

CODATA Global Roads Data Development Task Group Implementation Plan: 2011-2012

Objective of the Task Group

The objective of this Task Group is to continue the work of the former CODATA Global Roads Data Development Working Group, and specifically to continue the development of the CODATA Catalog of Roads Data Sets (v.1 was released in December 2009) and to release a version one Global Roads Open Access Data Set (gROADS) (projected for early 2011). The Task Group will also continue with efforts initiated under the Working Group to pilot test and refine innovative methodologies for roads data development, including the use of semi-automated extraction algorithms from high resolution remote sensing imagery and PDA tools for field data collection.

Background

The CODATA Global Roads Data Development Working Group (2008-2010) was established with the primary objective of producing a Global Roads Open Access Data Set (gROADS) that is:

- a) globally consistent (using the United Nations Spatial Data Infrastructure UNSDI-Transport version 2 data model);
- b) spatially accurate (~50m positional accuracy);
- c) topologically integrated;
- d) suitable for mapping at an approximate scale of 1:250,000;
- e) focused on roads between settlements (not streets);
- f) up-to-date and with the possibility of frequent updates;
- g) well documented; and
- h) freely distributed (on an “attribution only” basis).

At the close of 2010 the working group released an alpha version of the gROADS version 1 data set that achieved goals a, d, e, g, and h. The data set was based heavily on the “global map” produced by the Information Technology Outreach Services (ITOS) of the University of Georgia with funding from the U.S. Agency for International Development (USAID) in support of the UN Geographic Information Support Team (GIST). This map, in turn, was compiled from publicly available data sets, including many legacy data sets such as Vector Smart Maps 0 and 1 (VMAP0 and VMAP1), as well as additional data available through the GIST/ITOS repository.¹ The Center for International Earth Science Information Network (CIESIN), under working group co-chair Alex de Sherbinin and with inputs from working group members, obtained and swapped in improved data for several countries in Africa (Ethiopia, Kenya, Uganda, Somalia, Tanzania, Burkina Faso, Nigeria, and South Africa), and filled minor gaps for island states from OpenStreetMap

¹ This repository was enormously useful for the development of the CODATA Catalog of Roads Data Sets v.1. It is available at <https://gist.itos.uga.edu/index.asp?body=repository>.

(OSM).² There remains substantial work to be done to improve the spatial accuracy of the data set for most countries, to clean internal topology (border matching of roads is complete), and to obtain more up-to-date data.

The working group also supported efforts to develop new methods for data creation through grants from NASA-SERVIR and the Gates Foundation's AGCommons initiative. For NASA-SERVIR, CIESIN tested a tool developed by the University of Tokyo's Center for Spatial Information Science (CSIS) for development of roads data from ASTER imagery. The AGCommons project developed data according to the UNSDI-Transport data model using customized GPS-enabled PDAs based on the open source Cybertracker software, and provided the PDAs to field teams working with the World Food Program in Ethiopia. Both projects provided valuable lessons learned, and both contributed data for an improved Ethiopia road map, but neither proved to be "silver bullets" for developing roads data quickly and accurately or at reasonable cost. The project reports are available from the gROADS wiki.³

Meanwhile, the landscape changed considerably over the past two years with rapid development of crowd sourced data sets including OSM, Google Mapmaker, and a new partnership between OSM and Mapquest.⁴ There are additional efforts to develop data through manual or semi-automated extraction from remote sensing data.⁵ Though there are a proliferation of roads data development efforts, there is still a need for an overarching framework for bringing data together into a global map for research, modeling, applied uses, and analytical purposes. That continues to be the primary goal of the CODATA Roads Task Group, and it will continue working closely with existing global road mapping efforts such as OSM and the PBL GRIP (Global Roads Inventory Project) through data sharing and information exchange.⁶ The three projects are highly synergistic, yet each has a slightly different niche.

Work Plan

1. Release gROADS v.1 with Web site including full documentation, FAQ, and explanation of the CC0 license (target: Spring 2011)
2. Solicit and evaluate inputs to a gROADS v.2 (2011-2012), and release gROADS v.2 (target: Winter 2013).

² CIESIN, through the efforts of Senior GIS analyst Greg Yetman and IT staff, also developed the infrastructure necessary for regular updates and releases of gROADS using ArcGIS Server technology. This technology will also be deployed for browsing the data set once it is released.

³ See May 17, 2010 update at the gROADS News & Events wiki page:

<http://www.ciesin.columbia.edu/confluence/pages/viewpage.action?pageId=19726351>.

⁴ See <http://company.mapquest.com/2010/12/16/mapquest-extends-openstreetmap-partnership-with-launch-of-open-mapquest-com-in-u-s/>.

⁵ For example, the World Resources Institute is collaborating with national mapping agencies in the Central Africa region to develop roads data from Landsat and other remote sensing sources. More on this and other efforts is available through the presentation made available via in the October 18, 2010, update on the gROADS wiki.

⁶ See <http://www.openstreetmap.org> for OSM, and <http://geoservice.pbl.nl/website/GRIP> and <http://www.gsdi.org/gsdiconf/gsd11/posters/71.pdf> for PBL GRIP.

3. Develop a non-commercial distribution global roads data set (gRDS) that includes data sets restricted to non commercial distribution (target: Spring 2012).
4. Develop a gROADS Catalog v.2 which includes additional national and regional roads data sets (target: Fall 2012).
 - a. Version 1 of the catalog included 367 records for country or regional public domain data.⁷
5. Continue promoting and experimenting with road data development activities, including:
 - a. Experiment with approaches to the extraction of roads data from ASTER or other imagery.
 - b. Experiment with new open source field data collection tools beyond Cybertracker, and either refine the existing Cybertracker gROADS interface or use another software package as a basis for the gROADS interface moving forward.
 - c. Build on the lessons learned from the AGCommons project for a wider application of the gROADS PDA interface for roads data collection through collaborations with the African Soil Information System (AfSIS) field teams, Millennium Villages teams, and other field based groups.
6. Continue interactions with OSM, GRIP, Google Mapmakers, GISCorps, World Resources Institute, and other groups interested in the development of improved roads data for applications and research.

⁷ Download at <http://www.ciesin.columbia.edu/confluence/display/roads/4.+Download+Data>.