Univerzitet u Beogradu - Građevinski fakultet
Modul za hidrotehniku i vodno-ekološko inženjerstvo

SEMINARSKI RAD iz predmeta MERENJA U HIDROTEHNICI

Radarsko i optičko merenje (LSPIV) površinske brzine vode

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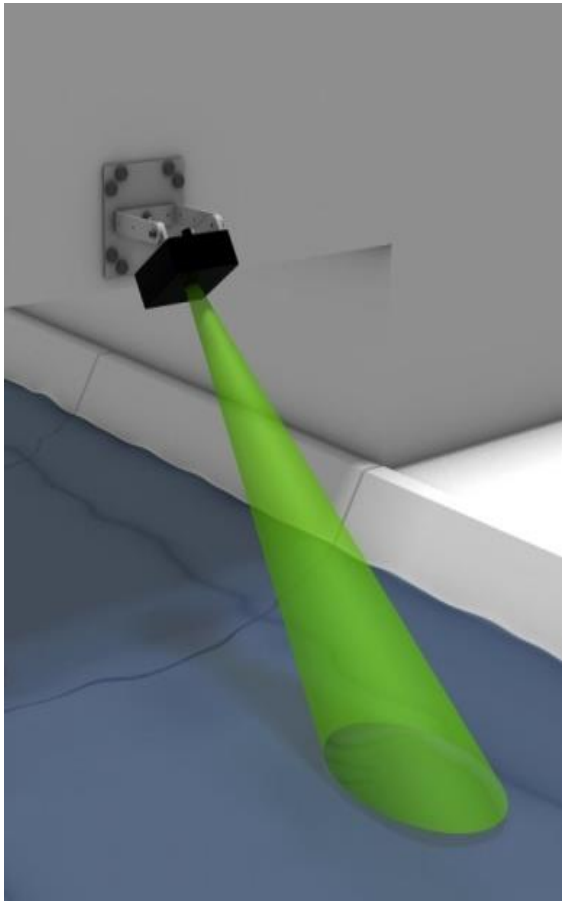
Nevenka Bašić 602/19

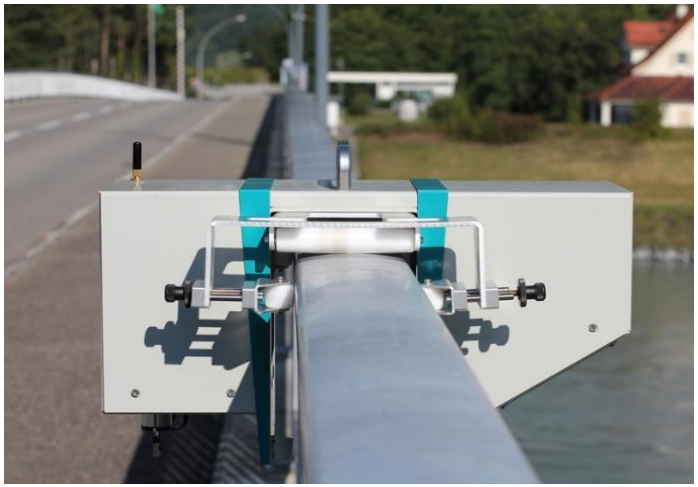
Sadržaj:

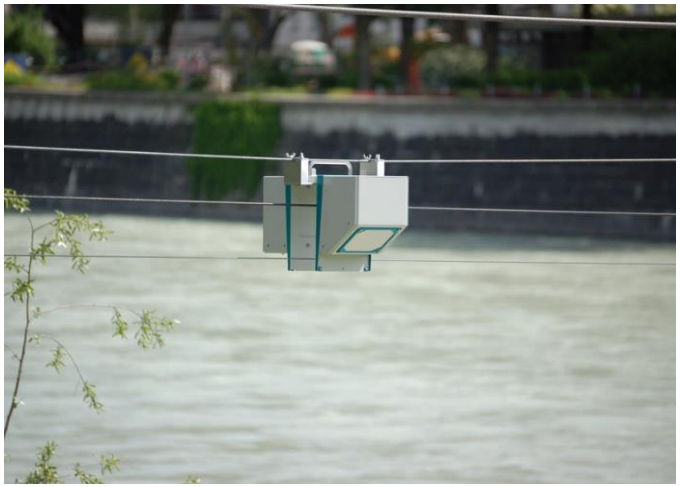
1. Radarsko merenje površinske brzine

- Primer fiksnog radara za merenje površinske brzine vode na otvorenom vodotoku

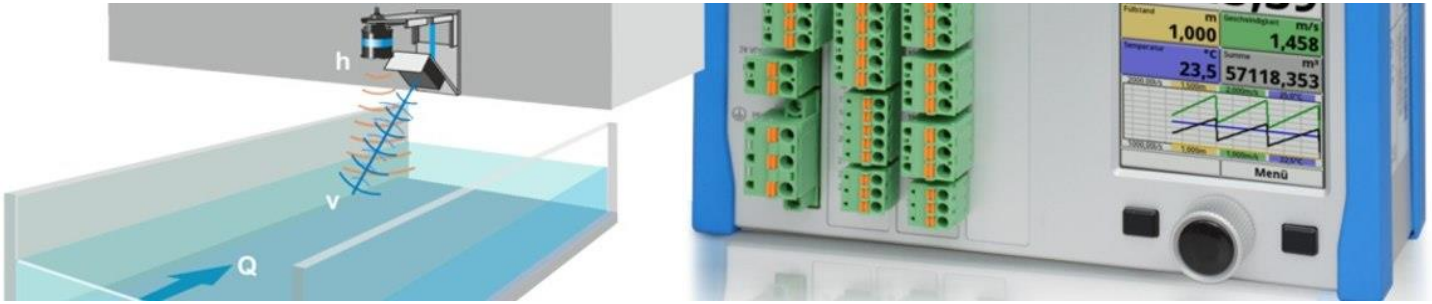


• Dva primera mobilnog radara za merenje površinske brzine vode na otvorenom vodotoku (pomeranjem radara preko celog preseka omogućeno je snimanje površinskih brzina u celom poprečnom preseku)





• Primer kombinovanja radarskog i ultrazvučnog merenja dubine, sa procesorom koji računa protok



1. **Prednosti metode:**

- jednostavno postavljenje opreme
- tačnost zavisi od kalibracije

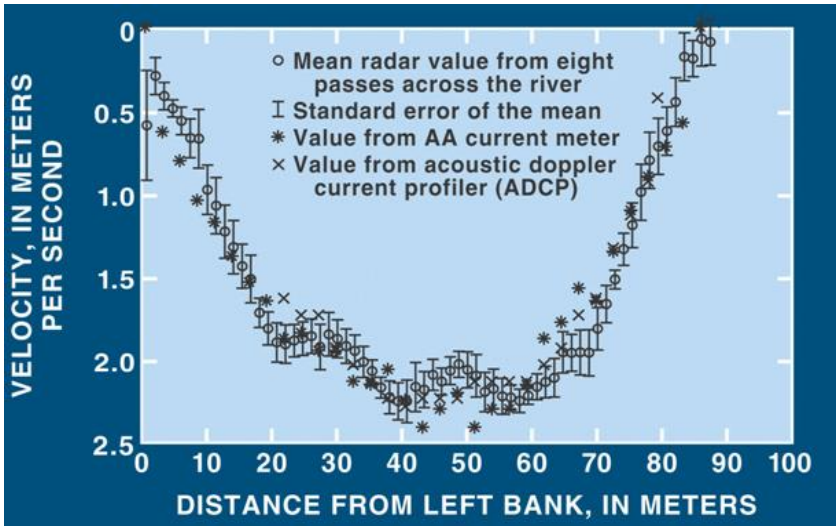
2. **Nedostaci metode:**

- oprema je skupa (investicioni troškovi su veliki, troškovi održavanja nisu)
- za povratni tok potrebna je još skuplja oprema
- pogrešna merenja će se dobiti ako se uređaj nađe u zoni uticaja vetrova
- ne meri male brzine, u zoni uspora
- neprimenjiva je u slučaju kolektora pod pritiskom

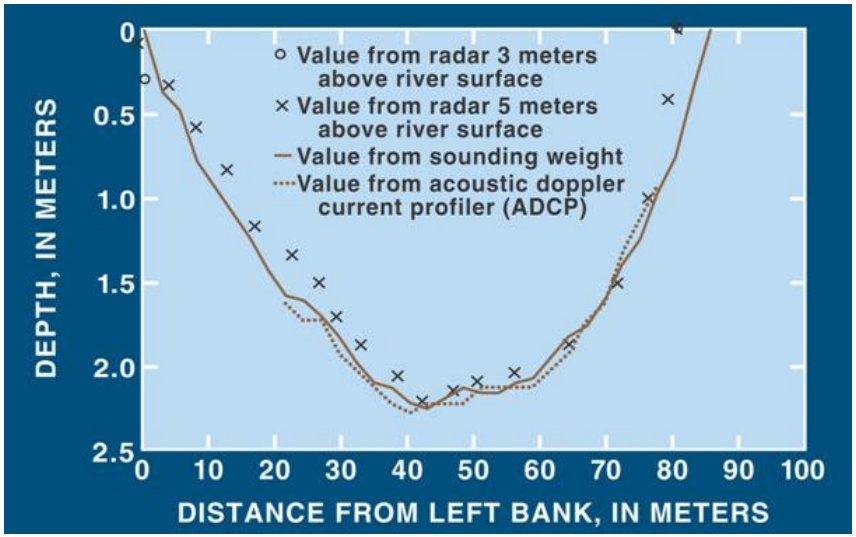
2. Primer radarskog merenja

- Ispitivanje koje je vršio Geološki topografski institut SADa (USGS, United States Geological Survey);
- Radar je bio prikačen na donjoj strani helikoptera ;
- Helikopter se nalazion na rastojanju od 3 do 5 metara od same površine vode;
- Podaci o brzinama i poprečnim presecima su bili zabeleženi za svako merenje, kao i evidencija o položaju i stavu helikoptera za vreme merenja.

- Prikaz rezultata ispitivanja (brzina)



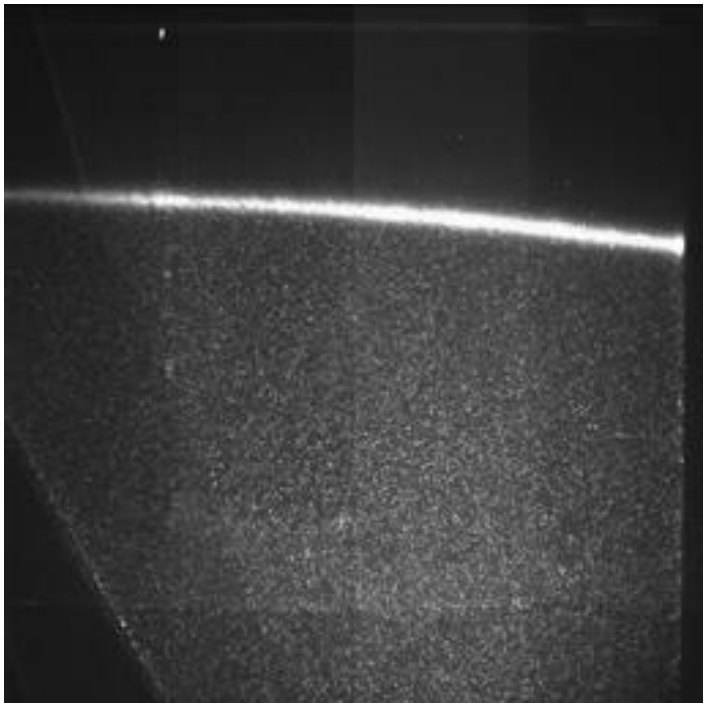
- Prikaz rezultata ispitivanja (dubina)



3. Optičke metode za merenje brzine

- PIV

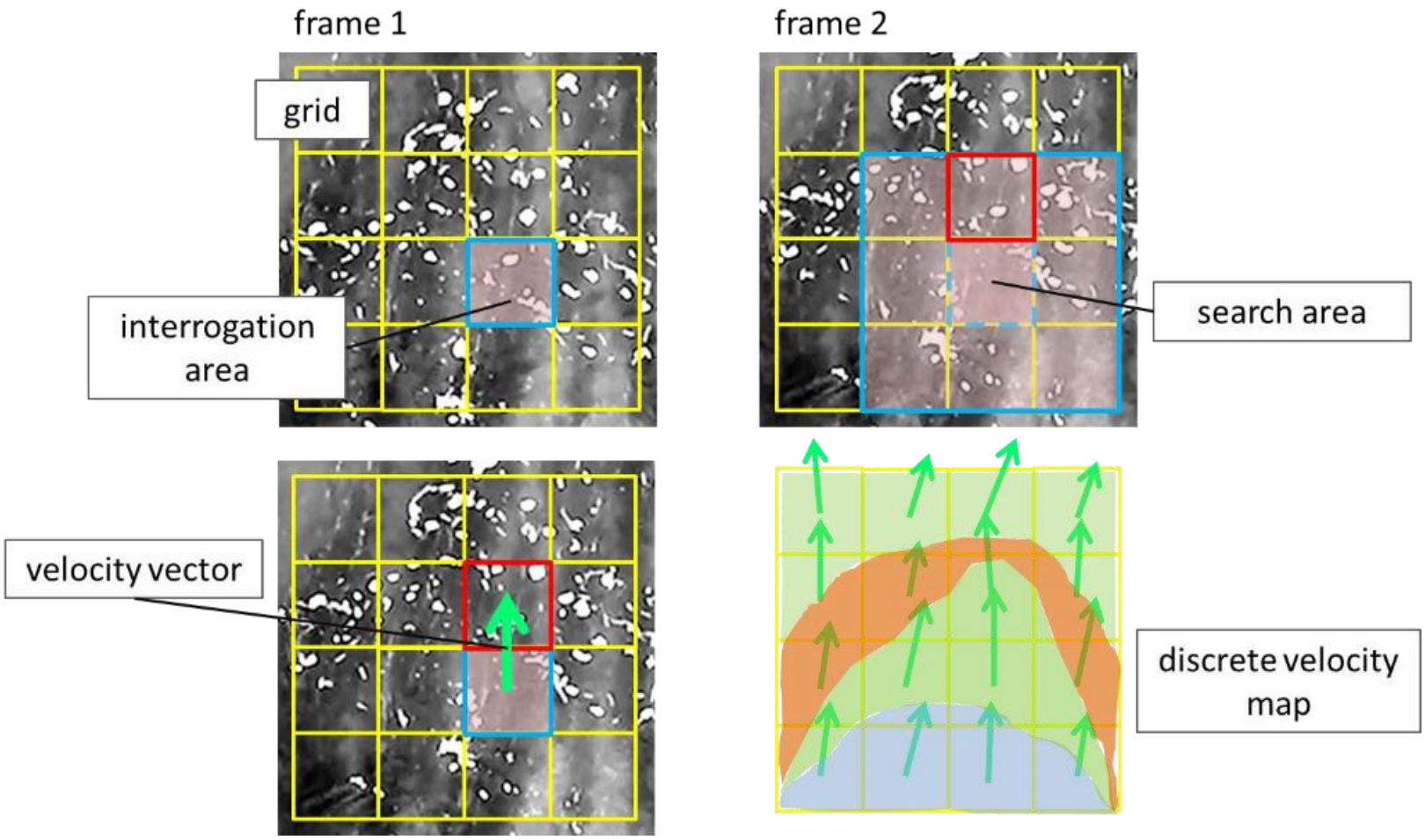
(Particle Image Velocimetry)



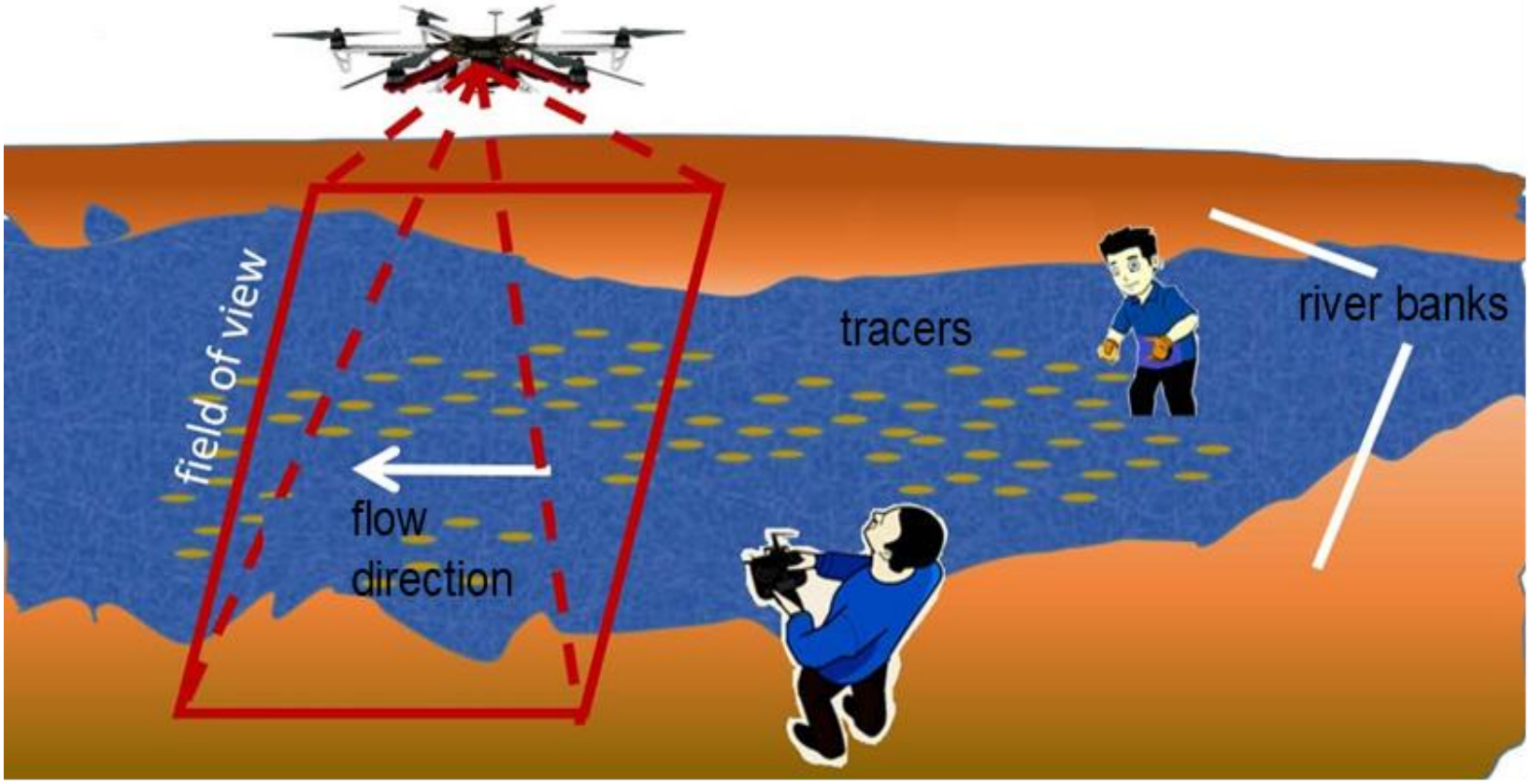
- LSPIV

(Large Scale Particle Image Velocimetry)

•LSPIV metoda (Large Scale Particle Velocimetry)

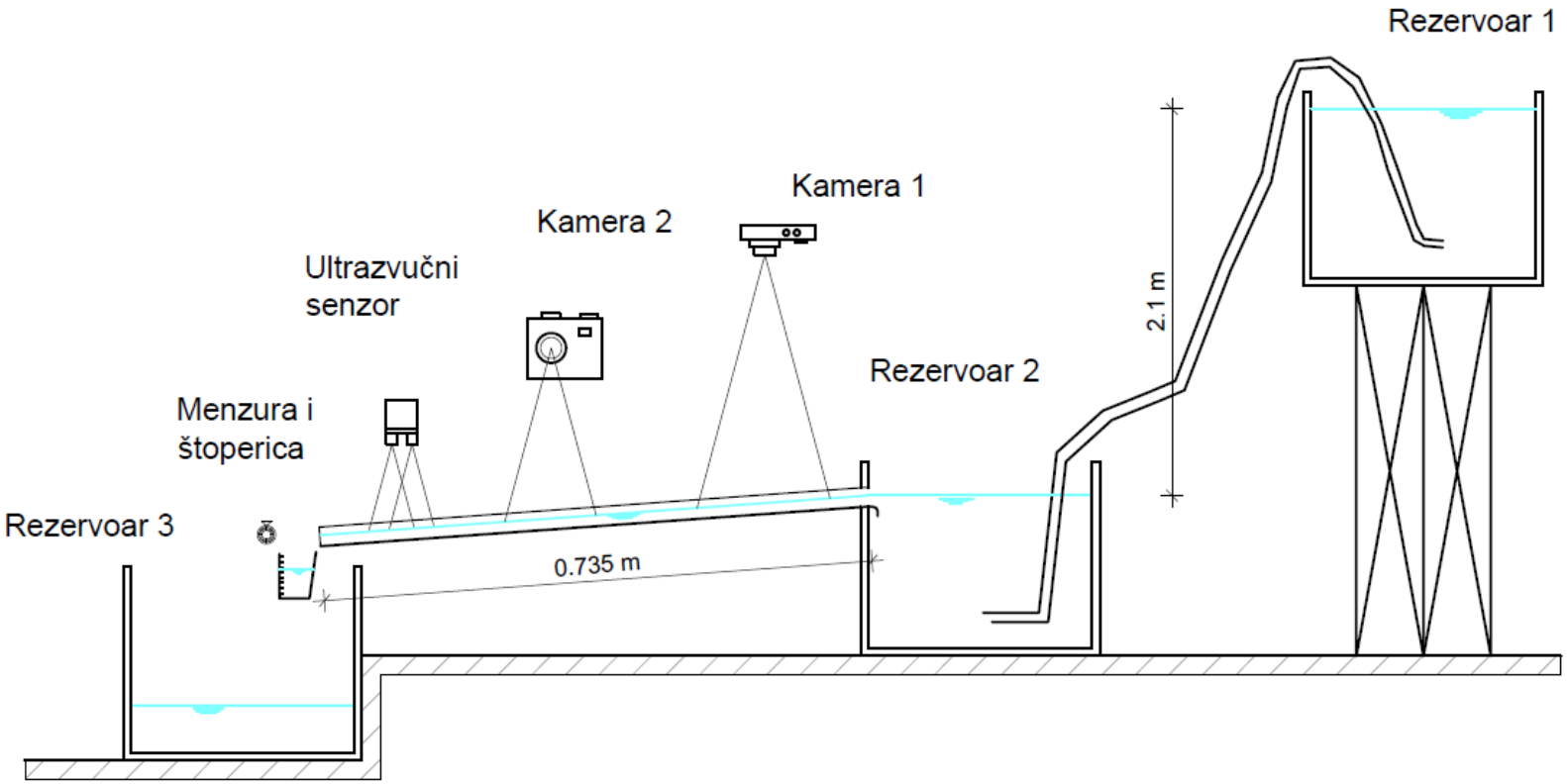


- Načini za pravljenje snimaka u LSPIV metodi
  - UAV (Unmanned Aerial Vehicle)

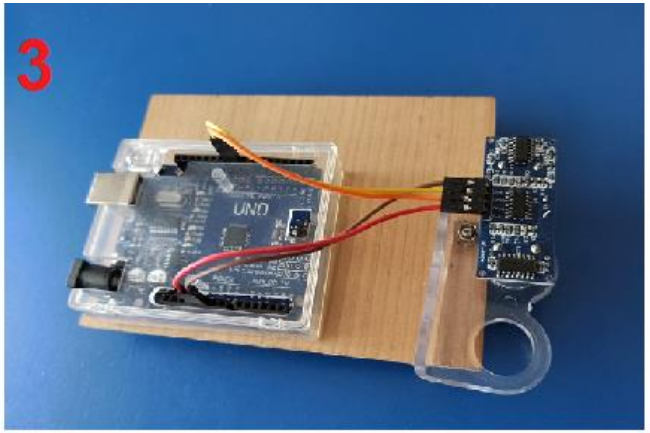


- DischargeKeeper

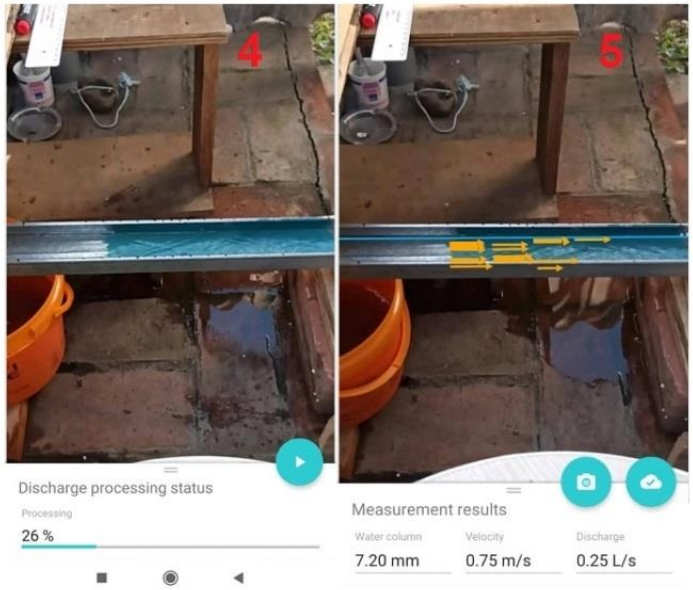
Šema instalacije



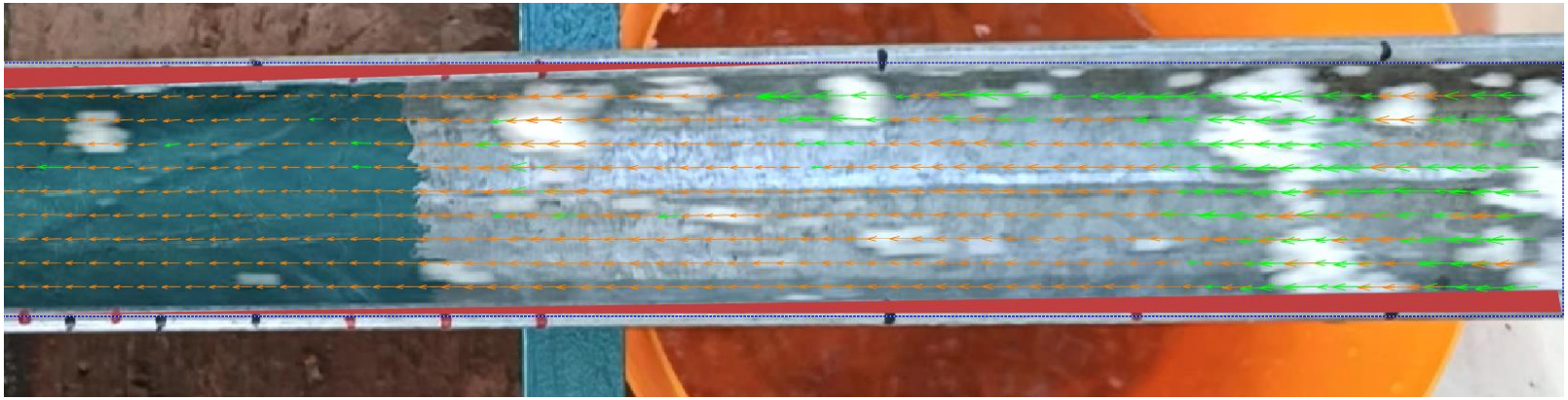
Prikaz merne opreme i položaja kamere

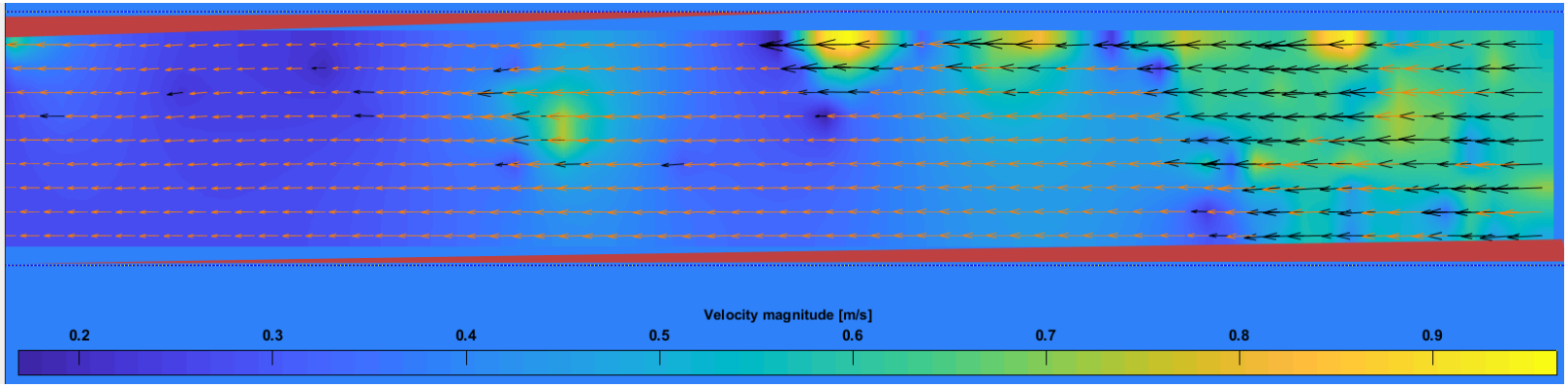


Korišćenje aplikacije DISCHARGE

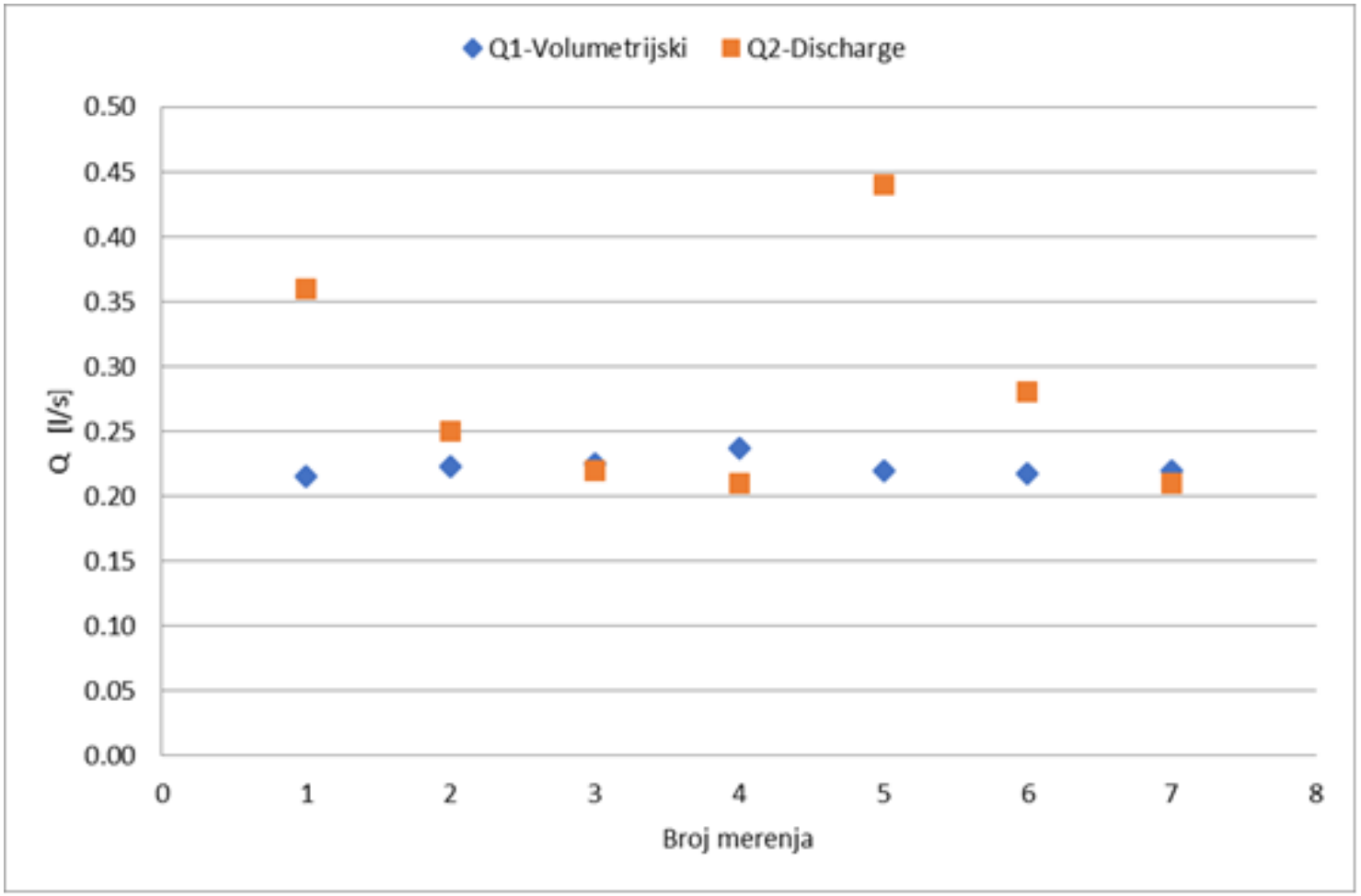


Polje brzina dobijeno programom PIVlab

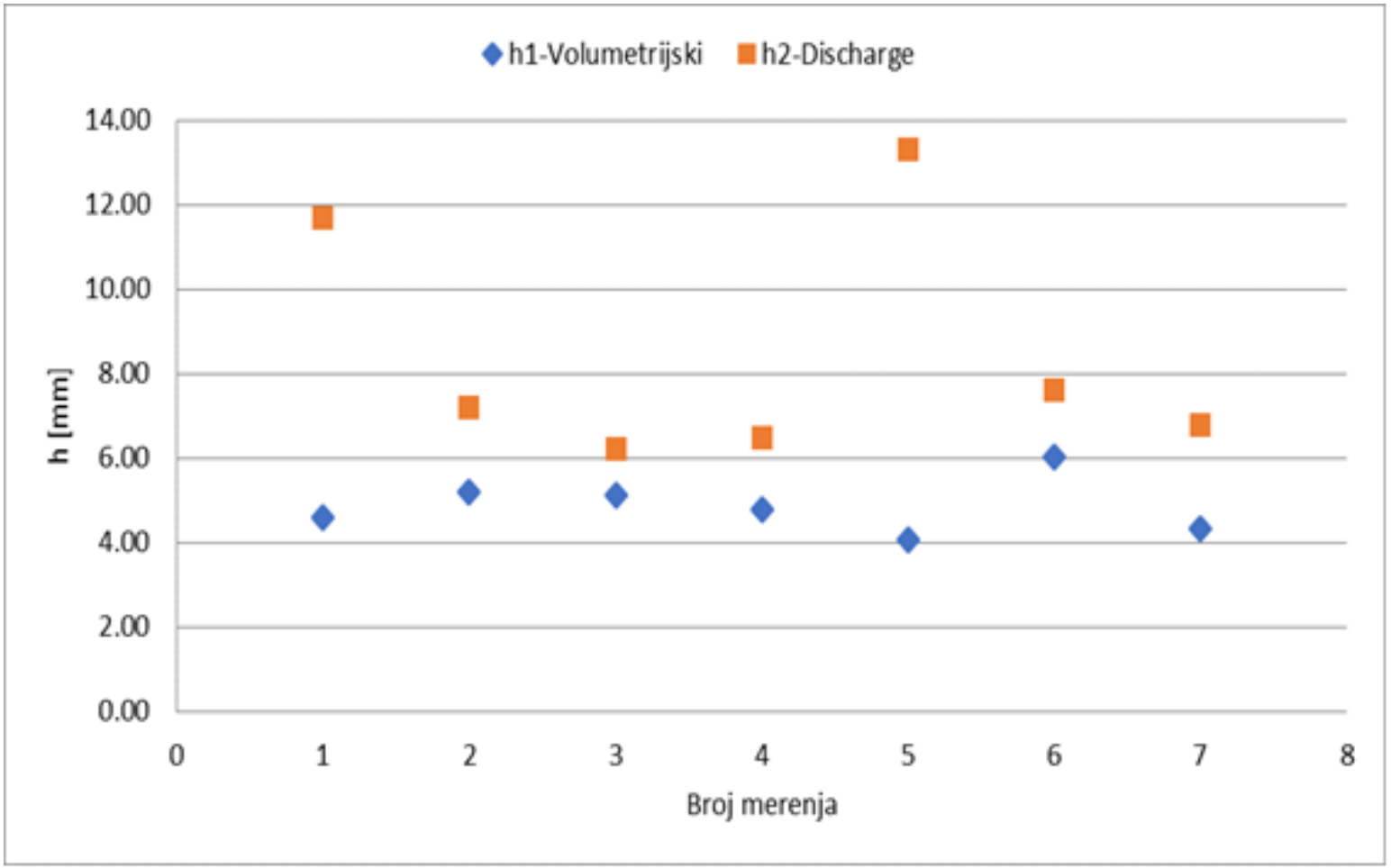




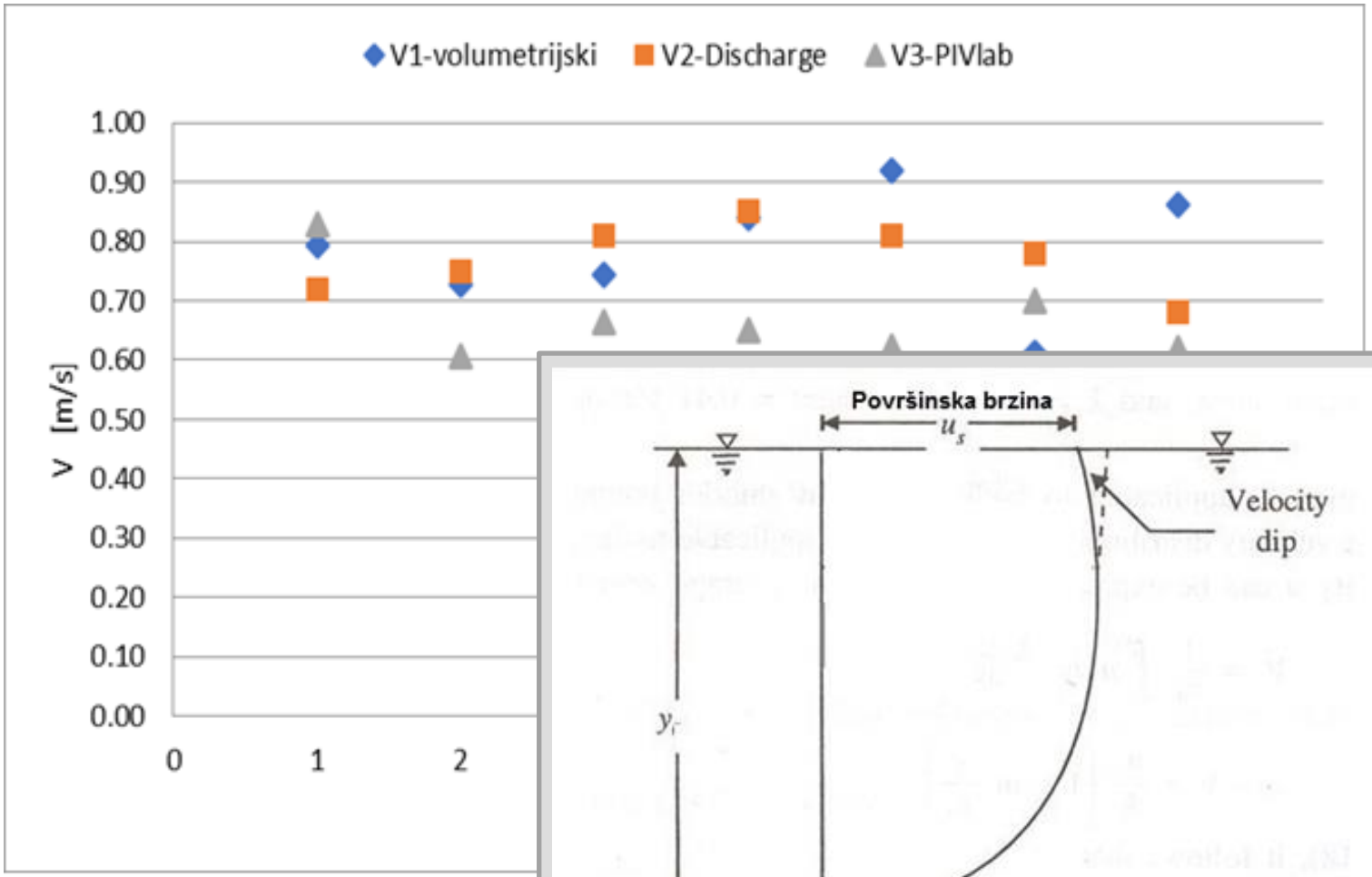
Dobijeni rezultati protoka



Dobijeni rezultati dubina



Dobijeni rezultati brzina



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HVALA NA PAŽNJI.