



MOUNTAIN RESCUE SERVICE
AVALANCHE PREVENTION CENTER

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Avalanche transceivers test 2015



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AIMS

- Present the results obtained during the avalanche transceiver test in Zelené pleso (Vysoké Tatry, Slovakia)
- Test objectives:
 - Verify the transceivers range gained in real conditions
 - Test the functionality of beacons
 - Comparison of the results from TEST 2011



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TEST 2015

- Test participants:
 - Mountain Rescue Service (HZS), Slovakia
 - Mountain Rescue Service (HS ČR), Czech republic
 - UIAGM (Slovakia)
 - Jagiellonian University in Cracow (Poland)
 - Avalanche Prevention Centre (Slovakia)
- 10 testers
- 40 beacons – 8 types from 5 manufacturers
- Randomly 3 from 5 beacons of each type
- 360 measurements + 28 km



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TESTED BEACONS

TEST 2011

- Arva 3 Axes
- Arva Evo 3
- bca Tracker 2
- bca Tracker DTS
- Mammut Barryvox Pulse
- Mammut Barryvox VS 68
- Mammut Barryvox VSOpto 3000
- Ortovox 3+
- Ortovox F1
- Ortovox Patroller
- Ortovox S1
- Pieps DSP v 5.0
- Pieps DSP v 6.2
- Pieps Freeride

TEST 2015

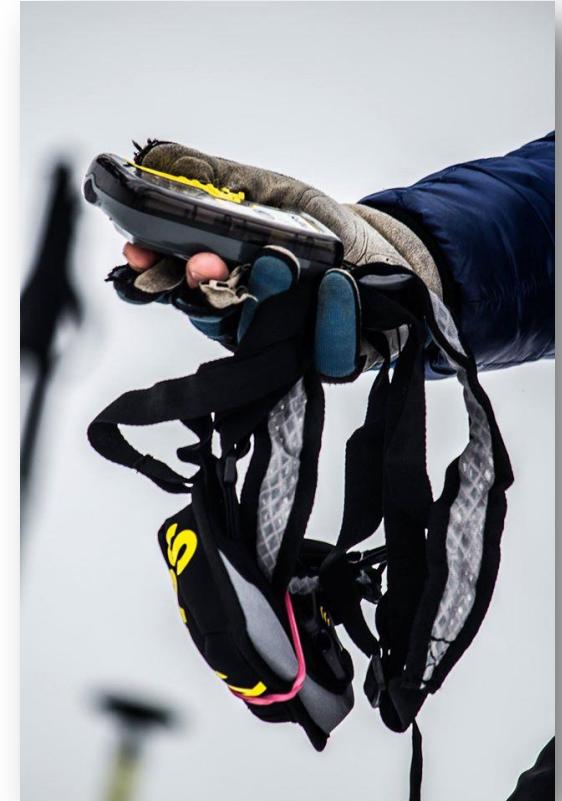
- Arva Neo
- bca Tracker 3
- Mammut Pulse
- Ortovox 3+
- Ortovox S1+
- Ortovox ZOOM+
- Pieps DSP PRO
- Pieps DSP SPORT



METHODOLOGY

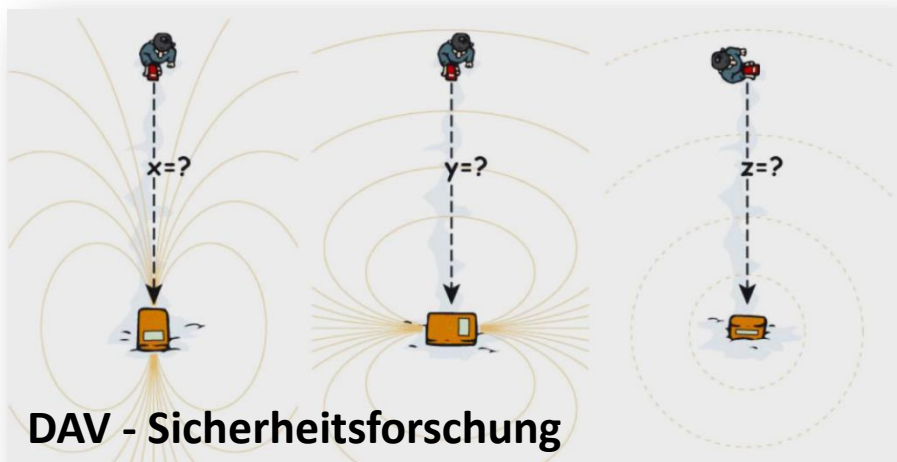
DAV - Sicherheitsforschung:

- Range - first signal search
- Direction - coarse search
- Accuracy - fine search
- Multiple burials - direct search



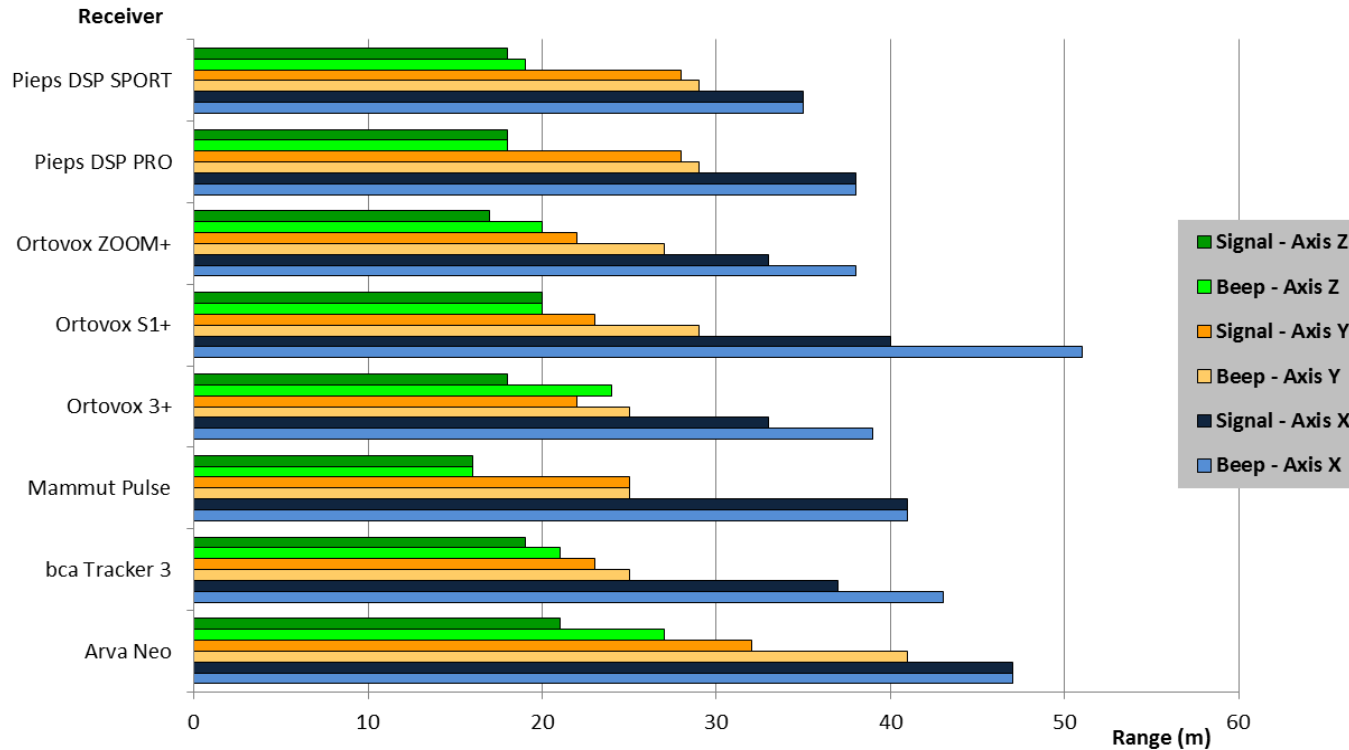
RANGE TEST

- From no signal to receiving the first signal
- Position of transmitting antenna in 3 axes (X, Y, Z and Ortovox Smart antenna) for each (5) transmitting beacons.



RANGE TEST

Transmitter - Pieps DSP PRO



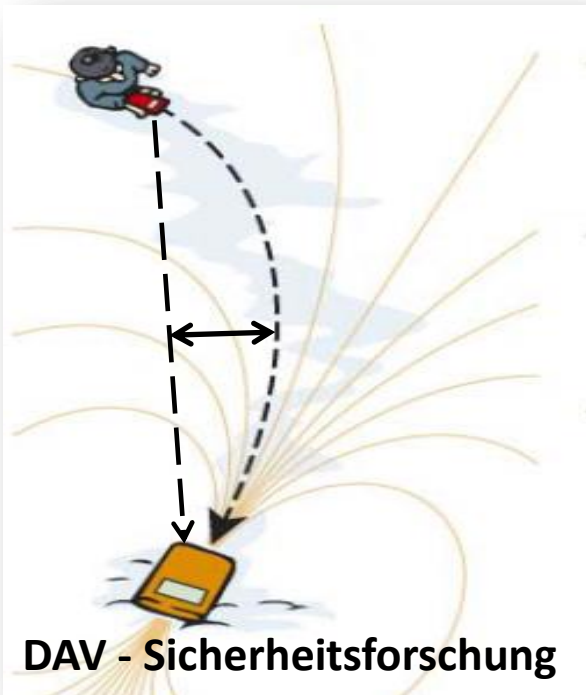
RANGE TEST

| Beacon | Axis X (%) | Axis Y (%) | Axis Z (%) | Average (%) |
|-----------------|------------|------------|------------|-------------|
| Arva Neo | 30 | 73 | 140 | 81 |
| bca Tracker 3 | 66 | 70 | 216 | 117 |
| Mammut Pulse | 42 | 79 | 137 | 86 |
| Ortovox 3+ | 29 | 52 | 125 | 69 |
| Ortovox S1+ | 27 | 77 | 134 | 79 |
| Ortovox ZOOM+ | 37 | 64 | 115 | 72 |
| Pieps DSP PRO | 33 | 76 | 126 | 78 |
| Pieps DSP SPORT | 30 | 79 | 140 | 83 |
| TOTAL | | | | 83 |



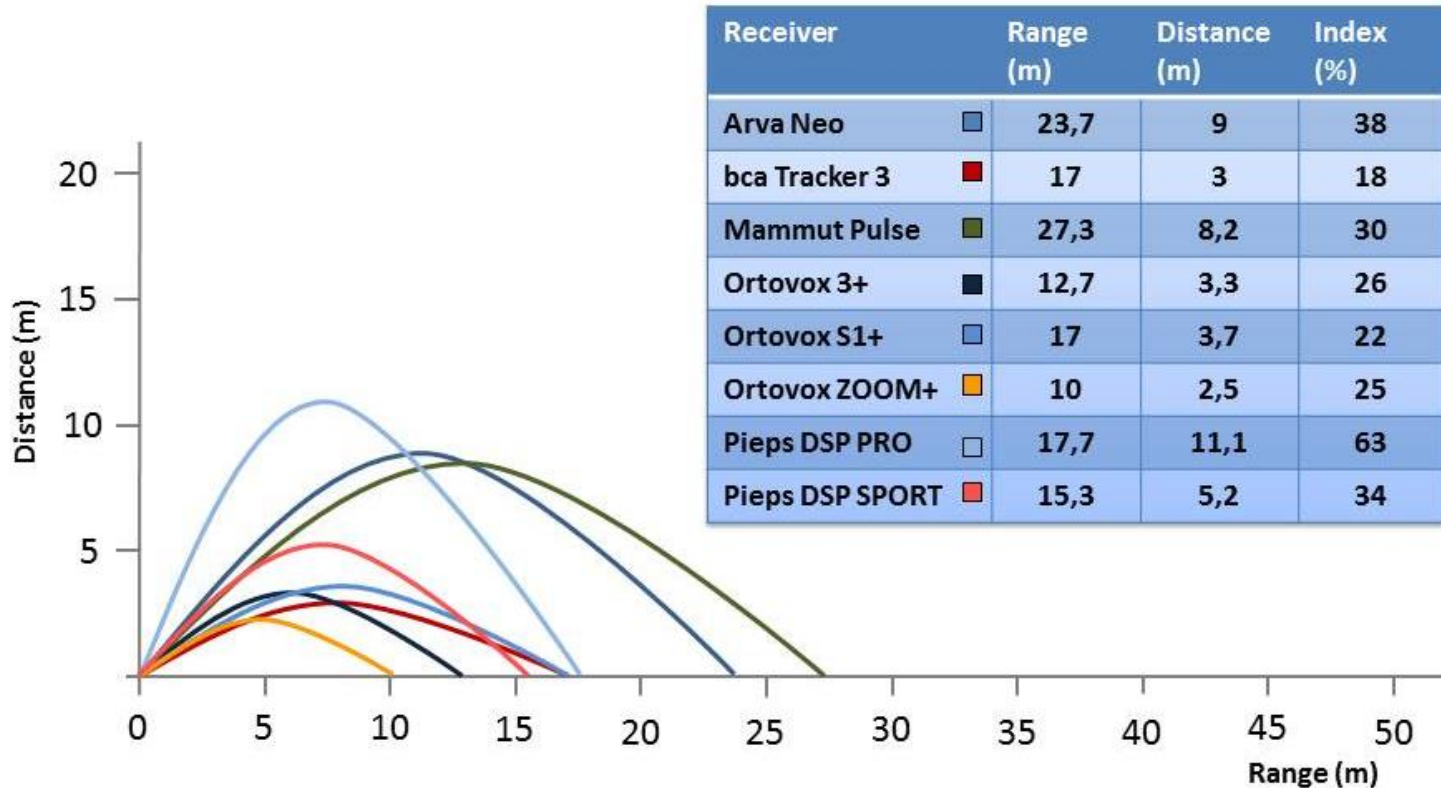
DIRECTION TEST

- Stable signal to immediate vicinity of search target



DIRECTION TEST

Transmitter – Pieps DSP - Axis Z



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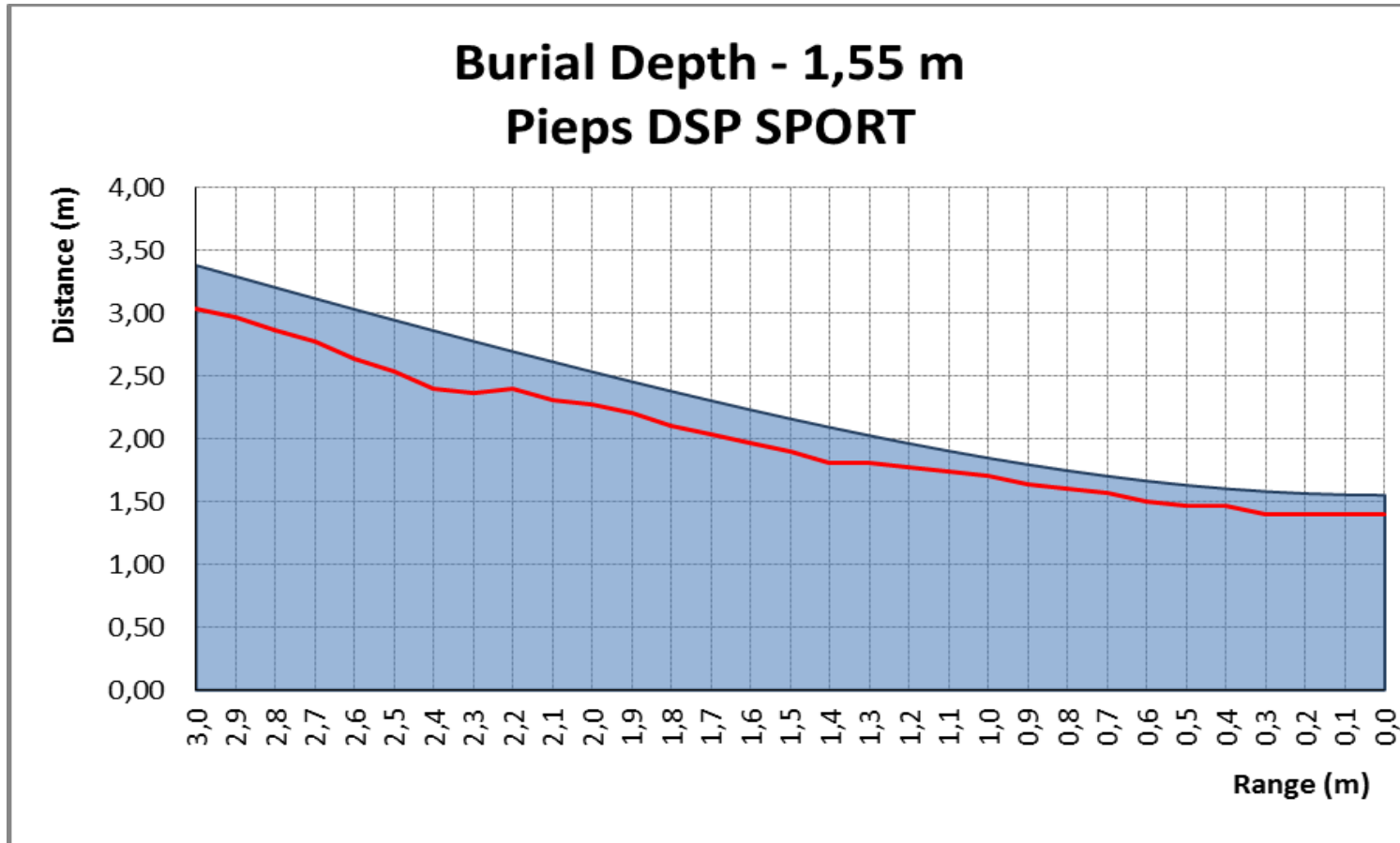
DIRECTION TEST

Results:

- If the transmitter antenna in Z axis – this means most unfavourable position of all (for the victim and for the rescuer)
- **Time of search increase**
- **Distance is longer**
- Test 2011 vs. 2015 - without improvement

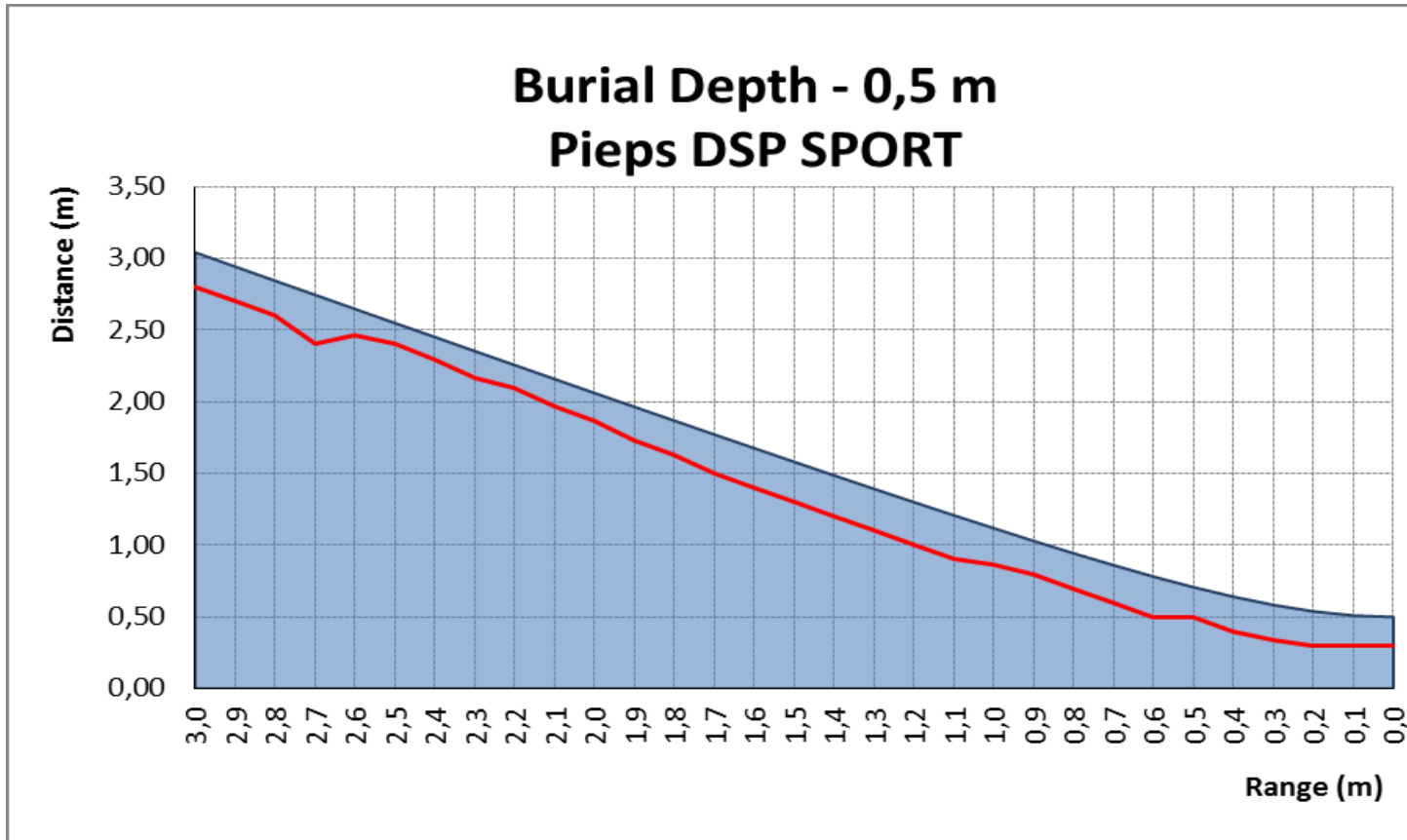


ACCURACY TEST



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ACCURACY TEST



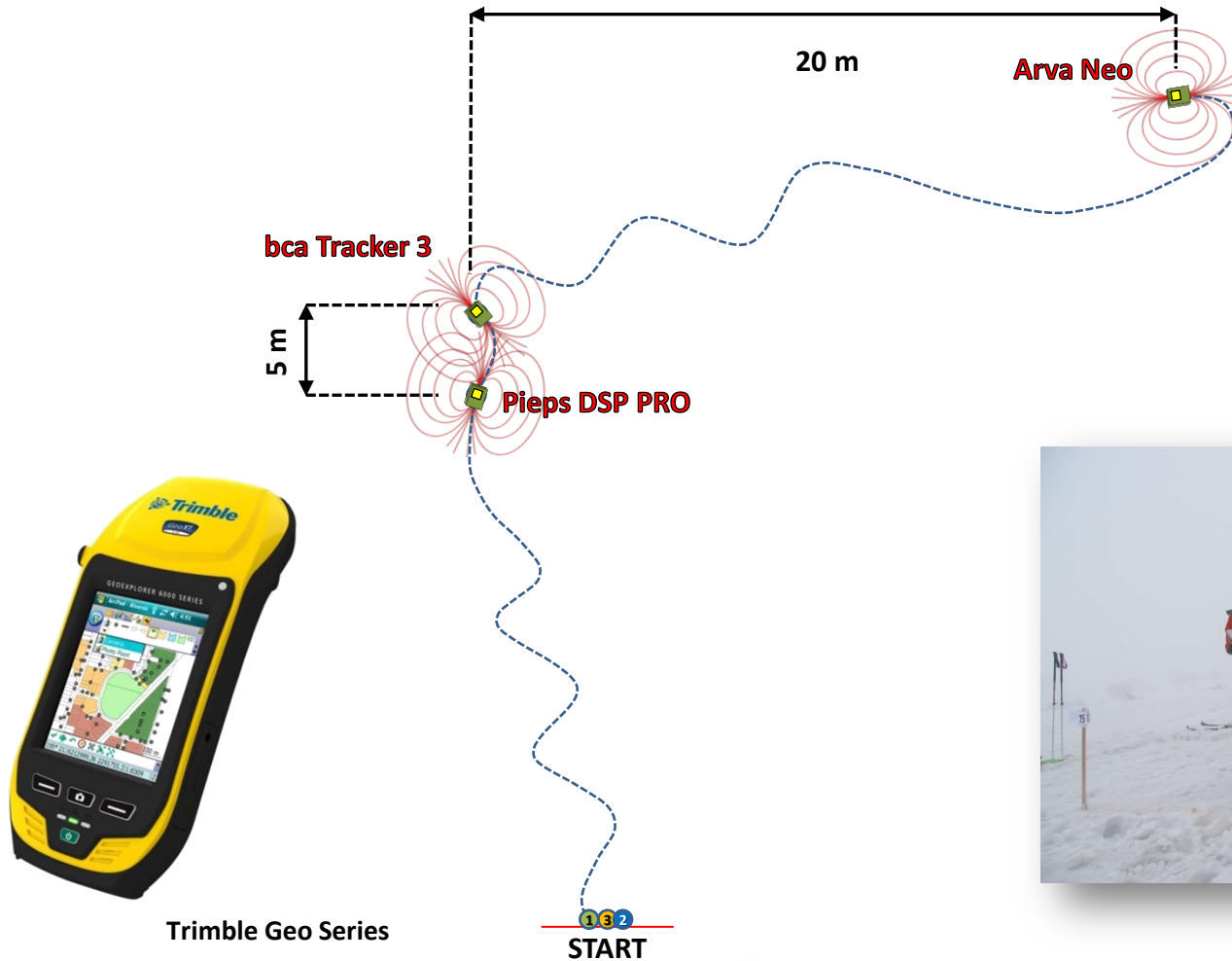
ACCURACY TEST

Results:

- Simply, most of the beacons has displayed shorter distance than real one, approximately 10 – 20 %.
- Keep this fact in mind when probing!



MULTIPLE BURIAL TEST (GPS measurement)

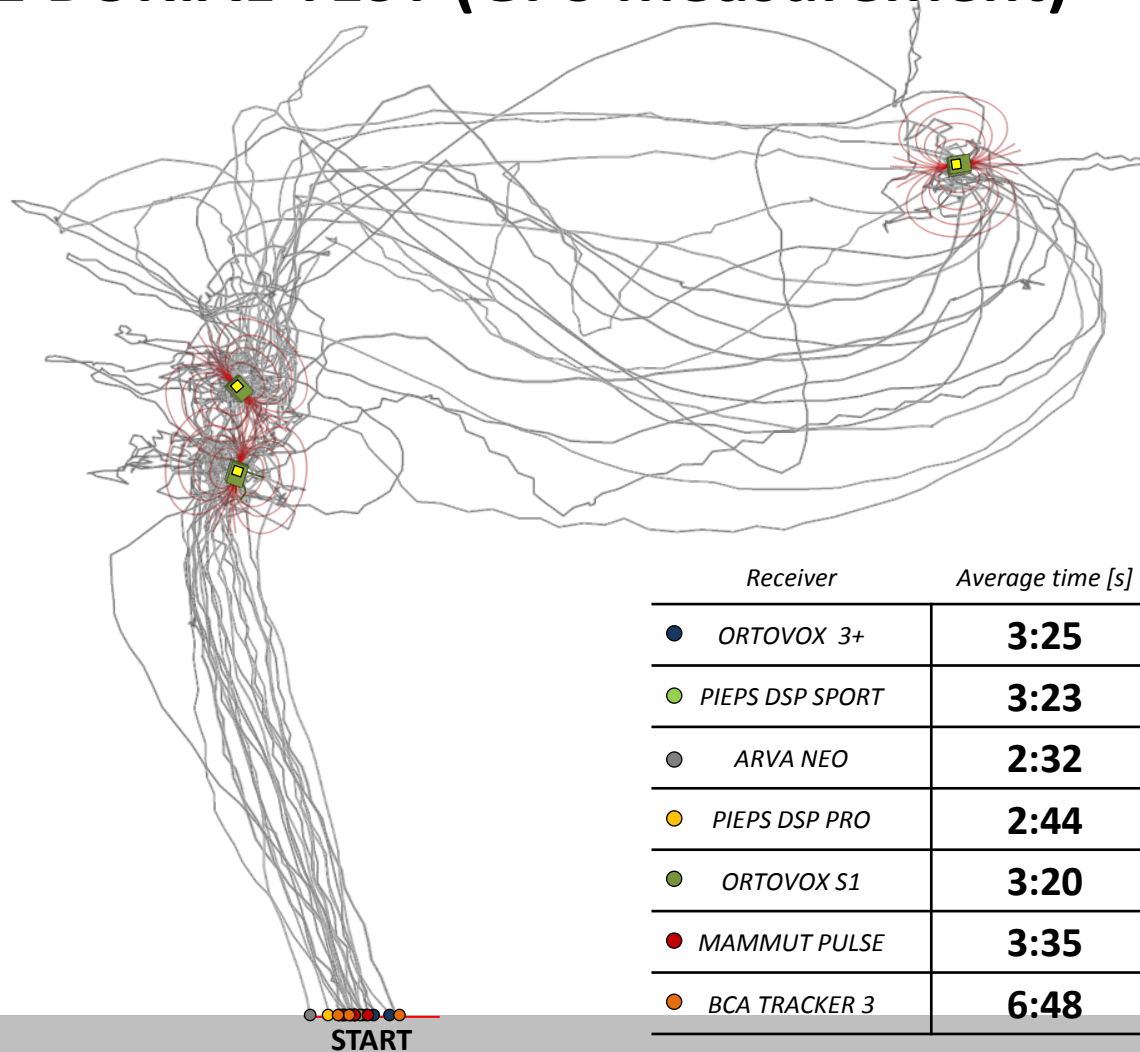


Trimble Geo Series



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MULTIPLE BURIAL TEST (GPS measurement)



| Receiver | Average time [s] | Average Distance [m] |
|-------------------|------------------|----------------------|
| ● ORTOVOX 3+ | 3:25 | 90 |
| ● PIEPS DSP SPORT | 3:23 | 91 |
| ● ARVA NEO | 2:32 | 91 |
| ● PIEPS DSP PRO | 2:44 | 94 |
| ● ORTOVOX S1 | 3:20 | 106 |
| ● MAMMUT PULSE | 3:35 | 113 |
| ● BCA TRACKER 3 | 6:48 | 151 |

MULTIPLE BURIAL TEST (GPS measurement)

Results:

- All beacons have found all 3 buried beacons except bca Tracker 3. Marking function has been improved!
- This result is a major improvement regarding results of 2011 testing!
- bca Tracker 3 is able to mark only once at a time!



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CONCLUSIONS

RANGE TEST

- Improvement only in Y axis
- Differences between real distance and displayed one is bigger then in 2011 Test
- **Width of search strip is misleading according to manuals**

DIRECTION TEST

- Unfavourable position Z axis without change

ACCURACY TEST

- Without major changes

MULTIBURIAL TEST

- Over all improvement, all buried beacons detected. Different marking function manufacturer approach causes time delay (bca)





Know your beacon and read the manual!



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