



Testimony on VT S.154 VT State Plane Coordinate System



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Dan Martin
Northeast Regional Geodetic Advisor
ME, NH, VT, MA, CT, RI, NY, NJ
Dan.martin@noaa.gov
240-676-4762

NGS Regional Geodetic Advisors

★ Advisor Locations



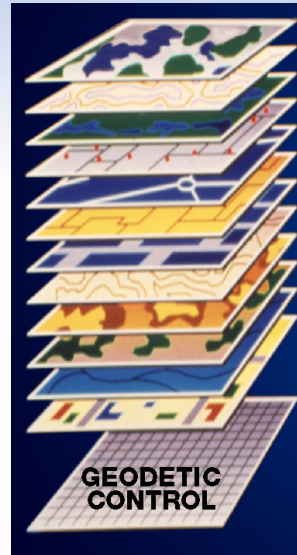
National Spatial Reference System (NSRS)

NGS Mission: To define, maintain & provide access to the **National Spatial Reference System (NSRS)** to meet our Nation's economic, social & environmental needs

Consistent National Coordinate System

- Latitude/Northing
- Longitude/Easting
- Height
- Scale
- Gravity
- Orientation

& how these values change with time



The National Spatial Reference System supports



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



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



Levee Safety Program to determine levee heights & 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

What is a Datum? What is it's purpose?

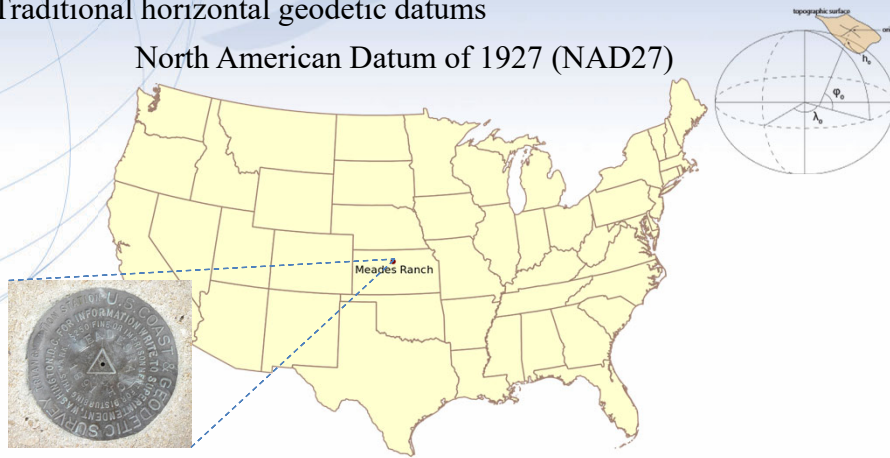
- "A set of constants specifying the coordinate system used for geodetic control, i.e., for calculating the coordinates of points on the Earth."
- Geodesists and surveyors use datums to create starting or reference points for floodplain maps, highway surveys, property boundaries, construction surveys, levee design, or other work requiring accurate coordinates that are consistent with one another.

National Spatial Reference System (NSRS) Improvements over time

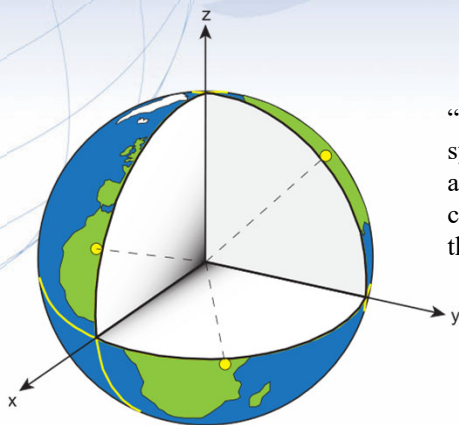
NETWORK	TIME SPAN	NETWORK ACCURACY	LOCAL ACCURACY	SHIFT
North American Datum of 27 NAD 27	1927-1986	10 meters	(1:100,000)	
North American Datum of 83 NAD83(86)	1986-1990	1 meter	(1:100,000)	10-200 m
North American Terrestrial Reference Frame of 2022 NATRF2022	2025-	0.01 meter	0.01 meter	≈ 1.30 m

Traditional horizontal geodetic datums

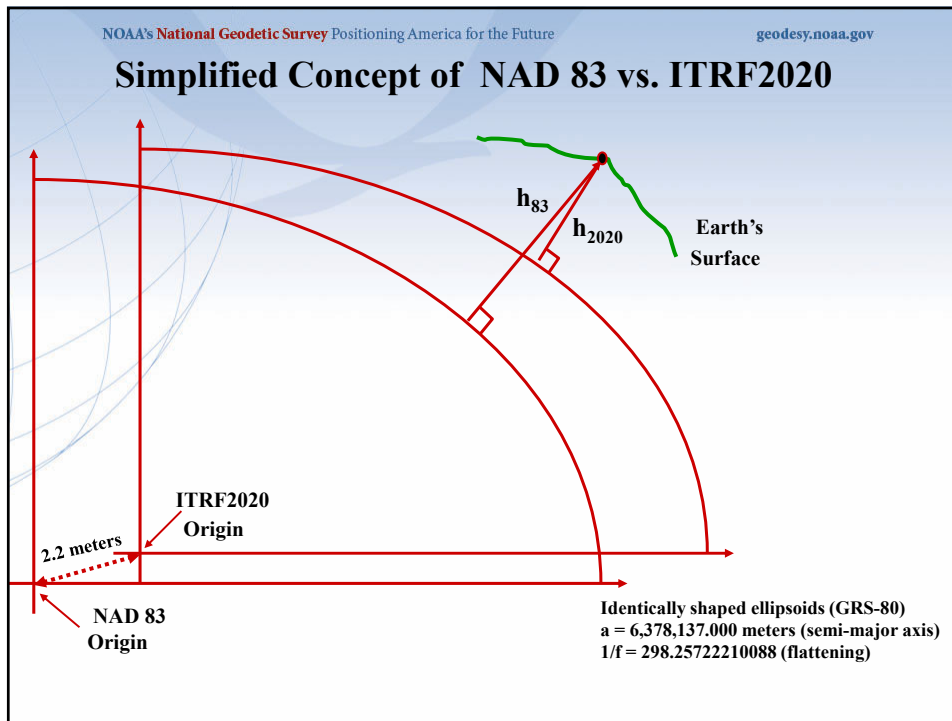
North American Datum of 1927 (NAD27)



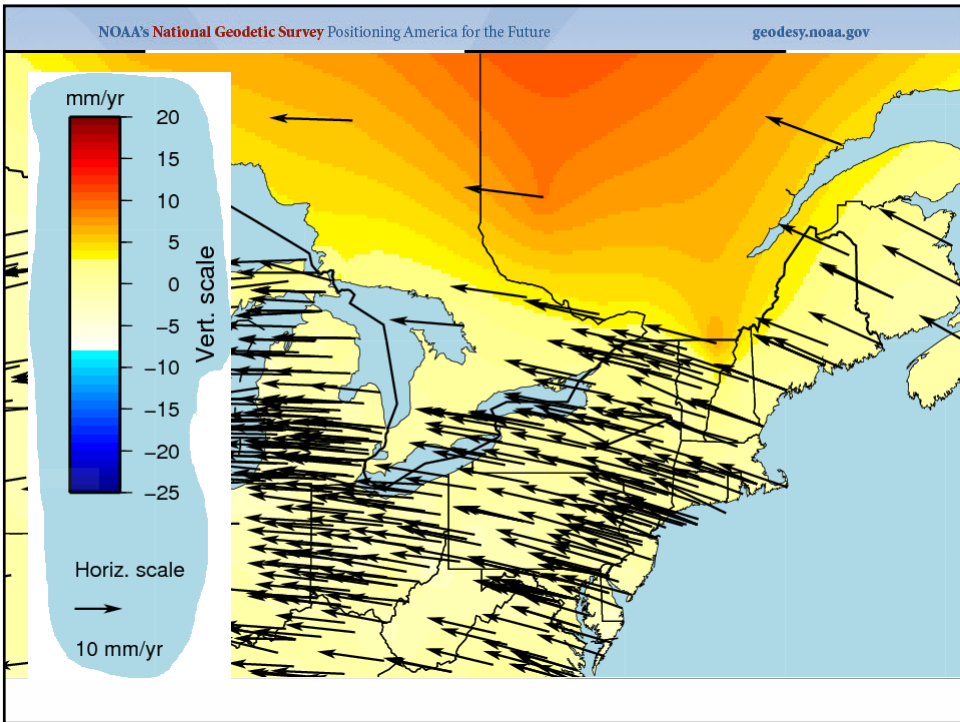
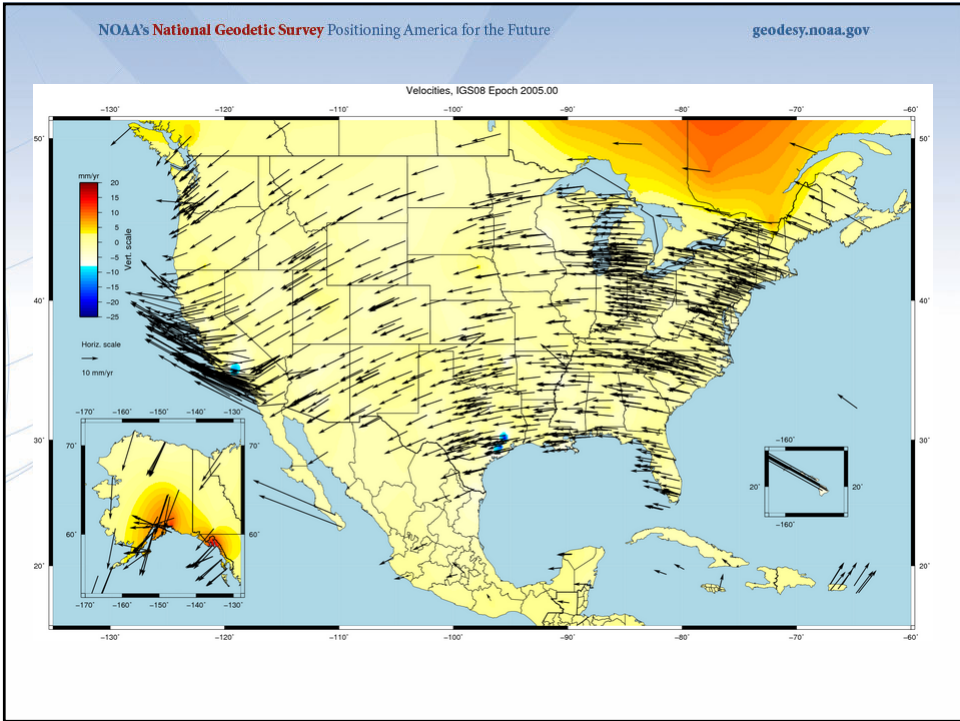
International Terrestrial Reference Frame (ITRF)

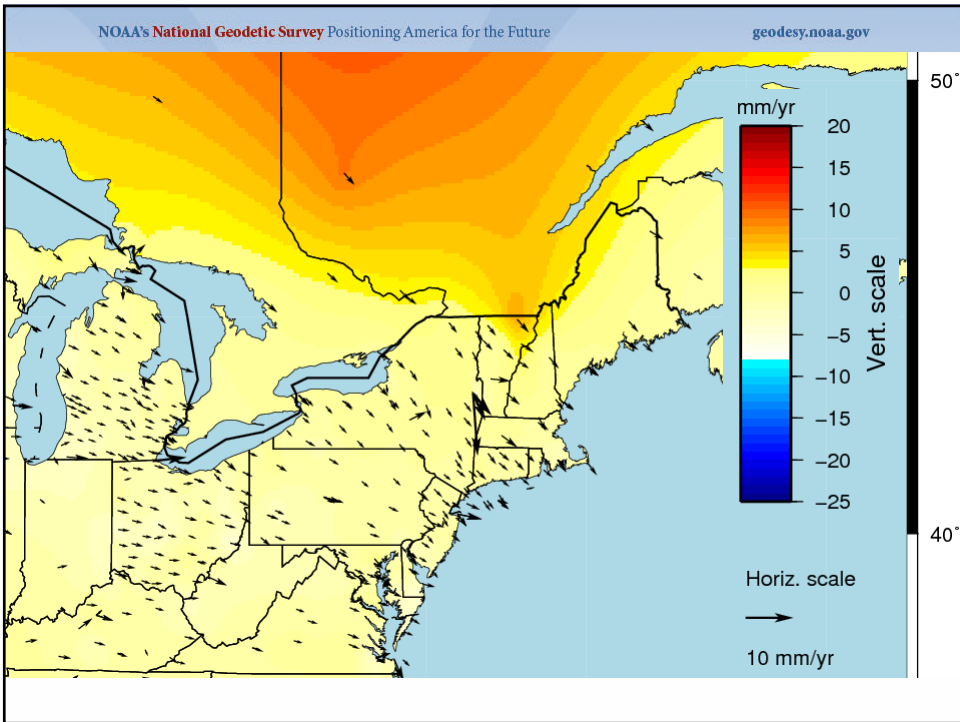
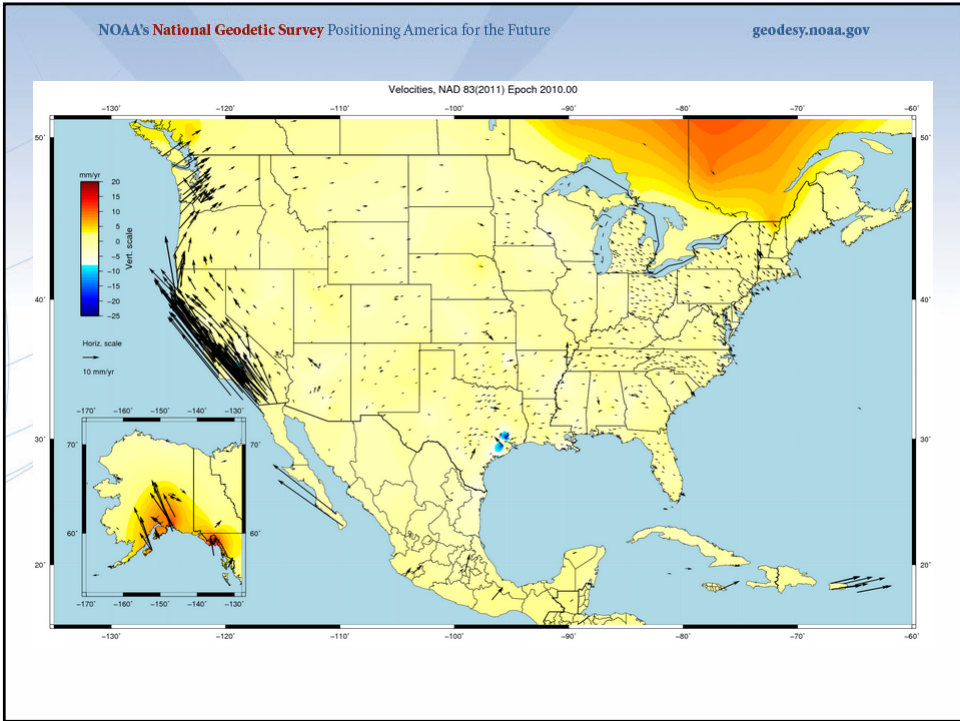


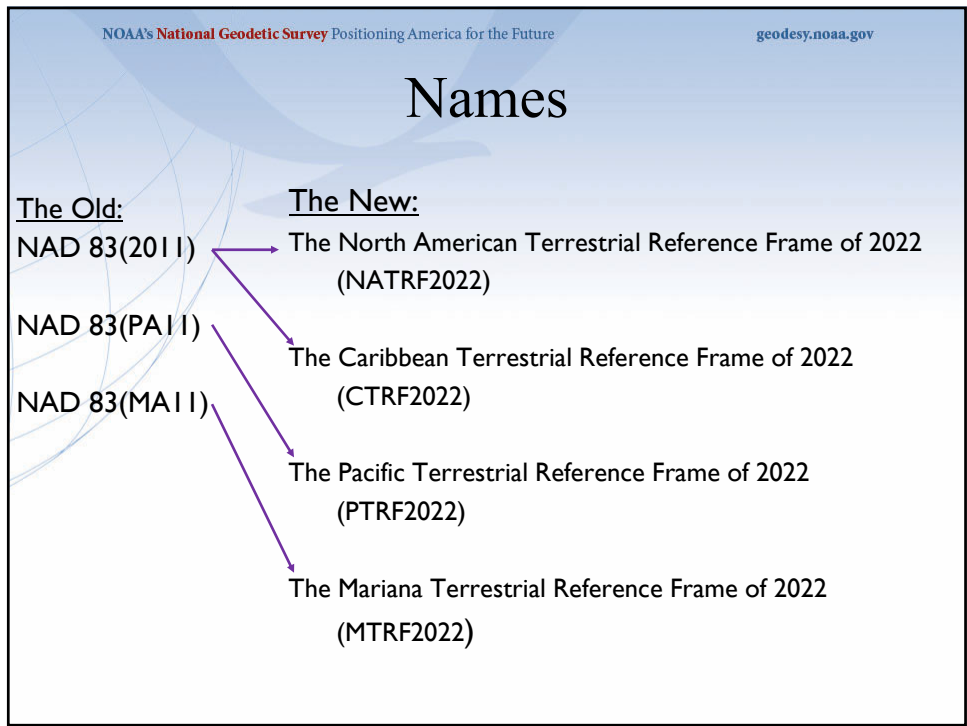
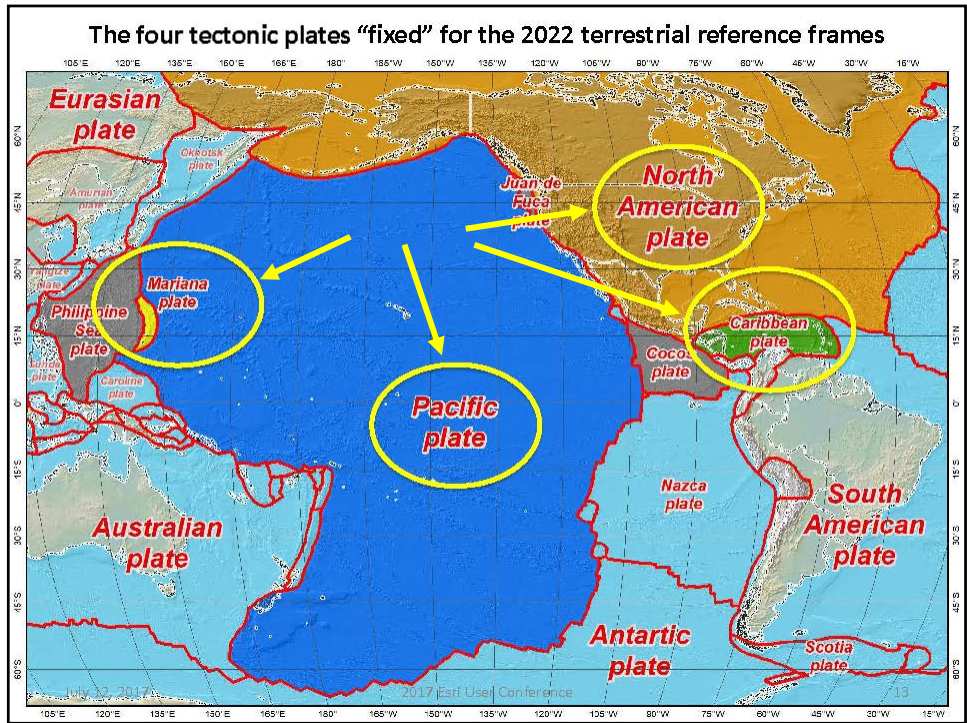
“Realization” of the idealized reference system occurs when coordinates are assigned to physical points in a self-consistent manner that honors the rules of the reference system.



- NOAA's National Geodetic Survey Positioning America for the Future geodesy.noaa.gov
- ## Why Replace NAD 83?
- **NAD 83** is not as geocentric as it could be (approx. 2 m)
 - **NAD 83** is not well defined with positional velocities
 - Earthquakes, landslides, intra-plate motions (horizontal)
 - Post Glacial Isostatic Adjustment (uplift in some places subsidence in others)
 - Subsurface fluid withdrawal (subsidence)
 - Sediment loading (subsidence)



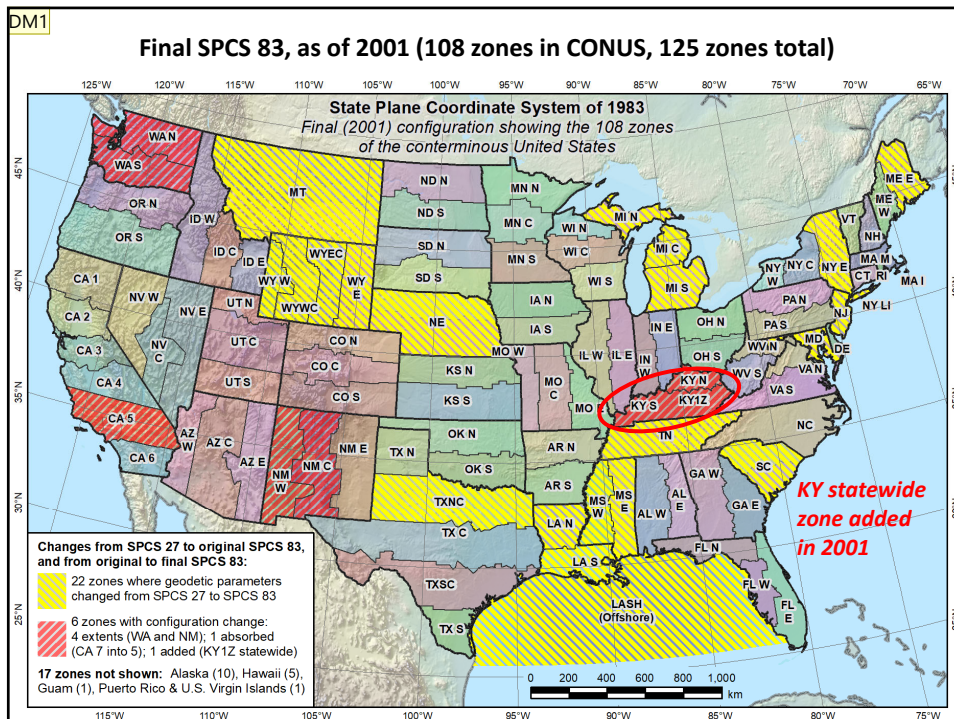




NOAA's National Geodetic Survey Positioning America for the Future geodesy.noaa.gov

What is the State Plane Coordinate System (SPCS)?

- SPCS is a system of large-scale conformal map projections originally created in the 1930s to support surveying, engineering, and mapping activities throughout the U.S. and its territories. A map projection is a mathematical transformation of latitudes and longitudes on the surface of a sphere or ellipsoid representing the Earth to grid coordinates (*northing, easting* or *y, x* values) on a plane.
- Since its inception, SPCS has served as a practical means for NGS customers to access to the National Spatial Reference System (NSRS).



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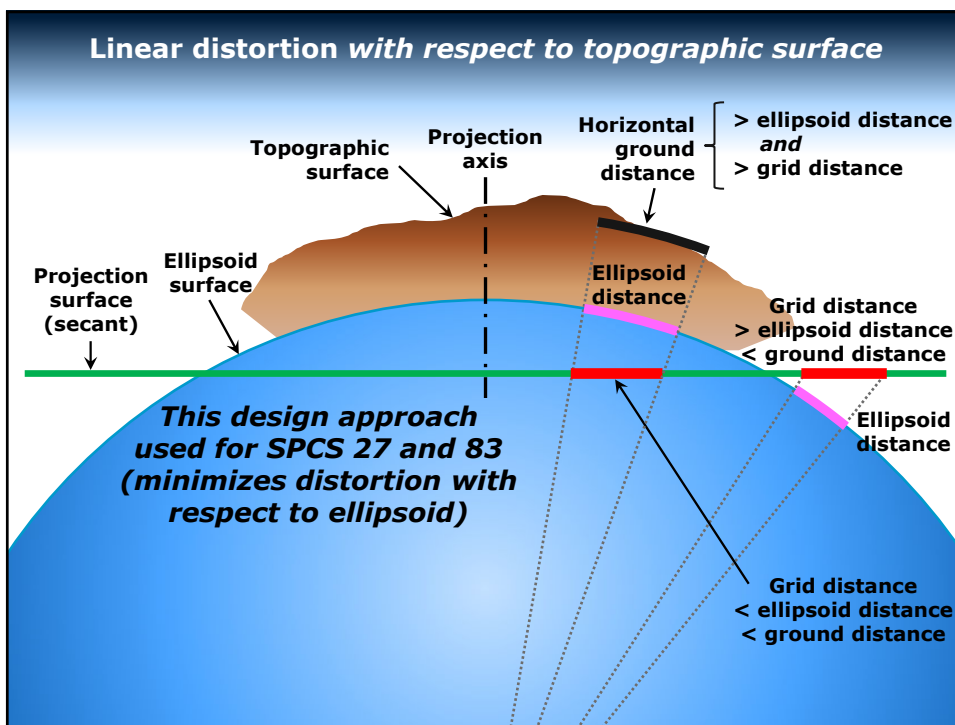
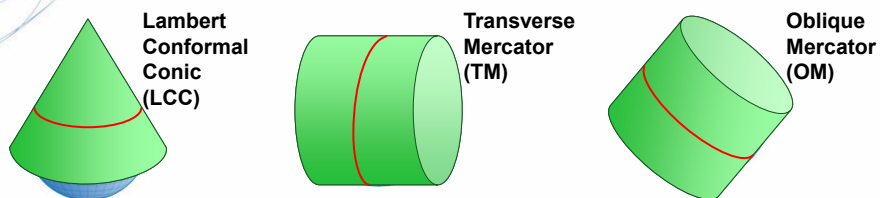
DM1

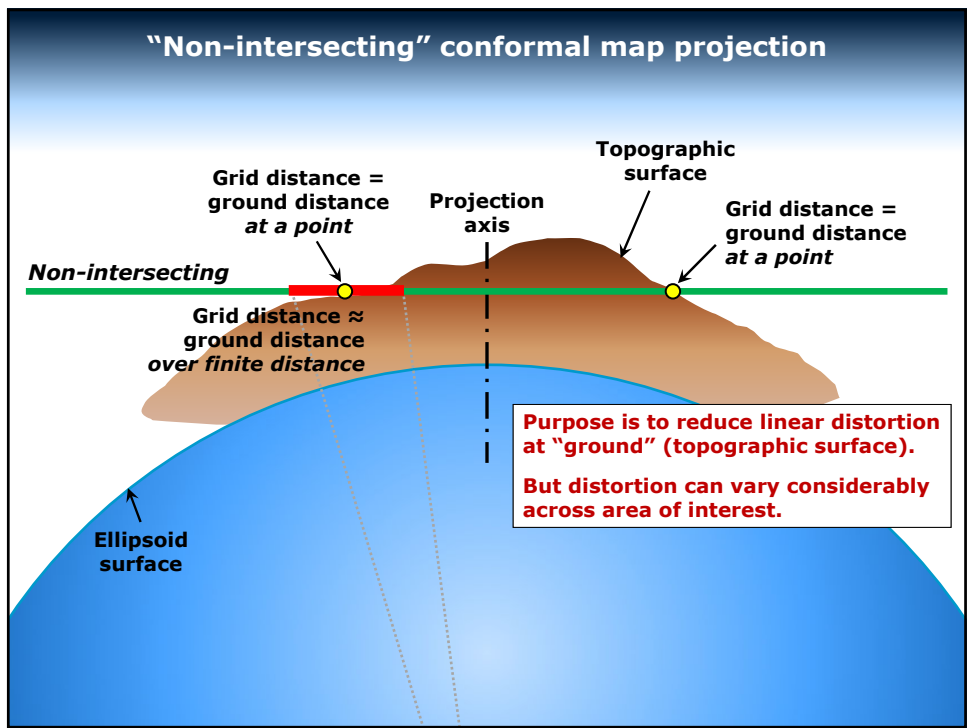
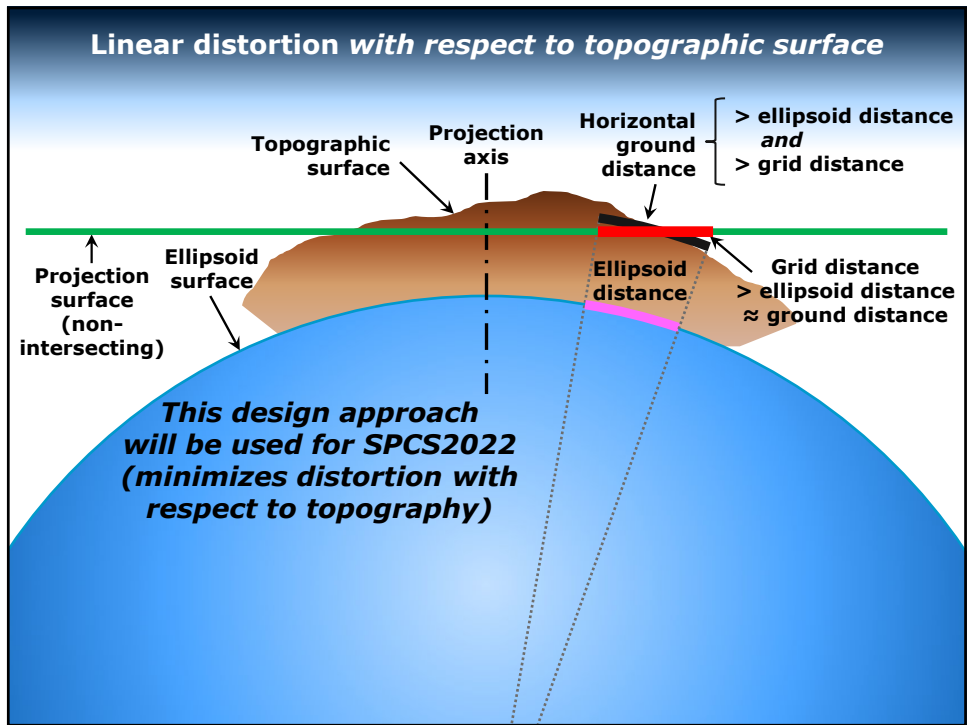
Dan Martin, 12/14/2018

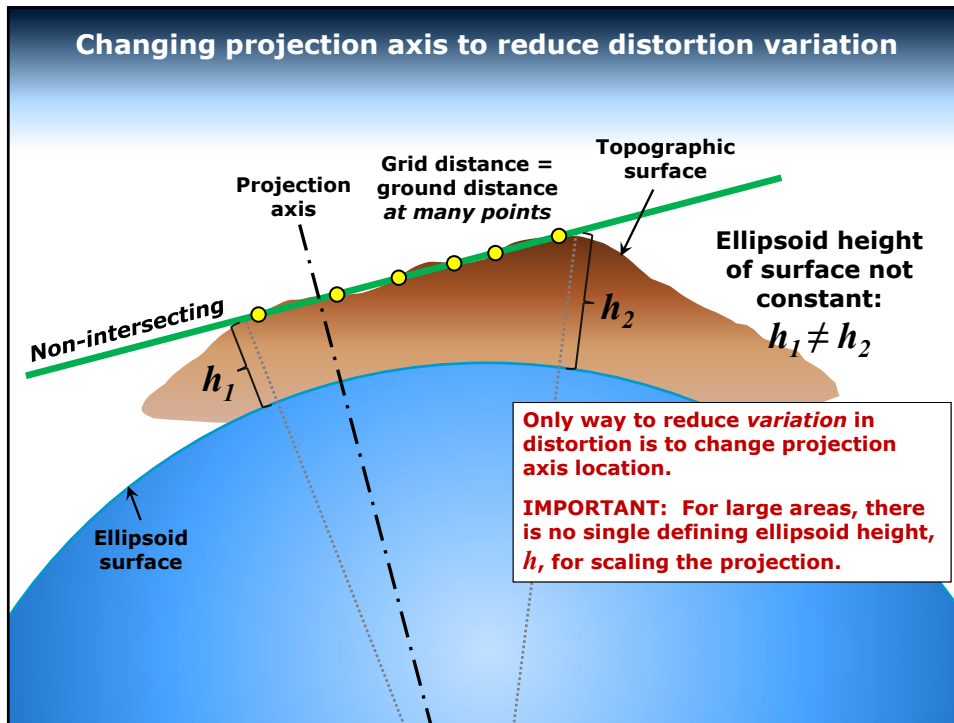
A New State Plane Coordinate System

- **State Plane Coordinate System of 2022 (SPCS2022)**

- Referenced to 2022 Terrestrial Reference Frames (TRFs)
- Based on same reference ellipsoid as SPCS 83 (GRS 80)
- Same 3 *conformal* projection types as SPCS 83 and 27:







NOAA's National Geodetic Survey Positioning America for the Future geodesy.noaa.gov

Why does all this “stuff” matter?

- Geospatial data is everywhere
- Usefulness diminished if “stuff” doesn’t line up

Courtesy of Michael Dennis

Who is affected by this change?

- Anyone creating or using or updating surveys, maps, or other products tied to the NSRS.
 - Surveyors, Engineers, GIS Professionals, etc...
 - Many/most Federal Agencies who produce mapping products.
 - Many State Agencies including VTrans, ANR, Digital Services (VCGI)
 - Town Governments (Tax Maps, Municipal mapping of infrastructure)
 - Construction (layout and machine control)
 - Agriculture (Precision Farming)

Questions?

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