geo grama
GIS & Mapping Services

29 - 30 Sept 2015
Copenhagen
The EGNOS Service Provision workshop

EGNOS in land application domain

EGNOS for road milestones inventory

Sept 2015

- The Project
- Positioning Requirements
- Options
- Costs
- Conclusions

About Geograma

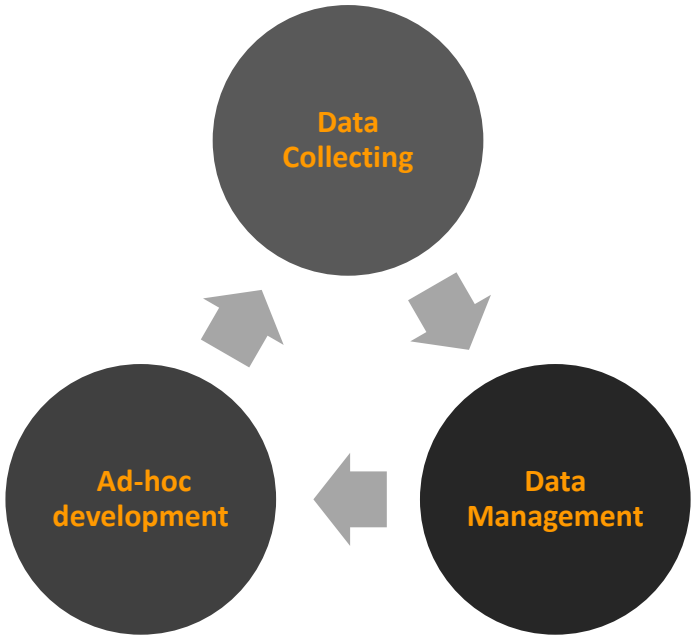
Group specialised in GeoInformation

We help to improve the bussiness process related with land management

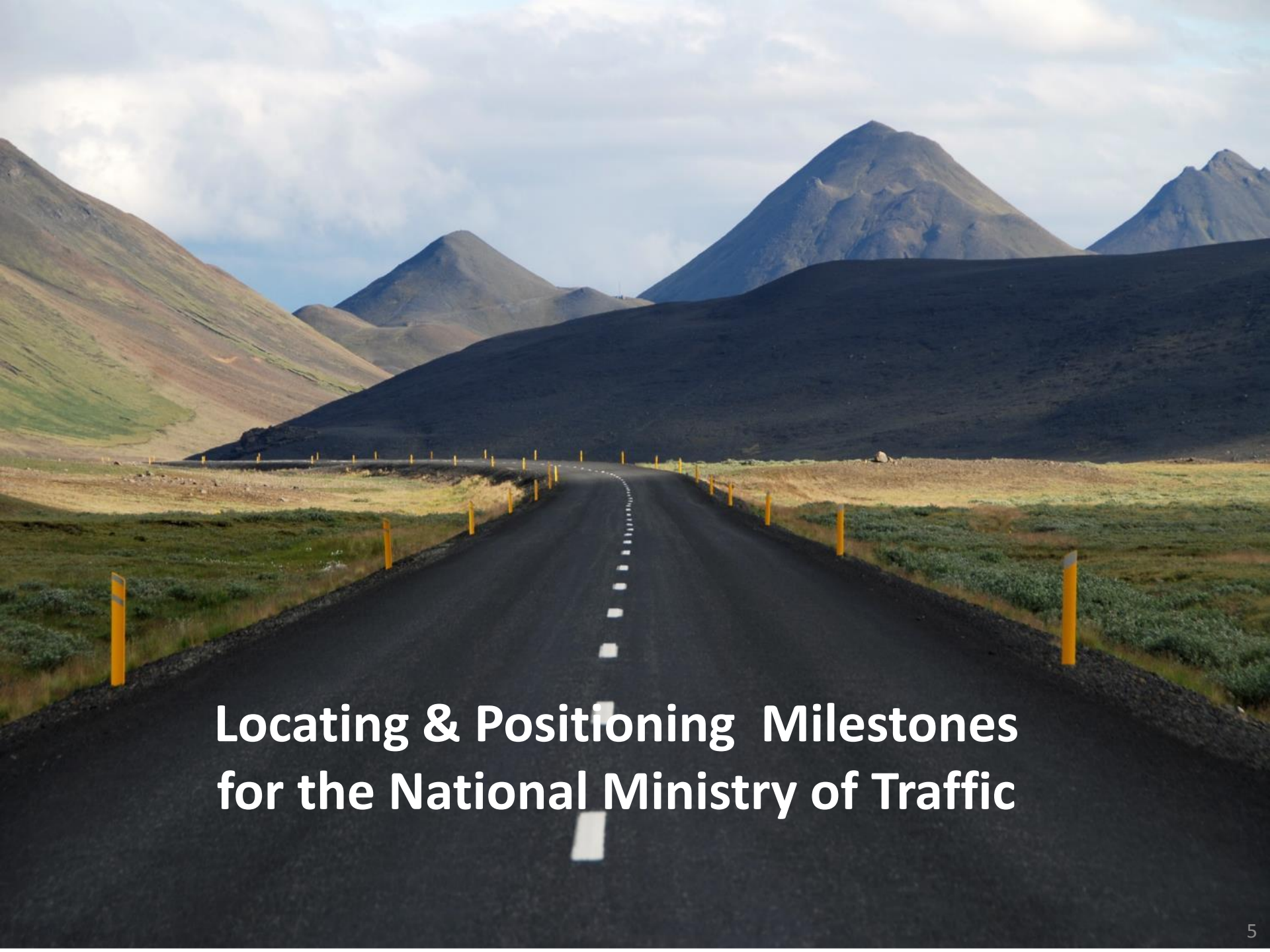
Public and Private industry oriented

About Geograma

17 years of experience



Products and services related to the entire cycle of cartographic data


Locating & Positioning Milestones
for the National Ministry of Traffic

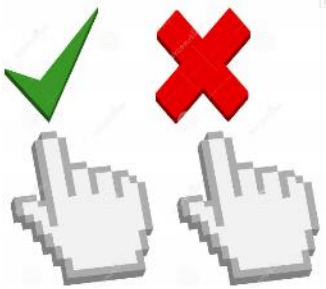
Locating & Positioning Milestones

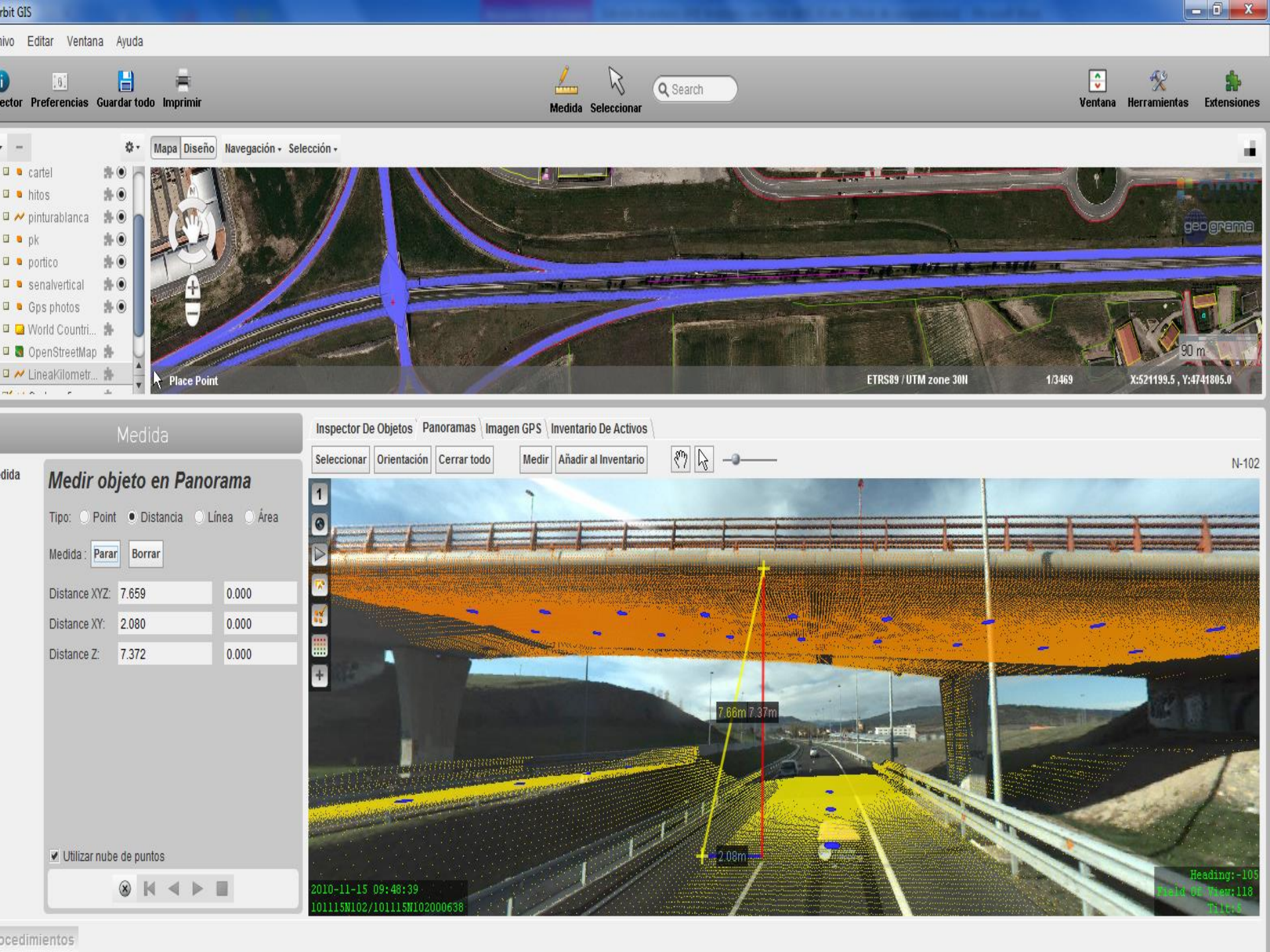
- **Targets**
  - Collecting Milestones
  - Integration
  - Consultancy

Positioning Requirements

- 120.000 kilometers
- All types of roads
- Limited Budget
- Limited schedule
- 5 meter accuracy

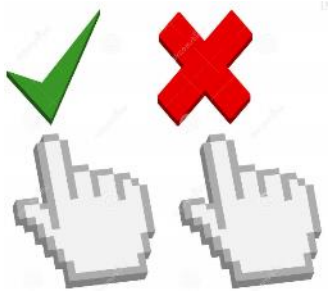
Positioning Options - Mobile Mapping




rbit GIS
nivo Editar Ventana Ayuda
ector Preferencias Guardar todo Imprimir
Medida Seleccionar
Search
Ventana Herramientas Extensiones
Mapa Diseño Navegación Selección
cartel
hitos
pinturablanca
pk
portico
senalvertical
Gps photos
World Countri...
OpenStreetMap
LineaKilometr...
Place Point
ETRS89 / UTM zone 30N
1/3469
X:521199.5 , Y:4741805.0
90 m
Medida
Medir objeto en Panorama
Tipo: Point Distancia Línea Área
Medida : Parar Borrar
Distance XYZ: 7.659 0.000
Distance XY: 2.080 0.000
Distance Z: 7.372 0.000
Utilizar nube de puntos
Inspector De Objetos Panoramas Imagen GPS Inventario De Activos
Seleccionar Orientación Cerrar todo Medir Añadir al Inventario
N-102
7.66m 7.37m
2.08m
2010-11-15 09:48:39
101115N102/101115N102000638
Heading:-105
Field Of View:118
Tilt:5

Positioning Options - GNSS

		Code	Phase
Absolute	Real-time	Navigation 5m-25m	n / a
	Post-processing	n / a	n / a
Differential	Real-time	DGPS Wide area (1) 1 - 5m DGPS (2) <1m	RTK 10 mm ± 1.5 ppm (3)
	Post-processing	DGPS <1m	<5mm ± 1 ppm (3)



Positioning Options - GNSS

Equipment and GNSS Position Method (Kinematic)

Item	GPS/GLONAS	GPS+EGNOS	DGPS (Rt)
Description	GNSS receiver and navigation solution	GPS receiver with EGNOS	GPS / GLONASS receiver and pseudorange corrections generated by differential reference station
Accuracy	5-25 meters	2-5 meters	Submeter
Solution	Real time	Real time	Real time
Correction	None	EGNOS	Reference station equipped with GPRS
Receiver Cost	200 €	1 200 €	4 000 €
Item	**DGPS (PP)**	**Carrier phase L1/L2**	**RTK**
Description	GPS / GLONASS receiver and pseudorange corrections generated by differential reference station	GPS/GLONASS receiver and carrier phase L1/L2 post-processed	GPS/GLONASS receiver and real-time corrections to carrier phase L1/L2
Accuracy	Decimeter	centimeter	Centimeter
Solution	Post-processed	Post-processed	Real time
Correction	Processing reference station and rover	Processing reference station and rover	Reference station equipped with GPRS
Receiver Cost	3 000 €	6 000 €	7 000 €

(*) EGNOS was the most suitable option for this project

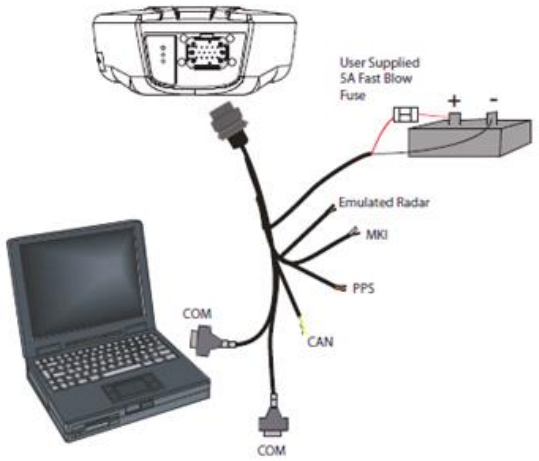
Postioning Options - Costs

Positioning Costs

Item	GPS/GLONAS	GPS+EGNOS	DGPS (Rt)
Points Positioned per Day	253 points / day	253 points / day	253 points / day
Points Postprocessed per Day	N/A	N/A	N/A
Cost of Field Work per Day	165 € / day	165 € / day	165 € / day
Cost of Field Staff	150 € / day	150 € / day	210 € / day
Cost of Office Staff	N/A	N/A	N/A
Total Cost per 100 points positioned	125 € / 100 points	125 € / 100 points	148 € / 100 points
Item	**DGPS (PP)**	**Phase L1/L2**	**RTK**
Points Positioned per Day	253 points / day	160 points / day	160 points / day
Points Postprocessed per Day	400 points / day	160 points / day	N/A
Cost of Field Work per Day	165 € / day	165 € / day	165 € / day
Cost of Field Staff per day	210 € / day	210 € / day	210 € / day
Cost of Office Staff per day	300 € / day	300 € / day	N/A
Total Cost per 100 points positioned	223€ / 100 points	422 € / 100 points	234 € / 100 points

(*) EGNOS was the most suitable option for this project

System Used


User Supplied
5A Fast Blow
Fuse
+
-
Emulated Radar
MKI
PPS
CAN
COM
COM


9997 HNK

Conclusions

- **Most Suitable Option**
  - EGNOS
- **Postioning accuracy**
  - 2 meters precision in most situations
- **European Global Coverage**
  - GPRS signal or data not needed
- **Simple Equipment**
  - Low cost system, no accessories, one receiver
- **Real-time Solution**
  - No post-processing
- **Continuous Service**
  - Stable and 24x7

Muchas Gracias

Alejandro Guinea de Salas

alejandro.guinea@geograma.com

www.geograma.com