



Resero Whistle
Alpine search and rescue system

Presentation for ICAR Congress 2018



17 October 2018

CONFIDENTIAL



Problem we solve



- 0.5 million accidents are registered in Alps every year
- 25% of all casualties during outdoor accidents are missing people
- 250 people are permanently missing in just one Swiss Canton Valais
- Among them the CEO/Owner of Largest German Retail Group, who is missing since April'7
- This happens because it is hard to communicate and locate the accident
- Smartphones, which are owned by everyone are not reliable outdoor
- GSM Network is not everywhere and smartphone battery dies in 6-8 hours when outdoors
- Satellite communication and positioning solutions such as Spot3, Garmin are not 100% a reliable in the mountain use due to direct satellite visibility need
- GPS TETRA radios are too expensive and sophisticated for everybody to use

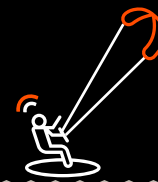
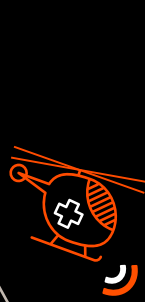
Source: Petzl Foundation Study of Mountain Accidents, Canton Valais Police; Swiss/German media



Solution — Resero

We help to locate you when it matters most

- LoRa/GSM GPS emergency beacons/sensors to send a signal or find you when missing
- LoRa IOT network for Outdoor applications deployed together with Swisscom
- Heli/Drone/Snowmobile Search and Rescue solution when there is no network
- User Apps for IOS/Android to upload your data to the platform
- IOT platform managing your data provided to rescue organizations/ski resorts
- Lots of smart features are already inside and more to come





Resero IOT platform

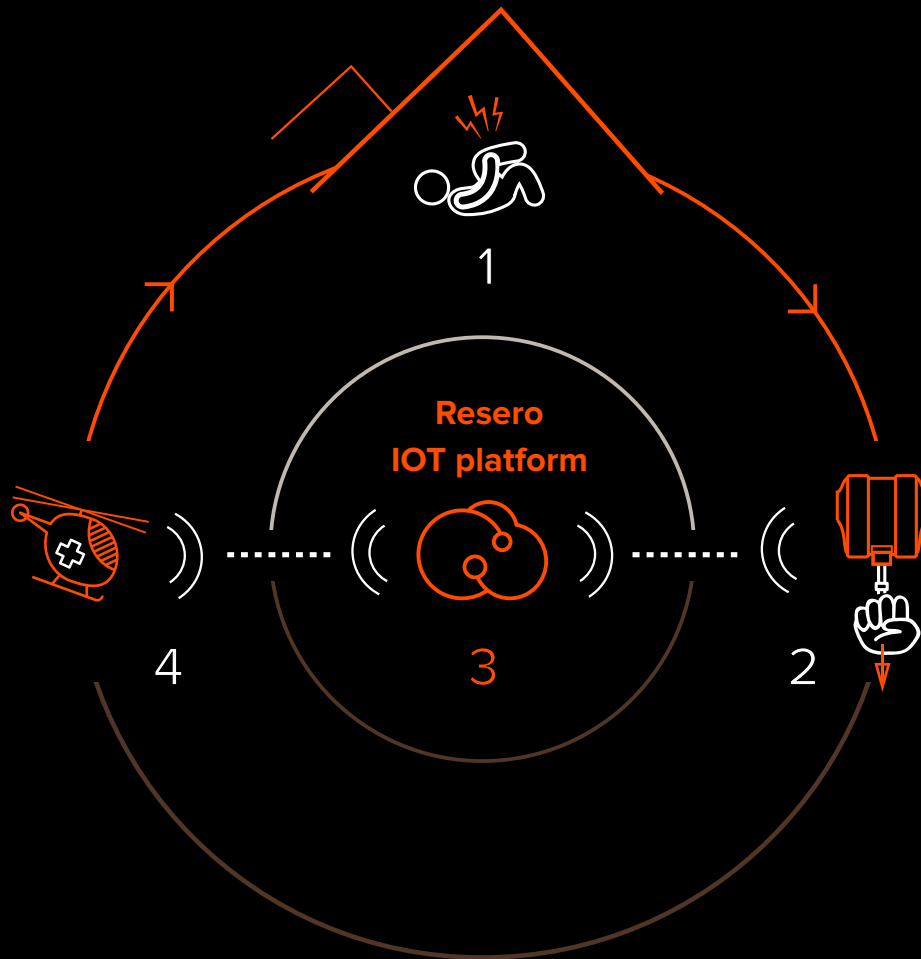
**Resero Whistle
IOT platform
includes:**

Wireless LoRa long
range network on
partner ski resorts

Personal wearable
beacon/sensor RW

Heli/Drone/
Snowmobile SAR
solution

Android/iOS App



- 1 In emergency, user pulls the RW trigger, which sends message to IOT platform through GSM, or LoRa network
- 2 Message includes user's GPS coordinates and personal data, uploaded in advance by user via Resero App. Message is then automatically redirected by Resero IOT platform to the rescue team next to the accident or to personal emergency numbers provided by the user
- 3 Resero IOT platform database securely stores user data and rescue contacts
- 4 In addition of receiving info about accident Rescue team can benefit from real time tracking and search of RW users via radio signal. It can be done also with equipment deployed at rescue vehicle or helicopter/ drone

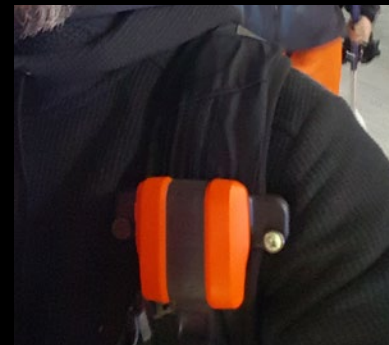


Resero GPS tracker



Production ready for the next winter season

- Dimensions: 64.5x60x25 mm, weight 89 g, USB type-C charger, IP67 water protection. Resero Whistle is narrower than any outdoor backpack strap and Resero can be mounted by a mechanical lock attached to plastic mount at the backpack strap or belt of the user
- The size of plastic mount is 44x50 mm. Plastic mount can be manufactured of flexible plastics to be more comfortable for the user
- Resero Whistle has own GPS, global GSM SIM card, LoRa chip, LiPo 2000 mAh rechargeable battery good for five days*. RW temperature range is -40° to $+40^{\circ}$ C



* Depending on GPS track cycle and outdoor conditions



Resero Heli/Drone SAR solution



- Resero Whistle can be traced by the receiver mounted at the Rescue Helicopter or Drone recreating the LoRa network when there no network (up to 25 km search spot range)
- We developed and validated Resero SAR prototype together with Air Zermatt
- We developed Resero Drone SAR prototype together with Squadrone system (France)
- Resero SAR solutions will be available and deployed in Valais, Switzerland next winter season

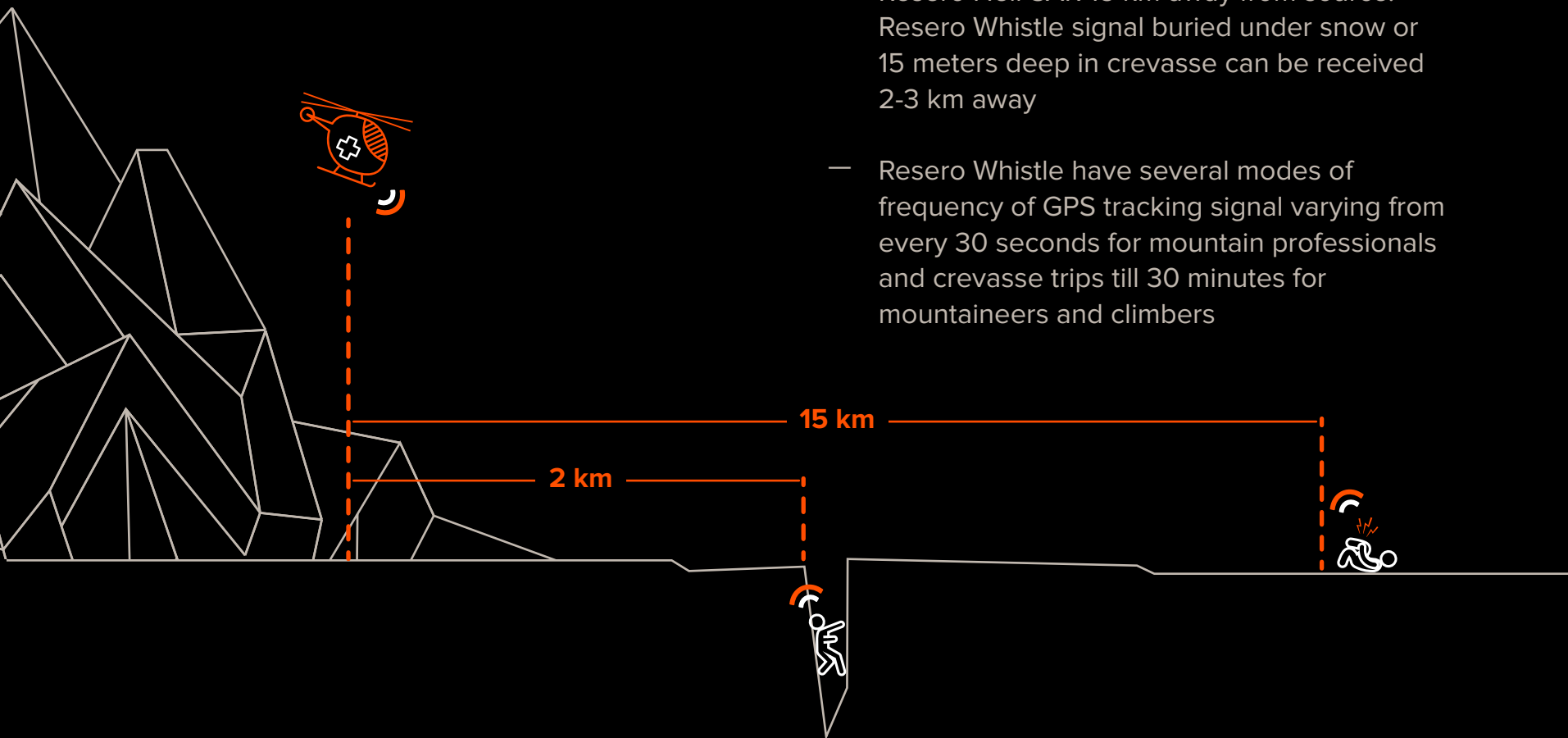




Resero Heli/Drone SAR improves Alpine search

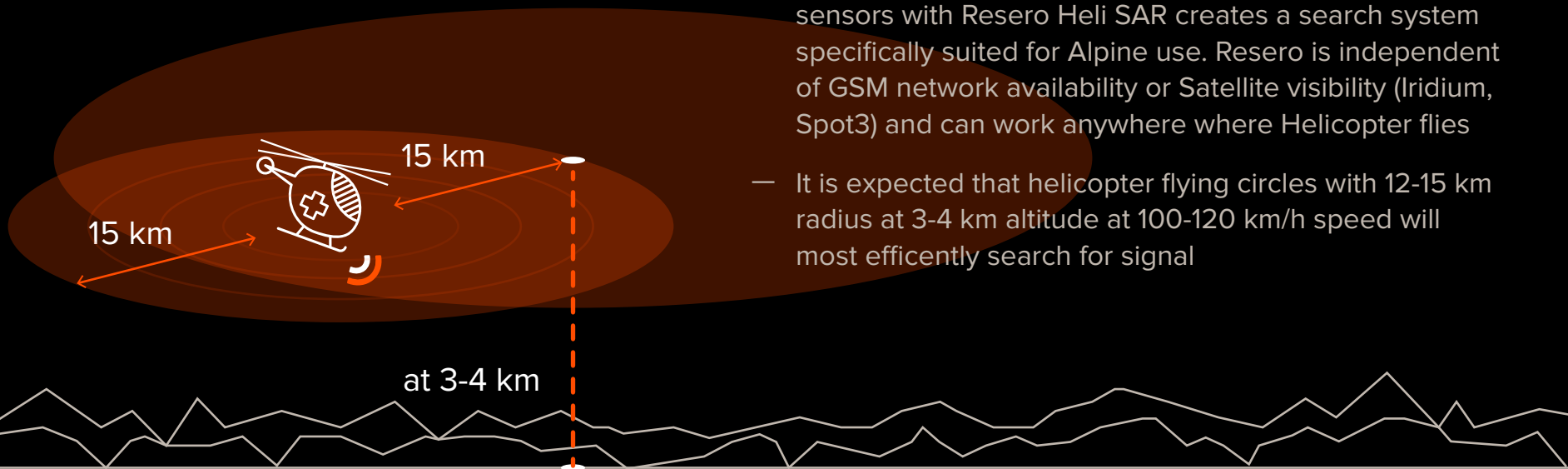
- When there is no GSM or LoRa network, Resero SAR mounted at the Rescue Helicopter recreates the network and searches for signal transmitted from Resero Whistle at 868 Mhz frequency.

- Signal at 868 Mhz has high material penetration, which allow it to go through snow/ice
- Resero Whistle signal can be received by Resero Heli SAR 15 km away from source. Resero Whistle signal buried under snow or 15 meters deep in crevasse can be received 2-3 km away
- Resero Whistle have several modes of frequency of GPS tracking signal varying from every 30 seconds for mountain professionals and crevasse trips till 30 minutes for mountaineers and climbers





Helicopter search with Resero SAR



- Combination of Resero Whistle emergency beacons/sensors with Resero Heli SAR creates a search system specifically suited for Alpine use. Resero is independent of GSM network availability or Satellite visibility (Iridium, Spot3) and can work anywhere where Helicopter flies
- It is expected that helicopter flying circles with 12-15 km radius at 3-4 km altitude at 100-120 km/h speed will most efficiently search for signal



Resero Heli SAR prototype with omnidirectional 8 Db antenna mounted at the helicopter



Widest valley in Zermatt area is 26 km wide, which is below Resero Heli SAR range



Outdoor safety standards

Outdoor safety standards: Innovation comes every ten years

1960-1970

Introduction of
Avalanche
Transceivers in 1968



1970-1980

Introduction of
RECCO reflectors in
1973



1980-1990

Introduction of
Avalanche Airbags in
1985



Mt. Hood Mountain
Search beacon

1990-2000

Helmets slowly become
a common outdoor
safety standard



2000-2010

Satellite PLB / phones
are introduced for SAR
at remote areas



2010-2020

Wearables such as
Garmin, Polar, Suunto
become widely spread
and accepted, but give
no solution in case of an
accident and are only
performance trackers

Introduction of IOT
powered emergency
beacons/sensors can
bring cutting edge tech
to outdoor safety





Competitive landscape



There are few Personal Life Beacons that are available to the market:

- Satellite PLB using satellite to send an emergency message. Works globally with limited coverage in mountains due to blocking of satellite signal by mountains. Prices from €420 plus €30 monthly subscription fee Slow to send a message due to satellite search (20-30 minutes). It is good for adventures in wilderness, but expensive for mass use in alpine resorts
- GPS trackers/watch using GSM. Used for kids and paragliding. Prices from €150 + €50 fee. Does not work without GSM coverage
- Urban panic buttons using bluetooth connection to your phone to send a signal via GSM. From €120 + €30 fee. Bluetooth connection is not reliable for outdoor use
- Smartphone apps without any wearable of smartwatch. Most are free, some have fees up to €100. Not reliable outdoor due to battery and network limitations



Resero Whistle beats all GSM based beacons by use of LoRa as a backup communication channel. All Satellite PLB are not price competitive (3X more) and can't become a mass product for resorts, water sports or everyday outdoor activities

In addition, Resero Whistle is easy to reach and easy to use — just pull the trigger. It matters when you are injured or panic after the accident. And its autonomous and long live



Where we stand



- Rescue professionals recognize the value of Resero as New outdoor safety technology
- Resero IOT platform is already deployed and validated in few Swiss and French resorts
- Successful Valais wide pilot phase with OCVS/Air Zermatt during spring/summer 2018. Production phase in Valais during winter 2018/19
- Resero beacons/sensors are already being ordered by Swiss, French and Russian Alpine professionals and large French retailers to be delivered next winter season
- Resero Whistle beacons/sensors are ready for production with world class OEM partner
- IP is secured, LoRa/CE certification done
- Resero Heli SAR prototype is developed and currently being tested together with Air Zermatt
- Resero Drone SAR prototype is developed together with Squadrone system (France)

Partnerships:



La Clusaz
French Alps





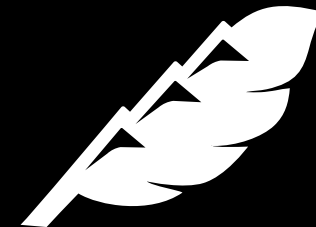
Partnership with Alpine rescue professionals

Offer to Alpine rescue professionals:

- Partner with us to deploy Resero in your area to make visitors safer
- Equip with Resero your team if they work at areas with crevasses and exposed terrains
- Help us develop smart features for Resero platform: accident prevention



Contacts



IOT platform for Alpine safety

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ISPO WEARABLES AWARD

Reserp Whistle is a finalist
of ISPO 2016/2017 Brandnew Award,
wearables