P T F S
Empowering Content

NEXT GENERATION
GEOSPATIAL CONTENT MANAGEMENT

WHITE PAPER

Knowvation GS ™

1. OVERVIEW

Knowvation GS™ is an enterprise geospatial data management and discovery solution that aides in organizational knowledge management. Progressive Technology Federal Systems, Inc. (PTFS) developed Knowvation GS to satisfy three requirements for a geospatial analysis application: 1) Easy to learn and intuitive to use; 2) Powerful search and discovery functionality across multi-INT data types; and 3) Robust ability to read/write metadata and display images for a diverse set of file formats and data types. To these ends, Knowvation GS has a user friendly, browser-based search interface that makes it simple to find Geographical Information System (GIS) datasets, images, maps, layers and other documents (Word, PDF, etc.), regardless of whether the data is stored locally or across the Web. With only a single click, users can navigate across different views (e.g., Google Earth™ and Esri™) and retrieve all images and links to all source intelligence on a geo-defined area of interest. Knowvation GS can automatically integrate all imagery sources, link metadata, extract samples, display myriad formats of imagery, and link geospatial data using multi-term search tools. Analysts require little training to effectively use Knowvation GS. The application significantly reduces analysts' time and effort to find the data they need, allowing them more time for planning, targeting, and analysis activities.

1.1 RELEVANCE TO THE INTELLIGENCE COMMUNITY

Knowvation GS currently supports the IC as the core software technology solution supporting a major DoD IPL replacement program due in large part to its intuitive yet powerful search and discovery capabilities with a user-friendly interface. The solution works with most geospatial product types and data formats along with a vast number of non-geospatial file formats. Once users have interrogated the geospatial repositories, the results can be displayed in multiple presentation and exploitation views. Because of the wide breadth of the DoD IPL replacement program, this solution will be deployed to many agencies.

The second (classified) program will allow organizations to order imagery gathered by United States sources. A rules engine will evaluate several criteria and sanitize files before dissemination. Our application for the classified program combines Knowvation GS's full text searching, geospatial file handling, workflow and redaction capabilities into one powerful solution.

1.2 THE GEOSPATIAL ANALYST'S CHALLENGE

Today, geospatial analysts are inundated with an overwhelming amount of multi-INT content, from a wide variety of sensors and sources. They are under pressure to find and evaluate relevant content more quickly than ever. Oftentimes, agencies have developed multiple repositories over the years that are not connected and cannot be simultaneously searched. As a result, the geospatial analyst is forced to search each repository independently, and then self-integrate the findings. Historically, analysts only had applications that were hard to learn and difficult to use effectively. In conjunction with the high turnover of geospatial analysts, training was extremely expensive.

PTFS
Empowering Content

2.   HOW KNOWVATION GS WORKS

Knowvation GS is a server-based solution that can be accessed through any Web browser. It is simple to install and configure, making set-up very straightforward in even the most complex IT environments.

Knowvation GS has Graphical User Interfaces (GUIs) to make loading data onto the system quick and easy. To use Knowvation GS, simply direct it at local data, data on the Web, or data on servers. Knowvation GS then builds a wide-ranging catalog of resources. Multi-INT data can then be searched with any of the following methods: Pattern (fuzzy logic), Concept (natural language), or Boolean (standard search) in combination with geospatial coordinates or bounding boxes. These methods can be used on full-text in digital documents, key metadata fields, or a combination of both.

3.   FUNCTIONALITY AND FEATURES

Knowvation GS offers a range of features, within a streamlined workflow, tailored to geospatial and imagery experts. The program's core capabilities include integration with third party map and discovery applications, a customizable GUI, access to a range of image manipulation features, and the ability to support both raster and vector data formats. These features are described below:

- **Esri™ and Google Earth™ Integration** – Knowvation GS integrates seamlessly with leading Web-map technologies like Google Earth™ and Esri™, which provide a graphical method that can specify the analyst's area of interest. With the help of the Google Earth interface, the system shows the geographic location of any kind of digital object at the same time the user executes the searching operations. For example, a user can display the satellite view of a building while at the same time retrieving construction drawings of that building. Knowvation GS's user-friendly display enables timely research and analysis results by allowing users to combine search criteria across a diverse set of media such as video clips, still images, full text documents, etc.

- **User Selectable Displays –** With one click, users can switch between Google Earth™ and Esri™ maps, as well as Knowvation GS's tabular views. These views provide users with the ability to show extents, overlay, order content, and more.

- **Robust Set of Tools and Functions –** Users can perform a number of complex operations such as chipping. By simply drawing an extent over an area on the map, a user can crop from one, two or more images and combine them into one while preserving the metadata record. The user can then share or email these newly created files through Knowvation GS's advanced collaboration tools.

- **Open Architecture and File Type Support –** Knowvation GS's open architecture can handle a range of geospatial and non-geospatial information. A partial list of supported products and formats are provided in Section 3.1.

- **Other Features and Functionality –** In addition to the above capabilities, Knowvation GS also has an intuitive and easy to use interface that requires minimal training to achieve proficiency.

- **Easy Integration with Other Systems –** Knowvation GS is open and can be accessed by other systems and interfaces using OGC (CSW, WCS)/REST, GIAS, GCCS, DIB 3.x, DIB 4.x (GeoBus), Z39.50, and OAI/PMH.

PTFS
Empowering Content

3.1 COMPATIBILITY & SUPPORTED FORMATS

Knowvation GS handles a range of data and media including: exploited imagery, unexploited imagery, commercial imagery, Intelligence, Surveillance Reconnaissance (ISR) video clips, geospatial products, Advanced Geospatial Processing (AGP) products, handheld pictures, and unstructured data. By supporting the full complement of product types and formats, Knowvation GS gives organizations control over their diverse repositories of geospatial intelligence and data. The following is a partial list of the products and formats which Knowvation GS supports:

- NITF 2.0, 2.1
- KML
- XML
- HRTe Level 3 GeoTIFF
- Shapefiles
- ADRG, CADRG

- Opaque
- NSIF 1.0
- JFIF & JPEG 2000
- Vector Product File
- NGA Data Formats
- MPEG-2 & H.264

- TFRD
- GeoPDF
- AAF
- DTED 1 & 2
- DNC
- VMap 0, 1, 2

3.2 MAPS, TOOLS & FUNCTIONALITY

The following are some of the key functions of Knowvation GS:

1 Toolbar provides quick access to tools and functions such as chipping, bounding box search, zoom / rotation, etc.

2 Displayed extents for search results that meet the specified criteria

3 Thumbnail and key metadata fields (Fig. 3.2-1, Google Earth™ interface) and shapefile with overlay (Fig. 3.2-2, Esri™ interface)

4 Select from Google Earth™ or Esri™ interfaces with access to software specific map manipulation tools and related features

5 Single click to display metadata fields for each object plus more tools for application to one image

6 Keyword search box to refine search (searches full text of documents, textual annotations on imagery and metadata)
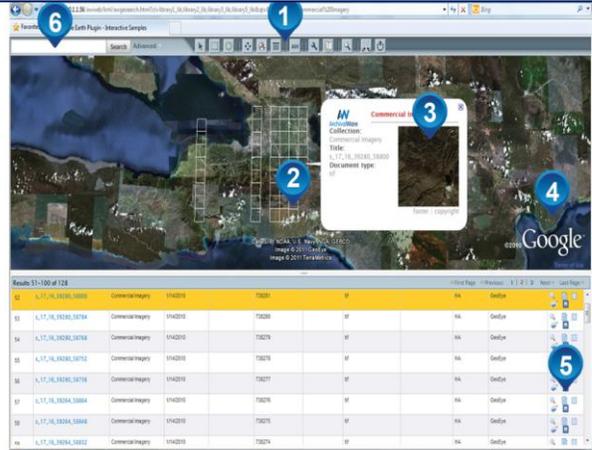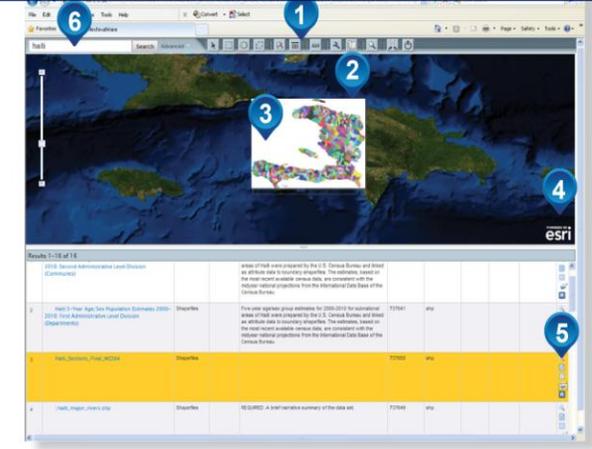

Figure 3.2-1: Google Earth™ Interface

Figure 3.2-2: Esri™ Interface

P T F S
Empowering Content

4.   BENEFITS

Knowvation GS provides discovery, exploitation and dissemination advantages, enabling geospatial analysts to be more efficient by finding the content they are looking for quickly and accurately regardless of data type: NITF images or a finished INTEL PowerPoint. The combination of powerful query tools, robust support for multi-INT data types, and intuitive user interfaces allows users to search mountains of data and pinpoint required information using sophisticated limiting techniques. Geospatial analysts can rapidly explore connections between maps, layers, and their corresponding datasets. Because Knowvation GS was specifically designed to be intuitive and easy to use, the time and costs for training are dramatically reduced. Its combination of functionality and high performance increase analysts' productivity, improves their decision making, and enhances the quality of their intelligence products. Moreover, the unique browser-based nature of Knowvation GS allows warfighters to access data and intelligence on the move, wherever Internet is available.
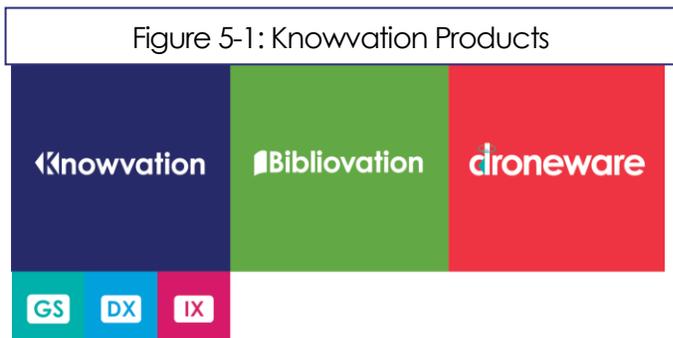
5.   ABOUT KNOWVATION

Knowvation™ is a Web-based, Enterprise Content Management (ECM) system that allows users to store, search, retrieve, browse and manage a diverse set of content/digital objects within one easy to use system. It has been in production for over 10 years, and provides the underlying Web-based search and retrieval capabilities for Knowvation GS.

A 100% browser-based Commercial-off-the-Shelf (COTS) product, Knowvation features advanced search tools (full text, metadata, and hybrid), workflow integration, custom Web interfaces, semantic dictionaries, foreign language support, spider, and more. Since its release in 2001, Knowvation has had over 75 installations, supporting thousands of users including: Defense Threat Reduction Agency, Department of Justice, Federal Reserve Bank, National Defense University, National Labor Relations Board, Office of the Secretary of Defense, and United States Air Force Declassification Office.

Starting in 2007, a number of new Knowvation-based products were designed and built as commercial products to address specific requirements. In addition to Knowvation GS for geospatial content management, these include:

- Knowvation DX™ – declassification, redaction and FOIA
- Knowvation IX™ – database information extension
- Bibliovation™ – open development Library Service Platform (LSP)
- Droneware™ – light version of Knowvation GS specifically for drone users (released in 2015)

Figure 5-1: Knowvation Products

The modules shown in Figure 5-1 are targeted to various customers and provide dedicated offerings into sectors often untouched by standard ECM applications.

P T F S
Empowering Content

6. ABOUT PTFS

Founded in 1995, PTFS has focused on developing enterprise content management solutions for Federal, state, and local government organizations, as well as commercial entities. Our experience implementing and integrating Knowvation and related products and services to satisfy customers' unique needs in multiple environments has made PTFS an industry leading solution provider. PTFS has a Top Secret (TS) facility clearance and is approved for safeguarding to the Secret level. There are more than 150 employees in the company, including nearly 100 with clearances up to the TS/SCI level. Of those employees, there are technical experts in GIS, geospatial analysis, database management systems, security, records management, and data communications, as well as seasoned project managers.

Figure 6-1: PTFS Headquarters

7. CONTACT

To schedule an appointment or to obtain more information on Knowvation, please contact Mr. Dan Quinn, VP Sales & Marketing at PTFS. He can be reached at (240) 380-1179, or by email at dquinn@ptfs.com.

P T F S
Empowering Content