48 Meeting

CIVIL GPS SERVICE INTERFACE COMMITTEE
INTERNATIONAL INFORMATION SUBCOMMITTEE

POLAND COUNTRY REPORT

POLISH ASG-EUPOS NETWORK OF 100 GPS REFERENCE STATIONS ALREADY OPERATING

Janusz Sledzinski, FRIN

Country Point of Contact of Poland

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48 Meeting IISC CGSIC
Savannah, Georgia, USA
15-16 September 2008

- **General information on the Project EUPOS (European Position Determination System);**
- **EUPOS reference stations in other European countries;**
- **Information on the Polish part of the project EUPOS:**

  Polish 100 reference stations of the project ASG-EUPOS (Active Geodetic Network) officially activated on 2 June 2008.

PROJECT EUPOS

EUROPEAN POSITION DETERMINATION SYSTEM

PROJECT EUPOS
EUROPEAN POSITION DETERMINATION SYSTEM

- **Project initiated by the Berlin Senate Department for Urban Development supported by the European Academy of the Urban Environment (EA.UE), Berlin, Germany;**
- **A Founding (Steering) Committee was elected 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 consists in establishment of the multifunctional reference GNSS stations in C&CE countries;**
- **EUPOS network will contain more than 900 stations in the area of 16 European countries.**

Conferences of the EUPOS Steering Committee

Conference	Place	Date
1. Conference of the ISC	Warsaw, Poland	2-3. 07. 2002
2. Conference of the ISC	Sofia, Bulgaria	6-7. 11. 2002
3. Conference of the ISC	Riga, Latvia	10-11. 06. 2003
4. Conference of the ISC	Berlin, Germany	23. 11. 2003
5. Conference of the ISC	Bratislava, Slovakia	18-19. 06. 2004
6. Conference of the ISC	Sofia, Bulgaria	2 - 3. 11. 2004
7. Conference of the ISC	Prague, Czech Rep.	11-12. 04. 2005
8. Conference of the ISC	Berlin, Germany	24-25. 11. 2005
9. Conference of the ISC	Warsaw, Poland	4 – 5. 05. 2006
10. Conference of the ISC	Budapest, Hungary	22-24. 11. 2006
11. Conference of the ISC	Riga, Latvia	29-30. 03. 2007
12. Conference of the ISC	Vilnius, Lithuania	20-21. 09. 2007
13. Conference of the ISC	Bucharest, Romania	24-25. 04.2008
14. Conference of the ISC	Berlin, Germany	sched. 25-26.9.2008

CONCISE CHARACTERISTICS OF EUPOS

- **EUPOS is an initiative and cooperation of currently 16 Central and Eastern European countries (CEE) and two German states that build up a ground based European regional GNSS augmentation system with uniform standards that will cover a territory of about 10 million square kilometres.**

- **The average distance between the stations will be about 70 km. Higher density may be required in conurbation. Existing reference station systems (e.g. EUREF, IGS) should 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.**

EUPOS SUB-SERVICES

Permanent DGNSS service EUPOS will maintain 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 DGNSS applications by phase measurements in static or kinematic mode with centimetre up to sub-centimetre accuracy.**

ORGANISATION

The management of the project *EUPOS* is performed by:

- **International *EUPOS* Steering Committee (ISC),**
- **National *EUPOS* Service Centres (NSC),**

CONSULTATIONS

- **European Commission Brussels;**
- **UN Office of Outer Space Affairs (OOSA), Vienna EU;**
- **INTERREG IIIC East Joint Technical Secretariat, Vienna.**

EC CONSULTATIONS

Galileo Joint Undertaking
European Commission EuropeAid Co-operate Office

- **POSITIVE ASSESSMENTS:**

  - Effective organisation and management,

  - Participation of a great number of countries,

  - Network covers about 25% of the European territory,

  - Many services for geodesy and navigation,

  - Galileo as main satellite signal for EUPOS,

  - Short time of realisation of the project.

EC CONSULTATIONS

- **NEGATIVE ASSESSMENTS:**
  - **high cost of the project,**
  - **participating countries have different relations to European Union.**
- **EC SUGGESTIONS:**
  - **to decrease cost of the project by decreasing number of stations,**
  - **to divide the project into some parts with countries that can get the financial assistance from the same EU programmes (ERDF, ISPA, CARDS, TACIS, PHARE, INTERREG etc.).**

POSSIBLE FINANCIAL SUPPORT FROM EC PROGRAMMES:

- **ERDF - for EU member countries,**
- **ISPA - for EU candidate countries,**
- **CARDS - for West-Balkan countries,**
- **TACIS - for the Russian Federation,**
- **INTERREG III C - for regional cooperation.**

EUPOS vs. Galileo

Expected advantages for Galileo:

- **Galileo gains a huge number of new users; more than 900 reference stations in 16 countries will work permanently using the Galileo system;**
- **By EUPOS Galileo will transfer the reference system to all users in Central and Eastern Europe;**
- **EUPOS will offer and guarantee the services of proper accuracy as recommended by the Galileo programme;**
- **EUPOS stations could be integrated into Galileo programme. Some selected EUPOS stations could be incorporated to the Galileo ground control segment.**

EU INTERREG IIIC East Joint Technical Secretariat, Vienna

Launching of the regional pilot project from the programme EU INTERREG IIIC East Project

“EUPOS -IRC (InterRegional Cooperation)”

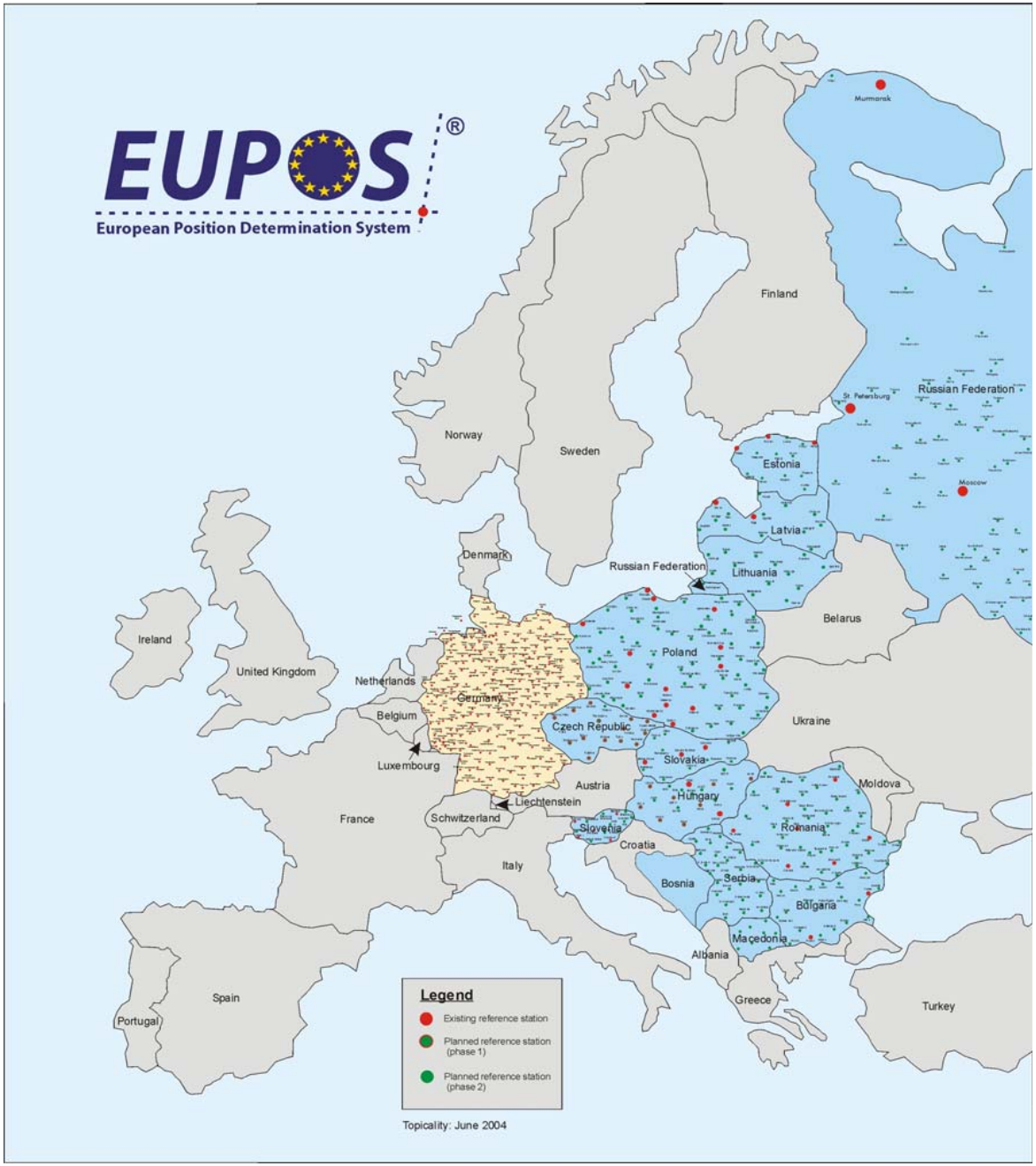
Financial assistance for organisation of conferences and workshops, study visits, training of the personnel

EUPOS ISC

- **EUPOS is an associated member of the International Committee of GNSS (ICG);**
- **EUPOS International Steering Committee cooperates with two Working Groups:**
  - **Working Group on Technical Cooperation with the Industry (TCI),**
  - **Working Group on System Quality, Integrity and Interference Monitoring (SQII).**

Number of planned EUPOS reference stations

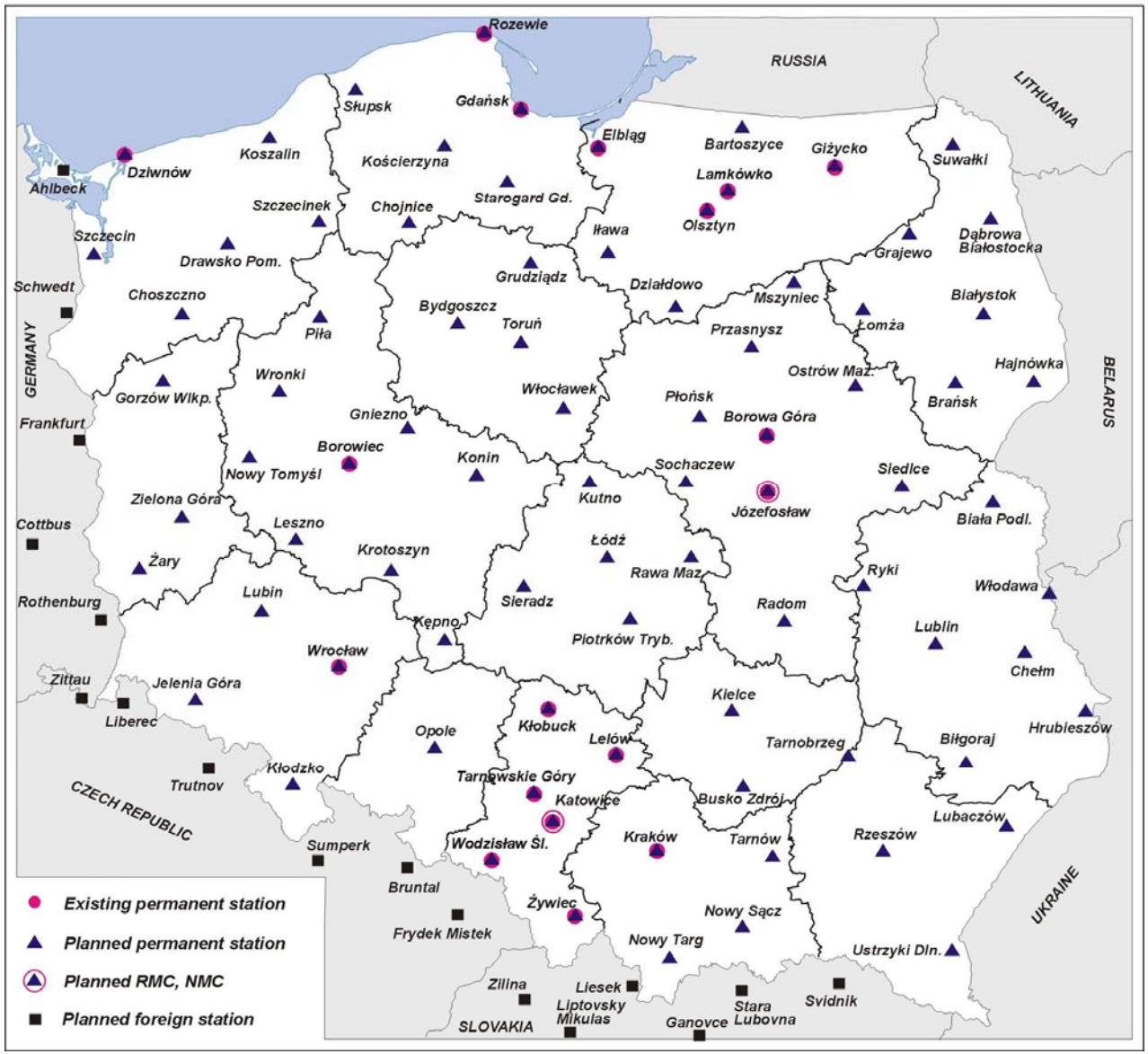
No.	Country	Area [km^2]	Number of planned *EUPOS* DGNSS reference stations
EU member countries			
1.	Bulgaria	110 950	23
2.	Berlin	891	4
3.	Czech Republic	78 870	26
4.	Estonia	45 220	13
5.	Hungary	93 030	36
6.	Latvia	64 600	24
7.	Lithuania	65 300	25
8.	Poland	312 680	90
9.	Romania	237 500	48
10.	Slovak Republic	49 035	21
11.	Slovenia	20 270	15
West Balkan States			
1.	Bosnia and Herzegovina	51 000	30
2.	Macedonia (FYROM)	25 330	15
3.	Serbia and Montenegro	88 360	32
Other countries			
1.	Russian Federation	17 075 000	500
2.	Ukraine	603 700	13
3.	Moldova	33 700	15
T o t a l			**930**



Planned and existing reference EUPOS stations

RUSSIAN PART OF THE EUPOS

Polish GNSS reference stations of the Project EUPOS "European Position Determination System"



ASG-EUPOS BASIC FACTS

ASG-EUPOS in POLAND developed in 2005-2007

- **67 reference stations built within the realised project,**
- **8 stations GPS/GLONASS built within the project,**
- **15 existing RTK reference stations (GPS module),**
- **3 existing RTK/DGPS GPS/GLONASS stations,**
- **about 30 foreign stations of border zone working within ASG-EUPOS system (cross-border cooperation).**

Total about 125 stations

SERVICES OF THE ASG-EUPOS

SERVICE	METHOD	DATA TRANSMISSION	ACCURACY	EQUIPMENT
NAVGEO	RTK	GSM/ GPRS Internet	≤ 0,03 m ≥ 0,05 m	L1/L2 receivers modem
NAVGIS/ KODGIS	DGPS	FM/ VFM (Opt.) GSM/ GPRS Internet	≤ 0,3 m ≥ 3,0 m	L1 (CA) receivers L1/L2 receivers/ modem
POSGEO/ POSGEO D	Static	Internet/ CDROM	≥ 0,01 m ≥ 0,1 m	L1/L2 receivers L1 receivers

65 rover GPS receivers, technical and information service and maintenance of the ASG-EUPOS home page

IGS/EUREF network of permanent stations in Poland

ASG-EUPOS SOME TECHNICAL DATA

- ✓ **REFERENCE STATIONS**
  - **Trimble Net RS and Net R5 receivers**
  - **Trimble GPS Net and Trimble GPS Base software**
- ✓ **2 PROCESSING CENTRES (Warsaw, Katowice)**
  - **Trimble VRS networking software**
  - **Trimble TTC post-processing software**
- ✓ **MOBILE EQUIPMENT**
  - **65 Trimble RS receivers**

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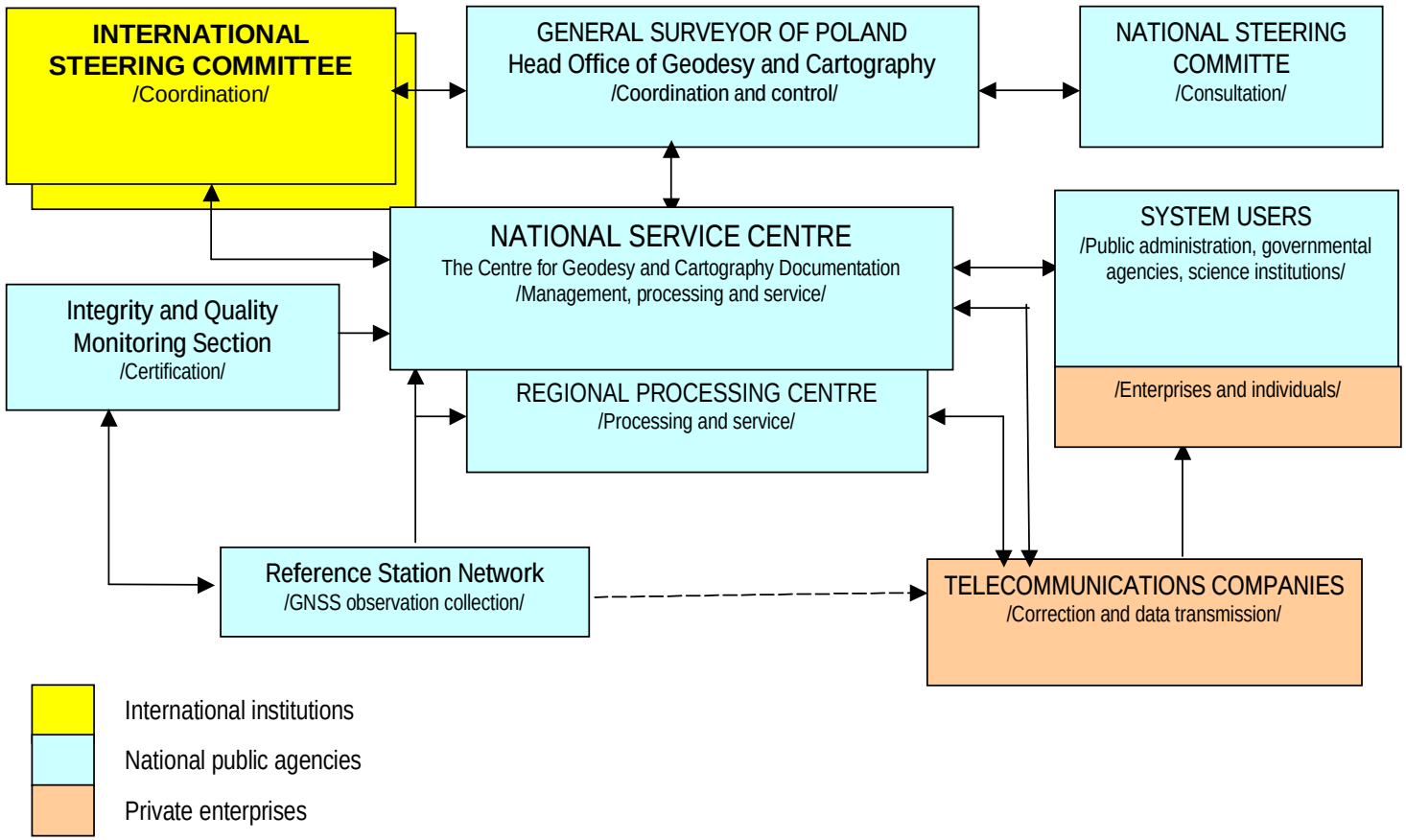
FINANCE (1)

- On 2 August 2005 the Head Office of Geodesy and Cartography has signed the agreement on financial support from the EU structural programme ERDF (European Regional Development Fund)
- The Managing Authority is the Ministry of Regional Development
- The Implementing Authority is the Department of European Funds acting within the Ministry of Science and Higher Education
- Final Beneficiary is the General Surveyor (Head Office of Geodesy and Cartography)

FINANCE (2)

Equipment and software	**€ 4.934.700**	**PLN 20.232.270**
Establishment	**2.266.090**	**9.290.100**
Personnel cost	**613.150**	**2.513.900**
Total cost	**€ 7.813.940**	**32.036.270**
ERDF co-financing	**€ 5.535.000**	

MANAGEMENT STRUCTURE



CONCLUSIONS

- ✓ **ASG-EUPOS project will prove reference system in Poland and fulfils requirements of many users for three-dimensional positioning.**
- ✓ **The Head Office of Geodesy and Cartography will manage the ASG-EUPOS system development to meet specific requirements of the providers of geodetic and engineering applications.**
- ✓ **ASG-EUPOS will be compatible with systems in neighbouring countries due to use unified EUPOS standard (FKP, VRS and NTRIP formats).**
- ✓ **All existing in Poland reference stations are to be incorporated into ASG-EUPOS system**
- ✓ **Cross-border exchange of GNSS observation data from reference station will be realised through NSC only**