Challenge 1 :
Container registration system on all transport means
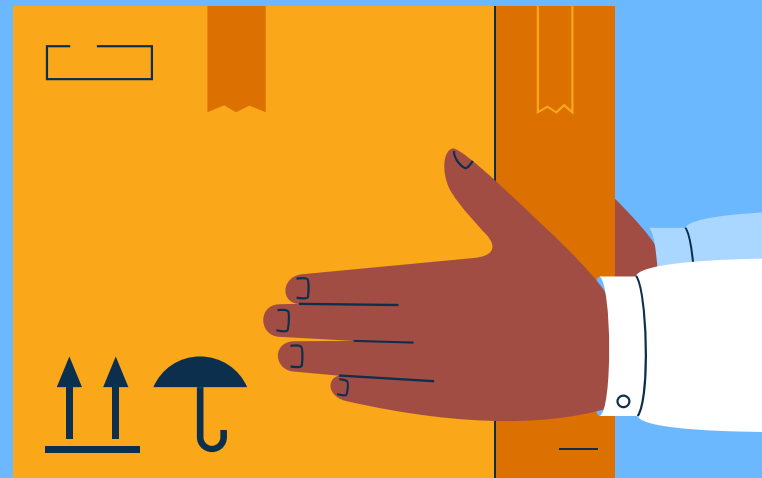
NON-STOP HACKATON

01

Problem

Problem

Counting automatically the containers without manual labour
Container : boat, train, truck

02

Solution

Solution

Sensor & scanner

= reading id of the container

Camera
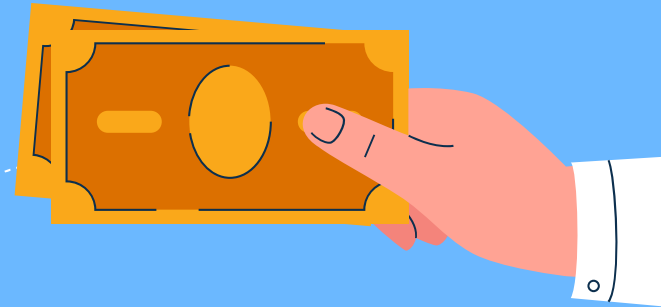
Working together with the sensor and scanner

Communication

Connection with database with 5G

Costs

Sensors and camera's can be put on the cranes, so no new cranes need to be bought

Sensors on every container, but can be reused

Privacy of persons

Contactpersons

Kyomi Staes

IT – HoGent

Matthias Vanpoecke

IT – HoGent

Sharon Compernolle

IT – HoGent

Diego Limonchi

industrial automation and robotics -IES Hermegildo Lanz
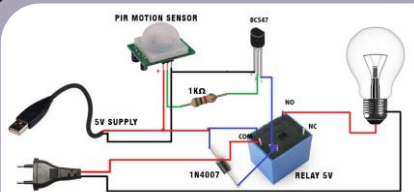
Challenge 2
Light Pollution

Gerben Van Snick
Thomas Odvart
Eleni
Aldrik Muys
Fernando

Mono-directional light's activated by motion

By adding full cutoff coverage to the port lights, light would be aiming at the ground and reducing light pollution
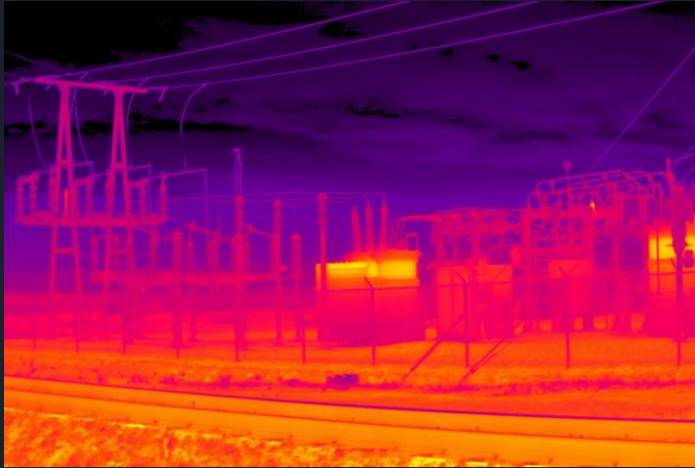
Divide the port into sectors

Motion sensor will be used if motion is detected in a certain sector and turn on the lights

Infrared/Night vision

Infrared

Night vision

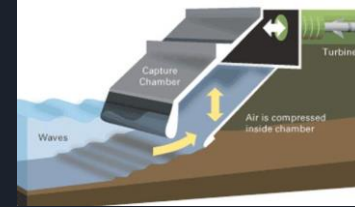Should these **technologies** be **implemented** in unloading cargo at ships, there will be a significant **reduction** in **light pollution**. Because there will **no** longer be a **need** to point large **light beams** at the boats. However, we have to keep **cost-efficiency** in mind.

CO2 reduction strategies

Waves for energy production

Solar panels on light poles & rechargeable battery inside

Summary Light Pollution

Solution 1 (reduce light pollution)

- Mono-directional motion activated lights
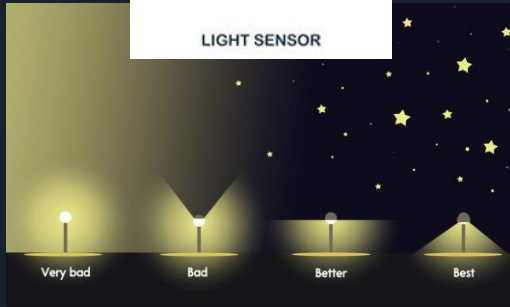
Solution 2 (reduce light pollution)

- Install Infrared/night vision cameras inside crane's so no light is required for moving cargo
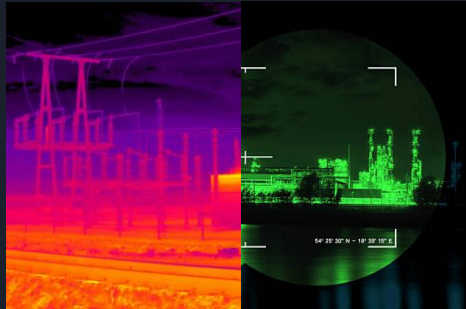
Solution 3 (more green energy)

- Solar panels on top of light poles + battery storage inside the light pole/camera

- Using waves/sea for energy production

Challenge 1

Container registration system on all transport means

OPTICAL CHARACTER RECOGNITION

Container Identification System

① Owner Code (3 letters): TGH
② Product Group Code (1 letter): U
③ Registration Number (6 digits): 759933
④ Check Digit (1 digit): 0
⑤ Size & Type Code (4 digits/letters): 45G1

Operational Characteristics
Maximum weight: 30,480 kg
Container weight: 3,870 kg
Payload weight: 26,610 kg
Cubic capacity: 2,700 cubic feet
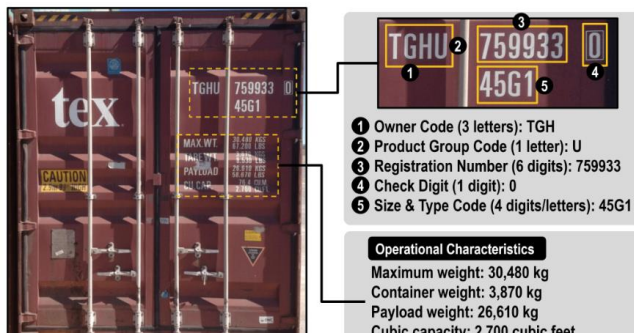
- ▶ Cameras with optical character recognition on cranes

- ▶ Able to interpret standardized container ID

- ▶ Real-life Implementations

- ▶ Easy to send information to database

- ▶ Able to use camera footage for geolocation of container

- ▶ Examples: Camco, Certus Automation

Concerns

- ▶ Privacy not an issue

- ▶ Initial implementation cost high

- ▶ Maintenance (Network administrator, technicians for cameras)

- ▶ Extremely reliable

- ▶ Installation of cameras and servers in 15 months

- ▶ Full cost to be determined by professionals

Light pollution

Group 4
Challenge 2

DD

What is the problem?

Solution

Very bad   Bad   Better   Best
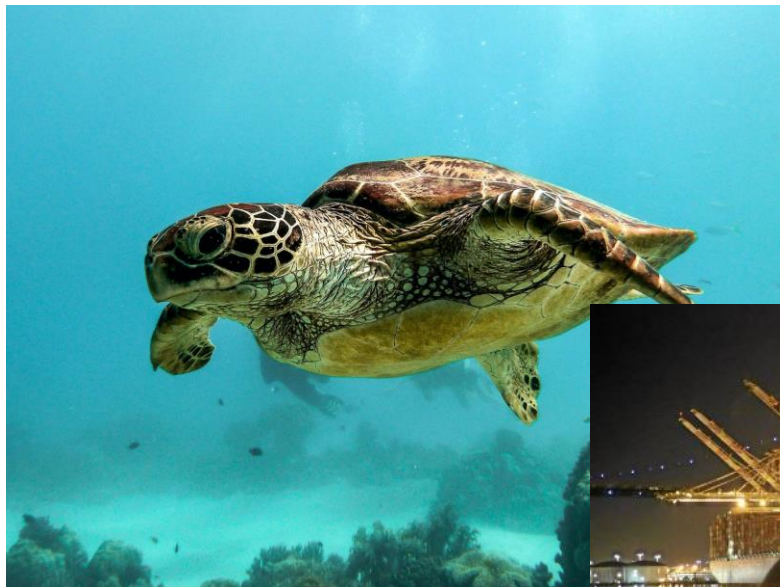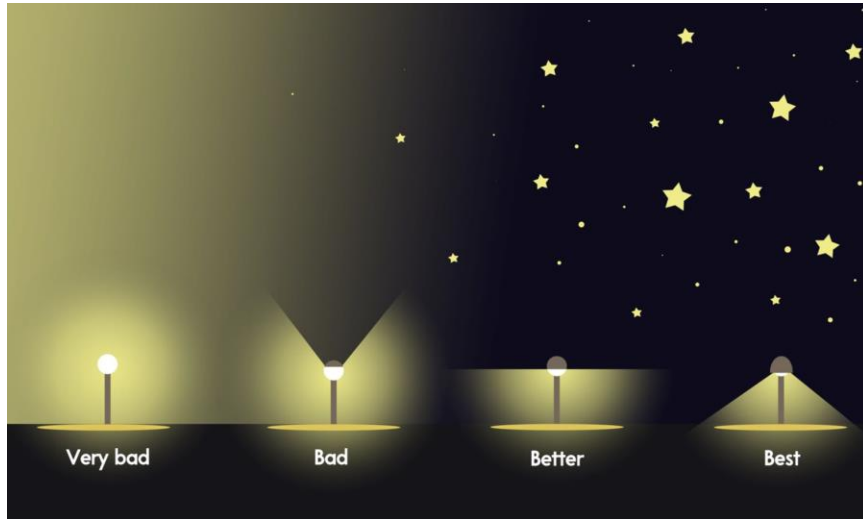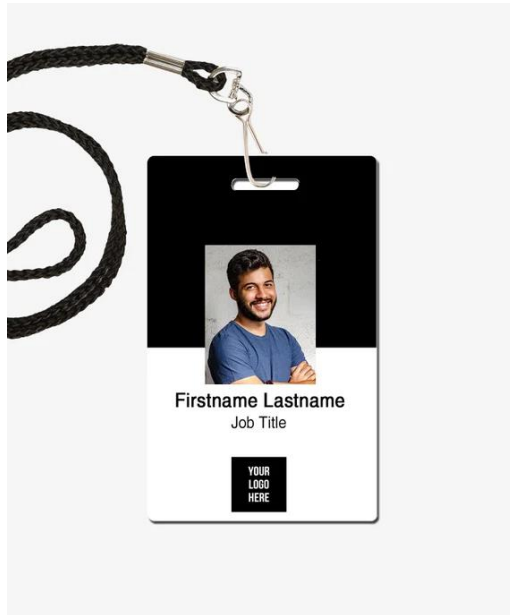
Solution

MQTT - Message Queuing
Telemetry Transport or
Bluetooth

Resources?

Feasibility

Port Size	Cost	Duration
Small	10 500 Euro	2 weeks
Medium	50 000 Euro	5 weeks
Large	100 000 Euro	12 weeks

Conclusion

Case study – Light pollution in ports

What is the problem about light emissions?
Light pollution and its potential impact on human body is a problem. Loss of darkness during the night has a negative effect on the environment, animals, plants and humans. Concerning humans, the light during the night can lead to desynchronization of circadian rhythms with subsequent lower production of sleeping hormone called melatonin. In addition to the negative impact on organisms, there is also economical effect of wastage of lighting during the night. Pollution caused by the occurrence of light during the night is relatively new term, which has been perceived very roughly so far.

The ports

With an average transshipment volume of over one million tons, 8.2 passengers carried and 35,000 ship calls annually, the island supply ports of Norddeich (the starting point of the ferry lines to Norderney and Juist), Bensersiel (starting point of the ferry line to Langeoog) and the island ports of Norderney, Baltrum, Langeoog, Spiekeroog and Wangerooge, represent a key economic factor in the region of East Frisia.

The Norden branch is responsible for operating those seven island and coastal ports. Managing the ferry traffic and island supplies, fishing and leisure boats presents a major challenge, especially in the summer months. Due to their individual characteristics, each port draws tourists and serves as starting point for the ferry boat services and as supply port for the East Frisian Islands. That makes the ports an important and integral part of the economic power in the coastal

region. Some islands are accessible during high tide, only. Except for the island of Norderney, the rest of the islands are car-free (only for public service and supply cars allowed). The means of transport in this case are horse-drawn carriages, buses and bicycles

Over the past few years, Norddeich has evolved into an important location for the offshore wind farms. In the Osthafen (the Eastern Port), multiple wind farm suppliers, such as Ørsted Wind Power Germany GmbH, Nordsee One and Frisia Offshore, have established their operational headquarters for the German Bight. Niedersachsen Ports will further increase the berth capacities.

Lighting needs and requirements in the port can change within a very short time (ferries, island supply boats, private boats, Crew transfer vessels for offshore arriving irregular, fishing boats, cars parking and leaving, trucks and walkers in the port). Inflexible and statically designed lighting only does justice to this to a limited extent. As a result, energy and light saving potentials remain untapped.
The East Frisian Ports are located in the Wadden Sea.

There are several stakeholder interests to consider:

Ferry Operators: Operate ferries according to the demand

Ports: Want to create a safe working environment, reduce the impact on nature, save money, and comply with lighting regulations

Residents: Want to have less light emissions

Nature Conservation Agencies: want to reduce light emissions and their negative impacts on sensitive areas
Etc.

How can the lighting be managed smarter and more dynamic in order to balance as much interests as possible?

5/12/2022, 13h-17h

NON-STOP
STUDENT HACKATON

Interreg
North Sea Region
NON-STOP
European Regional Development Fund
EUROPEAN UNION

HO GENT

UNIVERSITY OF THE AEGEAN
Department of Marine Sciences

JADE HOCHSCHULE
Wilhelmshaven Oldenburg Elsfleth

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PORT OF ZWOLLE

Port Oostende energy port

Niedersachsen Ports

KORSØR HAVN

BERG-PACKHÄUSER & KOLLEGEN
Rechtsanwälte & Wirtschaftsmediation

connectivity by
CITYMESH

PORT OF HELSINGOR
HOME OF HAMLET

Bluebridge
Incubatie- en Innovatiecentrum

Port of Antwerp Bruges

Narvik Havn KF

Associated partners

PROGRAM

The program of the hackaton will be as followed:

-13h-13h15: Presentation of the NON STOP project (Main room)

-13h15-13h45: Challenges in Ports to be solved (Main room)

-13h45-14h30: First part break out rooms

-14h30-14h45: Pause

-14h45-15h45: Second part break out rooms

-15h45-16h30: Pitches of the students' groups (Main room)

-16h30-17h00: Jury of the pitches and Closing words (Main room)

(SME) PORTS:

*Digital transformation in ports is needed

    -More efficient

    -Less polluting

    -Cost limiting

*But, ports are no copies of each other,

    -different activities

        with different infrastructures, financial possibilities,...

*Adapting existing technological applications or new ideas,...

NON-STOP

- New smart digital Operations Needed for a Sustainable Transition of Ports

- eco-innovation project ,co-funded by Interreg North Sea Region Program 2014 – 2020.

- green investments to reduce <u>by 10% the time </u>of several port operations and lower by <u>10% the pollution </u>of port activities.

- Aimed at SM Ports

- strong North Sea Region partnership

NON-STOP PILOTS

Pilot	Port
Harbour integrated digitalised management system	Port of Zwolle
Safety/security management to avoid shifting of ships	Port of Narvik
Development of a Port Digital Twin:	Port of Ostend/ Port of Zeebrugge
Shore power investment	Port of Helsingør
Integrated water & sediment management dash-board	Port of Emden
Intelligent shore power system & dashboard	Port of Korsør

Challenge 1

"Container registration system on all transport means"

Lennard Drogendijk

Challenge 2

"Light pollution in ports"

Daniela da Rosa

Break Out room:

*You will be automatically assigned to 1 of the 4 groups

*You will brainstorm on challenge 1 or 2 (depends on the group you are)

*One person of the groups opens a WORD document and share his screen

*Use the chat functions to pass each other extra information or links

*We have 3 coaches that will go in/out of the rooms to help you

Coaches:

Jan Allaert, Commercial Director Port of Ostend

Jens Buysse, Research Manager CityMesh

Daniela Da Rosa, Project engineer Niedersachsen Ports

Peter Merlevede, Innovation & digitalisation manager Port of Antwerp - Bruges

Break Out Session 1:

*Introduce yourself to each other

*One person share a WORD document to write notes

*Think, brainstorm, interact....

*You can use the chatfunction in the breakoutroom to pass each other information

*Ask the coaches

Break Out Session 2:

*Try to concretize your idea

*Make a small presentation on it (3 slides-5min)

*Choose a person who will present

Final Pitches:

*Group 1: Challenge 1: **"Container registration system on all transport means"**

*Group 2: Challenge 2: **"Light pollution in ports"**

*Group 3: Challenge 1: **"Container registration system on all transport means"**

*Group 4: Challenge 2: **"Light pollution in ports"**

Join at

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#2669 736

Inter
North Sea R
NON-STOP
European Regional Develop

Case study – Container registration system on all transport means

Port of Zwolle weet dat er veel lading door haar drie havens gaat. Meeste in Kampen en Zwolle. We zouden graag een soort tracking device willen hebben die het aantal containers dat de haven binnenkomt en de haven verlaat telt.
Dus een camera met object herkenning van de container op het schip. En camera's bij alle uitgangen van het haventerrein die ook vrachtauto container en of trein e.d. herkennen.
Zo weten we precies het aantal TEUs en ook het aantal wat juist van weg naar schip of schip naar trein e.d. gaat. We hoeven dat dan niet meer na te vragen of uit andere systemen te halen.

Hoe zouden we dat het beste kunnen aanpakken? Zonder privacy schendingen?
Wat is een kostenraming van zo'n project. Hoeveel doorlooptijd schatten jullie in.

What is the problem about container counts?

Every year the port authority has to request data from the companies in the port concerning shipment of goods and containers to calculate the total sum of shipments and movements in the port. This is a time consuming job and always a rough estimate. The importance of ports is measured in the number of Teu and the number of containers. Port of Zwolle has a need for accurate information.

The Port of Zwolle

The port of Zwolle had 6 million tons of bulk product shipped and 141.000 TEU in container load.
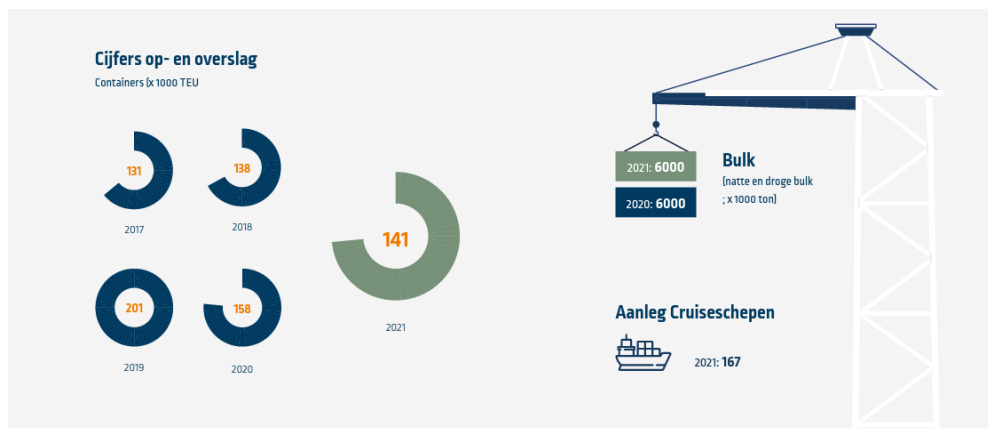
The top year of container movement was 2019 with 201.000 Teu. Port of Zwolle is a combined port of three municipalities with 3 ports and a number of docking stations. The port of Kampen receives a lot of cruise vessels and therefore people. The ports of Meppel and Zwolle are more industrial.
Lately, Port of Zwoll introduced a digital parking app to register its users and to collect the port duties. The digital system also unlocks shore power and water and registers waste (and collection) and creates a digital communication channel between shipper and port authority.
With the logistical crossroads within the ports, the Port of Zwolle is strong economic power in the region.
With a view to the energy transition, more transport by water and circular production processes, Port of Zwolle is developing as a logistical hub for circular activity; a port of the future. Port of

Zwolle is of essential importance in the development of the Zwolle Region into the 4th top economic region of the Netherlands.

Digitalization is a key objective in our ports. We think the automatic counting of containers and possibly bulk would be of value to us, but maybe also to others. What we would like is a closed system which counts the incoming container in the various ports. But also the outgoing containers by boat, truck and train. This means various camera positions on various points in the ports. One of the specific features would be the privacy infringement. We want a system which does not breach privacy. This means, the data stored on the computers should not contain images. This would possibly lead to a Lidar system and a computer system working with algorithm. The question is:

- How would a system that we foresee look like?

- What will be the costs building it (Investment)?

- What will be the costs maintaining it (exploitation)?

- How accurate will it be?

- How is the privacy of people safeguarded?

- Can you desdribe a timeline of implementation?

Stakeholder interest to be considered

Port Management Port of Zwolle
Various municipalities with their regional develompent plans and port development plans
Companies and shippers calling at Port of Zwolle
Private citizens on board of ships

Contacperson for this assignment:
Lennard Drogendijk – l.drogendijk@bdfriesland.nl
Jeroen van den Ende – j.vandenende@portofzwolle.nl