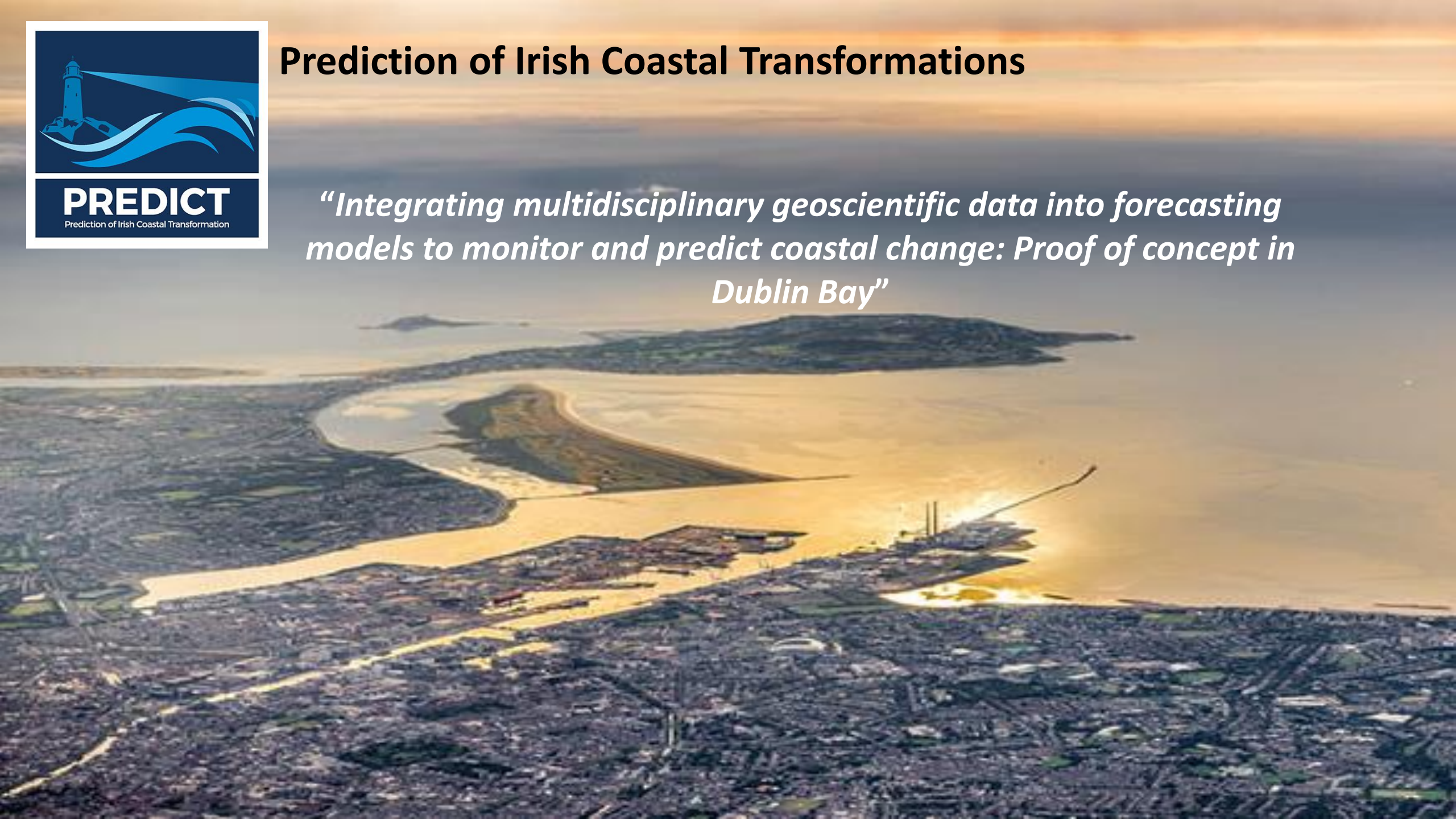
Prediction of Irish Coastal Transformations

PREDICT
Prediction of Irish Coastal Transformation

"Integrating multidisciplinary geoscientific data into forecasting models to monitor and predict coastal change: Proof of concept in Dublin Bay"



Prediction of Irish Coastal Transformations

"Integrating multidisciplinary geoscientific data into forecasting models to monitor and predict coastal change: Proof of concept in Dublin Bay"

- **Introduction to PREDICT**

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"Integrating multidisciplinary geoscientific data into forecasting models to monitor and predict coastal change: Proof of concept in Dublin Bay"

- **Introduction to PREDICT**
- **Some surmountable challenges**

Prediction of Irish Coastal Transformations

"Integrating multidisciplinary geoscientific data into forecasting models to monitor and predict coastal change: Proof of concept in Dublin Bay"

- **Introduction to PREDICT**
- **Some surmountable challenges**
- **An opportunity**

Prediction of Irish Coastal Transformations

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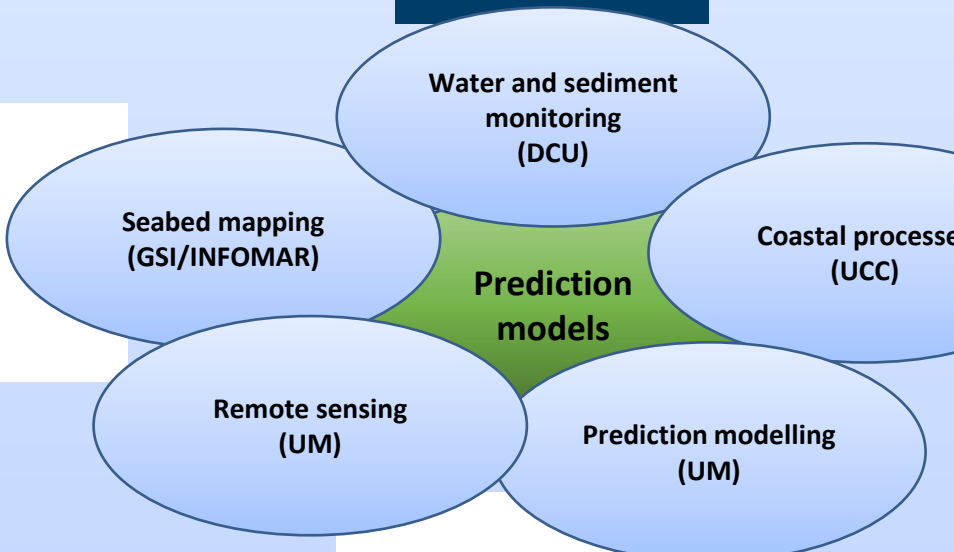
DCU
Ollscoil Chathair Bhaile Átha Cliath
Dublin City University



UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

Maynooth University
National University of Ireland Maynooth

Geological Survey
Suirbhéireacht Gheolaíochta
Ireland | Éireann

Funded through SFI IvP:

Science Foundation Ireland sfi For what's next

Marine Institute
Foras na Mara

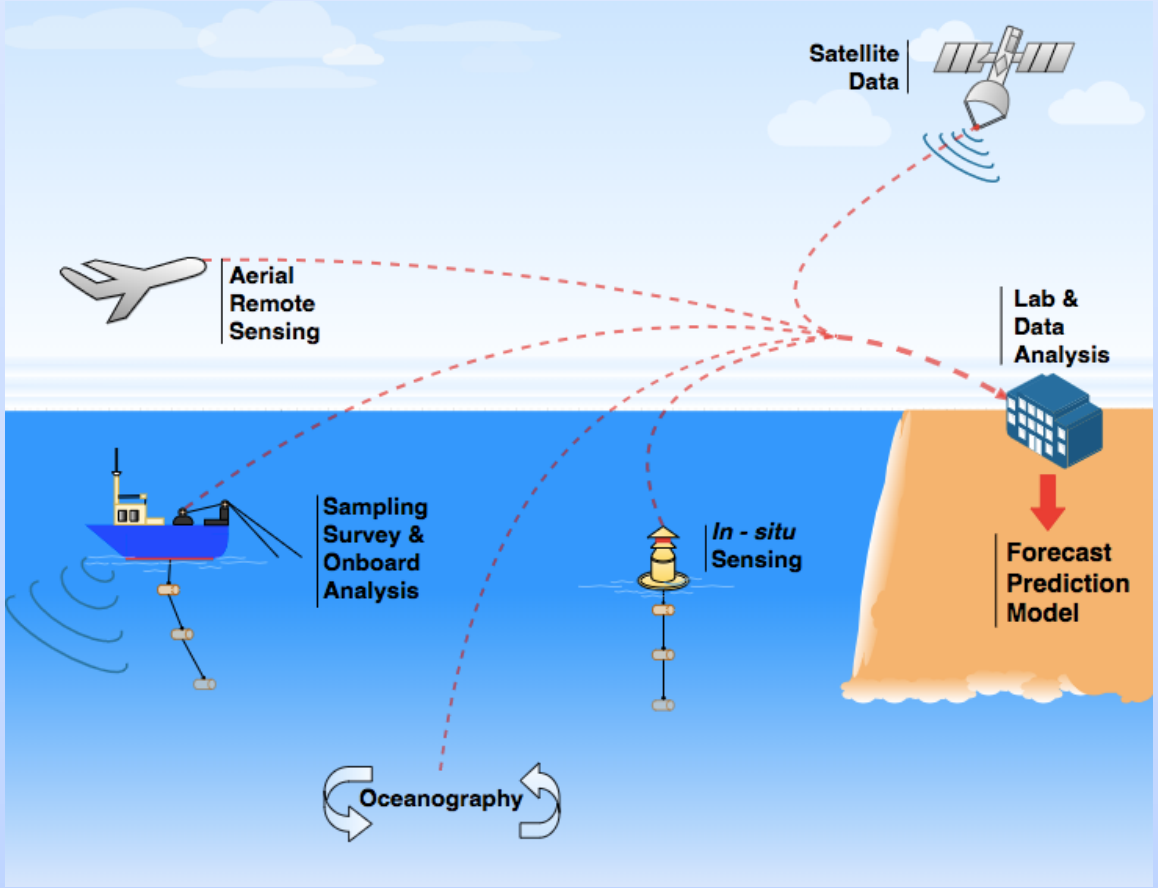
Geological Survey
Suirbhéireacht Gheolaíochta
Ireland | Éireann

Rialtas na hÉireann
Government of Ireland

Prediction of Irish Coastal Transformations

Aims

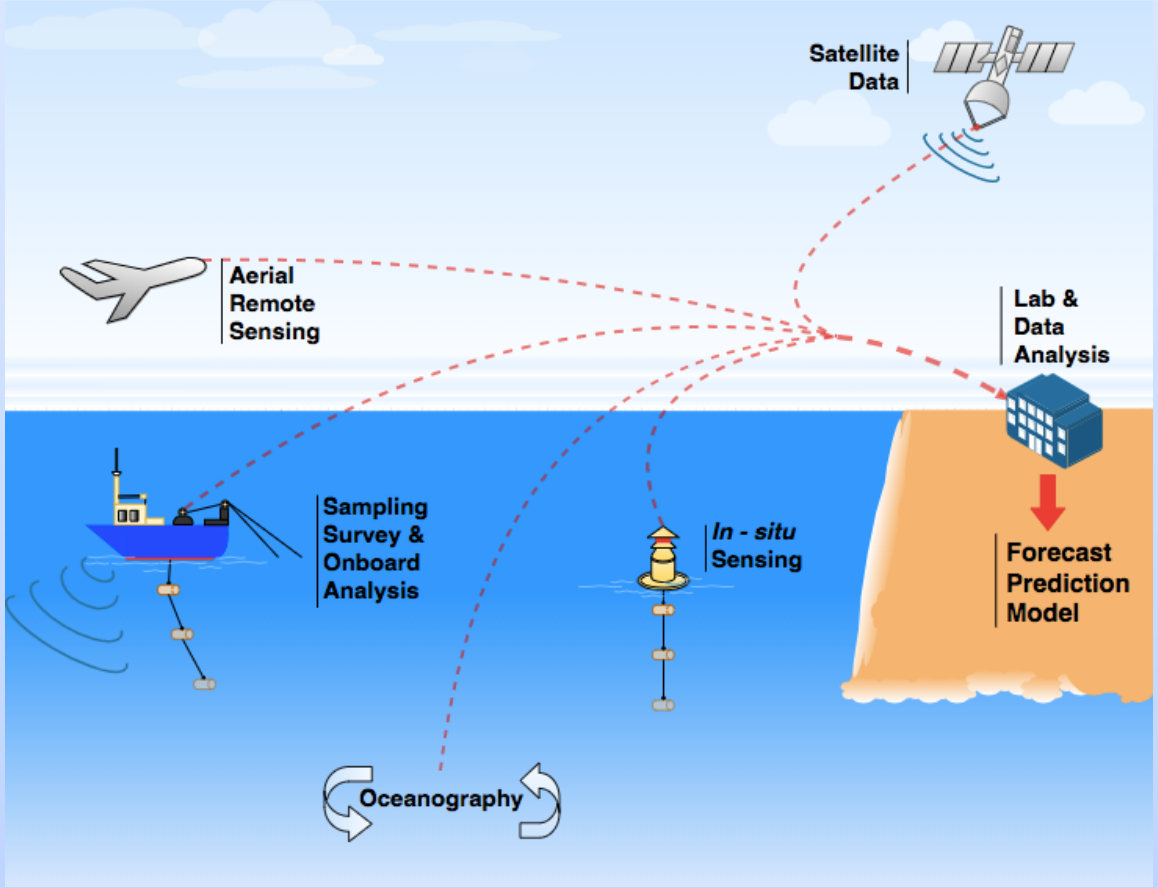
- Assessment and prediction of coastal vulnerability can only be achieved by systematic and sustained monitoring of physical, chemical and biological processes that occur in coastal zones.



Prediction of Irish Coastal Transformations

Aims

- Assessment and prediction of coastal vulnerability can only be achieved by systematic and sustained monitoring of physical, chemical and biological processes that occur in coastal zones.
- The objective of our project is a coordinated program of coastal observations that can be used to validate, calibrate and extract as much information as possible from remotely acquired environmental data.



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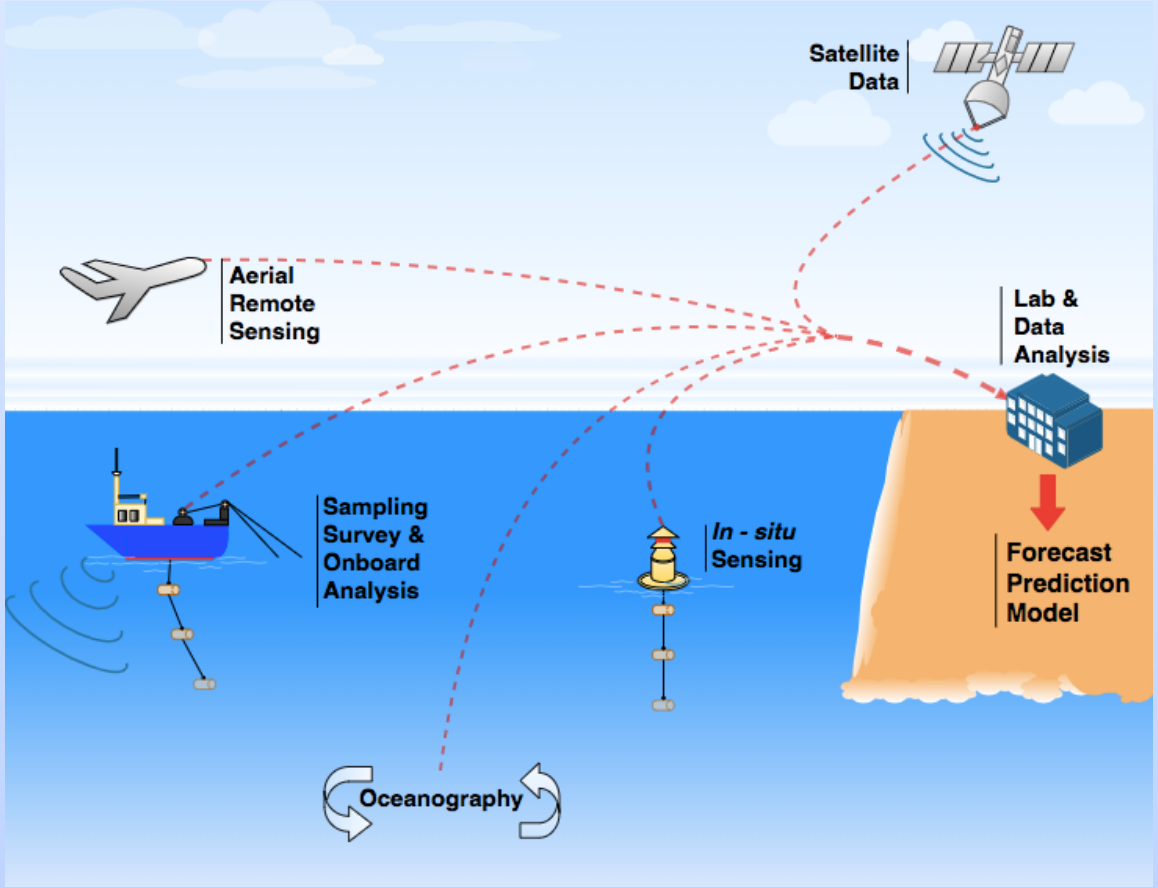
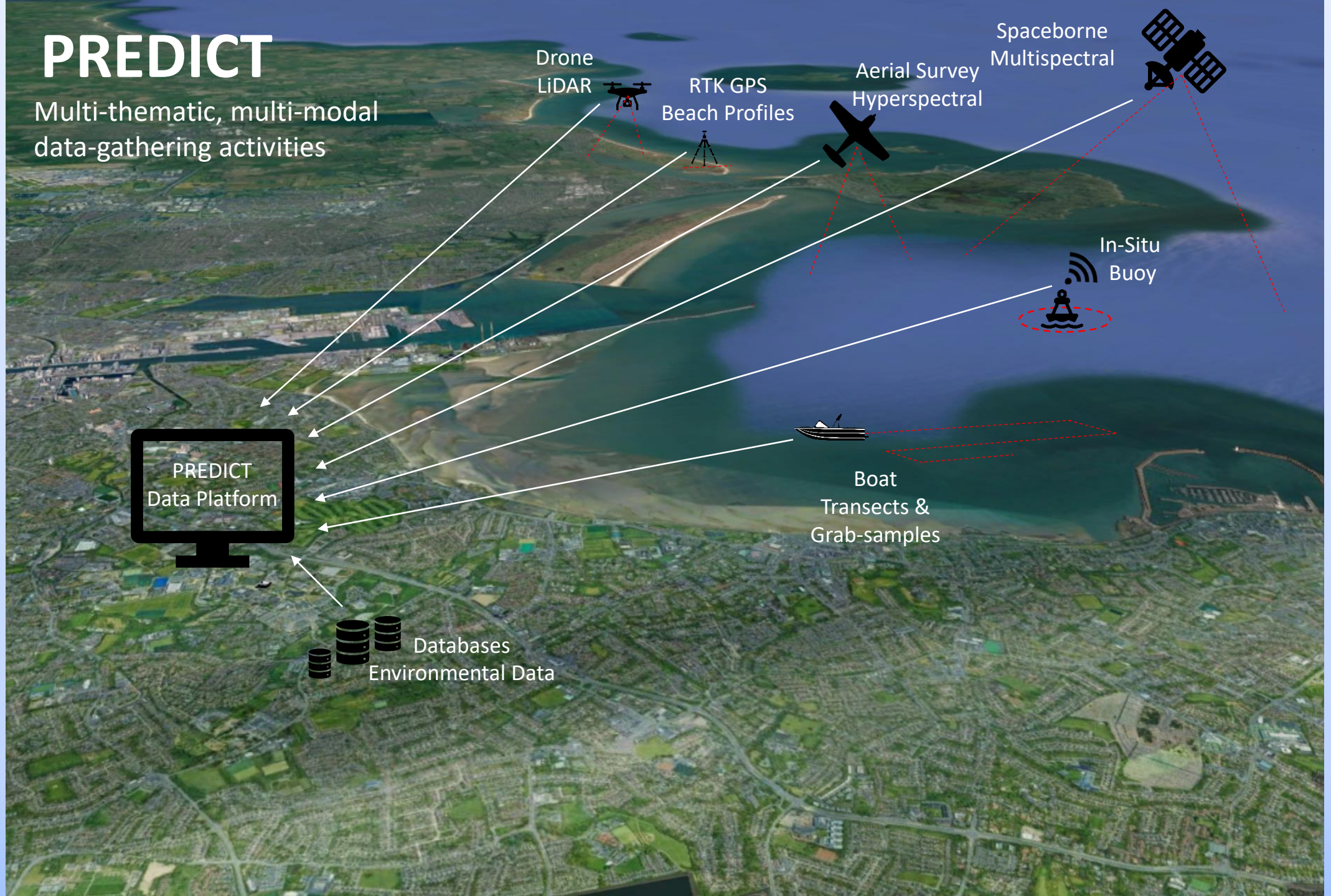
- The objective of our project is a coordinated program of coastal observations that can be used to validate, calibrate and extract as much information as possible from remotely acquired environmental data.
- These datasets can then be integrated to generate forecasting models that can be used to predict environmental change and inform future planning.




PREDICT
Multi-thematic, multi-modal
data-gathering activities
Drone
LiDAR
RTK GPS
Beach Profiles
Aerial Survey
Hyperspectral
Spaceborne
Multispectral
In-Situ
Buoy
PREDICT
Data Platform
Boat
Transects &
Grab-samples
Databases
Environmental Data

Prediction of Irish Coastal Transformations

DATA

All models should be validated with accurate, robust and consistent observations. Data generated through observation is elementary and imperative if we want to understand and predict coastal change.

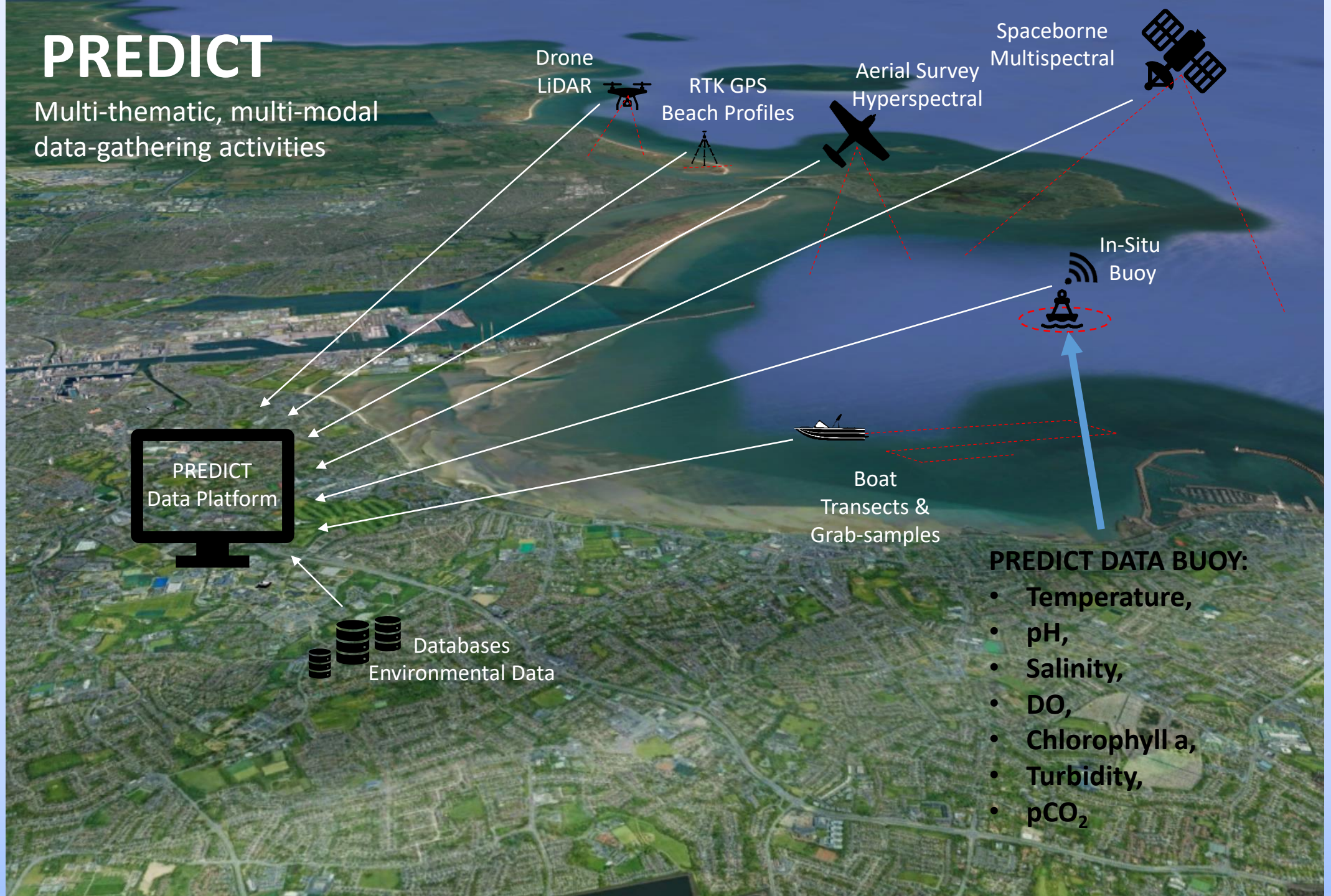
NO DATA-NO PREDICTION MODELS

Catalogue of scientific data on Dublin Bay:

http://predict-portal.com/predict/index.php

E.G.

- Bathymetry, meteorological, remote sensing, tidal gauges, water properties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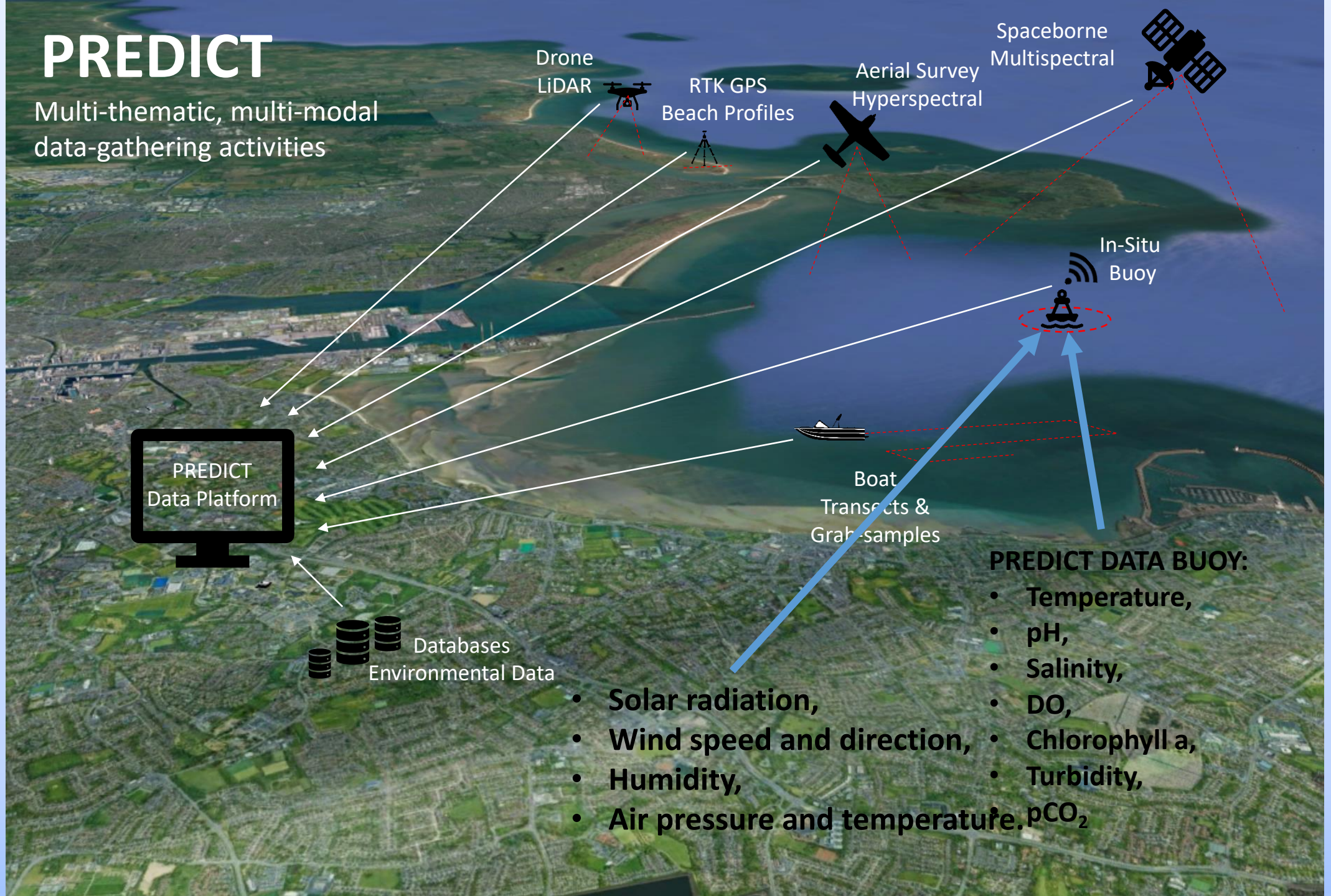
Databases Environmental Data
PREDICT DATA BUOY:
• Temperature,
• pH,
• Salinity,
• DO,
• Chlorophyll a,
• Turbidity,
• pCO_2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Databases Environmental Data
• Solar radiation,
• Wind speed and direction,
• Humidity,
• Air pressure and temperature.
PREDICT DATA BUOY:
• Temperature,
• pH,
• Salinity,
• DO,
• Chlorophyll a,
• Turbidity,
• pCO_2

Prediction of Irish Coastal Transformations

Challenges:

PREDICT DATA BUOY and SENSORS:
Currently stuck in Dún Laoghaire

Prediction of Irish Coastal Transformations

Challenges:

Buoy and sensor maintenance, insurance, licence agreements and on-going costs.

Agreements and licences:

- Statutory Sanction (Dublin Port Company, [DPC]),
- Signed agreement between DPC and DCU,
- Maintenance and deployment/recovery contract between DCU and the Commissioners of Irish Lights (CIL),
- Insurance agreement (DCU).
- Tender and contract with OSIL,
- Re-negotiations due to COVID
- Final agreement with OSIL 08/09/2021

Prediction of Irish Coastal Transformations

Buoy and sensor maintenance, insurance, licence agreements and on-going costs.

Challenges:

On-going costs:

- Deployment/recovery and annual maintenance of buoy for 6 years: **€18-20K.** Contract signed.
- DCU has contributed 10K to maintenance costs.
- Annual insurance cost: ~ **€4500**
- Sensor maintenance: boat hire: annual estimate ~ **€5000**
- Personnel?????

Prediction of Irish Coastal Transformations

Bull Island

Opportunities:

Bull Island

Inadvertently formed due to construction of the Great South Wall and the North Bull Wall

A: Bull Island and intertidal area characterisation

We know that coastal wetlands can:

- mitigate climate change even as sea levels rise,
- act as natural sponges that can lower flood heights
- dissipate storm surges
- protect against erosion
- capture of metals and pollutants,
- cycling of nutrients

BLUE CARBON

Tidal wetlands and vegetated coastal marshes have a very high capacity for the uptake and long-term storage of carbon