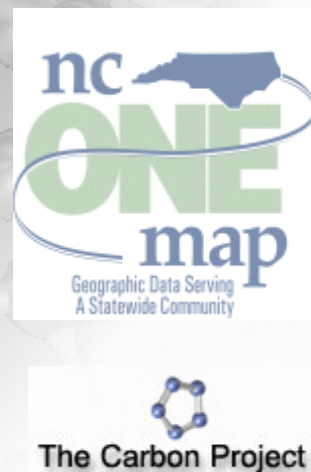




Interim Report

2006 NSDI Cooperative Agreement Program

Category 2: Framework Client Development:

Creating sustainable client applications for Framework data

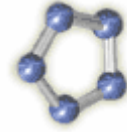
**Leveraging the NSDI: Empowering Local Incident
Response Communities using OpenGIS Web
Services and Interoperable Client Applications for
Framework Data**

Carbon Project, a member of the geoLeaders Network

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Interim Report

Agreement Number: 06HQAG0113

Report Type: Interim report

Project Title: Framework Client Development: Creating sustainable client applications for Framework data

Geographic Extent Served by Project: State of North Carolina

Organization:

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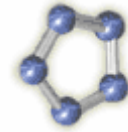
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Project Narrative

The Carbon Project has been selected for a grant from the National Spatial Data Infrastructure (NSDI) Cooperative Agreement Program (CAP) to develop an easy-to-use application that accesses online geographic data services and allows users to seamlessly share event-specific location content. The application will be freely available and tailored to the needs of the incident response and recovery community.

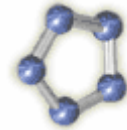
The new application, Gaia 3 for Incident Response (Gaia 3/IR), combines NSDI Framework data access with new capabilities to share user-generated, event-specific information between all levels of response, providing enhanced overall situational awareness. Gaia 3/IR is being developed with CarbonTools PROTM¹, a new software toolkit that provides extensible APIs for bringing location-based content into .NET and sharing this content within social networks.

The project involves the collaboration of the NC Dept. of Environment and Natural Resources (NC DENR), the City of Charlotte, NC, Wake County, NC, the U.S. Environmental Protection Agency (EPA), The Carbon Project, and the geoLeaders Network. The effort also engages State, County and Municipal government organizations in a collaborative requirements process and then develop and deploy an interoperable software application with the ability to access Open Geospatial Consortium, Inc. (OGC) Web services, including Framework data as Geography Markup Language (GML) from

¹ <http://www.thecarbonproject.com/dev.php>

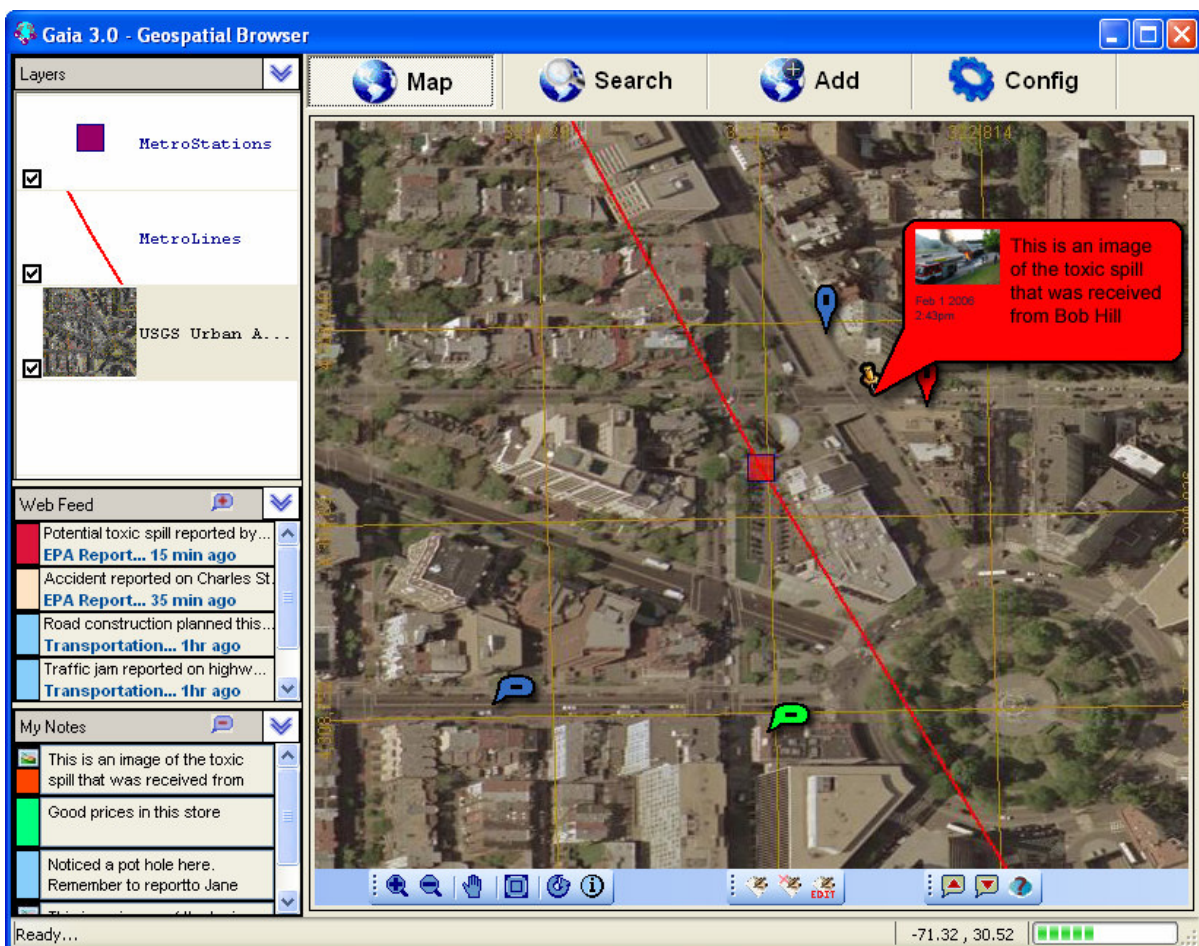
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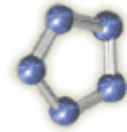


Web Feature Services (WFS), GPS and other sources in support of decision-making processes. The project will also provide software development tools and training to local organizations.

Gaia 3/IR is a sophisticated, yet easy-to-use, situational awareness application intended to support the incident response and management community. It is designed to be usable by non-GIS professionals, such as first responders, crisis managers and emergency operations center personnel. Users of Gaia 3/IR are able to access maps and geospatial features in an easy-to-use and understandable manner. In addition, the CarbonCloud™² framework provides a peer-to-peer (P2P) capability that allows end-users to communicate directly between themselves using geospatially referenced notes and pictures (user-generated content). Gaia 3/IR takes full advantage of the CarbonTools PRO caching capability, thus enabling users to pre-load all maps, aerial photography or other maps and features. Data from web services is also updated when internet connection is available.



² <http://www.thecarbonproject.com/social.php>

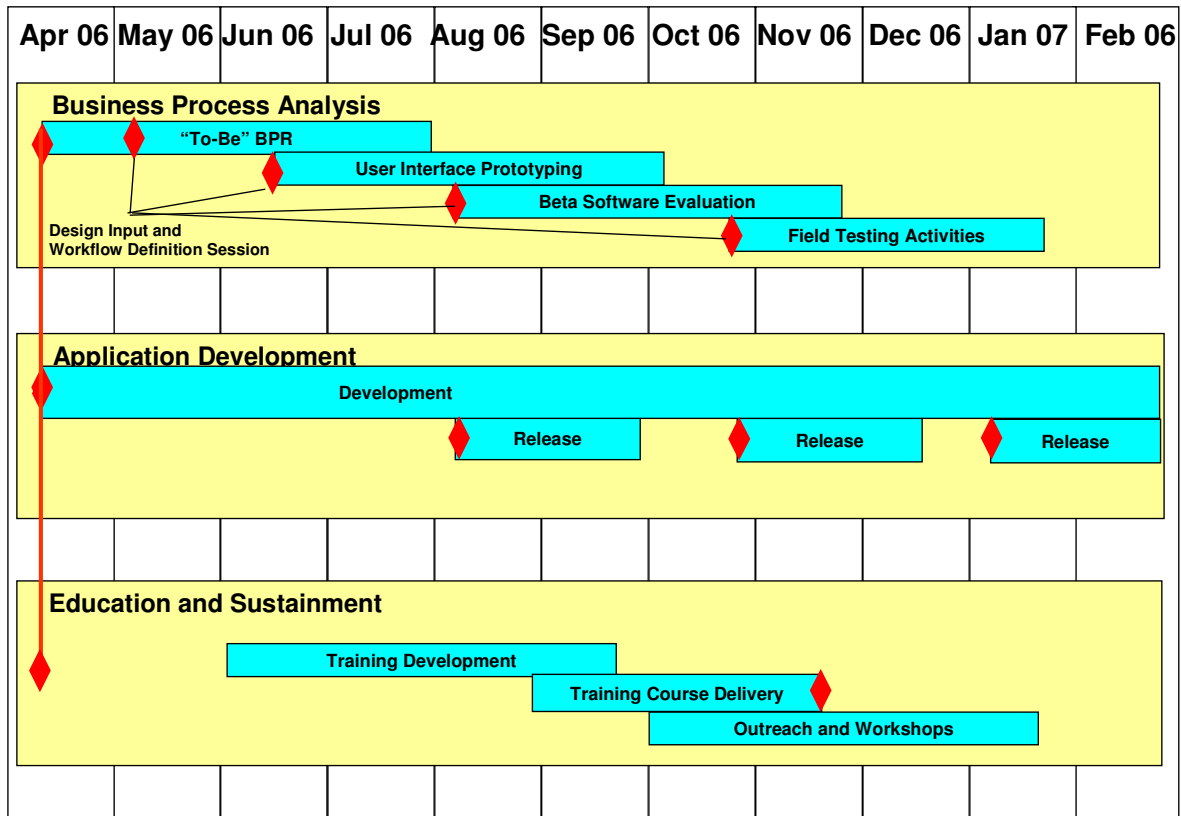
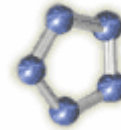


Status of data access activities

1. *What Framework data theme(s) will be accessed under this project?*
 - a. Orthoimagery, elevation, transportation, hydrography, governmental units.
2. *What is the data volume of Framework data anticipated for access (geographic coverage, dataset size, feature count)?*
 - a. It is possible that, in total, several hundred gigabytes of National Hydrography Data (NHD) and other sources may be accessed via WFS during this project as well as terabytes of Orthoimagery, depending on the needs of Gaia 3/IR users. However, it is likely that the average Gaia 3/IR user will access Framework data for local areas, resulting in much lower data volumes.
3. *Who are the primary organizations providing data for this project?*
 - a. NOneMap, The National Map, EPA, GlobeExplorer, Microsoft Virtual Earth, Yahoo! Maps, CustomWeather, CubeWerx, USGS, North Carolina localities including Raleigh and Charlotte.

Status of Framework Client Development

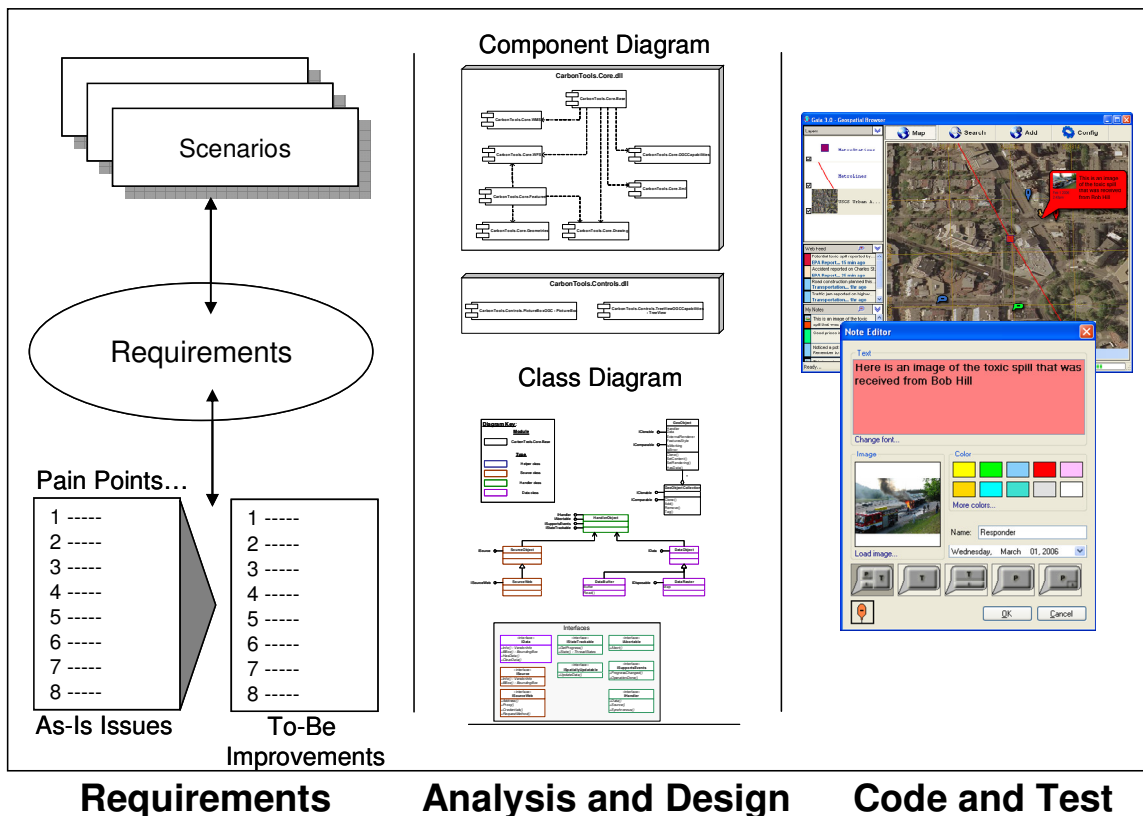
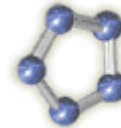
1. *What is the status of software development?*
 - a. Initial requirements assessments for Gaia 3/IR were completed during onsite visits to North Carolina in May and June 2006. Community feedback was integrated into the application design. Prototype components of both ((Echo))MyPlace™, a test platform for basic Gaia 3/IR functions, and CarbonCloud™, a peer-to-peer (P2P) framework for sharing location content, were tested. Beta versions of Gaia 3/IR and CarbonCloud were successfully demonstrated to community stakeholders in Raleigh, NC on August 30, 2006. Overall development is on schedule with the project plan briefed during the April 2006 kickoff (below).



2. *How will the client software be evaluated and quality assured?*
 - a. The client software will be evaluated by a series of onsite and remote meeting workshops conducted as part of User Interface Prototyping, Beta Software Evaluation, and Field Testing Activities. Overall quality assurance will be maintained as an integrated part of the Gaia 3/IR application development process (summarized below).

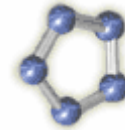
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To help develop specific workflows implemented in Gaia 3/IR, representatives from each of the participating local and state government partners participated in a series of functional requirements and workflow sessions with The Carbon Project team to ensure that the application meets the needs of many groups across a common set of location-based tasks. The partners are employing an iterative development process whereby the local and state government partners engage in a series of design input and workflow definition sessions with The Carbon Project.

3. *Describe your experience and purpose in accessing the data services?*
 - a. Gaia 3/IR is intended targets non-GIS users and provides "one-click" access to open-geospatial services including WMS and WFS. The UI is tailored to target the needs of the Incident Response and recovery communities. The application is being designed to present a clean and friendly "first view" with preset connections to relevant maps and geospatial data, have simple navigation tools. However, other than high quality orthoimagery via government-operated WMS and base mapping from commercial mapping services it has been challenging to locate usable Framework WFS with data over North Carolina to support the project.



4. *Describe any internal or external users that are using this client.*
 - a. Gaia 3/IR is still in development and testing and not in use by external users. However, the basic functions and software components have been tested “internally” several times at public events in Boston³, Vancouver⁴, Washington, DC and North Carolina⁵.
5. *Identify plans for promotion and distribution of this software.*
 - a. Gaia 3/IR will be freely downloadable from a link on the NC OneMap portal and The Carbon Project website. Outreach activities to inform NC local governments of Gaia 3/IR will be conducted by members of the NC Geographic Information Coordinating Council, via announcements to NC listservs, and by presentations at events such as Carolina URISA meetings and the NC GIS conference. Project partners will each be provided a commercial developer license of CarbonTools PRO and receive training in its use. The Carbon Project will also engage rural/small NC communities through the Local Government Subcommittee of the NC Geographic Information Coordinating Council, and provide the same CarbonTools PRO licenses and training opportunities to a select number of smaller agencies. This will provide for a wider cross-section of NC Local Governments to contribute to future development to this application. The Carbon Project is committed to maintaining and further developing Gaia 3/IR post-CAP.

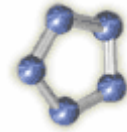
Project Management

1. *Will this project’s activities continue in the future?*
 - a. We hope so. Initial response to the application has been very positive and the project team is working with various stakeholders to advance a coordinated set of activities to test and expand the application.
2. *Describe the next phase in your project.*
 - a. Next phase includes “hardening” the application, adding GPS sources and field testing. Several stakeholders from North Carolina have already volunteered to assist in this process.

³ <http://carboncloud.blogspot.com/2006/07/first-carboncloud-demo.html>

⁴ http://carboncloud.blogspot.com/2006/08/carboncloud-in-vancouver_08.html

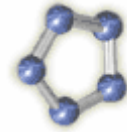
⁵ <http://carboncloud.blogspot.com/2006/09/carboncloud-in-north-carolina.html>



3. *Requirements (more technical assistance, software, other)?*
 - a. Additional assistance is needed to identify usable Web Feature Services (WFS) to support this project.
4. *What areas need work?*
 - a. Overall, the application is working very well. As stated above, additional assistance is needed to identify usable Web Feature Services (WFS) to support this project. In addition, the project is developing and testing several advanced P2P frameworks for sharing location content and

Feedback on Cooperative Agreements Program

1. *What are the program strengths and weaknesses?*
 - a. Strengths-Good management, fairly easy to understand the process and become engaged.
 - b. Weaknesses-Several of the automated grant application tools used at the beginning of the program did not function correctly.
2. *Where does the program make a difference?*
 - a. The program helps develop key elements of the NSDI. Overall, the program is making good progress but additional emphasis needs to be placed on promoting an online infrastructure of standards-based location content that can flexibly support operational incident response requirements. We suspect that funding issues are holding back development of this online infrastructure.
3. *Was the assistance you received sufficient or effective?*
 - a. Yes
4. *What would you recommend doing differently?*
 - a. We recommend maintaining a list of WFS-based Framework Data services. We are not able to identify these services using the GOS Portal.
5. *Are there factors that are missing or need to consider that were missed?*
 - a. The CAP program may wish to consider promoting development of online infrastructures of standards-based location content by coordinating with Homeland Security and critical infrastructure protection functions. For example, there is no reason why a low-cost program cannot provide grant incentives to hundreds of localities across the nation to make their own framework data available via simple Web Map and Features Servers so that these sources can be used for situational awareness in times of need,



or used to guide tourists to key destinations on most other days. This type of investment is a “win-win” for the Nation.

6. *Are there program management concerns that need to be addressed? Time frame?*
 - a. No
7. *If you were to do this again, what would you do differently?*
 - a. Nothing, the program is functioning well for this project.