

Geospatial Information best practices

By MAJ Christopher Blais, CW2 Joshua Stratton and MSG Moise Danjoint

The fact that Geospatial information can be codified and displayed to convey large amounts of critical data in one place was never more apparent than when leaders gathered in Baghdad near the end of that operation.

On 4 June 2011 in the Chancery of the U.S. Embassy, Baghdad, Iraq, Alcy Frelick, U.S. Embassy Baghdad Office of Provincial Affairs director, hung a four-by four-foot map depicting more than 70,000 civil capacity projects and programs completed in Iraq during Operations Iraqi Freedom and New Dawn at a cost exceeding \$58 billion (Figure 1).

This intricate product was created in response to a request by LTG Frank Helmick, U.S. Forces - Iraq, deputy commanding general for operations, for a map detailing the U. S. Government's direct investment in Iraq since 2003 to support Key Leader Engagements with Government of Iraq senior leaders. With the creation of the U. S. Civil Sector Improvements Map (Figure 1), USF-I senior leaders could visualize, a first ever common operational picture of U.S. reconstruction efforts and readily communicate improvements to civil and institutional capacity to senior leaders within USF-I, Department of State and the GoI.

This Geospatial Information and Services product is one example of visual tool portraying relevant information to enable military and

civilian leaders to make informed decisions. The creation, management and distribution of geospatial data and related mapping products played a significant role during Operations Iraqi Freedom and New Dawn as geospatial information provided the foundation upon which all other operational environment information was layered to form the COP. Geospatial information management and distribution required synchronization by geospatial technicians and information managers across multiple echelons.

The following four information management best practices implemented by the USF-I J7 Directorate GI&S section provided a diverse customer base of geospatial technicians, analysts, and end users - with widely varying

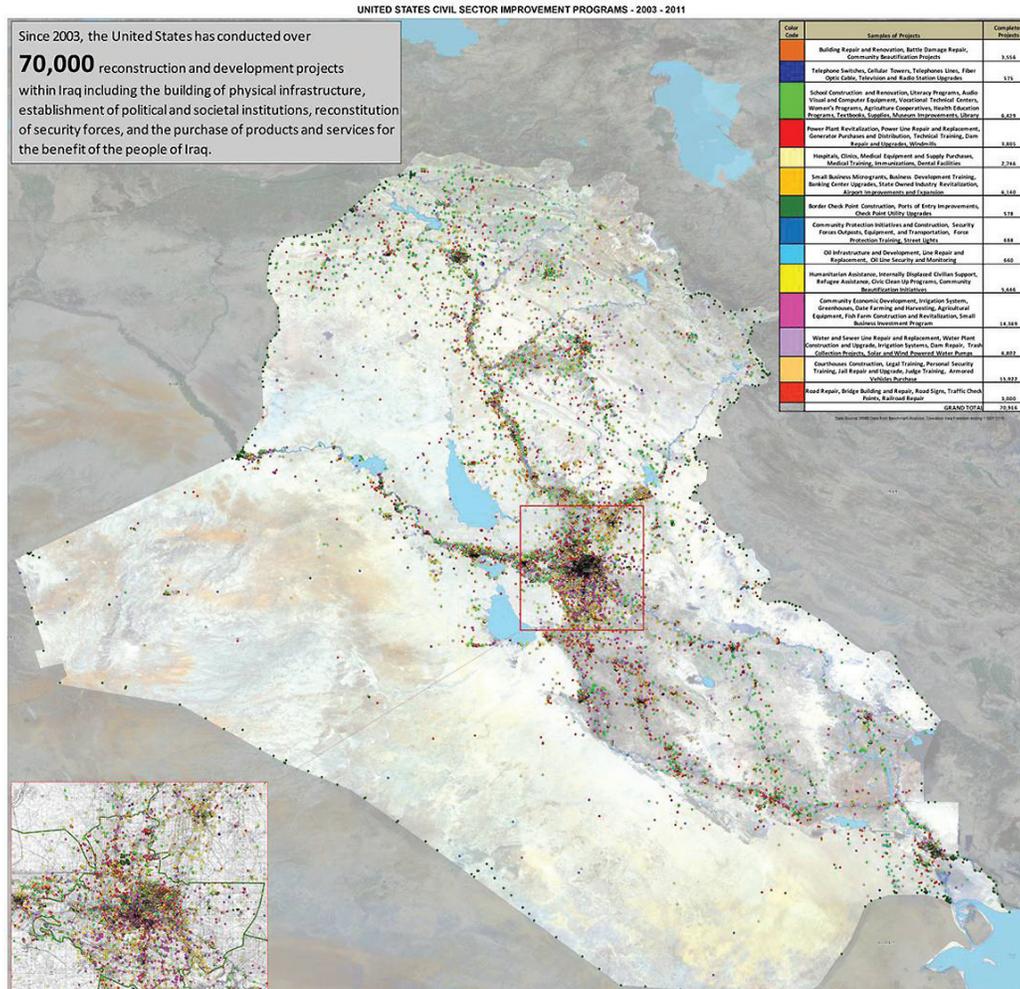


Figure 1 - U. S. Civil Sector Improvements Map depicting reconstruction projects completed in Iraq since 2003.

provided in Iraqi Joint Operations

needs and skills – with relevant, up to date geospatial information and products. Specifically, these best practices include the Iraqi Geospatial Database Portal, an online Request for Information utility, a File Transfer Protocol web page, and a review of embedded Uniform Resource Locators directly linked to new/ updated files delivered by email. All GI&S sections are required to ensure subordinate units use the same mission critical data sets to maintain the same COP. To accomplish this key task, the USF-I GI&S Team used a straight forward information sharing strategy based on a pull and push technique. Data was pulled from U.S. based agencies and J-Staff directorates. Notifications were pushed to users via e-mail when data sets, vector files or other information/products were updated or published.

Although it was systematic the process was not automated. However this approach allowed customers to pull data at their own discretion. This technique also allowed users to download larger files during periods of low network traffic. This self-help approach reduced the number of RFIs to the GI&S technicians, allowing them to focus on product creation in support of operations.

The most noteworthy best practice implemented by the GI&S team was the establishment of the portal-based Iraqi Geospatial Database. IGD provided a centrally located repository and clearing house for geospatial information as directed in Joint Publication 2-03, "Geospatial Intelligence Support to Joint Operations." The USF-I (formerly Multi-National Corps – Iraq) portal established in 2008

Figure 2 - USF-I Iraq Geospatial Database Portal Homepage.

was built using a commercial-off-the-shelf editing software, based on version 4.01 HyperText Markup Language. The IGD was originally located on a stand-alone server established and maintained by the J7 GI&S Section. It is currently archived at the National Geospatial Agency (<http://gil.nga.smil.mil/igd>).

The IGD is organized into a home page (Figure 2) with four sub-pages organized by type of product: vector data, map products, training, and a special section containing classified information relating to specific threats not described in this article. The IGD home page contained a standard header, a hyperlink to the USF-I GI&S Section's RFI submission page, links to each subordinate division's GI&S home page, support links to LiDAR Database, an FTP Site, a coordinate converter utility,

standard Iraq map templates, route bypass categories, an urban terrain analysis, and a security classification guide. A list of links to other geospatial information sites, staff contact information, and a file upload utility to support information sharing by subordinate GI&S teams, was also included. The second page of the IGD portal, designed primarily for GI&S technicians, contained nearly 200 vector data sets (points, lines, and polygons) commonly called shape files. Vector data sets were subcategorized into 30 groups including operational and boundary data describing base perimeters, unit boundaries, the location of Iraqi Security Forces, as well as topographic information, including building locations, hydrology, industrial areas, population demographics, cultural data, location of

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utilities and key infrastructure. Although much of the vector data did not change, several data sets grew in importance as U.S. bases transitioned to the GoI. In particular, data sets depicting partial base transitions consisting of incremental transfers of property to the GoI often resulted in the physical segmentation of a large U.S. base frequently redefining the external and interior perimeters (Figure 3).

As U.S. Forces transitioned bases or conducted partial transitions to the GoI, base boundary data changed and needed to be accurately recorded and shared across multiple echelons in a timely manner. The map depicted in Figure 4 illustrates the three phase transition of Contingency Operation Site Garry Owen to the Government of Iraq. Phase one, highlighted in the blue area of the map, required the transition of a small portion of the base to include buildings and life support facilities

necessary to house ISF. The Phase two partial transition, identified by amber shading, expanded the ISF footprint and supported a larger number of ISF personnel to occupy the base, perform security operations, conduct inventories, and accept the remaining areas and facilities from U.S. Forces. Phase three incorporated transfer of the remaining areas within the yellow external base perimeter boundary line to the GoI. Identification of U.S. personnel were tied to boundary identification as well as U.S.

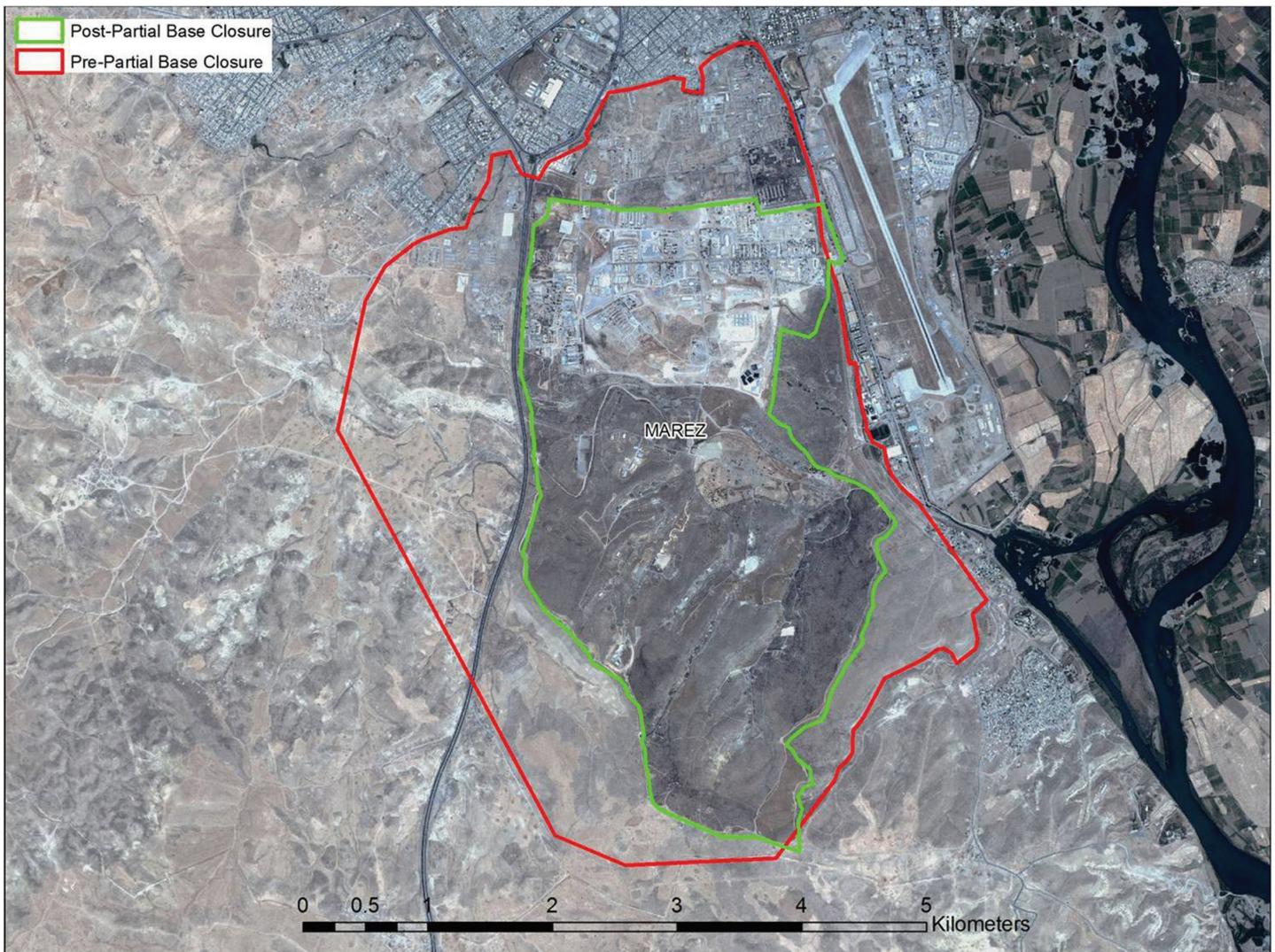


Figure 3 - Vector file depicting the partial transition of COS Marez.

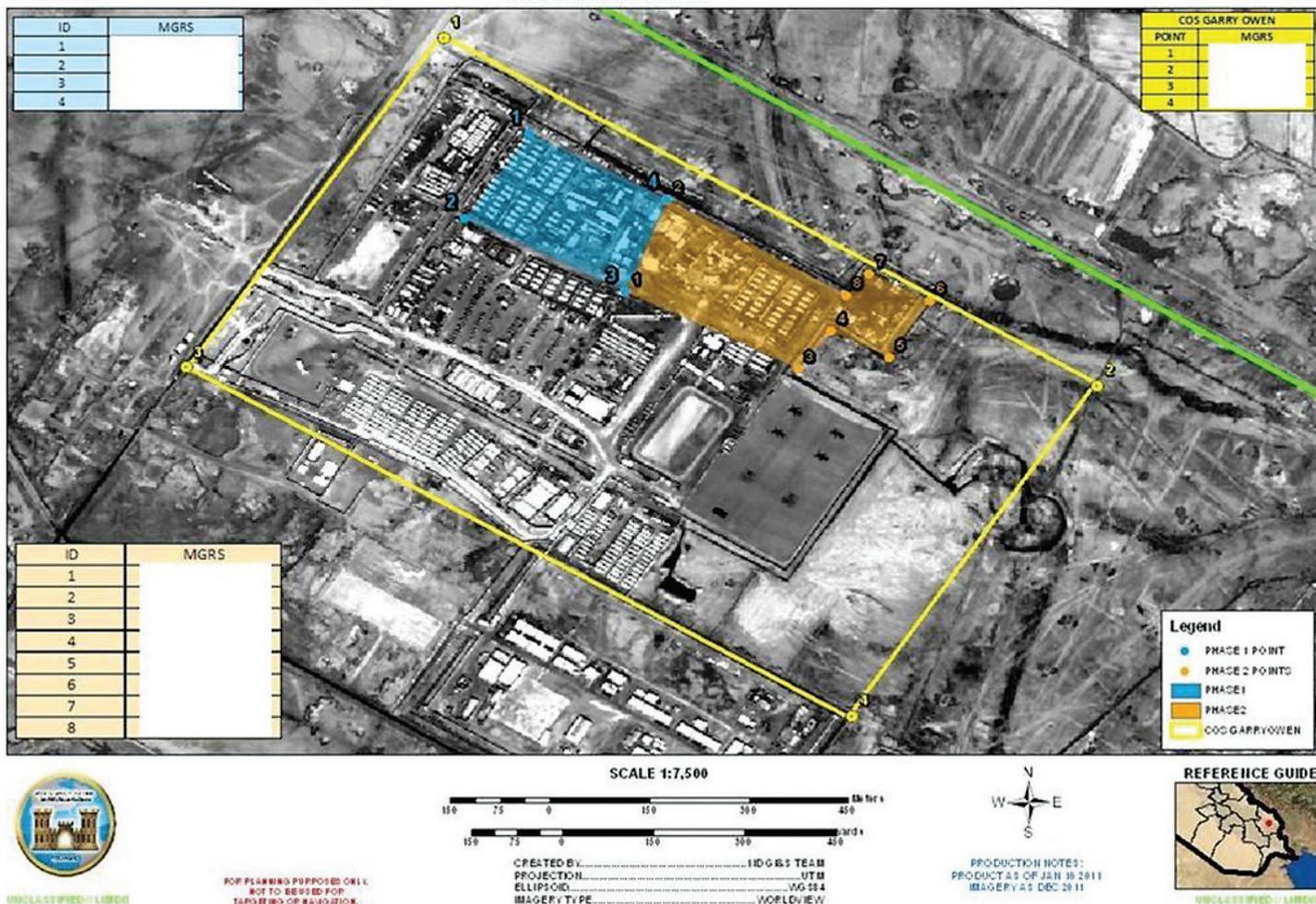


Figure 4 - COS Garry Owen phased transition site map.

funded contracts including Logistics Civil Augmentation Program for basic life support services or facility repairs. The third page of the IGD contained categorized, ready to print Adobe™ portable document format, small file size (3-5 megabytes), medium resolution maps. The site supported quick search and download by the end user for printing on a locally connected plotter. Available map categories included routes; division, brigade and battalion boundaries; and numerous

products depicting topography, population, and religious and tribal demographics. Another best practice implemented was the RFI Tracker (Figure 5) which captured user information and requests using a blend of fill in the blank and drop down menu lists. Once completed, a new numbered RFI was automatically created on a master tracker list and posted to the USF-I GI&S portal. During OND, the GI&S team responded to more than 300 formal RFIs and produced more than 1,200 individual

products from requests submitted using the RFI utility. As an additional benefit, the tracker provided users with request status including the name and email address of the GI&S technician assigned to answer the RFI, allowing for quick and easy communication between the GI&S technician and the customer. Additionally, the RFI Tracker utility included management functions allowing GI&S shift supervisors to easily sort assigned tasks by status, technician or customer.

An additional best practice

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implemented was the IGD FTP site which supported large file and custom file sharing to all USF-I customers. The FTP site included a public access folder for storing large files, including current imagery data sets. The FTP site also included password protected folders established for individuals, teams and delivery

of limited distribution products created to support Joint Planning Team initiatives. The FTP site provided three key advantages over other file transfer methods including shared drives. First, the portal-based FTP site allowed anyone within the USF-I domain access to the information, a significant advantage over shard drives which were limited to serving local domains at the unit

or base level. Administrative tools included with the portal software provided another advantage by supporting IGD administration at the GI&S Team level. Finally, the portal's administrative capabilities allowed GI&S technicians to create read only access folders which limited customers' ability to modify files on the portal thereby reducing the likelihood

UNCLASSIFIED//UNDIS
Once filled out: **SECRET//REL TO NSA, SYEY**

USF-I Geospatial Section
Location: BLD 6, VICTORY BASE SVOIP: 242-0555 DSN:(318) 485-2197/3977

RFI Number

**** Form will automatically fill in RFI number****

CONTACT INFORMATION

**** READ FIRST **** All fields marked with * must be filled out. If you have an error with this form make sure you did not check the item out on your computer. DO NOT fill out the bottom section marked **GIS PERSONNEL ONLY**. Any problems or questions Call S.VOIP: 242-0555 DSN:485-2197.

Branch of Service:

Last Name: * First Name: Rank/Position:

Section: *

Email:(SIPR) *

Phone #: *

Date: Today's Date * Date Needed: *

PRODUCT DESCRIPTION

Product Type: Background:

Write-Up/Brief Options: Soft Copy Format:

Slide-Blowups: Requests for slide-blowups will need to be submitted by SMG or MAJ and above.

Product Size: Copies: **Note 2:** Any more than 2 copies must have a memo signed by O5 or higher for **SECRET** products

Note 1: Any more than 10 copies must have a memo signed by O5 or higher for **UNCLASS** products.

Classification: * Do you have a courier card? *

Location: Example: Iraq, Mosul, 38SMB34567654 Justification/Mission: Example: Planning, Recon, Rip, Convoy

Figure 5 - USF-I Geospatial Information and Services Request for Information submission.

of an unintended change to a document or file.

The final best practice distributed text based e-mail notifications with embedded URLs to share information and updates with customers. This technique provided an easy and highly reliable method to notify a large distributed audience of new information available while limiting traffic on the network and email server. For example, a text email with embedded URLs averaged 25 kilobytes compared to a typical vector file which averaged over 400kb per file. Individual map products were significantly larger, ranging between 3-5 megabytes each. The decision to use email with embedded URLs reduced GI&S related network traffic by more than 98% and didn't require special skills, network access, or permissions to implement. The creation, management, and distribution of geospatial data and related mapping products will continue to play a significant role for developing and maintaining the COP in future Joint Operations. Successful implementation of the best practices described in this article is due to the initiative, hard work and creativity of the

USF-I J7 Geospatial Information & Services Team, and the availability of portal based tools and technologies provided by the USF-I Knowledge Management Office. The complex operational environment characteristic of future unified land operations will demand continued synchronization by geospatial technicians and information managers across multiple echelons to create, manage and distribute geospatial information and related mapping products throughout the Joint Force.

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Dawn (2011).

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ACRONYM QuickScan

OIF - Operation Iraqi Freedom
OND - Operation New Dawn
LTG - Lieutenant General
USF-I - United States Forces, Iraq
DCG-O - Deputy Commanding General for Operations
KLE - Key Leader Engagement
GoI - Government of Iraq
COP - Common Operational Picture
GI&S - Geospatial Information and Services
OE - Operational Environment
IGD - Iraqi Geospatial Database
RFI - Request for Information

FTP - File Transfer Protocol
COTS - Commercial-off-the-Shelf
HTML - HyperText Markup Language
NGA - National Geospatial Agency
LiDAR - Light Detection and Ranging
ISF - Iraqi Security Forces
COS - Contingency Operating Site
LOGCAP - Logistics Civil Augmentation Program
PDF - Portable Document Format
LIMDIS - Limited Distribution
JPT - Joint Planning Team
URL - Uniform Resource Locator
KB - Kilobytes