



## STRENGTHENING NATIONAL GEOGRAPHIC SERVICES IN LAO PDR (SNGS)

CREATING MODERN BASE MAP AND GIS DATABASE FOR LAO PDR

PRODUCTS  
AND  
MAP PRODUCTION

# AGENDA

- Project Components
- Output Products
- Geodetic Network
- Map Production Flowchart
- Aerial Photography
- Digital Elevation Models
- Digital Orthophotos
- Vector Data
- Generation of Landuse polygons
- Creation of a Seamless Geodatabase
- Topographic Base Mapping 1:50000
- Orthophoto Mapping

# PROJECT COMPONENTS

- Component 1. Service Policy Development in the National Geographic Department**
- Component 2. Technical Capacity Building of the National Geographic Department**
- Component 3. Aerial Photography, Survey and Production of Orthophoto and Topographic Maps and Satellite Image and establishing a NSDI**

# OUTPUT PRODUCTS

**Geodetic Horizontal and Vertical Network**

**Aerial Photographs**

**Digital Elevation Model**

**Ortophotos**

**Vector data**

**Seamless Geodatabase**

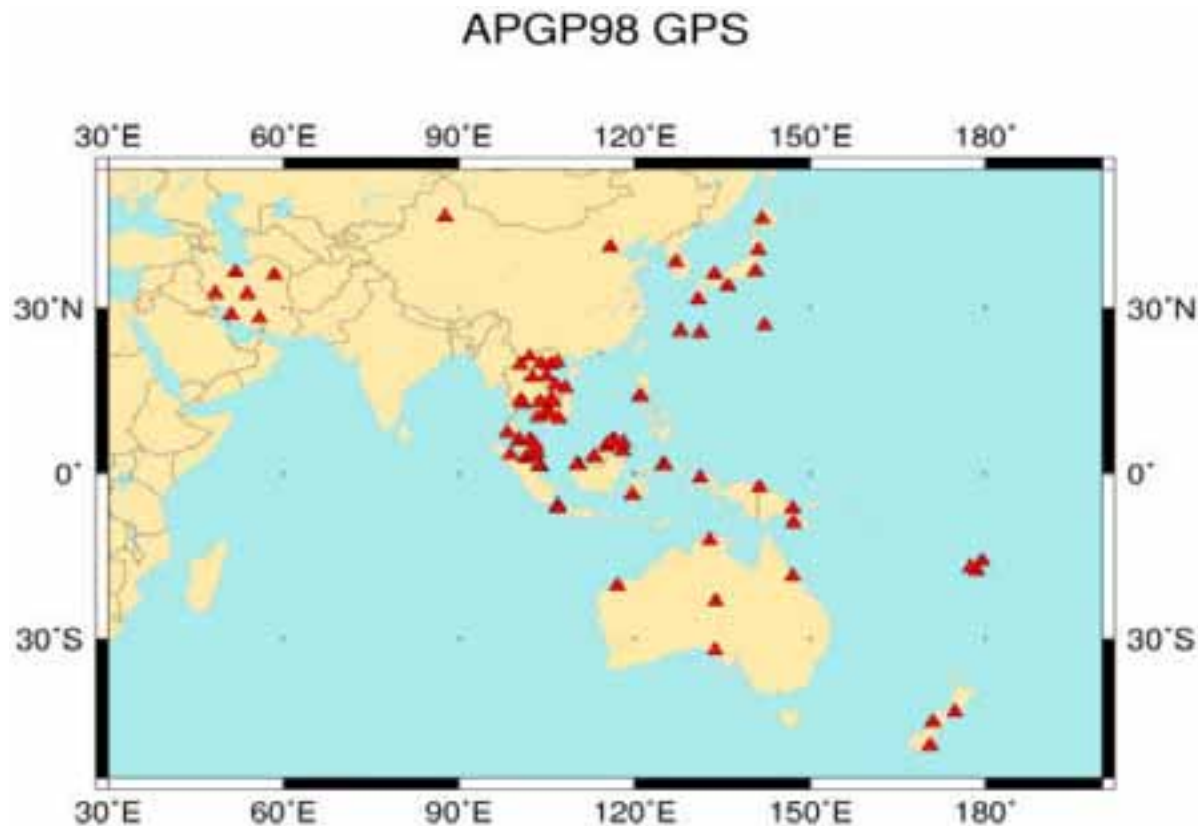
**1:50,000 Topographic Base Maps**

**1:5,000 Orthophoto Maps**

# GEODETIC NETWORK

## Re-observation and densification of the horizontal network

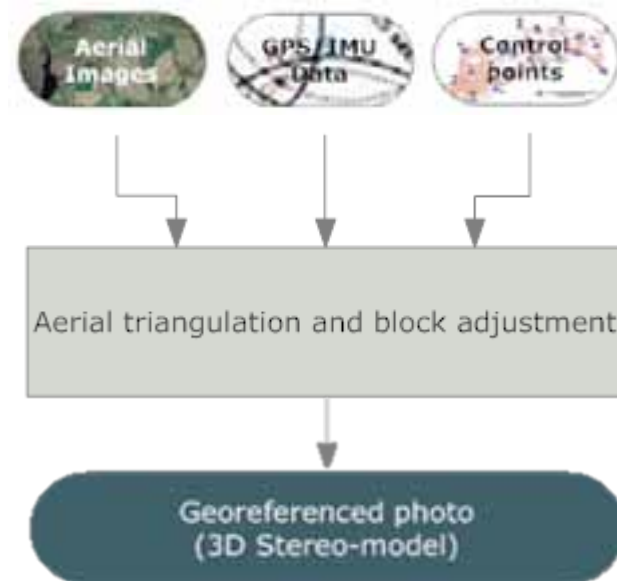
- ITRF reference frame based on Geodetic GPS computations of APRGP 1998 campaign in Lao PDR.



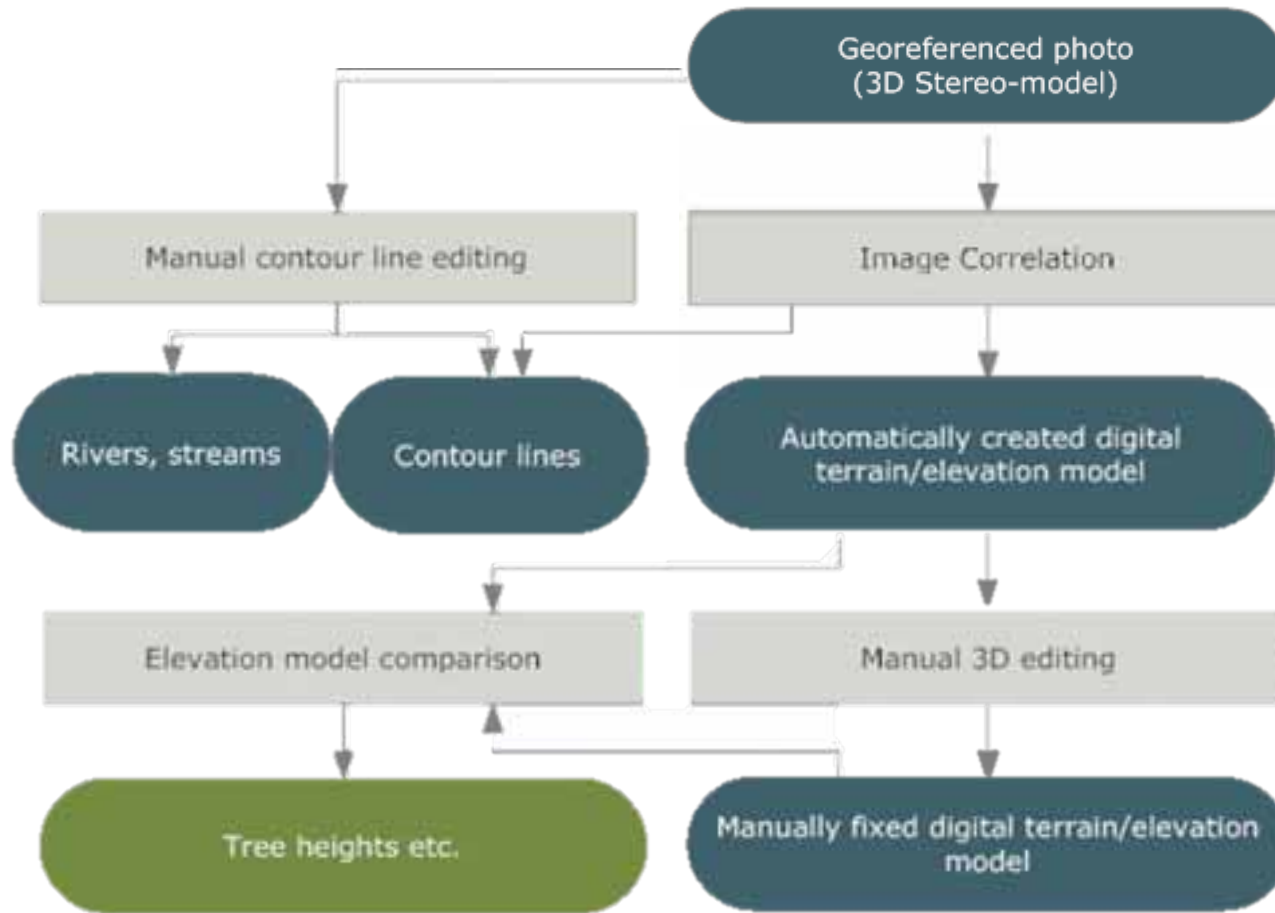


# GEOSPATIAL DATA AND PRODUCTS

## Photogrammetry

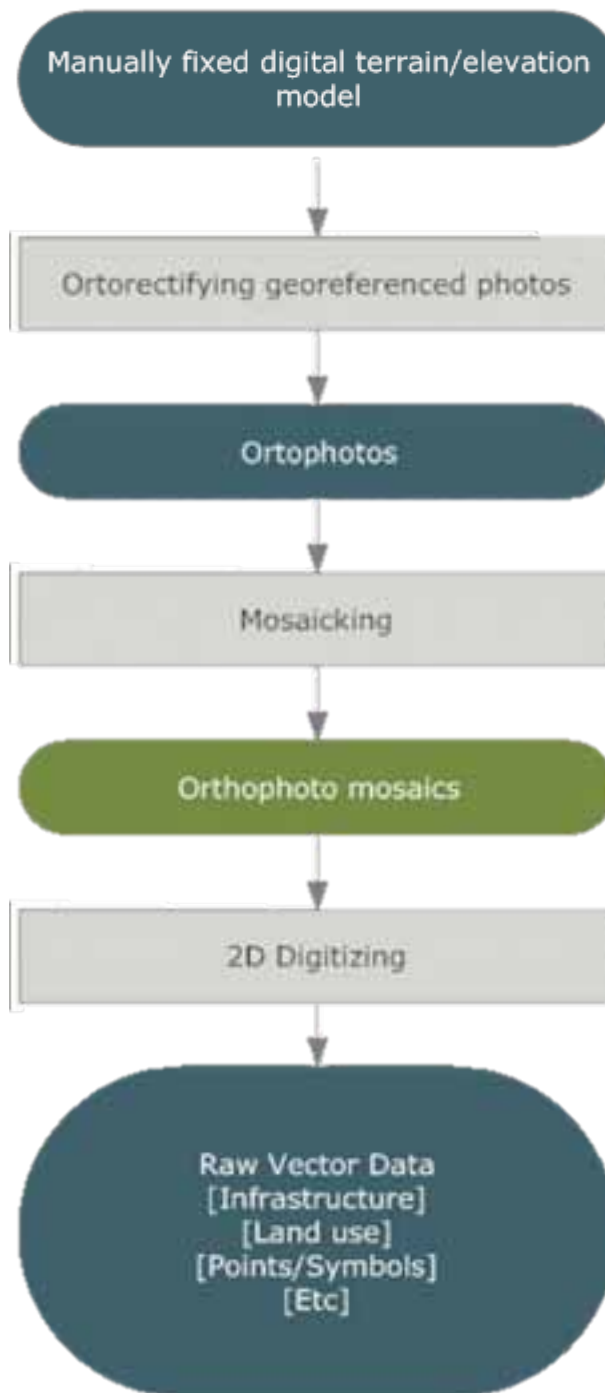


# PHOTOGRAMMETRY



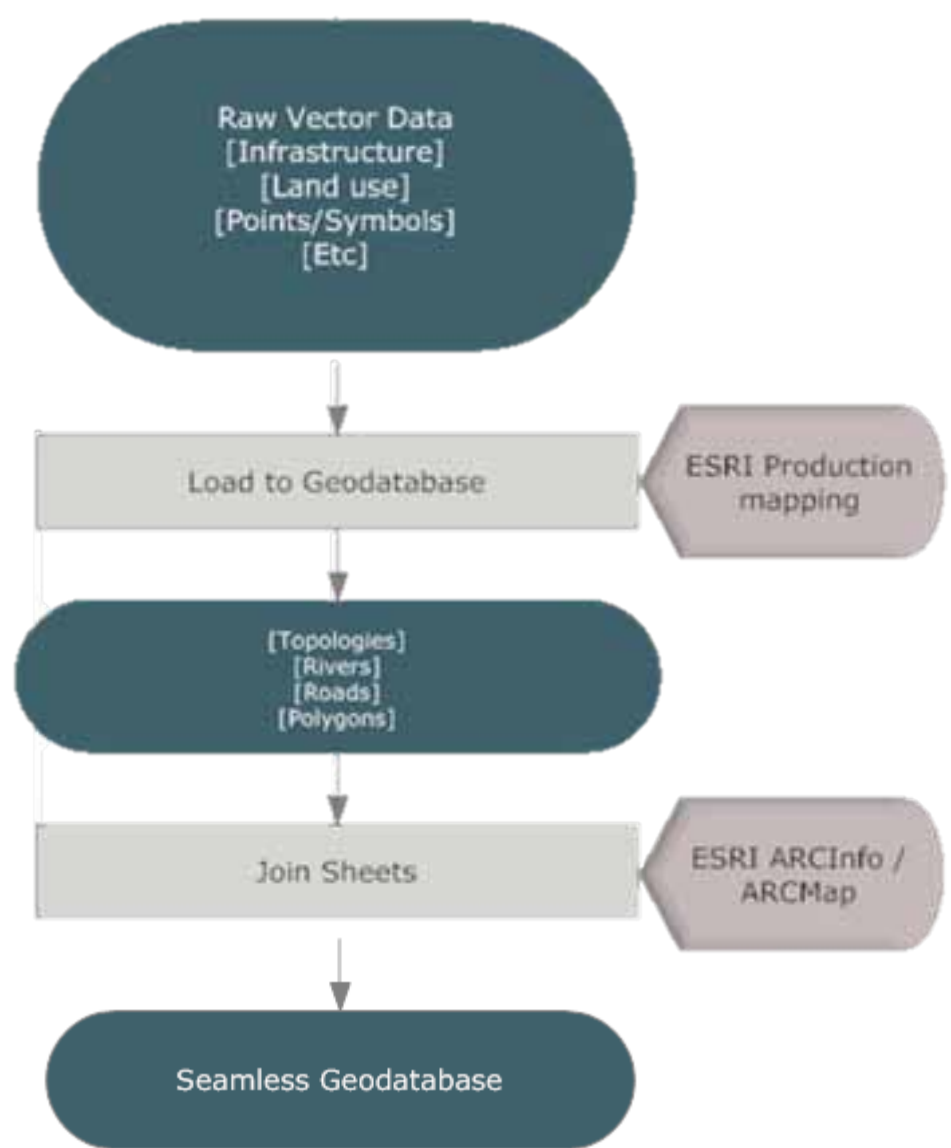


# ORTHOPHOTOS

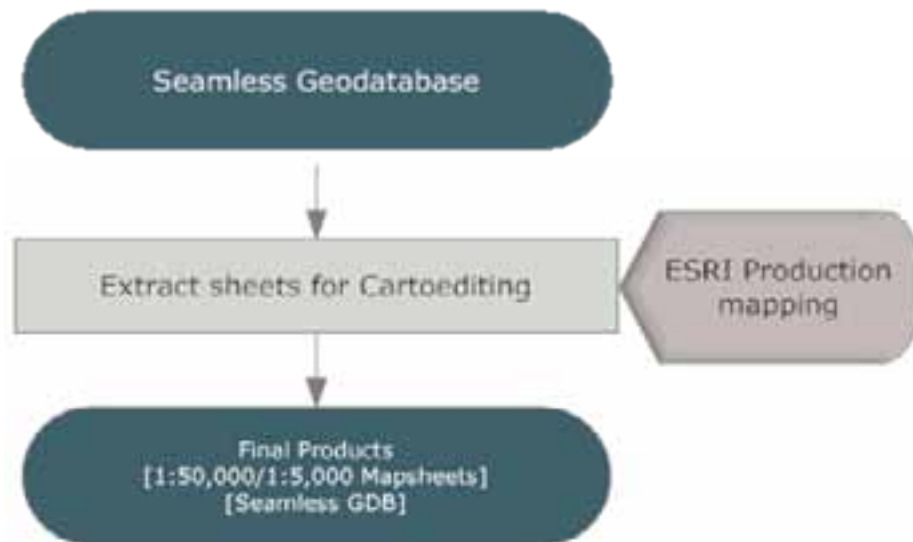


# Vector Data

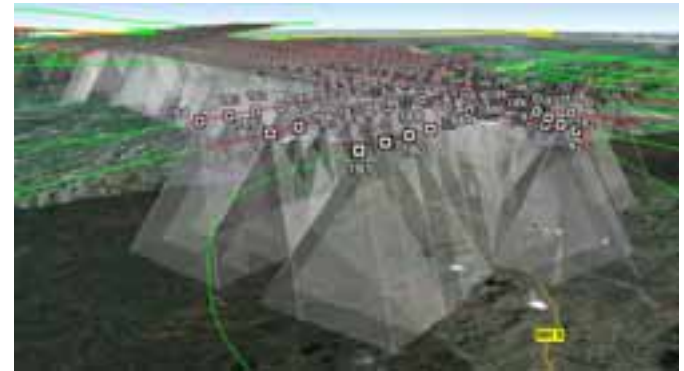
# GEODATABASE



# CARTOGRAPHY

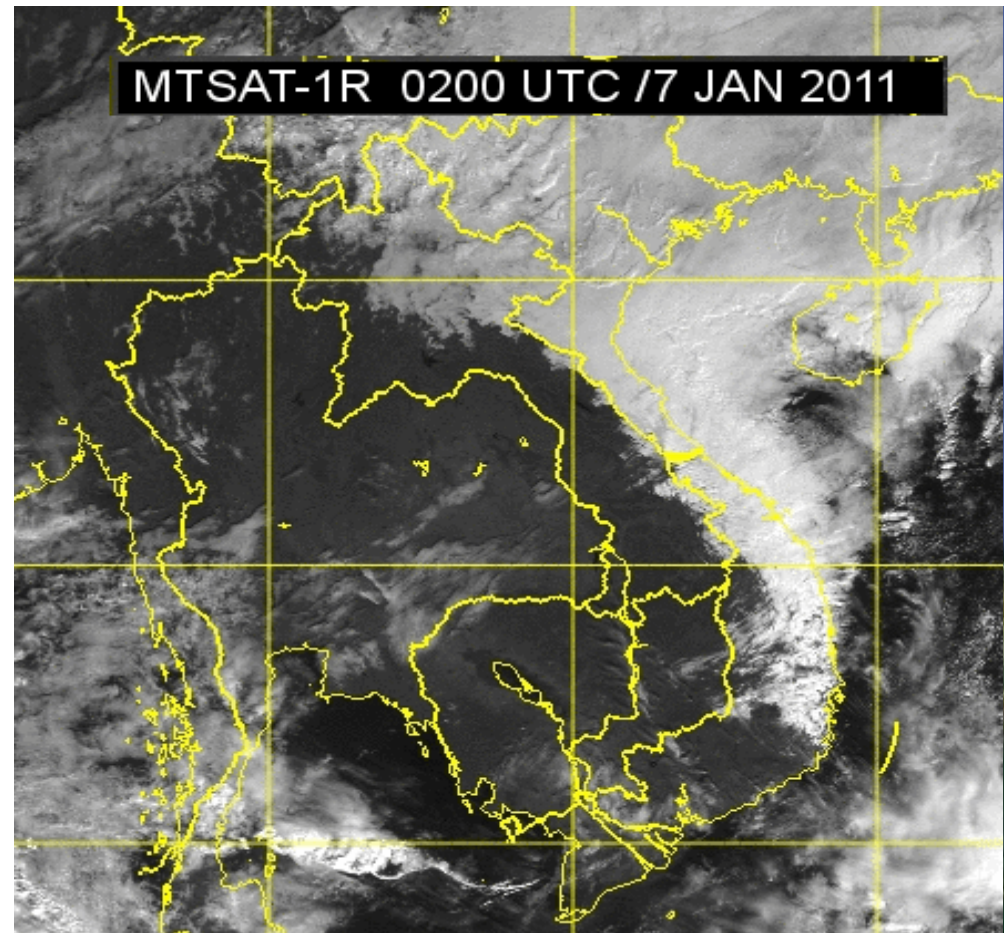


# AERIAL PHOTOGRAPHY



## ► PROGRESS

- Situation on 31<sup>st</sup> Dec 2010
- About 95% flown
- One flight after that
- Vietnamese border cloudy
- Cannot cross Thai border



# AERIAL PHOTOGRAPHY

▶ **PHOTO FORMAT**

- **17310 x 11310 Pixels**
- **Approx. 8000 x 5200 m**
- **Flight altitude 27,000 Ft**



# AERIAL PHOTOGRAPHY

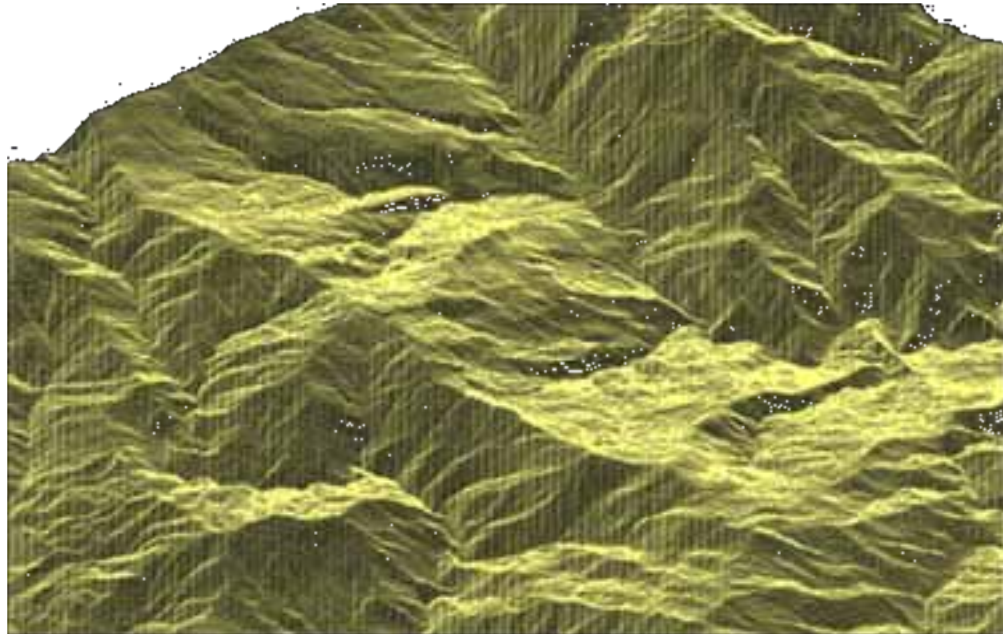
## ○ SAMPLE PHOTO FROM PAKSE

- Zoom in
- Original resolution (0.45 m)



# DIGITAL ELEVATION MODELS

- **DEM GENERATION IS HIGHLY AUTOMATED BASED ON IMAGE CORRELATION TECHNIQUES**
- **AUTOMATICALLY GENERATED DEM REQUIRES MANUAL 3D-EDITING**
- **Height accuracy is about +/- 2 m planimetric accuracy is about +/- 1 m**



# DIGITAL ORTHOPHOTOS

## Mosaicing



BEFORE MOSAICING AND COLOUR  
BALANCING

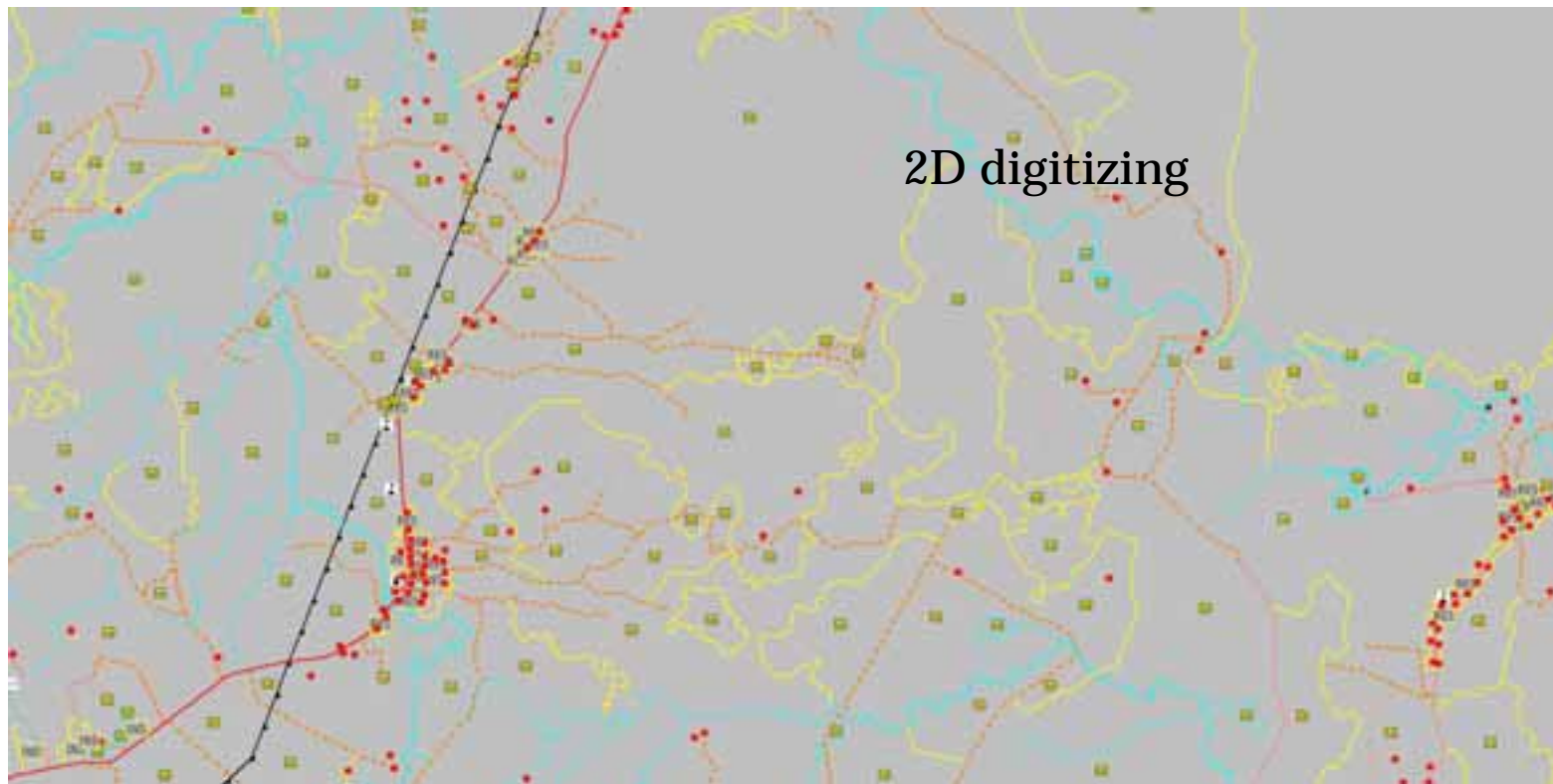


AFTER MOSAICING AND COLOUR  
BALANCING



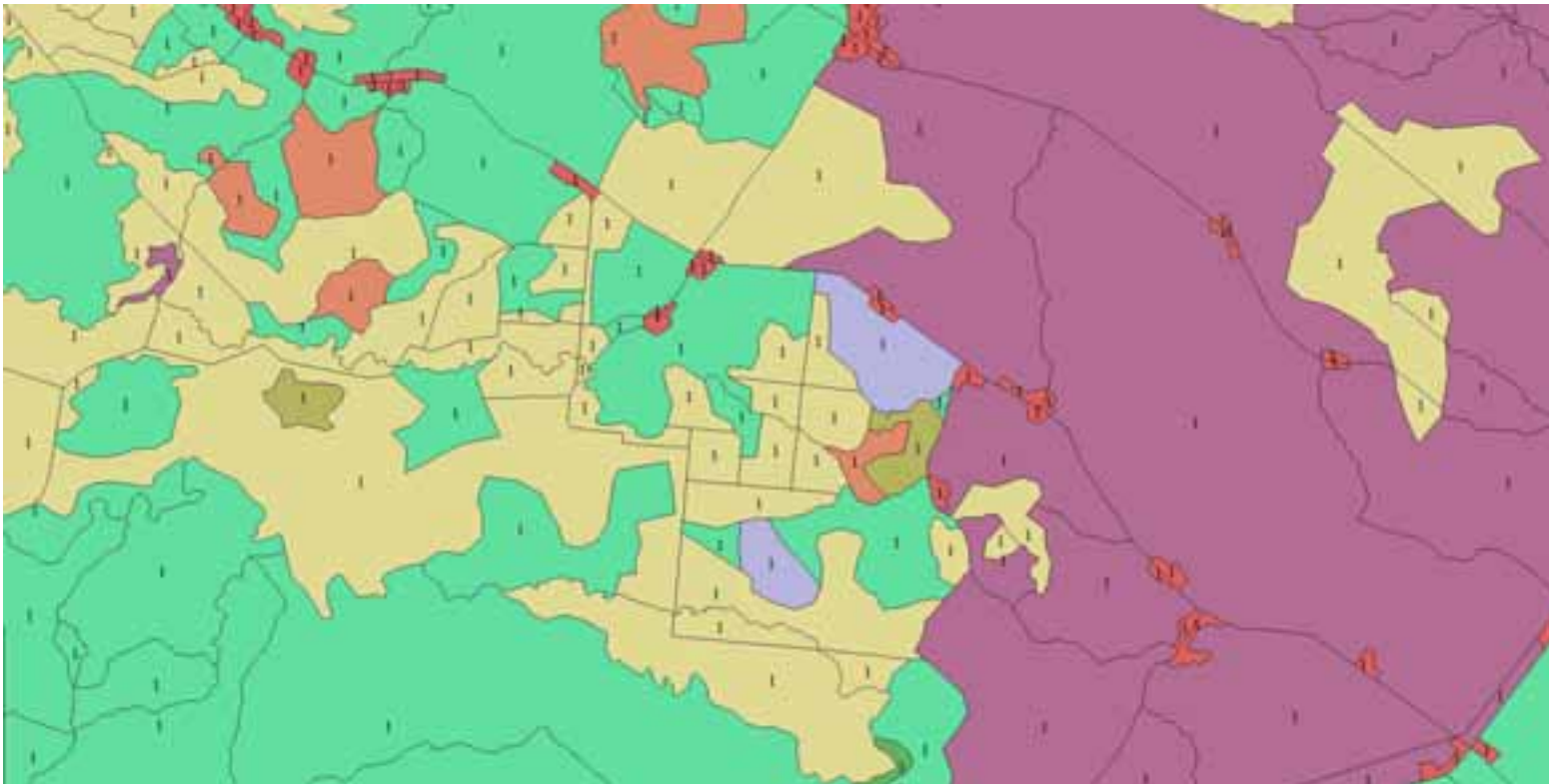
# VECTOR DATA

- **Vector data are generated by**
  - 3D digitizing (Rivers and Streams)
  - Data processing (Contours)
  - 2D digitizing (Transport, Hydro, Landuse, etc.)



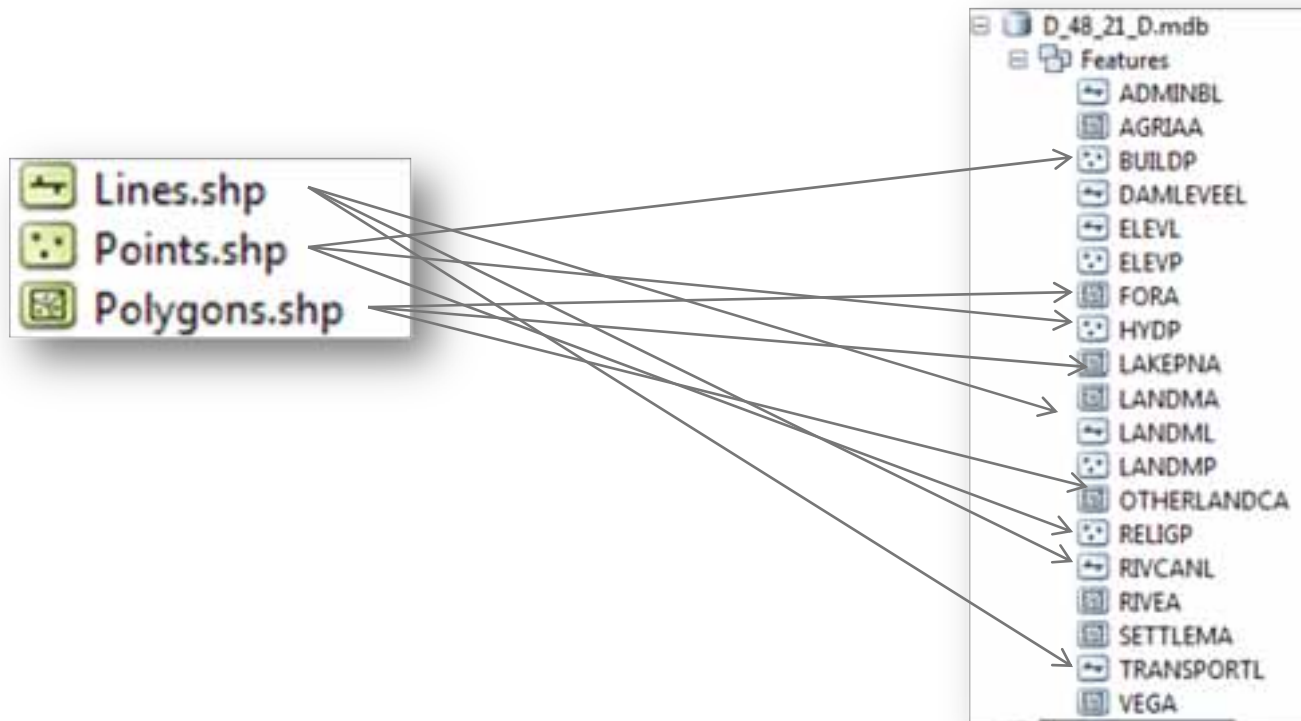
# GENERATION OF LANDUSE POLYGONS

1. Landuse polygons are created from Lines
2. The attributes for landuse polygons are taken from landuse points by “Spatial Join”. This process is automated using the Model Builder

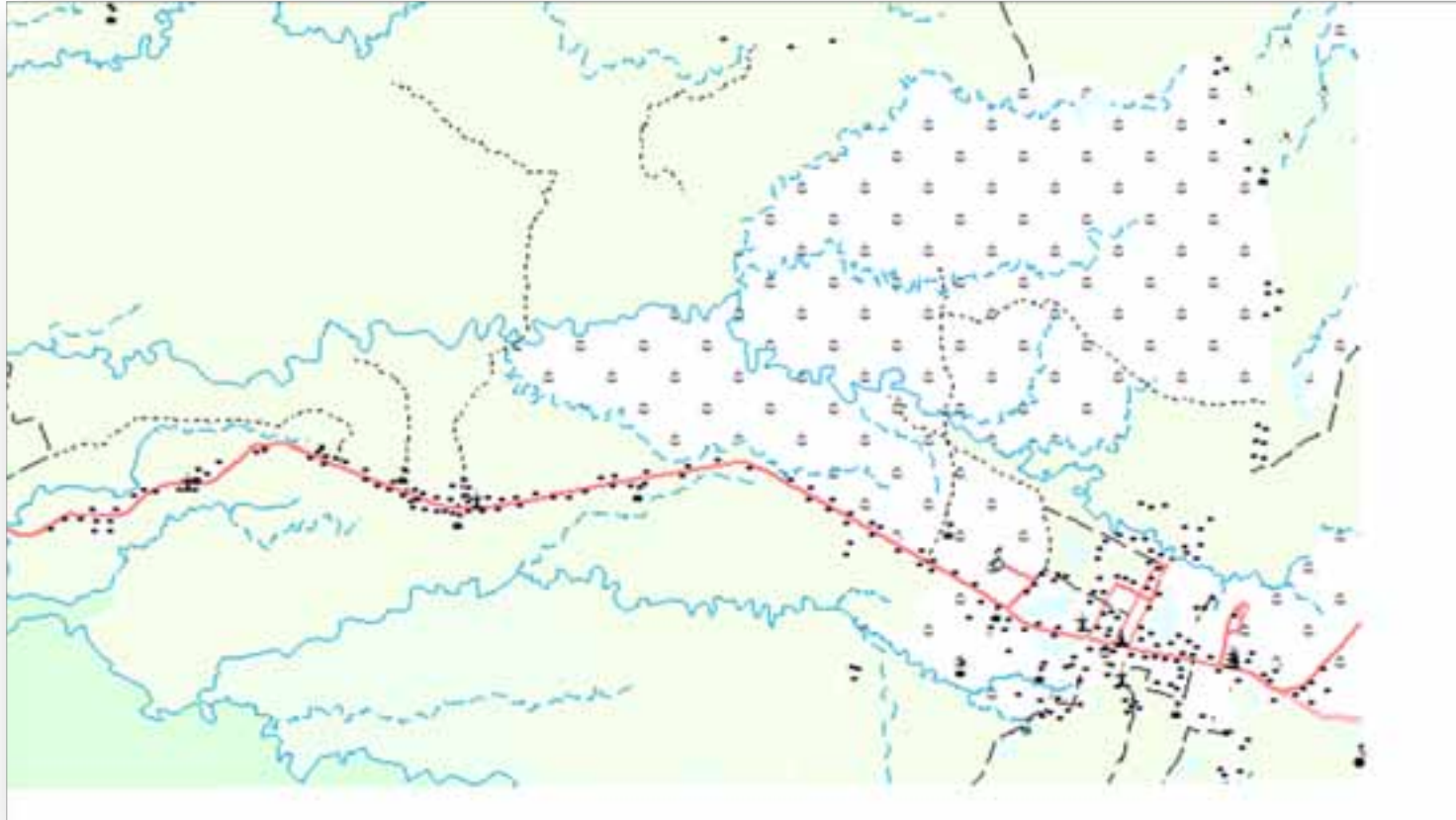


# LOADING DATA TO SHEET BASED GDB

- Data are loaded to sheet based geo-database (GDB) (individual sheets)
- Automation: Production Mapping – Data Loader
- Uses Excel file – from shape files to GDB



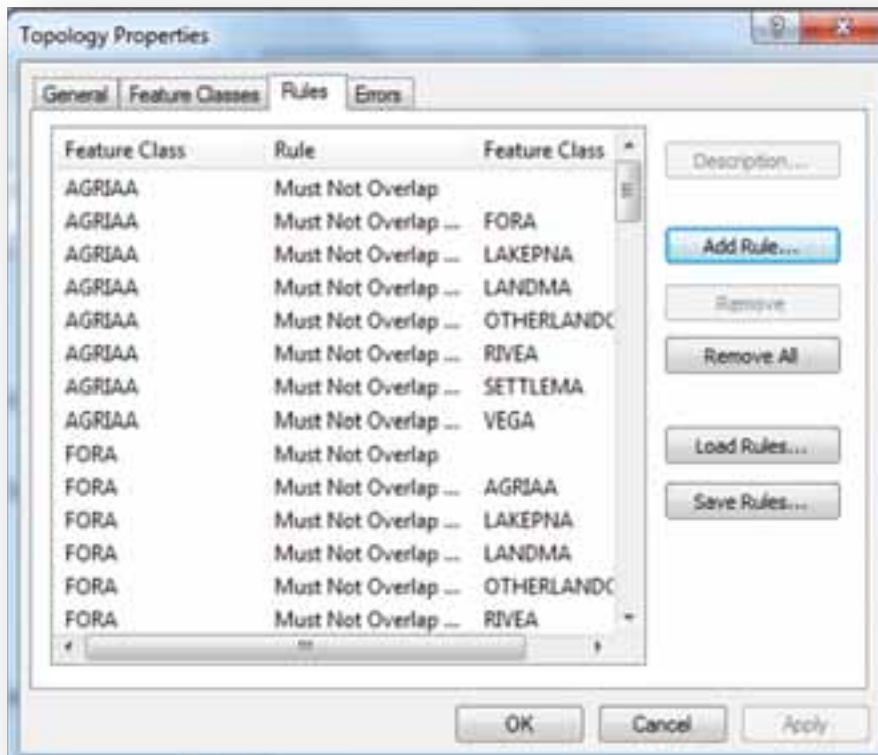
# GDB OF ONE SHEET



# STANDARD ERROR CHECKS

River and road network

Topology errors with topology rules (validate)



# TO SEAMLESS GDB

Finally sheet based GDBs > Seamless GDB

The features are edited to join

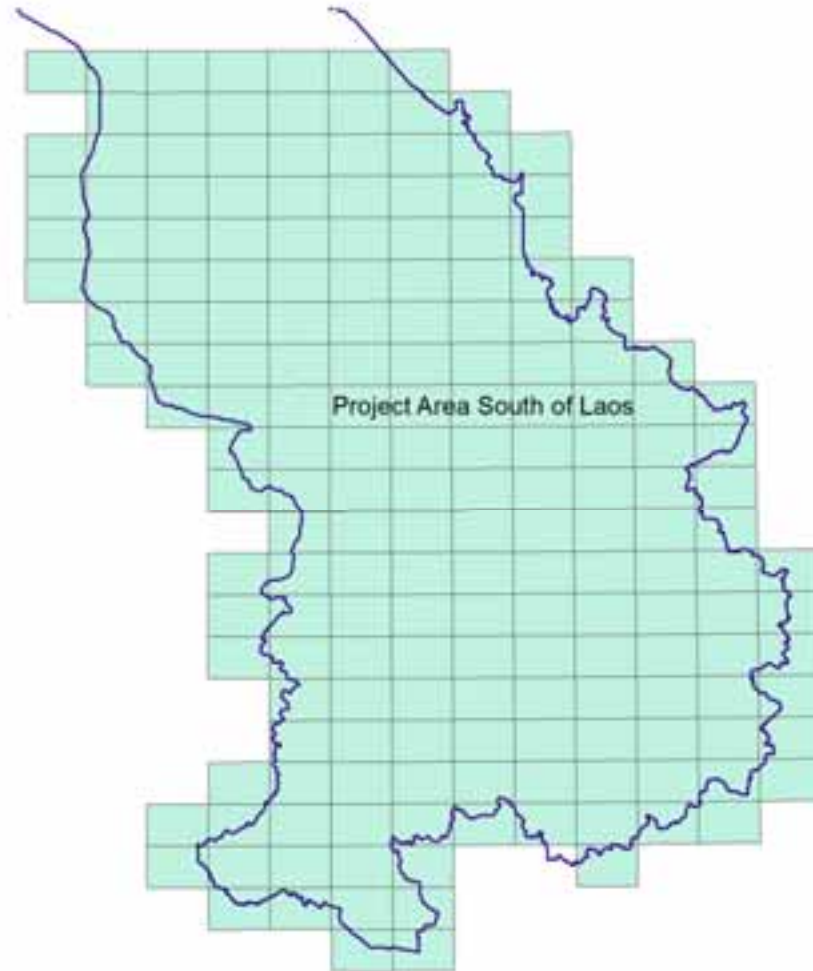
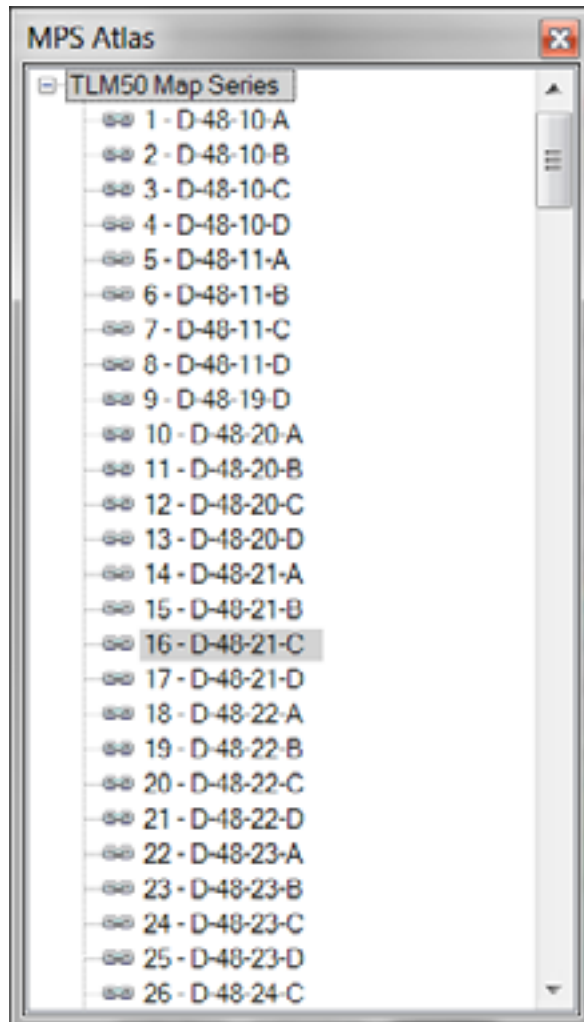


EXAMPLE FOUR  
SHEETS CONNECTED  
SEAMLESSLY



# CREATION OF MAP SERIES FOR TLM50

- The creation of map series is based on the map index 1:50000
- ArcGIS Extension “Production Mapping” and MPS Atlas tools are used.





# THE MAP LAYOUT

Grid

Text Elements

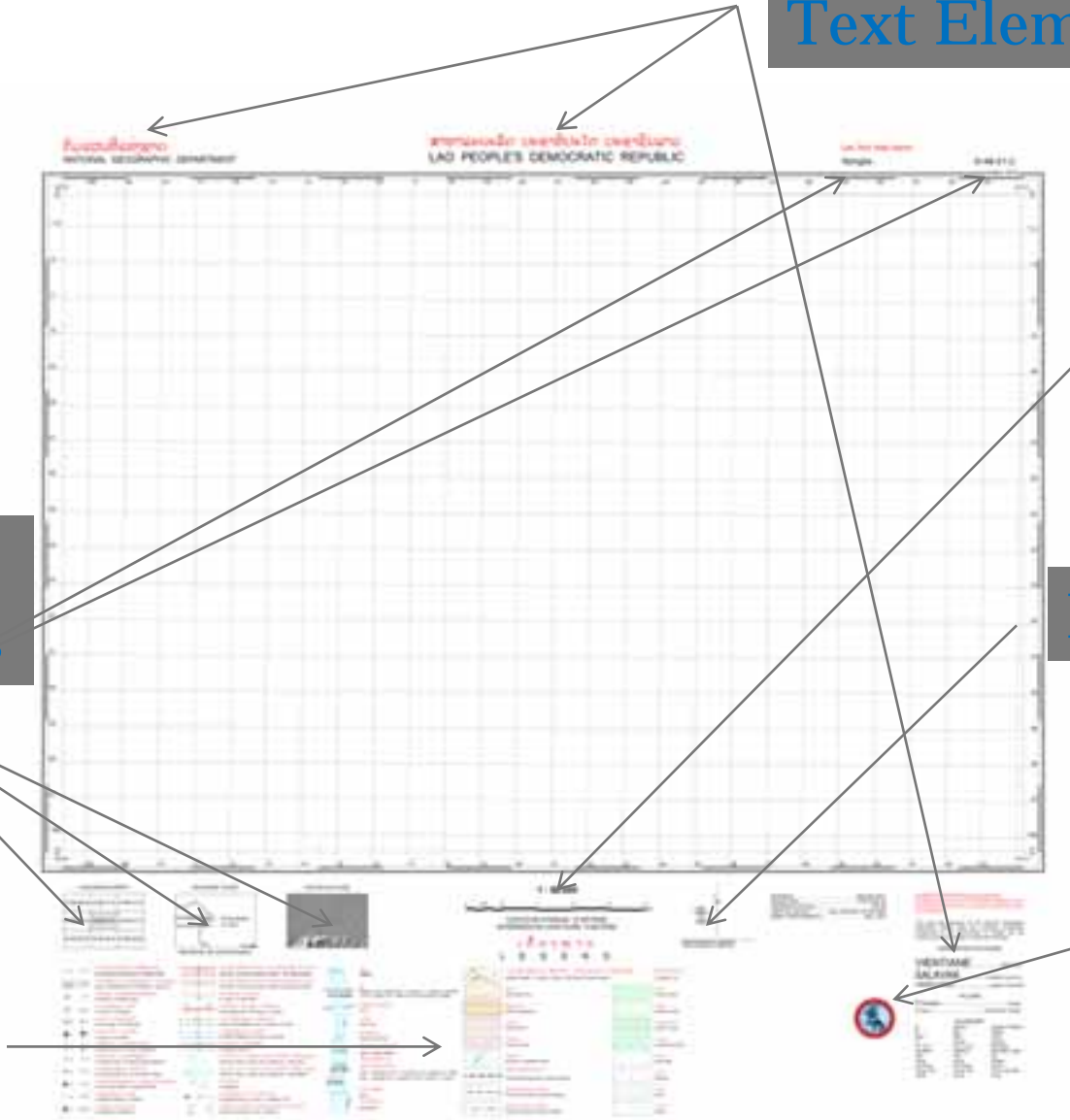
Scale Bar

North Arrow

Images

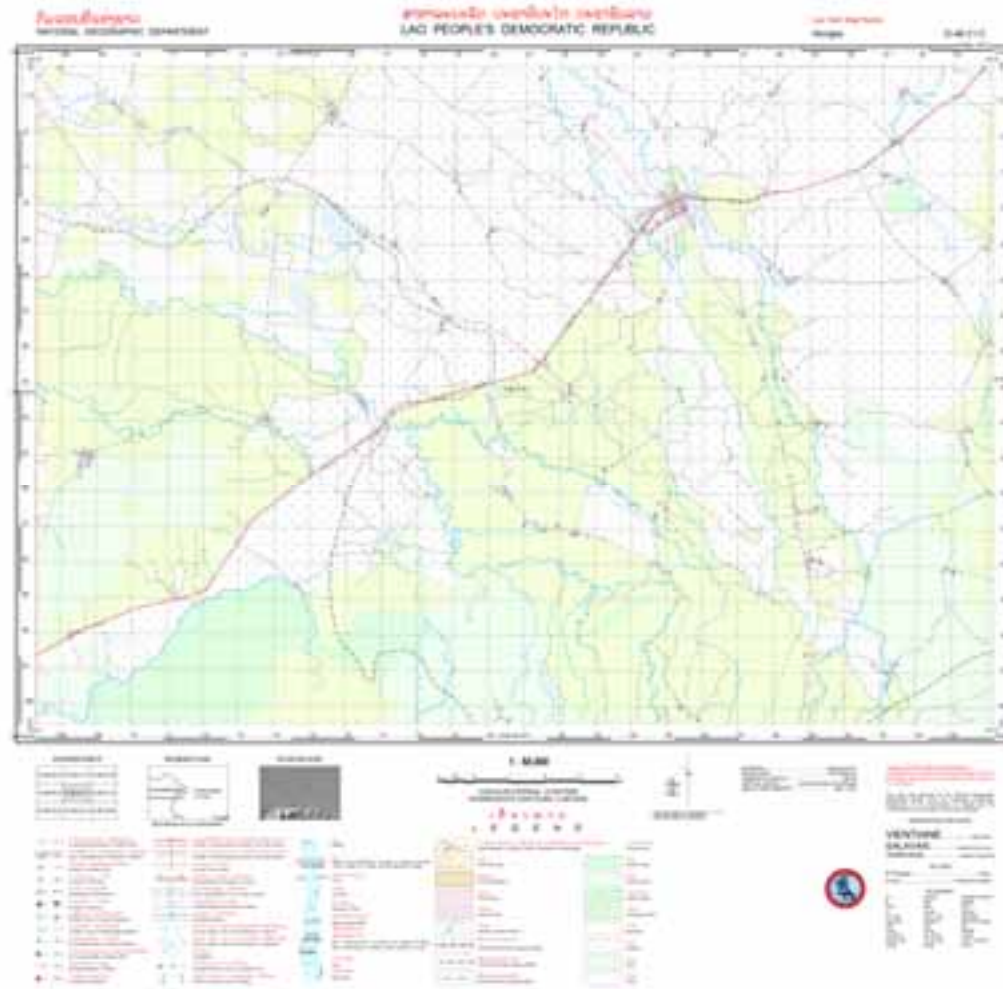
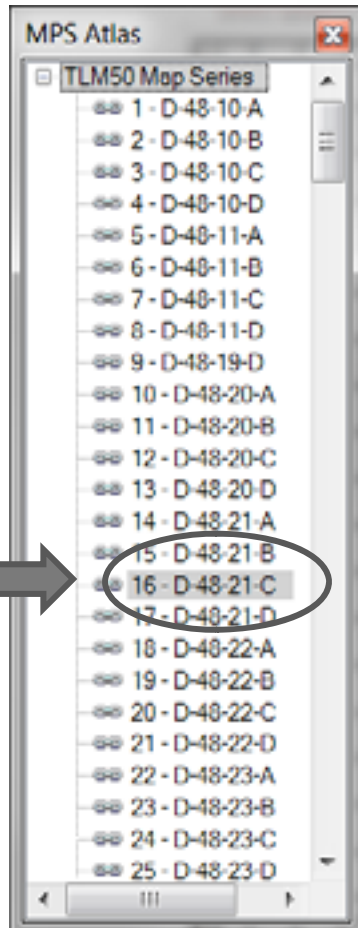
Dynamic Elements

Legend



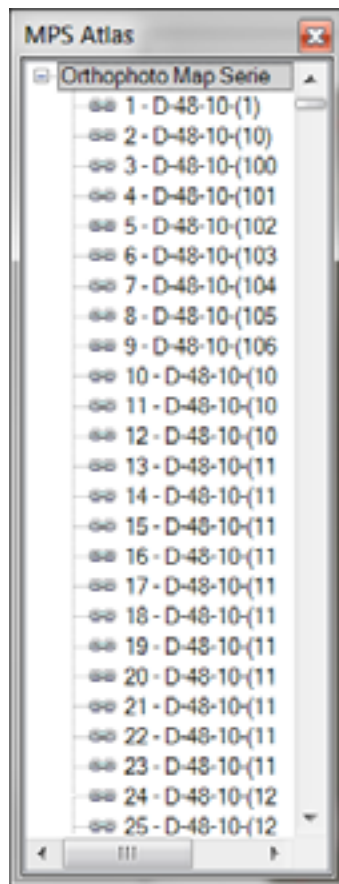
# TOPOGRAPHIC FEATURES

- Add symbolized topographic features from seamless database
- Select map sheet from the map series. (Dynamic text updates)
- Add Grid



# ORTHOPHOTO MAPPING

- The creation of orthophoto map series is based on the map index 1:5000
- ArcGIS Extension “Production Mapping” and MPS Atlas tools are used.



**Thank You**