The red button project:
A GPS Iridium tracking system applied in real field conditions

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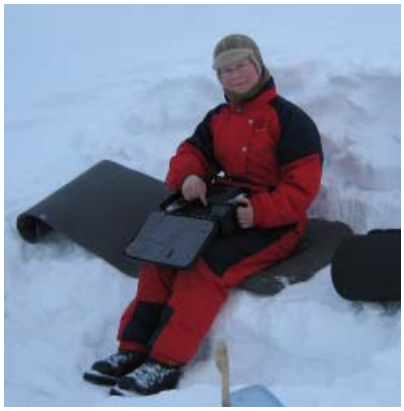
Abstract

The GPS Iridium tracking system was tested during an eight days ski trip in April 2006. A GPS, an Iridium satellite phone and the micro controller were set up in a hardcover suitcase to be portable in a hiking backpack.

Experimental setup:

1. Garmin E-Trex GPS, powered by two type AA batteries.
2. Iridium handheld telephone with external antenna, mounted in the hardcover suitcase and power supply by rechargeable battery pack.
3. Micro controller together with status display and the red “send” button in a single housing, powered by 9V block battery.
4. Additional 12V lead battery was used to recharge the phone battery pack.

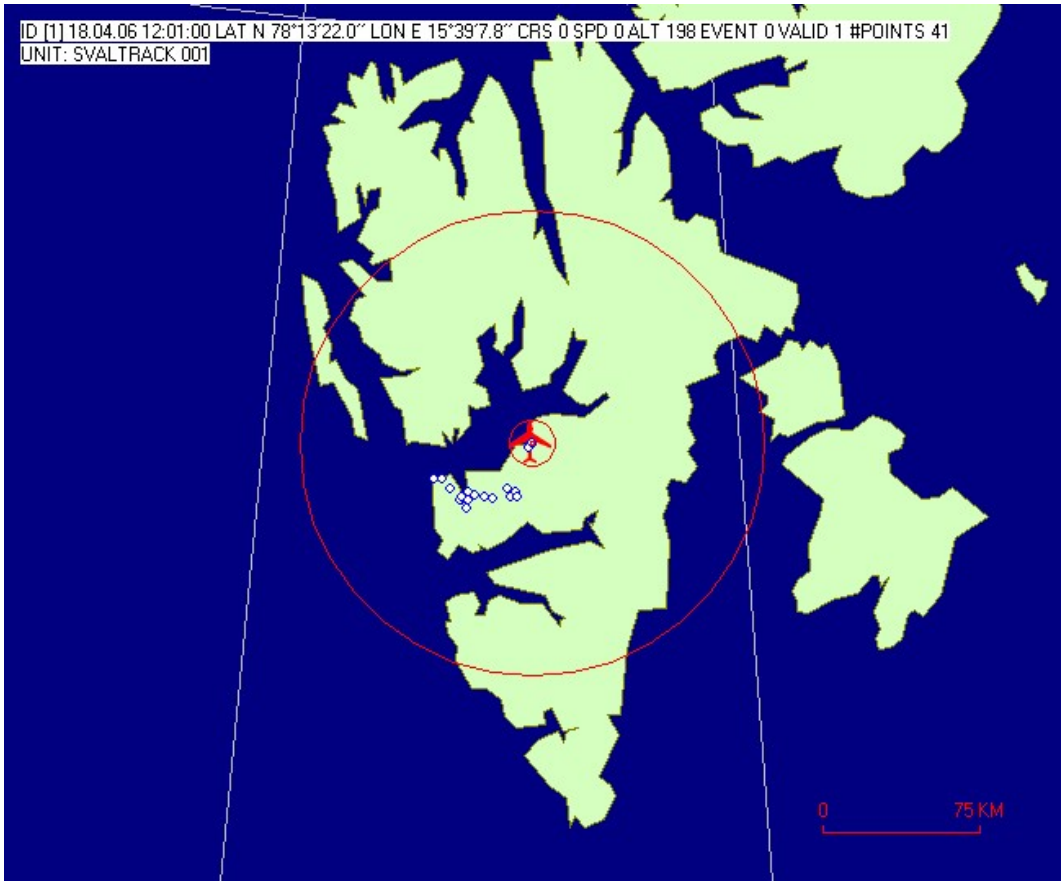


Procedure:

1. Sent about three waypoints per day, each waypoint was sent twice.
2. Positions are sent to a mail server and processed to obtain position marks on an online available and updated map image.

Outline of the experiment:

1. Transmission of 39 waypoints was successfully. The map image is shown below.
2. Two way communication via SMS could be established, therefore the phone had to be switched on for about five minutes to receive the messages.
3. In order to save battery power, the phone should be switched on when the GPS already got satellite contact.
4. The phone battery had to be preheated each time before use, therefore it had to be removed from the phone. During eight days recharging was not necessary.
5. Three single instruments, pin code lock in the phone and limited access to the phone battery complicated the operation in bad weather conditions.
6. While operating the system the instruments are not snow protected and easily get wet.



Suggestions for improvements of the set-up:

1. The micro controller and the satellite phone should be a single unit and properly snow protected. The micro controller could for example be built into the phone data plug with extension to the backside of the phone. Instead of a status display two LEDs could be used.
2. An external and easily pre-heatable battery should be used as reliable power supply for both.
3. An external and removable GPS could therefore also be used as navigational tool with independent power supply. An additional housing and an external satellite phone antenna would therefore not be needed.
4. The red button concept is found to be safe, reliable and biologist proof.