Daljinska detekcija: Optičke metode za procenu zdravlja useva

Bojana Ivošević

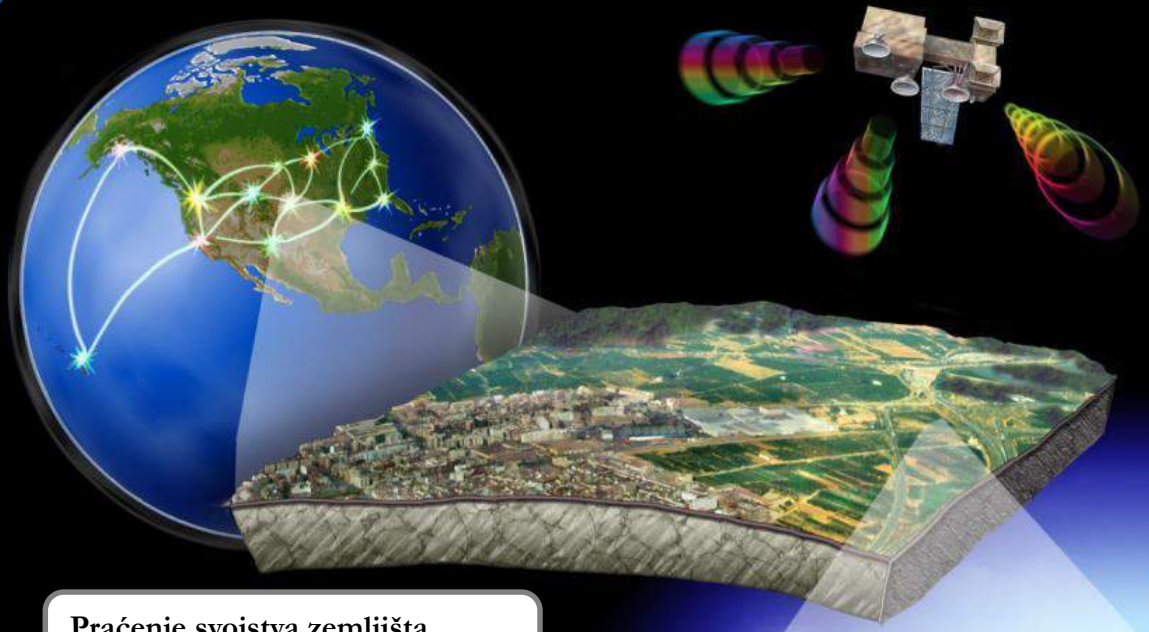
Precizna poljoprivreda

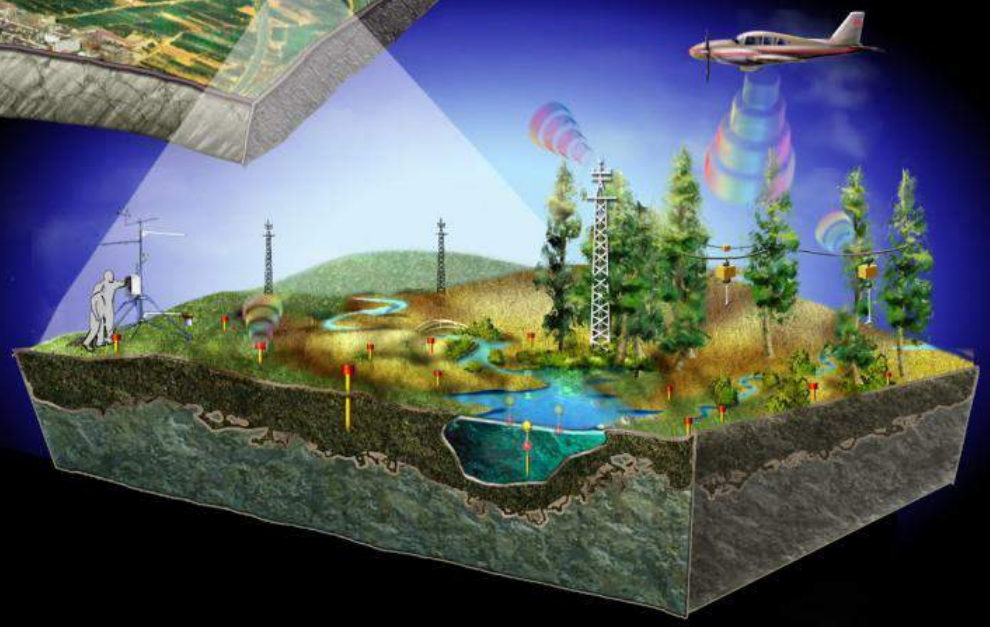
- dizajn platformi
- produkcija standardizacije za georeferenciranje i modeliranje
- ekstrakcija informacija radnog procesa

Precizna poljoprivreda

1. prikupljanje podataka
2. mapiranje varijabilnosti zemljišta
3. donošenje odluka
4. menadžment upravljanja

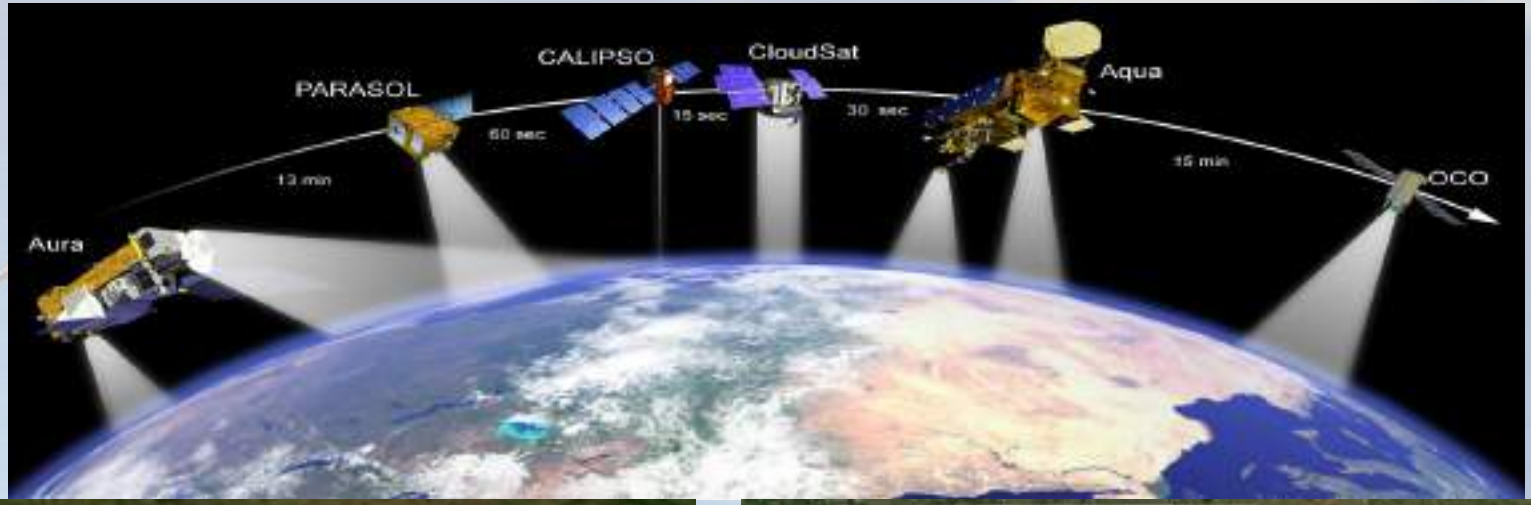
Daljinska detekcija





- Praćenje svojstva zemljišta
- Klasifikacija vrsta useva
- Medžment upravljanja štetočinama
- Detekcija stresa u biljkama
- Monitoring suzbijanja korova

Satelitski snimci



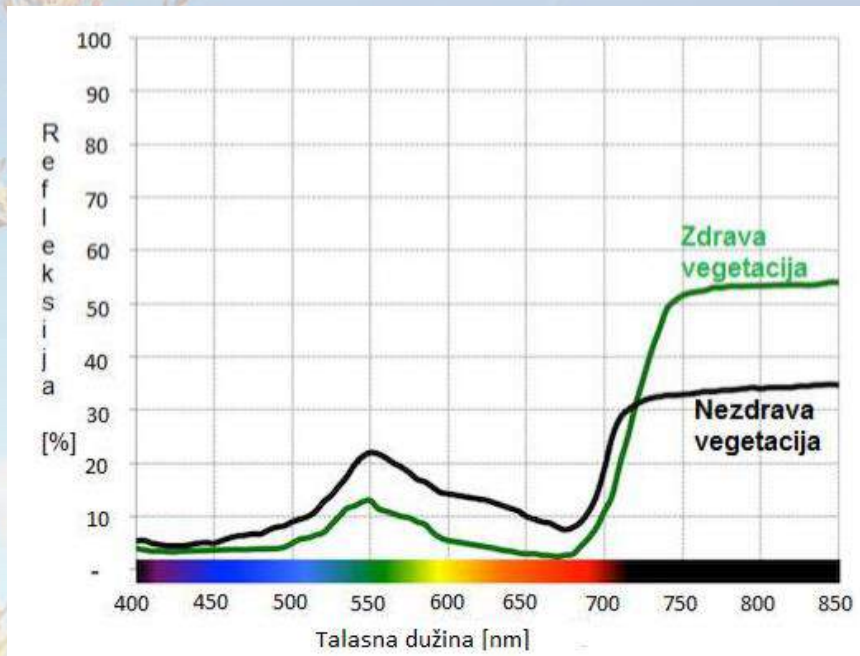
Landsat 8

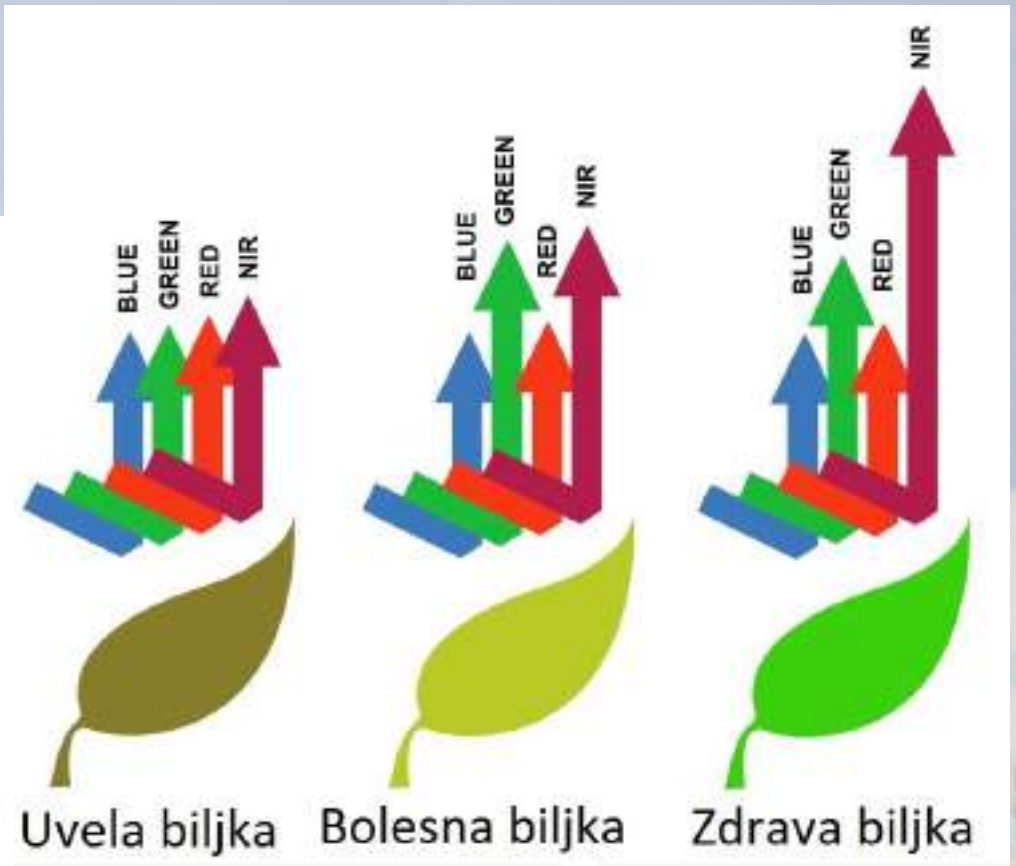
- 4 segmenta za celu Vojvodinu
- niska rezolucija (30 m)

Rapid Eye

- 85 segmenata za Vojvodinu
- visoka rezolucija (5 m)
- jedan prelet svaki dan- 5 satelita u orbiti

$$NDVI = \frac{\rho_{nir} - \rho_{red}}{\rho_{nir} + \rho_{red}}$$





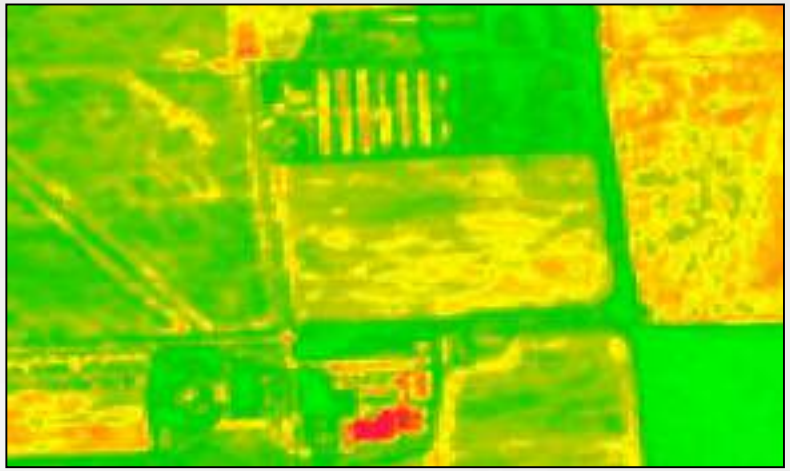
Refleksivnost elektromagnetnog zračenja

Satelitski snimci

Satelitski snimak dela Vojvodine - Sentinel 2

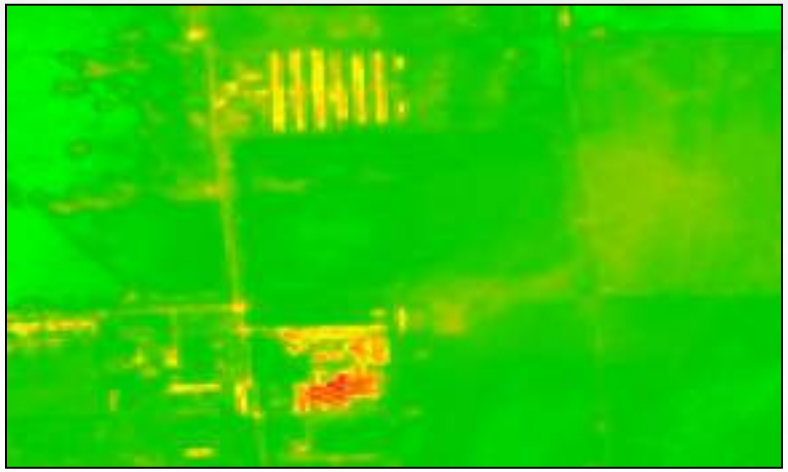
NDVI mapa – 30. Maj 2016.

Zemljište



NDVI mapa – 29. Jun 2016.

Rana faza razvoja useva



NDVI mapa – 8. Avgust 2016.

Kompletan razvoj useva

Bespilotne letelice (dronovi)

- mapiranje terena
- praćenje statusa rasta kultura
- detekcija bolesti i korova
- precizno prskanje useva

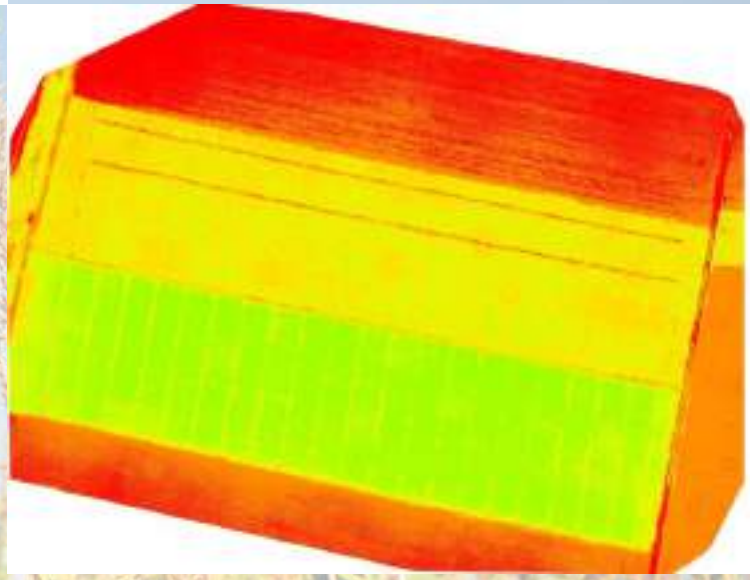
Bespilotne letelice (dronovi)

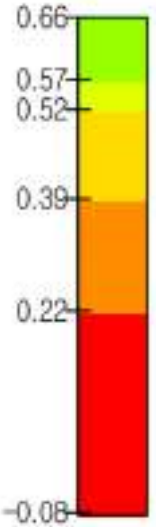
Mapa dobijena preklapanjem 69 fotografija slikanih dronom

kukuruz

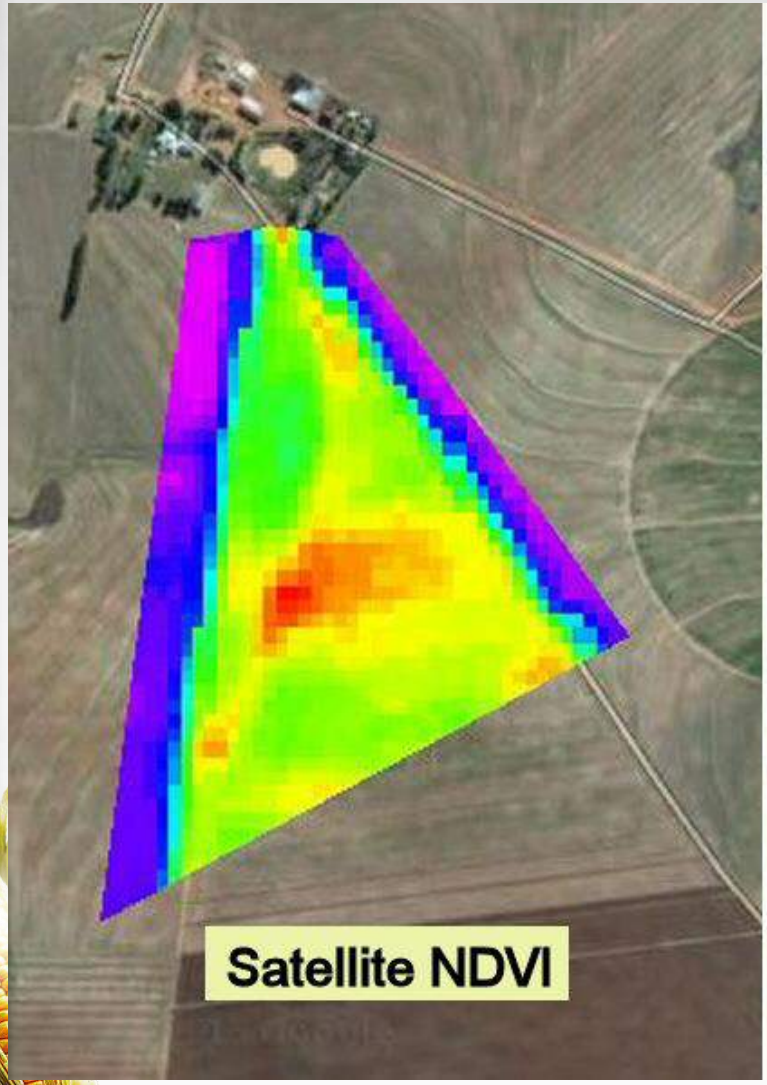
suncokret

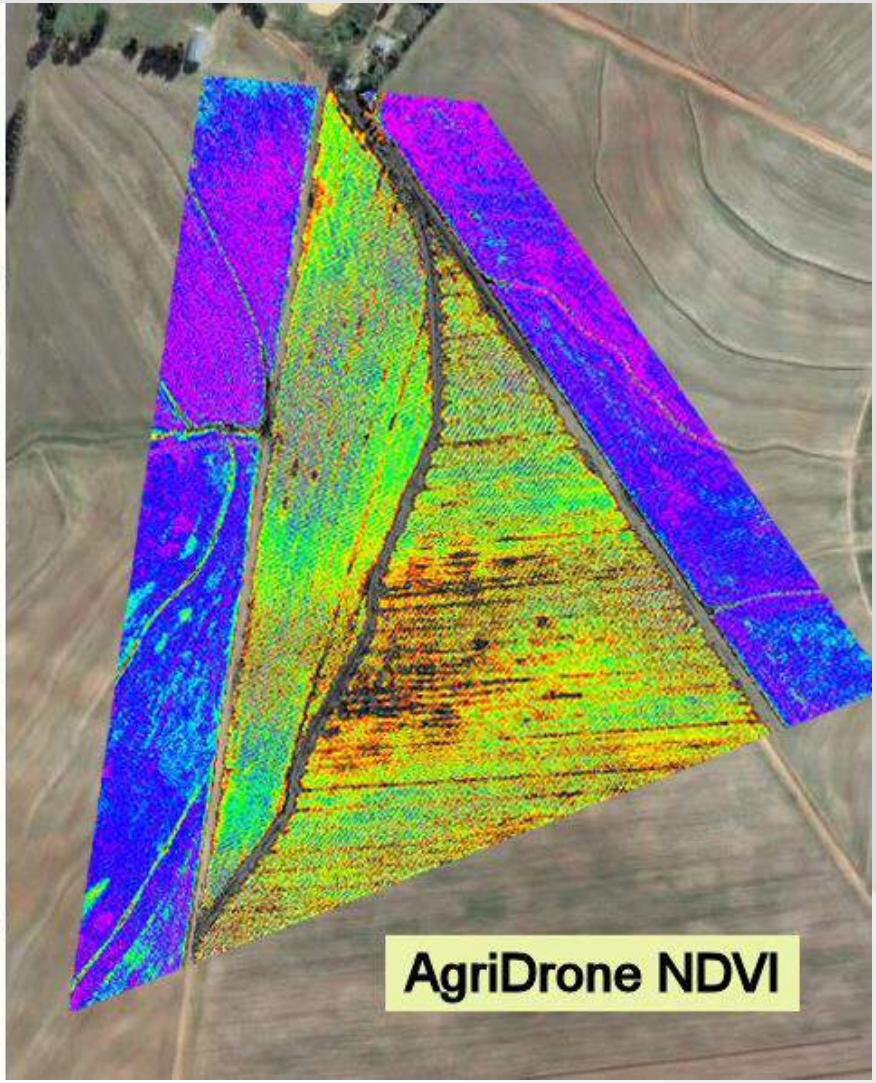
Ista parcela je slikana NDVI kamerom u c
ilju dobijanja NDVI vrednosti



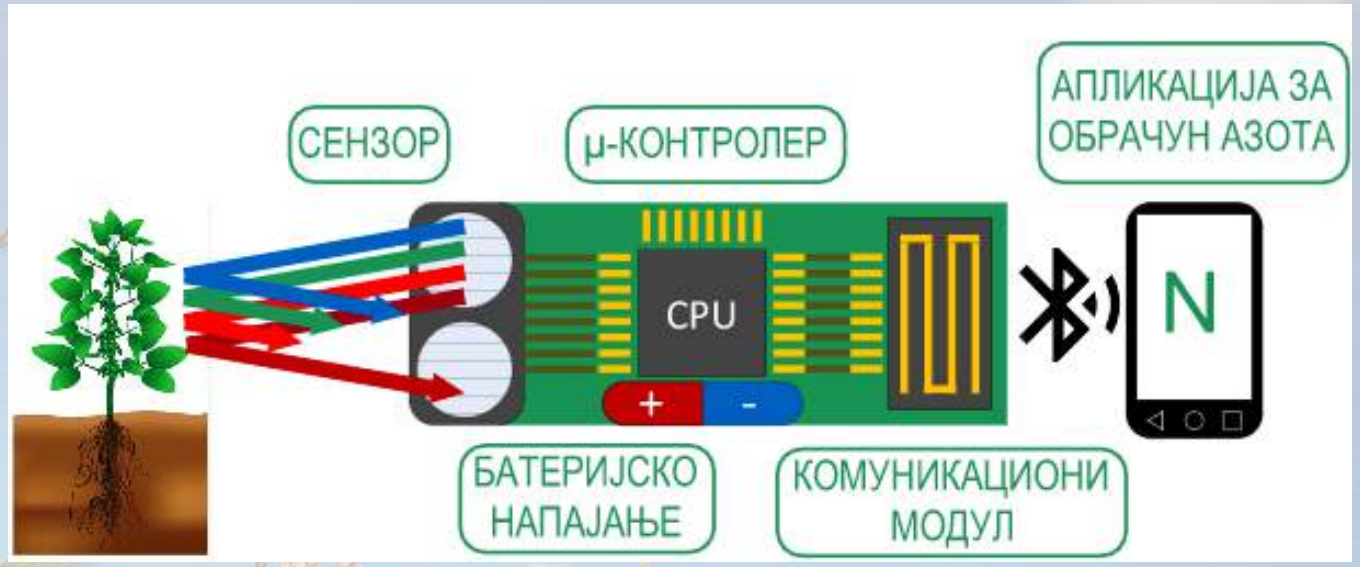


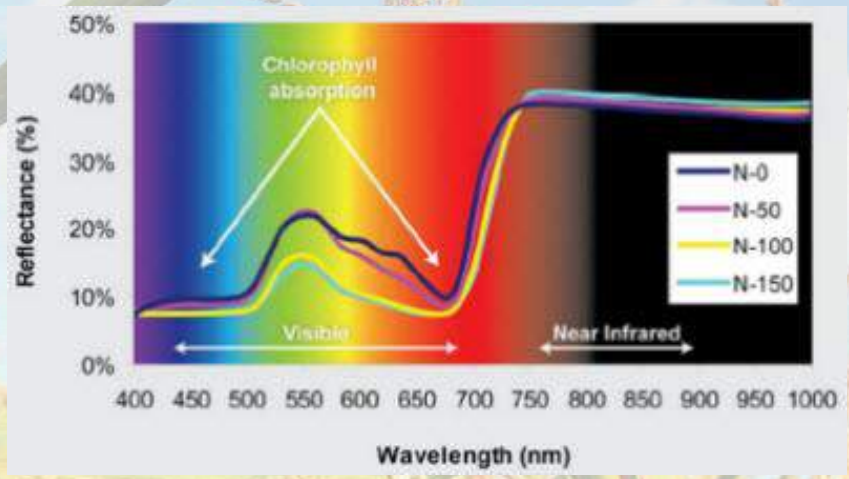
Bespilotne letelice (dronovi)

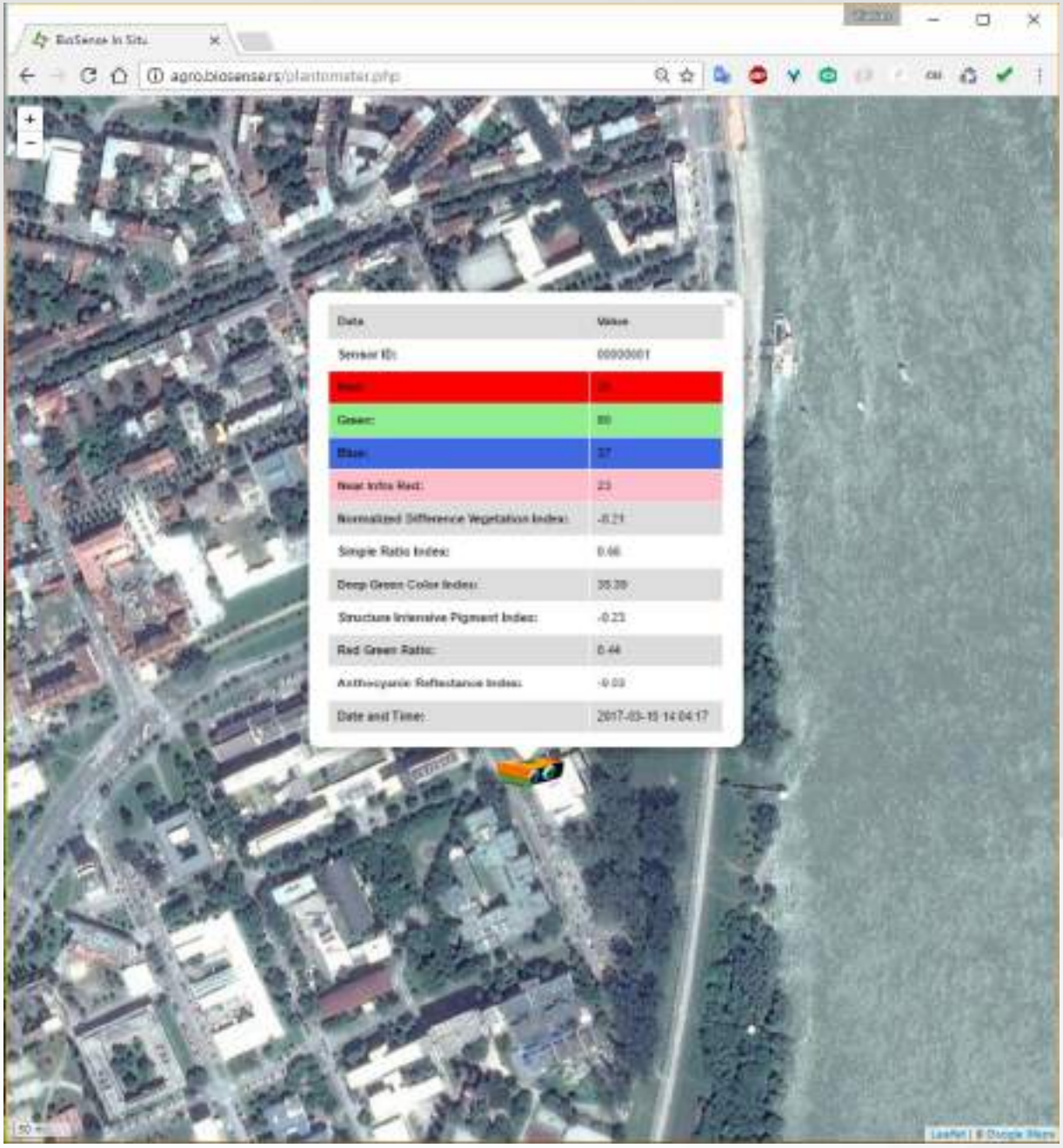




Uređaj za merenje trenutnih potreba biljke azotom






BioSense In Situ
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Value
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Green:
80
Blue:
37
Near Infra Red:
23
Normalized Difference Vegetation Index:
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Simple Ratio Index:
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Deep Green Color Index:
35.39
Structure Intensive Pigment Index:
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Red Green Ratio:
0.44
Anthocyanin Reflectance Index:
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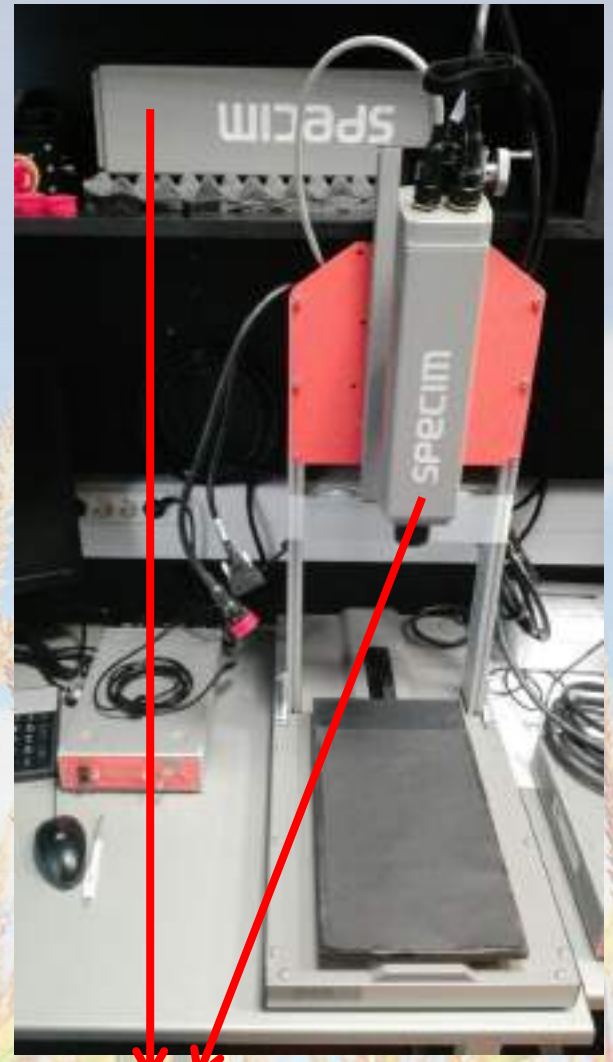
Date and Time:
2017-03-16 14:04:17

Multispektralna, hiperspektralna i termalna kamera

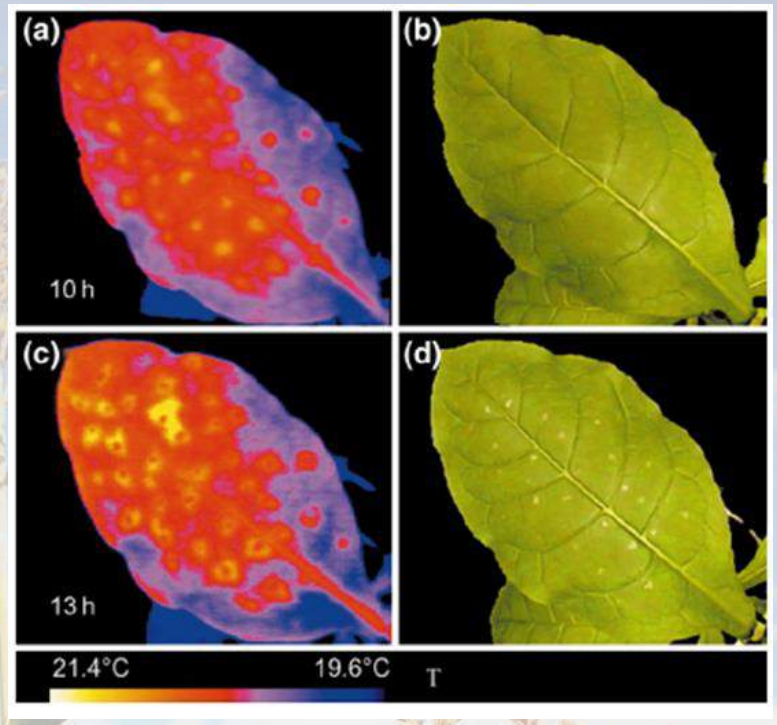
Multispektralna kamera



Hiperspektralne kamere

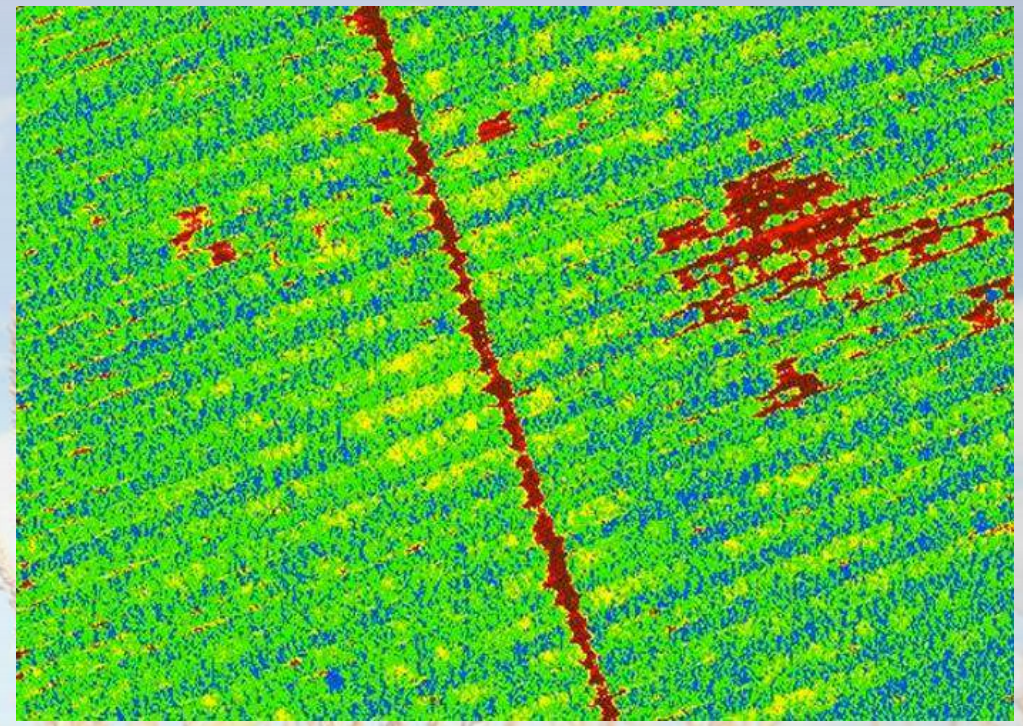
Termalne kamere

Termalna kamera



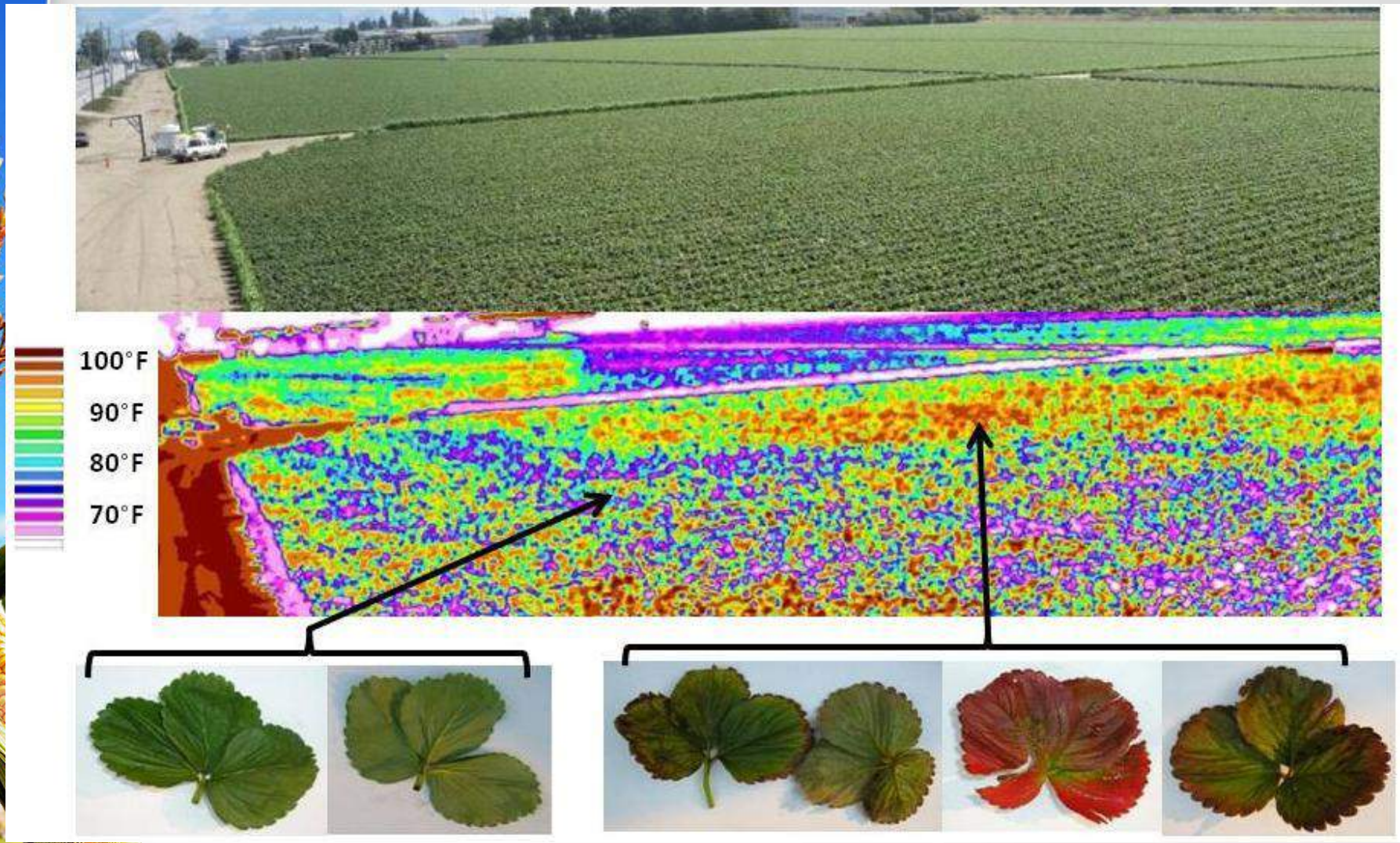
Analizom temperature listova može da se utiče na rano otkrivanje pojave virus a duvana

- Meri emitovanu energiju sa površine o bjekta (infracrveno zračenje)

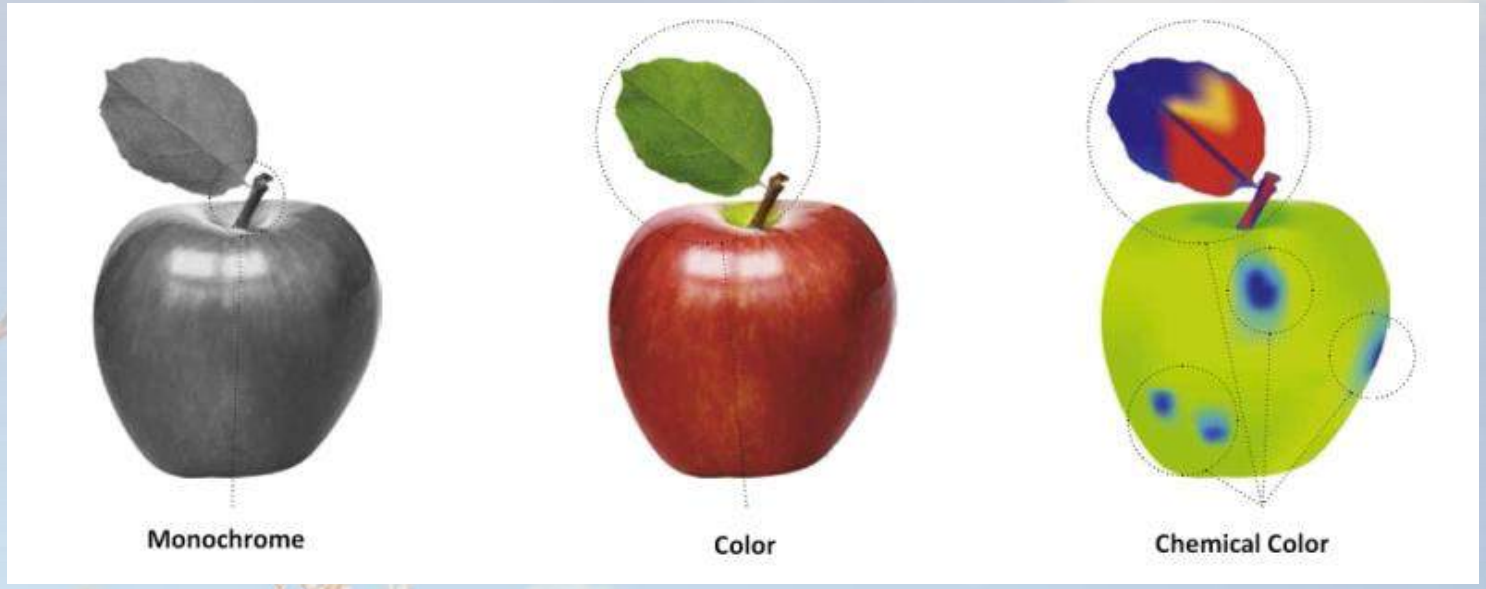


Slikano infracrvenom kamerom montiranom na bespilotnu letelicu

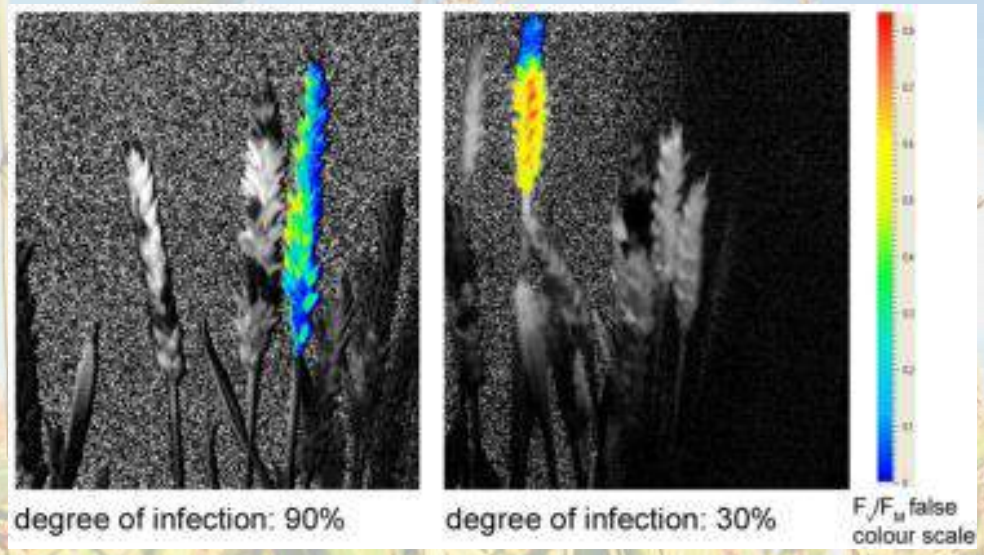
Termalna kamera



Hiperspektralna kamera



Detektovanje udaraca na jabuci



Detekcija *Fusarium* gljive na klasu pšenice

HVALA NA PAŽNJI