

Port of the future: innovation in action

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Port of
Antwerp
Bruges





2nd largest
port in **Europe**



Largest **car handling**
port in Europe
3,160,000 cars/year



21,400
Seagoing ships/year



Largest **chemical**
hub in Europe



Number one **export**
port in Europe
147 mio tons/year



Total throughput
289 mio ton/year



Important **cruise**
port in Benelux
+ 300,000 passengers



15% of EU **gas** market

Role of digitalisation ?

Vision without action is a pipe dream,
Action without vision is a nightmare

(Japanese proverb)





DIGITAL NERVOUS SYSTEM

sensor devices inspired by the five senses

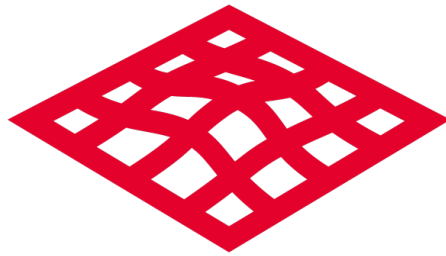
The smart port

Digital nervous system for efficient, safe and sustainable operations



Digital twin

To visualise data and for
operational use



Sensors

To collect relevant
datasets



Drones

For a safe port



5G

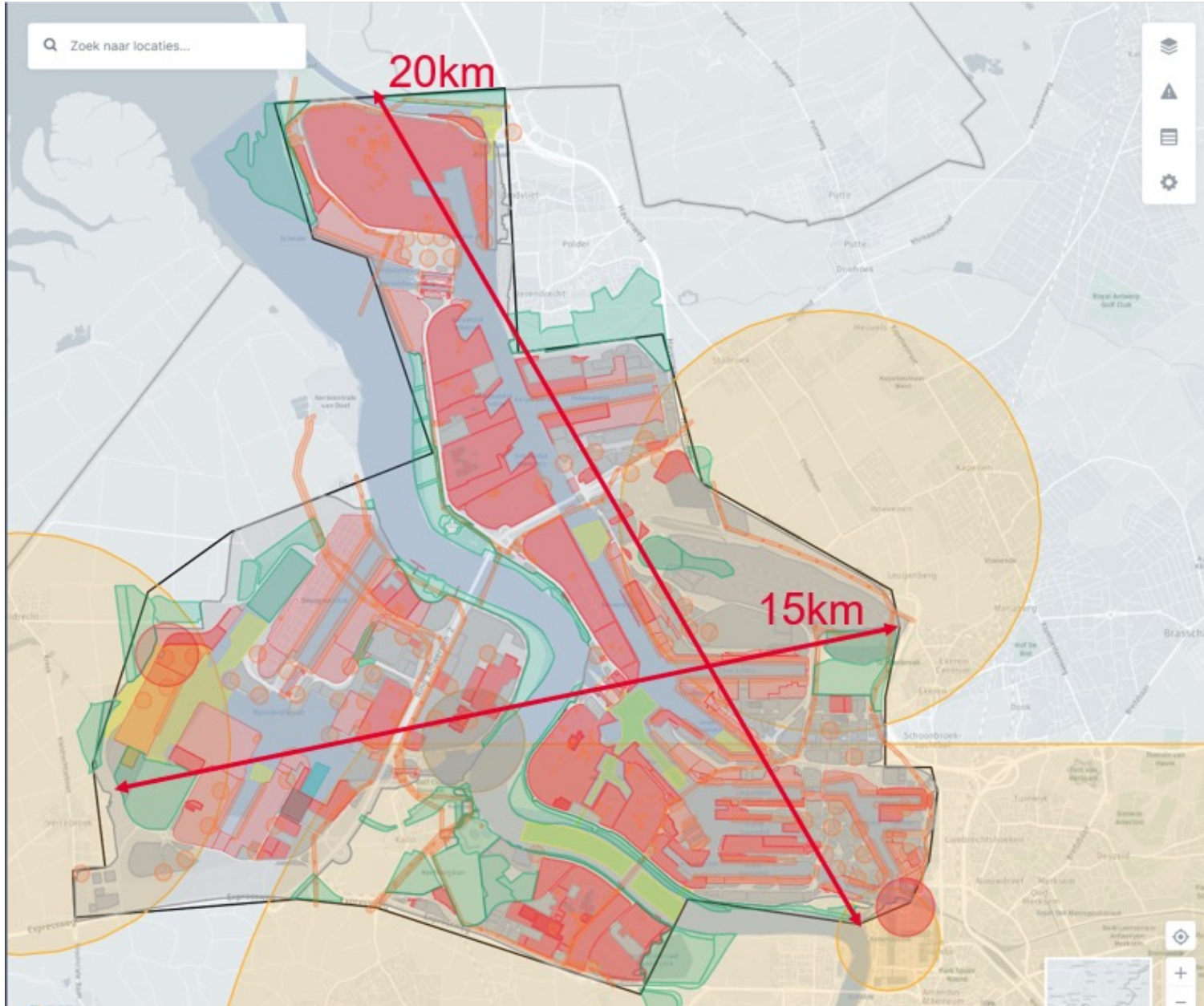
For operational
applications such as
towing tasks or
automation

2018: We had a dream !



“The port of the future has a network of autonomous drones that fly beyond visual line of sight over the port area several times a day and transmit data in real time”

Port of Antwerp-Bruges: a challenging area for drones



- Second largest chemical hub in the world
- 60+ windmills
- 1 airport (CTR-overlap)
- 2 airfields / 2 heliports
- Nuclear Powerplant
- High tension lines
- Nature reserves

Complex Port Area & **Geo Zone**

2019: One giant step forward for autonomous drones !

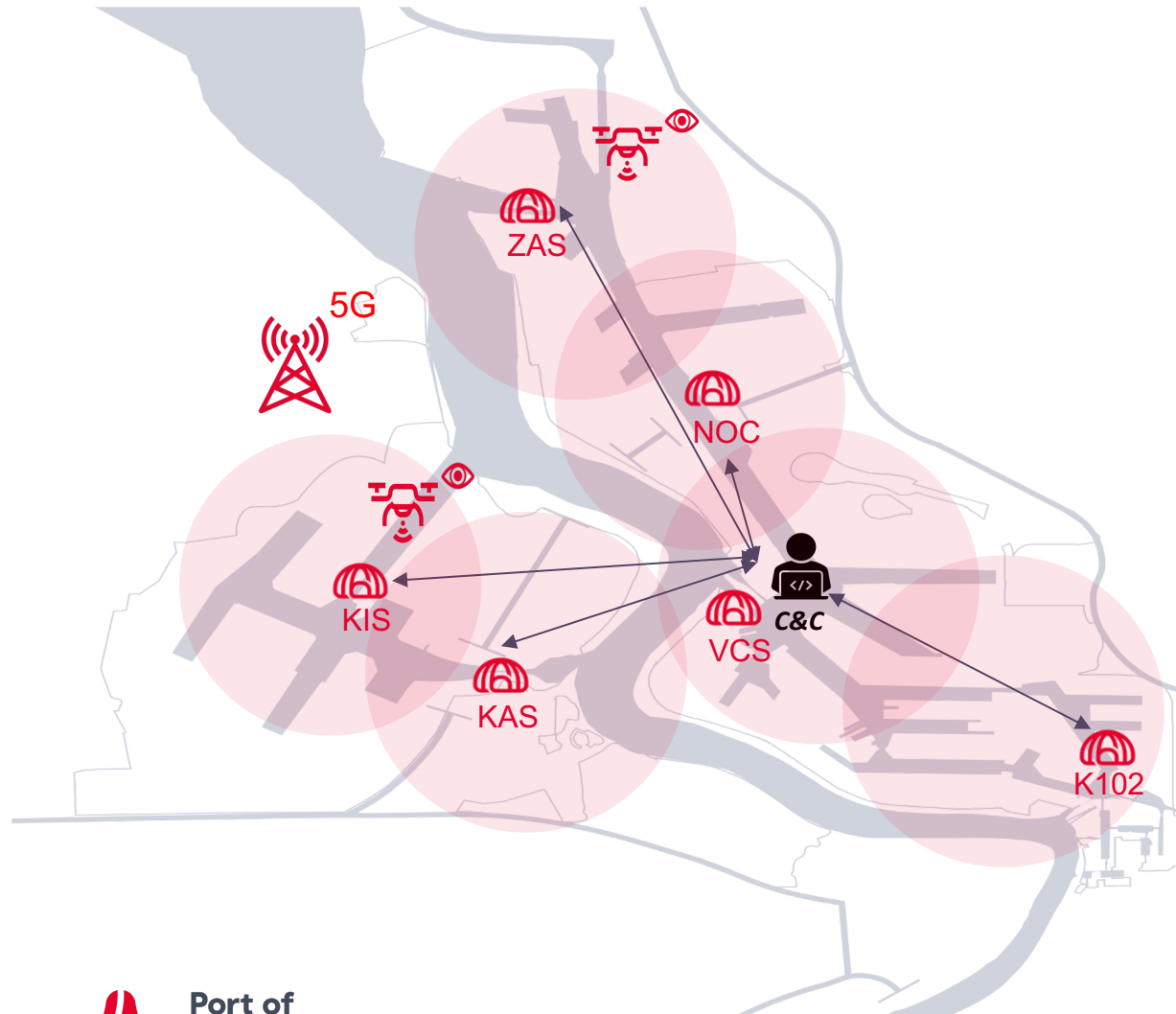


Safe **A**nd **F**lexible Integration of initial U-space services in **R**eal environment



Port of
Antwerp
Bruges

Fast forward to 2023



- Network of **automated** drones POAB
- Fleet of **6 drones** + docking stations
- Central coordination and control center
- DAAS: drone as a service (3 year contract)
- Potential for 18 flights per day 24/7/365
- Flights Above waterways
- Communication via dedicated 5G network
- Authorization for BVLOS





- BVLOS & ATOL
- 8km radius
- 30min flight time
- >7Bft & IP55
- RGB & IR 4K-video
- Integration in port camera network
- 6 base stations throughout the port



Operations

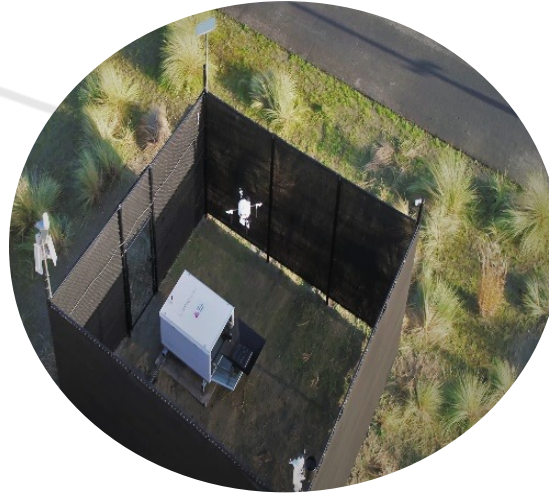


Port planning at Antwerp Remote Command & Control Center (ARCC)

- Define flight path & Risk mitigation
- Get flight authorization
- Activate drone
- Operate Payload

Execute drone flight (Dronematrix)

- Coordination and control drone
- Situational awareness monitoring

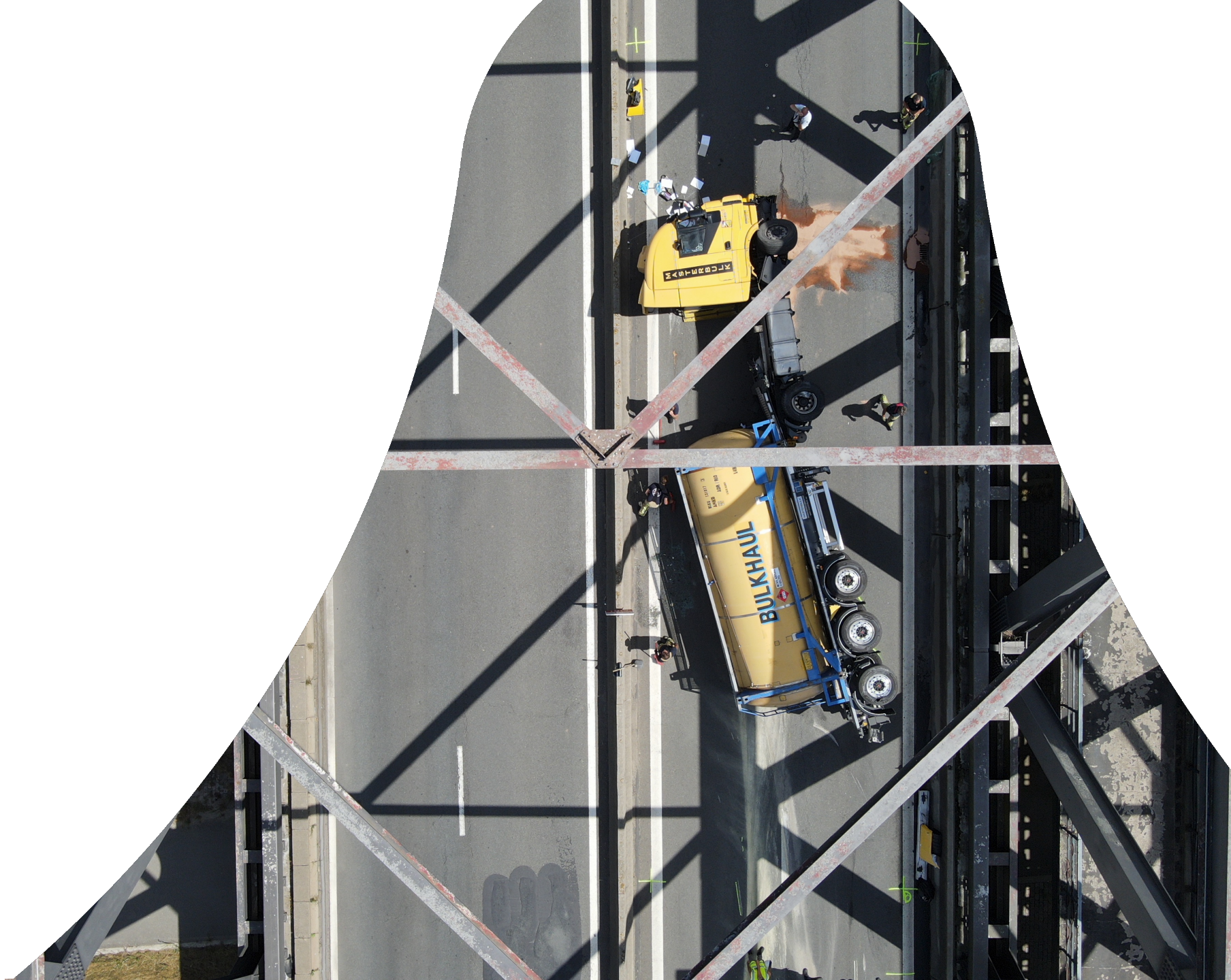


Images / Video (live & HD 4K)

- Integration CCTV
- Actions based in real-time data feeds



Use-cases



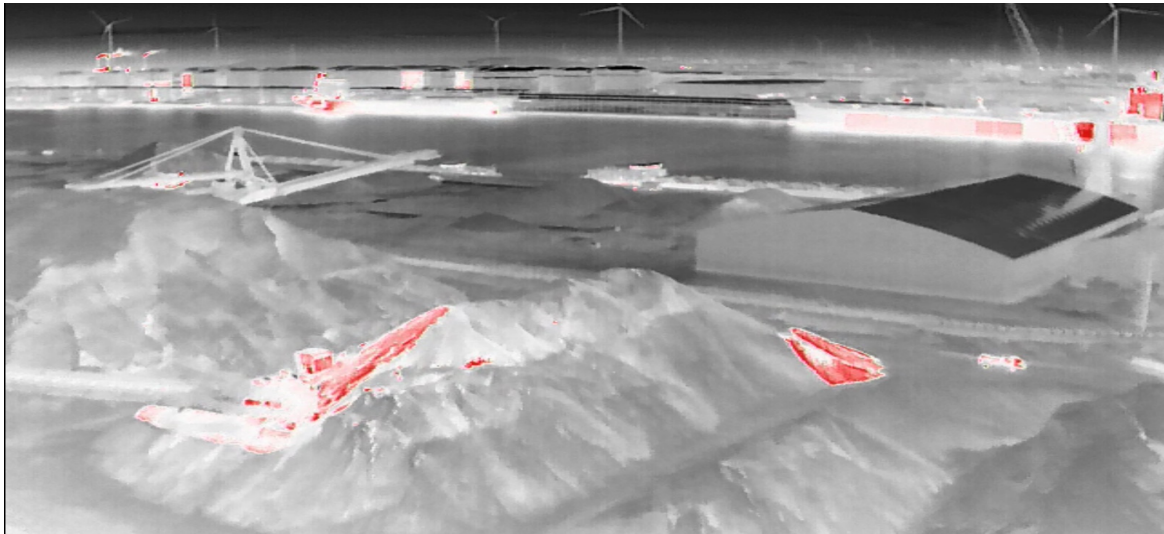
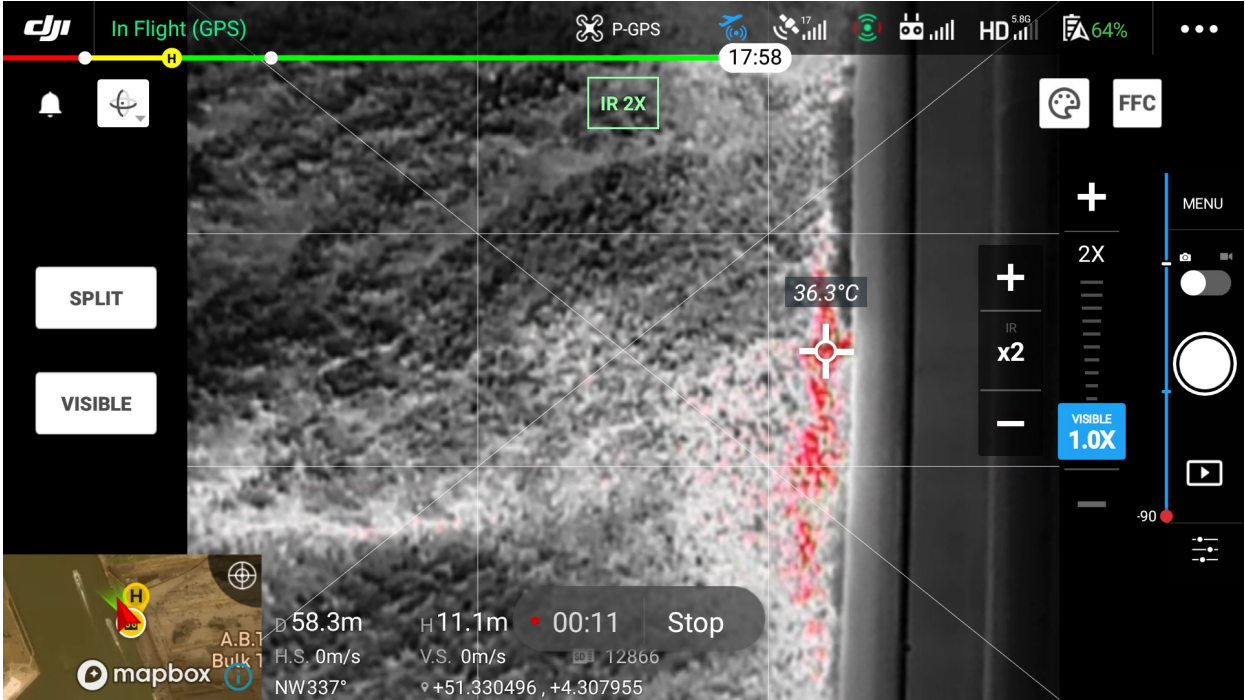
incident management



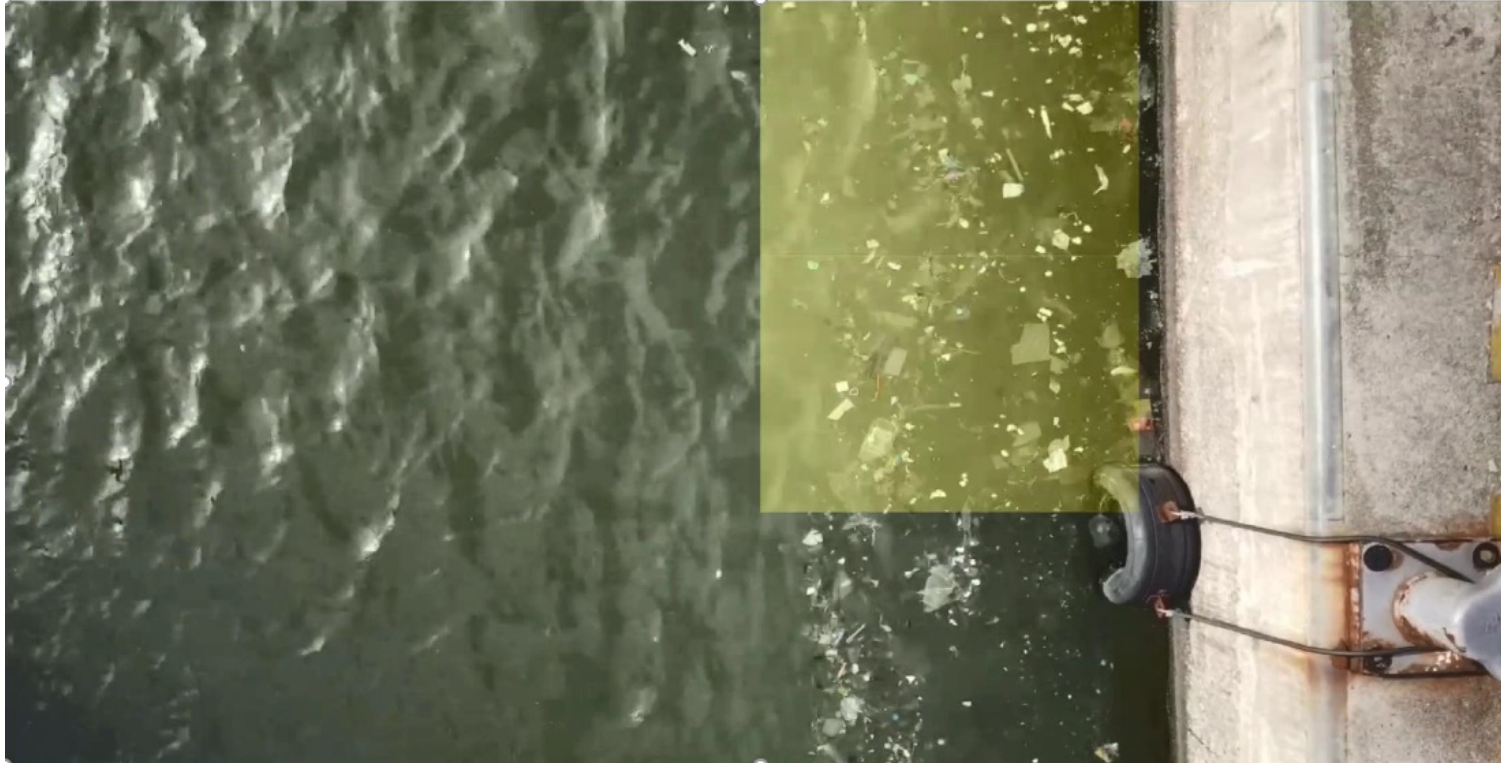
Incident prevention



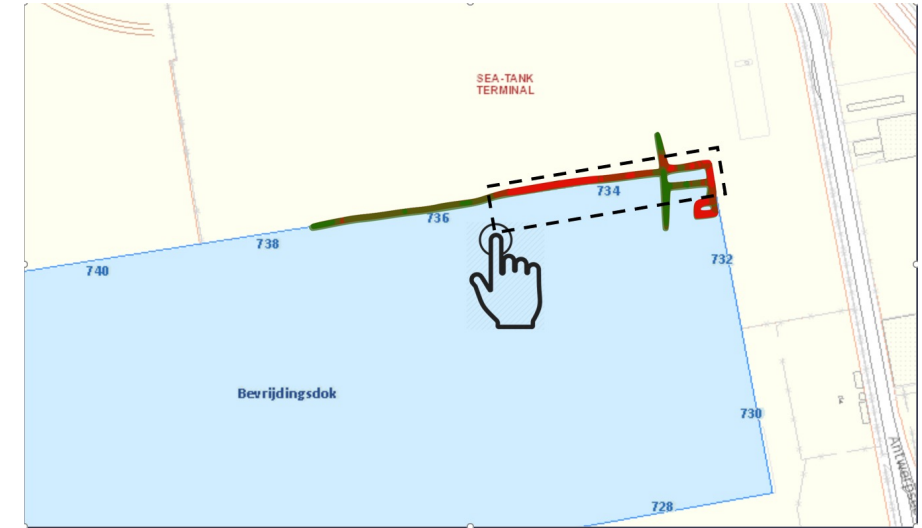
Potential heat pocket detection in coal ore cargo



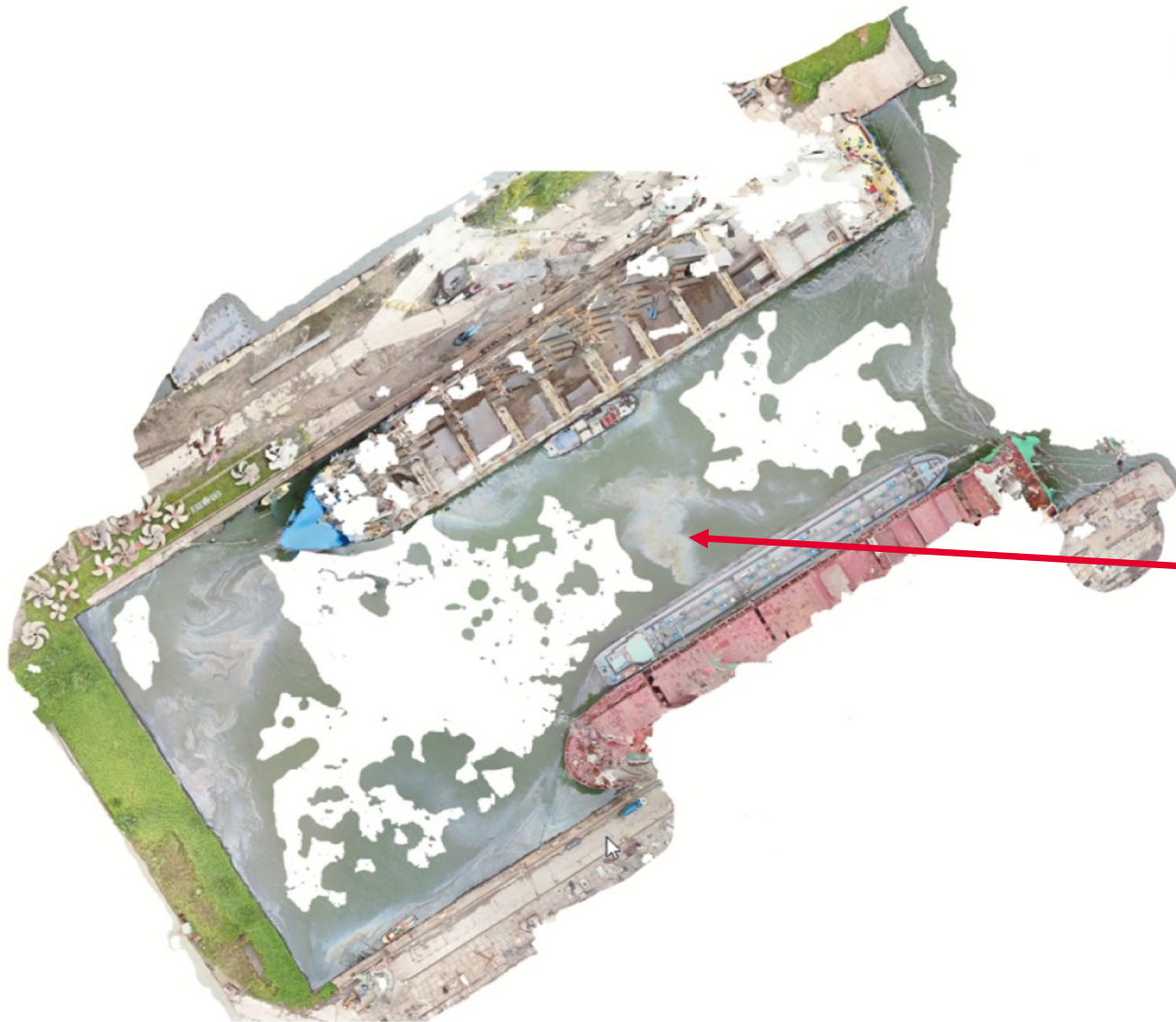
Floating debris detection



Computer Vision of floating debris detection



Oil spill management



Fast situational overview oil spill

2D-stich photo stich

70+ high resolution photos



Infrastructure inspection

