# 14th Meeting on the Follow-up of the Joint Statement

# Operation of Atons on the Hungarian Danube

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|---|---|
| Presenter: | Bede Csaba |
| | Project manager |
| Date: | 13. September 2023. |
| Place: | Zagreb, online |

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# Fairway Danube AtoN bouys

## Testing of different type of AtoNs

AIS AtoN: Navigation Aid what provides information via AIS beside visual observation from the vessels.

Key element is a VTS providing AIS full coverage for the desired area

| Type | Advantage | Disadvantage |
|---|---|---|
| Physical AIS AtoN | Physical radio station with reliable signal strenght and operation | High power consumption |
| | | Heavy equipments requires greater, heavier bouys |
| | | Each unit requires permission from authorities with permanent fees |
| Synthetic AtoN | Very low power conumption | LORA coverage is reuqired on the 417 km of the river |
| | Very light equipments (1-2kg) | |
| | No permission required from authorities, fees may be applied for the use of LORA network | |
| Virtual AtoN | No any physical equipment | Not supported by authorities |
| | No permissions from authorities, no fees | |

## LoRa WAN Communication

**LoRa (from "long range")** is a physical proprietary **radio communication** technique. It is based on spread spectrum modulation techniques derived from chirp spread spectrum (CSS) technology. LoRa uses **license-free** sub-gigahertz radio frequency bands EU868 (**863–870/873 MHz**) in Europe. LoRa enables **long-range transmissions with low power** consumption.

# Key Features of LoRa

### Long Range
Connects devices up to 30 miles apart in rural areas and penetrates dense urban or deep indoor environments

### Low Power
Requires minimal energy, with prolonged battery lifetime of up to 10 years, minimizing battery replacement costs

### Secure
Features end-to-end AES128 encryption, mutual authentication, integrity protection, and confidentiality

### Standardized
Offers device interoperability and global availability of LoRaWAN networks for speedy deployment of IoT applications anywhere

### Geolocation
Enables GPS-free tracking applications, offering unique low power benefits untouched by other technologies

### Mobile
Maintains communication with devices in motion without strain on power consumption

### High Capacity
Supports millions of messages per base station, meeting the needs of public network operators serving large markets

### Low Cost
Reduces infrastructure investment, battery replacement expense, and ultimately operating expenses

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# LoRa WAN Users

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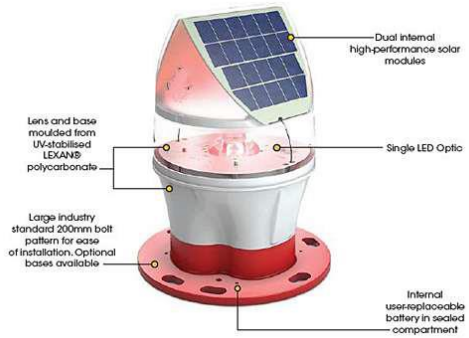
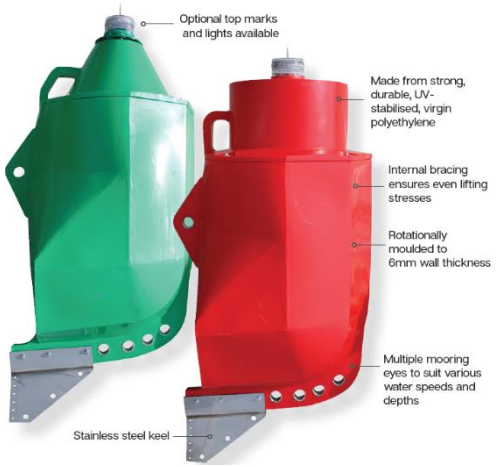
# CEF HUMARK project – AtoN implementation

- 372 intelligent buoys (112 with lights)
- communication: LoRa WAN
- connected to national RIS system
- visualised in AIS system

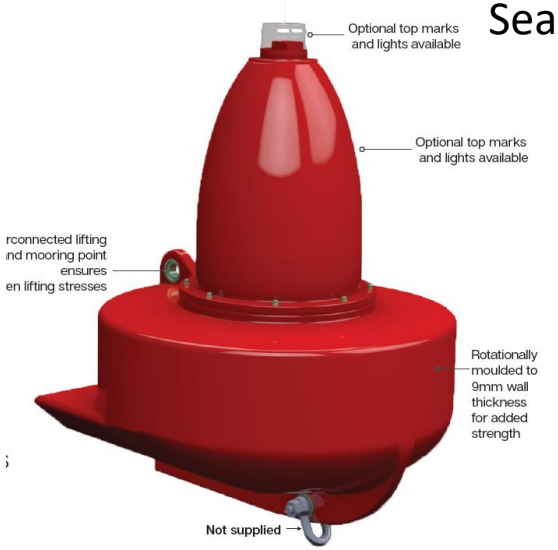



Sealite SL-75-LPWAN


Sealite LPWAN Asset Tracker




Sealite SLB750




Sealite SLB-1200

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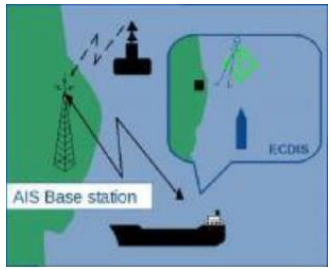
# Syntethic AtoN transmission

PannonRIS

LoRa BS

AIS BS




LoRa

AIS transmission

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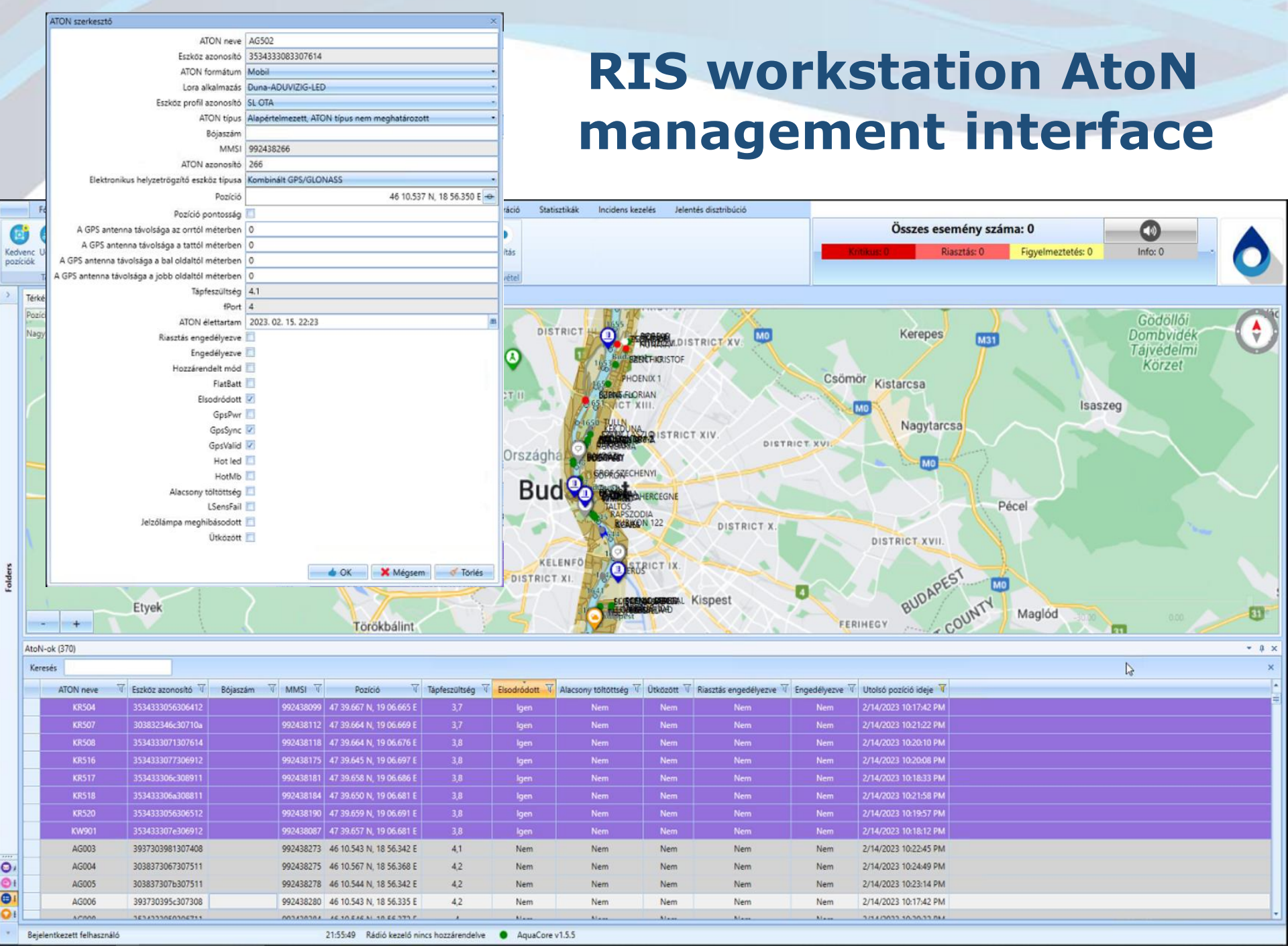
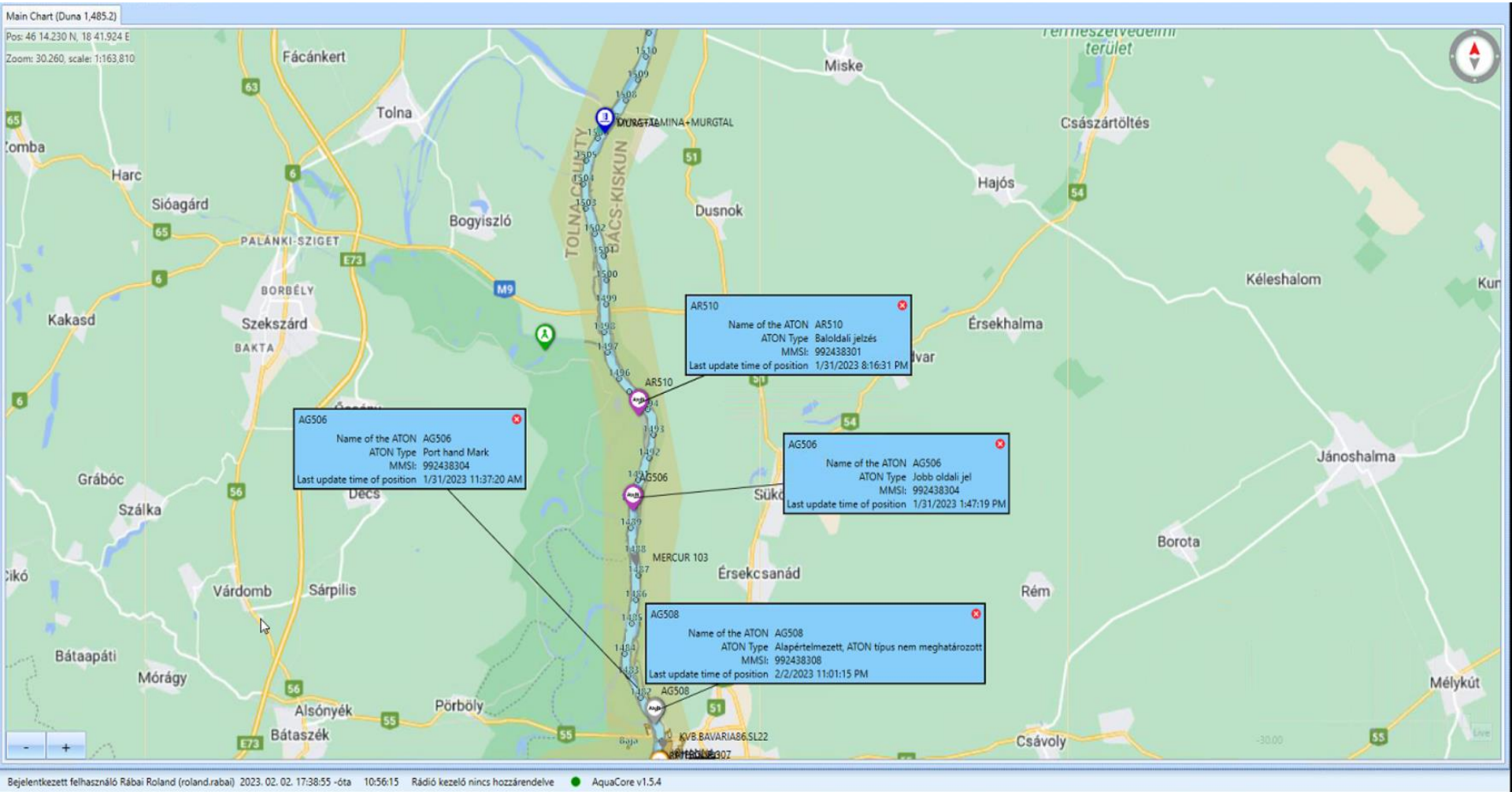
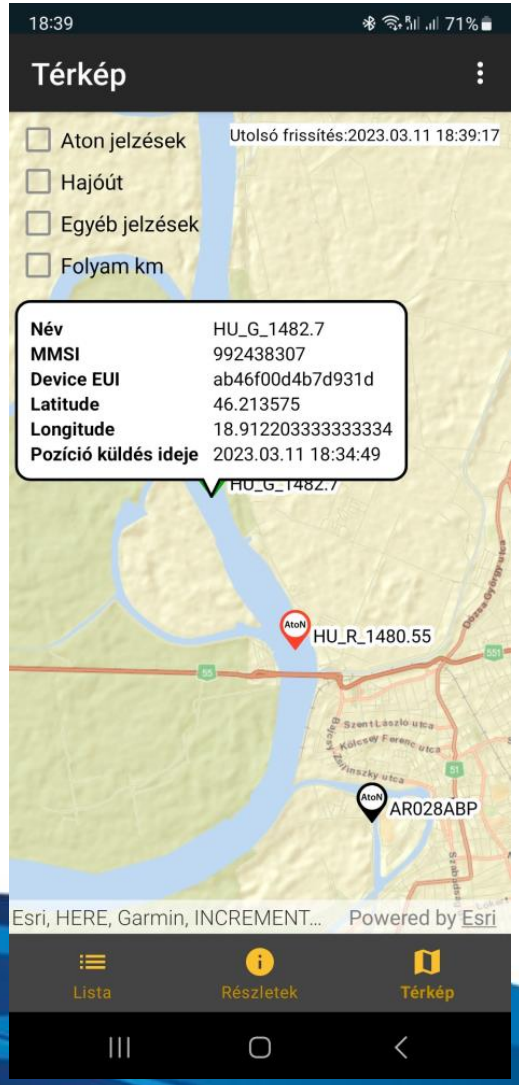
# RIS workstation AtoN management interface

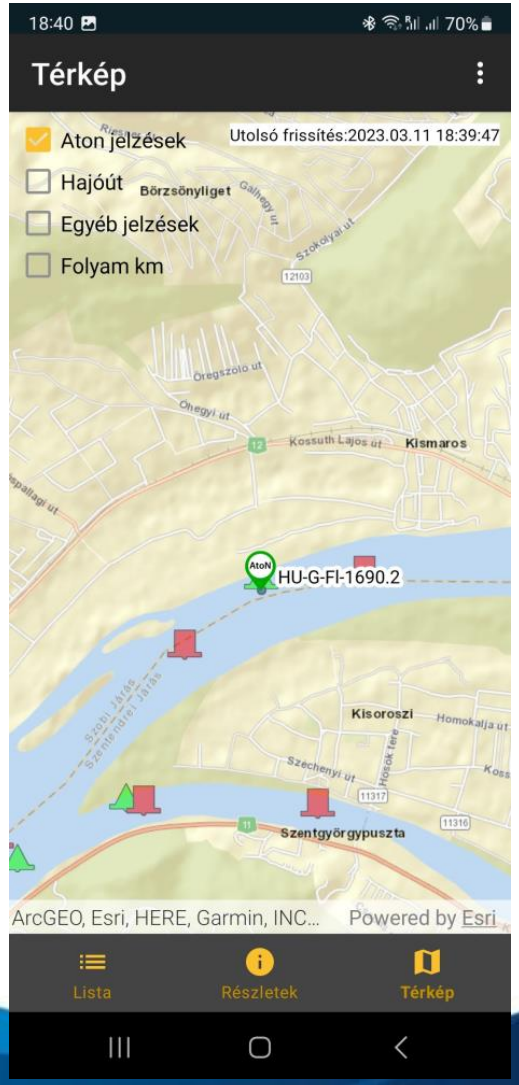


# RIS workstation AtoN monitoring



# AtoN Management mobile application for on-board use



# Thank you for your kind attention!

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