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TerraShare – An Image Storage and Distribution Solution

Introduction

The difficulties associated with managing large amounts of image or elevation data within an enterprise is one of the leading inhibiting factors preventing the widespread adoption of digital photogrammetric technology. Large disk farms connected to a large number of servers, present a file management problem that affects operator productivity, and decreases throughput. Z/I Imaging is now offering a solution to this problem – TerraShare. TerraShare is 3-tier client-server software for the storage and distribution of large amounts of data.

TerraShare helps users to organize their data by presenting the data in a logical hierarchical view or a geo-referenced view, both from within Windows Explorer™. TerraShare utilizes a scalable database and software that is tightly integrated with the Windows NT or Windows 2000 operating system. With TerraShare, operators never have to know the physical location of their data, and, in most cases, can utilize their existing software, traversing into the TerraShare tracked data in common dialogs, such as File Open, File Save As, and Browse For Folder. Data that is entered into the TerraShare environment, through natural Windows Explorer drag and drop operations, can be made available for distribution or sale over the Internet at practically the push of a button. TerraShare also stores meta-data, both intelligently extracted and user supplied. With the TerraShare software developer's kit, custom applications can programmatically perform queries, store, move, rename and delete files, and many other operations.

Software Description

TerraShare can be thought of at the most simplistic level as a document management system for image data where image data include the digital imagery together with photogrammetric data (interior/ exterior orientation, georeferencing information e.t.c) elevation data (DEM, grid, tin) and any other kind of metadata information the user needs to include into his "document".

fig.1 :TerraShare product family

TerraShare is a product family (fig. 1) based on a common core product (called TerraShare Core). This modular system is designed to address a range of customer needs from production/control data management to archiving and e-commerce, sharing the same data. TerraShare add-on modules allow users to easily manage, process, transfer, and distribute various types of data. TerraShare natively handles images, elevation models, ImageStation Photogrammetric Projects, and Digital Raster Graphics(DRG). Data can be published to the web and sold or distributed through an e-commerce ready set of controls. TerraShare can also be extended to process users data as Generic Files or Extended datatypes with user-defined metadata.

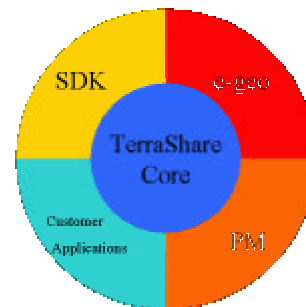Terrashare comprises the following modules (*see also* fig. 1):

1. TerraShare Core

The TerraShare Core is the heart of a TerraShare system. Tightly integrated within the Windows environment, TerraShare Core is a Microsoft Transaction Server (MTS) multi-tier, client-server application. Operating within MTS, TerraShare Core contains the heavy-duty design features expected in an enterprise solution such as support for distributed servers, support for multi-processors and transaction processing.

TerraShare is designed to work with an ODBC (Open Data Base Connectivity) database (SQL Server 7.0, Oracle8i or the Microsoft Data Engine) through the Microsoft Transaction Server (MTS) for better performance, security, and reliability with multiple transactions. Principle components include administrative tools by providing tools management functions such as setting up the system, adding and removing disk storage, loading images, archiving and system monitoring. The TerraShare Core's key-roles to the TerraShare family comprise the setup, maintenance and management of the TerraShare Database, and the display of TerraShare logical folders and files in Windows Explorer. The database is populated with data containing information associated with each file or files imported into TerraShare, such as Physical file location, coordinate system, geographic location, Online/Offline information, standard metadata and user-defined metadata. TerraShare Core is also responsible for responding to queries or data requests made by any user of the Intranet or Internet.
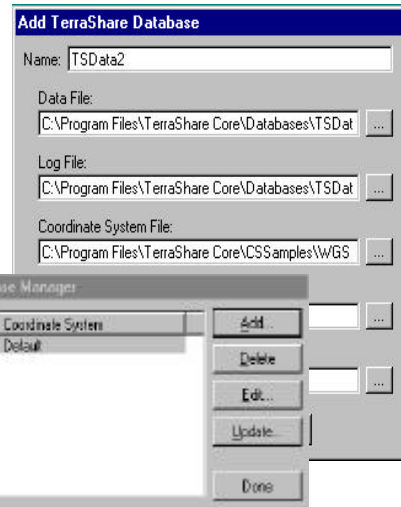
The TerraShare Core module also provides the user with the interface to TerraShare, through the Windows Explorer Plug-in. The Plug-in provides the ability to import/ export, copy, rename and delete TerraShare files (see box below). TerraShare files represent *physical* files that are distributed across the network within the well-known environment of Windows Explorer. In this environment, which is natural to all windows users, TerraShare can be treated like a file management system that separates the physical location of files from their logical view. There is also a footprint view, in the right pane of Explorer, that allows users to see the georeferenced locations of images in a TerraShare folder or multiple folders. Simple operations, traditionally performed only on files, can now be performed on TerraShare entities, such as logical files, logical folders, and footprints.

TerraShare Files

A TerraShare file is a logical file that is made up of **0** or **more** physical files.

Virtual Files
A TerraShare file with **0** physical files is a virtual TerraShare file, which will be attached to a physical file at some later time. Virtual files are handy in assigning a TerraShare logical location, and adding the physical data later.

Multiple Files
An example of a TerraShare File made up of more than 1 physical file would be a LandSat7 image, which is made up of 7 separate raster files. The 7 physical files would appear in TerraShare as 1 TerraShare file, and could be treated as one file in all operations.

Auxiliary Files
TerraShare files can have auxiliary files attached to them. Using this feature, a user can equate a Generic File, like a design file or TFW file, with an image or elevation file.

2. Photogrammetric Manager (PM).

The Photogrammetric Manager is a module that understands ImageStation Photogrammetric projects, displays project information and status, and allows a production user to see a constant view of the structure of project files as they dynamically move through an networked environment. This feature alone provides the user with dramatic productivity gains since he no longer needs to waste production time in moving and searching for project/image files. With TerraShare PM, an ImageStation software user can increase productivity by accessing projects, images, stereo models, and elevation data through TerraShare's logical representation of their data. The operators need never know where the physical data exists, even if it is moved or redistributed throughout the enterprise.
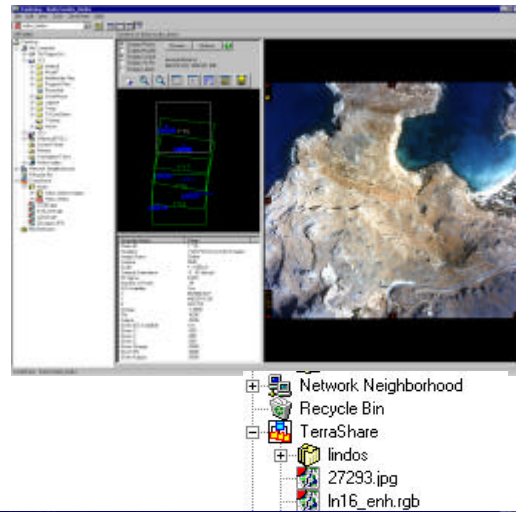
3.   TerraShare e-geo

TerraShare e-geo projects the TerraShare geo data to the web.   This allows organizations to publish their data for e-commerce activities or simply as a convenient means to distribute project information and data to distributed users.
TerraShare e-geo allows users to view data (Photogrammetric projects, elevation models, DRG or images) in a geo-spatial context.   Easily customizable, e-geo also supplies metadata regarding the project. For example, image outlines can be color-coded to indicate project status. e-geo offers the possibility of innovative uses of the web for collaborative and concurrent project performance.   For example, a scanner contractor can directly scan to the TerraShare environment and immediately publish the project to the web. The project image footprints would appear for the entire project with outlines in say green for images that have been scanned and in red for images that have yet to be processed. The contracting company could immediately, via the web, view the images, request changes (more dodging, for example). The possibilities are only limited by the customer imagination.
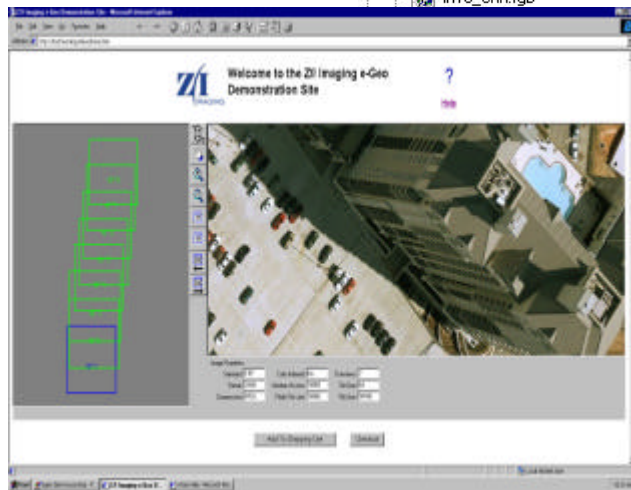
4.   TerraShare Software Development Kit (SDK)

TerraShare is an open architecture system. Implementing the COM+ (Component Object Modeling) technologies provided by Microsoft, TerraShare supplies developers with the ability to make use of its own core functions. With the Software Developer's Kit (SDK), users can tailor the system to create new applications that can be seamlessly integrated into the production line of the enterprise or simply customize TerraShare as their needs change.

In addition, the modular design allows users to add modules in the future without making an up-front commitment to options that currently are not needed. This saves not only on the up-front costs, but allows the user to add capabilities at a pace that is manageable for the enterprise/ organization.

5. TerraShare Aware Applications

TerraShare functionality offers the user an ideal platform on which he can perform all of the photogrammetric production workflow. All Z/I Imaging software is therefore oriented to the TerraShare concept, allowing customers to create photogrammetric products, using the ImageStations software from within TerraShare.
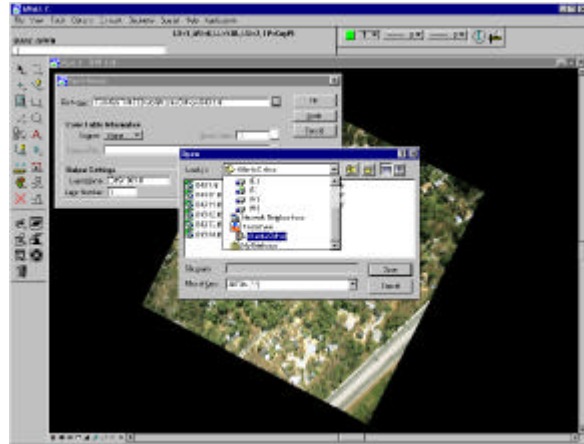
TerraShare Installation - Workflow

Figure 2 illustrates a typical TerraShare installation within the enterprise/organization network.

Assuming a domain server exists on the network, TerraShare distributes the data controlled by the TerraShare Server to the clients, according to the privileges that each user account has. There are 4 different roles/security levels that a Terrashare user may have. These are :
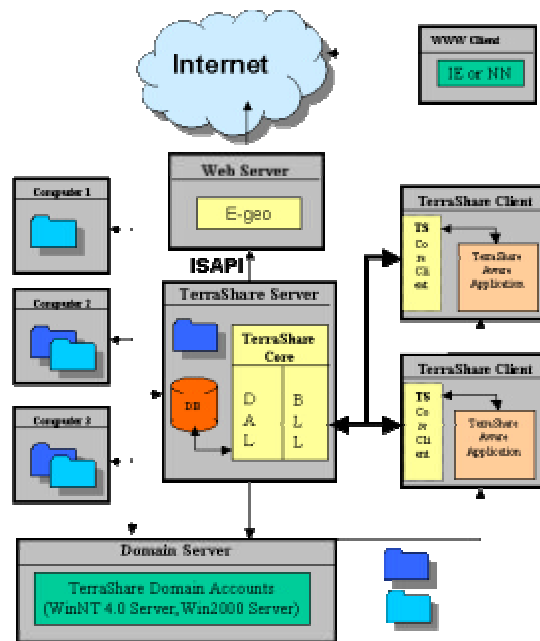

fig. 2 : TerraShare Network Setup

- TerraShare Administrators - have complete access to all functionality of TerraShare Core and TerraShare database,
- TerraShare Power Users - have the same privilege, as administrators except that they are not allowed to manage the TerraShare database,
- TerraShare Users - similar to the power users except that they are not allowed to manipulate metadata information
- TerraShare Viewers - have read only access to TerraShare data.

Data located on different machines participating in the network (see fig 2 – Computer 1,2,3), can be easily imported in the TerraShare Server through Windows Explorer. TerraShare Core creates a logical view of physical file(s) imported. This view is available to all TerraShare Client machines through Windows Explorer, or any other TerraShare Aware Application.

Similarly, data the customer wants to publish to the Web, is prepared by TerraShare Core and ready for use by the Web Server of the enterprise network that accommodates the e-geo software, together with the web page that will host visitors' requests.

Summary

- TerraShare revolutionizes the production environment
- TerraShare provides a modular system that can grow as image management needs expand
- TerraShare is fully customizable, by the user, to accept new file formats and user-definable metadata
- TerraShare is programmable to allow to be totally customized or integrated
- TerraShare is the bridge to the "e" world