Experiment description – INS with DMU10 Inertial Measurement Unit and GPS uBlox NEO-6P – 14th May 2016

20160514_INS_DMU10_Flight_01.mat (1538489 x 59) – three flights, without inertial data outages (original file C1.mat, GPS data RB1AA_F.pos, reference data 039782135A0_900.pos). uBlox RTK – FIX = 94,5%; FLOAT = 5,5%. Geodetic RTK – FIX = 90,2%; FLOAT = 9,8%.

20160514_INS_DMU10_Flight_02.mat (394629 x 59) – one flight, without inertial data outages (original file C4.mat, GPS data RB4AA_F.pos, reference data 039782135A2_850.pos). uBlox RTK – FIX = 58,4%; FLOAT = 41,6%. Geodetic RTK – FIX = 85,5%; FLOAT = 14,5%.

20160514_INS_DMU10_Flight_03.mat (384138 x 59) – two flights, without inertial data outages (original file C5.mat, GPS data RB5AA_F.pos, reference data 039782135A2_850.pos). uBlox RTK – FIX = 75,2%; FLOAT = 24,8%. Geodetic RTK – FIX = 85,5%; FLOAT = 14,5%. First part of flight – GPS data are delayed, because of FLOAT status.

20160514_INS_DMU10_Flight_04.mat (425167 x 59) – one flight, without inertial data outages (original file C6.mat, GPS data RB6AA_F.pos, reference data 039782135A2_850.pos). uBlox RTK – FIX = 88,9%; FLOAT = 11,1%. Geodetic RTK – FIX = 85,5%; FLOAT = 14,5%.

20160514_INS_DMU10_Flight_05.mat (204111 x 59) – one flight, without inertial data outages (original file C7.mat, GPS data RB7AA_F.pos, reference data 039782135A2_850.pos). uBlox RTK – FIX = 78,9%; FLOAT = 21,1%. Geodetic RTK – FIX = 85,5%; FLOAT = 14,5%.

sampling freq - IMU - 200 Hz
sampling freq - uBlox GPS - 5 Hz
sampling freq - Geodetical GNSS - 10 Hz – X91+ GNSS receiver (CHC)

Data structure:

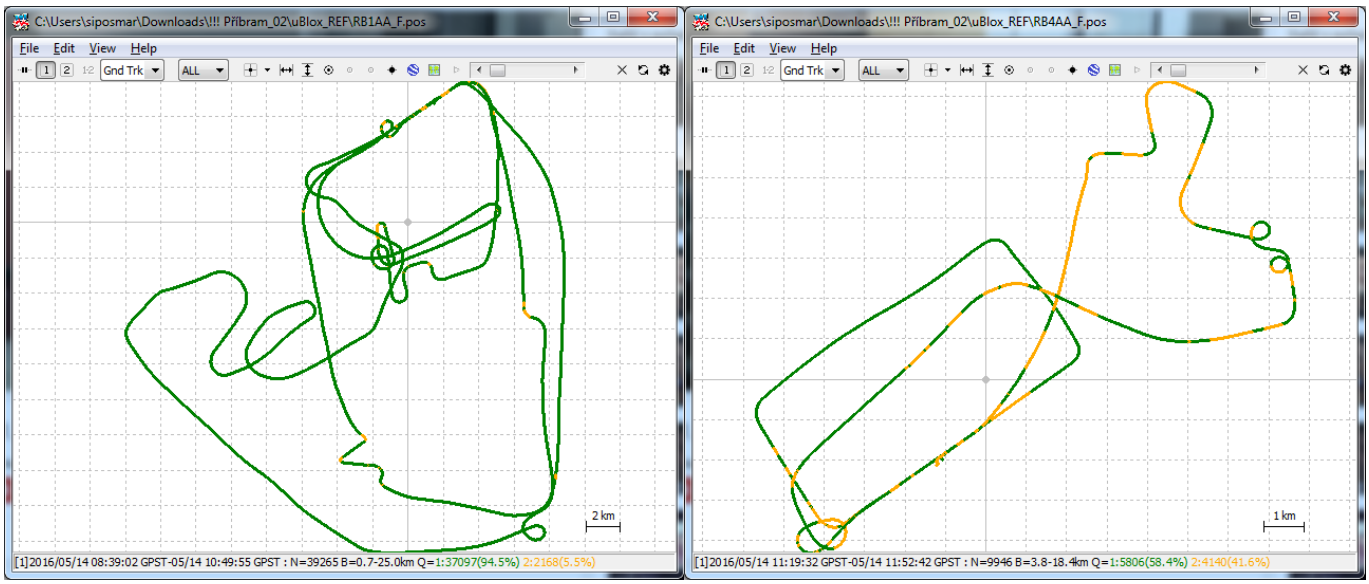
Inertial data + temperature:
01 - counter
02 - time [ms] from start of the program
03 - DMU10 acceleration X – (g) – longitudinal
04 - DMU10 delta acceleration X – (g)
05 - DMU10 acceleration Y – (g) – lateral
06 - DMU10 delta acceleration Y – (g)
07 - DMU10 acceleration Z – (g) – vertical
08 - DMU10 delta acceleration Z – (g)
09,10 - Zeros
11 - DMU10 rate X – (°/s) - longitudinal
12 - DMU10 delta rate X – (°/s)
13 - DMU10 rate Y – (°/s) – lateral
14 - DMU10 delta rate Y – (°/s)
15 - DMU10 rate Z – (°/s) – vertical
16 - DMU10 delta rate Z – (°/s)

uBlox GPS data – absolute position, based only on receiver
17 - uBlox GPS time (s)
18 - uBlox GPS fix & valid (LSB = fix, MSB = valid)
19 - uBlox GPS number of satelites (-)
20 - uBlox GPS latitude (°)
21 - uBlox GPS longitude (°)
22 - uBlox GPS altitude (m)
23 - uBlox GPS speed over ground (m/s)
24 - uBlox GPS VDOP (-)
25 - uBlox GPS HDOP (-)

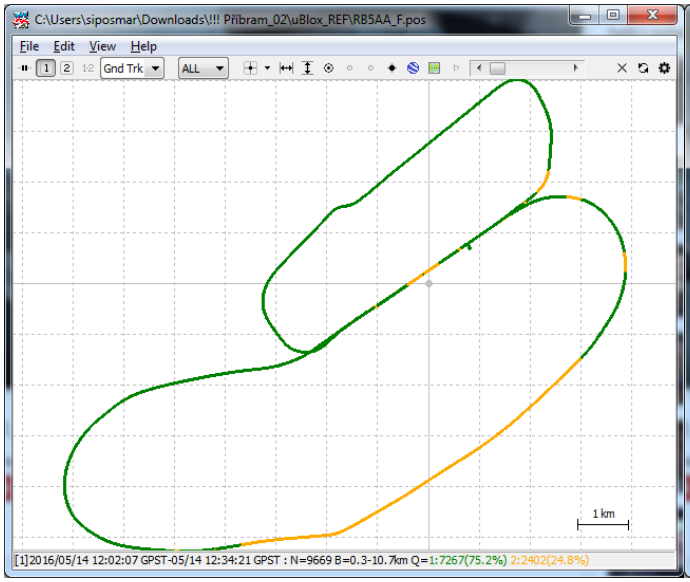
26 - uBlox GPS PDOP (-)
27 - uBlox GPS NED velocity down (m/s)
28 - uBlox GPS NED velocity north (m/s)
29 - uBlox GPS NED velocity east (m/s)
30 - uBlox GPS heading (°)
31 - uBlox GPS date (may be wrong by one day because of SD parser error) (-)

uBlox NEO-6P GPS receiver – (uBlox NEO-6P receiver 2 Base station Pribram)
32 - uBlox RTK GPS time (s)
33 - uBlox RTK GPS latitude (°)
34 - uBlox RTK GPS longitude (°)
35 - uBlox RTK GPS altitude (m)
36 - uBlox RTK GPS fix & valid (5 = single, 2 = float, 1 = fix)
37 - uBlox RTK GPS number of satelites (-)
38 - uBlox RTK standard deviation - north (m)
39 - uBlox RTK standard deviation - east (m)
40 - uBlox RTK standard deviation - up (m)
41 - uBlox RTK standard deviation – north-east (m)
42 - uBlox RTK standard deviation – east-up (m)
43 - uBlox RTK standard deviation – up-north (m)
44 - uBlox RTK age (s)
45 - uBlox RTK ratio (-)

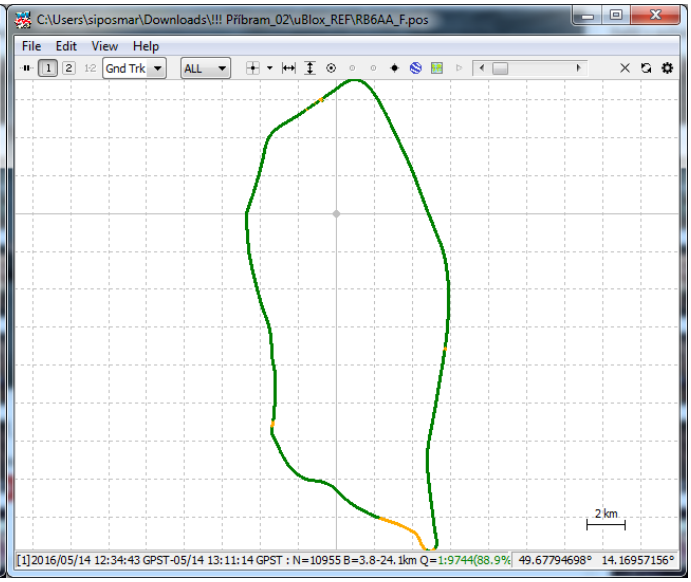
Geodetic X91+ GNSS receiver – Results based on RTKLIB (Geodetic receiver 2 Base station Pribram)
46 - Reference RTK GPS time (s)
47 - Reference RTK GPS latitude (°)
48 - Reference RTK GPS longitude (°)
49 - Reference RTK GPS altitude (m)
50 - Reference RTK GPS fix & valid (5 = single, 2 = float, 1 = fix)
51 - Reference RTK GPS number of satelites (-)
52 - Reference RTK standard deviation - north (m)
53 - Reference RTK standard deviation - east (m)
54 - Reference RTK standard deviation - up (m)
55 - Reference RTK standard deviation - north-east (m)
56 - Reference RTK standard deviation - east-up (m)
57 - Reference RTK standard deviation - up-north (m)
58 - Reference RTK age (s)
59 - Reference RTK ratio (-)



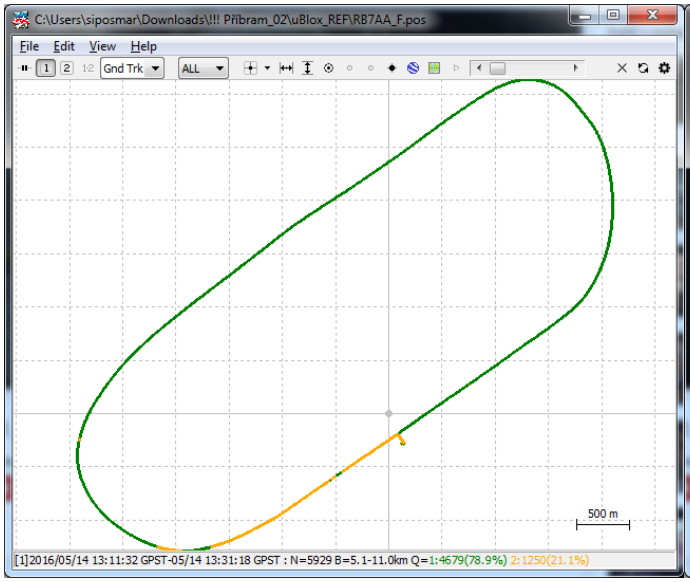
RTK – uBlox NEO-6P – Flight 1 – RB1AA_F.pos



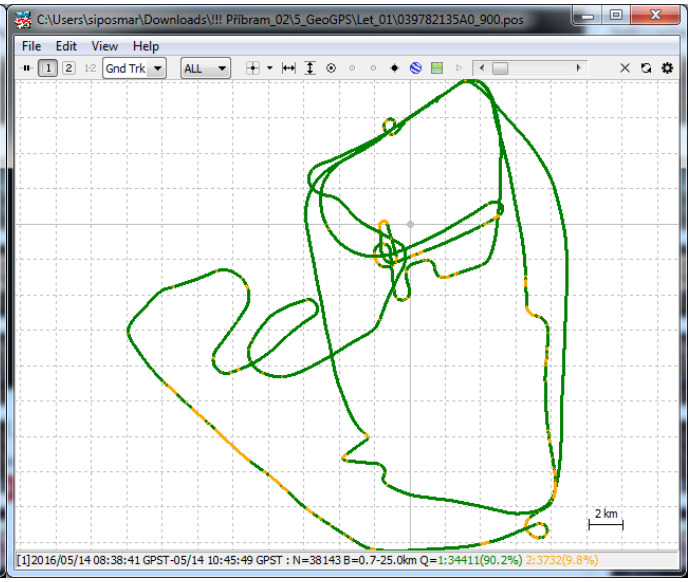
RTK – uBlox NEO-6P – Flight 2 – RB4AA_F.pos



RTK – uBlox NEO-6P – Flight 3 – RB5AA_F.pos

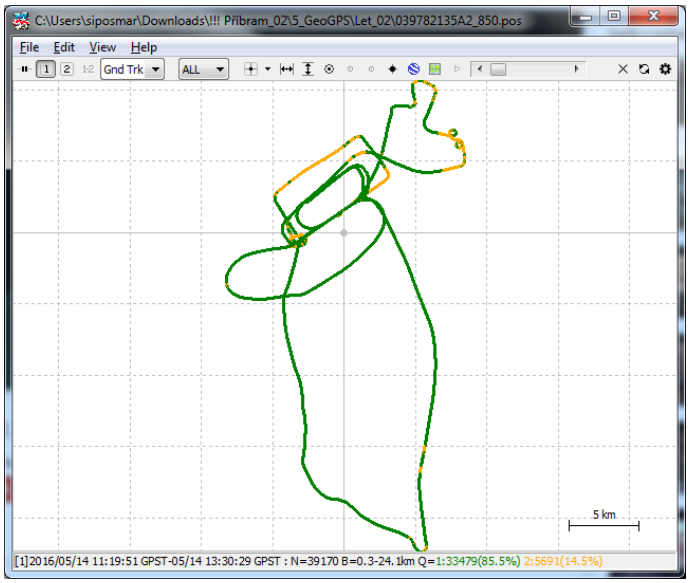


RTK – uBlox NEO-6P – Flight 4 – RB6AA_F.pos



RTK – uBlox NEO-6P – Flight 5 – RB7AA_F.pos

RTK – Geodetic X91 – Flight 1 – 039782135A0_900.pos



RTK – Geodetic X91 – Flights 2-5 – 039782135A2_850.pos