

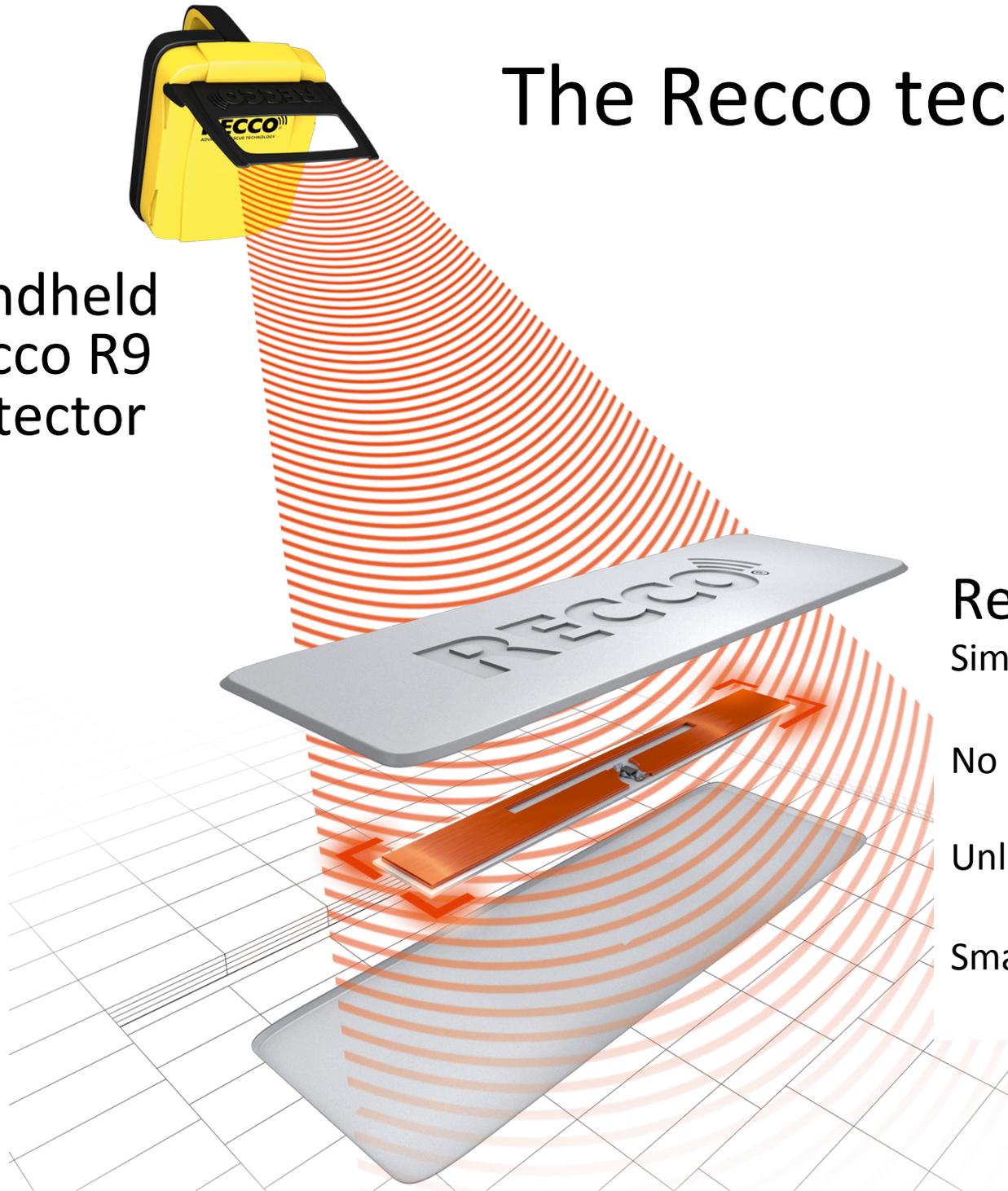
RECCO SAR

A SEARCH SYSTEM FOR ALL SEASONS

- Basic information presented by Lennart Brügge, Recco AB.
- A case study from a search in Zürs-Lech, Austria in February 2017 presented by Gebhard Barbisch, ÖBRD (Austrian Mountain Rescue).

The Recco technology

Handheld
Recco R9
detector



Recco-reflector

Simple antenna with a diode

No battery and “always on”

Unlimited lifetime

Small and light (4 g)

2 000 Recco R9 detectors on 800 ski resorts and rescue bases worldwide

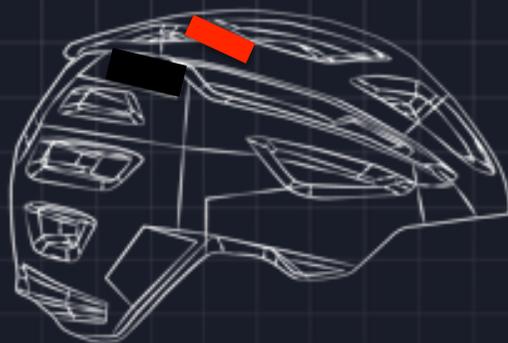




Around 200 brands integrate Recco reflectors in their products.
25 %



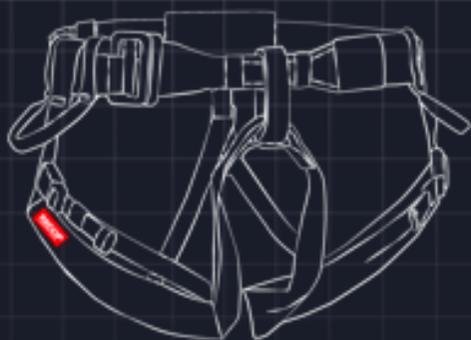
Recommended positions



helmets



pants



climbing



jackets



boots

How come that the Recco detector can locate other electronics than the RECCO- reflector ?



Foto Mats Hjelle



RECCO SAR





D3 VS D4



Weight
80 KG







Video 1

Recco SAR operates on the same frequency as the handheld Recco R9 detectors.

- All Recco reflectors are searchable with both detector systems.

FOOTPRINT



D4

**Height
above
ground
AGL**

50 m

100 m

150 m

200 m

250 m

800 m

**Size of
footprint**



Recco reflectors can now be used in all kinds of outdoor activities year around:

- From small children up to old demented people.
- At sea from passengers on cruise ships to canoes.
- Airplanes, helicopters , paragliders etc

The Recco SAR detector is mainly designed to search for Recco-reflectors outside urbanized areas.



Offshore

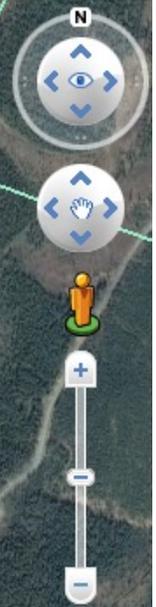




Glaciers



2 km in 40 seconds



Tysjoarna

© 2016 Google

Image © 2016 CNES / Astrium

Google earth

2008

Bliddatum: 18-5-2014 63° 14.156'N 14° 39.952'Ö höjd 371 m visningshöjd 3.72 km

Video 2

The system can also be used for avalanche rescue:

- If victims are not found with transceivers or Recco handheld detectors to search for electronics victims might carry
- To search for snow scooters or cars
- In case of high risk for rescuers
- For a quick first search over an area with several avalanche fields

Range in air with Recco SAR in the center of the antenna lobe

- Mobile phones - 15 m
- Transceivers without Recco-reflectors - 35 m
- Cars and snowmobiles without Recco-reflectors – 60 m
- Recco reflector attached on upper body - 250 m
- Recco reflector on helmet - 600 meter
- If shadowed by body or covered in snow the range is generally shorter.

Precision by searching in snow:

- Mobile phone and cameras 1x1 meters
- A Recco reflector attached to body 4 x 4 meters
- A Recco reflector on a helmet 10 x10 meters
- For more accurate pinpointing a R9 detector can be used.

Limitations

- If a person is lying on the reflector and if there is NO snow on the ground there there will be no respond.
- With only a few decimeters of snow under the person the reflector can be located as signals will bounce on the ground.
- If the body “shadows” the reflector the range will be reduced.
- Vegetation and moisture reduces the signal somewhat.

Limitations

- When flying high above ground, signals from several Recco reflectors might be heard at the same time.
- Flying low, below 20 meters, above ground might trigger minerals in stones to cause “false” respond.

Recommended search tactics in forest:

:

- 100 meters height– 100 meters wide search strips and 100 km/h = 6 min/km²
- Tested up to 200 km/h = 3 min /km²
- Increased height can speed up the search but reduce the reliability

In open terrain we recommend
150 meters height
150 meters search strips
100 km/h = 4 min/ km²

7 Recco SAR detectors in tests:

Zermatt, Air Zermatt

Sion, Air Glacier

Courmayeur / Aosta, Soccorso Alpino

Südtirol, Aiut Alpin

Vorarlberg ,ÖBRD

Ålesund, Nord Helikopter

Åre / Östersund, Jämtlandsflyg.





Courmayeur

One ultra marathon runner located in a crevasse after 5 minutes search.

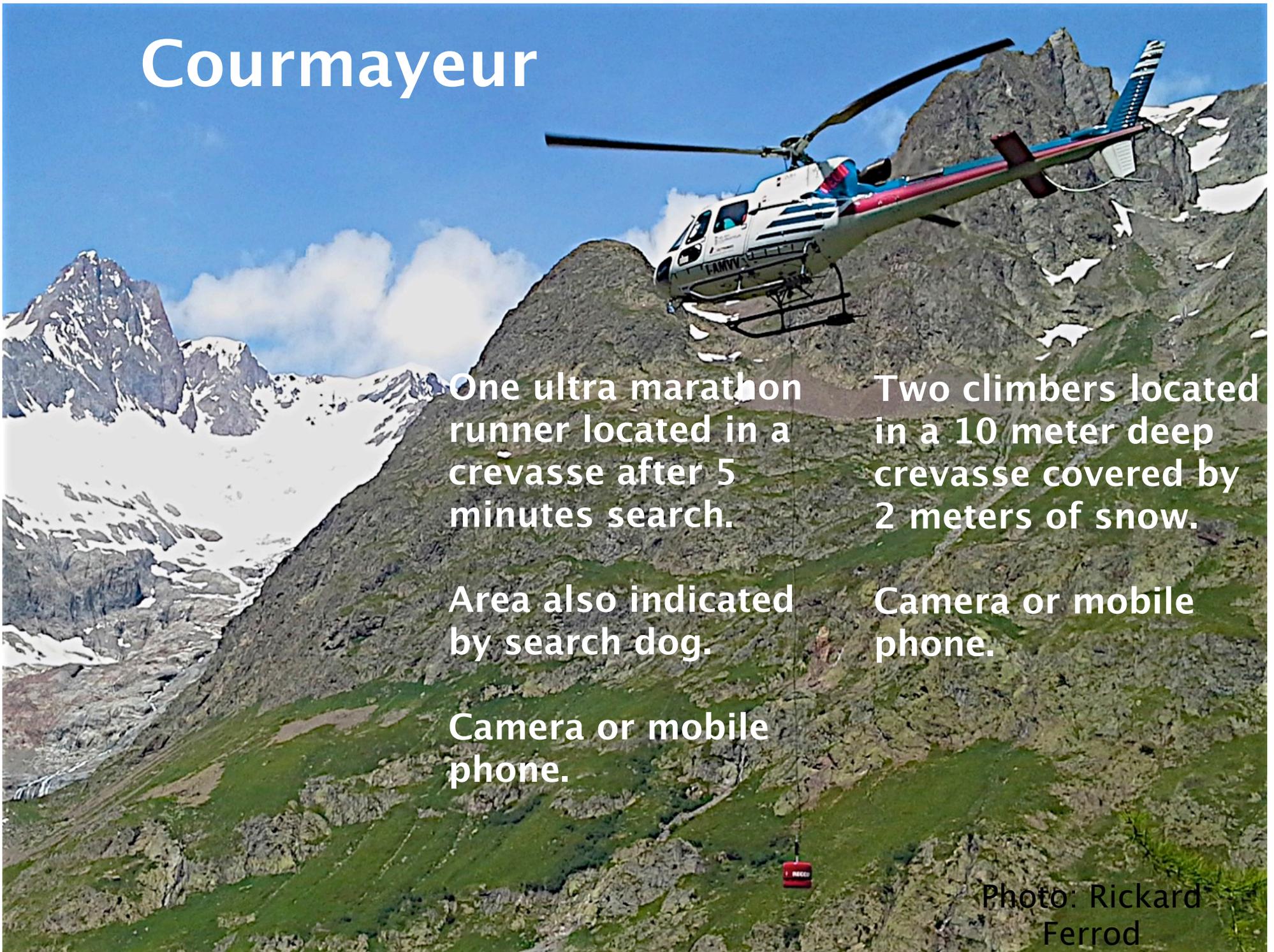
Area also indicated by search dog.

Camera or mobile phone.

Two climbers located in a 10 meter deep crevasse covered by 2 meters of snow.

Camera or mobile phone.

Photo: Rickard Ferrod





Hochferner Northface, Südtirol

Two climbers
localized after
10 minutes
search under 2
meters of snow
in a crevasse.



One of the climbers in Hochferner carried a helmet with a Recco reflector integrated.

The helmet was sold by ÖBRD 10 years ago.

Zürs Lech



**A possible area located by Recco SAR
Skier located by Recco SAR and pinpointed
by avalanche dog, Recco R9 and probe.
Skiboat with integrated Recco reflector.**



Die Bergrettung
Landesleitung VORARLBERG

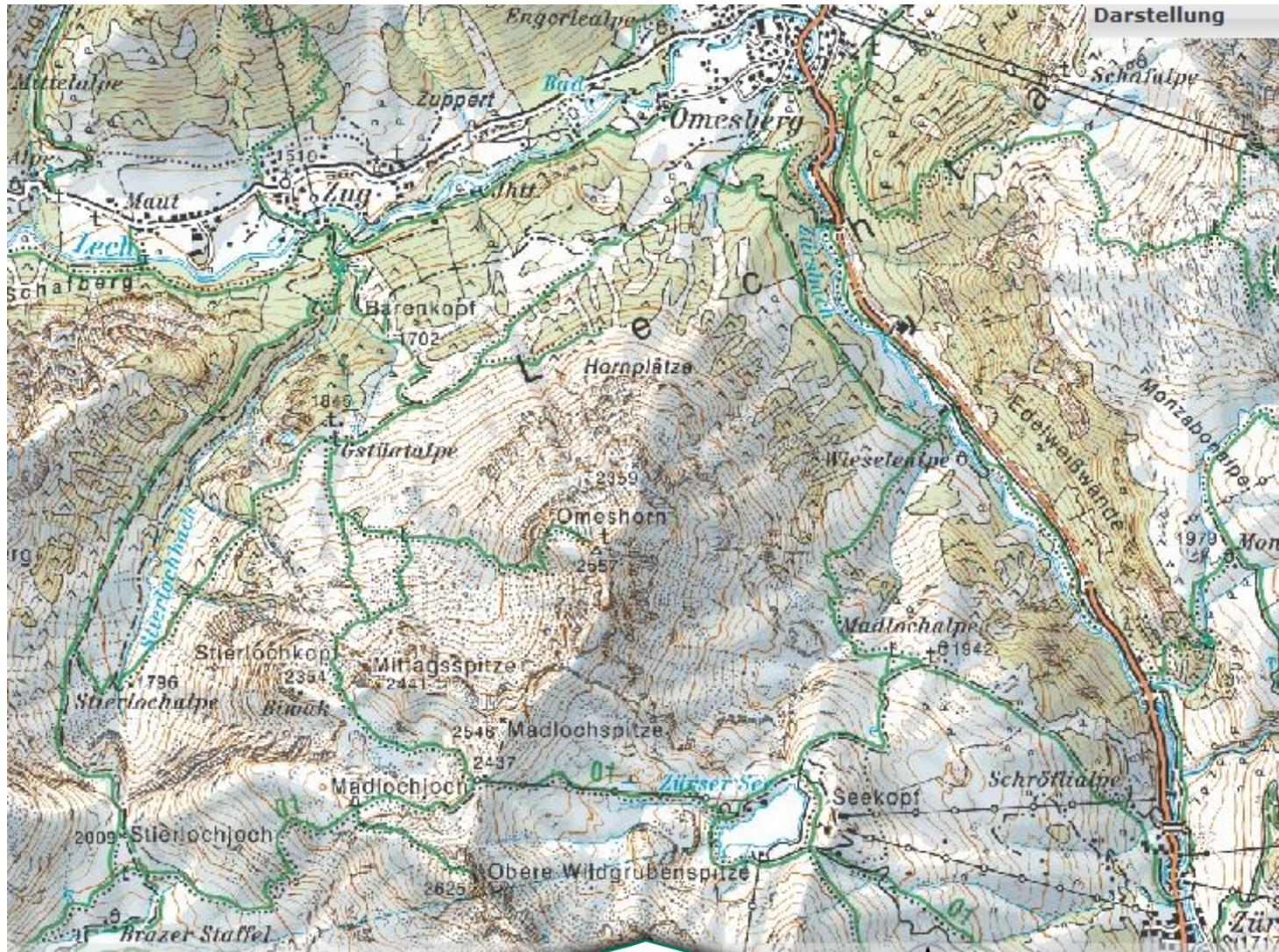
Search Operation with SAR-Detector in Lech am Arlberg



Initial Situation

- Missed Person is reported at 2.2.2017 evening
- Data evaluation of his cellphone and his skiarea ticket shows that he should be in the area „Madloch“, „Stierloch“ or „Wiesle“

Initial Situation



SAR-Operation during the night

- FLIR-Helicopter is operating in the whole search area
- MOBI-Drone is operating in the area „Wiesle“
- Terrestrial search operation with rescue teams in the whole search area



Results in the morning of the 3.2.2017

- No new information about the missing Person
- Many avalanches in the whole area
– all scales
- No avalanche beacon was used – unknown if he has a RECCO reflector in his equipment



Next steps for 3.2.2017

- Terrestrial search with rescue teams and avalanche dogs will continue
- Clarification with RECCO if a SAR-Detector is available
- RECCO have a SAR-Detector in Munich and organized transport to Lech



RECCO-SAR-Operation

3.2.2017

- We start at 17:00
- We got priority search areas to do our search operation
(Defined after a exclusion procedure from the incident commander)

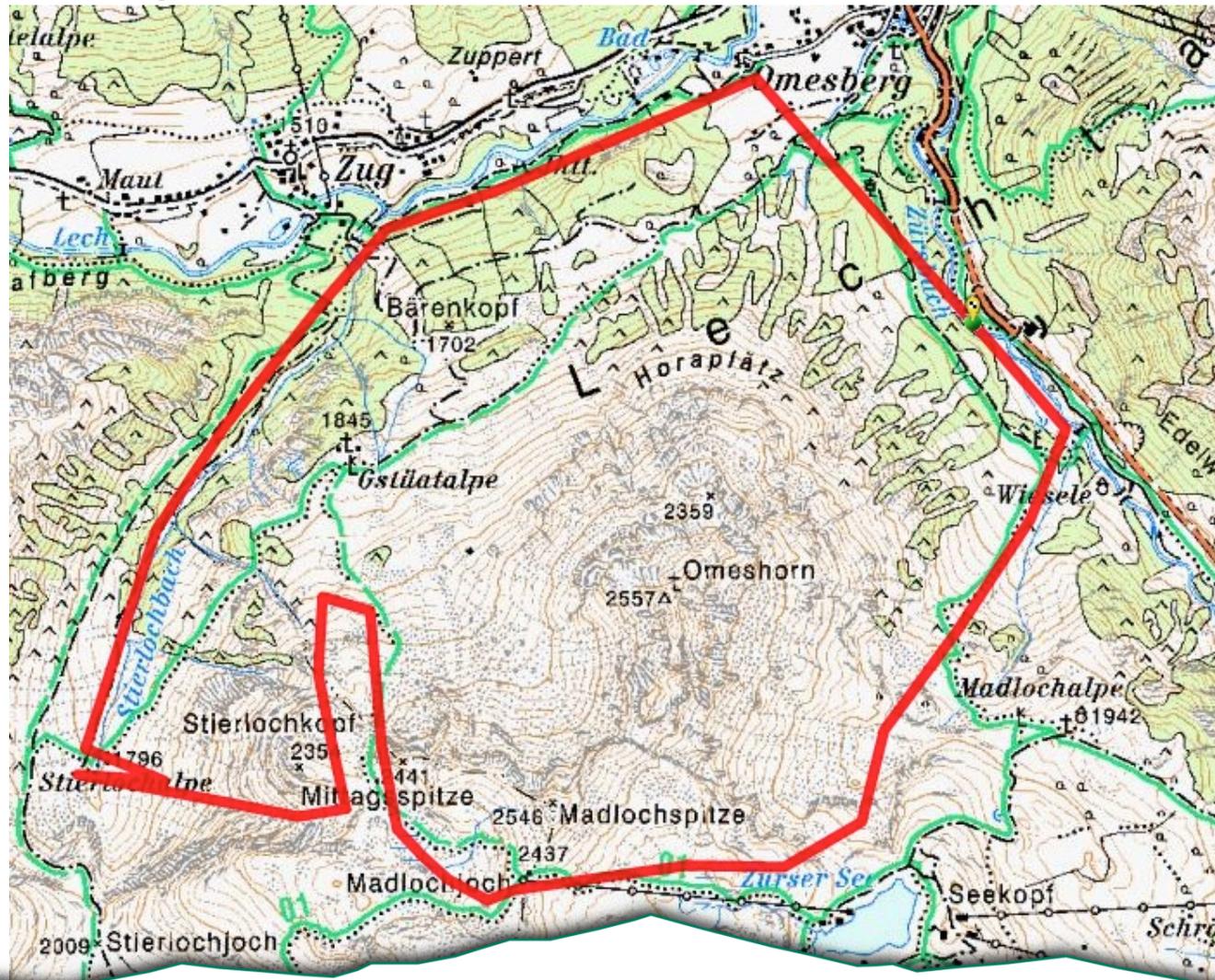
RECCO-SAR-Operation

3.2.2017



RECCO-SAR-Operation am 3.2.2017

- Search flight - Track



RECCO-SAR-Operation am 3.2.2017



- Locating of signals



RECCO-SAR-Operation am 3.2.2017



- Signal in the area underneath „Weisser Ring“



RECCO-SAR-Operation am 3.2.2017



- Signal in the area west of Madlochjoches





RECCO-SAR-Operation

3.2.2017

- Search must be stopped because of darkness
- Steps for the next day:
 - Terrestrial Search with RECCO R9
 - SAR-Detector team is ready if necessary



Terrestrial SAR-Operation – 4.2.2017

- Missed Person was found in an avalanche below Madlochjoch – found by RECCO R9 and avalanche search dogs nearby at the same time
- Evacuation terrestrial with Akja because of strong winds

Review / Analysis



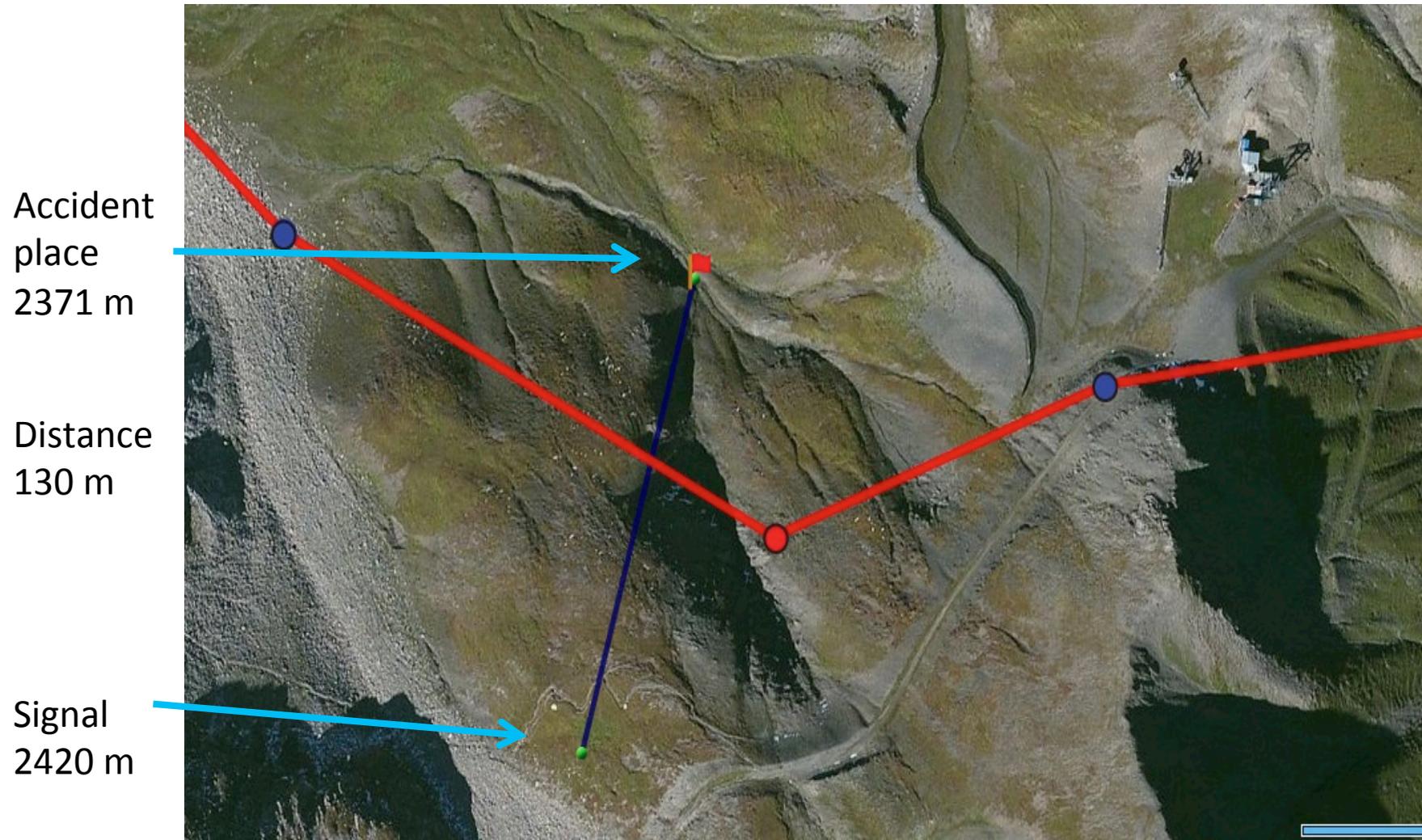
- Accident place / RECCO-Signals with SAR-Detector



Review / Analysis



- Accident place / RECCO-Signals with SAR-Detector



Review / Analysis



- Missed person has a RECCO reflector in his boots



Experiences from Search operation



- Full information about the functionality of the SAR-Detector is important
- Incident commander must be informed about the possibilities and limits of this tool. Then he can optimize the search with his decisions
- Pilot and flight operator must also know how it works to optimize their flight route in the searching area

Experiences from Search operation

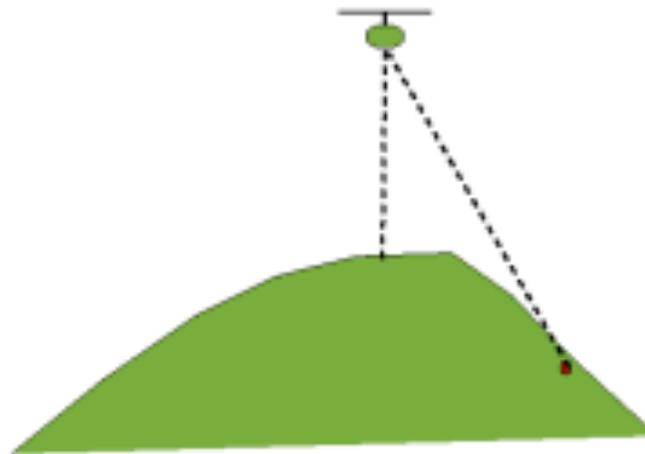


- When preparing in Zürs we had stress because we only had a short time so search between the skislopes are empty and darkness come in
- We had only contact with one member of the incident command system on the heliport.
It is very important to have direct contact to speak about possibilities and define priorities in the search areas.
All this contacts and information could be discussed without any stress before the search flight by phone.

Experiences from Search operation



- When searching in steep areas you will have changing diameters of coverage



Experiences from Search operation



- Exact location or pin-pointing is possible but it needs time.
The crew need's training to do this.
The flight operator confirms that this would be possible if the whole crew knows the functionality of SAR-Detector and if they have enough time
- The searching area must be free of skieres, rescuers or other people

Experiences from Search operation

- We got wrong signals from RECCO reflectors which were used together with explosives. When they are not correctly fixed on the explosive material sometimes they are not completely destroyed!





Die Bergrettung

Landesleitung VORARLBERG



Thank you

Around 30 pilots have been flying with the Recco SAR detector during tests, demonstrations and searches.
Total flight time around 90 hours.

▪

Ulf Grinde, Jämtlandsflyg, Schweden
Jonas Grinde, Jämtlandsflyg, Schweden
Trond Renå, Jämtlandsflyg, Schweden
Björn Franzen, Jämtlandsflyg, Schweden
Lars Åsengård, Jämtlandsflyg, Schweden

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Daniel Neugel, Air Zermatt
Stephan Dreesen, Air Zermatt
Daniel Aufdenblatten, Air Zermatt

Patrick Fauchère, Air Glacier, Sion

Allessandro Remine, Courmayeur, Italien
Marco Costner, Aiut Alpin, Val Gardena, Italien

Werner Senn, BMI Polizei Österreich
Gerald Hiesmayr BMI Polizei Österreich

Sunniva Nordberg, Nord Helikopter

Our Recco support team will be available in the lobby during coffee breaks and evenings for further information.

Thanks for your attention

