



Sveučilište u Zagrebu – Geodetski fakultet <sup>1</sup>

# III. KONGRES O KATASTRU U BiH

s međunarodnim sudjelovanjem



Republika Hrvatska – Državna geodetska uprava <sup>2</sup>

Katarina MILEC<sup>1</sup>, Željko BAČIĆ<sup>1</sup>,  
Margareta PREMUŽIĆ<sup>2</sup>, Danijel ŠUGAR<sup>1</sup>:

## Testiranje BiHPOS VPSP i CROPOS VPPS servisa



Mostar, 2. – 4. prosinca 2015.



## Sadržaj:

1. Uvod
2. Koncepti mrežnih RTK rješenja – VRS & MAC
3. Servisi (CROPOS & SRPOS)
4. Ispitivanje performansi CROPOS-a i SRPOS-a
5. Ispitivanje performansi CROPOS-a (standardna i nestandardna konfiguracija mreže)
6. Zaključak



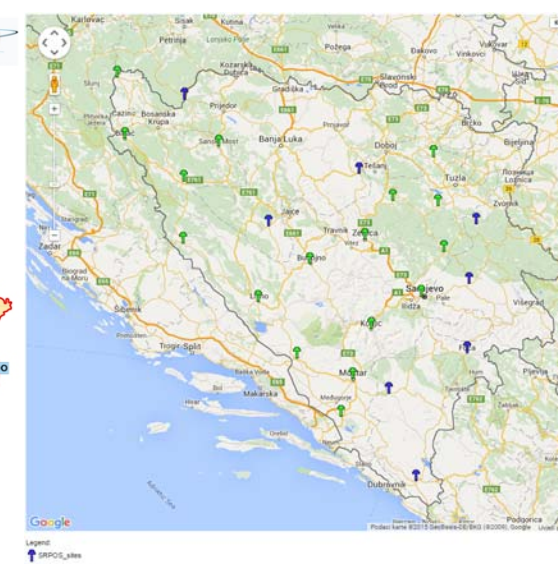
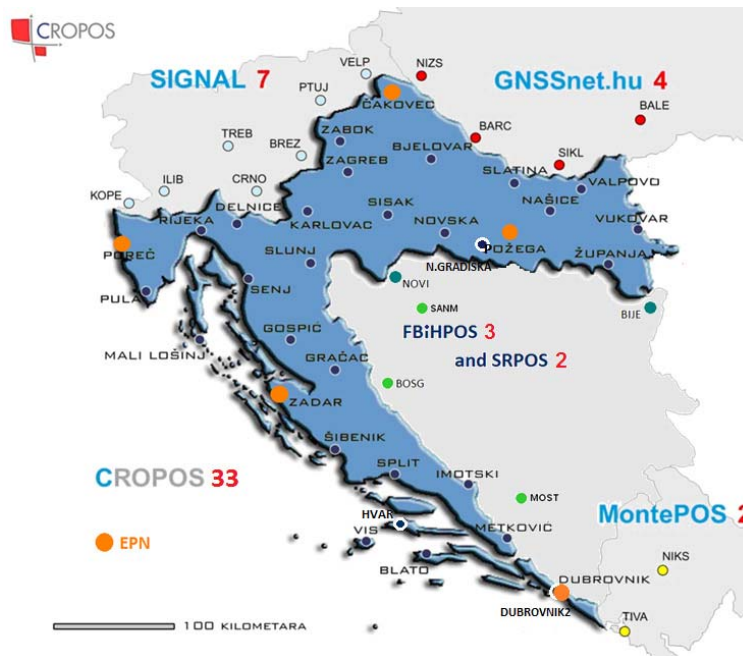
# 1. Uvod

- CROPOS

- 5.12.2008.
- ≈ 70 km
- DSP, VPPS, GPPS

- BiHPOS

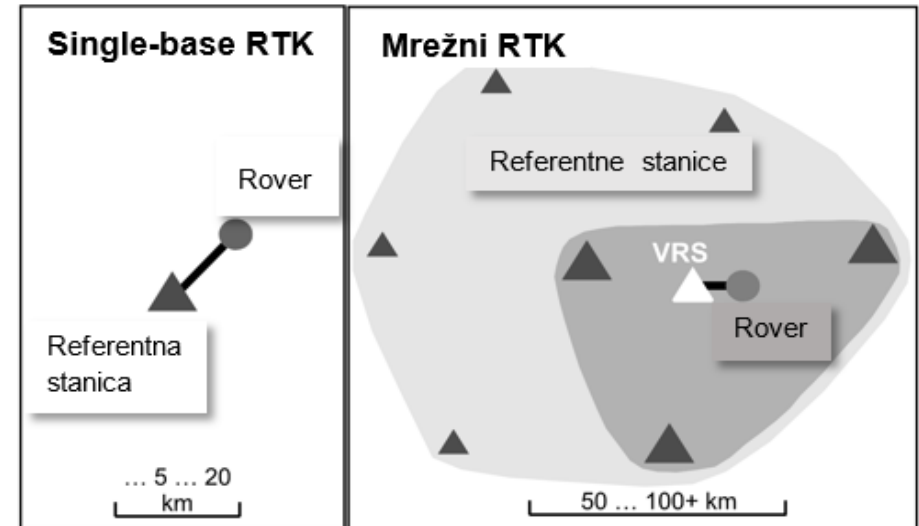
- 27.9.2011.
- FBiHPOS (17) & SRPOS (17)
- 35-50 km
- DSP (DGNSS), VPSP (PDGNSS), GPSP



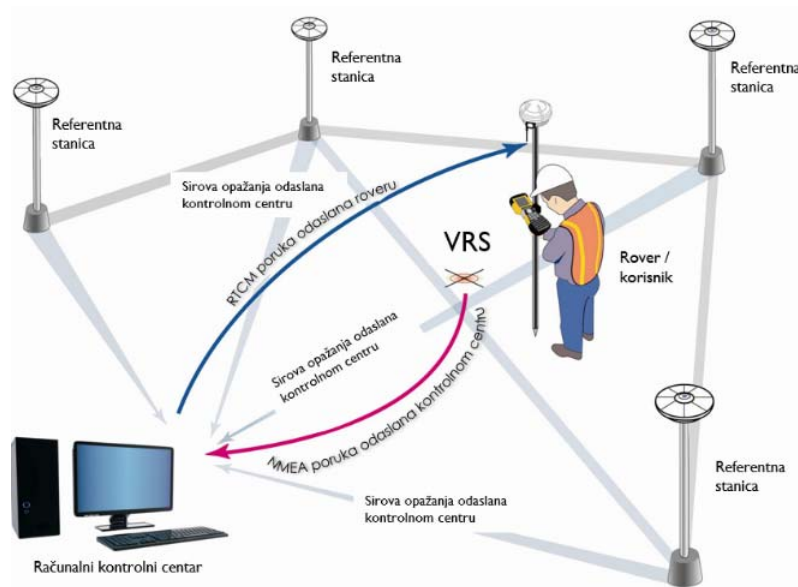
Testiranje BiHPOS VPSP i CROPOS VPPS servisa

## 2. Koncepti mrežnih RTK rješenja

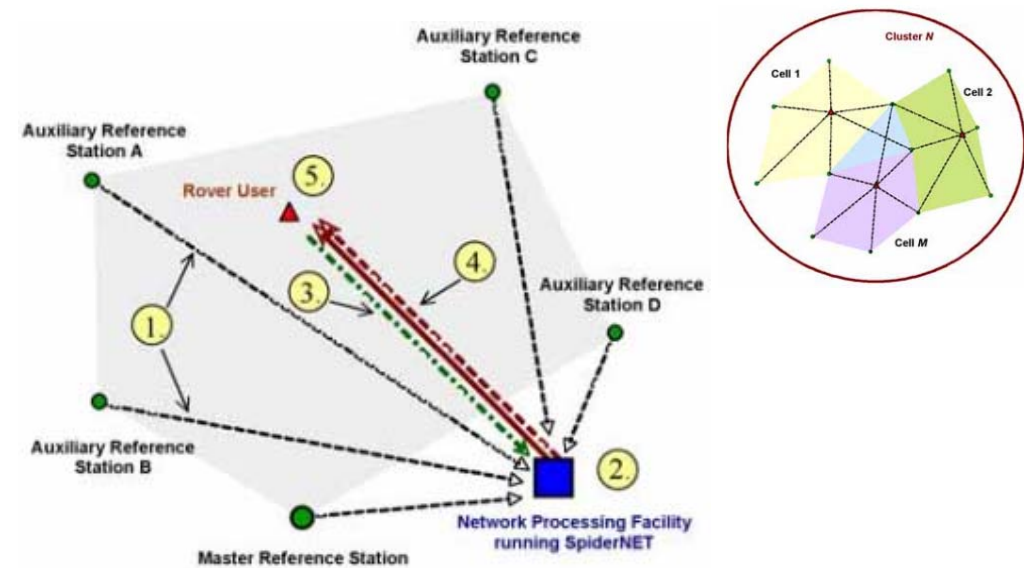
- Single-base VS. Networked RTK
- modeliranje o udaljenosti ovisnih pogrešaka



### Virtual Reference Station (VRS)



### Master Auxiliary Concept (MAC)



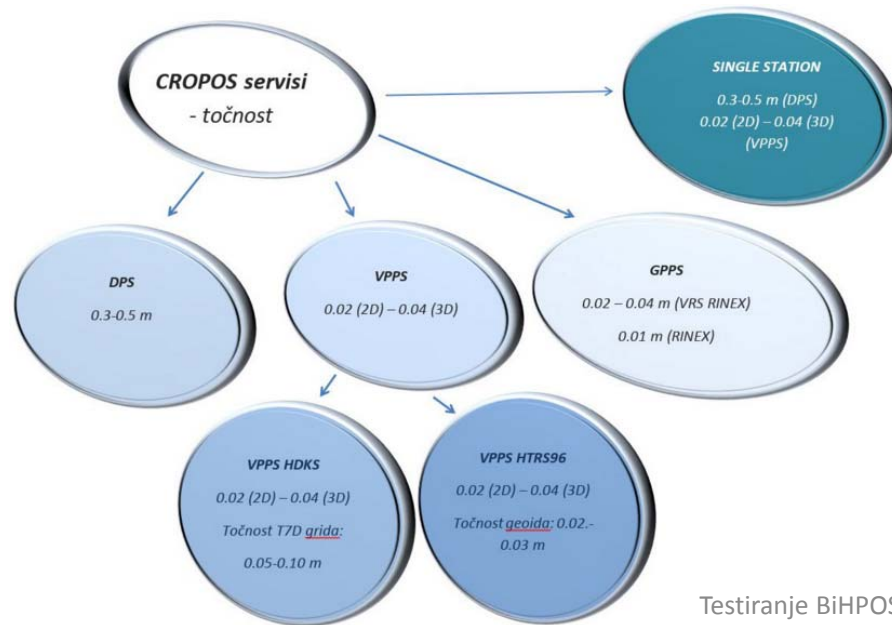
### 3. Servisi

#### CROPOS (VRS, Trimble)

- DSP
- VPPS (RTCM 2.3, RTCM 3.1)
- GPPS (RINEX)

#### SRPOS (MAC, Leica)

- DSP (DGNSS)
- VPSP (PDGNSS) (RTCM 2.3, RTCM 3.1)
- GPSP (RINEX)

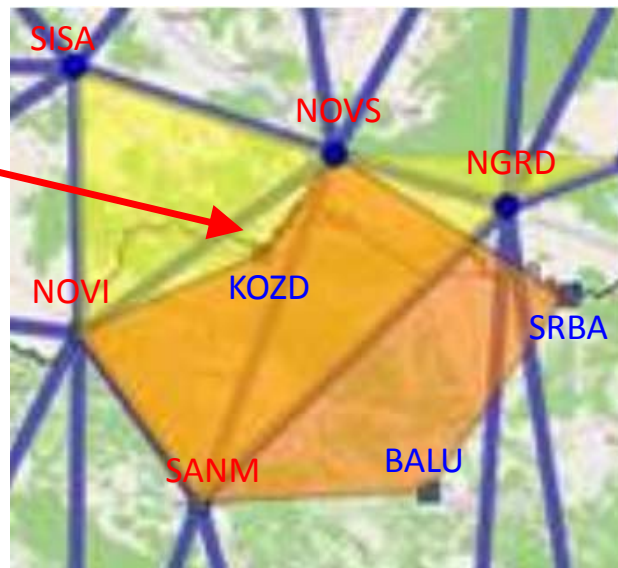


Testiranje BiHPOS VPSP i CROPOS VPPS servisa

MOUNT POINT
MAX-AUTO
iMAX-AUTO
VRS-AUTO
FKP-AUTO
NEAREST
iMAX-AUTO_2.3
VRS-AUTO_2.3

# 4. Ispitivanje performansi CROPOS-a i SRPOS-a

- Pounje (Hrvatska Dubica)
- GNSS instrumentarij (Trimble, Leica, Stonex)

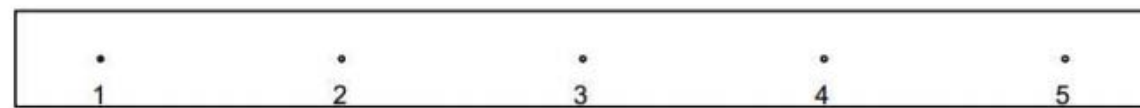
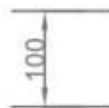
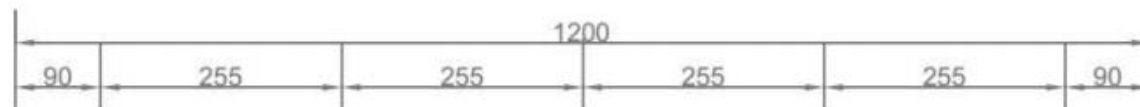


CROPOS\_VRS\_RTCM31

MAX-Auto

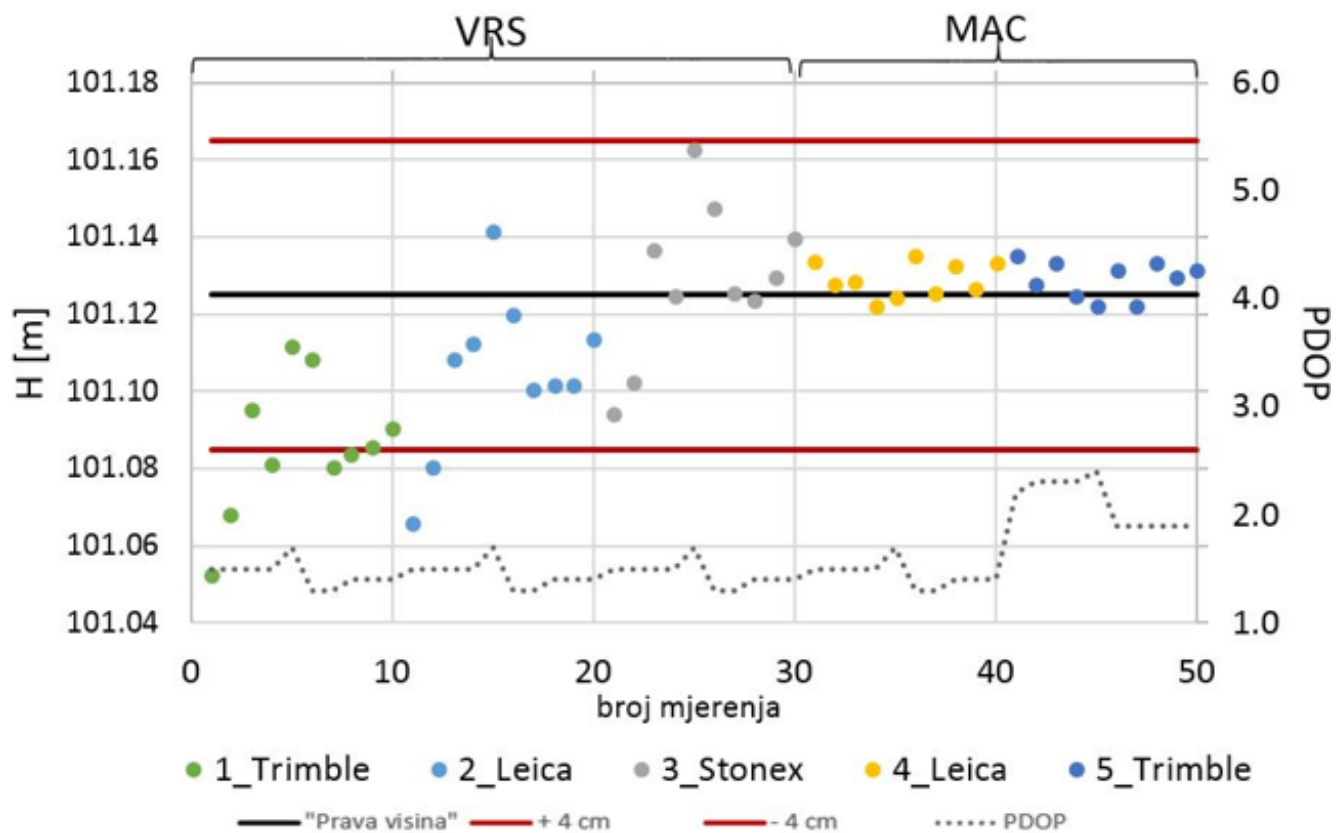


1. sesija	2 sata	2. sesija
5 ponavljanja	STATIKA (1 sat)	5 ponavljanja



Testiranje BiHPOS VPSP i CROPOS VPPS servisa

# Usporedba visina (CROPOS vs. SRPOS)



SRPOS:

- preciznost: 0.00 m
- točnost: 0.01 m

CROPOS:

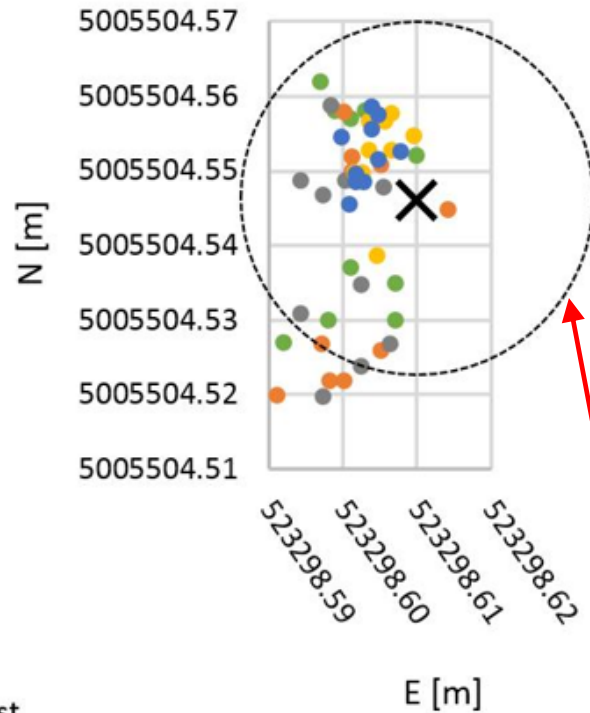
- 1\_Trimble: 0.02 m (p); 0.07 m (t)
- 2\_Leica: 0.02 m (p); 0.06 m (t)
- Stonex: 0.01 m (p); 0.04 m (t)

postignuta točnost:

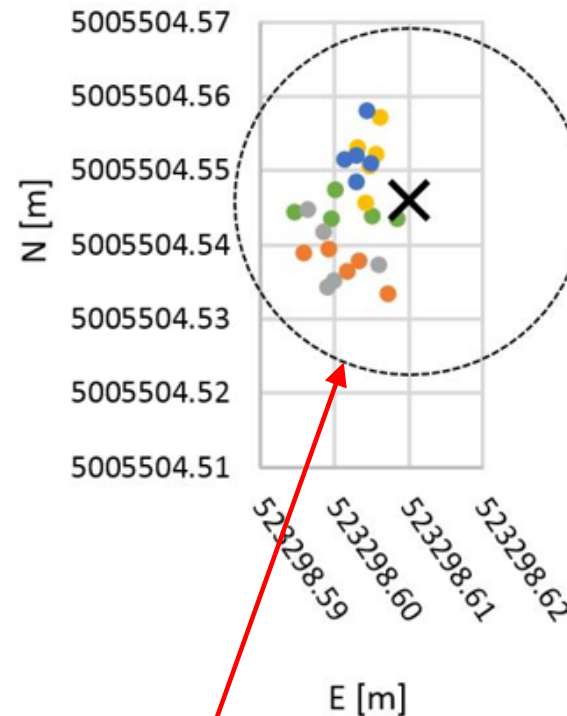
23/30 (77%) unutar  $\pm 4$  cm



# Usporedba položaja (CROPOS vs. SRPOS)



radijus kružnice uključuje nesigurnost položaja određenog STATIČKOM metodom.



osrednjavanjem rezultata dviju sesija povećava se pouzdanost koordinata.

SRPOS:

- preciznost: < 0.01 m
- točnost: 0.01 m

CROPOS:

- preciznost: 0.01 m
- točnost: 0.03 m

postignuta točnost:  
25/30 (83%) unutar  $\pm 2$  cm





## 5. Ispitivanje performansi CROPOS-a (standardna i nestandardna konfiguracija mreže)

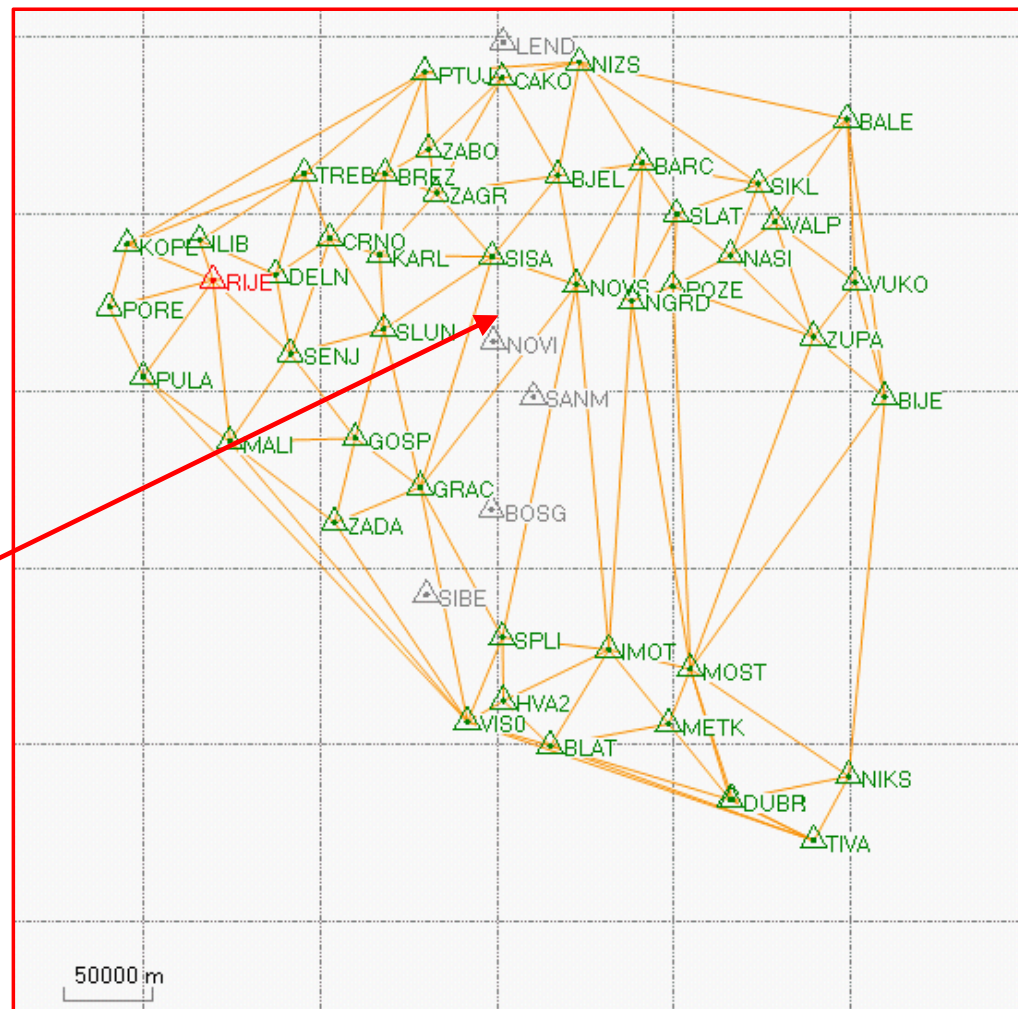
- CROPOS: 33 (51) CORS točke  
→ standardna konfiguracija
- nestandardna konfiguracija
- deklarirana točnost VPPS-a:  
 $\pm 2$  cm (2D);  $\pm 4$  cm (3D)

Ilokacija Unčani (9. i 10. 5. 2015.)

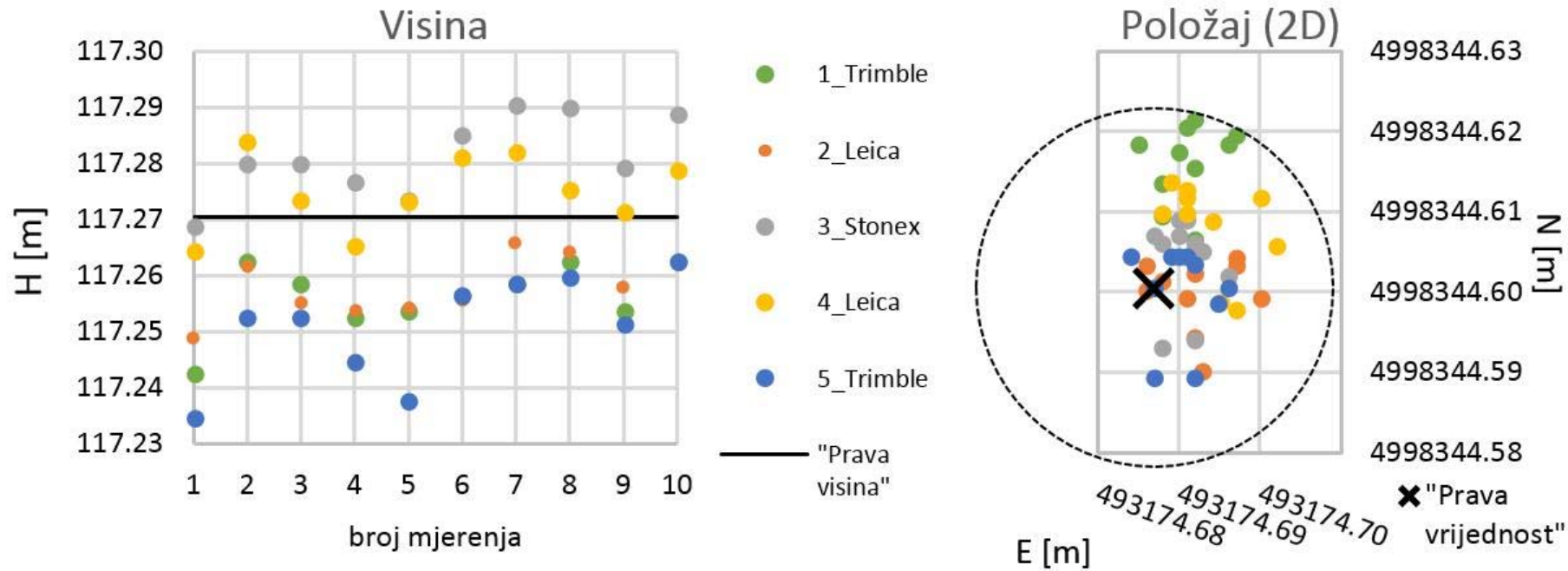
stand. konfigur.

nestand. konfigur.

Testiranje BiHPOS VPSP i CROPOS VPPS servisa



# CROPOS – standardna konfiguracija mreže

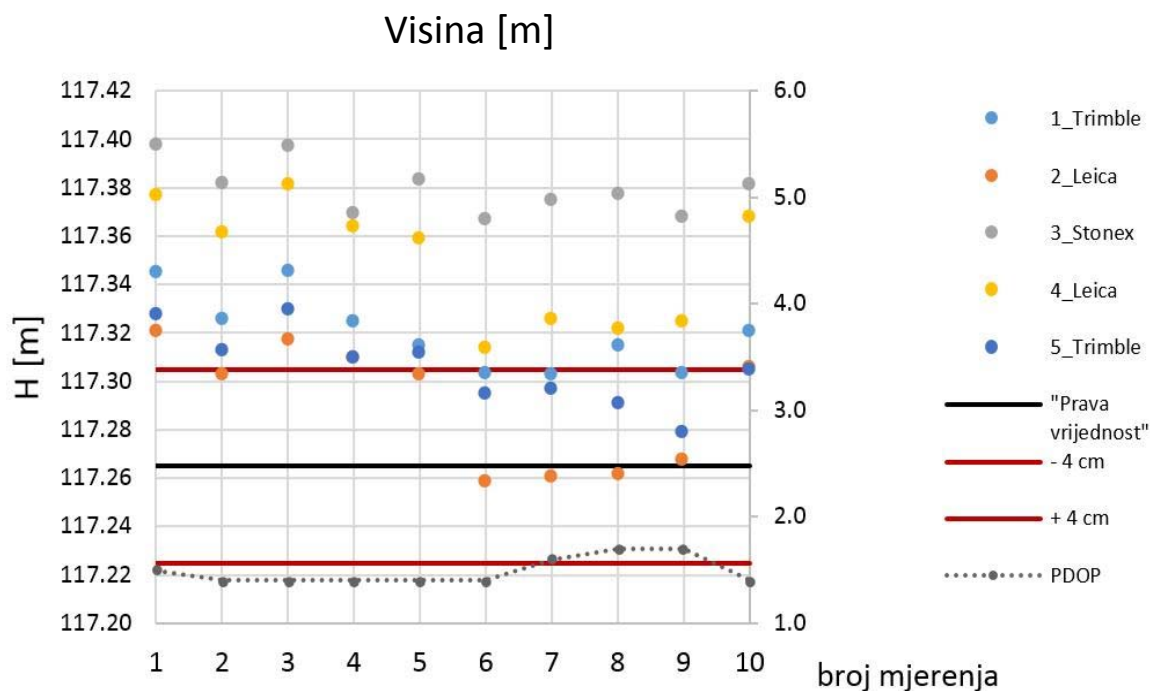


preciznost: 0.00 – 0.01 m (2D); 0.01 m (H)  
 točnost: 0.01 – 0.02 m (2D); 0.01 – 0.04 m (H)

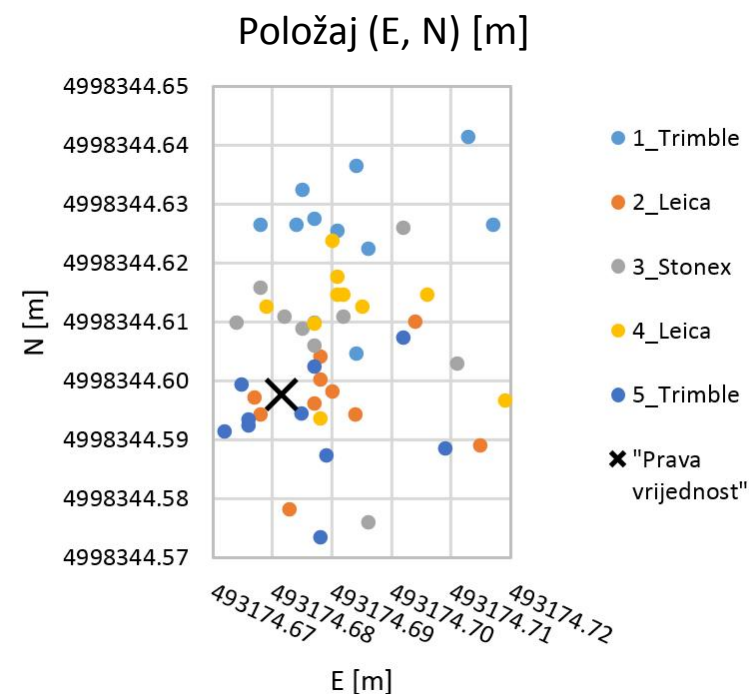
unutar deklarirane točnosti VPPS-a



# CROPOS – nestandardna konfiguracija mreže



preciznost: 0.01 – 0.03 m (H)  
 točnost: 0.06 – 0.13 m (H)  
 14/50 (28%) unutar deklarirane točnosti  $\pm 4$  cm



preciznost: 0.01 m (2D)  
 točnost: 0.03 – 0.04 m (2D)

Izvan deklarirane točnosti VPPS-a!



## 5. Zaključak

- SRPOS (MAC) daje pouzdanije rezultate od CROPOS-a (VRS),  
✓ za potrebe ispitivanja planirano je bilo isključenje CORS KOZD
- dobri pokazatelji preciznosti (SRPOS), nešto lošiji (CROPOS),
- CROPOS (Hrvatska Dubica): točnosti: 3 cm (2D), 4-7 cm (H),
- CROPOS (standardna konfiguracija mreže) → postignuta deklarirana točnost 2D i 3D,
- CROPOS (nestandardna konfiguracija mreže) → degradacija točnosti: 3 – 4 cm (2D), 6 – 13 cm (H),
- utvrđena degradacija točnosti VPPS-a u ovisnosti o povećanju udaljenosti između aktivnih CORS točaka,
- potreba uspostavljanja usluge obavještanja korisnika o ispadu iz sustava pojedine CORS točke tj. nepouzdanosti sustav na određenom području.





pitanja...

