the new Open Source Geospatial Foundation (OSGeo). This could provide resources, code, and inspiration for *GRASS* development to take place much more rapidly than when it was on its own. This is an exciting development for geospatial technologies in general.

Thanks for the interview and all the best for your GRASS engagement!

The GRASS Development Team announces GRASS GIS 6.2.0

released 31 Oct 2006

We are happy to announce that a new stable version of GRASS GIS has been released today. This release adds hundreds of new features, support for the latest GIS data formats, and includes new translations for many languages. The Geographic Resources Analysis Support System, commonly referred to as GRASS, is a Geographic Information System (GIS) combining powerful raster, vector, and geospatial processing engines into a single integrated software suite. GRASS includes tools for spatial modeling, visualization of raster and vector data, management and analysis of geospatial data, and the processing of satellite and aerial imagery. It also provides the capability to produce sophisticated presentation graphics and hardcopy maps. GRASS is currently used around the world in academic and commercial settings as well as by many governmental agencies and environmental consulting companies. It runs on a variety of popular hardware platforms and is Free open-source software released under the terms of the GNU General Public License. Joining GRASS's well-developed raster engine, the GRASS 6 series introduced a new topological 2D/3D vector engine featuring support for vector network analysis and SQL-based DBMS management of linked attributes. This new release improves the integration and functionality of the raster and vector engines, and greatly enhances 3D raster volume (voxel) support. Additionally, this release debuts a new graphical GIS manager and menu system, while an improved version of the old GUI display manager has been retained for legacy support. The NVIZ visualization tool has been enhanced to display 3D vector data and voxel volumes, and now supports the creation of on-the-fly MPEG animations. Further improvements include substantial message translations (i18n) with support for FreeType fonts, including multi-byte Asian characters, and the inclusion of tools to create new project locations automatically given a georeferenced data file or EPSG code. This is the first release of GRASS as a proposed founding project of the new Open Source Geospatial Foundation. In support of the movement towards consolidation in the open source geospatial software world, GRASS is tightly integrated with the latest GDAL/OGR libraries. This enables access to an extensive range of raster and vector formats, including OGC-conformal Simple Features. GRASS also makes use of the highly regarded PROJ.4 software library with support for most known map projections and the easy definition of new and rare map projections via custom parameterization.

Platforms supported by GRASS

GNU/Linux, Mac OS X/Darwin, Microsoft Windows (native using MinGW or with full UNIX support via Cygwin), Sun Solaris (SPARC/Intel), Silicon Graphics Irix, HP-UX, DEC-Alpha, AIX, BSD, iPAQ/Linux and other UNIX compliant platforms. GRASS runs on both 32 and 64 bit systems with large files (>2GB) supported by many key modules.

Software download/CDROM

- http://grass.itc.it
- http://grass.ibiblio.org
- numerous mirror sites
- GRASS on CDROM/DVD

The new source code is available now and binary packages for major operating systems will be published shortly.

For details on GRASS software capabilities please refer to: http://grass.itc.it/intro/general.php, the previous GRASS 6.0.0 Announcement, and the newly renovated Wiki collaborative help system.

What's new in GRASS 6.2.0

(selected improvements)

- Numerous bug fixes
  - see the ChangeLogs (6.1, 6.2) for details
- Source code quality/libraries:
  - The GRASS code base is now in large part ANSI C compliant
  - Ported natively to MS-Windows (MinGW based)
  - Source code header files: improved, many compiler warnings fixed
  - Compilation: compatible with GCC 4.x
  - Programmer's Manual: continued Doxygen integration and automated generation into PDF and HTML formats. Publicly available for download and perusal.
  - Improved policies for code submission specified in the SUBMITTING files
  - GRASS-SWIG prototype interface added (library bindings for Perl and Python)
  - DBMI: SQLite driver added; SQL parser extended (support for expressions, new types, etc.)
  - DBMI: MySql driver rewritten; MeSql added
  - Support for long map/mapset names
  - Raster maps: ZLIB compression bug fixed for tiny maps
  - Raster maps: optional large file support (LFS, experimental) for maps > 2GB
  - Display: X11/PNG driver rewritten, added RGB-raster operations
  - Display: Movement toward X-Windows as an optional dependency (new multi-platform GUI support)
  - Display: High CPU use during interactive mouse functions fixed
  - Projection code database: updated to EPSG 6.11.2
  - Tcl/Tk 8.4 support for Debian and other platforms using threaded libraries
  - Full FFTW3 support for fast Fourier transforms
  - NetBSD configuration fixes
- New quality control systems:
  - New internal GRASS test suite (scripts collection in "testsuite/")
  - New external GRASS test suite (TU Berlin)
  - New external GRASS Quality Assessment and monitoring system (École Polytechnique de Montréal and ITC-irst)
  - CVS-commit reports into IRC '#grass' channel via CIA - The open source informant
- Graphical User Interface (GUI):
  - All modules: Major improvements in the auto-generated GUIs
  - **gis.m**: NEW - GIS manager added as a replacement for **d.m** (optional)
  - **d.m**: Legacy support provides access to the latest features while preserving code maturity
  - QGIS integration: fixes for the GRASS plugin and toolbox available from Quantum GIS
  - Continued behind-the-scenes infrastructure refinements for the next generation GUI
- GRASS Extensions Manager (GEM): NEW
  - Configure, compile and install additional GRASS modules without needing the GRASS source code. Simplifies the addition of new modules or themed module groups.
- Modules/Scripts:
  - Message translation (i18N): added and extended to more than a dozen languages, Tcl/Tk GUI and shell script messages are now translatable

- Documentation/man pages: various fixes and improvements (more examples added, including graphics, improved style, new introductory pages)
- Raster modules: improved support for meta-data and map history
- **d.correlate**: NEW - create a graph of the correlation between data layers
- **d.graph**: rewritten and extended, merged with d.mapgraph; support for symbols
- **d.grid**: added support for geographic grid overlay on non lat/lon map projections and display of coordinate values
- **d.labels**, **v.label**: d.paint.labels renamed d.labels; significant fixes and improvements to the label subsystem
- **d.m**: improved layout; added functionality
- **d.menu**: NEW - creates and displays a menu within the active graphics monitor (tool for interactive scripts) (port from GRASS 5)
- **d.mvmon**: NEW - moves displayed maps to another monitor
- **d.out.file**: NEW - saves active display monitor graphics to an image file (PNG,JPEG,...)
- **d.out.gpsdrive**: NEW - exports display monitor to a GpsDrive compatible backdrop image
- **d.polar**: NEW - draws a polar diagram for an angle map such as topographic aspect or flow direction
- **d.rast.arrow**: many enhancements, support for magnitude as well as 360 degree directional inputs
- **d.text**: added support for text rotation
- **d.vect**: variable vector line width added, random colors for points and lines, dynamic width and colors from attribute data
- **d.vect.thematic**: NEW - customizable thematic mapper for vector map displays
- **g.html2man**: fixes for improved man page output
- **g.transform**: NEW - utility to compute coordinate transformations based upon GCPs, including error analysis
- **gis.m**: NEW alternative graphical GIS manager (see above)
- **i.in.spotvgt**: NEW - import SPOT-VGT NDVI satellite imagery into a raster map
- **i.landsat.rgb**: NEW - auto-enhancement of colors for LANDSAT imagery
- **i.ortho.photo**, **i.rectify**: no longer signal completion with email notification
- **i.spectral**: fix for finding `gnuplot`
- **i.points**, **i.vpoints**: various fixes, including reverse transform overlay of vector maps from the target projection
- **m.proj**: NEW - utility to convert coordinates from one projection to another (automated frontend for `cs2cs`)
- **NVIZ**: integrated into single user interface; animation labels; new fly-through navigation; direct output of animations to MPEG with FFMPEG library; menus polished; full Tcl/Tk 8.4 support
- **ps.map**: many improvements (extended RGB support, etc), new vector fill patterns including vector legend support
- **r.carve**: NEW - hydrologic module for transforming vector stream data into a raster map, including the subtraction of stream depth from the output DEM
- **r.flow**: block erroneous Lat/Lon calculations
- **r.in.srtm**: support for US 1-arcsec tiles
- **r.in.wms**: NEW - download and import data from WMS servers
- **r.in.xyz**: NEW - creates a raster map from an assemblage of many coordinates using univariate statistics (LIDAR/Swath bathymetry import tool)
- **r.lake**: NEW - raises lakes in a DEM from a seed at a given water level
- **r.le**: many stability fixes
- **r.mapcalc**, **r3.mapcalc**: acos(), asin(), pow(), &&& and ||| added for more intuitive handling of null data
- **r.mask**: NEW - create a MASK for limiting raster operations (port from GRASS 5)
- **r.out.gdal**: added support for multiple CREATEKEY and METAKEY parameters
- **r.out.vtk**: NEW - converts raster maps into the VTK-ASCII format for 3D visualization
- **r.profile**: improved handling of input data
- **r.sim.sediment**: NEW - overland flow hydrologic erosion model based on duality particle-field concept (SIMWE)

- **r.sim.water**: NEW - overland shallow water flow hydrologic model based on duality particle-field concept (SIMWE)
- **r.sun**: fixed units in description; new shadow algorithm; correction factor for shadowing to account for the Earth's curvature
- **r.support**: NEW - raster map layer support module (port from GRASS 5)
- **r.thin**: fixed maximum iterations for lines
- **r.to.rast3**: NEW - converts 2D raster map slices to one 3D raster volume map
- **r.to.vect**: add flag to not build topology (for *r.in.xyz + v.surf.rst*)
- **r3.***: many code improvements and extended functionality for 3D raster volume (voxel) data
- **r3.cross.rast**: NEW - Creates a cross section 2D raster map from a g3d raster volume map based on a 2D elevation map
- **r3.out.vtk**: NEW - converts 3D raster maps into the VTK-ASCII format for visualization
- **v.centroids**: NEW - adds missing centroids to a vector map's closed area boundaries
- **v.db.addcol**: NEW - creates one or more columns in the attribute table connected to a vector map
- **v.db.addtable**: NEW - creates a new attribute table and connects it to an existing vector map
- **v.db.droptable**: NEW - removes an existing attribute table from a vector map
- **v.db.reconnect.all**: NEW - reconnect vector maps to a new database
- **v.db.select**: multiple column support added
- **v.db.update**: NEW - allows the user to assign a new value to a column in an attribute table
- **v.drape**: NEW - converts a 2D vector map into a 3D vector map by sampling an elevation raster
- **v.digit**: new layout, tools added, bugs fixed
- **v.dissolve**: NEW - dissolve boundaries between adjacent areas in a vector map
- **v.external**: GID search added; auto-search of FID added
- **v.extrude**: NEW - extrudes flat vector objects into 3D vector faces of a defined height
- **v.in.dxf**: NEW - rewritten for GRASS 6, support for 3D features added
- **v.in.ogr**: repaired the `--overwrite` flag, selective import with WHERE option
- **v.in.e00**: various fixes
- **v.in.gns**: NEW - imports US-NGA GEOnet Names Server (GNS) country files
- **v.in.gpsbabel**: NEW - import Waypoints, Routes, and Tracks from a GPS receiver or a GPS ASCII file into a vector map (supports many GPS formats)
- **v.in.mapgen**: NEW - imports Mapgen or Matlab vector maps (port from GRASS 5)
- **v.kernel**: speed improvements
- **v.lrs.***: NEW - Linear Reference System for vector line networks
- **v.out.ogr**: 3D 'face' export added (3D vectors, for Google Earth KML format, etc.)
- **v.out.vtk**: NEW VTK vector export
- **v.patch**: attribute transfer, if table structures are identical
- **v.rast.stats**: NEW - calculates univariate statistics from a GRASS raster map based on vector objects
- **v.report**: NEW - calculates and reports geometry statistics for vector maps
- **v.surf.rst**: default `npmin` option fixed; fix for reading spatially variable smoothing parameter
- **v.to.rast**: added option to compute the direction (angle) of lines
- **v.to.rast3**: NEW - converts a vector points map into a 3D raster map
- **v.univar.sh**: NEW - calculates extended univariate statistics on a selected vector map attribute table column
- **v.what.vect**: NEW - uploads the values of a given vector map into a coinciding vector point map's attribute table
- Misc. display modules: Increased support for true-color RGB decorations
- Misc. vector modules: Support for dynamic fill color and dynamic feature sizing from DB attribute columns
- Scripts: Fixes for awk and related calculation problems for various locales
- Scripts: Variable test portability issues fixed

For a comprehensive list of changes to modules see the 6.1 and 6.2 ChangeLog files.

For a complete list of commands available in GRASS 6.2.0 see the online manuals.

We are always looking for testers, code developers, and technical writers to help us maintain and accelerate the development cycle.

The GRASS GIS project is developed under the terms of the GNU General Public License (the GPL) in the open by volunteers the world over.

GRASS differs from many other GIS software packages used in the professional world in that it is developed and distributed by users for users, mostly on a volunteer basis, in the open, and is given away for free.

Emphasis is placed on interoperability and unlimited access to data as well as on software flexibility and evolution rate.

Release history:

- GRASS GIS 6.1.0 technology preview released 11 August 2006
- GRASS GIS 6.2.0beta1 released 28 August 2006
- GRASS GIS 6.2.0beta2 released 30 August 2006
- GRASS GIS 6.2.0beta3 released 18 September 2006
- GRASS GIS 6.2.0RC1 released 26 September 2006
- GRASS GIS 6.2.0RC2 released 6 October 2006
- GRASS GIS 6.2.0RC3 released 24 October 2006
- GRASS GIS 6.2.0 released 31 October 2006

Please read the following article about the GRASS 6.2.1 release for further enhancements and bug fixes.

The GRASS Development Team announces GRASS GIS 6.2.1

released 12 Dec 2006

We are happy to announce that a new stable version of GRASS GIS has been released today. This release fixes several bugs discovered in the 6.2.0 source code. It is solely for stability purposes and adds no new features. Besides bug fixes it also includes a number of new message translations, updates for the help pages, and will better handle errors caused by missing or incorrectly installed support software. It also introduces a new 3D raster module which was left out of the last release due to time constraints.

What's new in GRASS 6.2.0

(selected improvements from the more than 100 minor and important fixes)

- System and Libraries:
  - Install of include files problem on Solaris (Glynn)
  - Handle non-standard ETRS_1989 datum name (Paul)
  - Graphical User Interface (GUI):
  - Fixes for geo-rectifier (Michael)
  - Zooming fixes (Michael)
  - Meaningful error messages on failed startup (Michael)
- Modules/Scripts:
  - d.histogram: clear just the current frame, not the full screen (Hamish)
  - i.group: fix subgroup listing (Hamish)
  - ps.map: broken for named paper sizes (Hamish, Glynn)
  - v.db.select: fix errors with the SQL where= option (Hamish)
  - v.in.db: don't copy the entire attribute table with a SQL where= query (Martin)
  - v.in.ogr: fix for gcc4.1.x and non-C locale (Andrey Kiselev)
  - r.to.rast3elev: NEW - Completes the 3D raster tool set. Creates a 3D volume map based on 2D elevation and value raster maps.

For a comprehensive list of changes to modules see the 6.1, 6.2.0 and 6.2.1 ChangeLog files.
For a complete list of commands available in GRASS 6.2.1 see the online manuals.

Release history:

- For earlier releases see previous article.
- GRASS GIS 6.2.1RC1 released 6 December 2006
- GRASS GIS 6.2.1 released 12 December 2006

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