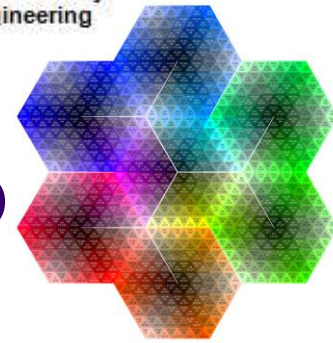


Surveying Engineering

Lecture 1: Introduction to Surveying for Engineering



Dr. Eng. Hassan Mohamed Hassan
Hassan.husseain@feng.bu.edu.eg
Geomatics Department



What you learn from this course

1. Understand the usage of surveying in various engineering projects
2. Ability to use basic linear measurements tools for planimetric detailing
3. Comprehend surveying for mapping
4. Analyze basic coordinate computations
5. Utilize leveling for height determination.
6. Ability to test and operate optical and electronic instruments used to acquire field data in land surveying.
7. Recognize total station along with its components and main programs



Course Contents :

Week	Topics
1	Introduction to Surveying for Engineering Purposes
2	Simple linear measuring techniques- Distance measurements-Scale
3	Bearings
4	Traversing-1
5	Traversing-2
6	Computation of areas
7	Leveling (leveling procedures, leveling instruments, Errors in leveling)
8	Midterm Exam
9	Leveling computations
10	Leveling (Grid-Precise)
11	Volume Computation
12	Total Station (Surveying-Setting out)

Engineering Projects needs Surveying



Surveying Observations

1- DISTANCES

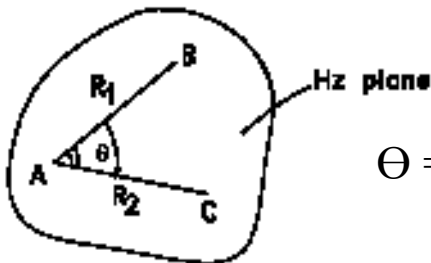
HL _____

VL |

SLOPE

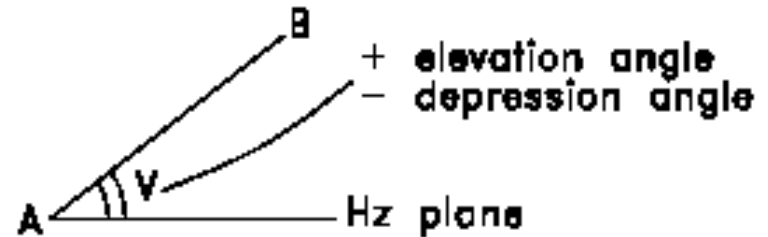
2- ANGLES

HZ angles



$$\Theta = R_2 - R_1 = \text{BAC}$$

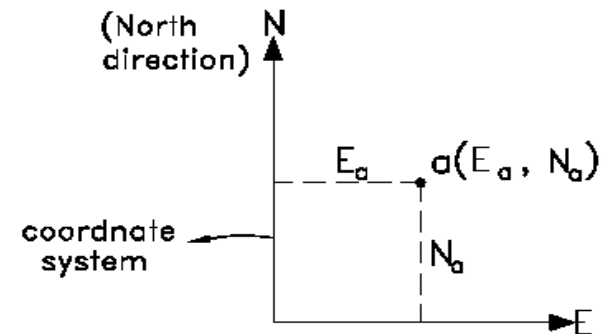
VL angles



3- COORDINATES

X, Y, Z

To position features and points relative to a certain coordinate system
(Local or Global)

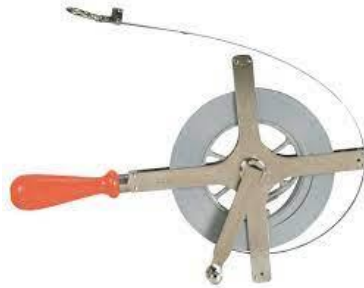




Surveying Instruments

1) Tape

Measuring distances 20m, 30m, 50m, 100m



2) Range Pole





Surveying Instruments

3) Level

Differencing of heights



4) Total Station

Coordinates X,Y,Z





Surveying Instruments

5) Laser Scanner

Coordinates from
laser scanning



6) Digital Camera

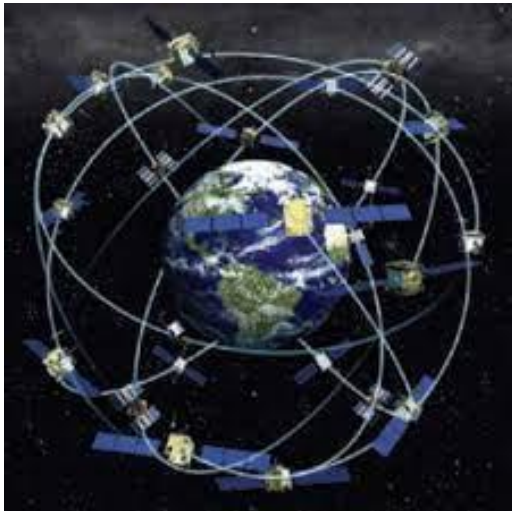
Coordinates from images





Surveying Instruments

7) Global Navigation Satellite System





Map Definition

Map is simply a drawing or picture of a landscape or location. Maps usually show the landscape as it would be seen from above, looking directly down.

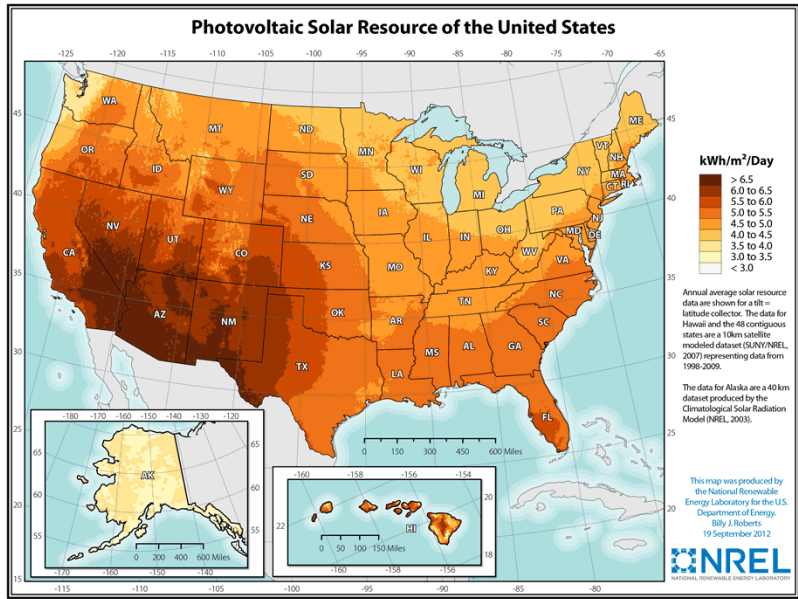
Maps function as visualization tools for spatial data.

الخريطة هي رسم او صورة لمكان من مسقط راسى و هي وسيلة الرؤية للمعالم المكانية


As well as showing the landscape of an area, maps will often show other features such as roads, rivers, buildings, trees and lakes.

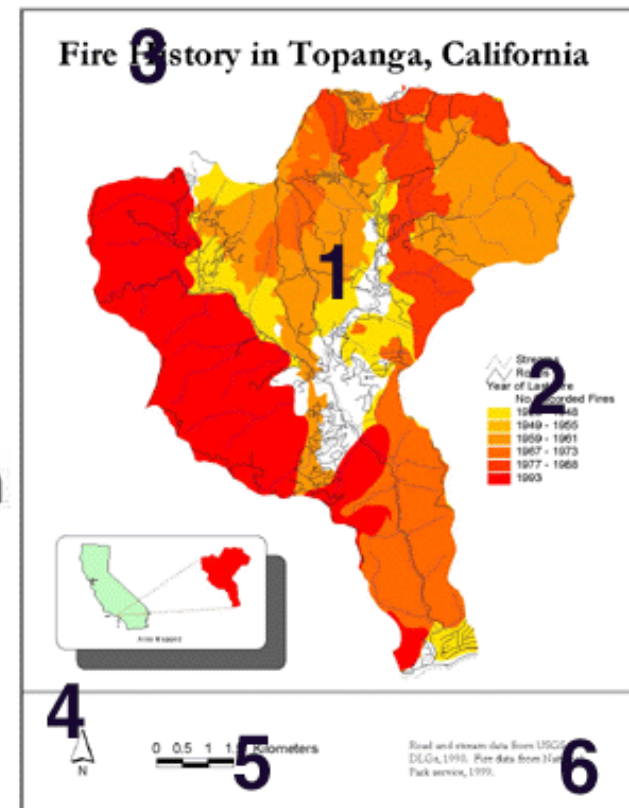
المعلومات المكانية تجمع من قياسات و ارساد و تخزن فى قواعد بيانات تجمع لعدد من الاغراض المختلفة مثل عرض منطقة و المعالم المختلفة مثل الطرق و المباني و المجارى المائية

Map Definition



Basic Elements of Map Components

1. **Title** – what the map is about
2. **Compass Rose** – directions  (orientation of map)
3. **Symbols** – pictures used instead of words
4. **Legend or Key** – explains meaning of symbols and colour
5. **Colour** – highlights important or different information to help interpret maps
6. **Scale** – shows the proportion of map to real life
7. **Grid reference** – intersecting lines to help locate specific places on the map. Ex. E8





Types of maps

1. Planimetric maps: الخرائط المستوية

The planimetric maps are the horizontal projection of a part of the earth's surface with a given scale. No information about the elevation or levels

هي خرائط للمسقط الافقى لجزء من سطح الارض بمقياس رسم معين و ليس بها معلومات عن الارتفاعات او المناسيب

Cadastral maps one of the famous types of the planimetric maps such as:

- City maps drawn with scale 1:500

-agricultural maps. Drawn with scale 1:2500

الخرائط التفصيلية هي احد انواع الخرائط المستوية منها خرائط المدن و الاراضى الزراعية



Types of maps

2. Topographic maps: الخرائط الطبوغرافية

Topographic maps show the ground surface relief (Levels, elevation, heights or depths)....contour lines.

Topographic maps present the natural and man made topographic features.

هي خرائط توضح تضاريس الارض عن طريق مناسيب الارض او خطوط
كنتور و كذلك المعالم الطبيعية و المبانى و الطرق



Types of maps

3. Geographic maps:

They are drawn with a very small scale 1:1000000 - 1:2000000

Geographic maps shows very large areas such as: countries or States

خرائط جغرافية توضح البلاد او المدن و تكون بمقياس رسم صغير



Types of maps

4. Thematic Maps: خرائط ذات المعلم الواحد

Roads networks maps, Railway network maps, Geological map, Military maps and Hydrographic maps.

شبكة الطرق او السكة الحديد او الخرائط الجولوجية او عسكرية او مائية



Supplementary files:

- <https://www.youtube.com/watch?v=GJlyC4DIJJs>
- <https://www.youtube.com/watch?v=TnBkO8Di448>
- https://www.youtube.com/watch?v=stOFxRK_40w

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Thanks

Dr.Eng. Hassan Mohamed