

SURVEY DEPARTMENT
Republic of the Union of Myanmar

Geospatial Data Infrastructure
in Myanmar

16-17 October, 2016

Kuala Lumpur, Malaysia

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General Description

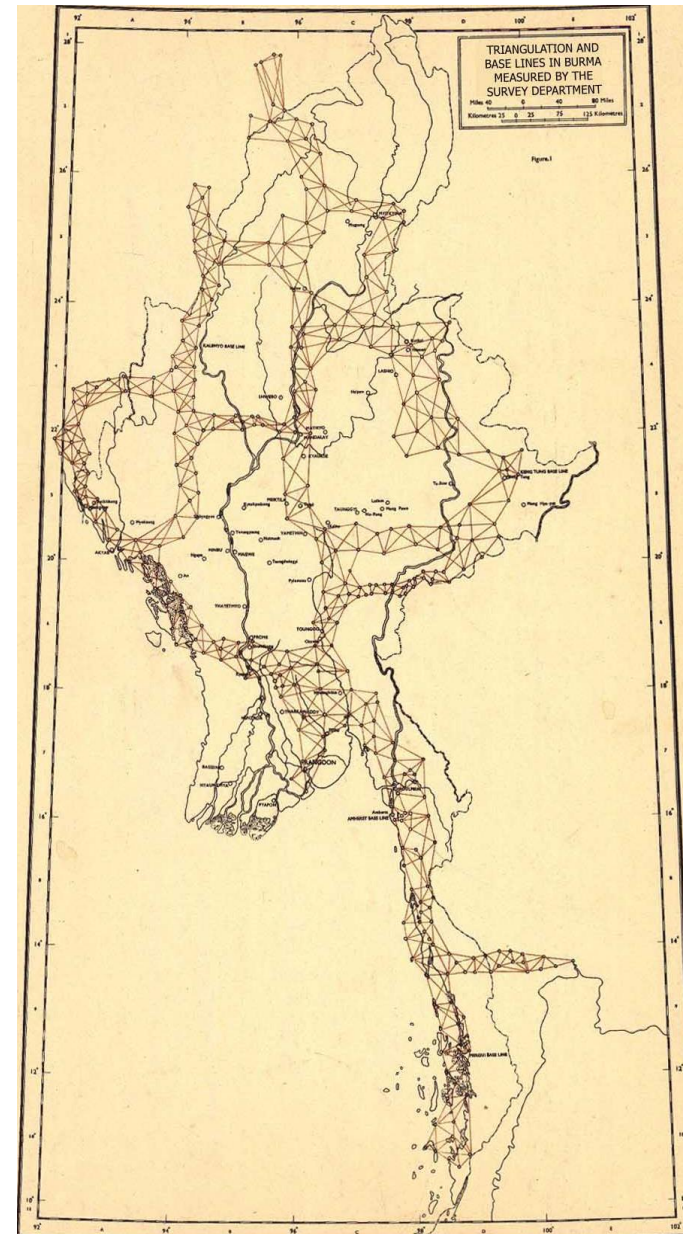
From 1905 to 1946, under the British rule, all the surveying works were undertaken by the Survey of India.

At the end of World War II, the British government separated surveying works from Survey of India.

On 1st November 1946 Survey Department was established.

Old Triangulation Series

- ❖ **Old Geodetic Datum:
Indian Datum on
Everest 1830 ellipsoid
with Lambert conical
orthomorphic projection.**
- ❖ **Topographic maps at
scales of (1 inch =1 mile,
1 inch =2 miles,
1 inch = 4 miles)**
- ❖ **Maps were published in
1935-1944.**



**Lambert
Projection
One Inch Map
(1 inch = 1 mile)**

Sample Map Sheet ➔



Organization

Survey Department is fully responsible for production of National Topographic Maps and Ground Control Points (GCP) establishment for the entire country.

Main Objectives of Survey Department:

- To produce National Topographic Maps**
- To demarcate the national boundary
with neighboring countries**

Organization Chart

Director General

Deputy Director General

**Planning &
Administration
Division**

**Training &
No(1) Survey
Division**

**Geodetic &
No(2)
Survey
Division**

**International
Boundary &
Civil
Construction
Survey
Division**

**Aerial
Survey
&Photogr
aphy
Division**

**Map
Reproduction
Division**

Planning
& Admin

Budget &
Account

Main
Store &
Map
Records

Survey
Training
Center

No(1)
Survey
Sub
Division

Geodetic
Survey
Sub
Division

No(2)
Survey
Sub
Division

Intl;
Boundary
Survey
Sub
Division

Civil
Constructi
on Survey
Sub
Division

Aerial
Survey
Sub
Division

Aerial
Photo
Sub
Division

Map
Drawing
Sub
Division

Map
Printing
Sub
Division

Establishment of Myanmar Datum 2000

The following factors are the main causes to reproduce the National Topographic maps with UTM (Universal Transverse Mercator) Projection

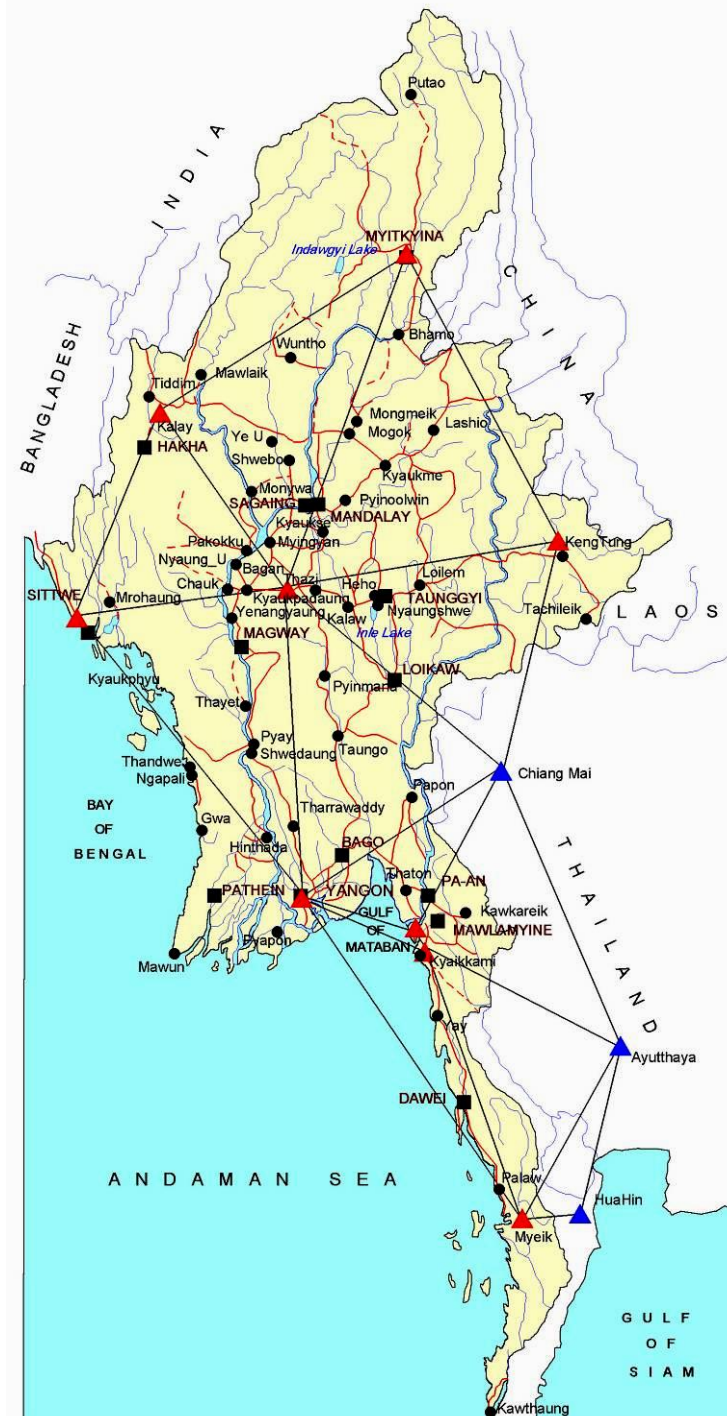
- 1) Most of the maps were produced last 70 years ago.**
- 2) The old projection system of Myanmar, Lambert, was suitable only for the nations whose East-West extent is longer than North-South extent.**
- 3) The units used in old map were in British System and not suitable for the modern mapping practice.**
- 4) UTM Projection is widely accepted and used in the mapping world today.**

Myanmar Datum 2000

Establishment of Transformation Parameters

Identification and selection of (9) Primary Triangulation stations whose Indian coordinates are known and evenly distributed over the area of country to form a new primary horizontal network. They are:-

- 1) Myitkyina (Maru bum)
- 2) Kale (Hkwe-u taung)
- 3) Meikhtila (Taungpila)
- 4) Sittwe (U-Gin taung)
- 5) Kengtung (Loi Hsu Khan)
- 6) Yangon (Ngweya taung)
- 7) Kyaikkami 1 (Amherst Base Line, -near Htonman village)
- 8) Kyaikkami 2 (Kyaikkami)
- 9) Myeik (Nattalin taung)



Datum Definition

➤ Base on Everest 1830 Ellipsoid

Semi-Major Axis (a) = 6377276.345 m

Semi-Minor Axis (b) = 6356075.434 m

Flattening (f) = 0.003352811

➤ Transformation Parameter

between WGS84 and Myanmar Datum 2000

- **dx = - 246.632 m**
- **dy = - 784.833 m**
- **dz = - 276.923 m**

Ground Control Survey



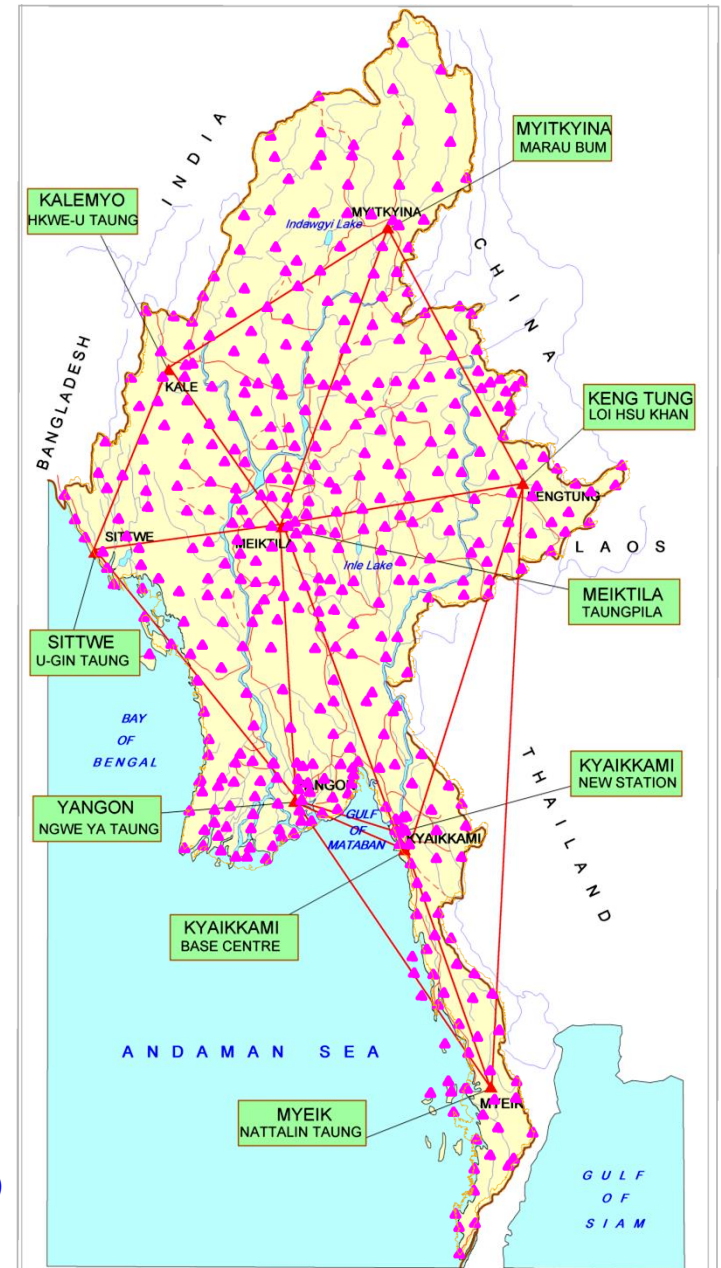
Dual Frequency Differential GPS
(Ashtech Z12, Trimble 5800)



Total Station (Trimble M-3 (1"))

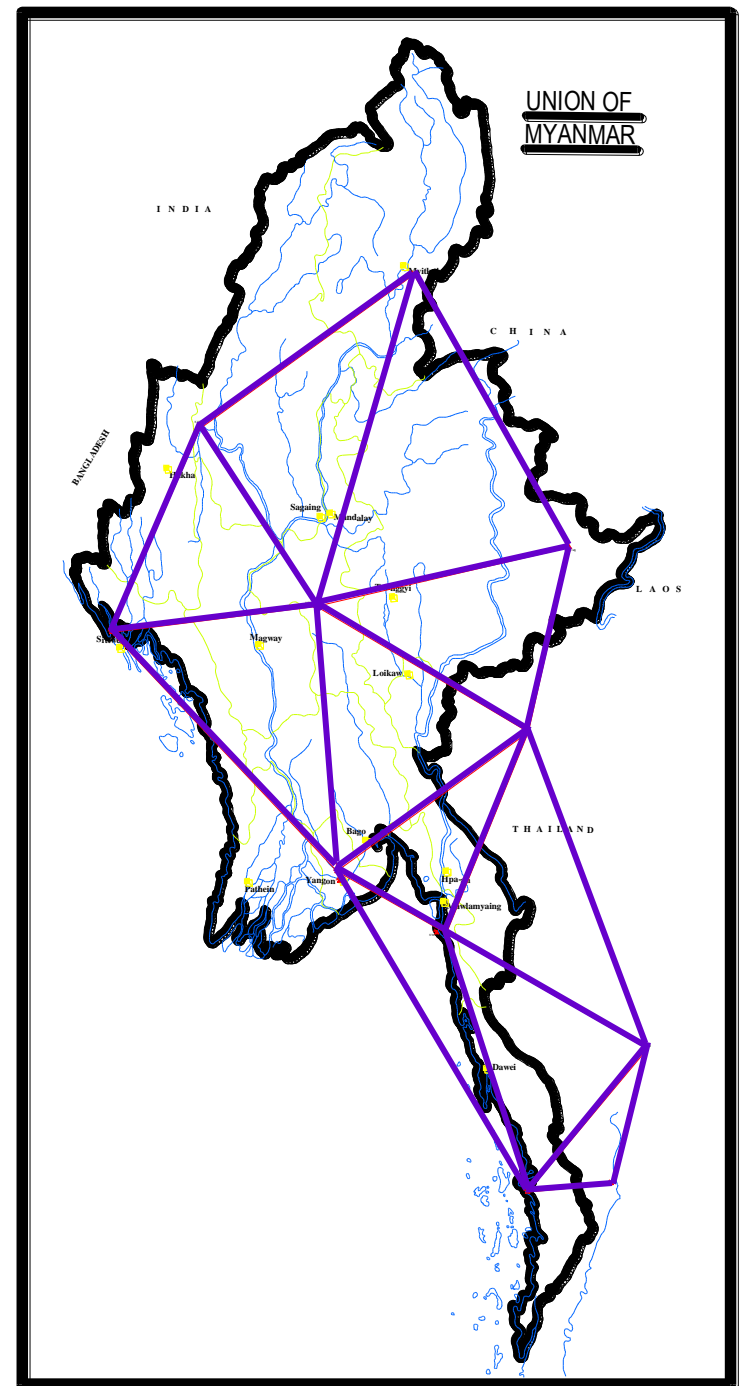


Digital Level (Trimble DiNi 0.3)



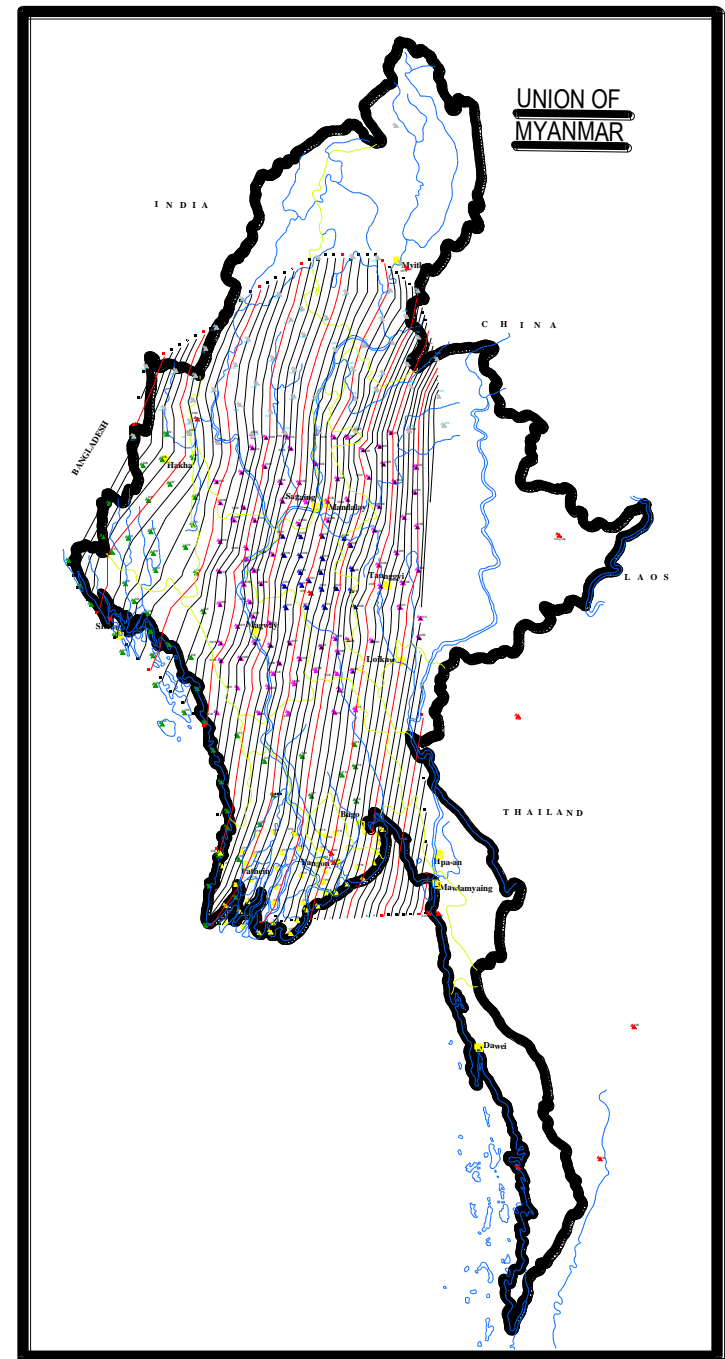
Primary Network (9) Stations Year 2000

- Network Accuracy 0.1 ppm
- Position Accuracy 0.01 - 0.05 m



Geoid Model Of The UTM Area. Geoid- Ellipsoid Separation Values Between Geoid And MMD 2000 On Everest 1830 Ellipsoid

Geoid contour interval 1 m.
Accuracy +/- 0.1 m in plane areas



FINAL COMPUTATION OF GPS STATIONS

- Average Baseline Length 30-50 km
- Baseline Accuracy 0.5 ppm = 0.5 mm/km
- Position Accuracies 0.03 - 0.05 m

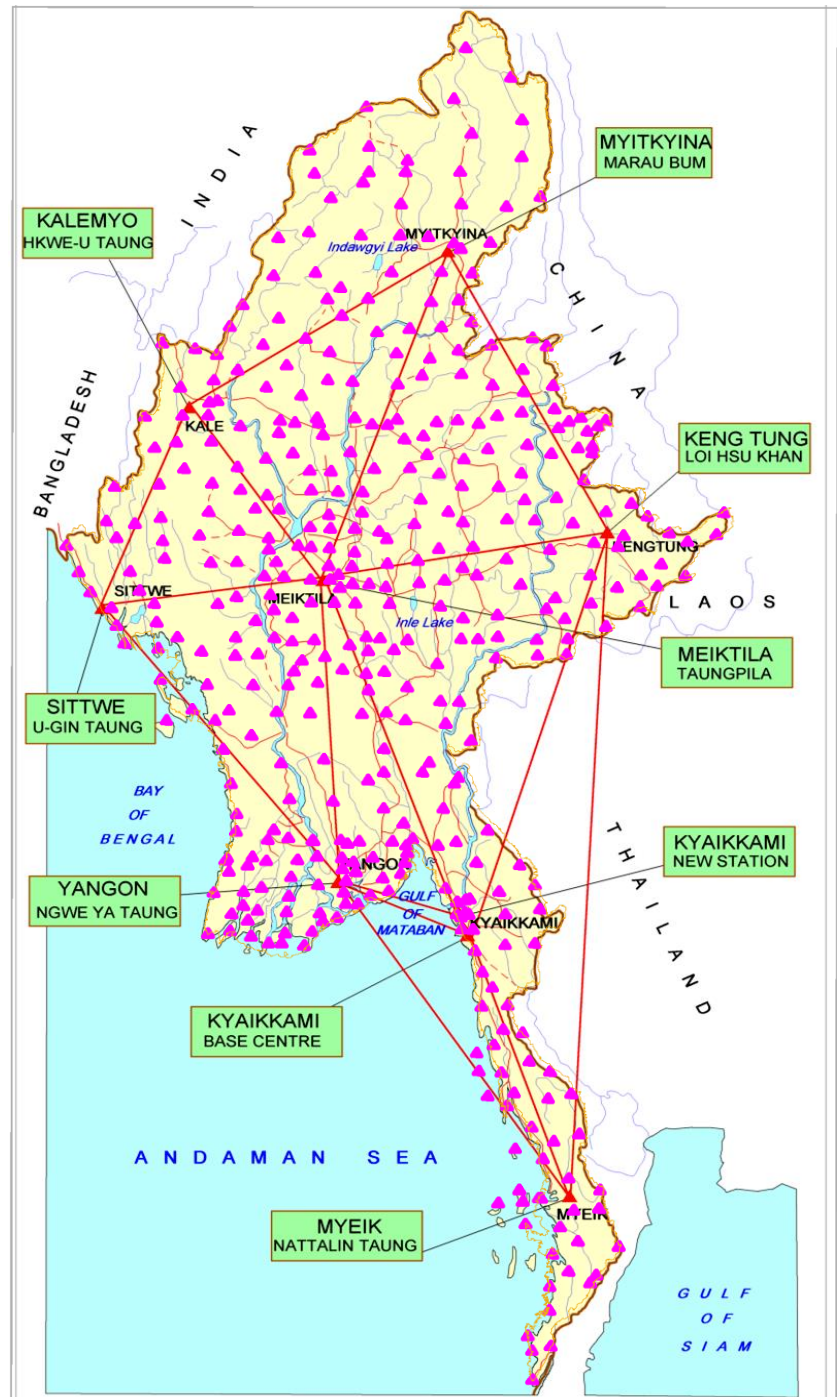
Current Situation

Current Condition of GCP Network

**Primary Network = (9) Points
(Zero Order Accuracy)**

**Secondary Network = 474 Points
(First Order Accuracy)**

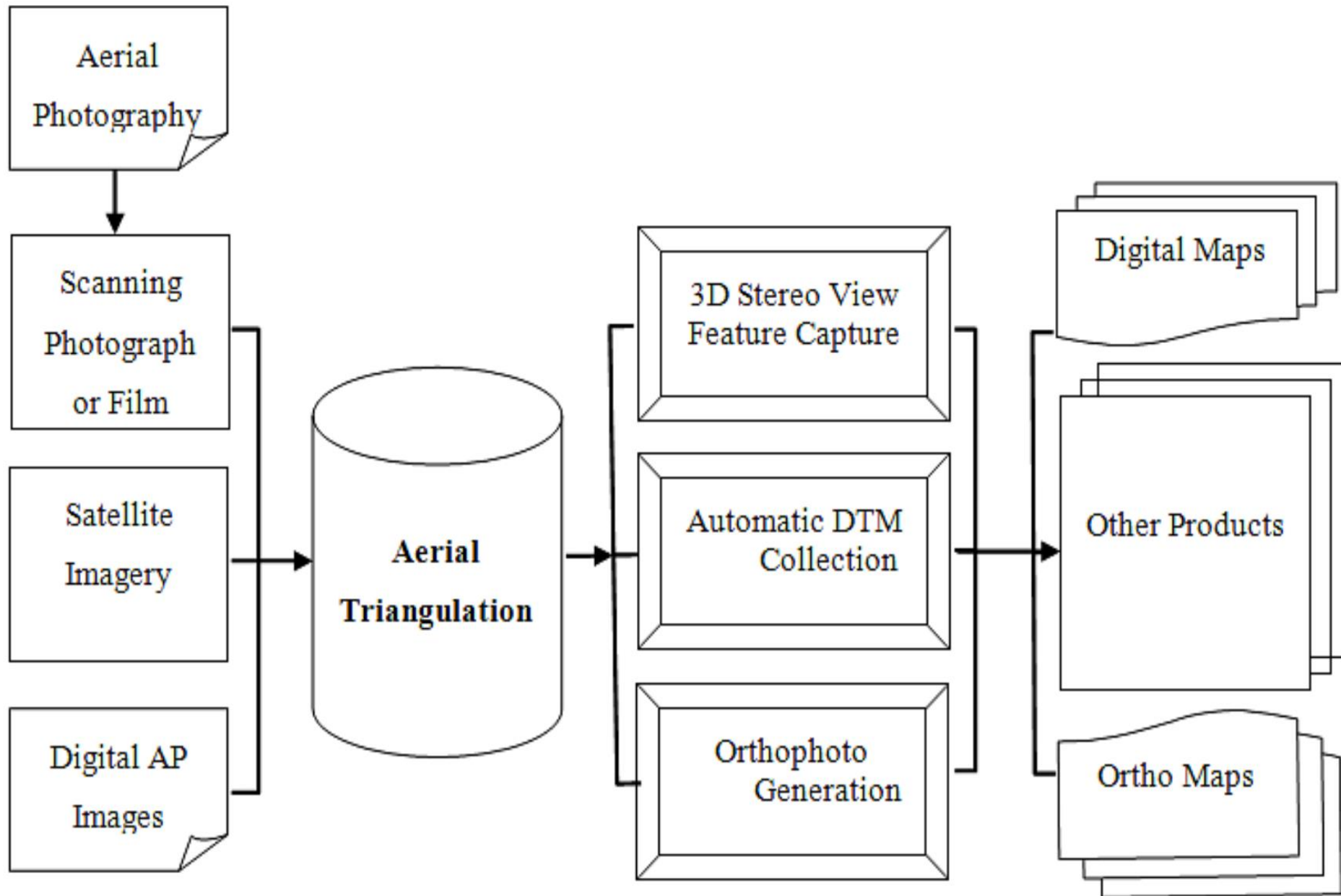
**Secondary Network = 341 Points
(Second Order Accuracy)**



GCP LIST IN MYANMAR

Sr. No	YEAR	GCP .Nos	REMARK
1	2000-2001-2002	103	Including 53A,54A,54B,56A
2	2002-2003	32	
3	2003-2004	72	
4	2004-2005	33	
5	2005-2006	85	
6	2006-2007	51	
7	2007-2008	43	
8	2008-2009	30	
9	2009-2010	-	No Observation
10	2010-2011	68	43Nos(2010) 25Nos(2011)
11	2011-2012	33	
12	2012-2013	100	50Nos(2012) 50Nos(2013)
13	2013-2014	64	35Nos(Annual) 29Nos(Aerial Photo)
14	2014-2015	53	35Nos(Annual) 18Nos(Aerial Photo)
15	2015-2016	48	35Nos(Annual) 13Nos(Aerial Photo)
	Total	815	

Photogrammetry and Map Production

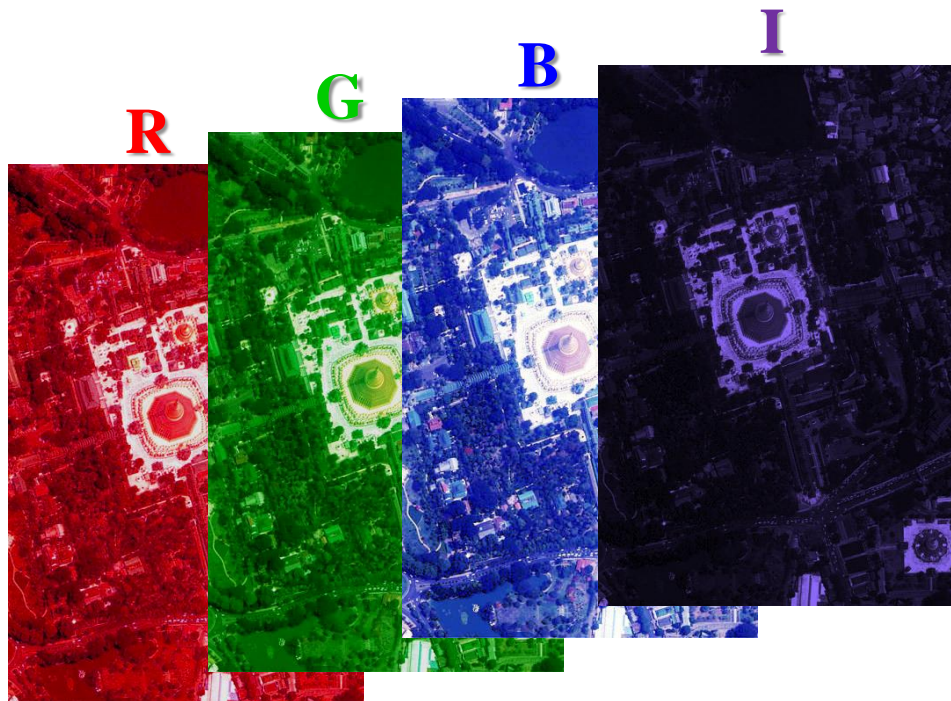
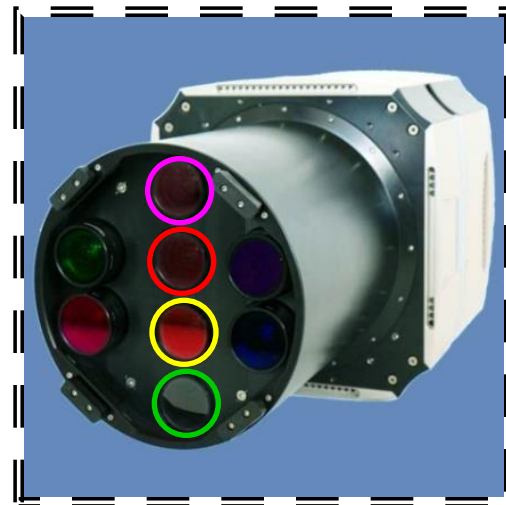




ALGORITHM OF FUSION WITH COLOR COMPOSITE



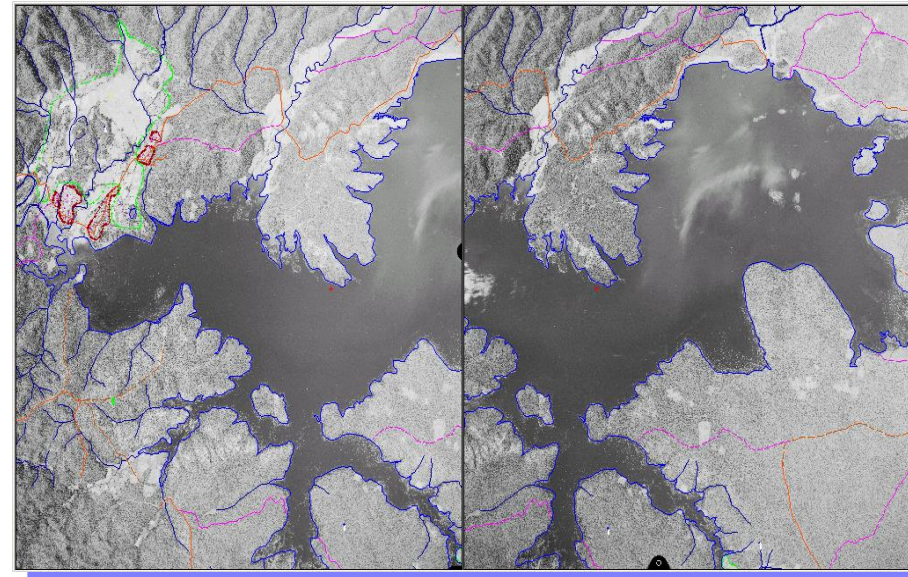
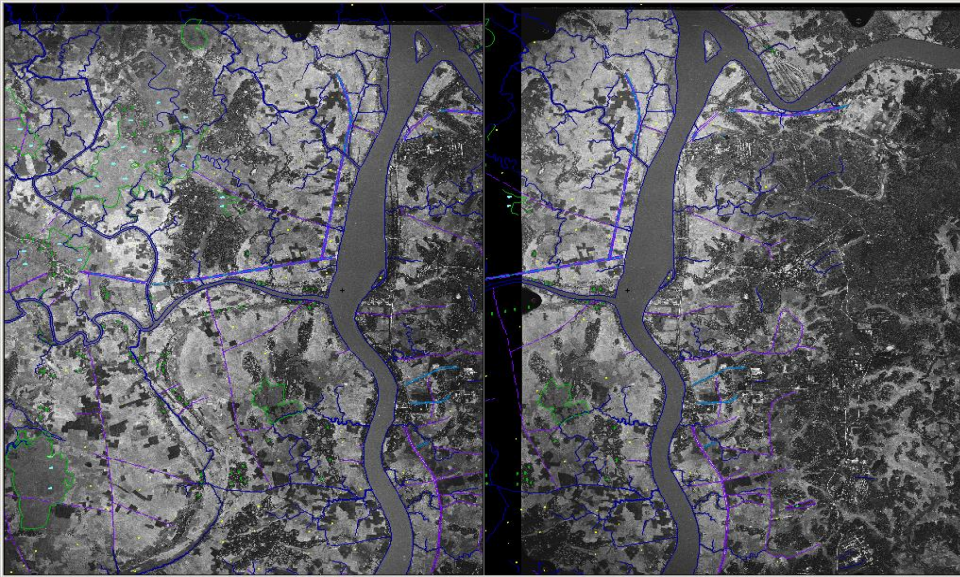
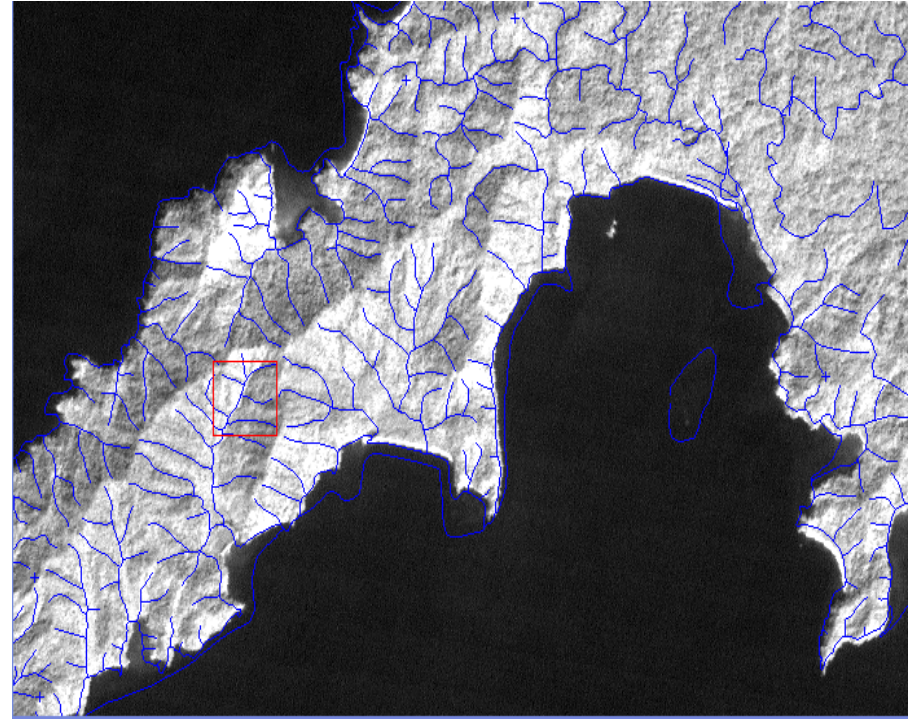
Tie-Point Area



Output RGBI Image

River and Drainage

- ❖ River
- ❖ Stream
- ❖ Canal
- ❖ Reservoir
- ❖ Lake / Pond
- ❖ Coastal line
- ❖ Shoal



Built up information



Monastery



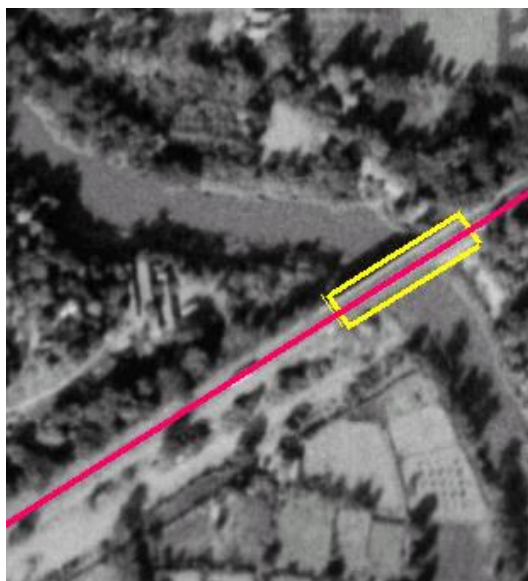
School



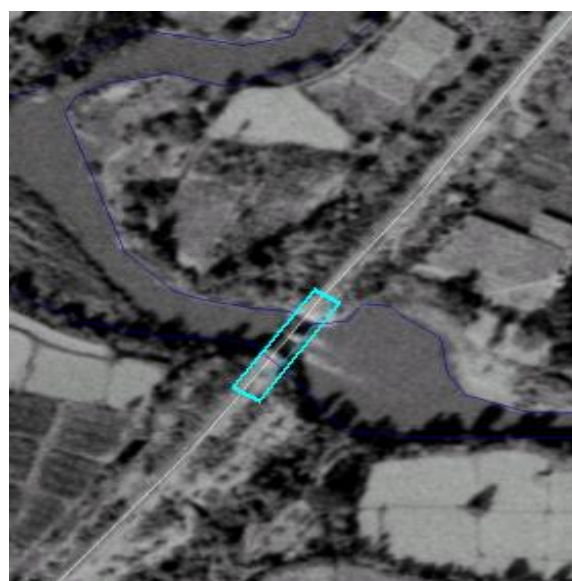
Pagoda



Sport field



Road and Bridge



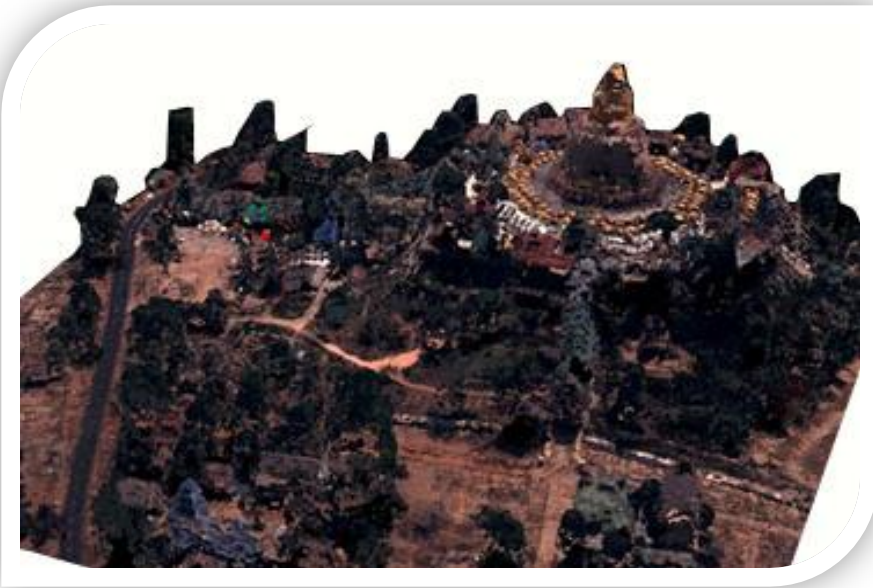
Railway line and Bridge

Geospatial feature collection

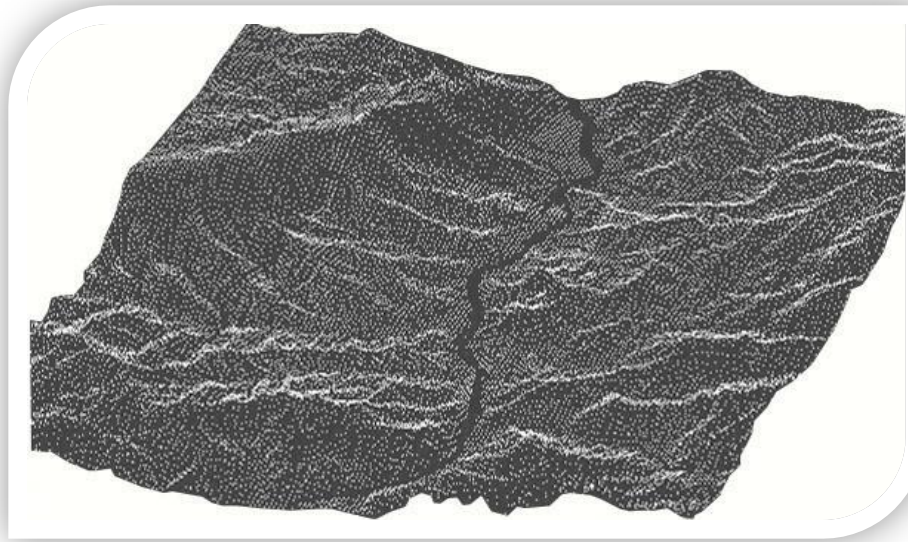


Contour Generation

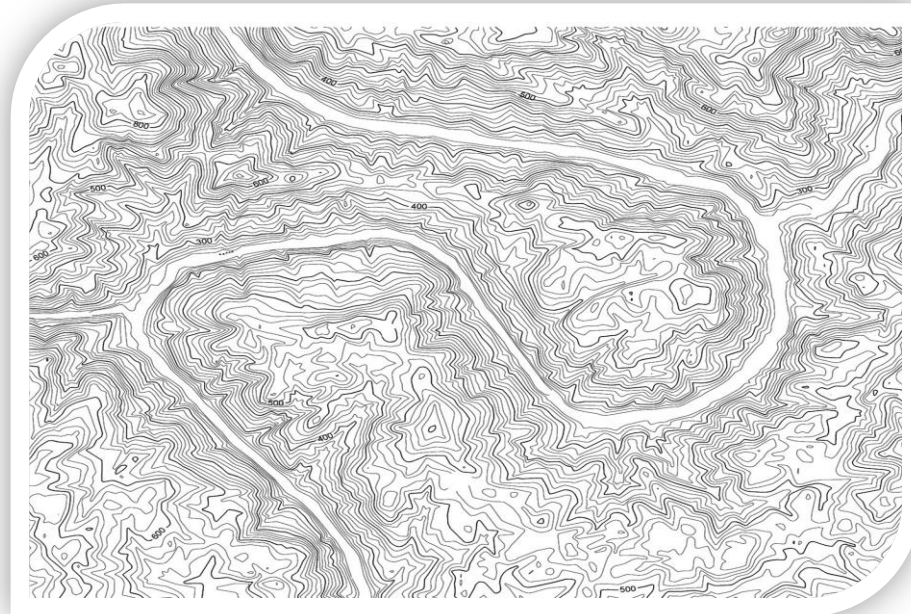
❖ Digital Terrain Model (DTM)



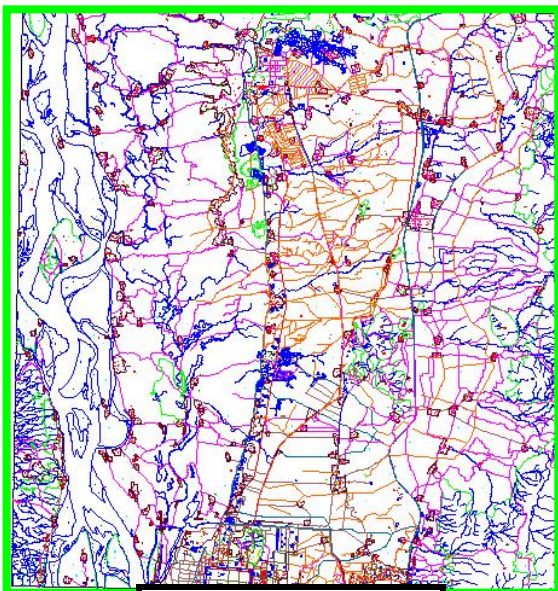
❖ Contour generation to display the topography



❖ Digital Surface Model (DSM)

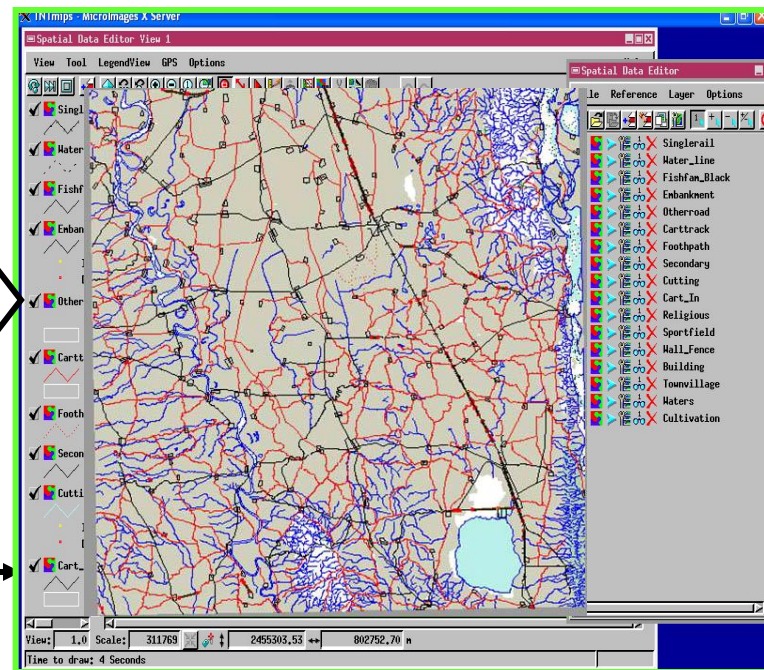


WORK FLOW CHART OF MAP REPRODUCTION DIVISION



Raw Data

Raw data Importing
By TNT mips software



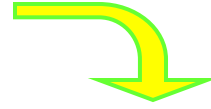
- ❖ .dxf format
- ❖ ASCII format



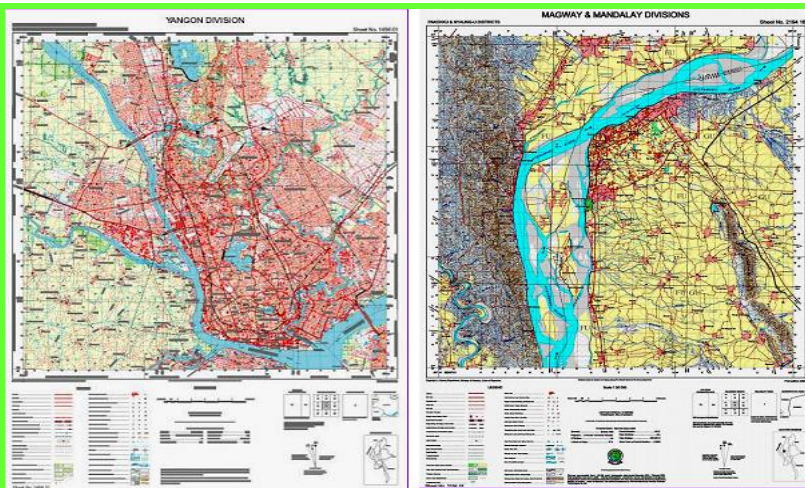
Map Printing



Two Colour Printing Machine
Heidelberg (SM 102)

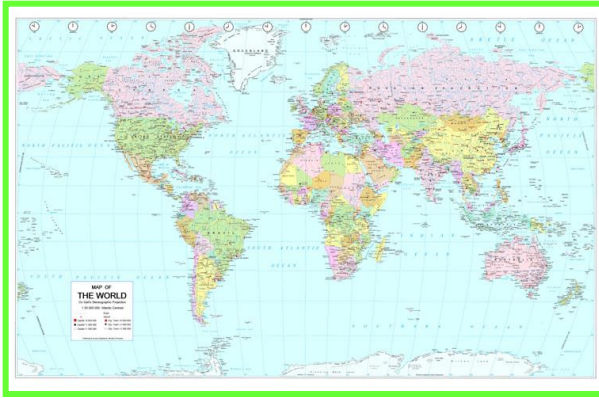


Paper Cutting Machine
SQZK 115 NE

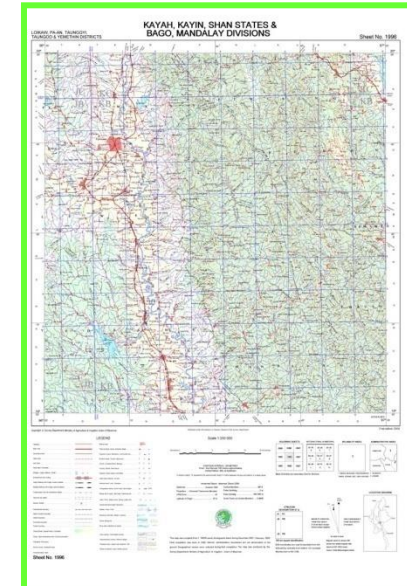
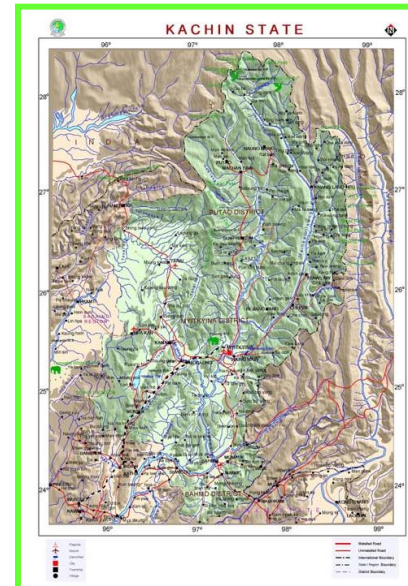
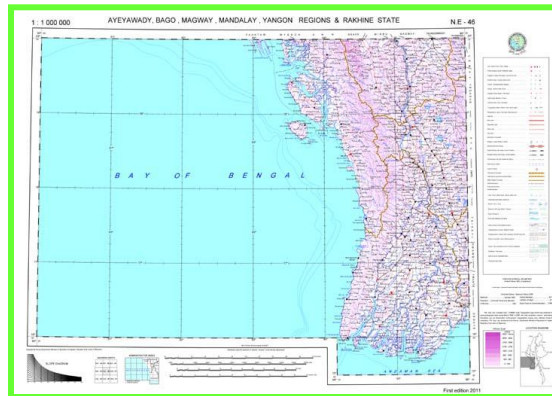
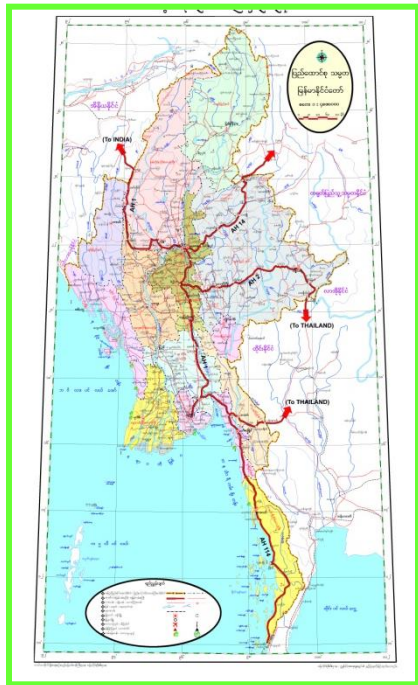
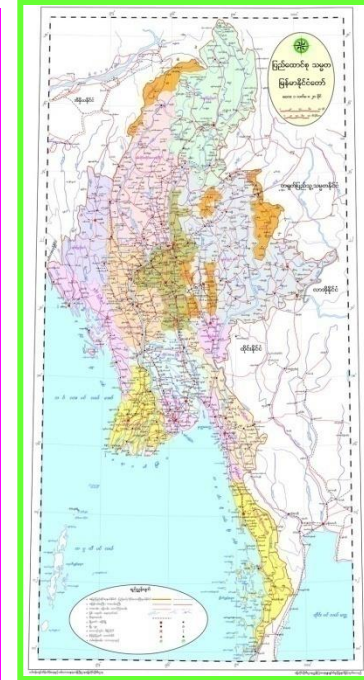


Printed Maps

THE MAPS PRODUCED BY SURVEY DEPARTMENT



- ❖ 1 : 50000 scale maps
- ❖ 1 : 100000 scale maps
- ❖ 1 : 250000 scale maps
- ❖ 1 : 1000000 scale maps
- ❖ Boundary maps
- ❖ Myanmar map (1inch = 45 mile)
- ❖ Myanmar map (1inch = 20 mile)
- ❖ Atlas maps of Myanmar
- ❖ Yangon Guide map
- ❖ Naypyitaw Guide map



Geodetic Services

- **Survey Department provides Geospatial Data (Base Map) with the permission of Defence Ministry.**
- **50 meter interval DTM Points are available for the DEM generation**
- **Survey Department maintains GPS Observation Network for the whole country**
- **Survey Department is preparing to Share the Spatial data for One Map Myanmar Project.**
- **Survey Department is seeking technical & financial assistance to establish the Continuously Operating Reference Station (CORS) system.**

Users

- **Government Organization / Agencies**
- **Local Authorities**
- **Private sector / companies**

Issues to be Resolved

- **Reliability of existing GPS Ground Control Points**
- **Large scale mapping for capitals and cities**
- **Establishment of new Tidal Station and accurate Geodetic Leveling Network**
- **Establishment of CORS system across nationwide**
- **Overseas training for Survey Technicians**
- **Survey Act for Surveying and Mapping**
- **Upgrading the Survey Training School**

Survey Department cannot afford such implementations by itself due to technical limitations and financial constraints.

Future Plans

- **Regular checking for accuracy of existing GPS
Ground Control Points**
- **Large scale mapping for capitals and cities**
- **Survey Act for Surveying and Mapping**
- **Establishment of CORS system**
- **Upgrading the Survey Training Center**

Contact Information

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Thank you for your

kind attention.