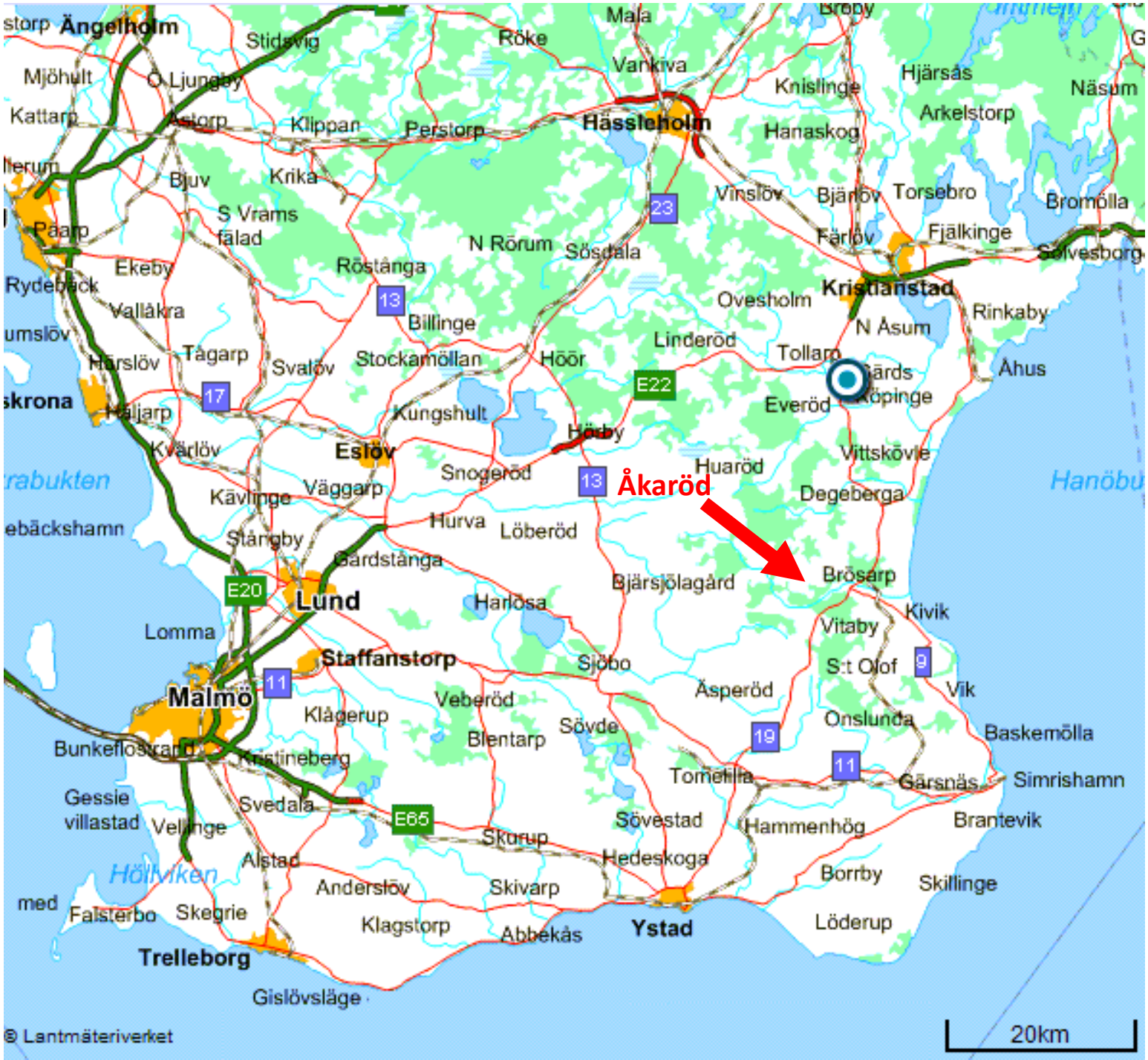
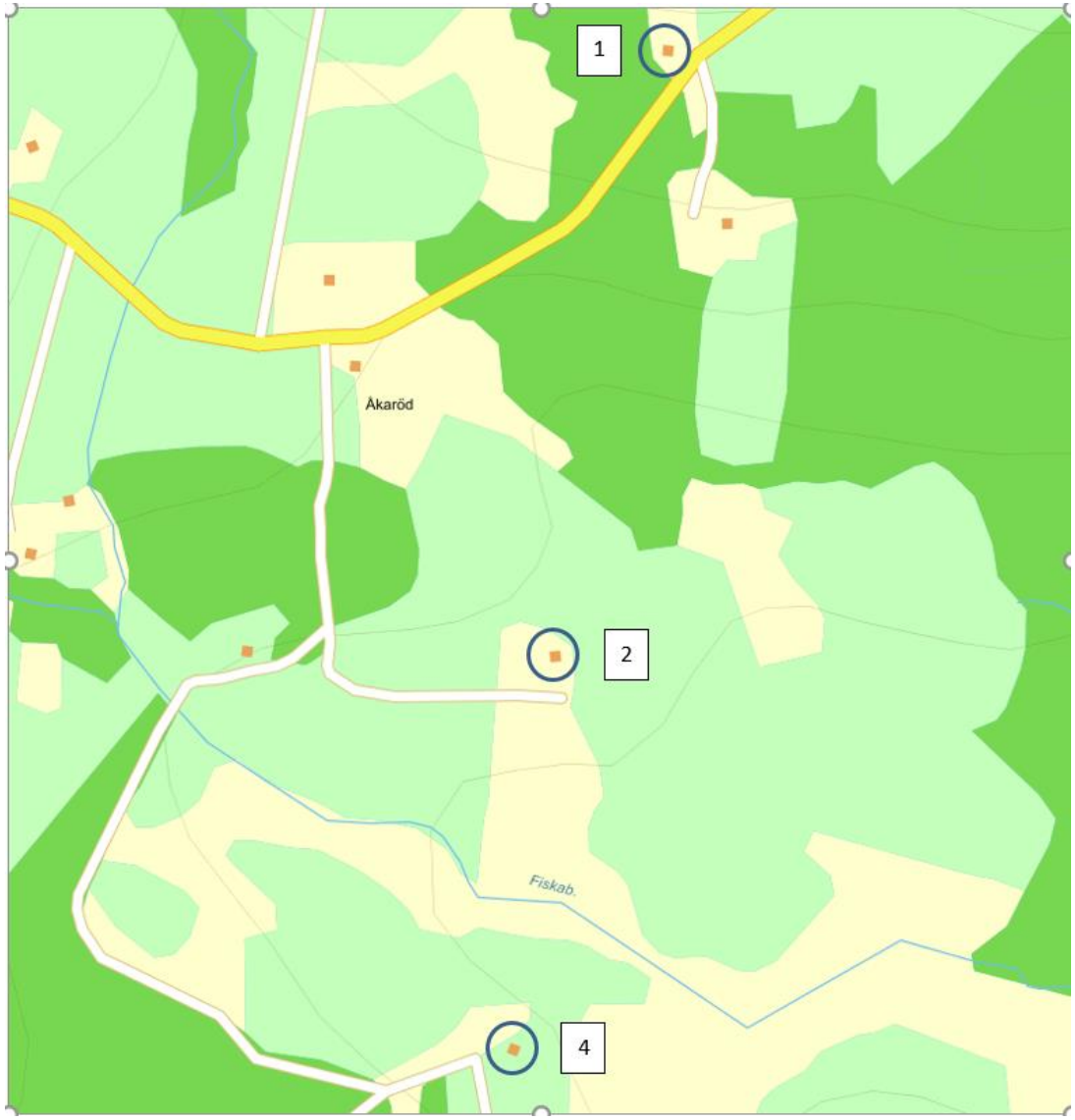

Ängelholm
Stidsvig
Röke
Mala
Broby
Mjöhult
Ö Ljungby
Vankiva
Knislinge
Hjärsås
Näsum
Kattarp
Åstorp
Klippan
Perstorp
Hässleholm
Hanaskog
Arkelstorp
Bjuv
Krika
Vinslöv
Bjärlöv
Torsebro
Bromölla
S Vrams
fälad
Päarp
N Rörum
Sösdala
Färlöv
Fjälkinge
Solvesborg
Ekeby
Röstånga
Rydebäck
Kristianstad
Ovesholm
Vallåkra
Billinge
Rinkaby
N Åsum
Linderöd
Tågarp
Svalöv
Stockamöllan
Höör
Tollarp
Härslöv
Åhus
Everöd
Köpinge
Kungshult
Hörby
Eslöv
Kvärlöv
Huaröd
Vittskövle
Snogeröd
Åkaröd
Väggarp
Degeberga
Kävlinge
Hurva
Löberöd
Starrgby
Gårdstånga
Brösarp
Bjärsjölagård
Lund
Harlösa
Kivik
Lomma
Vitaby
Staffanstorp
Sjöbo
S:t Olof
Malmö
Äsperöd
Vik
Klågerup
Veberöd
Onslunda
Sövde
Baskemölla
Blentarp
Bunkeflostrand
Kristineberg
Tomelilla
Gärsnäs
Simrishamn
Gessie
villastad
Svedala
Vellinge
Sövestad
Hammenhög
Brantevik
Skurup
Hedeskoga
Alstad
Hällviken
Borrby
Anderslöv
Skivarp
Skillinge
med
Falsterbo
Skegrie
Klagstorp
Abbekås
Ystad
Löderup
Trelleborg
Gislövsläge
Hanöbu
20km
© Lantmäteriverket

Accomodation

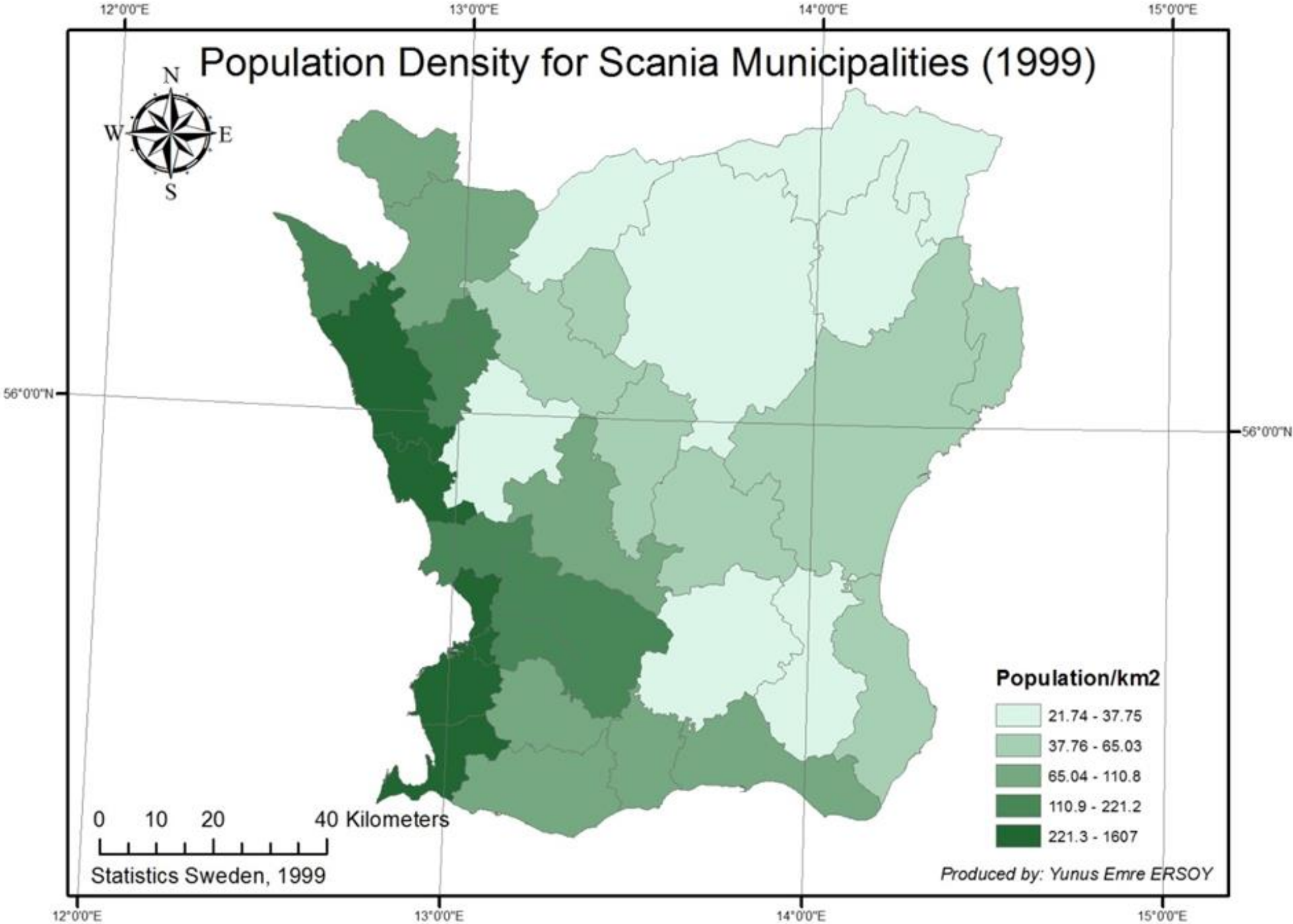


Gladan & Vråken,
Hostel
Uthuset (2+2+3)
Stora salen (2+2+3),
Änden (4+3). **21 pers**.

2. Åkaröd **6 pers**

3. Teachers house.
Yellow. **6 pers**

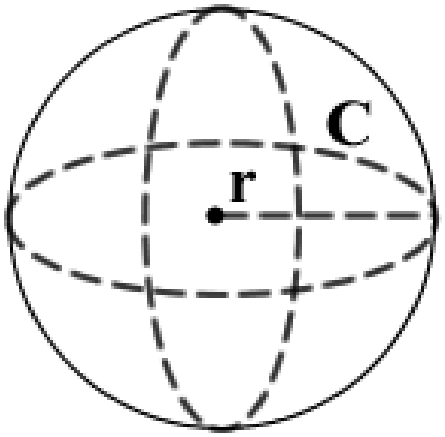
4. Fiskabäck


Population Density for Scania Municipalities (1999)
12°0'0"E
13°0'0"E
14°0'0"E
15°0'0"E
56°0'0"N
N
W
E
S
Population/km2
21.74 - 37.75
37.76 - 65.03
65.04 - 110.8
110.9 - 221.2
221.3 - 1607
0 10 20 40 Kilometers
Statistics Sweden, 1999
Produced by: Yunus Emre ERSOY

How do we describe a location on Earth?

Geodetic reference system

How do we define the shape of the earth?



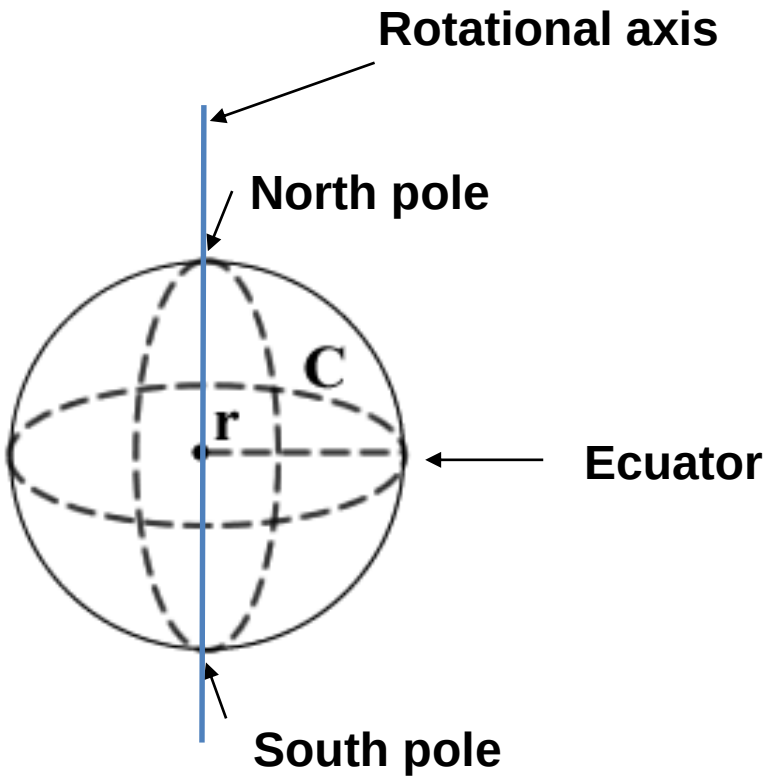
Definition of the sphere:

A three-dimensional surface, all points of which are equidistant from a fixed point.

The Earth as a sphere...

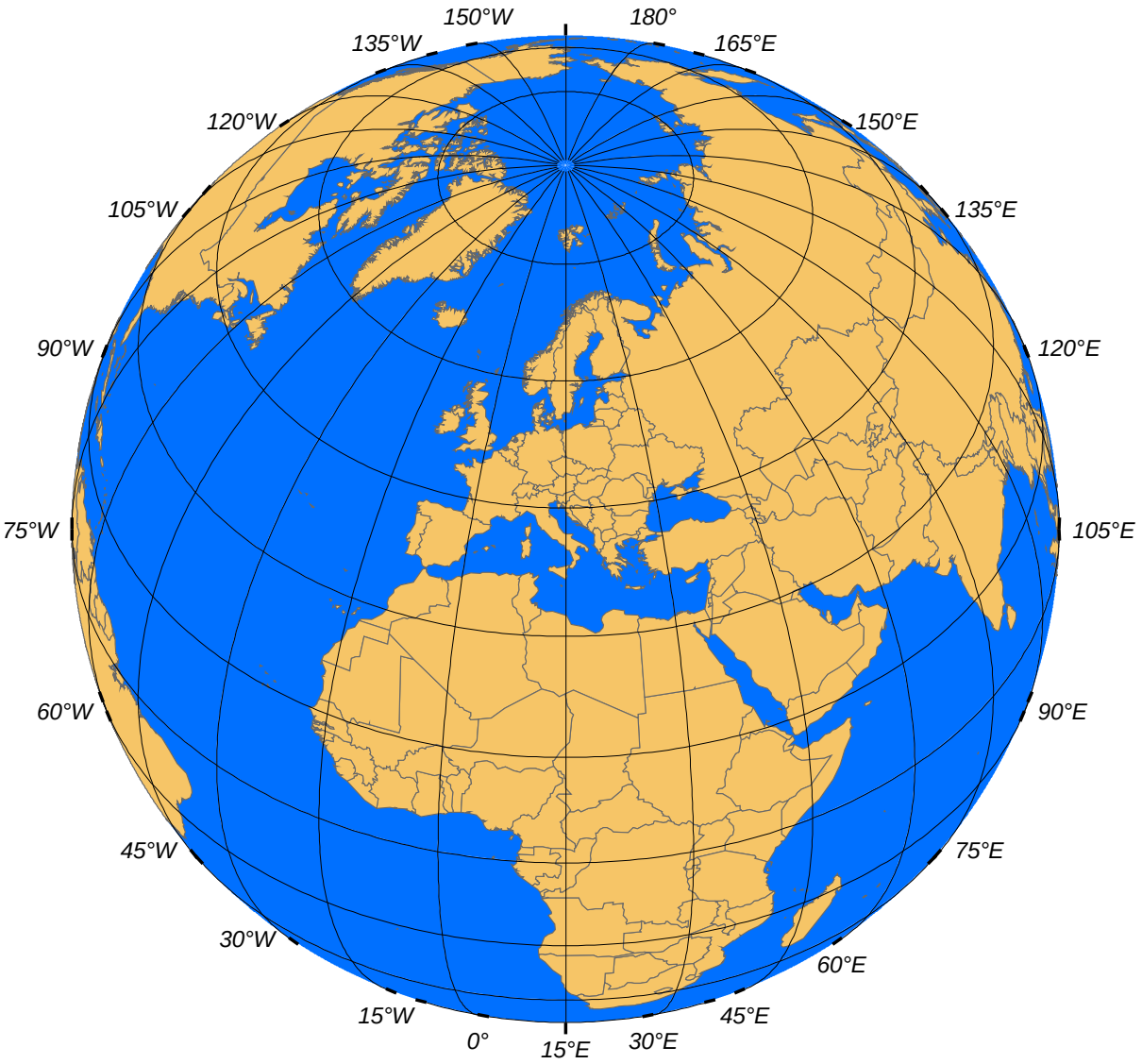
Poles =
ends of the earth's rotational axis

Equator = an imaginary line on the Earth's surface equidistant from the north pole and south pole



Spherical coordinate system

Coordinates in latitute
and
longitude



Points of known positions

= “stompunkter”

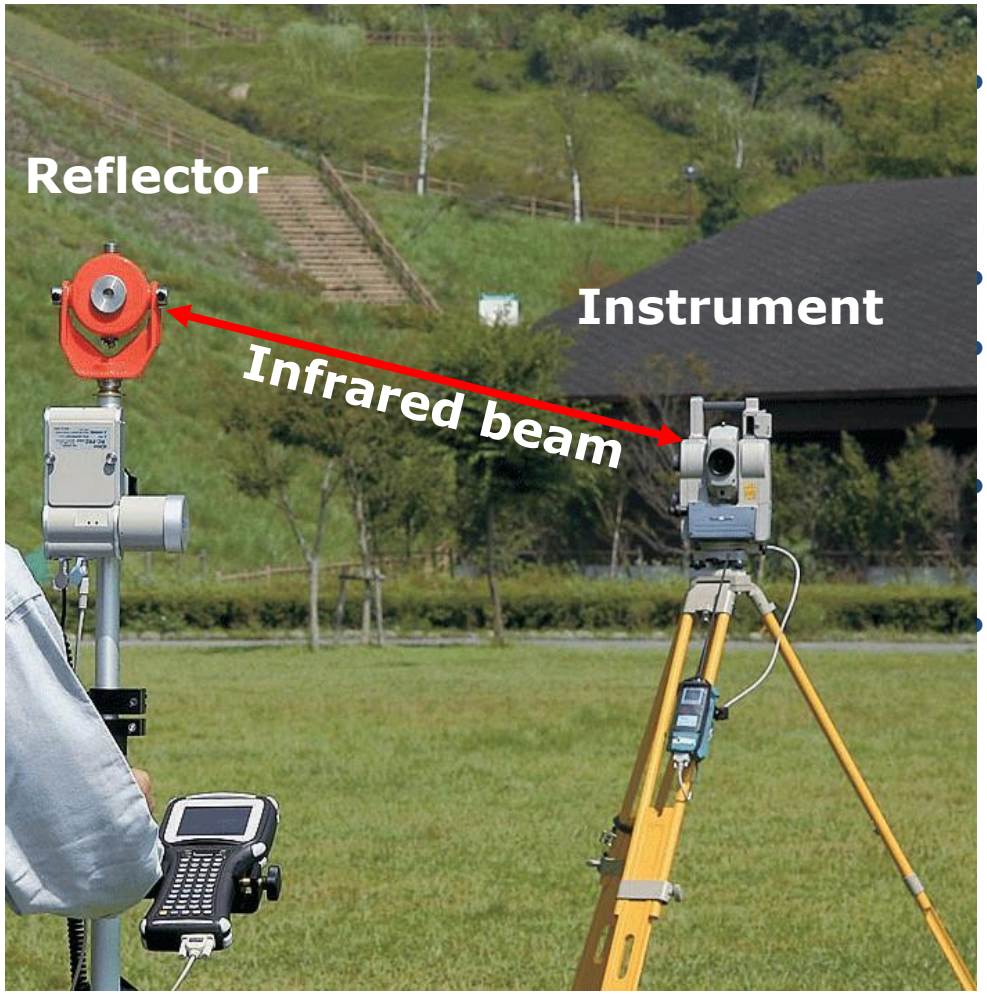
Coordinates in lat/lon

Elevation (above the ellipsoid)

Tachymeter/Tacheometer for topography

= Instrument for fast measurements of distances and heights

Tacheometer/Theodolit



- Measures both distances and angles (built in compass).
- 1. Distance from infrared beem
- 2. Angle (α)
- -from control point (A) to Reflector.
- 2. Use traverse method to compute coordinates.

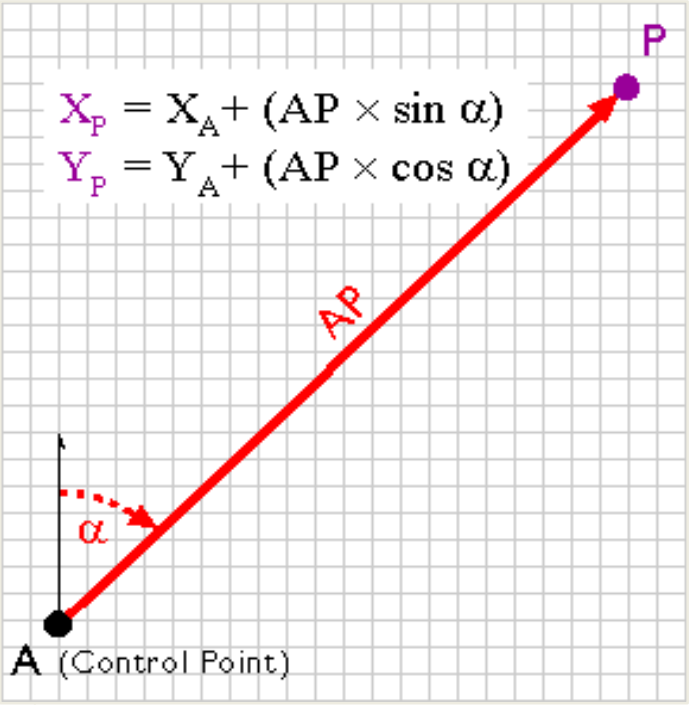
Distance (m) = Velocity (ms^{-1}) * Time (s)

Measurement method: Traverse

Traverse
= to estimate the coordinate pair of a point when you know:

* angle
* distance

…to a point with known coordinates.



Example:
A (x, y) = 385951, 6174851
Distance AP = 2352 meters
α = 45°

→Xp = 385951 + (2352 * sin 45) = 387952
→Yp = 6174851 + (2352 * cos 45) = 6176087

Ground meas. - Heights

Differential leveling

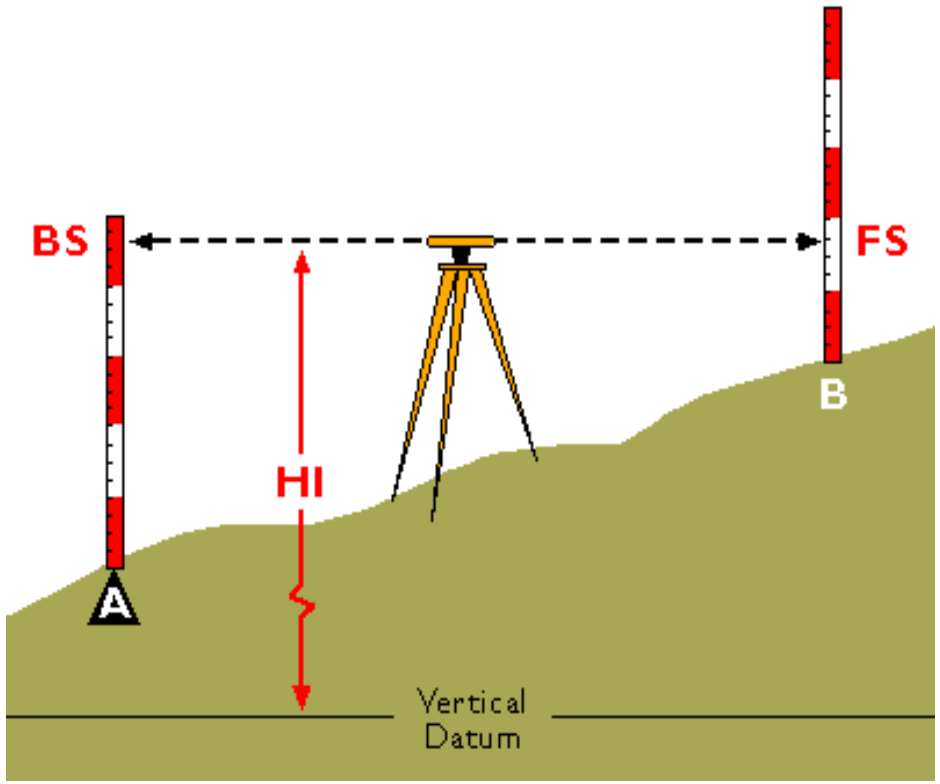


Image from: Wolf & Brinker, 1994

Point A = known height.
Point B = unknown.
Leveling instrument is placed between A and B.

HI = height to instrument.

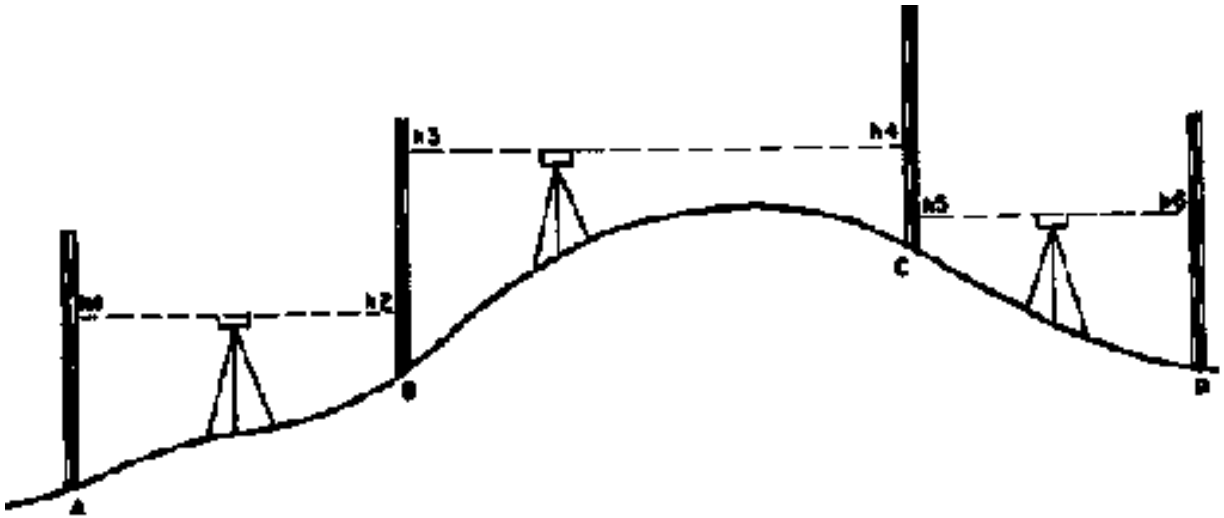
1. Back sight measurement (BS) off of a leveling rod on A.

→ HI (value on leveling rod + height at A)

3. Rod is turned to point B.
4. Telescope is rotated 180°to measure fore sight height.

5. Height at B
= Instrument height - foresight height (FS).

Levelling work on long distances…

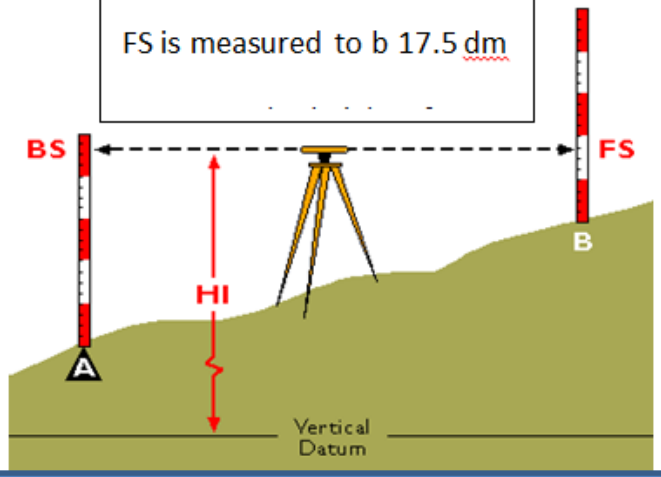


Quiz

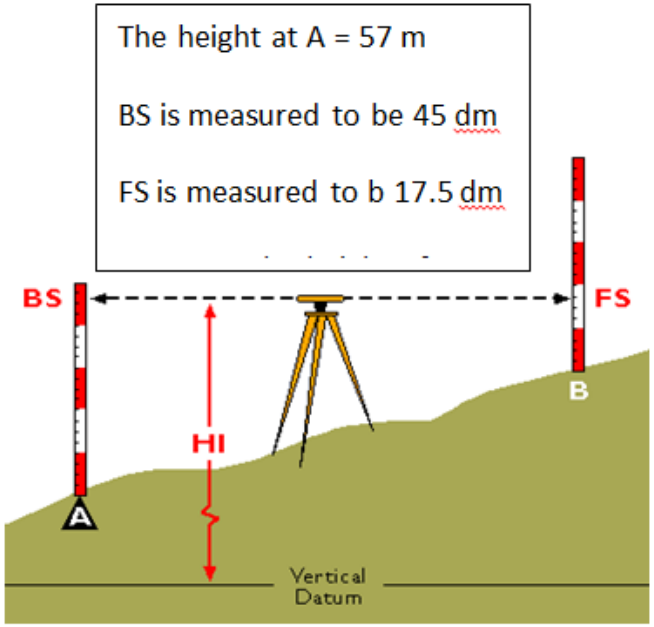
The height at A = 57 m

BS is measured to be 45 dm

FS is measured to b 17.5 dm



Solution to question 2



Solution:

HI (height of instrument) = A + BS → 57 + 4.5 =61.5

FS = 1.75

B = HI – FS → B = 61.5 – 1.75 → B = 59.75

Determine position from satellites

Navigation Satellite System

- GPS = Global Positioning System (USA)

  Start: 1973/1978 (American defense dep.+ air force),

  Officially: 1995.

  Selective availability (SA) until: 2000. → 70 – 100 m error

  Name: **Nav**igation **S**ignal **T**iming **a**nd **R**anging **GPS (NAVSTAR)**

  More at: http://GPS.gov.

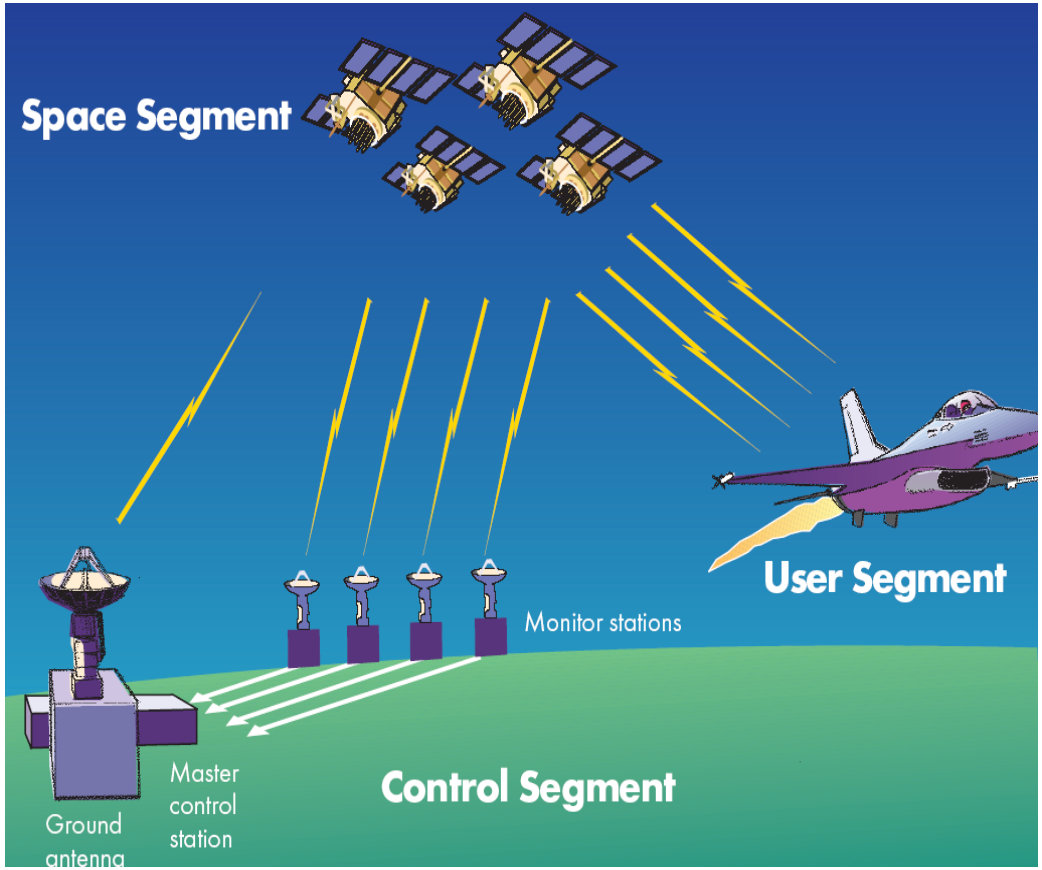
GPS

3 main segments:

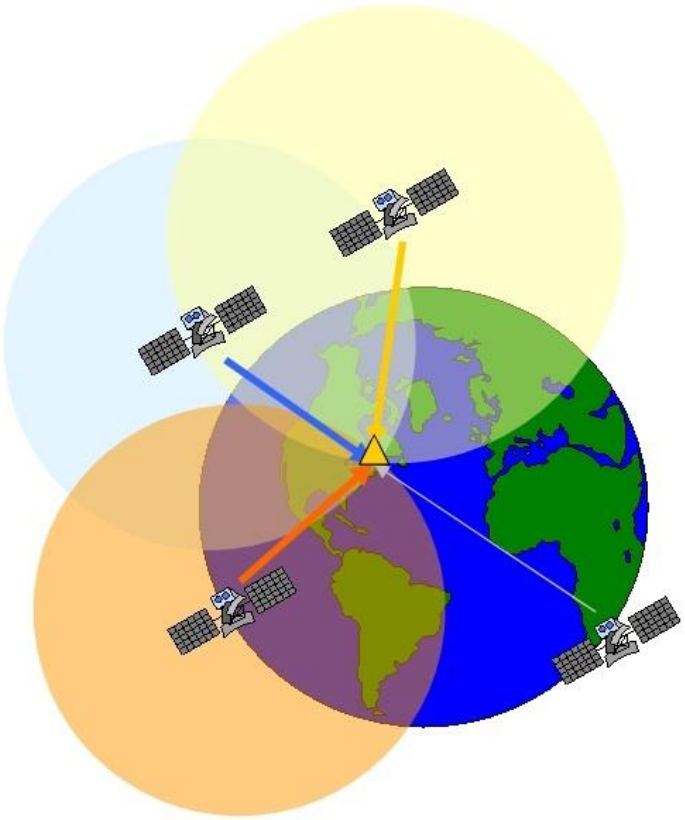
Space Segment
= constellation of satellites

Control Segment
= ground receivers

User segment
= the receivers



HOW DOES IT WORK?



Trilateration:
… the angles of a triangle can be determined if the lengths of all sides are known.

GPS extends this principle in 3 dimensions.

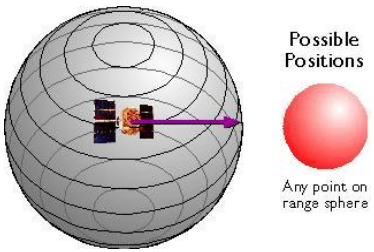
GPS receivers calculate distance as a function of time from satellite to receiver.

Distance = velocity * time

Distance estimation

Distance from one satellite to receiver

→ positions possible on the surface of a sphere



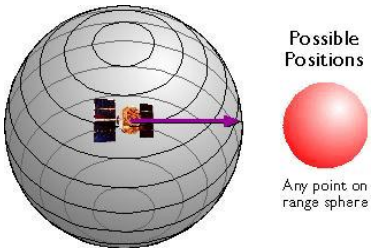
Distance estimation

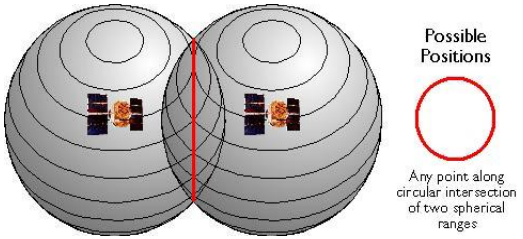
Distance from one satellite to receiver

→ positions possible on the surface of a sphere

Distance from 2 satellites to receiver

→ positions on a circle (the intersection between 2 is a circle

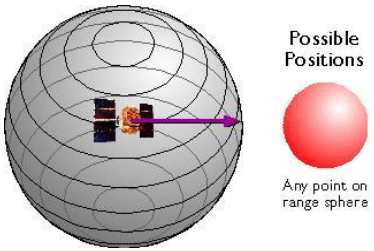




Distance estimation

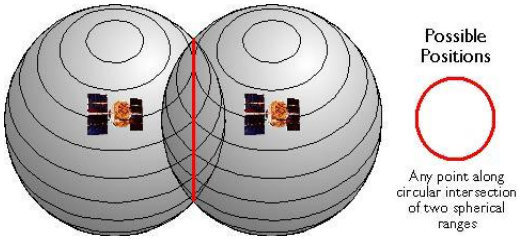
Distance from one satellite to receiver

→ positions possible on the surface of a sphere



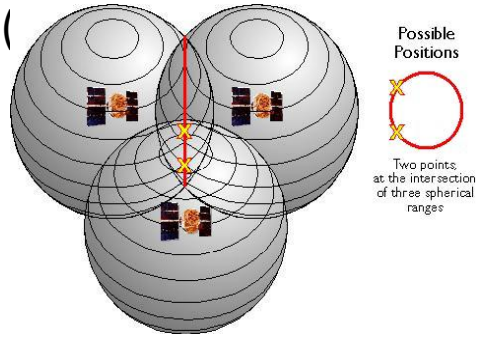
Distance from 2 satellites to receiver

→ positions on a circle (the intersection between 2 is a circle



Distance from 3 satellites

→ 2 possible locations, of which 1 is generally impossible (space or within earths crust).



Distance from 4 satellites

→ possible to estimate elevation

To bring

- Warm clothes
- Rain protection
- Wellington or hiking boots
- Bed sheets, (not sleeping bag), towels
- Other hygiene stuff (not perfume)
- Medication

- Note book
- Hard folder for papers
- Pencils
- Compass
- Small backpack
- Extra socks
- Tic – picker

- Illness
- Water scarcity