

From Edulis to ULTFARMS: a challenge for mind and craft

Nancy Nevejan, Annelies M. Declercq, Jessica Knoop, Koen Allewerelt, Stefanie Debels, Steven Degraer, Daan Delbare, Sander Devriese, Bert Groenendaal, Francis Kerckhof, Thomas R.H. Kerkhove, Frank Leroy, Vicky Stratigaki, Sam Desmet, Simon Petit, Laura Pilgrim, Elisabete Pinto da Silva, Ajie B.K. Pribadi, Brecht Stechele, Jan Vanaverbeke, Dirk Vandercammen, Olivier De Clerck, Evert Lataire

What have we achieved? Key results and impacts of UNITED pilots

THEME:



From Edulis to ULTFARMS : a challenge for mind and craft

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Offshore aquaculture in OWF in Belgium

location →

location →

Edulis
2016-2019



EDULIS
OFFSHORE MOSSELKWEK
IN WINDMOLENPARKEN

- EU EMFAF
- Partners :
 - UGent
 - Belwind (Parkwind)
 - Brevisco
 - Colruyt group
- Partners :
 - C-Power
 - DEME

United
2020-2023



UNITED

- EU Horizon2020
- Partners :
 - UGent
 - Parkwind (Belwind)
 - Brevisco
 - Colruyt group
 - Jan De Nul
 - RBINS

Ultfarms
2023-2026

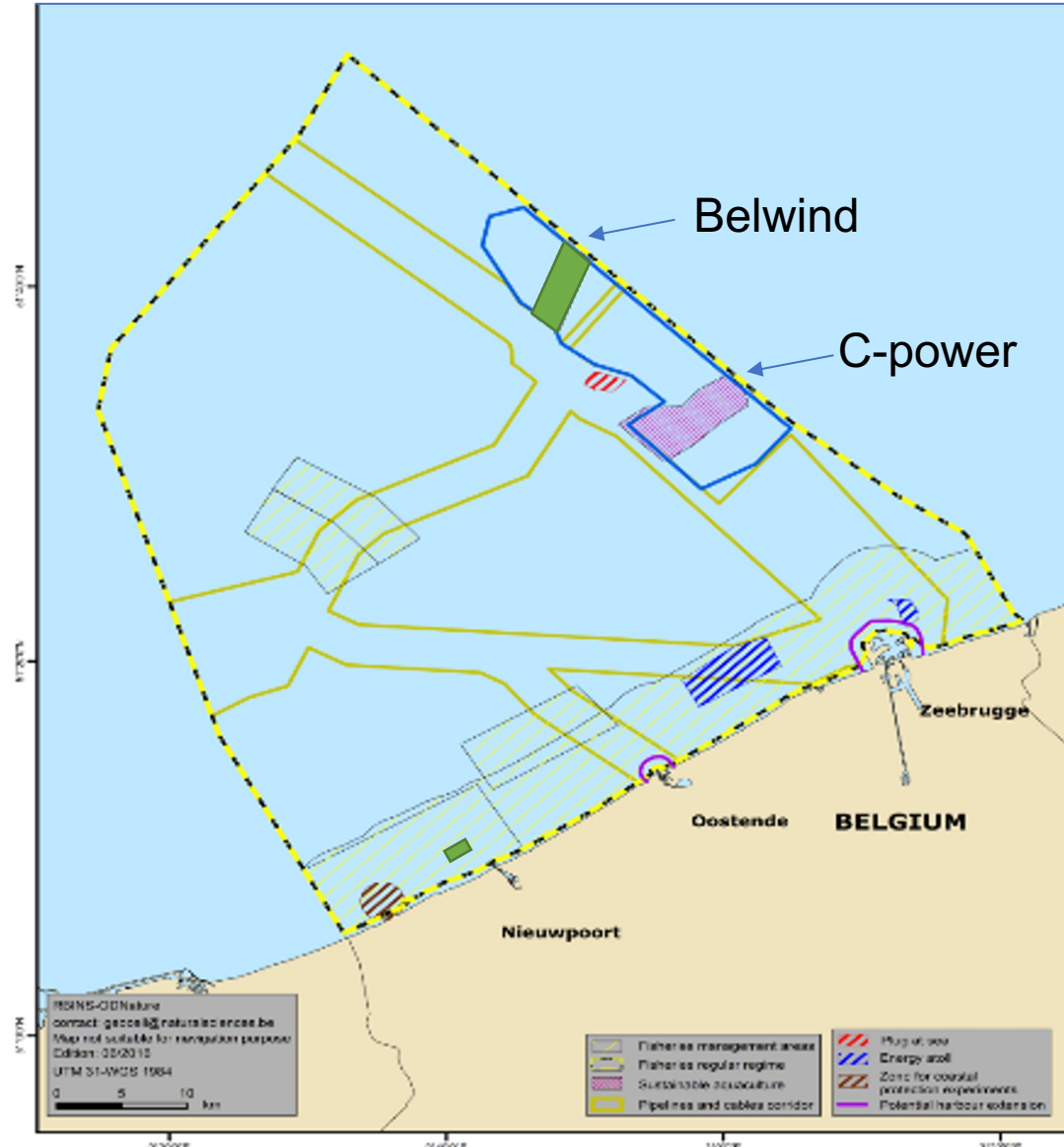


FARMS
ULT

- EU Horizon-Miss-2021-Ocean-04
- Partners :
 - UGent
 - Parkwind (Belwind)
 - Colruyt
 - Jan De Nul
 - RBINS
 - Impact-9
 - Vliz
 - SAS



Offshore aquaculture in OWF in Belgium

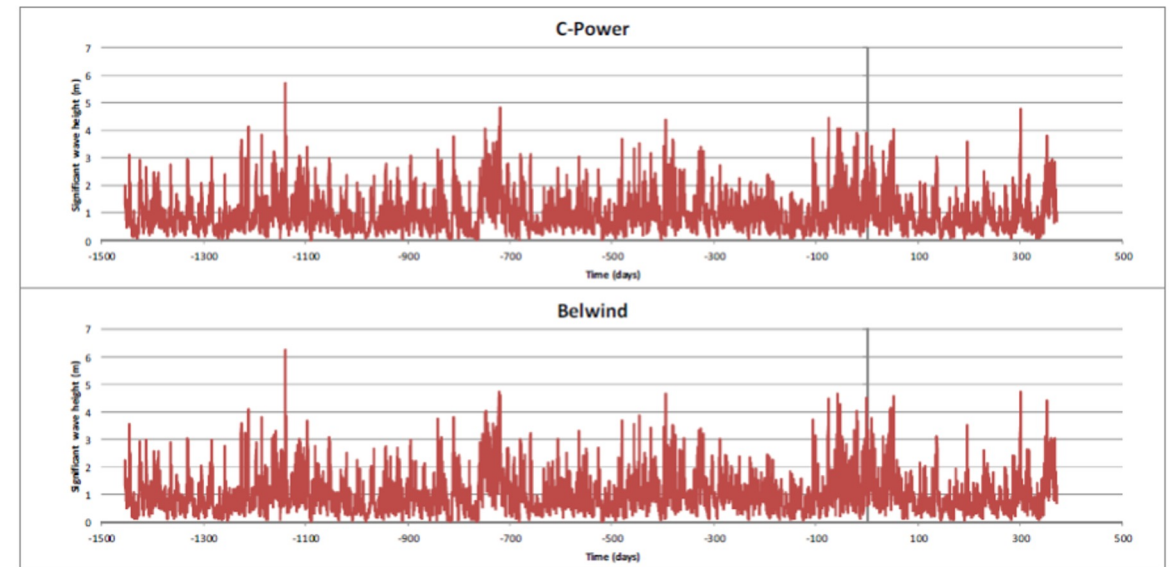
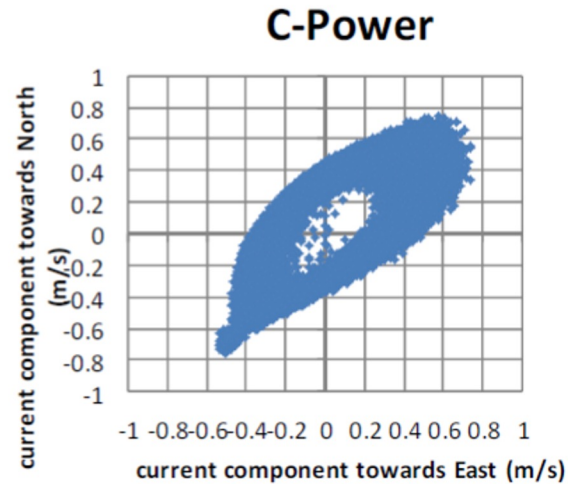
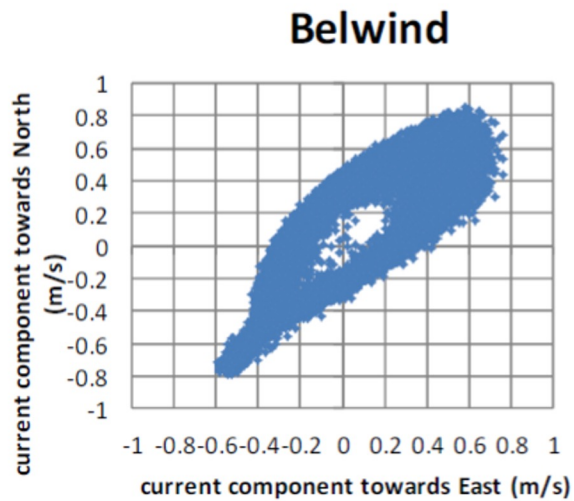


Conditions Belwind & C-power in the North Sea




Currents : max 1,05m/s of tidal origin, NO-ZW directions, difference between high & low tide: 5.5 m

Waves : 2-3m sign. waveheight on average, 5.72 m - 6.25 m max. sign. waveheight






Bottom : sand with a measured average grain size of 300-500 μm




Offshore aquaculture in OWF in Belgium

Evolution from simple to complex (and back)			
Low trophic species	Blue mussel (<i>Mytilus edulis</i>)	Flat oyster (<i>Ostrea edulis</i>) & sugar kelp (<i>Saccharina lattissima</i>)	Flat oyster (<i>Ostrea edulis</i>), sugar kelp & blue mussel
Availability of seed	In situ (wild spatfall)	Import of seed ; own hatchery production (testing different techniques)	Improved seeding technique for seaweed ; wild spat for mussels ; import flat oyster seed
Growth systems	Self-attachment on ropes (V-shape versus droppers)	(Self) attachment on 2D-nets (seaweed) ; cages/baskets/ropes (oysters)	Droppers for mussels ; baskets for oysters ; improved net for seaweed
Previous experience	Mussel longline systems well known for nearshore	exposed 2D-seaweed culture not known; nearshore longline culture flat oyster very rare	Edulis & United

Offshore aquaculture in OWF in Belgium



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Offshore aquaculture in OWF in Belgium

<p>Evolution from simple to complex</p>	
<p>Longline system</p>	<p>Semi-submerged</p>
<p>Length backbone</p>	<p>58 m</p>
<p>depth</p>	<p>-3 m</p>
<p>buoys</p>	<p>Spar buoys</p>
<p>Previous experience</p>	<p>First offshore aquaculture pilot in OWF in the world</p>



Offshore aquaculture in OWF in Belgium

Evolution from simple to complex	 EDULIS <small>OFFSHORE MOSSELKWEK IN WINDMOLENPARKEN</small>	
Longline system	Semi-submerged	“Submerged”
Length backbone	58 m	120 m
depth	-3 m	- 9 m for oysters - 1m for seaweed
buoys	Spar buoys	Spherical buoys
Previous experience	First offshore aquaculture pilot in OWF in the world	Edulis



Offshore aquaculture in OWF in Belgium




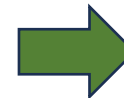
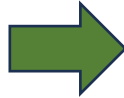
Evolution from simple to complex			
Longline system	Semi-submerged	“Submerged”	Submergible
Length backbone	58 m	120 m	120 m
depth	-3 m	- 9 m for oysters - 1m for seaweed	Depth sugar kelp longline can be adapted to weather conditions
buoys	Spar buoys	Spherical buoys	Small spherical buoys since inflatable beam structure
Previous experience	First offshore aquaculture pilot in OWF in the world	Edulis	United



Photo N. Nevejan-Edulis



IMPACT 9 SEASTRUT: FULL-SCALE BUILD TRIALS (TRL6)
Testing and Analysis promising for submerged mussel longline flotation:

- Automatic Ballast Compensation
- Visual Impact
- Reduced Anchor loads
- Reduced Dynamics
- Collapsible for logistics and marine operations

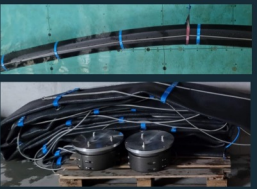

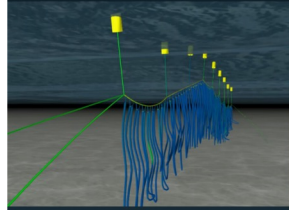


Photo A. Declercq-United



Inflatable Marine Products for Aquaculture Containment Technology
John Fitzgerald | john@impact-9.com

SeaStrut - Inflatable Beam Structures for Shellfish, Seaweed and Marine Finfish Installations

<https://impact-9.com/technology>

Edulis






United



Ultfarms

Offshore aquaculture in OWF in Belgium

Evolution from simple to complex			
Anchoring longline	Gravity anchors + Danforth anchors	Screw anchors	Screw anchors
Position OWF	Drilling is not wishful/possible	Drilling is ok under certain conditions (UXO, removable, ..)	Drilling is ok under certain conditions
Previous experience	Only nearshore installation of screw anchors ; experience with weight & Danforth anchors	Translation of nearshore experience to offshore installation screw anchors difficult	Will use anchors of United

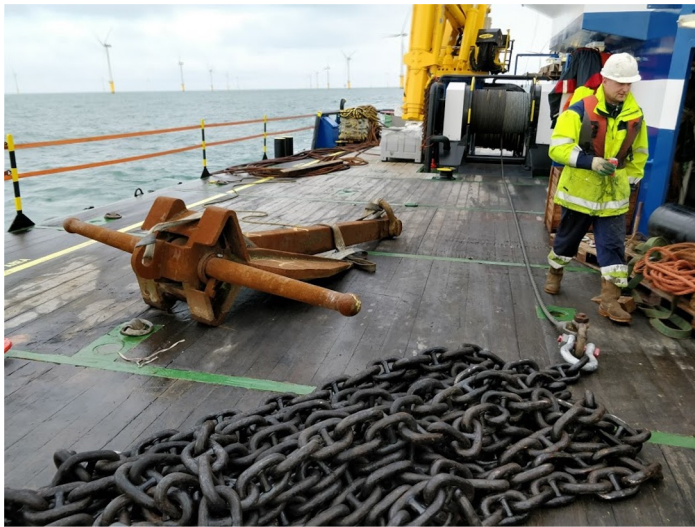
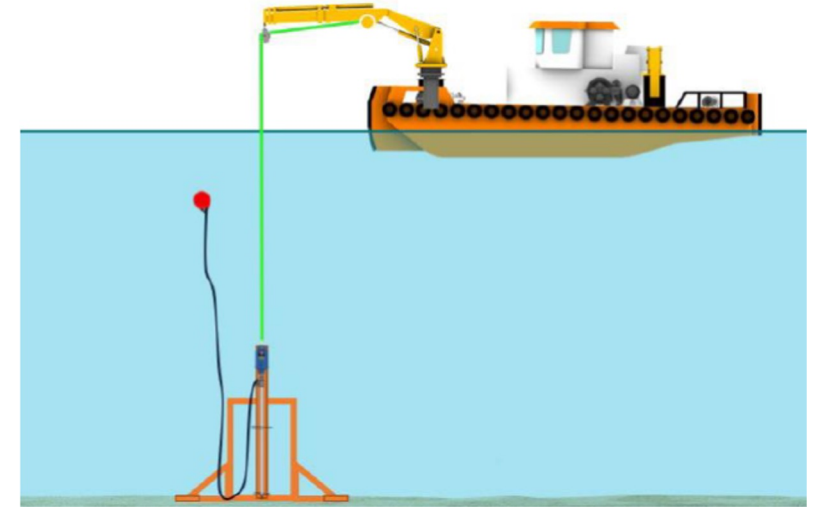


Photo G. Lesage-Edulis

Edulis



Photo A. Declercq-United



United/Ultfarms



Offshore aquaculture in OWF in Belgium

<p>Evolution from simple to complex</p>			
<p>Monitoring, rescue, maintenance</p>	<p>Diving from crew vessels Multicat DP2</p>	<p>Scientific diving for restoration activity Multicat DP2 ROV</p>	<p>Multicat DP2 ROV Multibeam sonar Underwater camera</p>



Photo N. Nevejan-Edulis

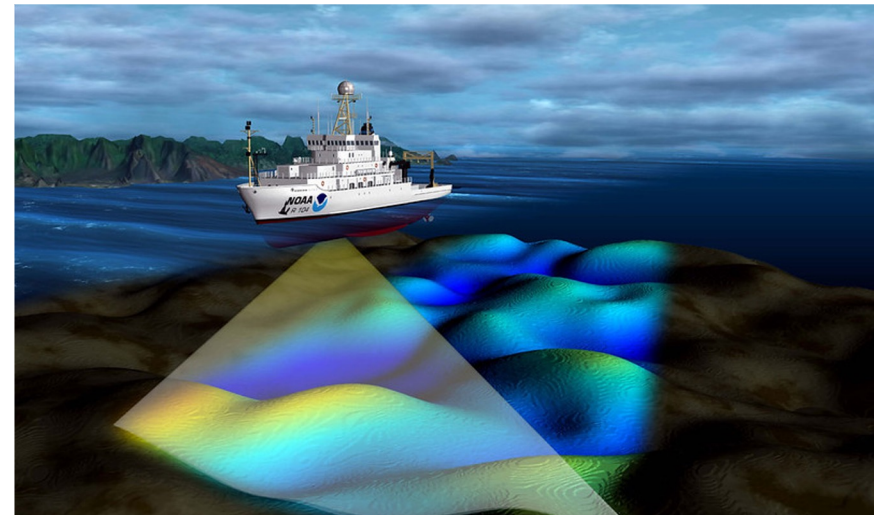


Photo NOAA's National Ocean Service

Offshore aquaculture in OWF in Belgium

Evolution



*Growth
mindset*

- Belgian OWF's Belwind and C-power first in Europe open for aquaculture pilot
- general critical attitude towards aquaculture along the Belgian coast



+ Value@Sea

Nearshore commercial musselfarm of Colruyt group



Offshore aquaculture in OWF in Belgium

Evolution



Growth mindset

- Belgian OWF's Belwind and C-power first in Europe open for aquaculture pilot
- general critical attitude towards aquaculture along the Belgian coast

- Mutual confidence between OWF's and other partners is growing
- more OWF are interested
- OWF committed to nature restoration
- focus on commercially viable solutions through synergies
- marine aquaculture in OWF : "talk of the town"



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Offshore aquaculture in OWF in Belgium

Evolution



Growth mindset

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- focus on commercially viable solutions through synergies
- marine aquaculture in OWF : "talk of the town"

- co-design and multi-use of space are key
- marine parks "talk of the town"



+ Value@Sea

Nearshore commercial musselfarm of Colruyt



Roadmap to commercialisation



WWW.H2020UNITED.EU   



Nancy Nevejan

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shellS & Valves

expert in aquaculture & pond ecosystems

The logo for 'shellS & Valves' features a detailed illustration of a scallop shell with its mantle edge visible. The word 'shellS' is in a dark blue serif font with a horizontal line underneath, and 'Valves' is in the same font with a horizontal line underneath. An ampersand is placed between them. Below the logo, the text 'expert in aquaculture & pond ecosystems' is written in a smaller, dark blue sans-serif font.