

## **Our Products Include**

1. Analogue to Digital Conversion
2. Automatic Photo/Flight Indexing
3. Fully Automated Aerial Triangulation
4. Digital Terrain Modelling
5. Creation of high-quality Time Series Maps
6. Cloud Processing
7. Dynamic Image Services (powered by esri)
8. Application Development

## **How are we Different**

- Cutting edge technology and high-quality professional cameras, reduces the time of conversion to 2 seconds/ frame making it extremely accurate and cost-effective
- Live data storage from scanner to storage device making it more time effective and ready for parallel processing.
- Supporting GIS community by providing customized data to specific requirements and tasks with respect to contents and attributes
- Fully automated work-flow from scanning to the time series maps.
- Automatic Quality control procedures and logs to determine what went wrong at appropriate time.
- No requirement of GIS/Photogrammetry background.

## Product Details

### 1 Analogue to Digital Conversion

**1.1 prompt Capture** analogue/digital conversion of aerial photography is an technologically advance hardware and software which scans the aerial photographs and Films at amazing speed of 2 seconds/frame and post process the data with extremely high accuracy at 14 microns.

The hardware includes,

- **prompt Capture** is a customized hardware with a base and head unit.
- Base unit consists of power source, electronics, light source and platen surface.
- Head units consists of Cameras
- **prompt Capture** is equipped with,
  1. Six (6) Baumer industrial cameras with High performance CMOS and CCD based cameras with GigE vision, USB3 vision and Camera link. The Baumer cameras have high image quality and high frame rates.
  2. High speed automatic frame feed for Roll films.
  3. Special customized manual feed tray for cut films.
  4. Additional light source of Head unit for contact photographs.
  5. Automatic parameter setting through **prompt Preview**.
  6. Friendly user interface and live picture preview from platen.
  7. Emergency stop function.
  8. Easy installation in three steps.
  9. Data transfer via ethernet using 1GB LAN.

**1.2 prompt Convert** is a software which converts scanned images in to digital image. Six images captured during scanning are used to post-process the data.

The software functionalities are,

- Fully automatic stitching of images.
- Rectified using geometric camera grid of 5mm

- Automatic Sharpness validation.
- Automatic character recognition for frame numbers.
- Automatic fiducial identification using wide range of camera library.
- Automatic radiometric enhancement.
- Keeps the radiometric range to full dynamic range at 16bits.
- Automatic recording of test results and key quality indicators.
- Automatic quality check using key quality indicators.
- Stores data in compressed or uncompressed TIFF imagery in 16bit.
- Creates frame quick view images.

## 2 Automatic Photo/Flight Indexing

One of most important steps in time series mapping, is to create a better-quality photo indexing in real coordinate system. Being a time series, it is not always possible to get a photo index from the past records. Geodyns recognizes this issue and made a procedure to create one, if not available.

Photo index features are;

- **Automatic Image Matching**  
*This function uses a complete set of scanned imagery and perform image matching routines. Once the image is matched successfully with the next image, it is treated as part of a strip. Once the image matching fails the criteria, the software recognizes it as a separate strip. All the information will stored in frame relation database*
- **Strip Generation**  
*Strip generation is a second routine which combines the imagery recognized as part of one strip in to a single image using the frame relation database*
- **Strip Geo-reference**  
*Individual strips need to be geo-referenced using ArcMap/ArcPro geo-reference tool. By manually assigning 4~5 points per strip using an ArcGIS online basemaps or any existing mapping.*

- **Strip Coordinates Converter**

*This routine will extract the coordinates from the geo-referenced strips and frame relation database and write the coordinates in to a file, which will be imported in ArcGIS to form a Photo Index.*

### **3 Fully Automated Aerial Triangulation**

The geo-referencing of time series maps is done via complete photogrammetric process. This provides high accuracy and important values for future work and processes. Photogrammetry using aerial photographs provides the information regarding the photo center and its orientation angles. Geodyn utilize the best available software and devised a fully automated procedure for smooth and error free Triangulation.

Some of the features are;

- Wide range of camera models in library dated back to 1950's.
- Automatic determination of interior orientation of fiducials.
- Automatic strip definition.
- Automatic and fast point generation.
- Robust block adjustment.
- Add/Edit manual points in stereo.
- Absolute orientation using photo control.
- Graphical display of statistics.
- Wide range of self-calibration parameters.
- Automatic adjustment of focal length.
- Earth curvature and refraction correction.
- Lens distortion correction.

### **4 Digital Terrain Modelling**

Digital terrain models using time series maps is one of greatest achievement of temporal mapping. Creating a past provides valuable information of the land use and resources over time.

Geodyn use state of the art combination of software and procedure to ensure that the Digital terrain Models are of best quality and depicts the terrain correctly. The accuracy of a terrain model comes with the accuracy of the photo control. In time series maps, where the possibility of full ground control is not possible, the accuracy is some what compromised. However, the use of multi-ray technology helps improve the accuracy in many folds.

Terrain Modelling consists of,

- Generation of dense point cloud using correlation methodology.
- Possibility to generate either DSM or DTM.
- Wide range of available strategies around the world from archive.
- Stereo viewing and edit functionality.
- Terrain Modelling using morphological data.
- Inclusion and exclusion of areas.
- Automatic contour generation.
- Perspective view of Terrain Models with available vector data.
- Read in/out almost every possible format.

## **5 Creation of high-quality Time Series Maps**

Time series maps require high precision and geo-reference. It is not possible to detect any change unless the maps are perfectly geo-referenced. A good quality and accurate time series maps can provide all the possibility of image analysis which includes but not limited to;

- Change Detections
- Land use
- Environmental changes
- Development curves
- Water resources
- Archaeology

Time series maps consists of following characteristics,

- Highly accurate rectification process.
- Quality terrain models.
- Fully automatic seamline generation.
- Radiometric balancing for seamless mosaic.
- Export to tiles functionality.
- Positional accuracy checks and RMS to ascertain accuracy.

## **6 Cloud Processing**

Analogue/Digital conversion creates the large data volumes required for BigData analysis, data mining, pattern recognition; and to reach significant statistical insights

For scalable processing GeoDyn uses cloud compute such as Amazon S3 or Azure. Typically, the customer uses a program provided by GeoDyn to upload the imagery to the cloud. In this process the format of the imagery is converted to a format that enable fast cloud access and includes options for lossless or lossy compression. Reduced resolution version of the scans is often also created to speed up processes such as photo index generation. The product in the form of orthophotos or refined parameters are also delivered back on the same cloud storage for optional download or to directly run Image Service from the cloud infrastructure. Using cloud infrastructure reduces storage and processing cost for both the customer and GeoDyn.

Some customers reluctant to upload any imagery to cloud environments and want all processing to be performed on their premises. GeoDyn has procedures that enable this. The costliest option is for a GeoDyn engineer to perform all processing on site. A more cost-effective option is for a GeoDyn engineer to be provide remote desktop access to a customer machine, while enabling the customer to monitor all activities.

## **7 Dynamic Image Services (powered by esri)**

Modern day big data processing requires large volumes to store data. Traditionally, all processing steps creates a separate output file which will increase the size/volume of the complete data.

With the help of esri, Geodyn is now working on large data volumes by using the Dynamic image services using ArcGIS platform. In such an environment, there will be only one data, which is the scanned imagery. Rest of the processing is done on-fly and the data will not create a temporary or permanent copy of the data.

Advantages of Dynamic Image Services,

- Only one copy of the data stays in the system.
- One set of data removes redundancy and improves data management.
- Being a Dynamic dataset, any change in any processing step, will be changed on-the-fly and reflects immediately.
- Multiple access of the data can be granted with full control over the shared contents.
- Complete or partial data download is possible for Admin users.
- Least amount of data management resources.
- Easy to update without any shutdown.

## **8 Application Development**

Geodyn is actively working with its client base to provide them best quality products. There is also a need for a customized solution for a specific client. It is better to provide a light version of software for a specific user rather than to have a full loaded and heavy software, which requires ages to learn and master.



For this purpose, Geodyn in partnership with esri offers to provide customized solution via small software applications to its client base.

Some of the potential areas, where customize solution can be provided are;

- Engineers / planners
- Environmental Study groups
- Coast Line changes
- Water reservoirs
- NGO's
- Landuse study