

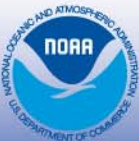
A proposed LDP Design Tool and LDP Registry

Dave Minkel
NGS Geodetic Advisor to Arizona
Geospatial Professional Member, APLS



Presentation Outline

- **History with respect to NGS**
- **Example Implementation**
 - LDP Design Tool
 - LDP Registry
- **Why Should NGS Consider This? (Minkel personal opinion)**



But First – Caveats, Disclaimers, Etc.

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- NGS has NOT decided if it will implement an LDP Design Tool or Registry
 - This Workshop might help make that decision
- NGS might not implement both the Design Tool and the Registry
 - Registry more likely to be implemented than Design Tool
 - Supports National Coordination
 - Less Resources required
- Depending on Where You Live/Work this concept may be of NO benefit to You.
- The “Views” presented here are mine, not necessarily those of NGS.



LDP History at NGS

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- ~ 1991 - Thaddeus Vincenty (NGS) assists in the definition of an LDP for adoption by Lancaster County, NE
- August, 2005 – Minkel/Dennis develop LDP tools concept for NGS Geodetic Tool Kit
- August, 2005 – NGS Director Challstrom and NOS Administrator Spinrad endorse LDP concept
- September 30, 2005 – Challstrom retires
- October, 2005 – LDP Concept Presentation at NGS Convocation
- March, 2007 – LDP concept presentation at ACSM National to assess user support (NGA supportive of idea)
- September, 2007 – Outreach/Survey W/R to NGS support of LDP Concept starts with AAGS
- November, 2008 – OGUG Workshop
- January, 2009 – Director Zilkoski retires



Definition – LDP Design Tool

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- An on-line tool that steps the user through the process of designing a Low Distortion Projection for their area of interest
 - Open to any user
 - Local government agencies
 - Surveying & Engineering Firms
 - Educational facilities
 - Uses NGS assets and data
 - Interactive
 - Enforces good practices
 - Selection of projection parameters “controlled”
 - On-line tutorial



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Conceptual Implementation – Design Tool

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- **User Specifies Area of Interest**
 - Registered LDPs in that area?
 - If so, it's displayed to user
- **Select Projection (Design Tool proposes one)**
 - Transverse Mercator & Lambert only (?)
- **Specify Central Meridian & Origin Latitude (Tool proposes one)**
- **Specify Reference Ellipsoid Height**
 - Tool uses NED & Geoid model to propose one
 - Select linear units, easting, northing, scale factor
- **"Clean" values enforced**
- **Iterate above until User is satisfied**
 - process assisted by distortion plots



Conceptual Implementation – Design Tool

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- Upon completion, User provided with:
 - Graphic Showing distortion of LDP across project area
 - Industry-standard files with projection parameters
 - GIS files
 - Data Collector files
- Entire design process assisted with design suggestions and tutorial information
- User given opportunity to “register” LDP if they represent a governmental entity
- Only “approved” datums are supported
 - e.g. no BAD 27, WGS 84, etc.













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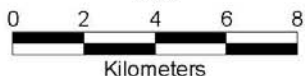
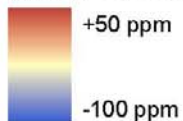
Globe-Miami low-distortion grid coordinate system

Linear unit: International foot
 Geodetic datum: North American Datum of 1983 (1992)
 Projection: Transverse Mercator
 Latitude of grid origin: 33°15'00" N
 Longitude of central meridian: 110°48'00" W
 Northing at grid origin: 0.000 ift
 Easting at central meridian: 50,000.000 ift
 Central meridian scale factor: 1.000167 (exact)

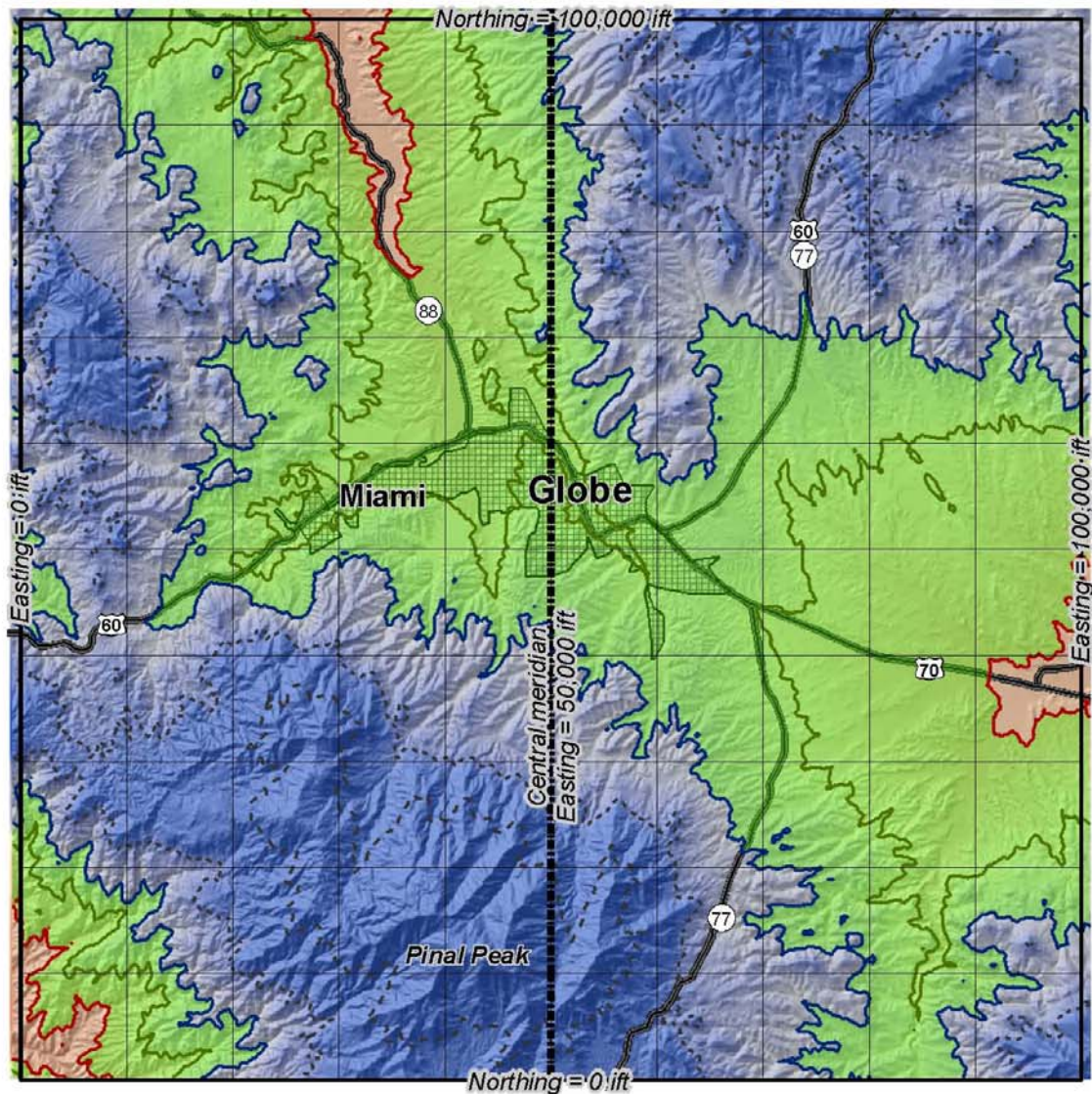
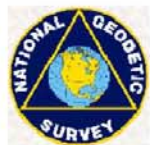
Legend

-  Globe-Miami built-up area
-  Highways
-  Central meridian (E = 50,000 ft)
-  10,000-ft grid lines
-  Area within ±20 ppm distortion (±0.11 ft/mi)
-  Zero distortion contour
-  +20 ppm distortion contour (+0.11 ft/mi)
-  -20 ppm distortion contour (-0.11 ft/mi)
-  -50ppm ppm distortion contour (-0.26 ft/mi)
-  -100 ppm distortion contour (-0.53 ft/mi)

Linear distortion



1:125,000



Definition – the “Registry”

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- A single, national, on-line source for the parameters of local projection systems
 - Limited to governmental entities
 - “Project LDPs” not accepted
 - Meant to mitigate the negative effects of “encouraging” the use of local coordinate systems in lieu of UTM (aka US National Grid), SPC, or other “standard” projections



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Conceptual Implementation – Registry

NATIONAL GEODETIC SURVEY

- LDP Registration accomplished via
 - LDP Design Tool
 - Sign-up Web page
 - LDP design issues here
- Access to the Registry through two means:
 - Subscription – push technology gives instant updates
 - Push subscriptions might be limited to Emergency Response agencies
 - Web/FTP page – 24 hour, publicly accessible

Benefits -

- Reduces proliferation of local projections
- Reduces negative effect of local projections, i.e. unknown projection parameters



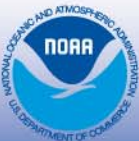
Conceptual Implementation – Registry

NATIONAL GEODETIC SURVEY

- **Customized NGS Products Possible**
 - OPUS results could include LDP coordinates
 - Custom data sheet product could include LDP coordinates
 - On-line utility's to convert LDP to/from geodetic coordinates or other projected coordinate systems
 - Allows utilization of LDPs and all other NGS products

Benefits -

- Encourages registration of the projection
- Encourages use of registered LDPs rather than "project" LDPs



So, Why should NGS consider this?*

NATIONAL GEODETIC SURVEY

The fundamental purpose of the NSRS is to support mapping.

- SPC are not adequate for many applications or areas
 - Statute and Contracts may require “ground” distances
 - SPC Distortion is not acceptable for some applications
 - NGS Describes how to “bring SPC to ground”
 - Not a good thing when the metadata are typically (?) not provided
- The projection provided is “superior” to others
 - Best practices are enforced in design process
 - Clean values, defined W/R to the NSRS
 - Use by registrants/professionals encouraged
 - Projection considers an entire jurisdiction
 - Can be mandated for use by the jurisdiction



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* Presenter's Opinion

So, Why should NGS consider this?*

NATIONAL GEODETIC SURVEY

Local GIS will increasingly use LDPs for their data

- The value of a GIS increases directly as a function of its accurate portrayal of items of interest
 - Local govt. GIS managers are realizing the benefits of incorporating as-builts and COGO
 - Better decision support from the GIS
 - There is virtually no “cost” to using them
 - “On-the-fly” re-projection is a reality
- Use of registered LDPs can encourage use of the NSRS rather than local control.
 - OPUS option for positions in LDP coordinates
 - Data sheets could include LDP coordinates
 - Data sharing is enhanced through use of NSRS



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* Presenter's Opinion

So, Why should NGS consider this?*

NATIONAL GEODETIC SURVEY

Homeland Security

- As LDPs gain popularity it will become more difficult to use local data for emergency response without a coordinating activity.
 - The best GIS data for emergency responders is local GIS data.
 - More current & more accurate/resolute
 - The Projection Registry mitigates the negative effects of local projections
 - Projections parameters are readily available
 - “Push” technology for ER agencies
 - Web/FTP site for non-subscribers
 - Registration encouraged through custom NGS products and services



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* Presenter's Opinion

So, Why should NGS consider this?*

NATIONAL GEODETIC SURVEY

NGS gains VISIBILITY

- LDP design tool and Registry increase GIS community's awareness of NGS
 - LDP design tool can be used by anyone
 - Survey/Engineering firms
 - Local Government Agencies
 - Educational facilities
- Custom products supporting *Registered* LDPs promotes use (hence awareness) of NSRS and other NGS products and services
- GPRA (*Government Performance and Results Act*)
 - Custom OPUS solutions & other NGS products
 - LDPs designed
 - LDPs registered

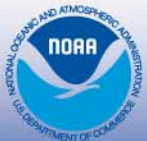


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* **Presenter's Opinion**

NATIONAL GEODETIC SURVEY

Questions, Comments?



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