

#### **EUPOS-** Initiative for Unified Ground-based GNSS Infrastructure in Central and Eastern Europe

**EUPOS** Steering Committee Members contributing to the Project:

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### The initiative EUPOS

- establishment of a uniform GNSS ground based infrastructure in C&EE countries for precise real time positioning and navigation regional character supporting European integration
- examples of GBAS in Europe (AGRS, GPSNet, RGP, SAPOS, SWEPOS, SWIPOS)
- the case of late starters opportunity for C&EE region to catch up in GBAS
- initiative in 2002 joint effort of Berlin Senate Department for Urban Development and 13 C&EE
- extending the SAPOS philosophy to C&EE countries
- a Steering Committee was founded at the Conference in Berlin on 4-5 March 2002 to draw up the draft proposal of the European network to be established in the near future;
- project preparation for EU promotional programmes (ERDF, ISPA,CARDS, TACIS, INTERREG III C)

#### **CONCISE CHARACTERISTICS OF EUPOS (1)**

- Dense network of permanent GNSS stations 411 stations
- The average distance between the stations will be about 70 km. Higher density may be required in conurbation. Existing reference station systems (e.g. EPN, IGS) will be connected or incorporated.
- The coordinates of the stations will be determined with high precision, both in ETRS 89 and in conventional geodetic reference systems by connecting to EUREF points as well as to the other control networks of the countries.
- EUPOS will use the signals of Galileo as basis standard as soon as it is available and GPS as basis standard up to the complete availability of Galileo and as optional additional standard after complete availability of Galileo; also System GLONASS will be used as optional additional standard.

#### **CONCISE CHARACTERISTICS OF EUPOS (2)**

- The ,,full scale accuracy" concept
  - » The dense reference station network networking close to the user,
  - » Real time accuracy ~1cm, serving all kind of users
- A common use of reference stations in neighbouring countries close to border areas will be taken into account. The reference stations will be networked with each other, even cross-border (data exchange).
- All participating countries will observe the unified standards open system

## **EUPOS SUB-SERVICES**

# Permanent DGNSS service EUPOS will provide the following sub-services:

- **EUPOS DGNSS** for real time or post processing DGNSS applications by code and code-phase measurements with metre up to sub-metre accuracy;
- **EUPOS RTK** for real time DGNSS applications by carrier phase measurements with centimetre accuracy;
- **EUPOS Geodetic** for post-processing DGNSS applications by phase measurements in static or kinematic mode with centimetre up to sub-centimetre accuracy.

### **EUPOS DGNSS**

**Correction data for real time or post processing DGNSS applications by code and code-phase measurements with an accuracy of 3 m up to 0.5 m,** 



## **EUPOS NETWORK RTK**

**Correction data for real time applications** by carrier phase measurements with an accuracy of  $\leq 2$  cm



### **EUPOS GEODETIC**

Observation data for DGNSS post processing applications by phase measurements in static or kinematics with centimetre up to sub-centimetre accuracy



#### NUMBER OF PLANNED REFERENCE STATIONS

Country	Area [km²]	Number of planned reference stations S	Density of stations [s/10 000km <sup>2</sup> ]	Average distance between stations [km]
Bulgaria	110 990	23	2,1	70
Czech Republic	78 870	16	2,0	70
Estonia	45 100	10	2,2	70
Hungary	93 030	19	2,0	70
Latvia	64 500	13	2,0	70
Lithuania	65 200	13	2,0	70
Macedonia	25 710	8	2,0	70
Poland	312 680	75	2,3	66
Romania	237 500	48	2,0	70
<b>Russian Federation</b>	17 075 000	150	-	70-100
Serbia and Montenegro	88 360	18	2,0	70
Slovakia	49 040	10	2,0	70
Slovenia	20 250	8	2,0	70
Total/average	1 247 770 (without Russia)	411	-	-

### Geographic coverage





### The National Service Centre (NSC)





### **EUPOS** - densification of EPN

- EUPOS respects existing infrastructure. Existing reference station systems (e.g. EUREF, IGS) will be connected or incorporated,
- EUPOS reference stations will be connected to the stations of the EPN; positions of the EUPOS stations as well as transmitted DGNSS corrections will be related to the ETRS89,
- EUPOS network of reference stations will transfer the ETRS system to all CEE countries,
- selected part of EUPOS reference stations could be proposed as subnetwork of the EPN when using the EPN standards,
- some selected EUPOS Processing Centres could serve also as EPN Local Analysis Centres and could process permanent observations from EPN and EUPOS stations,
- EUPOS stations will contribute to the maintenance of the ETRS in the area of CEE,
- EUPOS ISC would like to establish close co-operation links to the IAG Sub-Commission for Europe EUREF