

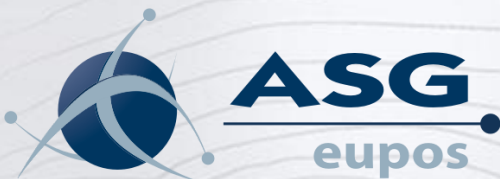


ASG-EUPOS reference system

Last year activities and future plans

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- ✓ **Introduction**
- ✓ **ASG-EUPOS system**
- ✓ **Future strategy**
- ✓ **GNSS considerations**
- ✓ **Conclusions**



- ✓ During last 10 years 5 ground augmentation systems have been established in Poland :
 - **ASG-EUPOS** (state owned) – semi commercial,
 - **NadowskiNet** (Nadowski) – commercial,
 - **SmartNet** (Leica Geosystems) – commercial,
 - **TPINet Pro** (Topcon) – commercial,
 - **VRSNet** (Trimble) – commercial.
- ✓ All the systems are distributing GPS and GLONASS corrections over whole or significant part of the country and some of them released satellite data from Beidou system.
- ✓ No specific legal regulations there are in Poland concerning usage of reference station networks, the only condition is to store the reference station complex data in state repository of geodetic and cartographic documentation.
- ✓ Since the project of ASG-EUPOS was developed the Galileo system has been considered as a primary source of satellite signals.

Introduction



Core network:

101 ref. stations established in Poland by GUGiK, universities and research centres

26 ref. stations working in neighbouring countries

2 independent management and processing centers located in Warsaw and Katowice



Introduction



- ✓ Since the beginning of operation of ASG-EUPOS, all stations are weekly processed using precise IGS and CODE products (i.e. satellite orbit, satellite clock corrections, atmospheric models) in order to determine actual ITRF/ETRF coordinates and velocity vectors.
- ✓ Reference frame monitoring is provided by post-processing module working on *Bernese GNSS Software v. 5.2*.
- ✓ Besides of internal monitoring stations are processed by 4 external EPN Local Analysis Centres (LAC): WUT, MTU, ECC and BKG.
- ✓ Network RTK service is processed within EUPOS service quality monitoring <http://monitoringEUPOS.gku.sk>
- ✓ For control measurements and manual post-processing the Leica GeoOffice software is exploited.

Last year activities

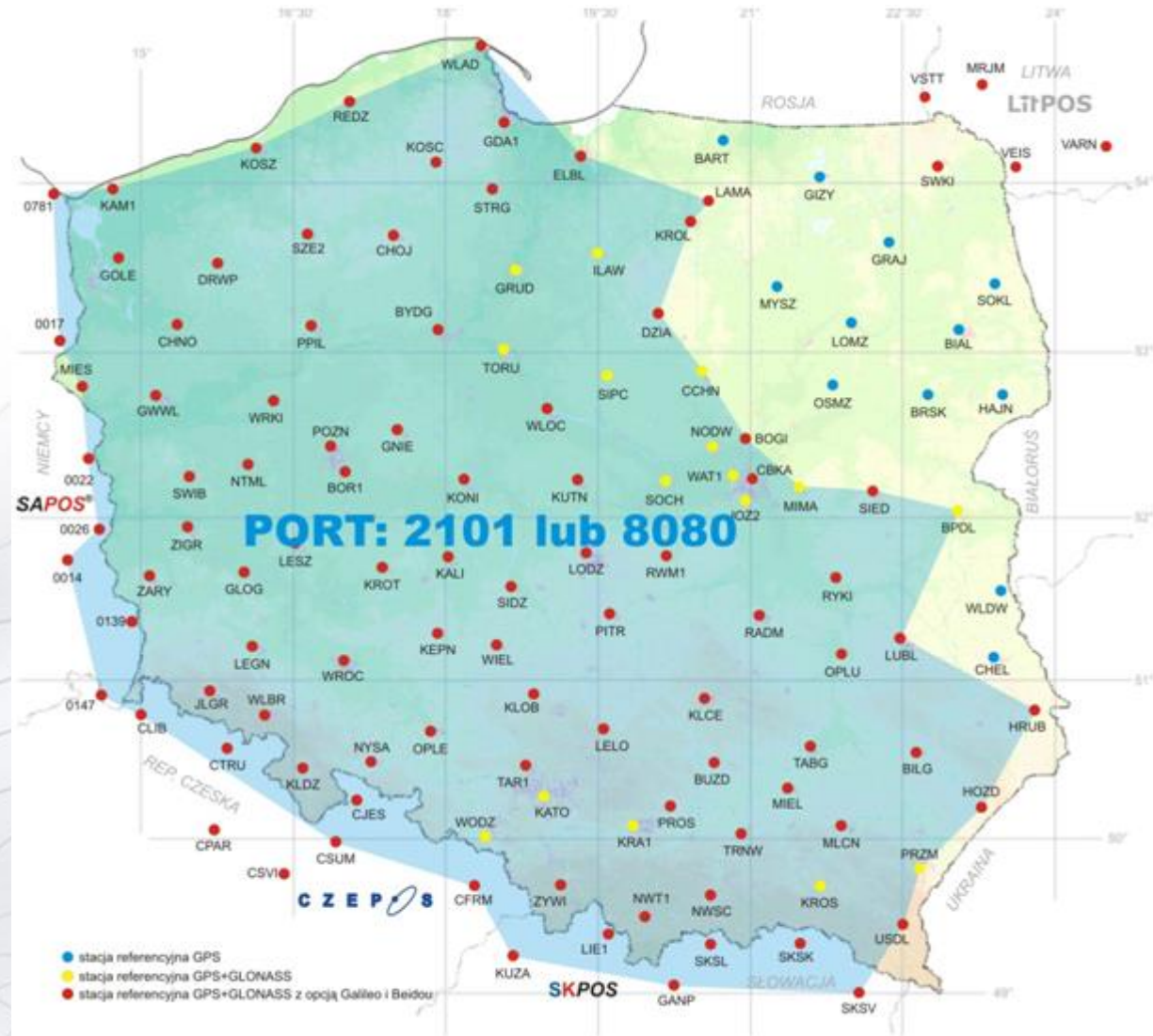


36 receivers and antennas were exchanged in 2015 year.

Regional subnetworks with GPS+GLONASS correction data were expanded

Since 01.07.2016 correction data streams from subnetworks were closed.

Finally 3 new correction data stream were formed for the whole area of subnetworks.



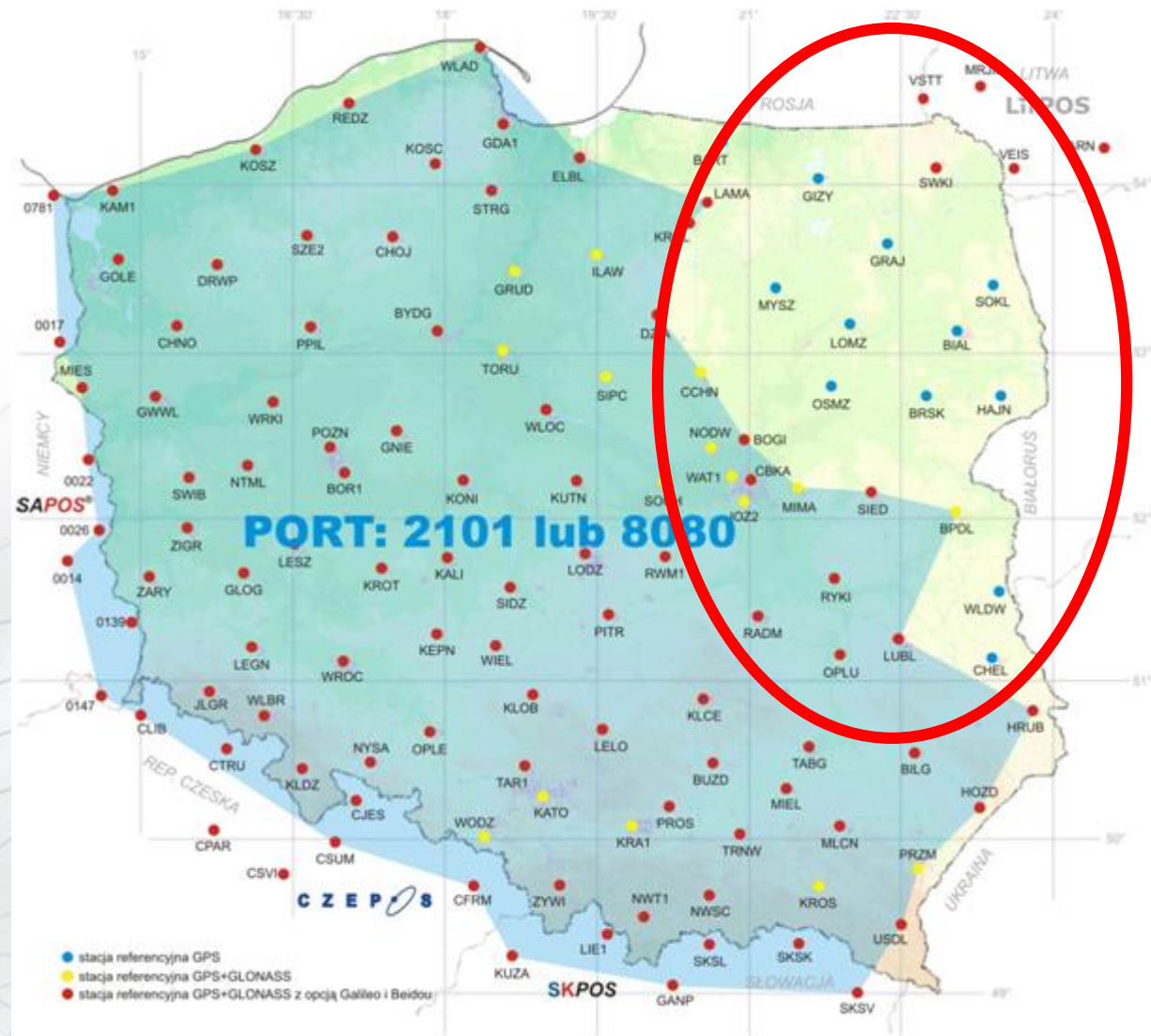
Last year activities



Northern-east part of Poland was without Network RTK from GPS+GLONASS systems.

12 reference stations with only GPS tracking possibilities.

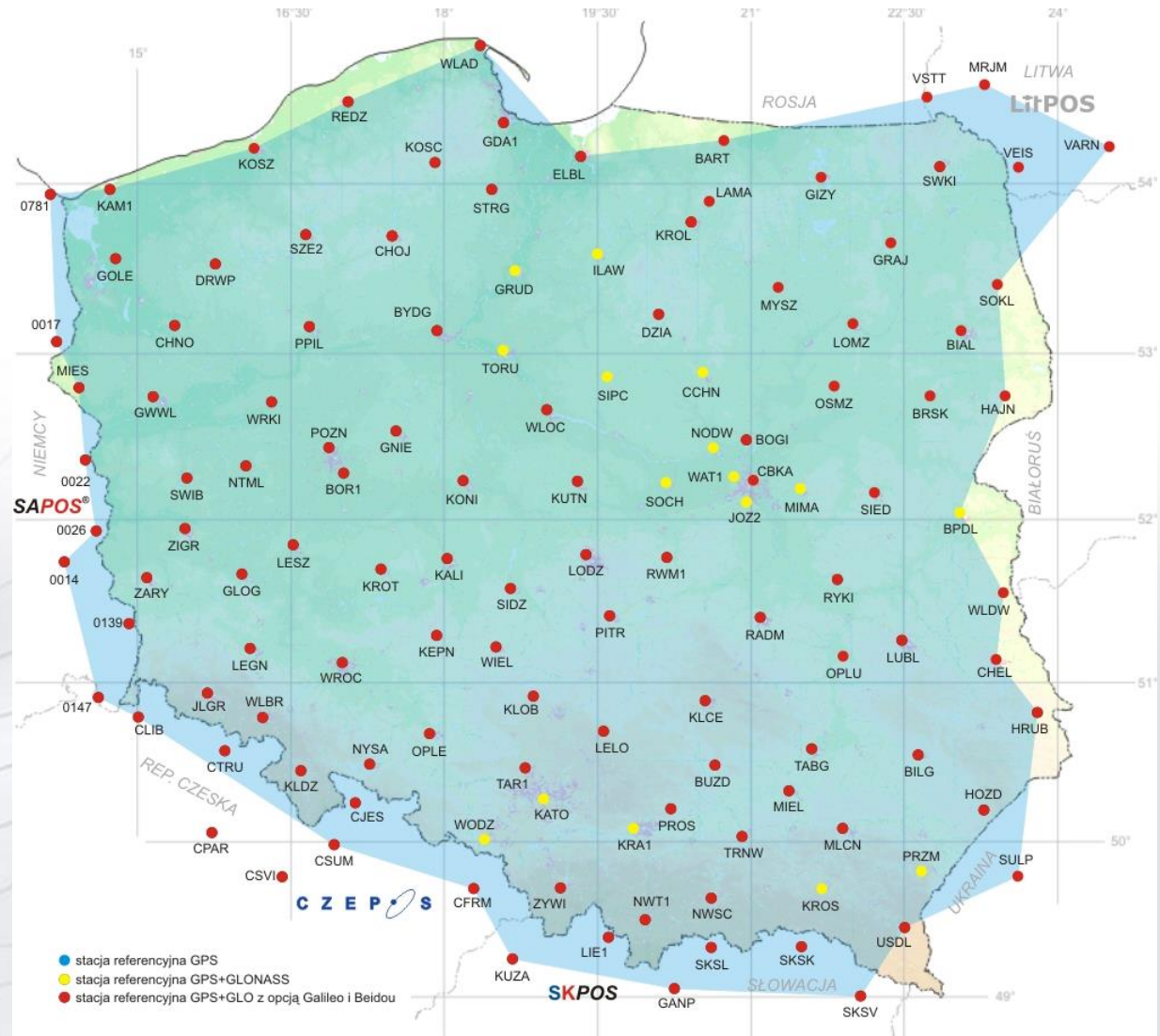
Technically, now we have finished exchange of equipment on those reference stations.





Whole area of Poland is covered with GPS+GLONASS Network RTK correction data.

Most of the receivers and antennas are Galileo and Beidou tracking.





Internet system for purchasing ASG-EUPOS services:

- User can create login in Trimble Pivot Platform and place order for required subscription.
- Credit card and internet fast payment is possible.
- With regular bank transfer when money are transferred to account subscription is automatically assigned.

Witaj, p_aknapik

geoportal.gov.pl



 Baza Danych Obiektów Topograficznych	 Niestandardowe opracowania topograficzne	 Mapy tematyczne i specjalne	 Rejestr podstawowych osnów geodezyjnych	 Fotogrametryczne zdjęcia lotnicze
 Ortofotomapy	 Numeryczne Modele Terenu	 ASG-EUPOS	 Zgłoszenia prac geodezyjnych i kartograficznych	 Dane bezpłatne
 Weryfikacja licencji	 informacje o zasobie Zamów usługi			

Wniosek o czasowe udostępnienie usług systemu ASG EUPOS

Moje konto w systemie ASG EUPOS

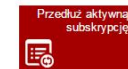
Wybierz konto z listy lub zapisz dane kolejnego konta.

Konto w systemie ASG EUPOS:

Login konta

przykład/przyk

Test/testowy



+ Dodaj informacje o istniejącym koncie ASG EUPOS

+ Dodaj nowe konto ASG EUPOS



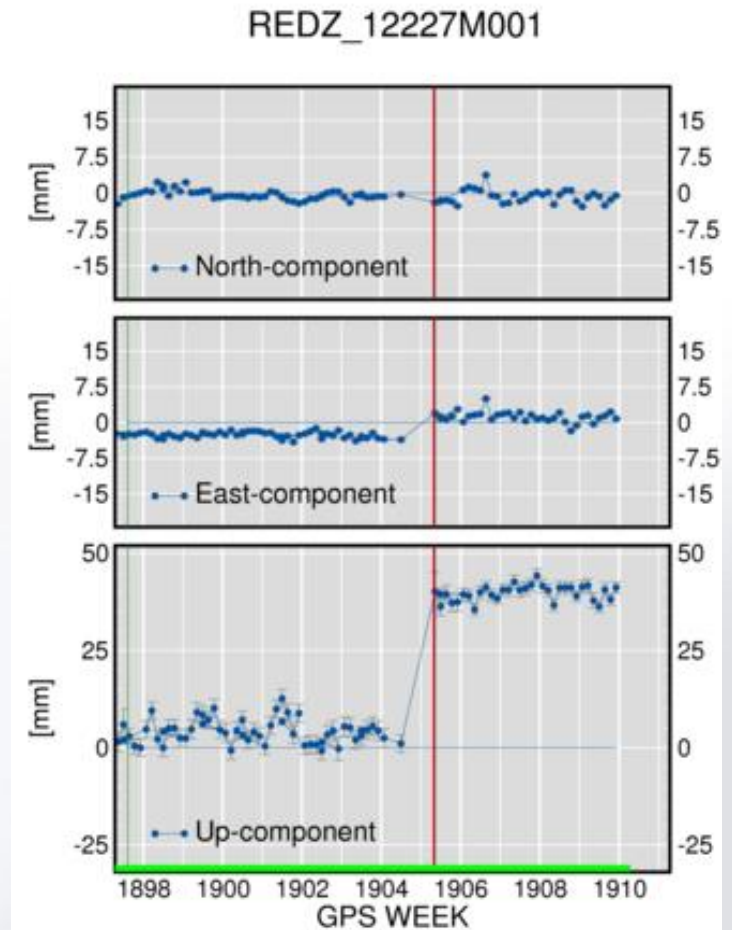
Przedłuż aktywną subskrypcję
Nowa subskrypcja



Antenna Trimble GNSS Ti Choke Ring on REDZ reference station was damaged by lighting.

Temporary we have installed Trimble GNSS Zephyr and we have observed 45mm jump in height.

Last Monday antenna after repair was installed back and coordinates are also back.



Future steps



✓ NMEA

- **National Marine Electronics Association**
- Contains information about approximate user position

✓ RTCM 10403.1 (10402.3) RTCM 10403.2

- **Radio Technical Commission For Maritime Services**
- Transfer of correction data for users measurements

✓ CMR

- **Compact Measurement Record**
- Transfer of correction data for user measurements in compressed format (mainly for agriculture applications)

✓ NTRIP 2.0 (1.0)

- **Networked Transport of RTCM via Internet Protocol**
- Internet protocol responsible for RTCM data transfer via Internet

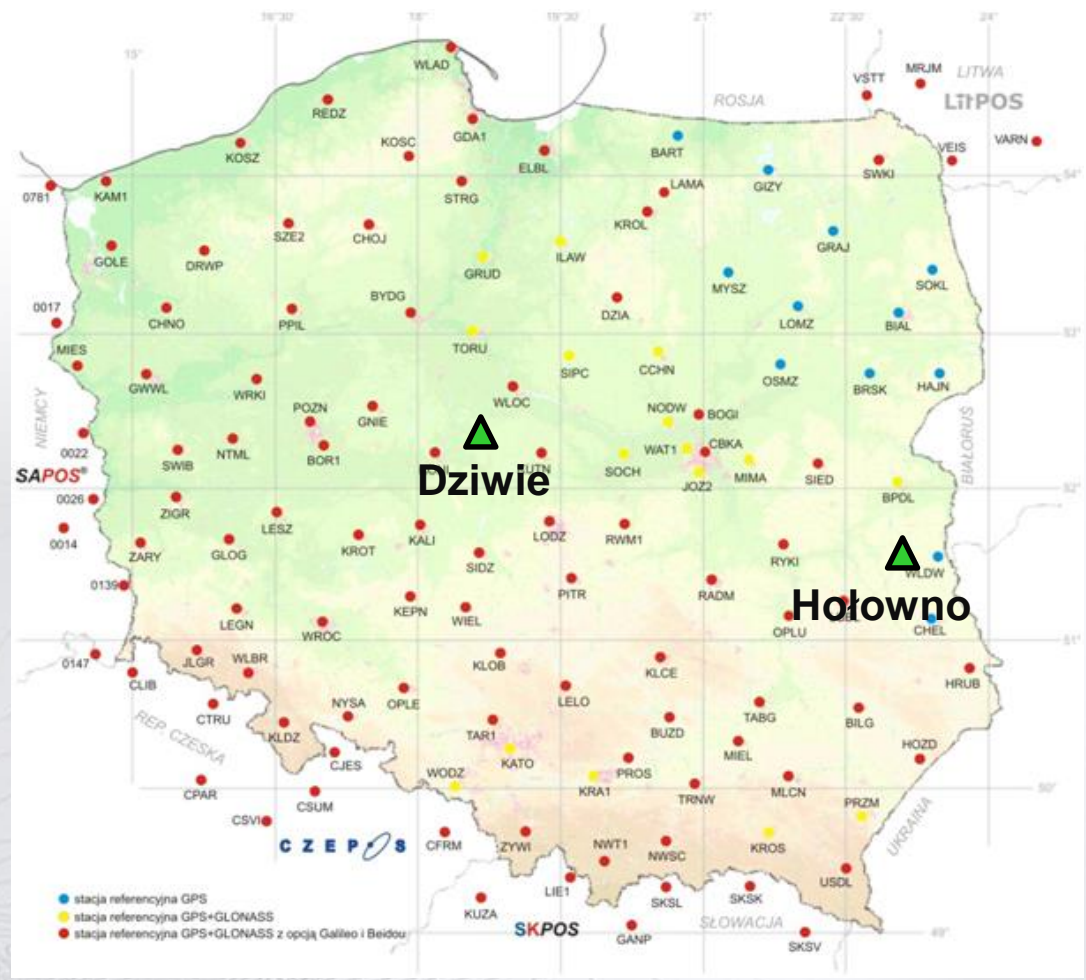
✓ RINEX 2.3 (2.11) RINEX 3.02

- **Receiver Independent Exchange Format**
- Internet protocol responsible for RTCM data transfer via Internet

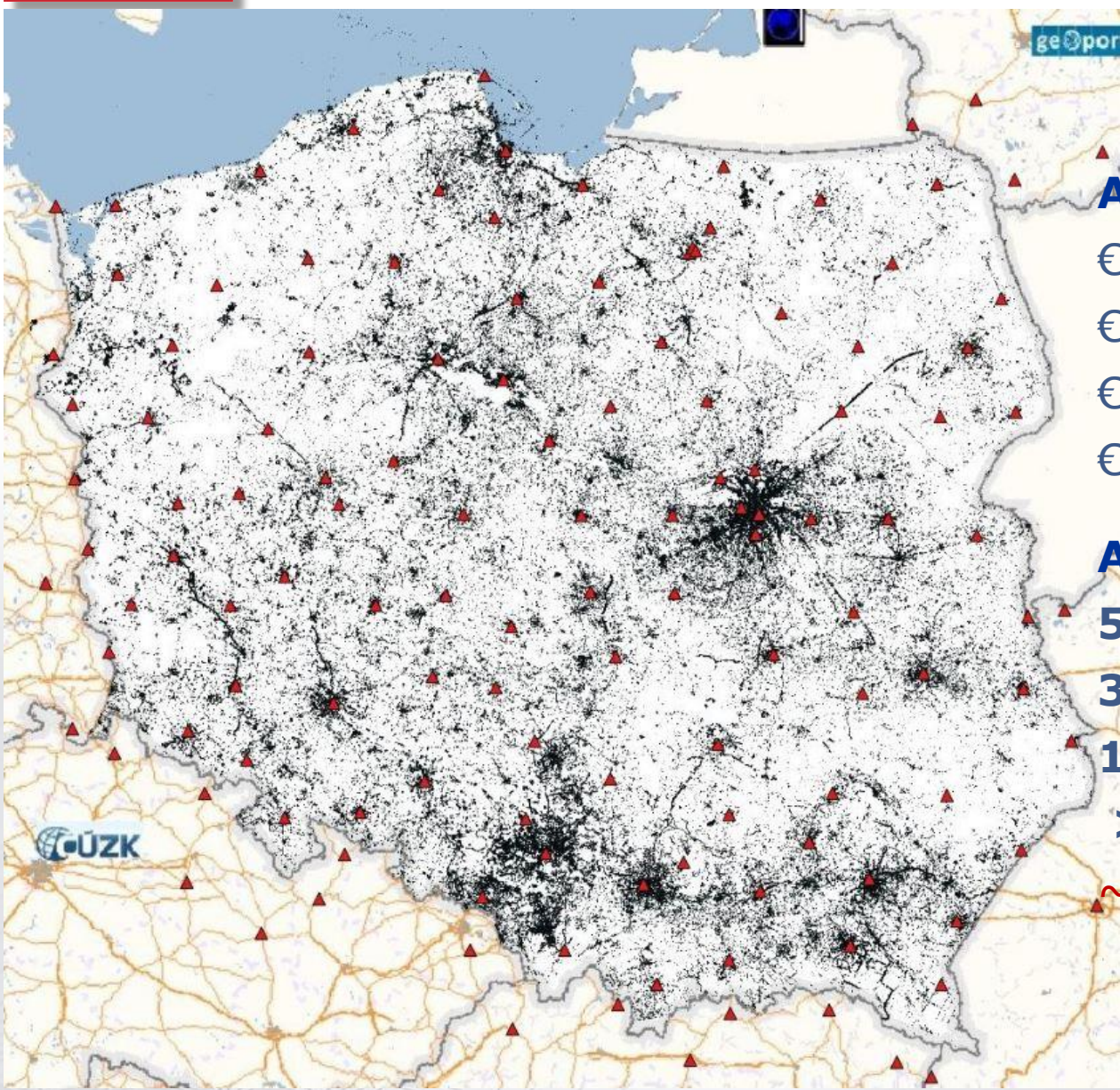
Future steps



With National Geological Institute new monitoring stations will be established very soon.



ASG-EUPOS service usage



ASG-EUPOS fees (RTN)

€360 – 1 year

€200 – 6 months

€43 – 1 month

€13 – 1 week

ASG-EUPOS users

5,629 – registered users

3,570 – active licences

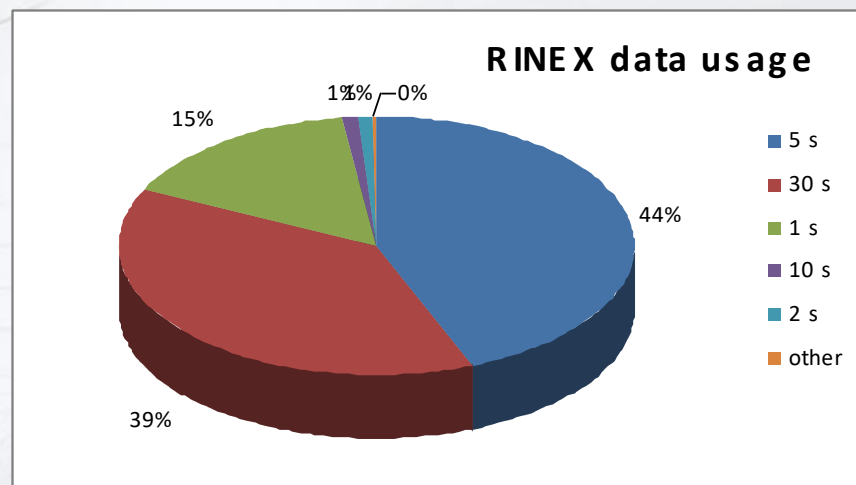
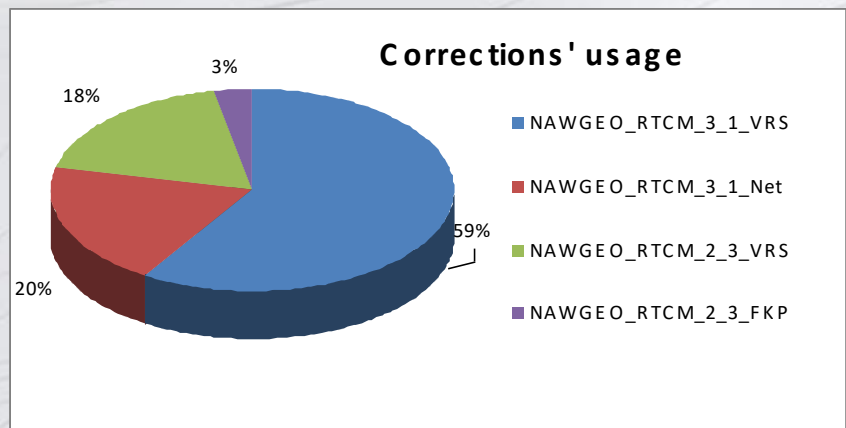
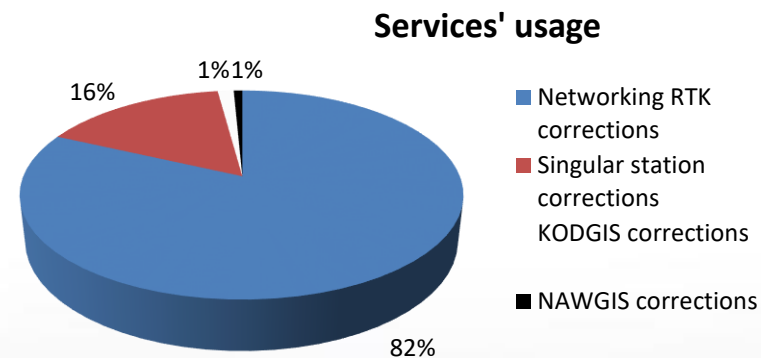
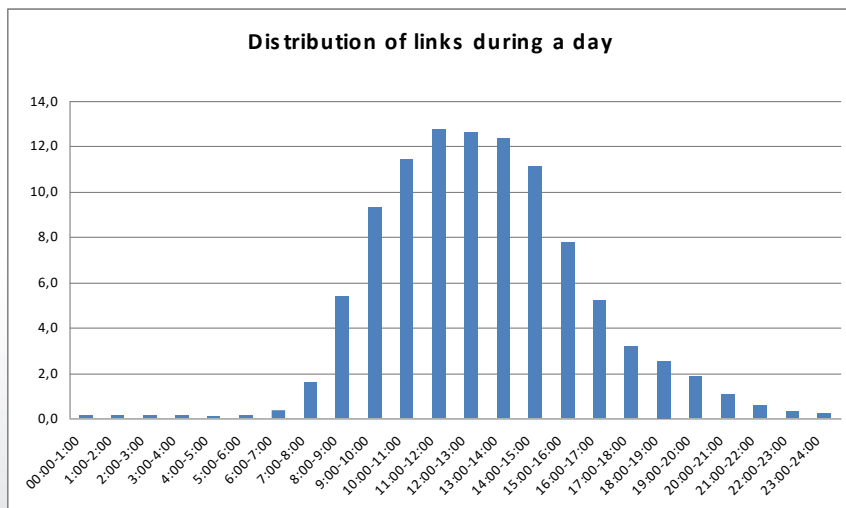
1,730 – average a day

>550 – in pick hours

~20% - prec. agriculture applications



Activity of ASG-EUPOS users





✓ **ASG-EUPOS system:**

- Implementation RINEX 3.02 and RTCM 3.2 to services
- Densification and relocation of reference stations in 2017-2018 to improve of services accuracy, quality and availability,
- Improvement of internet purchasing system for ordering and generating RINEX data for users,
- New internet site of ASG-EUPOS with more complex data about ASG-EUPOS status
- **Change (upgrade) of RTK processing software in 2018,**
- **Implementation and exploitation of Galileo Open Service signals in 2019-2020.**



Thank for your attention ...

www.eupos.org

www.asgeupos.pl

www.gugik.gov.pl

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