitude (g = 980.6199 gals.).
KK0356
KK0356.The modeled gravity was interpolated from observed gravity values.
KK0356
KK0356; North East Units Estimated Accuracy
KK0356;SPC CO C - 516,860. 957,640. MT (+/- 180 meters Scaled)

```

Done

 Trusted sites | Protected I

Direct Access to the NGS Datasheet

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

PROGRAM = datasheet95, VERSION = 7.89.4

1 National Geodetic Survey, Retrieval Date = SEPTEMBER 17, 2012

KK2099 *****

KK2099 CBN - This is a Cooperative Base Network Control Station.

KK2099 DESIGNATION - MCDONNELL

KK2099 PID - KK2099

KK2099 STATE/COUNTY- CO/DENVER

KK2099 COUNTRY - US

KK2099 USGS QUAD - FORT LOGAN (1994)

KK2099

KK2099 *CURRENT SURVEY CONTROL

KK2099

KK2099* NAD 83 (2011) POSITION- 39 44 34.68961(N) 105 00 03.94526(W) ADJUSTED

KK2099* NAD 83 (2011) ELLIP HT- 1570.549 (meters) (06/27/12) ADJUSTED

KK2099* NAD 83 (2011) EPOCH - 2010.00

KK2099* [NAVD 88](#) ORTHO HEIGHT - 1587.6 (meters) 5209. (feet) GPS OBS

KK2099

KK2099 NAD 83 (2011) X - -1,271,464.369 (meters) COMP

KK2099 NAD 83 (2011) Y - -4,744,806.603 (meters) COMP

KK2099 NAD 83 (2011) Z - 4,057,086.731 (meters) COMP

KK2099 LAPLACE CORR - -9.44 (seconds) DEFLEC09

KK2099 GEOID HEIGHT - -17.05 (meters) GEOID12A

KK2099

KK2099 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)

KK2099 Type Horiz Ellip Dist (km)

KK2099 -----

KK2099 NETWORK 0.45 0.92

KK2099 -----

KK2099 MEDIAN LOCAL ACCURACY AND DIST (021 points) 0.60 1.14 20.52

KK2099 -----

KK2099 NOTE: Click [here](#) for information on individual local accuracy

KK2099 values and other accuracy information.

KK2099

KK2099

KK2099.The horizontal coordinates were established by GPS observations

KK2099.and adjusted by the National Geodetic Survey in June 2012.

KK2099

- Data & Imagery
- Tools
- Surveys
- Science & Education

Sampling Rate (clickable legend icons)



Non-Operational



250 km radius

1 sec

5 sec

10 sec

15 sec

30 sec

All Active

Decom





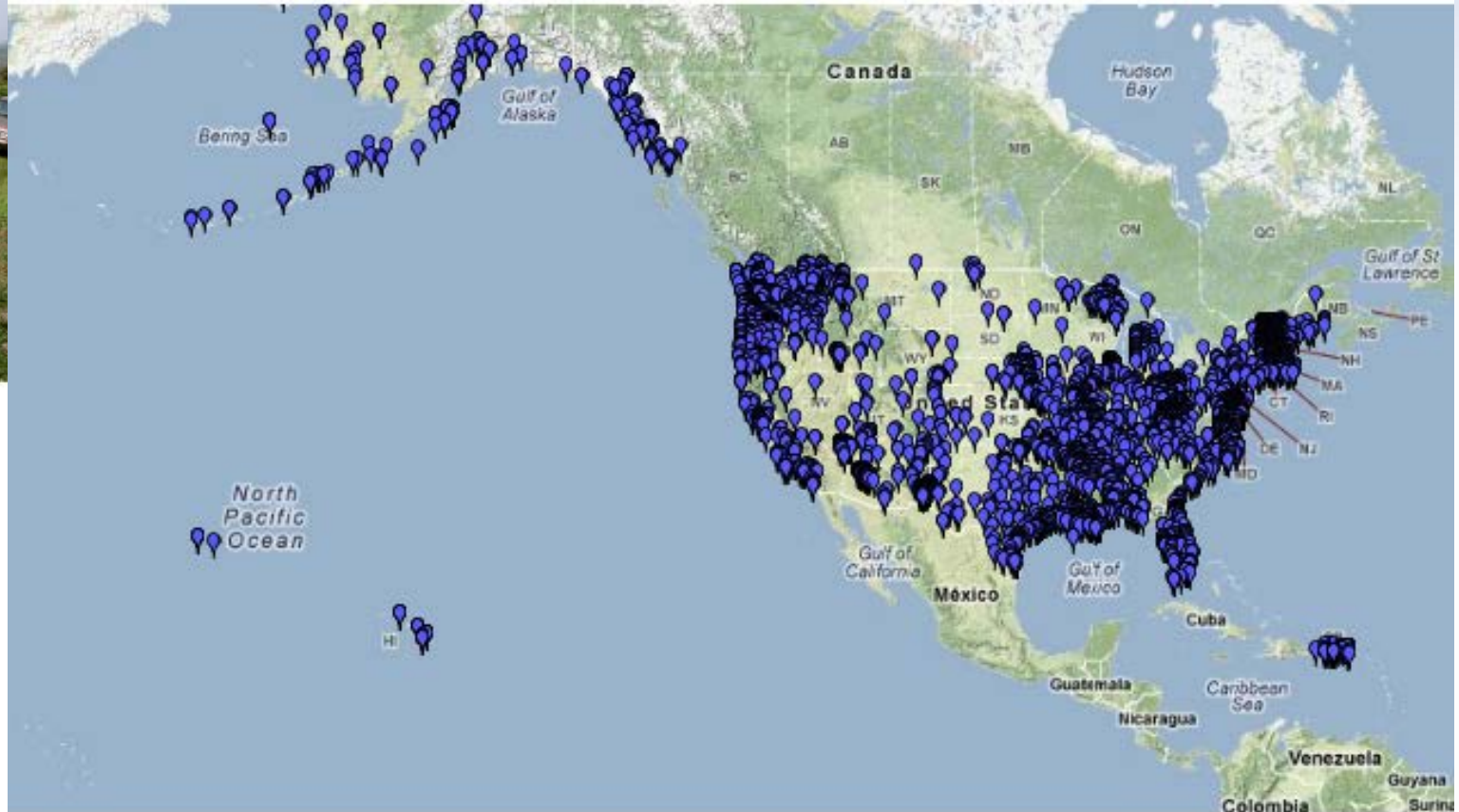
OPUS

Online Positioning User Service

- OPUS – S (2 hrs)
- OPUS – RS (15 minutes)
- OPUS – DB (Publish)
- OPUS – Projects (Network)

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NGS Data Sheets

Traditional
blue booking

New
OPUS-DB

```
SE = , PROGRAM = datasheet, VERSION = 7.86
National Geodetic Survey, Retrieval Date = APRIL 20, 2011
*****
4 DESIGNATION - C 281
4 PID - DO0454
4 STATE/COUNTY- TX/THROCKMORTON
4 USGS QUAD - THROCKMORTON NE (1965)
4
4 *CURRENT SURVEY CONTROL
4
4 NAD 83(2007)- 33 11 10.75472(N) 099 06 11.86433(W) NO CHECK
4* NAVD 88 - 383.465 (meters) 1258.08 (feet) ADJUSTED
4
4 EPOCH DATE - 2002.00
4 X - -845,419.278 (meters) COMP
4 Y - -5,276,185.563 (meters) COMP
4 Z - 3,471,464.429 (meters) COMP
4 LAPLACE CORR- 0.24 (seconds) DEFLECO9
4 ELLIP HEIGHT- 353.943 (meters) (02/10/07) NO CHECK
4 GEOID HEIGHT- -28.98 (meters) GEOID09
4 DYNAMIC HT - 383.004 (meters) 1256.57 (feet) COMP
4
4 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----
4 Type PID Designation North East Ellip
4 -----
4 NETWORK DO0454 C 281 1.10 1.47 2.14
4 -----
4 MODELED GRAV- 979,426.2 (mgal) NAVD 88
4
4 VERT ORDER - SECOND CLASS 0
4
```

SURVEY DATASHEET (Version 1.0)

PID: DO0454
Designation: C 281
Stamping: C 281 1934
Stability: Most reliable; expected to hold position well
Setting: In rock outcrop or ledge
Mark Condition: G
Description: Recovered as described by "Alpha Land Surveying, Inc."
Observed: 2006-09-28T22:19:00Z See Also [2006-09-28](#)
Source: OPUS - page 5 0810.20



REF_FRAME: NAD_83(CORS96)	EPOCH: 2002.0000	SOURCE: NAVD88 (Computed using GEOID09)	UNITS: m	SET PROFILE	DETAILS
LAT: 33° 11' 10.78167" ± 0.010 m		UTM 14		SPC 4202(TXNC)	
LOn: -99° 6' 11.86387" ± 0.016 m		NORTHING: 3671943.370m		2168676.749m	
ELL HT: 354.428 ± 0.028 m		EASTING: 490370.894m		543746.220m	
X: -845419.259 ± 0.014 m		CONVERGENCE: -0.05654024°		-0.32903401°	
Y: -5276185.517 ± 0.020 m		POINT SCALE: 0.99960114		0.99987537	
Z: 3471465.389 ± 0.023 m		COMBINED FACTOR: 0.99954552		0.99981974	
ORTHO HT: 383.464 ± 0.070 m					

CONTRIBUTED BY

[dbrouty](#)
 [Conrad Blucher Institute](#)

Horizon View



The numerical values for this position solution have satisfied the quality control criteria of the National Geodetic Survey. The contributor has verified the information submitted is accurate and complete.

OPUS Submission Webpage

OPUS: the Online Positioning User Service, process your GNSS data in the National Spatial Refer - Windows Internet Explorer


http://www.ngs.noaa.gov/OPUS/

File Edit View Favorites Tools Help

OPUS: the Online Positioning User Service, process yo...

OPUS: Online Positioning User Service
National Geodetic Survey

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Upload your data file.

Tie your GPS observation to the National Spatial Reference System.
What is OPUS? FAQs

* Email address - your solution will be sent here.

* Data file of dual-frequency GPS observations. [sample](#)

no antenna selected

Antenna type - choosing wrong may degrade your accuracy.

meters above your mark.

Antenna height of your antenna's reference point.

to customize your solution.

for data > 15 min. < 2 hrs. for data > 2 hrs. < 48 hrs.

* required fields

Your email address

Location of your data file

Your antenna type

Antenna height

Customize your solution - details on next slide

Sample Solutions

start 8 5 M... D... 2 G... D... T... P... Survey Software 10:45 AM

Introducing...

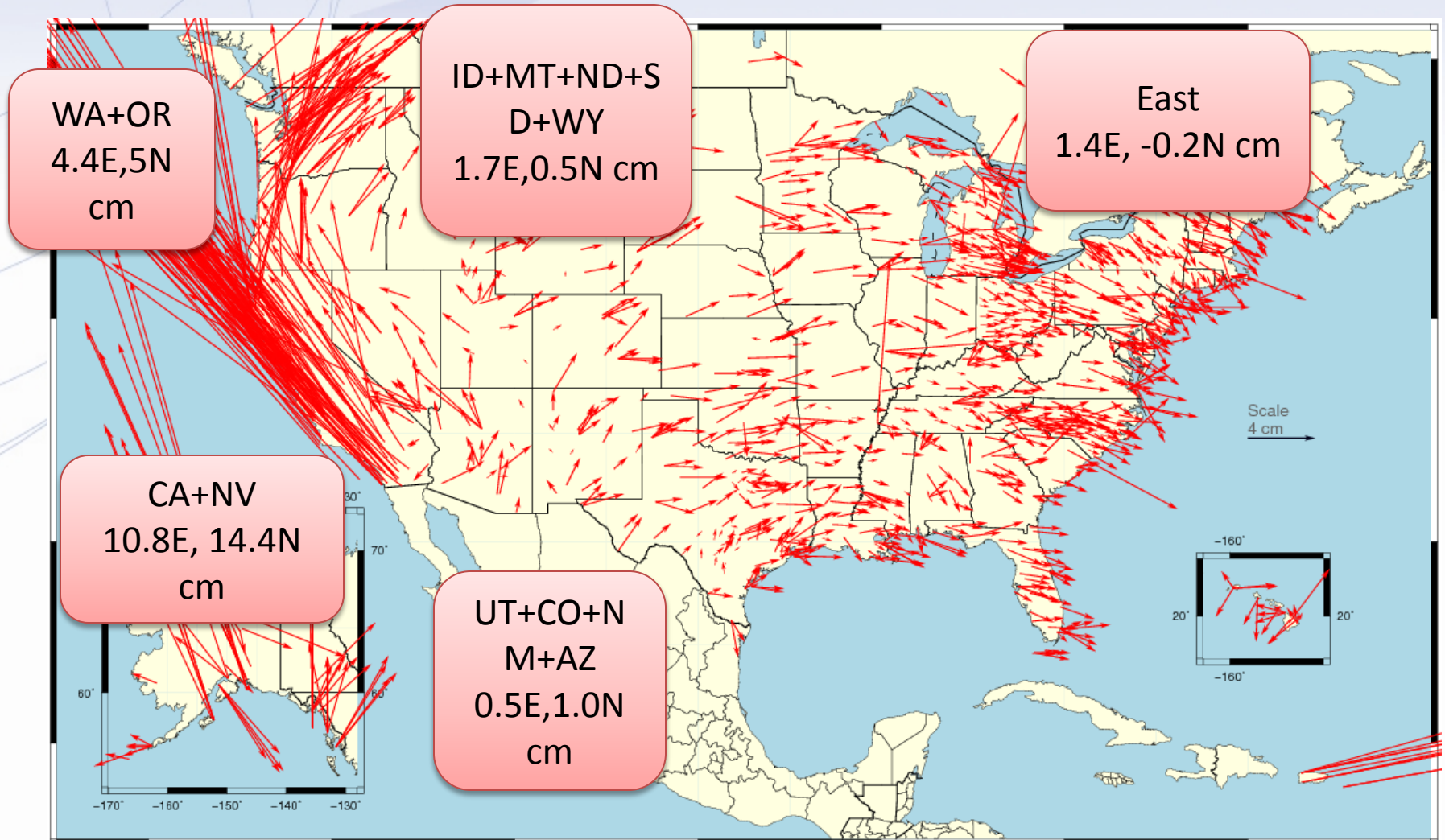
NAD 83(2011) epoch 2010.00

- **Multi-Year CORS Solution (MYCS)**
 - Reprocessed all CORS GPS data Jan 1994-Apr 2011
 - 2264 CORS & global stations
 - NAD 83 computed by *transformation* from IGS08
- **National Adjustment of 2011 (NA2011)**
 - New adjustment of GNSS passive control
 - GNSS vectors tied (and constrained) to CORS NAD 83(2011) epoch 2010.00
 - Approximately 80,000 stations and more than 400,000 GNSS vectors



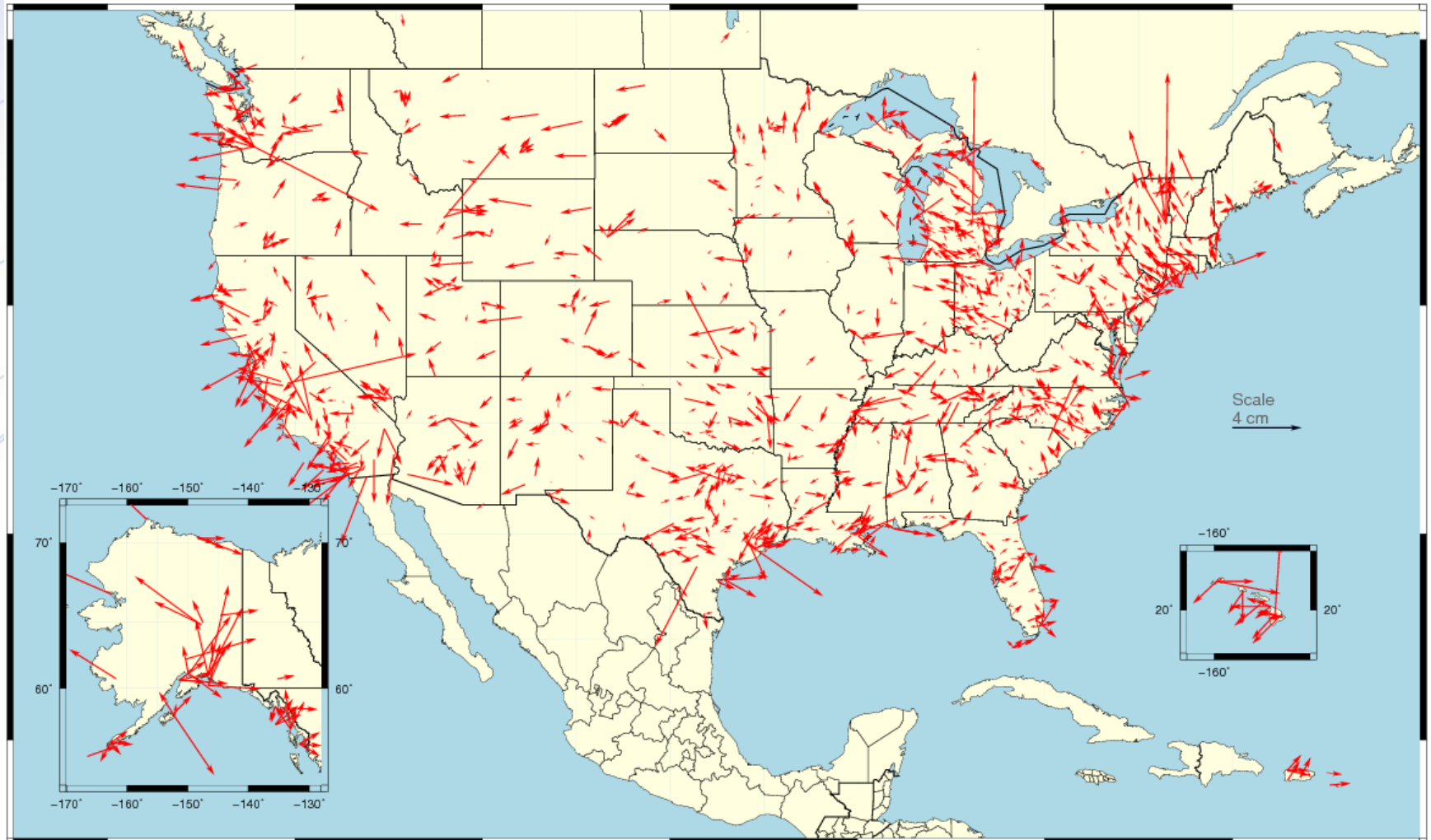
Changes in *Horizontal* NAD 83 Positions Different Epochs

NAD 83(2011) epoch 2010.0 – NAD 83(CORS96) epoch 2002.0



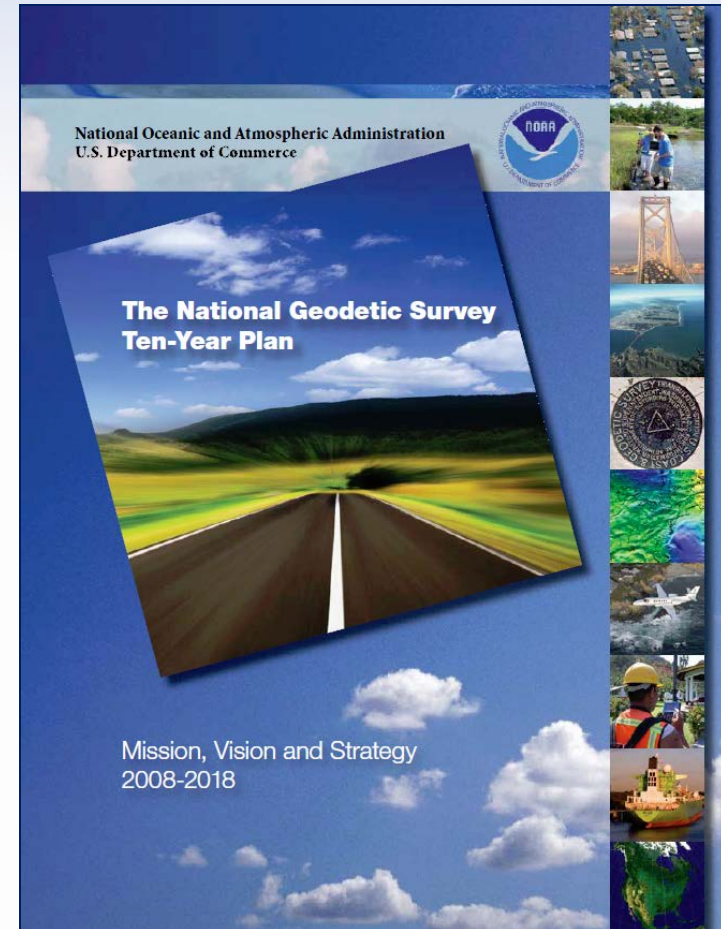
Changes in *Horizontal* NAD 83 Positions Same Epoch

NAD 83(2011) epoch 2002.00 – NAD 83(CORS96) epoch 2002.00

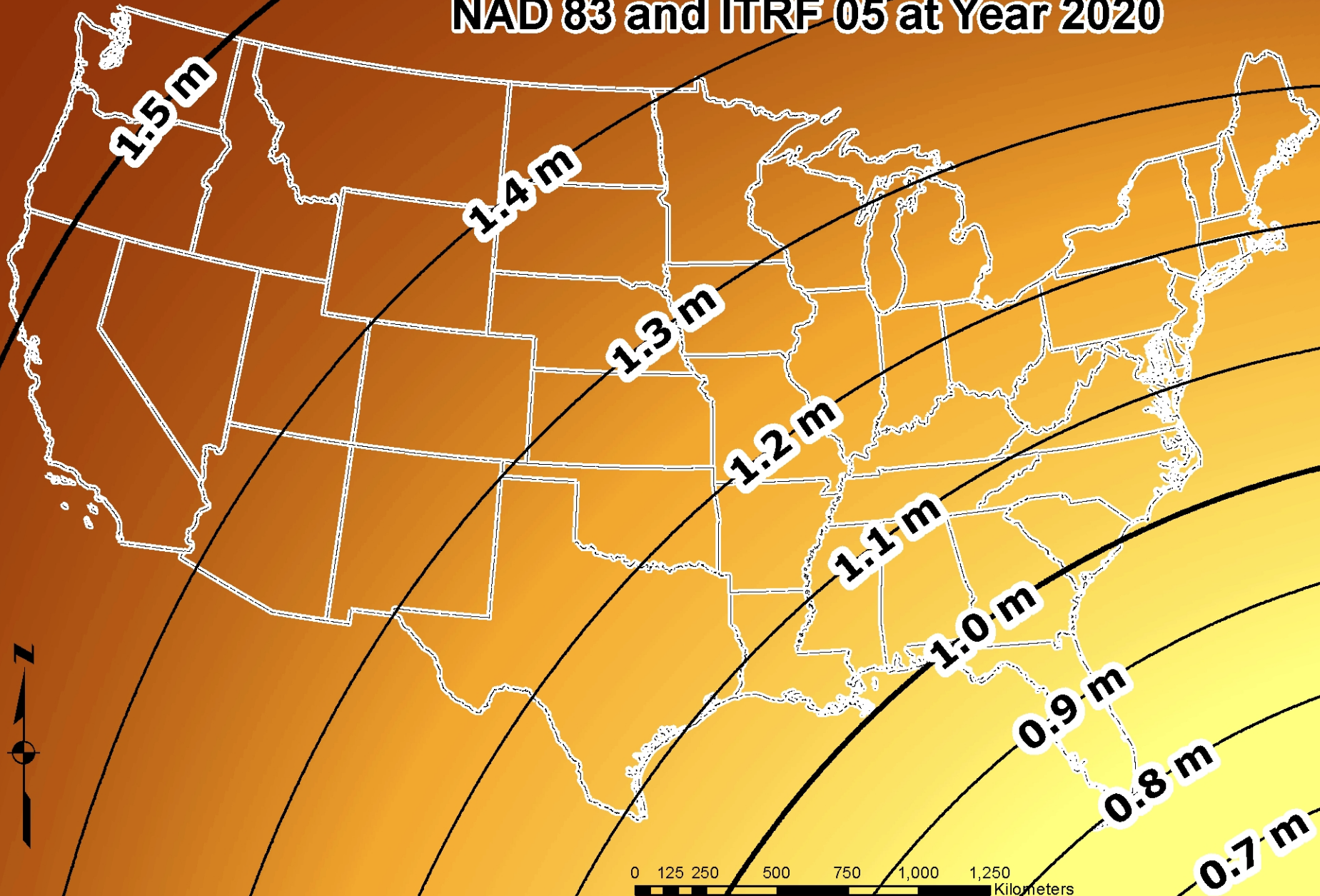


National Geodetic Survey Ten-Year Plan

- Official NGS policy as of January 2008
- Replace NAVD 88 with a GPS/geoid datum
- Replace NAD 83 with a geocentric GPS based datum

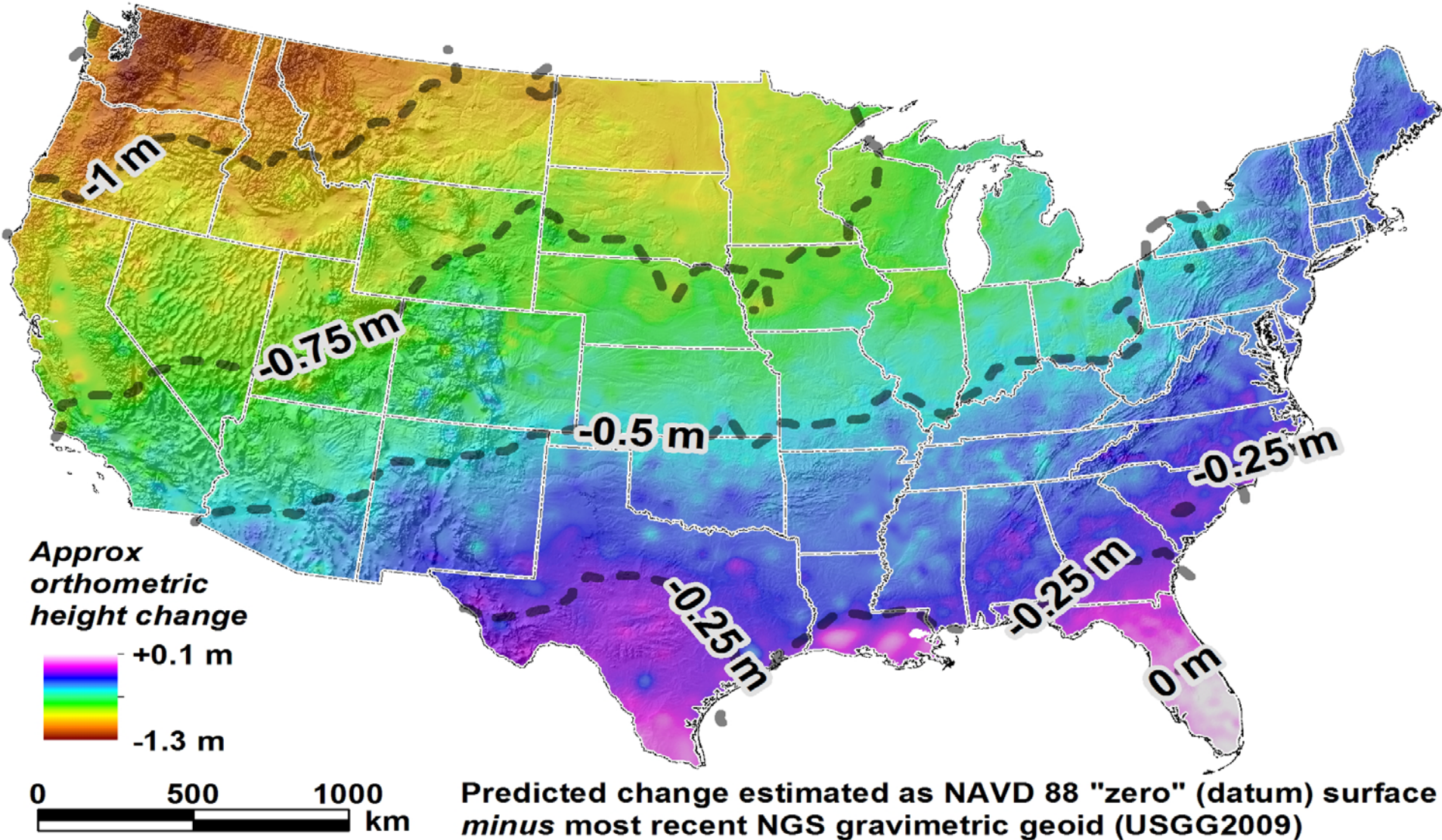


Horizontal Position Difference Between NAD 83 and ITRF 05 at Year 2020



New Vertical Datum

Approximate predicted change from NAVD 88 to new vertical datum



NGS Training Center



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This presentation will be uploaded to:

http://www.ngs.noaa.gov/web/science_edu/presentations_archive/

FAQs on the various webpages



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September 17, 2012

Announcements

NOTICE: NGS Update, September 11, 2012

GEOID12A Model Released

The National Geodetic Survey has released the **GEOID12A model**. Analysis of the underlying control data was completed and a number of corrections made to the original data used in making GEOID12. Changes impacted regions in the states of Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Wisconsin. GEOID12A is now available for production and use.

NOTICE: September 12, 2012

NGS requests your patience while updating the "bluebooking" process. New requirements are necessary in the Bluebooking process for GPS projects. NGS requests that while the **adjust guidelines** are being updated **submission of all GPS projects be postponed** until the new processes are posted. A notice will be posted here when this is accomplished.

The National Geodetic Survey Improves the National Spatial Reference System with Simultaneous Major Product Releases

In the first week of July, NOAA's National Geodetic Survey (NGS) released the results of three major improvements to the National Spatial Reference System (NSRS). The NSRS is the consistent coordinate system that defines latitude, longitude, height, scale, gravity, and orientation throughout the United States and its territories...[more](#)

Trial Version of the New NOAA Shoreline Data Explorer (Continuously Updated Shoreline Product only) is now Available:

NRC Highlights Importance of NGS Products...



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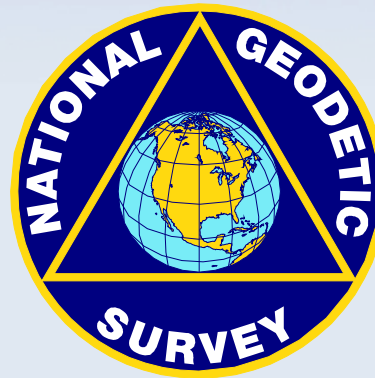
Storm Imagery

UFCORS

Upcoming Events

Questions

GOOD COORDINATION BEGINS WITH
GOOD COORDINATES



GEOGRAPHY WITHOUT GEODESY IS A FELONY

pamela.fromhertz@noaa.gov

303-202-4082

240-988-6363