



**ZAVRŠNI RAD br. 1867**

# **INTEGRACIJA SENZORA NA AUTONOMNI KAJAK**

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- ♦ Sustav MOOS
- ♦ GPS uređaj
- ♦ Kompas
- ♦ Video kamera
- ♦ Prijenos video signala
- ♦ Skica sustava

- ♦ Platforma za robotska istraživanja
- ♦ Otvorenog koda, napisan u C++
- ♦ Zvezdasta topologija
- ♦ Klijent - poslužitelj
- ♦ MOOSDB i MOOSApp
- ♦ uMS

## ♦ Locosys LS20030

- USB priključak
- LED indikator
- ugrađena baterija
- greška u horizontalnom pozicioniranju ~ 3m



## ♦ NMEA poruke

- GGA, GLL, GSA, GSV, RMS, VTG
- \$GPGGA,123519,4807.038,N,01131.000,E,1,08,0.9,54  
5.4,M,46.9,M,,\*47

## ◆ MOOSNavi klijent

### ■ Obrada unutar metode Iterate()

- Latitude
- Longitude
- Indic\_EW
- Indic\_NS

```
29 bool CSimulator::Iterate() {
30     size_t longitudeStart;
31     size_t longitudeEnd;
32     size_t latitudeStart;
33     size_t latitudeEnd;
34     size_t pom;
35     string temp;
36
37     string usbData = serial.readString();
38     if (usbData.substr(0, 6) == "$GPGGA") {
39         pom = usbData.find(",");
40         temp = usbData.substr(pom + 1);
41         latitudeStart = temp.find(",") + 1;
42         temp = temp.substr(latitudeStart);
43         latitudeEnd = temp.find(",");
44         latitude = temp.substr(0, latitudeEnd);
45         temp = temp.substr(latitudeEnd + 1);
46         indic_NS = temp.substr(0, 1);
47         temp = temp.substr(2);
48         longitudeEnd = temp.find(",");
49         longitude = temp.substr(0, longitudeEnd);
50         temp = temp.substr(longitudeEnd + 1);
51         indic_EW = temp.substr(0, 1);
52     }
53     m_Comms.Notify("Latitude", latitude, 0);
54     m_Comms.Notify("Longitude", longitude, 0);
55     m_Comms.Notify("Indic_EW", indic_EW, 0);
56     m_Comms.Notify("Indic_NS", indic_NS, 0);
57     return true;
58 }
```

## ♦ OceanServer OS5000

- USB priključak
- Male dimenzije
- Mala potrošnja energije
- Radna temperatura  $-40^{\circ}\text{C} - 80^{\circ}\text{C}$
- Točnost
  - Kompas u ravnini –  $0.5^{\circ}$
  - Nagib  $\pm 30 - 1^{\circ}$
  - Nagib  $\pm 60 - 1.5^{\circ}$



## ♦ Kalibracija

- Hard iron i Soft iron
- Prvo podesiti X i Y os
- Paziti na nagibe
- Podesiti Z os
- Soft iron opcionalno

## ◆ MOOSKompas klijent

### ■ Primjer poruke:

- **\$Chhh.hPpp.pRrr.rTtt.t\*cc**

### ■ Obrada unutar metode Iterate()

- compassData

```
60 bool CSimulator::Iterate() {  
61     size_t compassStart;  
62     size_t compassEnd;  
63  
64     string usbData = serial.readString();  
65     if (usbData.substr(0,2)=="$C"){  
66         compassStart = usbData.find("$C") + 2;  
67         compassEnd = usbData.find("P");  
68         compassData=usbData.substr(compassStart, compassEnd - compassStart);  
69     }  
70     m_Comms.Notify("CompassData",compassData,0);  
71     cout << usbData << '\n';  
72     cout<<"poslano"<<std::endl;  
73     return true;  
74 }
```



- ♦ Logitech QuickCam Express
- ♦ USB priključak
- ♦ Prijenos video signala pomoću programa VLC



- ♦ Skripte:
  - Run.sh
  - Receive.sh
- ♦ IP adresa
- ♦ Vrata (5004)
- ♦ Veličina slike (640x480)



