



LAND SURVEY OFFICE

CZEPOS

EUPOS 2019

Land Survey Office, Department of Geodetic Control

Jan Řezníček

Administration of CZEPOS network

C Z E P O S 

compatibility of CZEPOS services with
global navigation satellite systems

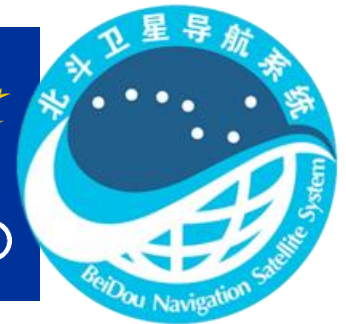
2004
GPS NAVSTAR



2012
GLONASS



2017/18/19
GALILEO
BeiDou



Upgrade of Receivers 2018/19

Leica GRX 1200+ GNSS

- case since 2004
- new motherboard since 2012
- Leica support finished 2017



GPS+GLO+GAL+BEI compatible,

- not all current frequencies (f.e. GLONASS L2C or Galileo E6 is missing)
- not compatible with Trimble software used in APOS/ASG-EUPOS/SKPOS

Leica GR30

- 2018 first 8 stations
- 2019 remaining 17 stations



Compatibility of receivers with GNSS

situation in 2018



MSM services only as a single site solution !

Compatibility of receivers with GNSS

current situation



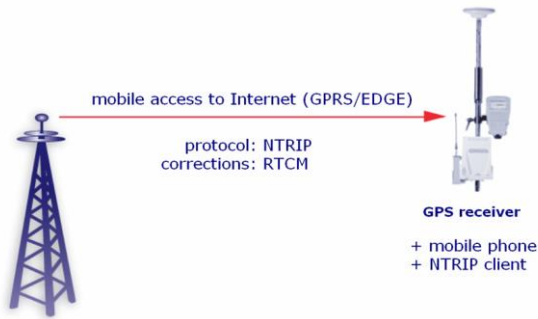
E - station included to EUREF network (EPN)

Stations receive GPS + GLONASS, selected also:
G - Galileo **B** - BeiDou **Q** - QZSS

MSM services also as network solution (VRS)

Administration of CZEPOS network

- 28 Czech stations
- 27 neighboring stations
- real-time services
- post-processing products
- GPS/GLONASS



- 7 stations involved in EUREF permanent network (EPN)
- cooperation within EUPOS project

**2019/10: 1820 users
+200 since last year**

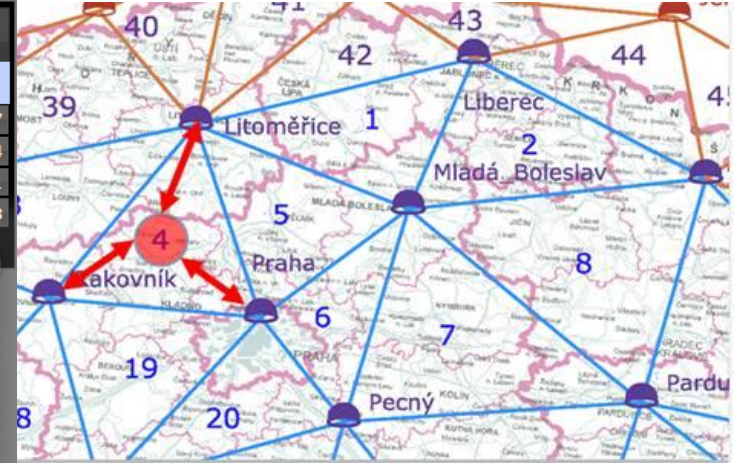
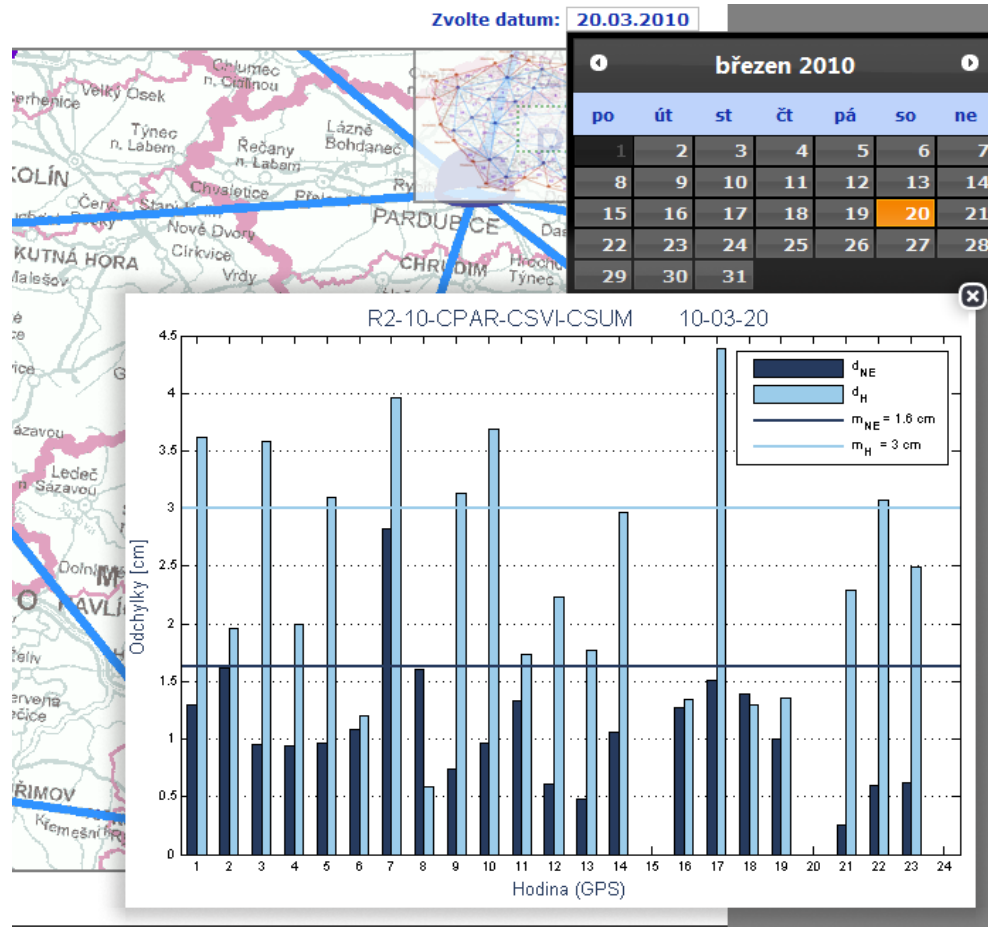


- private sector
- public sector



Administration of CZEPOS network

• monitoring of accuracy



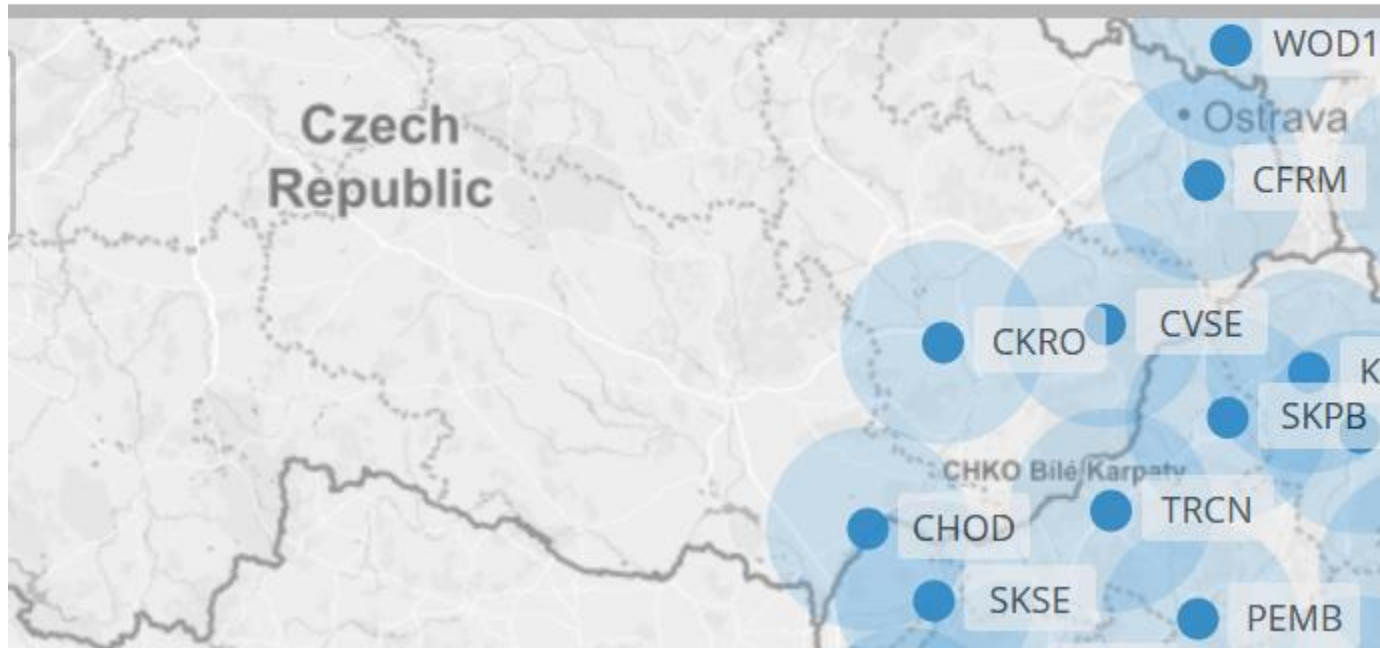
- Internet application, created in cooperation with CTU
- 75 testing areas on the territory of CR including border areas
- there are 3 testing baselines in each area
- each baseline is tested from RTK x VRS service

- since 2010
- upgrade 2018/19 (Galileo/BeiDou)

Administration of CZEPOS network



Service quality monitoring



- **since 2019 EUPOS SQM – 4 stations**

Administration of CZEPOS network

- monitoring of operation

ZEMĚMĚŘICKÝ ÚŘAD - CZEPOS - Mozilla Firefox

Soubor Úpravy Zobrazení Historie Záložky Oblíbené Nástroje Nápověda

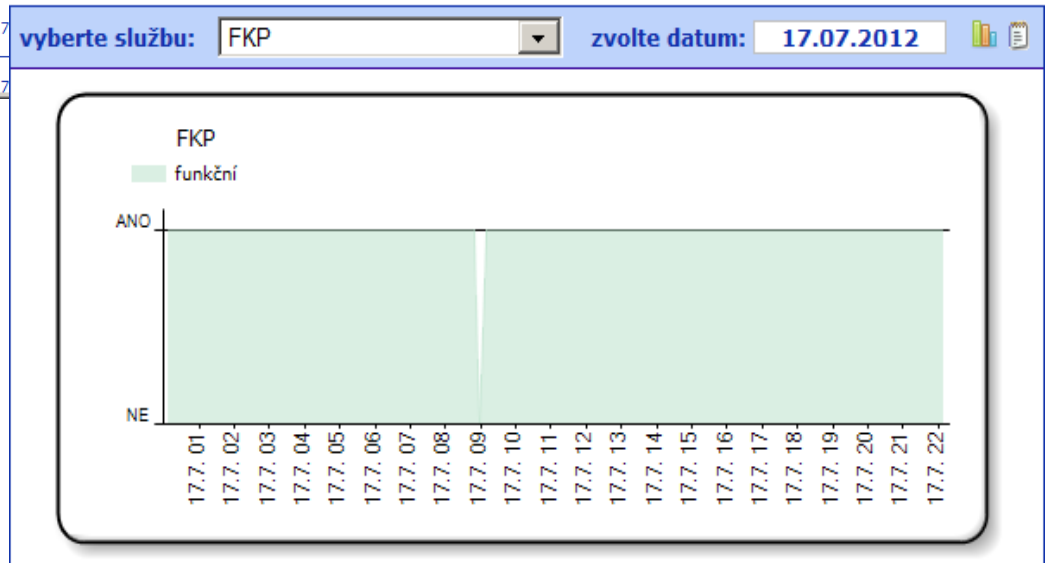
ZEMĚMĚŘICKÝ ÚŘAD - ...

czepos.cuzk.cz/_serviceStatus.aspx

aktuální stav služeb RTK a DGPS
služby RTK a DGPS, závislé na výběru stanice

n	stanice	kód	RTK funkční	DGPS funkční	testováno
1	Pardubice	CPAR	ANO	ANO	7/17/2012 9:31:36 PM
2	Svitavy	CSVI	ANO	ANO	7/17/2012 9:33:04 PM
3	Jihlava	CJIH	NE	NE	7/17/2012 9:34:32 PM
4	Dačice	CDAC	ANO	ANO	7/17
5	Tábor	CTAB	ANO	ANO	7/17
6	Příbram	CPRI	ANO	ANO	7/17

výpis historie - služby virtuální referenční stanice a nejbližší stanice



Administration of CZEPOS network

- monitoring of operation

Monitoring permanentních stanic GNSS - Windows Internet Explorer

http://oko.pecny.cz/monitor/#d

Monitoring permanentních stanic GNSS

Dočasné uživatelské rozhraní do doby, než bude služba umístěna na webu ČUZK

Statuty stanic a souřadnice pro konkrétní den | Aktuální ověřené souřadnice | Celkový přehled | Nápověda | Webová služba

Nahoru

1. Statuty stanic a souřadnic

Stav pro den 20.1.2015 (úterý) - poslední vypočtený den

Vybrat:

Statuty stanic a ověřené souřadnice

Výsledky pro síťová řešení (z ultra rapid řešení)

Sít	Výsledek
CZEPOS	CZEPOS : Síťové řešení ověřeno
TRIMBLE	Trimble VRS NOW : Síťové řešení neověřeno

Výsledky pro jednotlivé stanice z ultra rapid řešení

Stanice	Popis	B			L			H (ell.)	Status	Dráhy (*.sp3), komentář
CBUD	České Budějovice	48	58	3.47154	14	28	30.97608	456.223	Overeno	ultra rapid, vypocet OK
CDAC	Dačice	49	04	47.20485	15	26	12.45539	534.730	Overeno	ultra rapid, vypocet OK
CDOM	Domažlice	49	26	45.25334	12	55	26.77675	519.603	Overeno	ultra rapid, vypocet OK

Cooperation with Research Institute of Geodesy and Cartography

The figure displays three sets of GNSS coordinate time series plots. The first set, labeled 'CJIH', shows North (N) in mm (blue), East (E) in mm (red), and Up (U) in mm (green) over 500 days. The second set, labeled 'CLIT', shows North (N) in mm (blue), East (E) in mm (red), and Up (U) in mm (green) over 600 days. Each plot includes a smooth black trend line overlaid on the noisy data points.

New prices since 2017

<p>DGPS Differential GPS</p>	<ul style="list-style-type: none"> • DGPS 	<p><i>20 Kč (0.78 €) / 1 hour</i></p>
<p>RTK Real Time Kinematic</p>	<ul style="list-style-type: none"> • RTK • RTK3-GG • RTK3-NS-GG 	<p>80 Kč (3.13 €) / 1 hour 60 Kč (2.35 €) / 1 hour</p>
<p>VRS Virtual Reference Station</p>	<ul style="list-style-type: none"> • RTK-PRS • RTK-FKP • VRS3-MAX, VRS3-iMAX • VRS3-MAX-GG, VRS3-iMAX-GG • VRS-MAX-GG_L4G • VRS-iMAX-GG_CMR, VRS-iMAX-GG_CMR+ • VRS3-VirtualRS-GG 	<p>80 Kč (3.13 €) / 1 hour 60 Kč (2.35 €) / 1 hour</p>

New prices since 2017

Real-time services:

- fixed monthly payment

RTK-PRS, RTK-FKP, MAX, iMAX, MAX-GG, iMAX-GG,
RTK, RTK3-NS, RTK3-GG,
DGPS

~~6 000 Kč (234.74 €)~~

1 000 Kč (39.12 €)

- fixed annual payment

RTK-PRS, RTK-FKP, MAX, iMAX, MAX-GG, iMAX-GG,
RTK, RTK3-NS, RTK3-GG,
DGPS

~~25 000 Kč (978.09 €)~~

10 000 Kč (391.24 €)

Post-processing products:

data interval: 1 – 4 seconds

~~80 Kč (3.13 €)~~ **50 Kč (1.96 €)**

5 – 9 seconds

~~16 Kč (0.63 €)~~ **10 Kč (0.39 €)**

10 – ... seconds

~~8 Kč (0.31 €)~~ **5 Kč (0.20 €)**

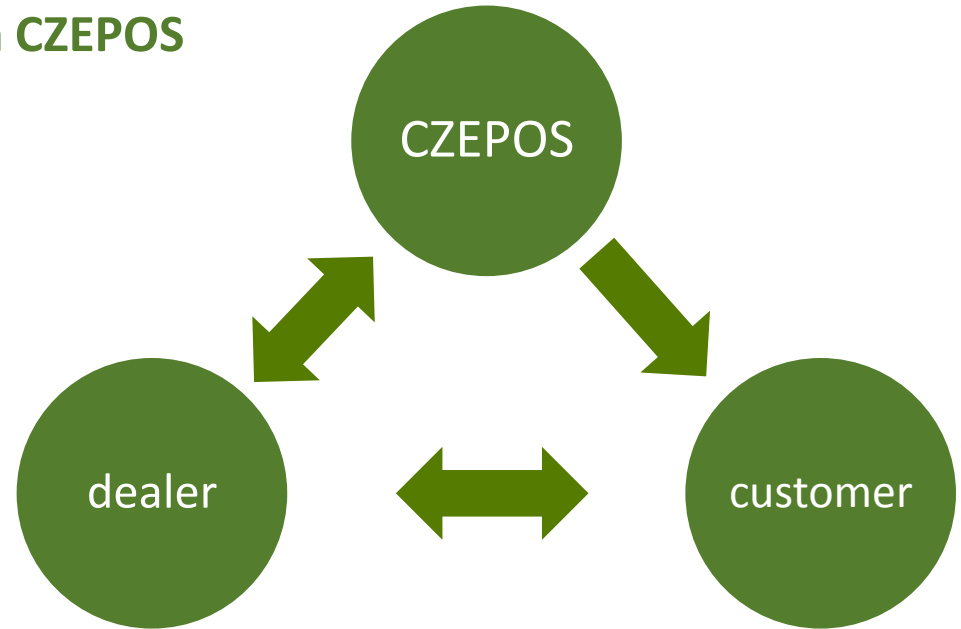
computation service

free of charge

CZEPOS – cooperation with dealers since 2018

- dealer register customers within CZEPOS

customers are still registered within CZEPOS



- dealer operates own GNSS software (virtual GNSS network)



dealer provides GNSS services to customers by his own GNSS software



thank you for your attention