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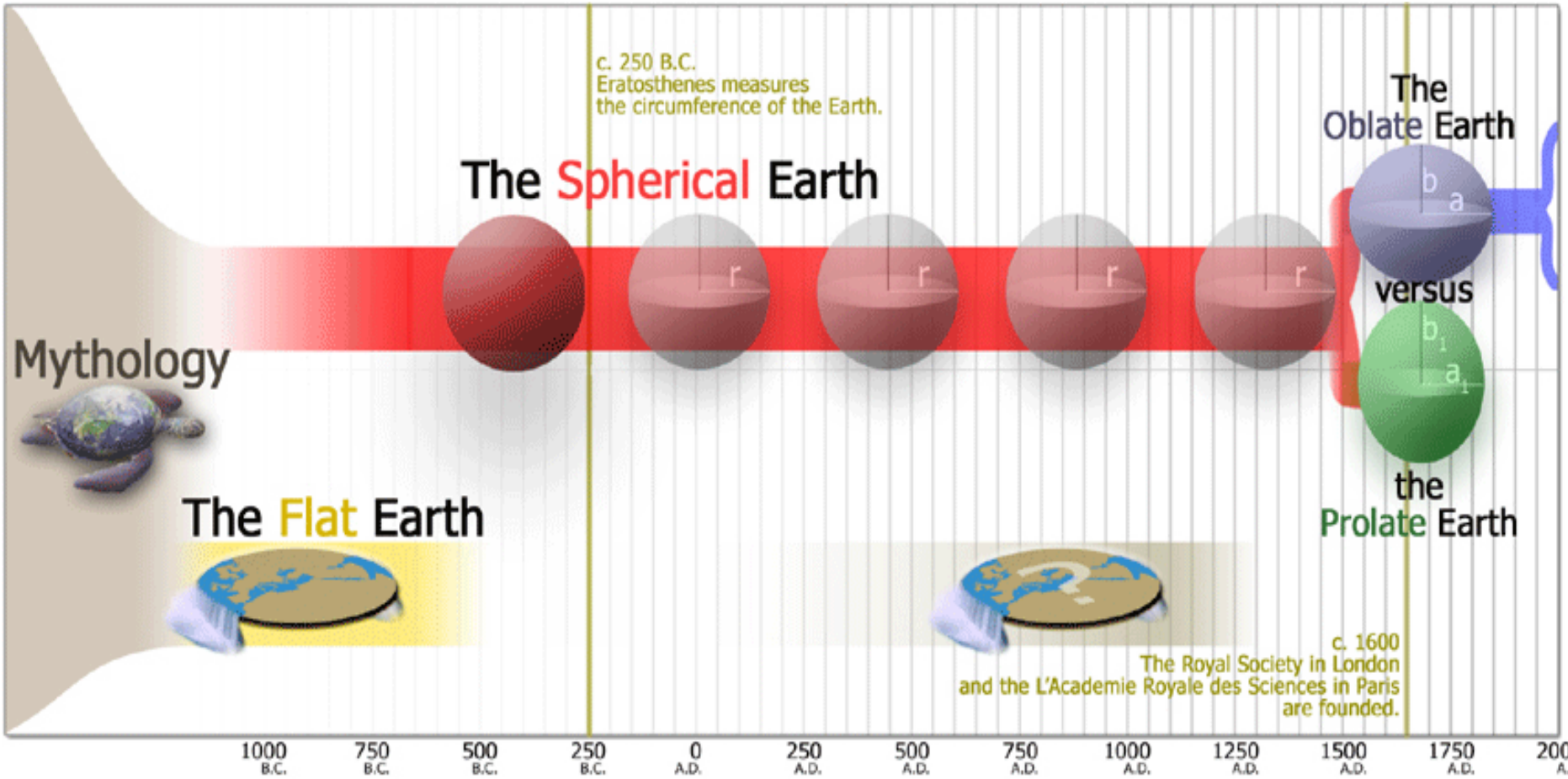
BASIC CONCEPTS

Contents

- Introduction,
- Basic definitions,
- Different Disciplines (& Surveys) in Geomatic Engineering.
- Co-ordinate systems
- Angular systems,
- Error types.

Introduction

Shape of the Earth Concepts



Introduction

Different professionals at one time or the other need the services of a Geomatic Engineer. They require comprehension of the principles of Geomatics in their day to day activities.

An Agricultural Engineer may require the principles of Remote Sensing and GIS in analyzing crop yield or spatial coverage over a certain portion of land over a decade.

Introduction

For a Civil Engineer, buildings must be vertical, long tunnels must end at the correct place and foundations must often be constructed in advance to accommodate prefabricated structural sections. To achieve this, surveyors are required to determine the relative positions of fixed points to high accuracy and also to establish physical markers at (or very close to) predetermined locations.

Introduction

A Mine Engineer, will require a Geomatic Engineer in correct and precise mine orientation especially for underground mining and exploration. This may also extend to quantification of stockpiles.

It is clear that Geomatics extends between a wide range of disciplines as already noted from the different applications in different professions.

Basic Definitions

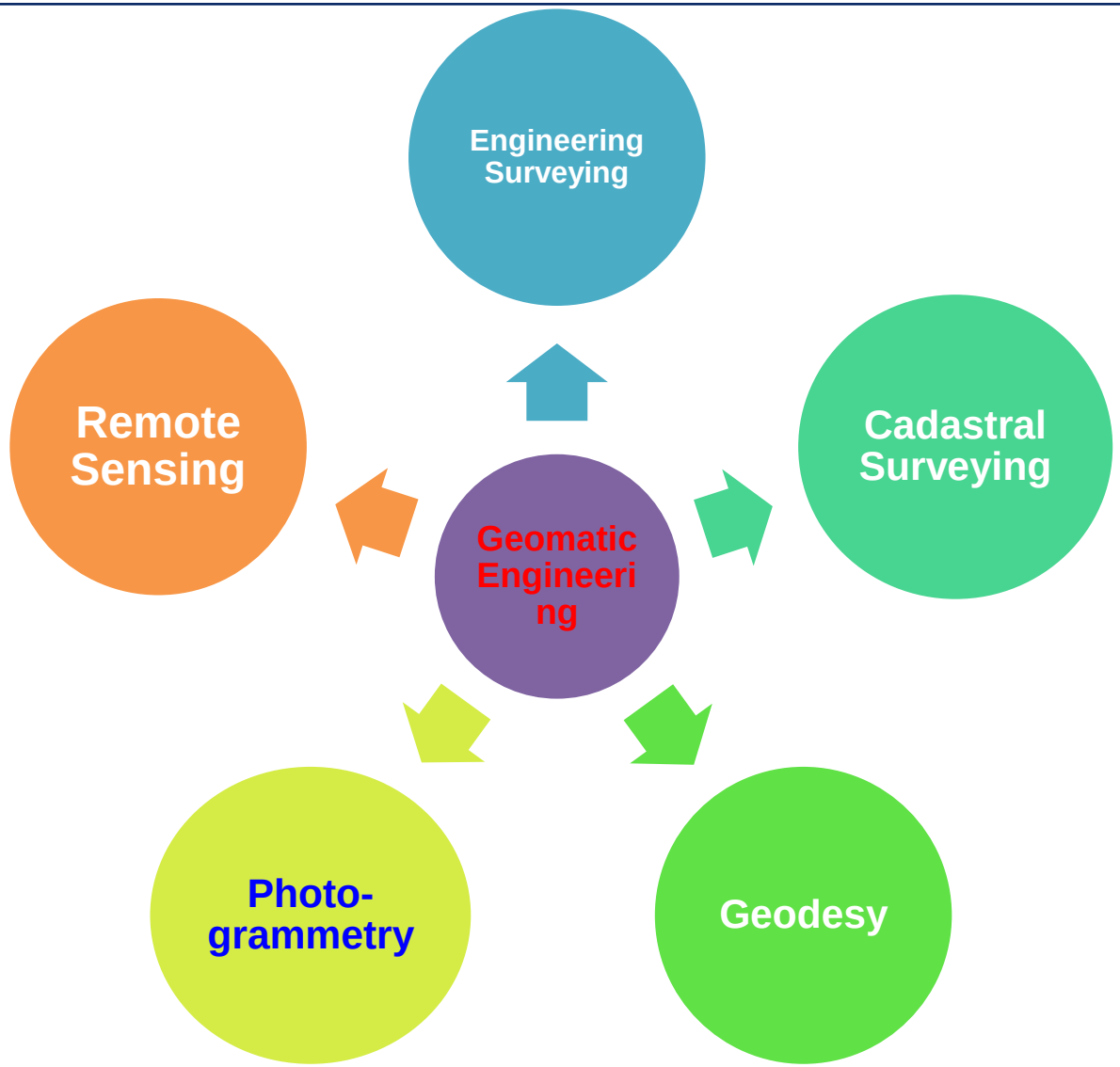
Geomatic Engineering can be interpreted as a branch of information science and engineering, which includes spatial data (position and information at that position) acquisition, management and presentation in support of scientific, administrative, legal and technical operations (Trinder & Han, 2010).

Geo : anything at, a little above or a little below the earth's surface level

Matics : measurement

hence, Geomatics or Geoinformatics is collecting information or measuring any object or phenomenon at, a little below or a little above the earth's surface.

Different Fields of Study in Geomatic Engineering



Different Disciplines (& Surveys) in Geomatics

- Engineering Surveying – is a discipline covering Engineering projects such as;
  - ✓ Deformation monitoring
  - ✓ Setting out
  - ✓ Topographic and Leveling in road construction works
  - ✓ Mine Surveying – covering the mine orientation, stockpile quantification, etc.
- Cadastral Surveying – is a discipline related to land boundaries and subsequent land ownership through title deeds. This also covers land dispute resolutions, verifications etc.

Different Disciplines (& Surveys) in Geomatics

- **Geodesy**; this is the main field of study to which all Geomatics disciplines are affiliated. It may roughly be defined as the science of measurement and mapping of the earth's surface, along with the determination of the earth's external gravity field.

geodesy may therefore, be broadly divided into three (3) categories as follows

Different Disciplines (& Surveys) in Geomatics

- Global Geodesy

Global geodesy is responsible for the determination of the figure of the earth including the external gravity field.

- Geodetic Surveying

Geodetic survey aims to define the surface of a country by the coordinates of a sufficiently large number of control points taking into account the curvature of the earth.

- Plane Surveying

In plane surveying (which encompasses topographic, cadastral and engineering surveying), the details of the land surface are obtained with the horizontal plane as the reference surface.

Different Disciplines (& Surveys) in Geomatics

- Photogrammetry – Photogrammetry consists of making precise measurements from Aerial photographs and other patterns of recorded radiant energy to reconstruct a three dimensional model of the terrain or other objects. This might be confused with Remote Sensing, however the main distinction is the altitude upon which observations are taken, and also the platform used for upon which sensors are mounted.

Different Disciplines (& Surveys) in Geomatics

- Remote Sensing - Remote Sensing is used to gather and process information about the earth's environment, particularly its natural cultural resources through the use of specifically satellite sensors unlike photogrammetry which uses aircrafts and terrestrial cameras.