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?
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.
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
I Arolla Schweiz testade vi systemets funktion mot en Ortovox transceiver utrustad med en RECCO reflektor. 800 meters räckvidd rakt ned. 2 km in 40 seconds.
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 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
Two climbers localized after 10 minutes search under 2 meters of snow in a crevasse.

Hochferner Northface, Südtirol
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. Skiboot with integrated Recco reflector.
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
• 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

Accident place 2371 m

Distance 130 m

Signal 2420 m
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 needs 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 skiers, 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 correct fixed on the explosive material sometimes they are not completely destroyed!
Thank you
Around 30 pilots have been flying with the Recco SAR detector during tests, demonstrations and searches. Total flight time around 90 hours.

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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 brakes and evenings for further information.
Thanks for your attention