

Proposal Plan for Geographic Information System (GIS) Capability for the Department of State Human Resources Knowledge Center

- C. Christian (IRM/BPC/eDiP), R. Harford (HR/EX/SDD), B. Van Pay and D. Smith (INR/GGI)

1.0 Business Case

The Bureau of Human Resources (HR) within the Department of State (DoS) strives to build a skilled and diverse workforce to meet the challenge and opportunities of American foreign policy. As bureaus and posts identify needs for specific expertise, HR can be an asset in fulfilling their requirements. Political crises, instabilities, and natural disasters are particularly acute situations where the germane expertise needs to be identified quickly.

In marshalling DoS human capital for an appropriate response, HR has access to data such as descriptions of personnel with key language specialties who can aid a relief effort or are at a post that is near a US military facility so as to enable a quick response to a crisis. In principle, HR also can identify security specialists who, for example, speak Arabic and are within a 100-mile radius of a particular city in the Middle East when a devastating event occurs there.

DoS's most pressing problems usually have a geographical context, and HR needs to quickly match its human resources to this context. What is needed is a simple, nearly automated ability to strategically and visually overlay DoS's human resources onto geographical maps and thereby juxtapose the problem with the means to a solution. Access to a tool that allows visualization of the locations of personnel and their expertise can save time, eliminate redundancy, and expand HR's capability to support deployment of personnel for DoS business.

2.0 Current Circumstances

The HR Knowledge Center (KC) responds to requests by manually combing personnel lists and spreadsheets to identify particular expertise when a situation demands it. The product is usually a paper document listing individual names, skills, and locations. A recent example occurred in which the HRKC was asked to provide a tabular list of DoS employees in response to the December 2004 Indian Ocean tsunami disaster. The list included those employees who had the requisite language skills and/or were at one time posted in Thailand, and the list was developed by an IT staffer working alongside a DoS functional expert. The end result after some hours of effort (approximately 16) were pieces of paper with names, skills, and locations listed in a table.

This approach is operative but at a significant cost with little residual investment for future situations. The tedious procedure must be repeated with an investment of another 2 FTE-days when the next situation occurs.

3.0 Proposed Solution

The HRKC could organize relevant staff data in a database that can be ingested into a GIS. Such systems can be thought of as portals to specific content that is tied to a geographic location. A GIS is a content and knowledge management interface and therefore compatible with other content management systems if the (dynamic) data is structured appropriately. Such a scheme allows HR functional experts interact with a GIS, without the aid of a dedicated information technology (IT) staffer. The individual can locate DoS personnel on a map, select the attributes desired such as

language skill, security expertise, IT knowledge, or any other expertise in minutes. From the GIS, they can probe the data on the experts, and if desired, extract the information in digital or paper form.

Functional Workflow: Users would access data through a GIS interface displaying a map of the region of the world of interest. Users can display the locations of personnel with specific expertise required and generate lists of relevant staff on the fly. Additional relationships between various data can be computed in real time, such as proximity to military installations, airports or hospitals, rather than through repetitive, manual, paper procedures. As a situation evolves, data can be updated rapidly and shared with the field.

4.0 Proof of Concept Demonstration/Pilot

We propose a proof of concept demonstration in two stages: first, a simple demonstration of the technology and second a pilot project. These activities comprise cooperation between the Office of eDiplomacy in the Bureau of Information Resource Management (IRM), the Bureau of Intelligence and Research (INR) Office of the Geographer, and HR.

4.1 Demonstration

The relevance of GIS for the HRKC will be demonstrated using a subset of HR data and other relevant GIS information (such as political boundaries, etc.). The purpose of the exercise is to show how a GIS system can exploit data (in this case a simple data set) derived from the HR KC to respond to a crisis or other event thereby identifying personnel with specific expertise in a straightforward manner. HR data can be displayed, searched, referenced and used to generate reports in the system. Additional data of interest will be country map data with political boundaries, infrastructure information as it exists, military installations, and other information. A suite of typical scenarios will be employed such as locating DoS employees around the globe, identifying the locations of staff who have been posted to a specific embassy at any time and other representative questions normally posed by HR.

The intended outcome of the demonstration is to gain approval to move forward with a GIS pilot project within HR.

4.2 Pilot Project

The purpose of the subsequent pilot project is to enable HR to exercise GIS software and evaluate developing the capability to use GIS regularly for HR business. The pilot depends implicitly on approval and support from **HR** HR, INR and eDiplomacy managers and bureau leadership for success. Key components of the proposed pilot project are:

- Identified personnel to participate in pilot
- Availability of relevant imaging data
- Assembly of relevant reference and ancillary data sets (political boundaries, location of key infrastructure, important buildings, etc.)
- Assembly of relevant HR data
- Identification of computer systems for the GIS system
- Acquisition of appropriate ESRI software
- Training of personnel with GIS system
- Usage of the installed system for a specified period of time
- Report on lessons learned and plan for integration of systems into routine operations.

The intended outcome of the pilot is to evaluate the usefulness for HR. It is anticipated that the pilot will uncover new possibilities and capabilities for HR. The results of the pilot will be documented including a list of target areas in HR where GIS will be useful, identification of potential expansions and a plan for full deployment of GIS within HR.

4.2.1 Requisite Data Sets

4.2.1.1 HR Data

The pilot should access relevant HR data. One mechanism is to export HR data into Access databases that can be ingested into the ESRI GIS software. A preferred method is to incorporate a two-way bridge between the ESRI software and BusinessObjects WebIntelligence software or any other source of “tabular” data from a database or spreadsheet. Users will be able to display the locations of personnel with specific skills, for example, urban generalists in a region of interest that speak a selected target language. They will have the ability to do filtering, and selection and modification of the requisite skill codes. Other operations such as zooming and panning to detailed areas of interest, overlays of physical critical infrastructure and examination of other critical features will be possible. Output to digital form or print products is a regular feature of GIS.

Many other scenarios are enabled such as using a standard reporting package to get a digital tabular listing of all employees who are of a specific grade, posted to a selected country or region and have a particular skill, and then display their current postings.

4.2.1.2 Other Base Data Desired:

- Political boundaries
- Cities and infrastructure (roads, ports, airports)
- Post locations
- Locations of buildings of other types – government, hospitals, schools
- Population demographics and density
- Military deployments
- Topography and imagery as reference base
- Hospitals, schools and government buildings
- Land use (residential, commercial, agricultural, etc.)
- Land cover (grassland, forest, etc.)
- Cultural landmarks

4.2.1.3 Data from outside sources

- Land cover United States Geographical Service:
http://edcdaac.usgs.gov/glcc/tabgeo_globe.asp
- Land cover, land use, and cultural landmarks (free) through NSDI:
<http://edcw2ks15.cr.usgs.gov/fgdc/EDCgateway.html>

5.0 Outcome

The intended outcome of the GIS demonstration is to illustrate, using real HR data, how GIS is an appropriate content management interface for HR work. The anticipated result is to obtain approval to move forward with a GIS pilot project within HR.

The intended outcome of the GIS pilot is to evaluate the usefulness of GIS as a content interface/management tool for HR's routine work. The pilot project will reveal additional applications and potential growth for HR capability as a result of an investment in GIS. Using the documented results of the pilot project, costs for wider deployment of GIS in HR can be evaluated along with the increase in productivity and time savings for personnel. Complementary functions for GIS use along with the ability to share data with other bureaus will be identified.

The pilot project also will help hone assessments of the suite of software, training and support required for GIS as DoS moves to enterprise-wide usage.

6.0 Appendix A – Pilot Project Staffing and Cost

6.1 Length of pilot project

- ◆ 4 months

6.2 Objectives

Note: the basic purpose of the pilot is to work out all the technical details and detail the costs of implementing a production GIS system that can access HR data and be integrated with existing INR data and systems.

- ◆ Live database queries from the GIS system against the HR Knowledge Center.
- ◆ Single login between the KC and the GIS system
- ◆ Data integration with INR’s database (e.g., line up the various names for the Congo)
- ◆ External system feeds, for example the USGS Earthquake Hazard Program
- ◆ End user access via OpenNet with requisite security considerations
- ◆ Ability of end-users to update the GIS database through wireless devices
- ◆ **Detail costs, personnel requirements, development timeline, and end user training needs for a production system**

6.3 Personnel for Pilot Project

Skill	Proposed Personnel	Level of Effort
Government Project Manager	Carol Christian	25%
Technical Lead / GIS Developer	Brian VanPay	50%
Oracle Data Warehouse Integrator	Bob Harford	75%
Web/Java Developer (link ESRI & WebI)	Not identified	75%
Business Objects Developer	Bob Harford	75%
Requirements Analyst	All those listed above	--

6.4 Hardware Costs for Pilot Project

No cost anticipated:

- ◆ The pilot project will need a server that can run ESRI’s server software (ArcIMS) and Business Objects server software (WebIntelligence). The HR Help Desk has said that they can make one available for four months.

6.5 Software Costs for Pilot Project

No cost anticipated:

- ◆ ESRI will supply any required GIS software for free
- ◆ Business Objects / WebIntelligence software is already licensed & can be used for the pilot
- ◆ Oracle is site licensed
- ◆ Microsoft IIS is already licensed and can be used for the pilot