GEOID12A for LGO

GEOID12A
for LGO

September, 2012

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1. INTRODUCTION:

The GEOID12A model can be used in LGO for geoid undulation calculations based on NAD83 Latitudes and Longitudes. The GEOID12A model consists of a single program named GEOID12A.EXE (provided by Leica Geosystems), with one or more grid coefficient file(s), named g2012a*.bin provided by NGS for Little Endian Data Binary structure. The g2012au0.bin file covers the entire USA Continental CONUS) region, whereas the g2012aa0.bin file covers the entire Alaska region. Binary (bin) files named: g2012ah0, g2012ap0, g2012as0, g2012ag0 bin cover areas for Hawaii, Puerto-Rico/US Virgin Islands, American Samoa, Guam and Northern Mariana Island territories respectively. Position limits of the different GEOID12A areas are listed below:

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g2012au0.bin        GEOID12 grid #1 for CONUS (24-58N, 060-130W)
g2012aa0.bin        GEOID12 grid #1 for Alaska(60-72N, 126-188W)
g2012ah0.bin        GEOID12 grid #1 for Hawaii(18-24N, 154-161W)
g2012ap0.bin        GEOID12 grid #1 for P-R/VI(13-21N, 064-069W)
g2012as0.bin        GEOID12 grid #1 for Samoa (17-11S, 168-174W)
g2012ag0.bin        GEOID12 grid #1 for Guam  (11-18N, 143-146E)
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It is under the user's responsibility to obtain the right number and the adequate Geoid2012A Grid coefficient (g2012a*.bin) file(s). The g2012a*.bin files must be the ones supplied by LEICA or must be obtained from NGS for Intel Binary (Windows) format as Little Endian Binary Structure. It is expected that some of the Geoid2012A grid coefficient files could be updated from time to time. Additional information about GEOID12A model can be found on the NGS web site.

2.0 INSTALLATION and OPERATION in LGO:

Copy or pkunzip the GEOID12A files in any subdirectory existing on the current hard disk drive where LGO resides (\LGO\Geoids\GEOID12A as an example). The GEOID12A files should contain the following files: GEOID12A.EXE, GEOID12A.DOC, with one or more GEOID12A Grid Coefficient (g2012a*.bin) files as provided by LEICA or correctly converted the little endian format from NGS web site. Make sure that there is at least ONE Grid Coefficient file (g2012a*.bin) in that same subdirectory corresponding to your area.

Set up LGO for GEOID12A undulation calculations by creating a new GEOID Model from the Geoid Models folder in LGO Coordinate Systems. Insert appropriate information in the parameter table as shown in the following Display Panel 1.

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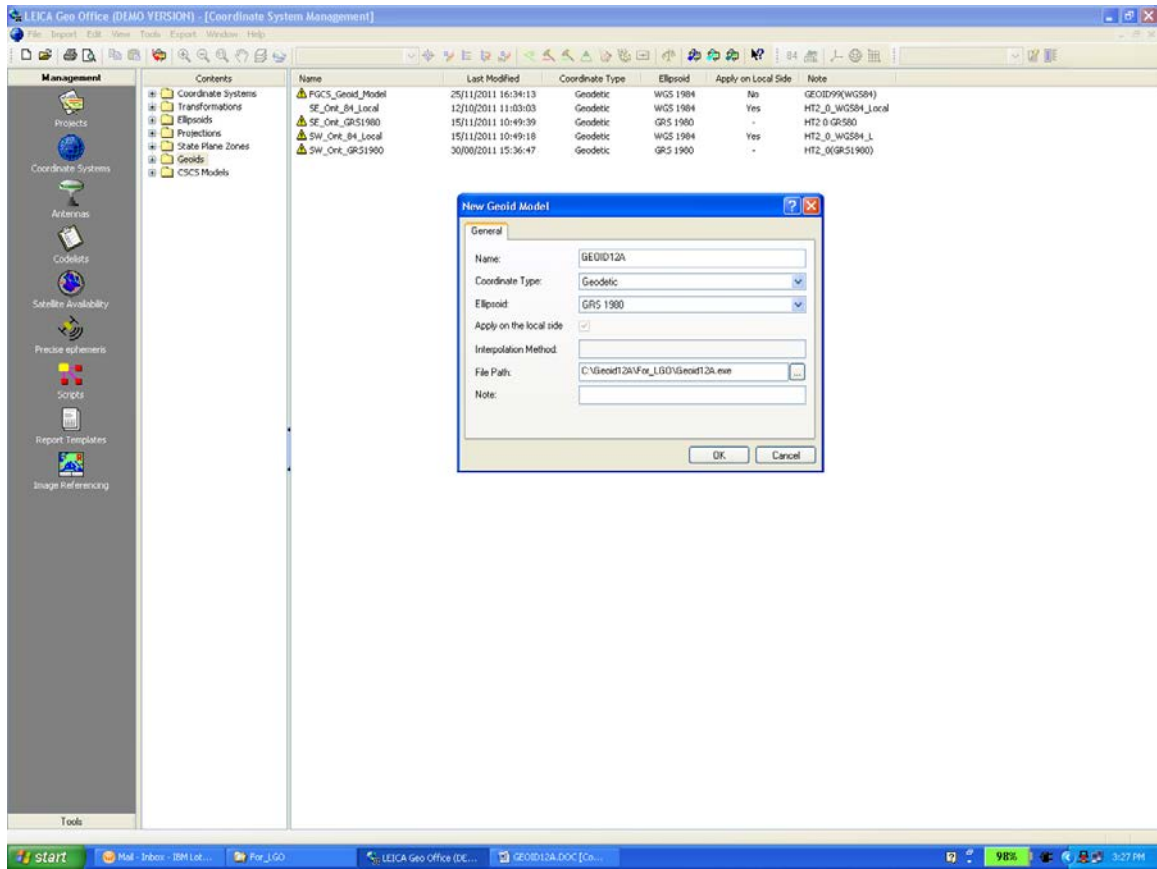
Display Panel 1: Definition of GEOID12A Model in LGO Coordinate Systems Geoids Folder.

The GEOID12A Model must be assigned to either a new or an existing Coordinate System as per the following Display Panel 2.

The reference ellipsoid for the GEOID12A model should be GRS 1980 since it is related to the NAD83 (Local) Coordinate System. This is critical when 3-D Classical Transformation is used to convert GNSS (WGS84) to Local coordinates for proper Orthometric Height conversion. The WGS84 ellipsoid can also be used as the reference ellipsoid for the GEOID12 Model. In the latter case, Orthometric Heights will be directly derived from the GNSS (WGS84) Ellipsoid Heights bypassing any vertical transformations between the GNSS (WGS84) and the Local Coordinate System when applied to the Global Side (Apply to Local unchecked). A WGS84 Geoid Model can be applied to the Local Side (Apply to Local checked) in order to be used in 1-Step or 2-Step Transformation types.

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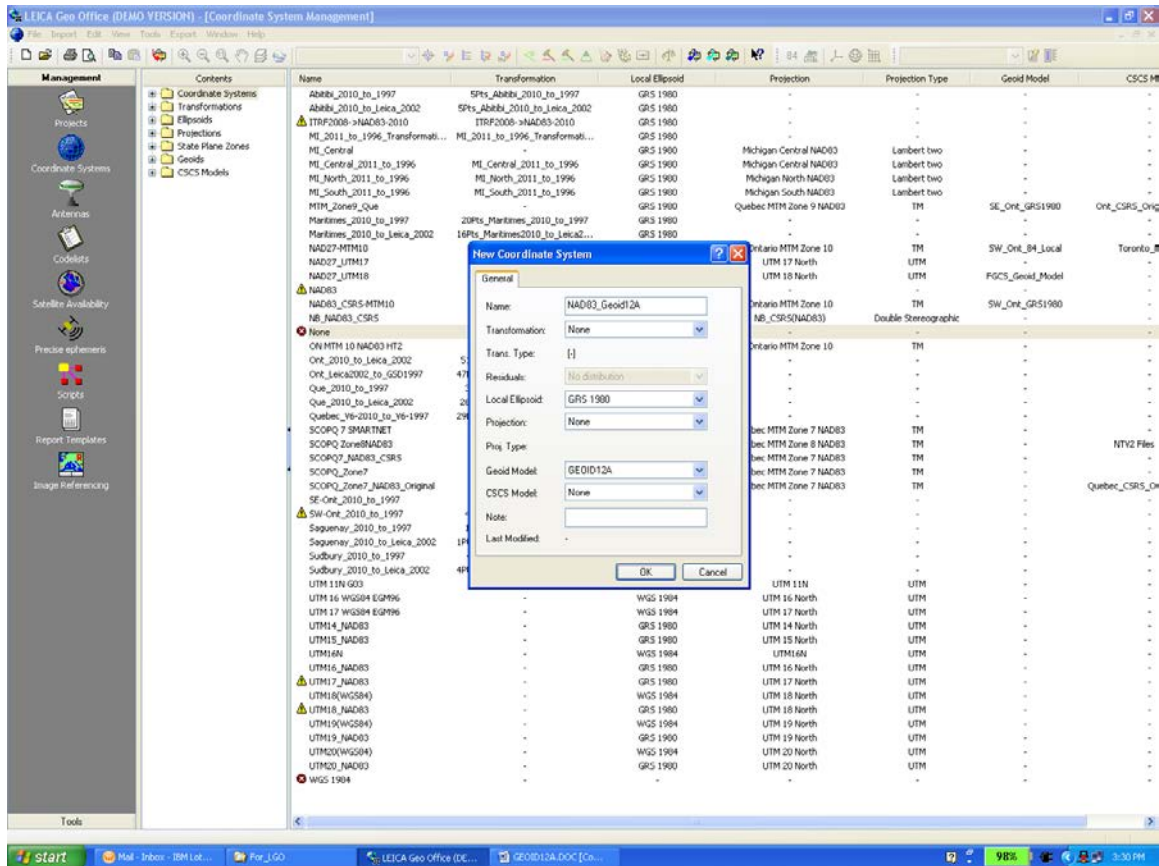
Display Panel 2: Assignment of GEOID12A Model to a Coordinate System in LGO.

Once the GEOID12A Model is attached to a Coordinate System, the GEOID12A undulation calculations must be conducted in a Project opened with the appropriate Coordinate System. Geoid undulation calculations are initiated by selecting Compute Geoid Separations from the Tools pull down menu as shown on Display Panel 3.

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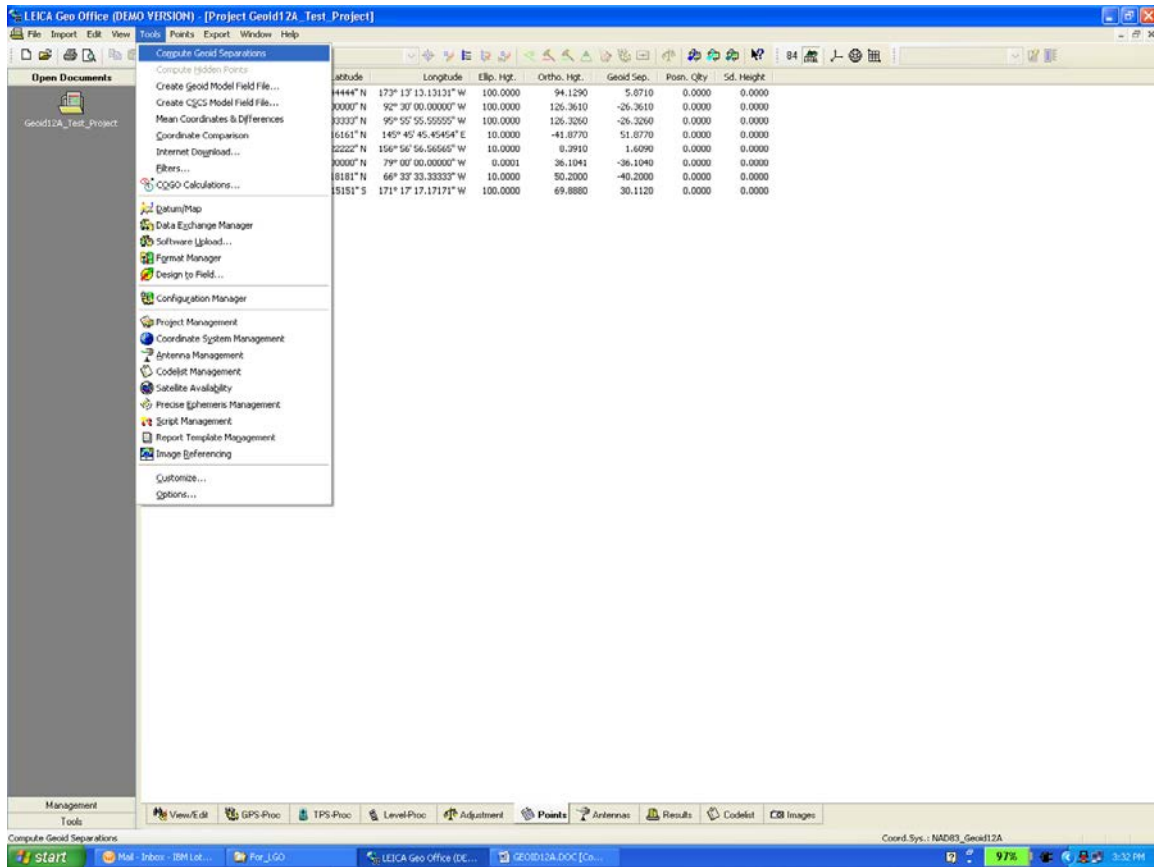
Display Panel 3: Calculation of GEOID12A undulations in a LGO Project.

A confirmation of the Geoid Calculations is presented with Orthometric Heights and Geoid Undulations for each point coordinates in the Local Coordinate System.

If one of the point coordinate falls outside any given grid limits, an error will be reported which indicates wrong coordinate inputs. Please make sure that the GEOID12A.EXE and the correct grid coefficient file(s) (g2012a*.bin) are in the Geoid subdirectory.

In case of Geoid model calculation problems in a given computer, a *.gem file can be used to define a New Geoid Model in LGO without using the EXE program.