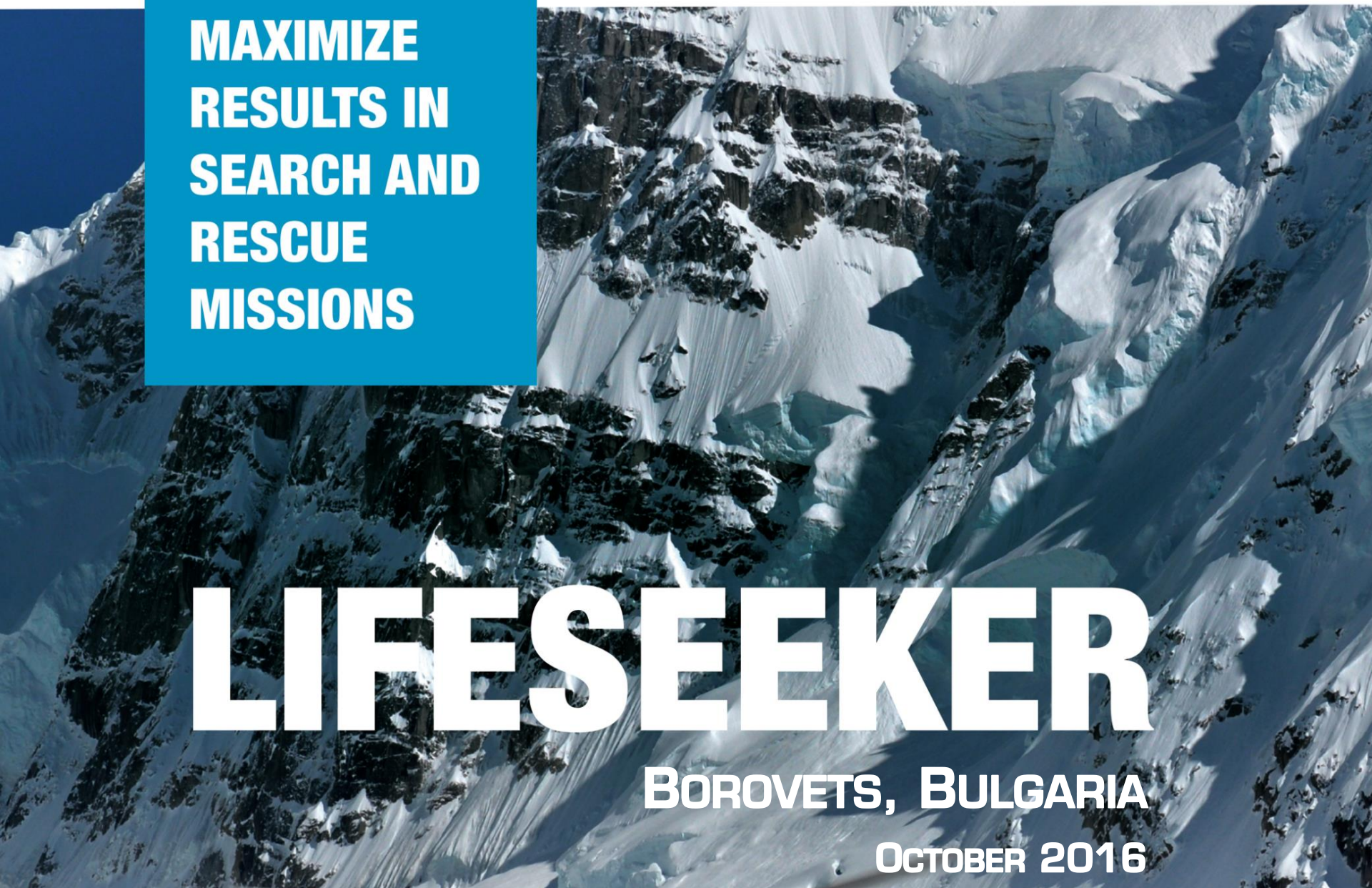
MAXIMIZE RESULTS IN SEARCH AND RESCUE MISSIONS

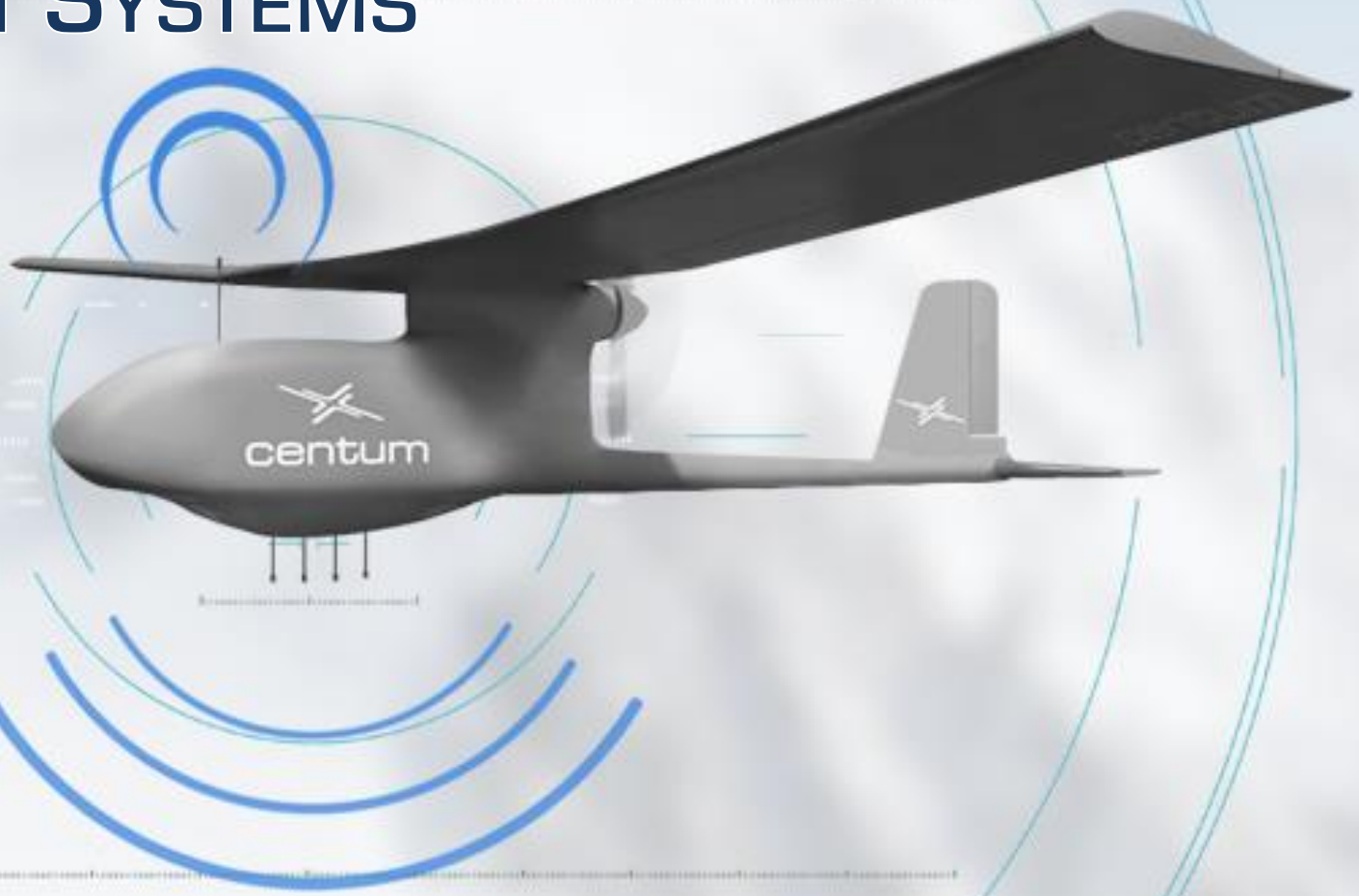


LIFESEEKER

Borovets, Bulgaria

October 2016

AERONAUTICAL MISSION SYSTEMS



Fly with a purpose

MOTIVATION

EL PAÍS IN ENGLISH

MOUNTAIN TRAGEDY

Two hikers lost in weekend storms found dead in Castellón

Third missing man survives to lead emergency services to his companions

IGNACIO ZAFRA

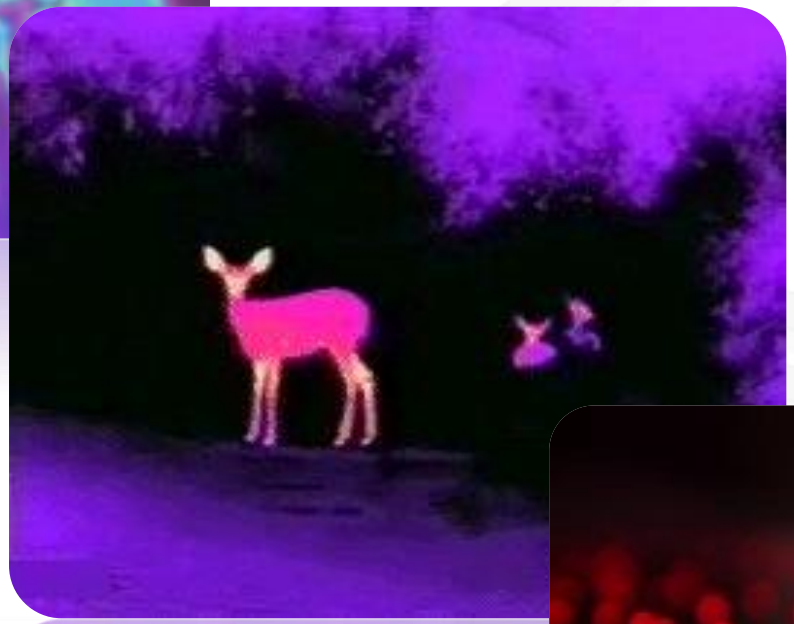
Valencia 29 FEB 2016 - 10:37 CET

centum research & technology

HELICOPTER

Current Search Missions

Image Sensors



centum research & technology

New Searching Paradigm

Mobile phones are the most extended radio beacons in the world

Visual Searching → Instrumental Searching

centum research & technology

New Searching Paradigm

New Capabilities

Detection

Communication

Identification

Geo-location

Visual Searching → **Instrumental Searching**

centum research & technology

Main advantages of the Instrumental Searching

- Search under **Low or No Visibility**, including **Night** flights

- Radio of detection of several **Kilometers**:
  - ✓ Reducing **Sweep Time** of the searching area
  - ✓ Reducing **Operating Cost**

- Detection under **Rubble** (earthquakes),
  under **Foliage** (forest areas),
  under **Snow** etc.

LIFESEEKER

Software defined radio (SDR)

Aerospace standards (DO - 160)

Reduced SWaP

Maximum Success in Search & Rescue Missions

Functionality

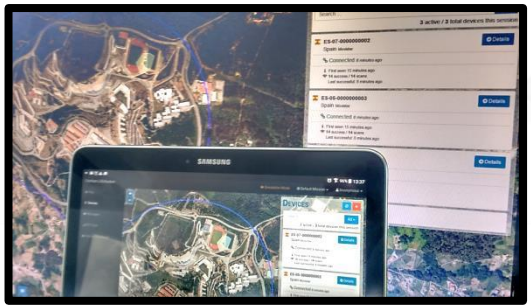
- **Locates missing people** through their mobile phone
- **With no collaboration** of the missing person
- Works in areas **with / without coverage**
- Acts as a **communication relay**

LIFESEEKER – SUBSYSTEMS

LifeSeeker includes **two subsystems:**

Onboard sensor

- Detects and locates **GSM transmissions**
- Sends **geographic coordinates** of the transmission to the control station



Control station

- Provides **system intelligence** and operational control
- **Easily adapted** to mission needs

centum research & technology

LIFESEEKER – CONTROL STATION

Features

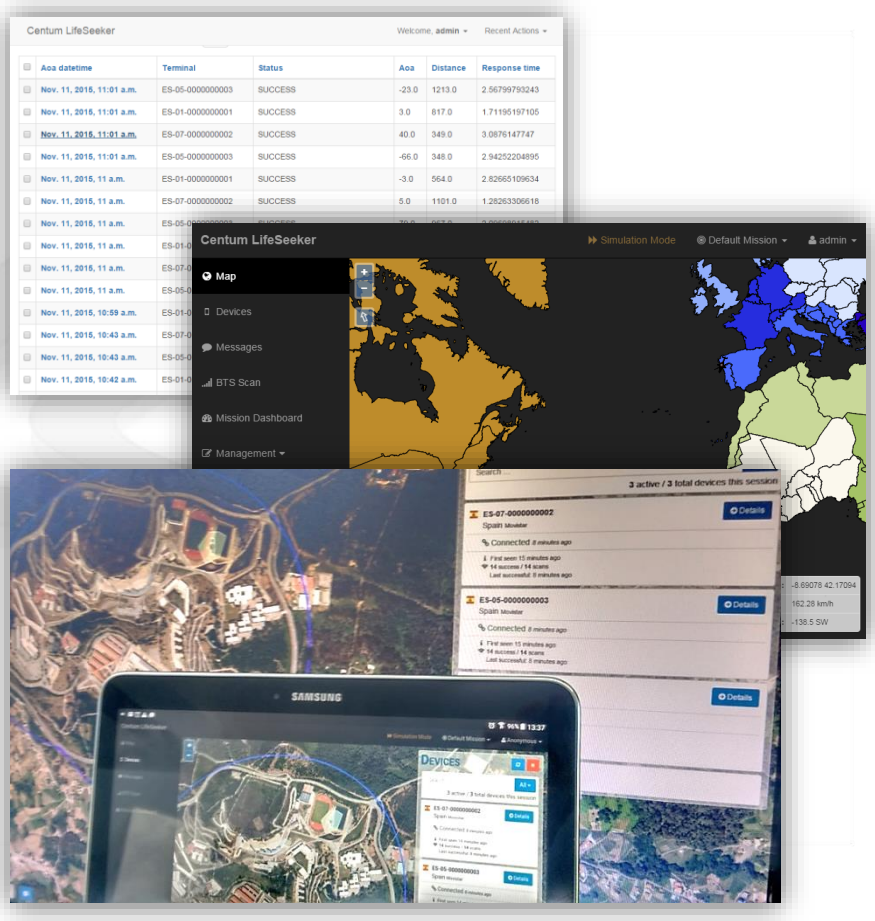
Maximize User Experience

History mission record

Mission Simulator - Trainings

HTML5 (multi-OS, multi-devices)

Visual Event Notifications for the operator



centum research & technology

LIFESEEKER CONOPS

PLANNING & CONTROL

1. EMERGENCY ALERT
- Rescue team receives the alert

2. PLANNING
- Mission planning through system specific tools

3. MISSION CONTROL
- The H/C flies over the search area
- LifeSeeker provides GSM coverage
- The operator controls the mission from the control station

RESCUE

7. RESCUE MISSION
- LifeSeeker sends missing person position and status to the rescue team

SEARCH

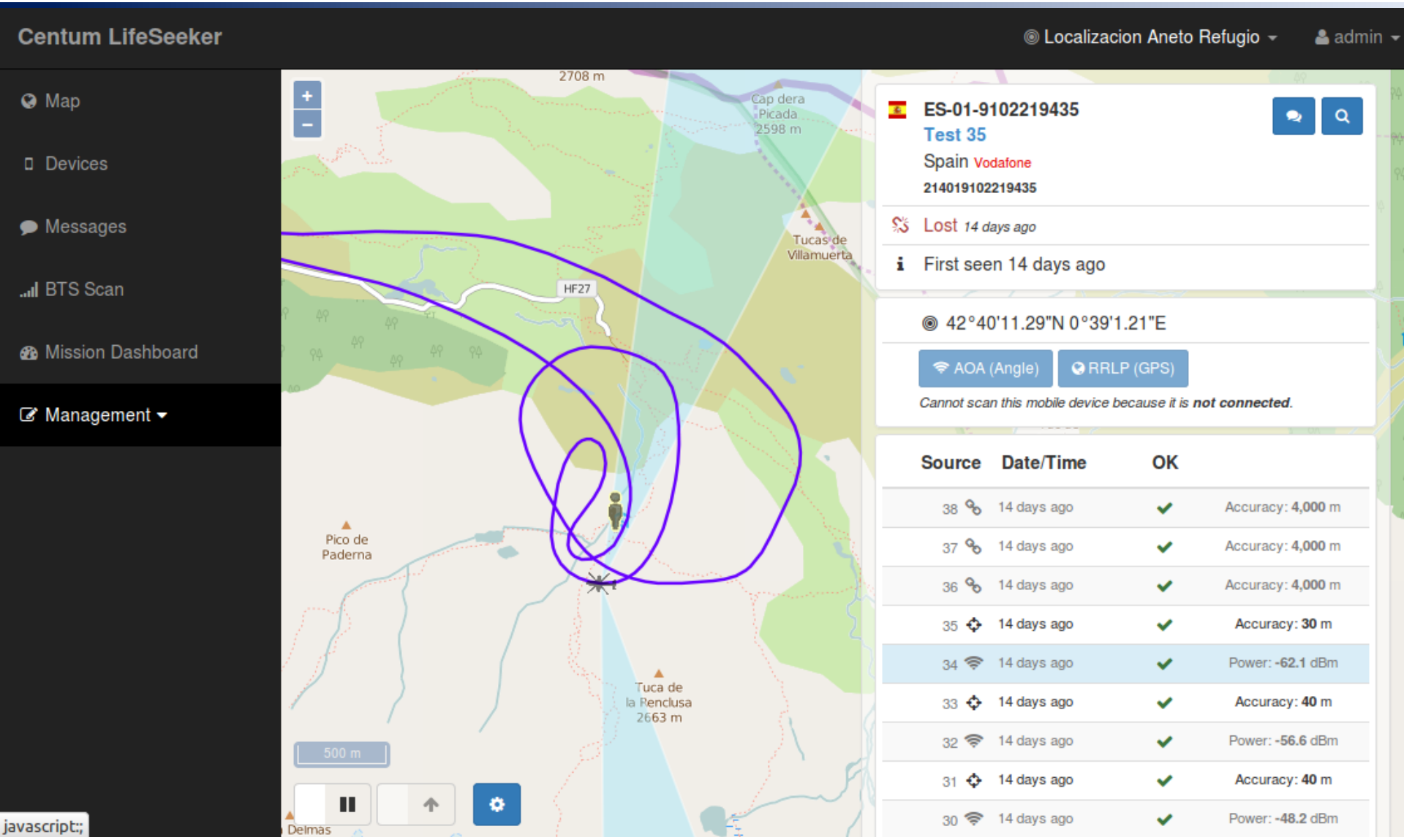
4. DETECTION
- LifeSeeker detects the mobile phone of the missing person
- IMSI number is filtered and registered
- No collaborative detection. No interaction required for the missing person

5. GEO-LOCATION
- Mobile phone is located: latitude and longitude sent

6. COMMUNICATIONS
- Text message exchange between search & rescue team and victim
- Situation assessment: risks, medical services needed, etc.

centum research & technology

LIFESEEKER: ANETO MISSION (3.404M)



Distance: 141km Mission Time: 14.5min Location Error: 26,5m

centum research & technology

Operation Procedures

Need to implement or modify certain operating processes

1. New conditions to consider in flight planning:
   - **Visibility**
   - **Altitude**
2. Flight pattern to follow to maximize probability of detection by **Instrumental Search**
3. New **operative procedure** might need to be develop (IMSI)

centum research & technology

CONCLUSIONS

LIFESEEKER is a great complement to the current technologies and procedures able to maximize search mission success

Some benefits:

- Searching Time
- Operational Cost
- Risk

centum research & technology

CONCLUSIONS

EL PAÍS IN ENGLISH

MOUNTAIN TRAGEDY

Two hikers lost in weekend storms found dead in Castellón

Third missing man survives to lead emergency services to his companions

IGNACIO ZAFRA

Valencia 29 FEB 2016 - 10:37 CET

centum research & technology

CONCLUSIONS

EL PAÍS IN ENGLISH

MOUNTAIN TRAGEDY

Two hikers lost in weekend storms found in good condition in Castellón

Third missing man survives to lead emergency services to his companions

IGNACIO ZAFRA

Valencia 29 FEB 2016 - 10:37 CET

centum research & technology

LIFESEEKER – FURTHER INFORMATION

centum
research & technology

KEY **FEATURES**

- GSM 900 band communications
- Narrowband (200 KHz) and wideband (25 MHz) modes
- Cognitive Radio techniques for dynamic spectrum allocation
- **Software Defined Radio** (SDR) core technology for easy scalability and upgrading
- Accurate GPS positioning for detected mobile phones
- Conduction cooling
- Built-In-Self-Test capabilities
- **Mission Planning Software**
- Call send/receive functionality
- SMS send/receive functionality

TECHNICAL **SPECS**

- 4 Rx RF channels (for phased array)
- 1 Tx RF channel
- 2 x RS-232 ports for datalink and AHRS interfacing
- Rugged 3U-VPX architecture
- Ethernet interface
- **Reduced SWaP:**
  - Size: 143x168x215 mm
  - Weight: <8kg
  - Power: 80 W
- Transmission power: 4W
- Frequency range: 860-960 MHz

LIFESEEKER

Airborne Base Transceiver & Geo-localization System

LIFESEEKER is an innovative on-board system capable of locating mobile phones accurately and without network coverage, which provides Base Transceiver Station (BTS) services 24 hours a day, even under adverse weather conditions.

PRODUCT OVERVIEW

LIFESEEKER is a state-of-the-art radio system designed to locate missing people under extremely adverse conditions, leading rescue teams to the persons in danger.

LIFESEEKER also acts as a communications relay for mobile voice and messaging services between the missing party and the rescue teams.

LIFESEEKER comprises an on-board payload and an on-ground control console. The on-board subsystem detects GSM transmissions and uses a phased array antenna to locate the source of the transmission. The geographic coordinates of the signal source are communicated to the ground control station.

The on-ground subsystem serves as the operational and control station, from where the mission operator can coordinate LIFESEEKER operations.

LIFESEEKER supports both single-phone and multi-phone detection modes.

centum
research & technology

CENTUM research & technology

Where Technology addresses Market

www.centum-rt.com

INNOVATIVE SME

Valid until Dec 31st 2018

GOBIERNO DE ESPAÑA
MINISTERIO DE ECONOMÍA Y COMPETITIVIDAD

centum
research & technology