FACULTY OF ENGINEERING AND ARCHITECTURE

Construction status of the Coastal & Ocean Basin – COB @ Ostend Science Park (Belgium)

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& Techn. campus Oostende

Waterbouwkundig Laboratorium

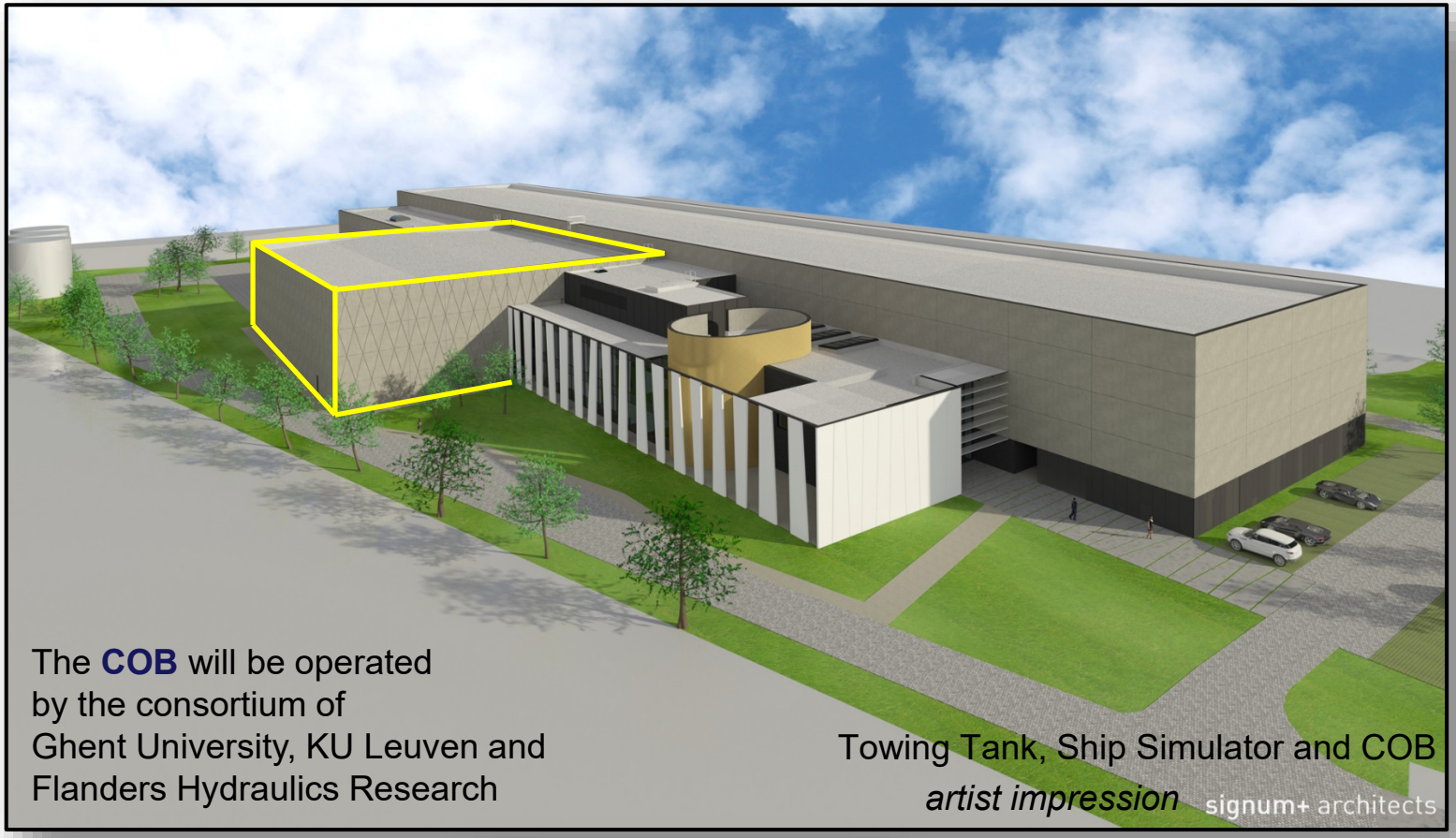
Vlaanderen is wetenschap

Flanders Maritime Laboratory, Oostende

Ostend, March 2018

Flanders Maritime Laboratory, Oostende

Flanders Maritime Laboratory, Oostende



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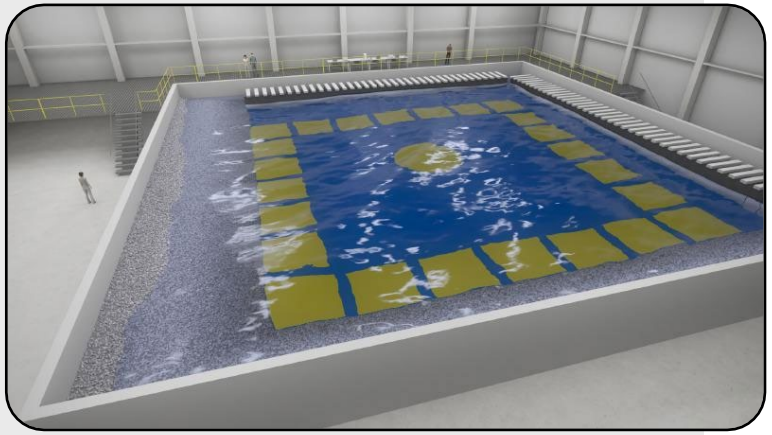
Coastal & Ocean Basin

- background, funding and consortium
- motivation and unique positioning
- COB design characteristics
- project integration on various scales
- conclusions



background and funding

- **Gen4Wave project**
  - initiated by **UGent** + **AGORIA - Generaties**
  - organised by **UGent** + **KU Leuven** + **FHR**
- **Hercules foundation project (now under FWO)**
  - large research infrastructure only
  - wavemaker and current generator
- **VLAIO (formerly IWT)**
  - research infrastructure and personnel
- **Department of Mobility and Public Works**
  - housing and concrete structures for COB
- **network of innovative companies**
  - contractors, consultancy, developers, …

fwo Opening new horizons

AGENTSCHAP INNOVEREN & ONDERNEMEN

Vlaanderen is mobiliteit & openbare werken

Vlaams Instituut voor de Zee

DEME
Dredging, Environmental & Marine Engineering

anteagroup

LAMINARIA

Vrije Universiteit Brussel
R&D-DEPARTEMENT

SAEY
STEEL SERVICE CENTER

ZF

MBG

COMPANIES AND INSTITUTES SUPPORTING THE DEVELOPMENTS FROM THE EARLY START

DJN ondernemingen Jan De Nul n.v.

HERBOSCH-KIERE

Cocas

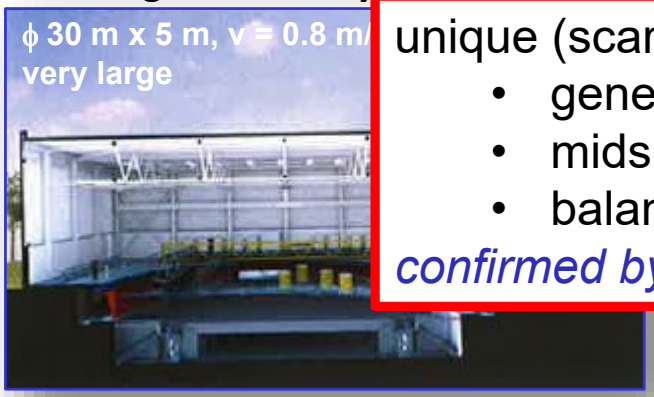
IMDC
International Marine & Dredging Consultants

CATHIE ASSOCIATES

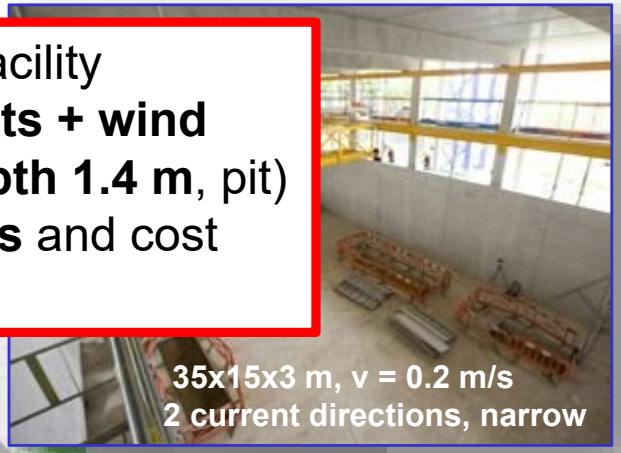
unique positioning in Europe

recently constructed basins in Europe

Edinburgh University, UK



Plymouth University, UK

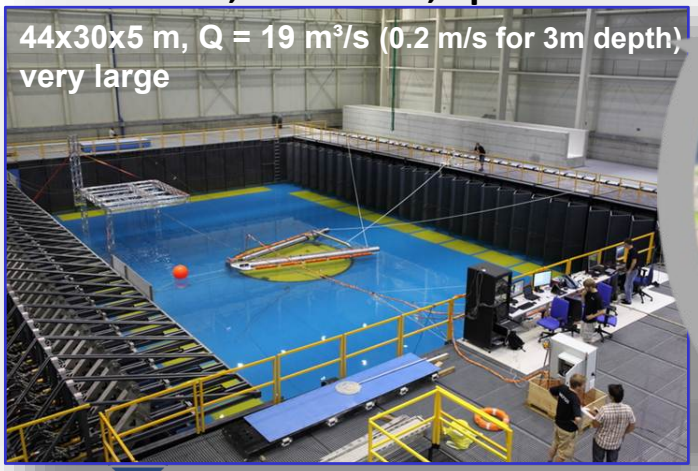


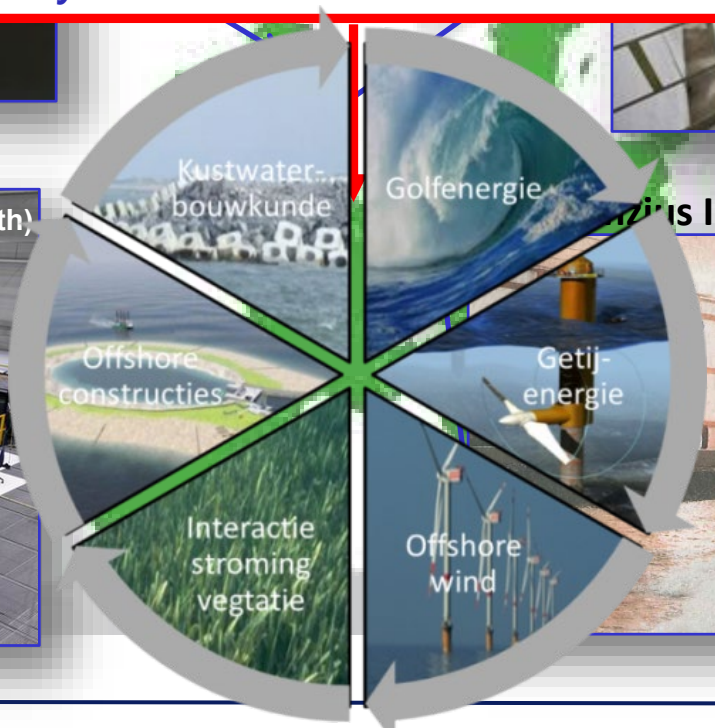
unique (scarce) European research facility

- generation of **waves + currents + wind**
- midsize (30 x 30 m, **water depth 1.4 m**, pit)
- balance between **scale effects** and cost

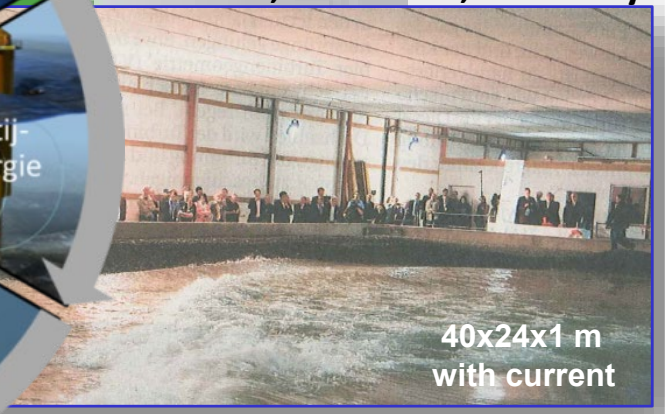
confirmed by international reviewers!

IH Cantabria, Santander, Spain





…s Institute, Hannover, Germany



Coastal and Ocean Basin – COB, Oostende

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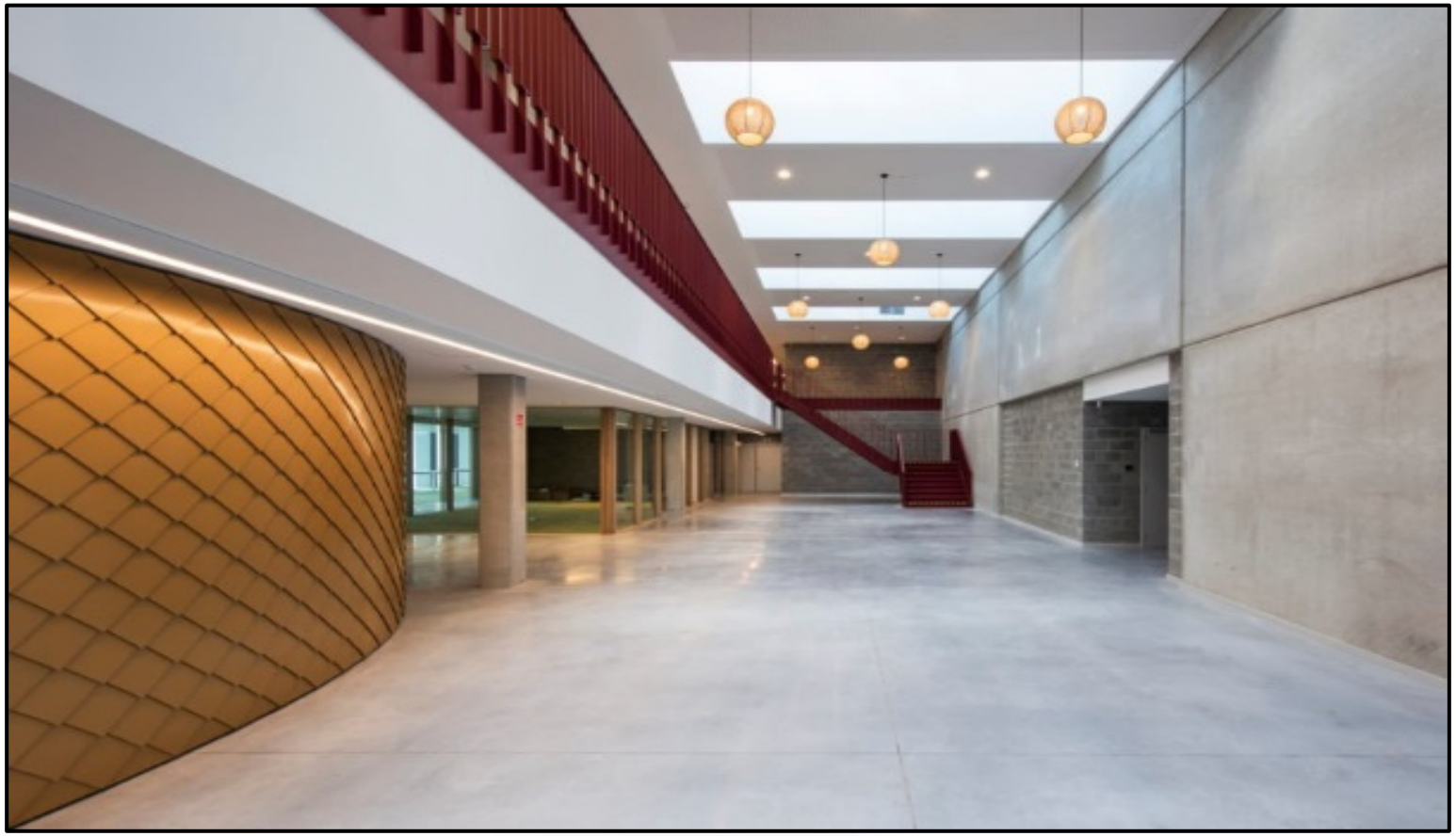

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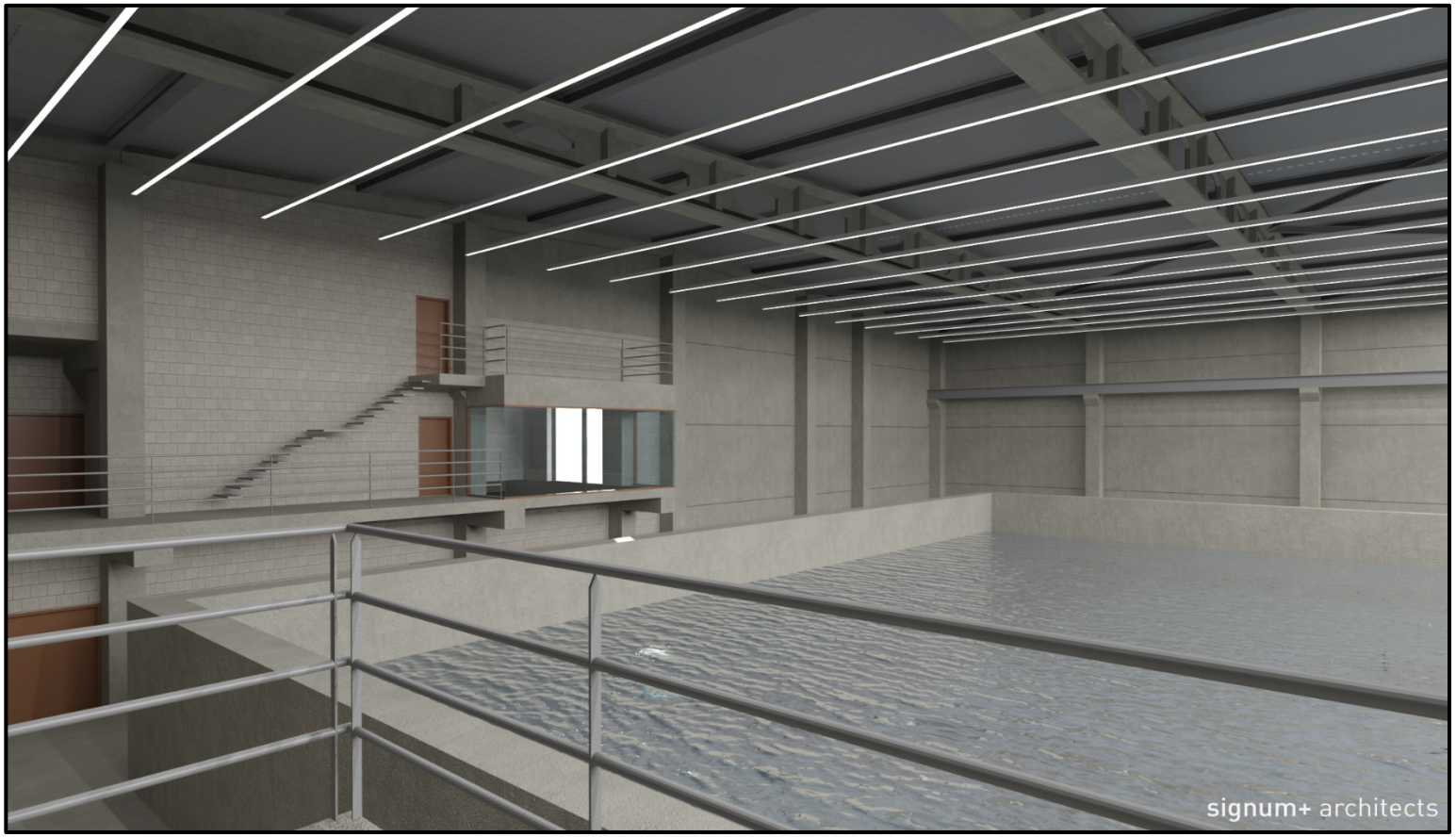

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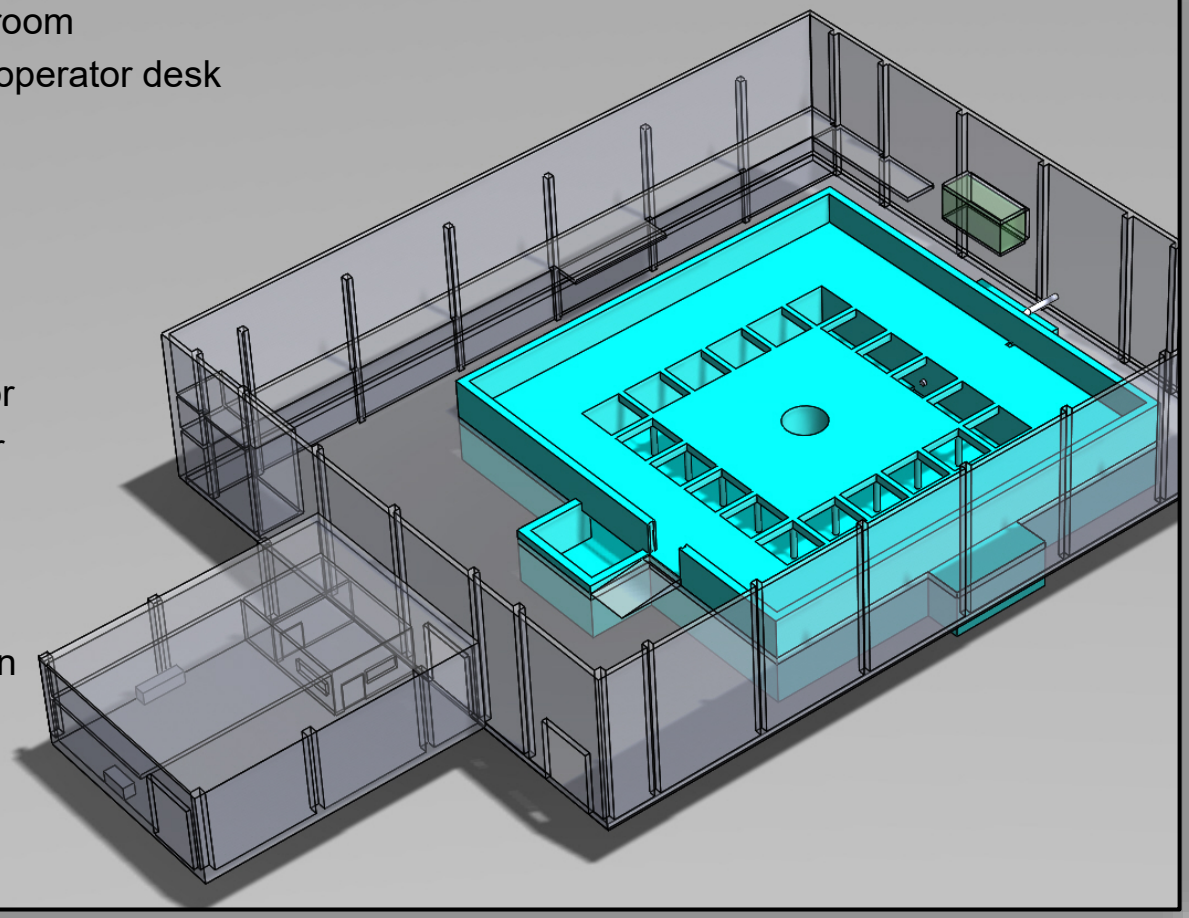
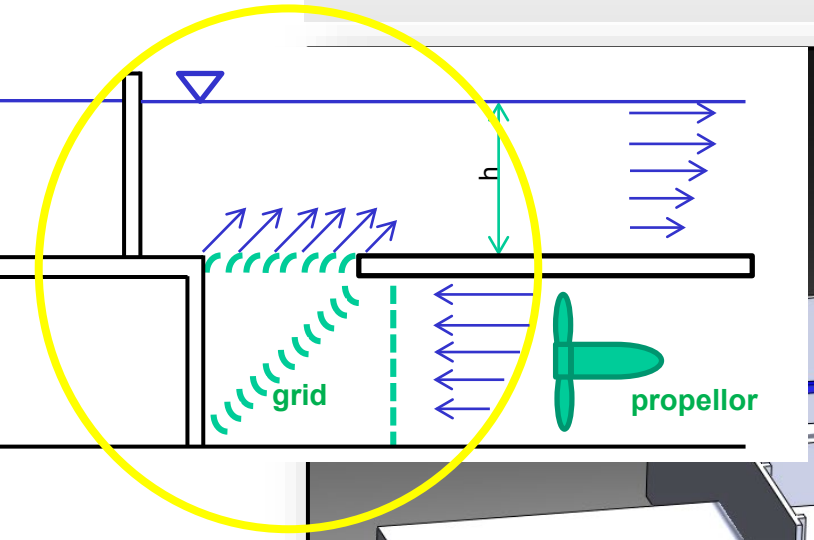
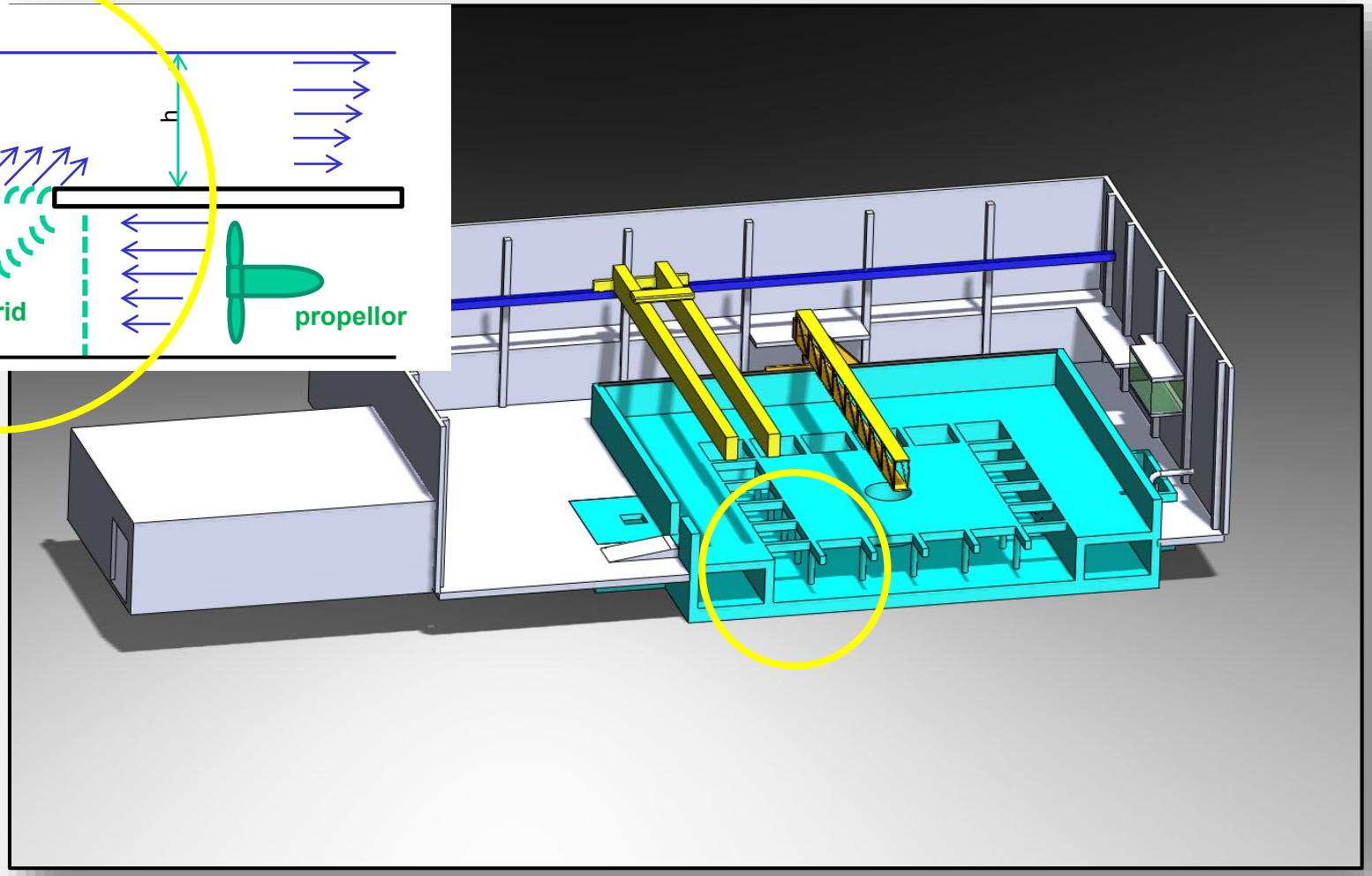
Coastal and Ocean Basin – COB, Oostende

- COB main hall
- main operator room
- Gangway with operator desk
- Wave tank
- Current tank
- Central pit
- Working area
- Workshop
- Wave generator
- Wind generator
- Current pumps
- Bridge crane
- Passerelle
- Pumping station
- Wheelloader
- Forklift
- DAQ

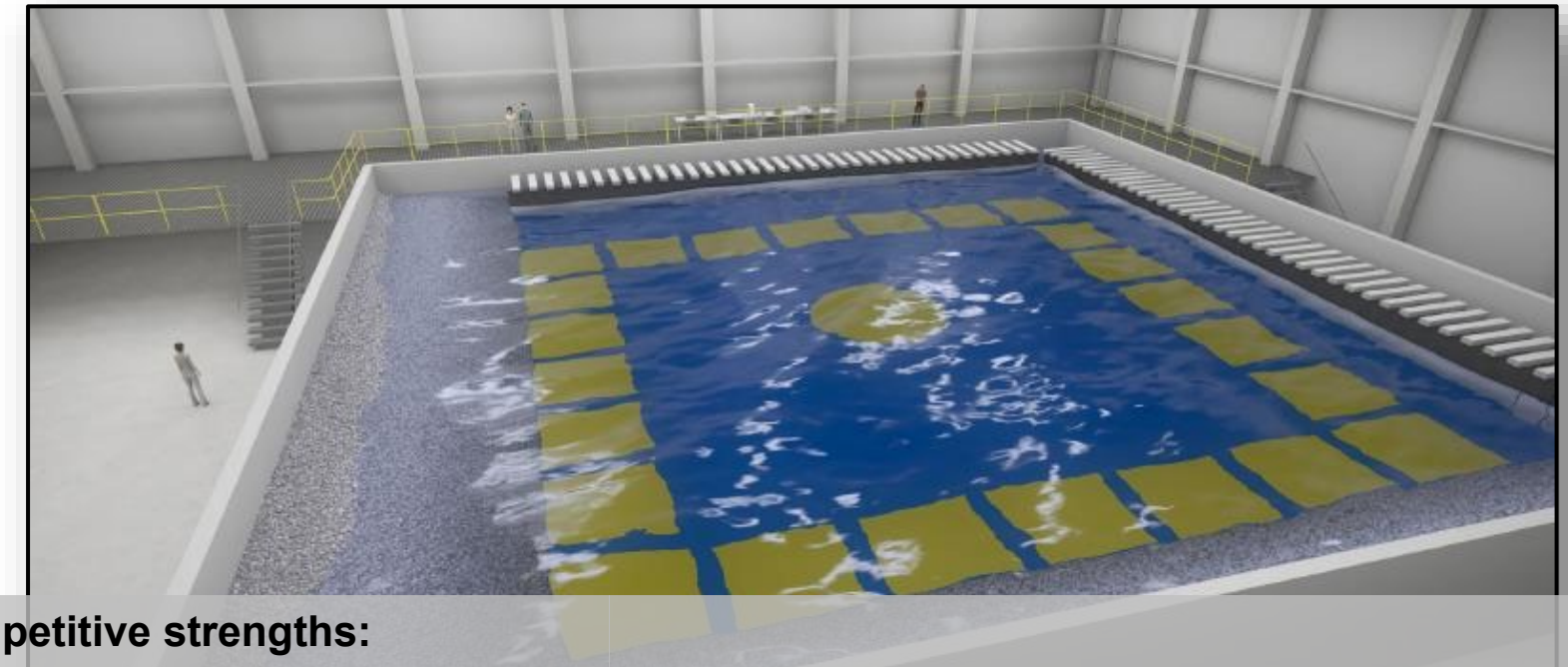


Coastal and Ocean Basin – COB, Oostende



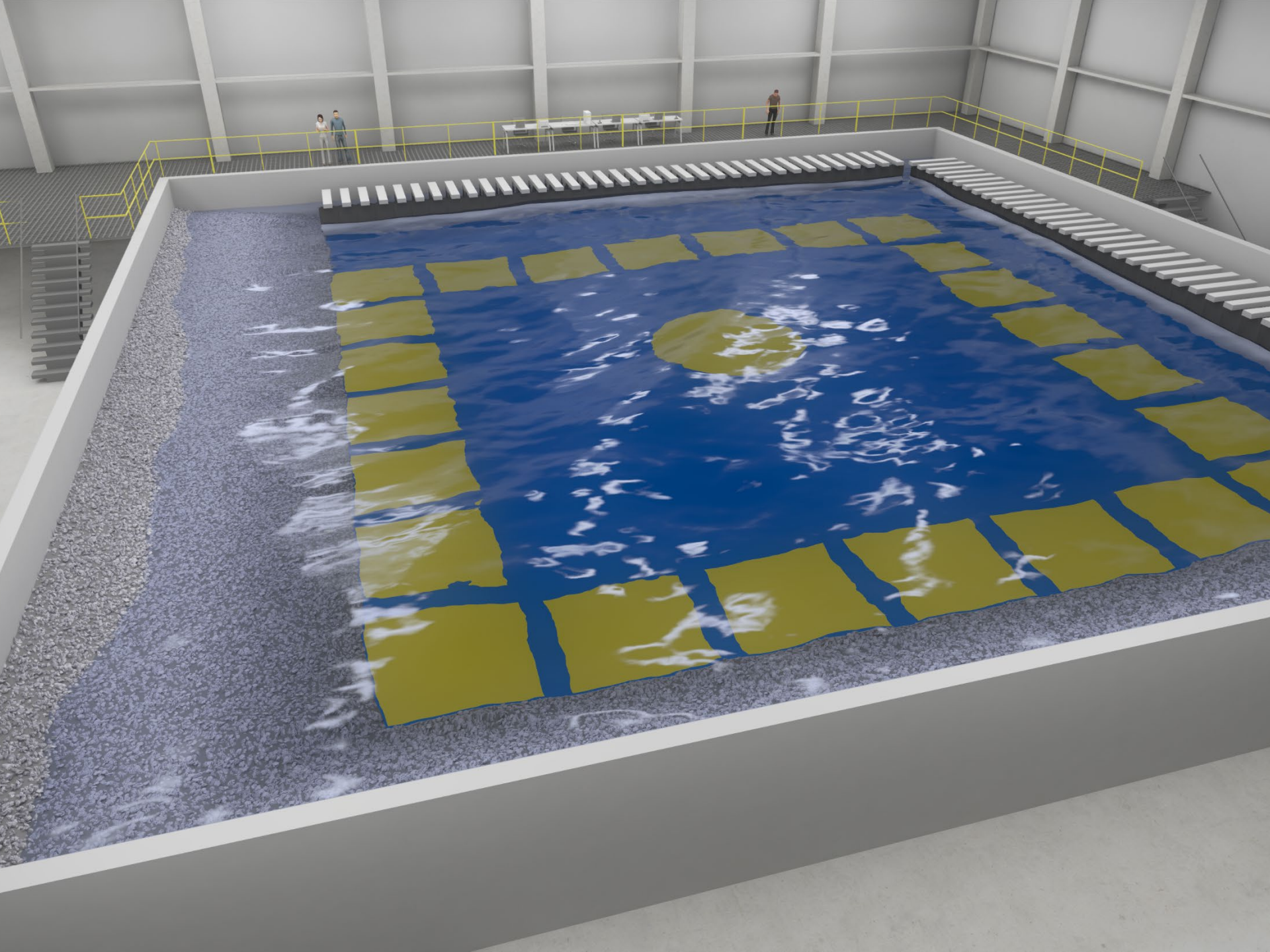


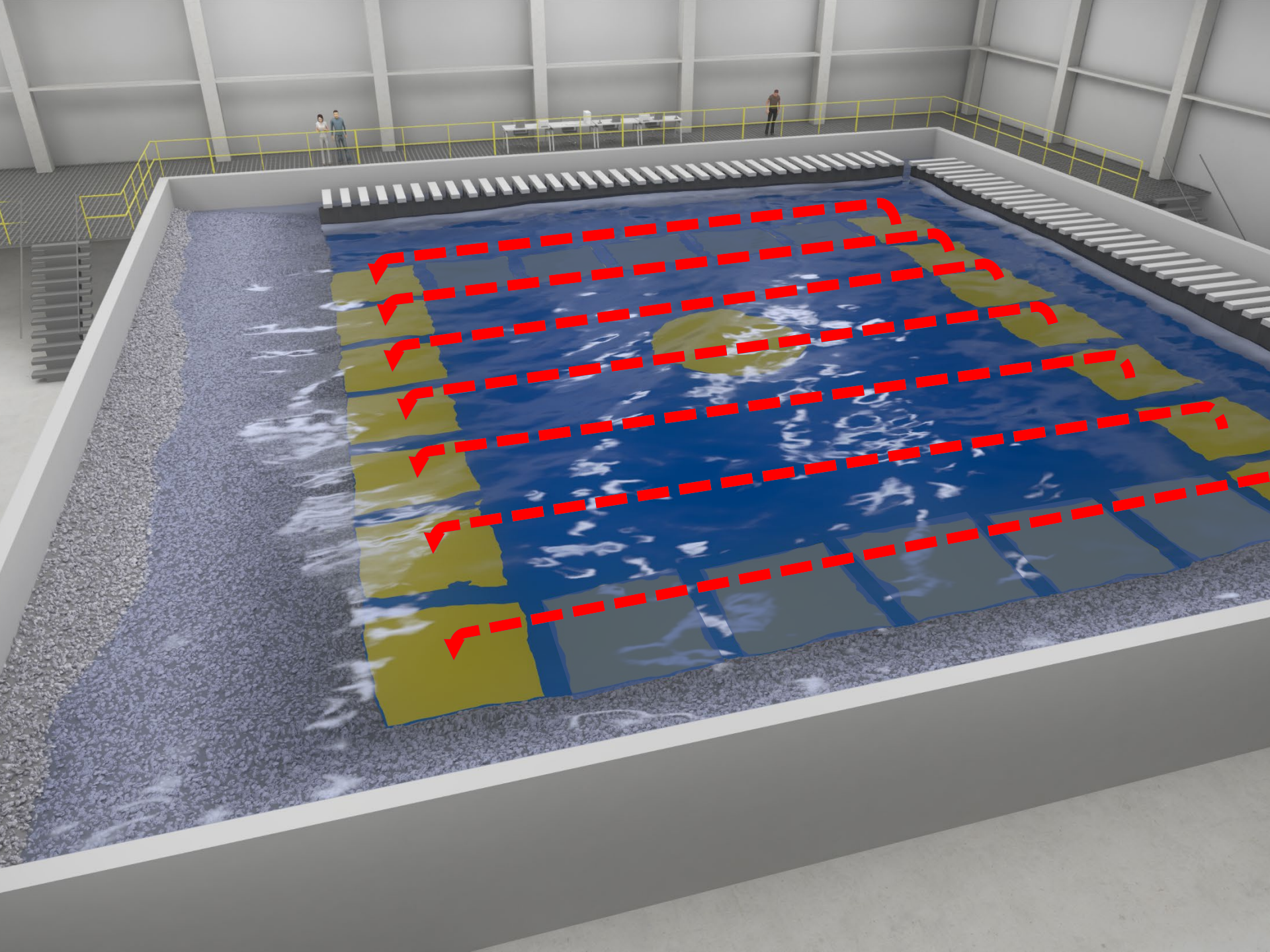
Coastal and Ocean Basin – COB, Oostende

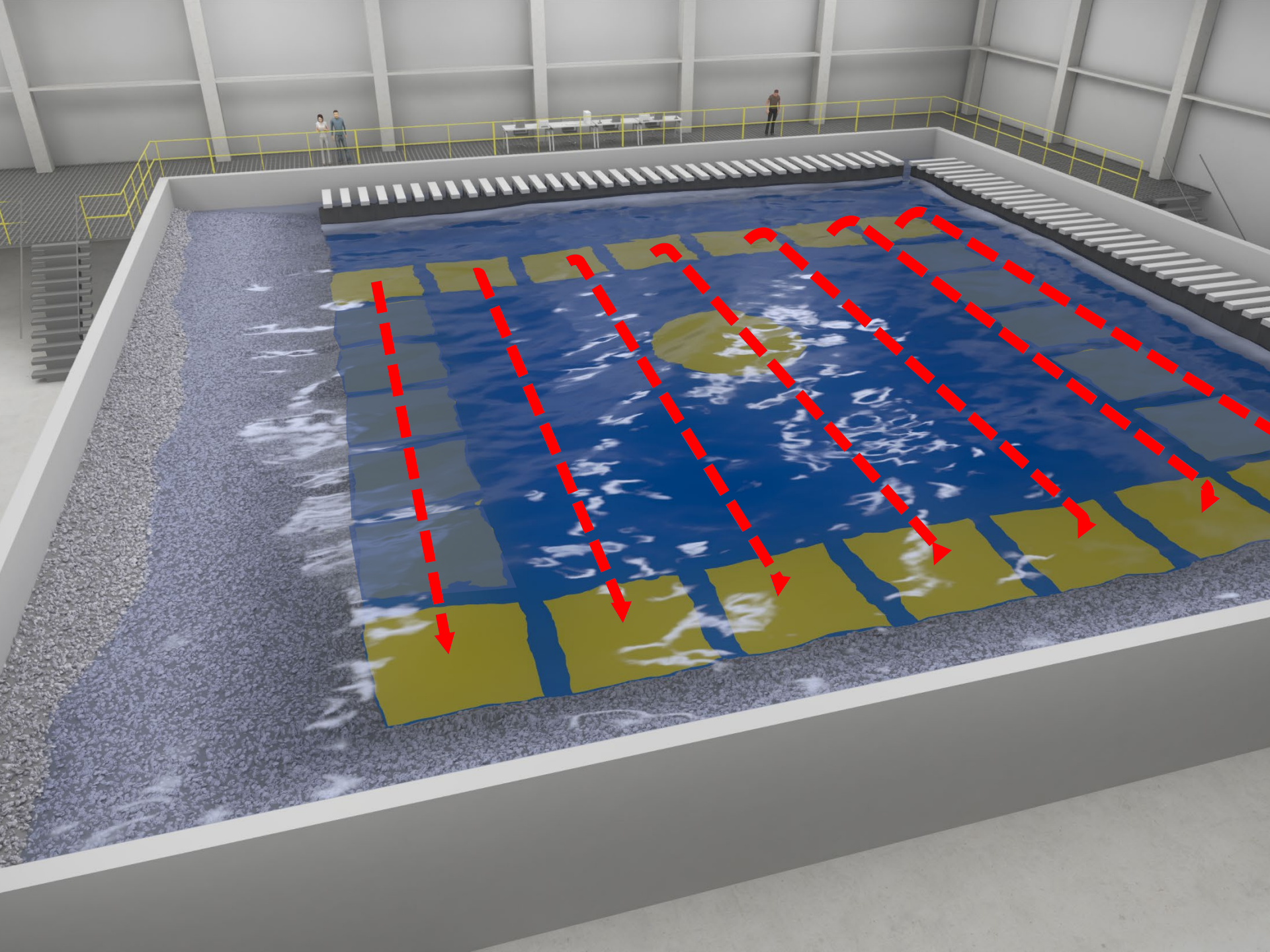


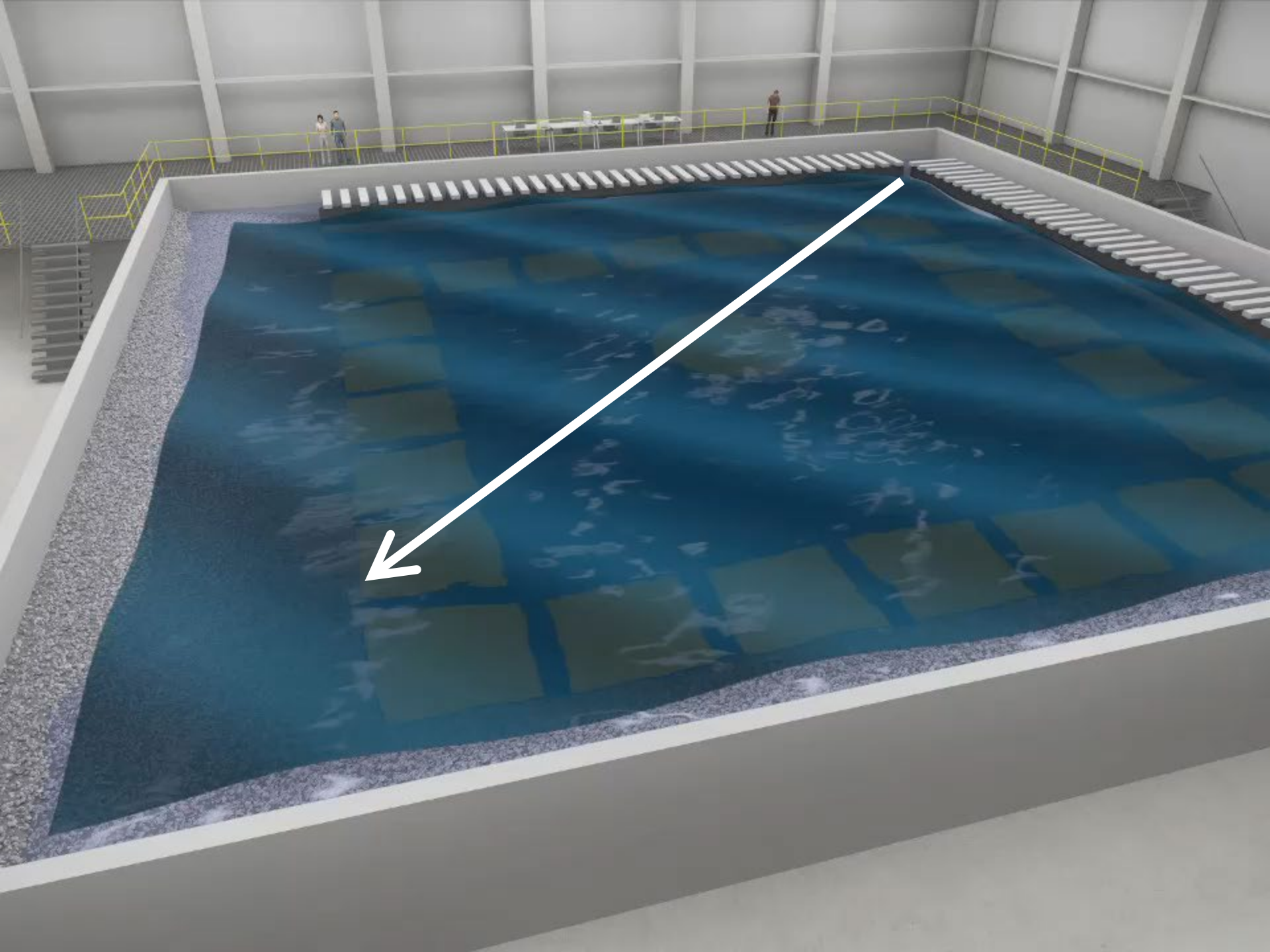
COB competitive strengths:

- variable **water depth** (0.4 – 1.4 m)
- modular multi-directional **wave generator** in L lay-out (H_{max} = 0.55 m)
- **currents** up to 0.4 m/s
- **wave-current** interaction in any direction
- **wind** up to 15 m/s in 2 x 2 m flow section
- exceptional quality **velocity profile** (< 10%) based on numerically design of inlet grid vanes









project integration on various scales

- **research roadmaps** defined by research groups (PhDs)
- studies defined by FHR supporting **the governmental policy**
- availability of COB for **commercial usage by companies**
- integration in the "**Blue Growth@UGent**" strategy
  - *Ghent University clusters its ongoing marine and maritime research and valorization activities under the Blue Growth umbrella coupling this to its Campus in Ostend.*
- integration in the action plan of the province of West-Flanders, **Factory of the Future "Blue Energy"**
  - *supporting developments in the blue energy field to satisfy the demands from the academic sector and private companies developing coastal and offshore technology.*
- integration on the **"EU research infrastructure"** level
  - *The new Coastal and Ocean Basin (COB) is included in the HORIZON2020 Marinerg-i* (www.marinerg-i.eu) *project for the development of an integrated European distributed test infrastructure to accelerate research & development for offshore renewable energy.*

FABRIEK VOOR DE TOEKOMST BLUE ENERGY

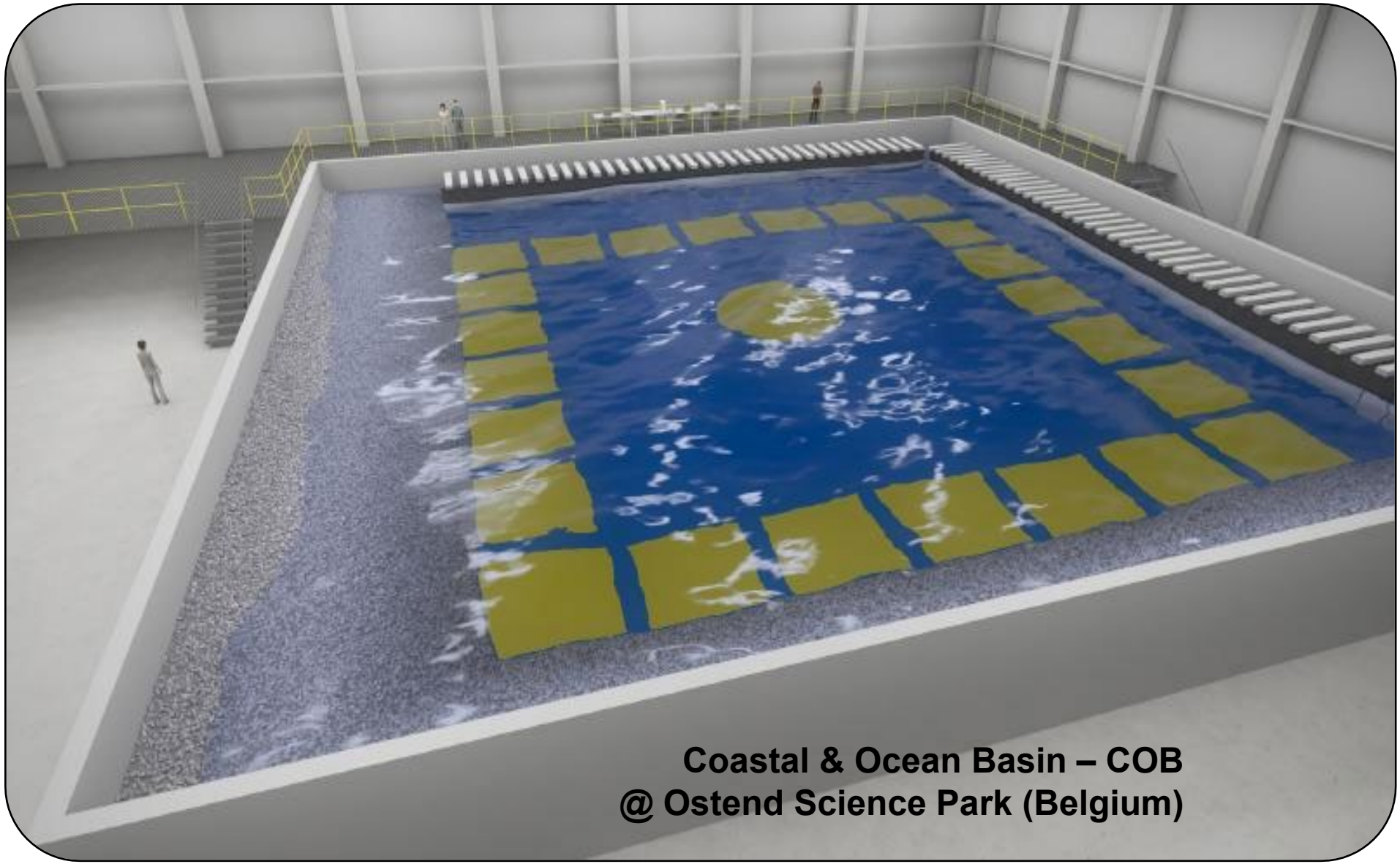
marinerg-i

GHENT UNIVERSITY

conclusions

- **Coastal & Ocean Basin – COB** is ~~under construction~~ nearly completed in Ostend, Belgium
- **consortium** composed of Ghent University, KU Leuven and Flanders Hydraulics Laboratory
- **wide range of applications**, from ocean energy to coastal and ocean engineering
- COB competitive **strengths**:
  - variable **water depth** (0.4 – 1.4 m)
  - modular **wavemaker** in L lay-out
  - **currents** up to 0.4 m/s (for 1 m water depth)
  - wave-current interaction **in any direction**
  - excellent quality **velocity profile** (< 10%)
- **operational** from 2021 onwards (initial validation followed by commercial work)

thank you for your attention



Coastal & Ocean Basin – COB
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