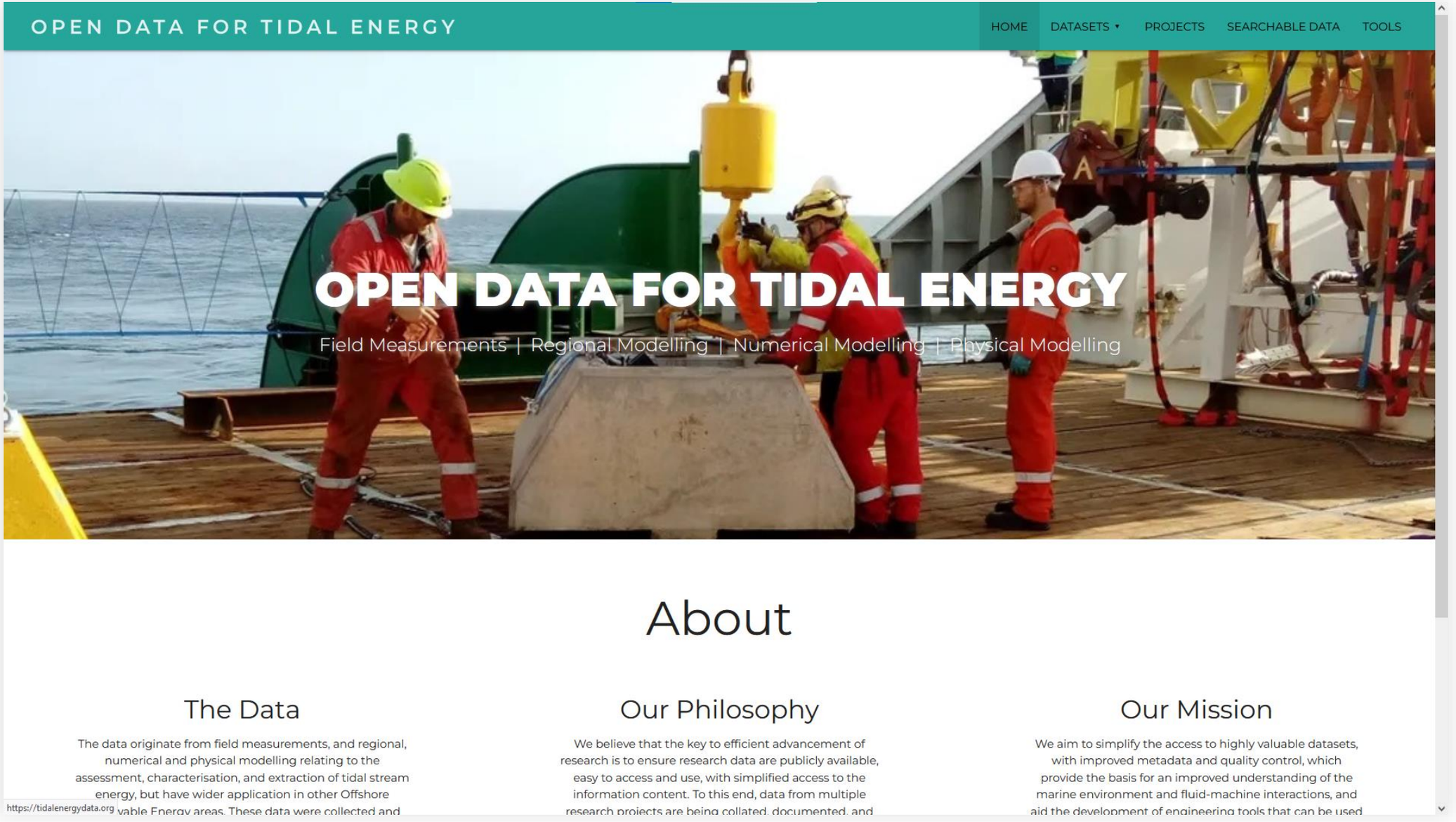
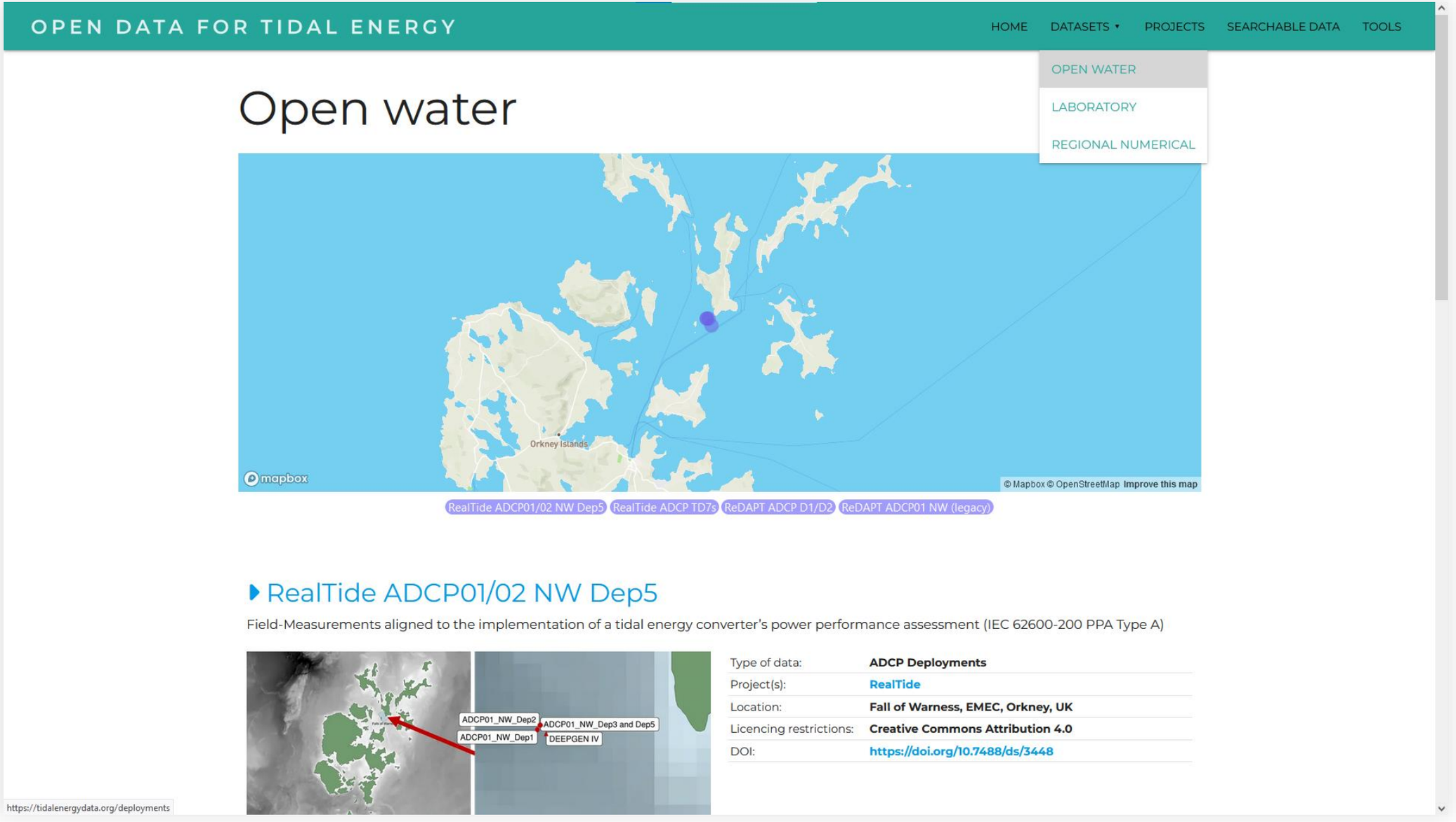
Open Data for Tidal Energy



Open Data for Tidal Energy



Open Data for Tidal Energy

OPEN DATA FOR TIDAL ENERGY

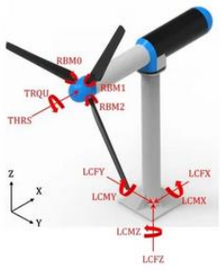
HOME | DATASETS | PROJECTS | SEARCHABLE DATA | TOOLS

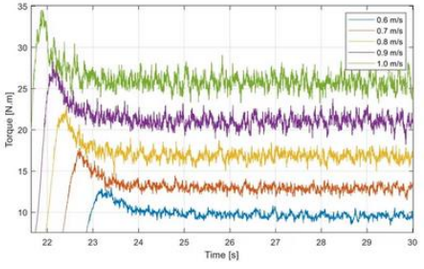
- OPEN WATER
- LABORATORY
- REGIONAL NUMERICAL

Laboratory Data

RealTide: RLT-WP3- D3.5

Synthetic Load Spectra and Time Series Data





Type of data:	**Tank test**
Project(s):	**RealTide**
Facility:	**FloWave (University of Edinburgh)**
Licencing restrictions:	**Creative Commons Attribution 4.0**
DOI:	**https://doi.org/10.7488/ds/3186**

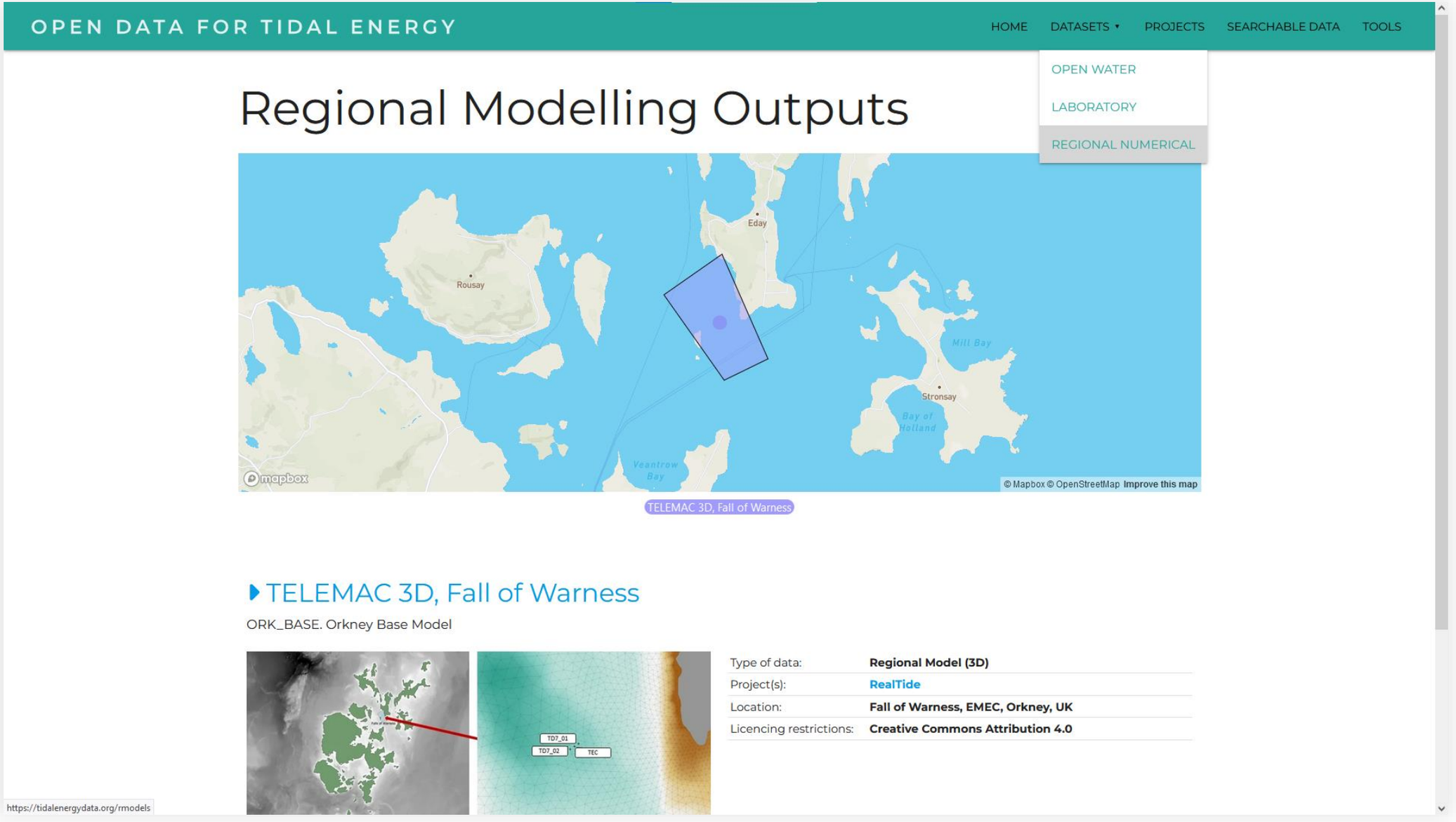
SuperGen: 3 Turbine Array - Flow Data

Flow data around three Supergen UKCMER Tidal Turbines in a closely spaced staggered array at FloWave

Type of data:	**Tank test**
Project(s):	**SuperGen UKCMER**
Facility:	**FloWave (University of Edinburgh)**
Licencing restrictions:	**Creative Commons Attribution 4.0**
DOI:	**https://doi.org/10.7488/ds/2762**

https://tidalenergydata.org/experiments

Open Data for Tidal Energy



Open Data for Tidal Energy

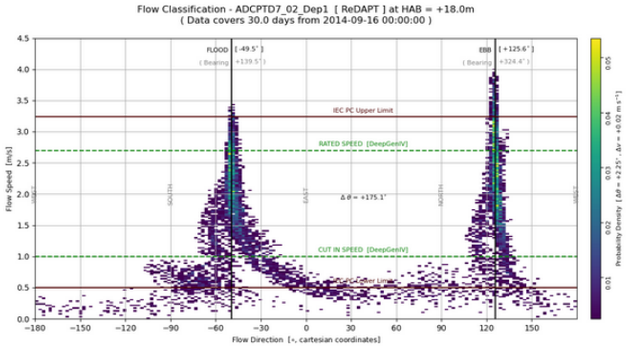
OPEN DATA FOR TIDAL ENERGY

HOME | DATASETS | PROJECTS | SEARCHABLE DATA | TOOLS

Projects

FASTWATER

FASTWATER: Freely Available Simulation Toolset for Waves, Tides and Eddy Replication.



Lead:	**University of Edinburgh**
Partners:	**Supergen ORE Hub; The European Marine Energy Centre; University of Edinburgh; ORE Catapult**
Value:	**£100,000**
Status:	**Live project**
Dates:	**Aug. 15, 2021 to Aug. 31, 2022**

EPSRC
Engineering and Physical Sciences Research Council

RealTide

RealTide: Advanced monitoring, simulation and control of tidal devices in unsteady, highly turbulent realistic tide environments

Lead:	**Bureau Veritas**
Partners:	**University of Edinburgh; IFREMER; Bureau Veritas; EnerOcean; Sabella; 1-Tech; Ingeteam; Bureau Veritas Solutions Marine & Offshore**
Value:	**€4,974,990**
Status:	**Completed**
Dates:	**Jan. 1. 2018 to Dec. 16. 2021**

https://tidalenergydata.org/projects

Open Data for Tidal Energy

OPEN DATA FOR TIDAL ENERGY

HOME | DATASETS | PROJECTS | SEARCHABLE DATA | TOOLS

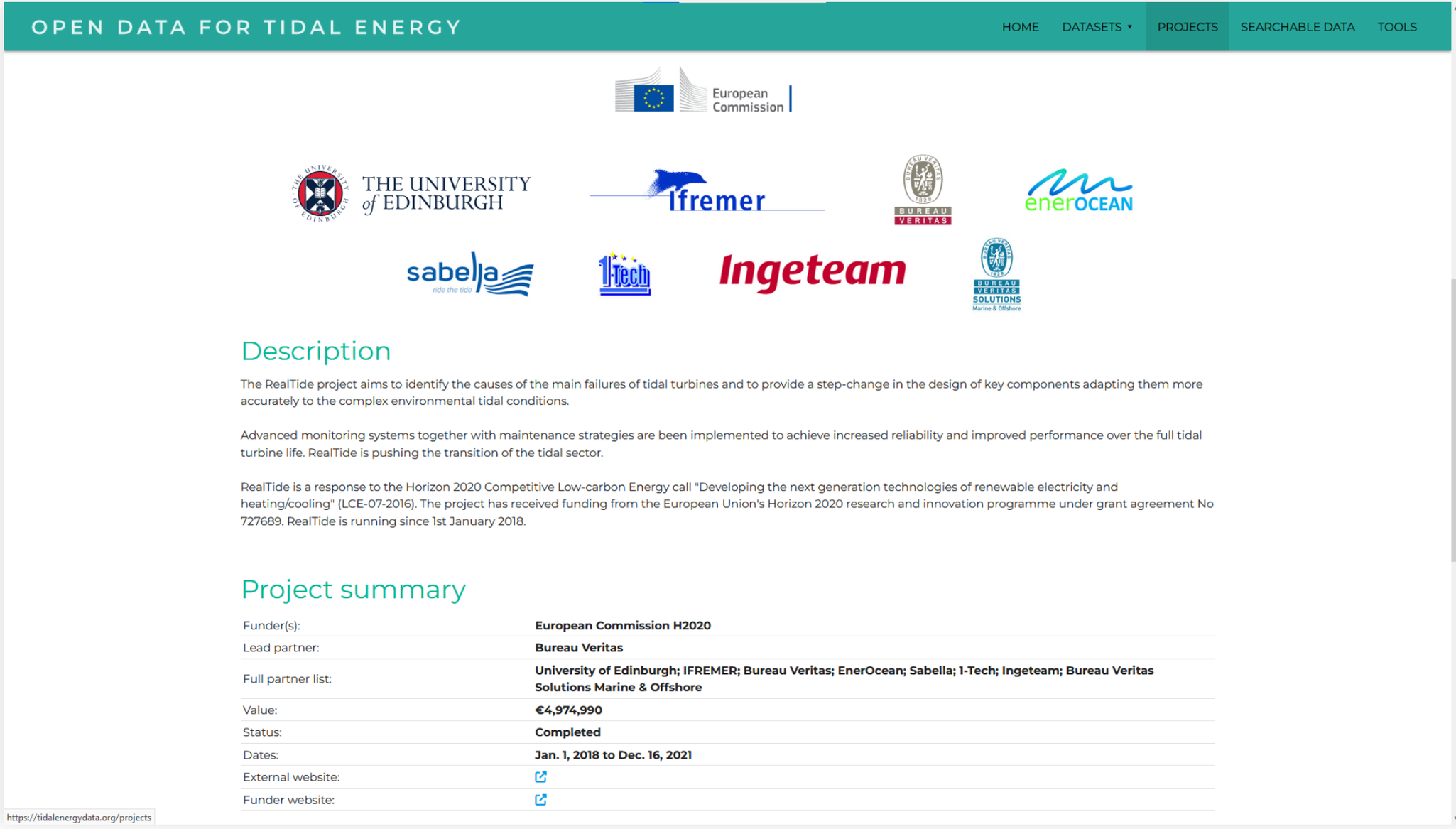
Projects

RealTide

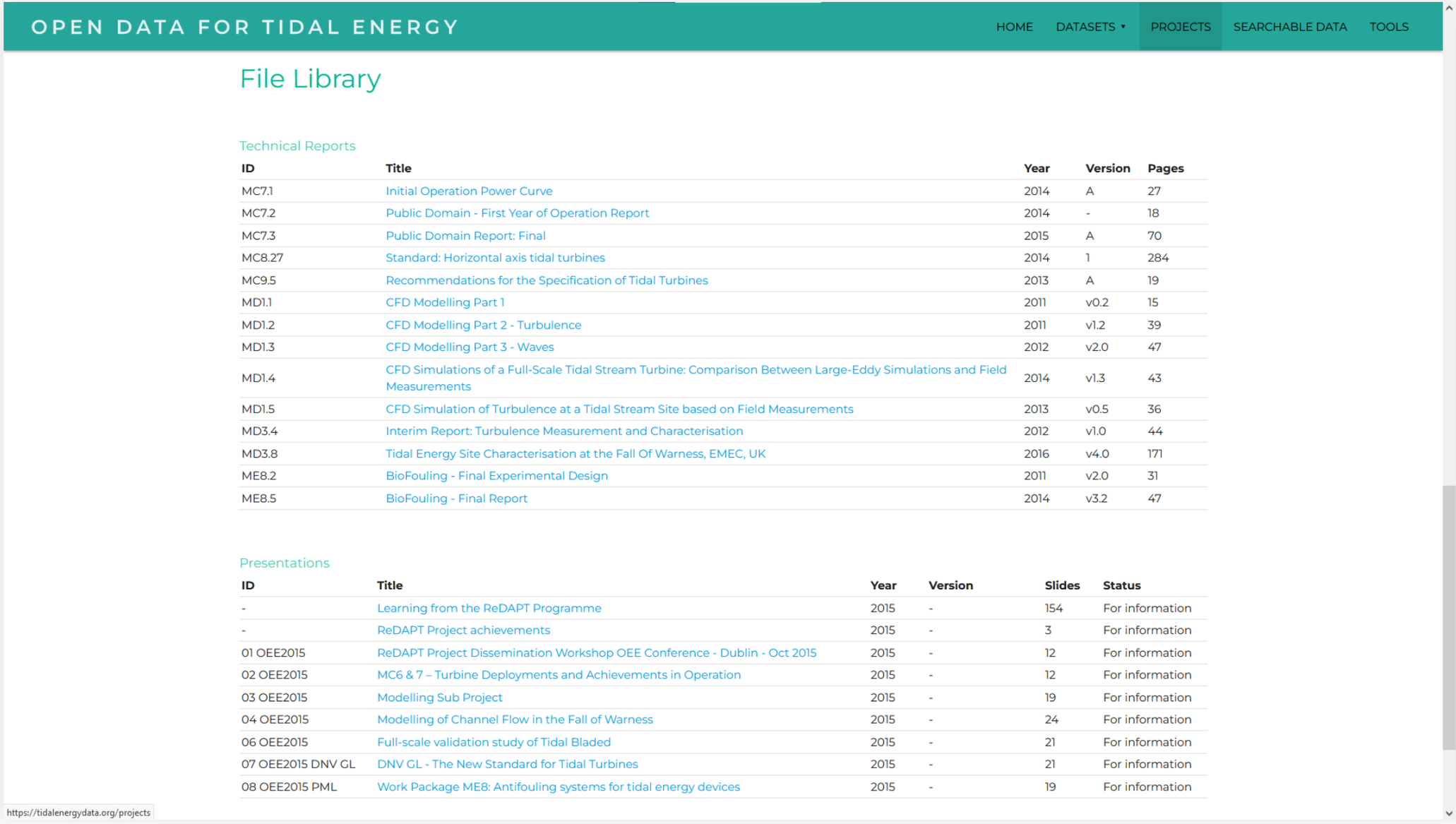
RealTide: Advanced monitoring, simulation and control of tidal devices in unsteady, highly turbulent realistic tide environments

https://tidalenergydata.org/projects

Open Data for Tidal Energy



Open Data for Tidal Energy



OPEN DATA FOR TIDAL ENERGY

HOME DATASETS PROJECTS SEARCHABLE DATA TOOLS

File Library

Technical Reports

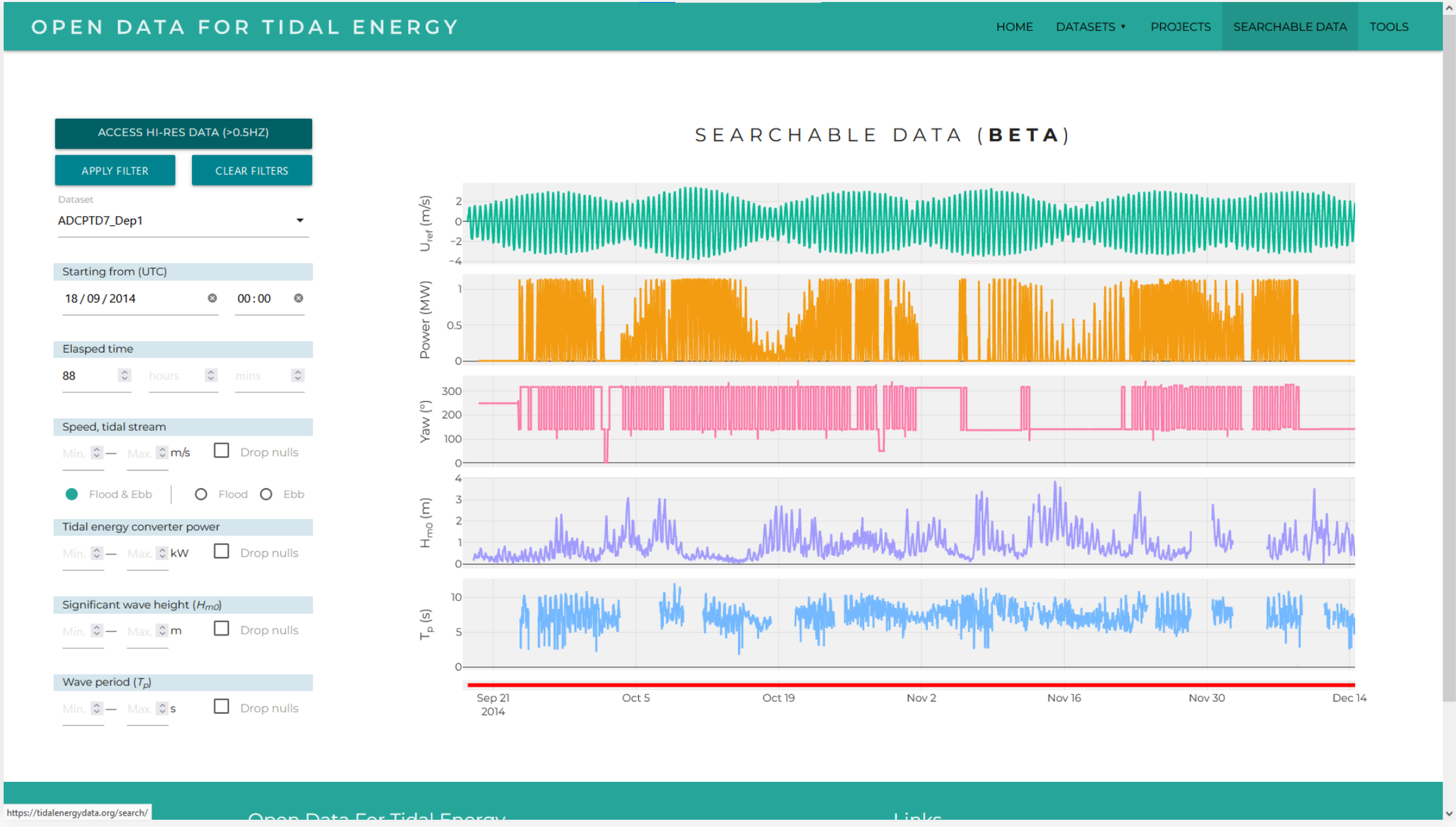
ID	Title	Year	Version	Pages
MC7.1	Initial Operation Power Curve	2014	A	27
MC7.2	Public Domain - First Year of Operation Report	2014	-	18
MC7.3	Public Domain Report: Final	2015	A	70
MC8.27	Standard: Horizontal axis tidal turbines	2014	1	284
MC9.5	Recommendations for the Specification of Tidal Turbines	2013	A	19
MD1.1	CFD Modelling Part 1	2011	v0.2	15
MD1.2	CFD Modelling Part 2 - Turbulence	2011	v1.2	39
MD1.3	CFD Modelling Part 3 - Waves	2012	v2.0	47
MD1.4	CFD Simulations of a Full-Scale Tidal Stream Turbine: Comparison Between Large-Eddy Simulations and Field Measurements	2014	v1.3	43
MD1.5	CFD Simulation of Turbulence at a Tidal Stream Site based on Field Measurements	2013	v0.5	36
MD3.4	Interim Report: Turbulence Measurement and Characterisation	2012	v1.0	44
MD3.8	Tidal Energy Site Characterisation at the Fall Of Warness, EMEC, UK	2016	v4.0	171
ME8.2	BioFouling - Final Experimental Design	2011	v2.0	31
ME8.5	BioFouling - Final Report	2014	v3.2	47

Presentations

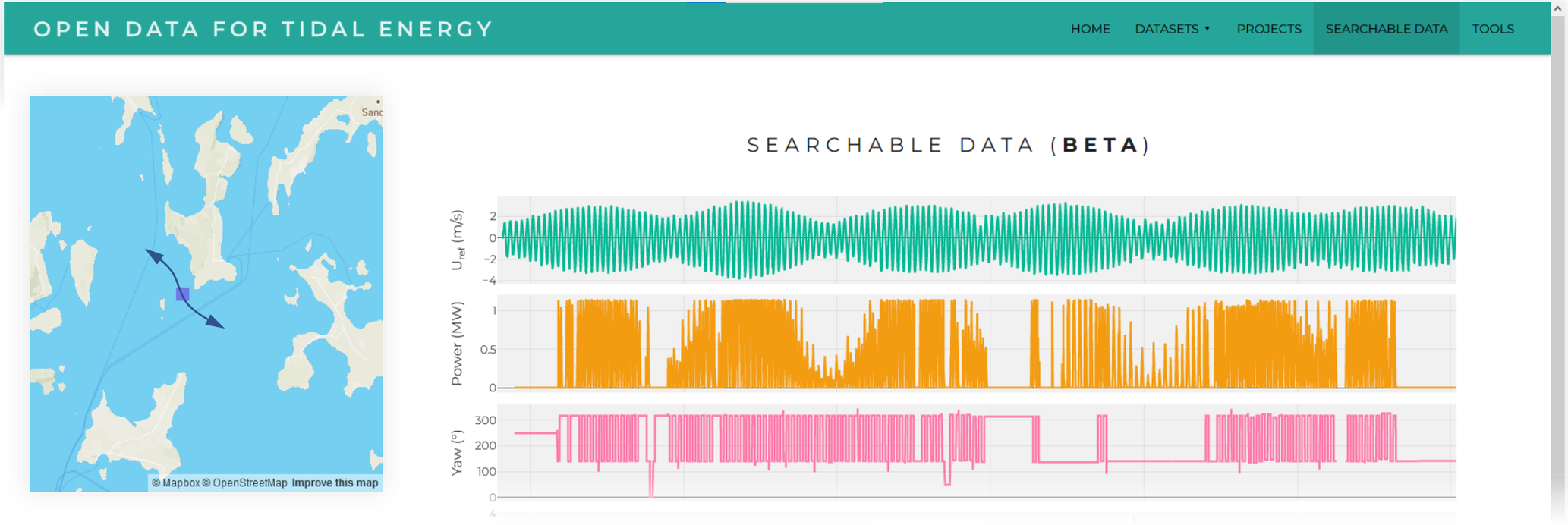
ID	Title	Year	Version	Slides	Status
-	Learning from the ReDAPT Programme	2015	-	154	For information
-	ReDAPT Project achievements	2015	-	3	For information
01 OEE2015	ReDAPT Project Dissemination Workshop OEE Conference - Dublin - Oct 2015	2015	-	12	For information
02 OEE2015	MC6 & 7 – Turbine Deployments and Achievements in Operation	2015	-	12	For information
03 OEE2015	Modelling Sub Project	2015	-	19	For information
04 OEE2015	Modelling of Channel Flow in the Fall of Warness	2015	-	24	For information
06 OEE2015	Full-scale validation study of Tidal Bladed	2015	-	21	For information
07 OEE2015 DNV GL	DNV GL - The New Standard for Tidal Turbines	2015	-	21	For information
08 OEE2015 PML	Work Package ME8: Antifouling systems for tidal energy devices	2015	-	19	For information

https://tidalenergydata.org/projects

Open Data for Tidal Energy



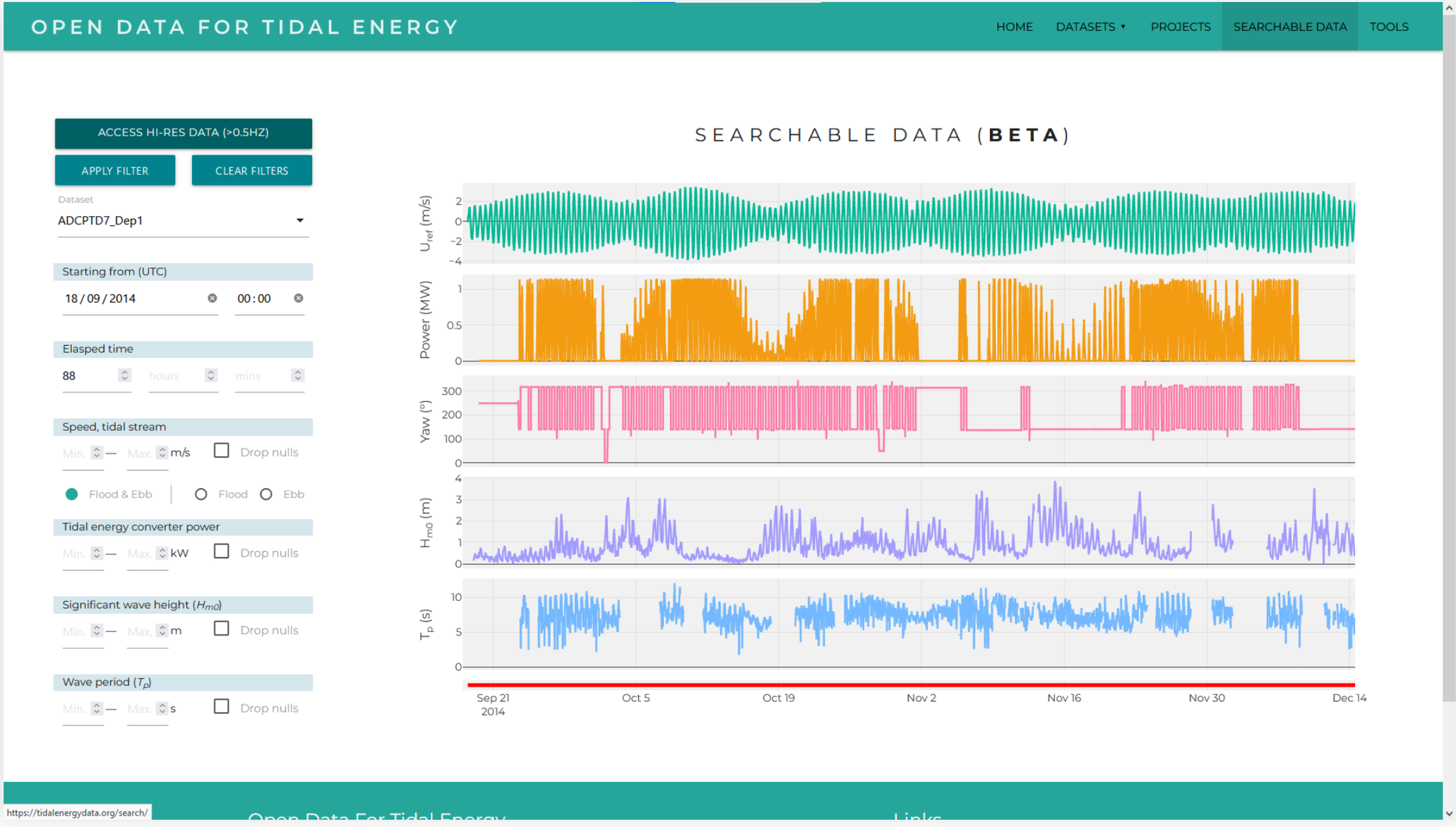
Open Data for Tidal Energy



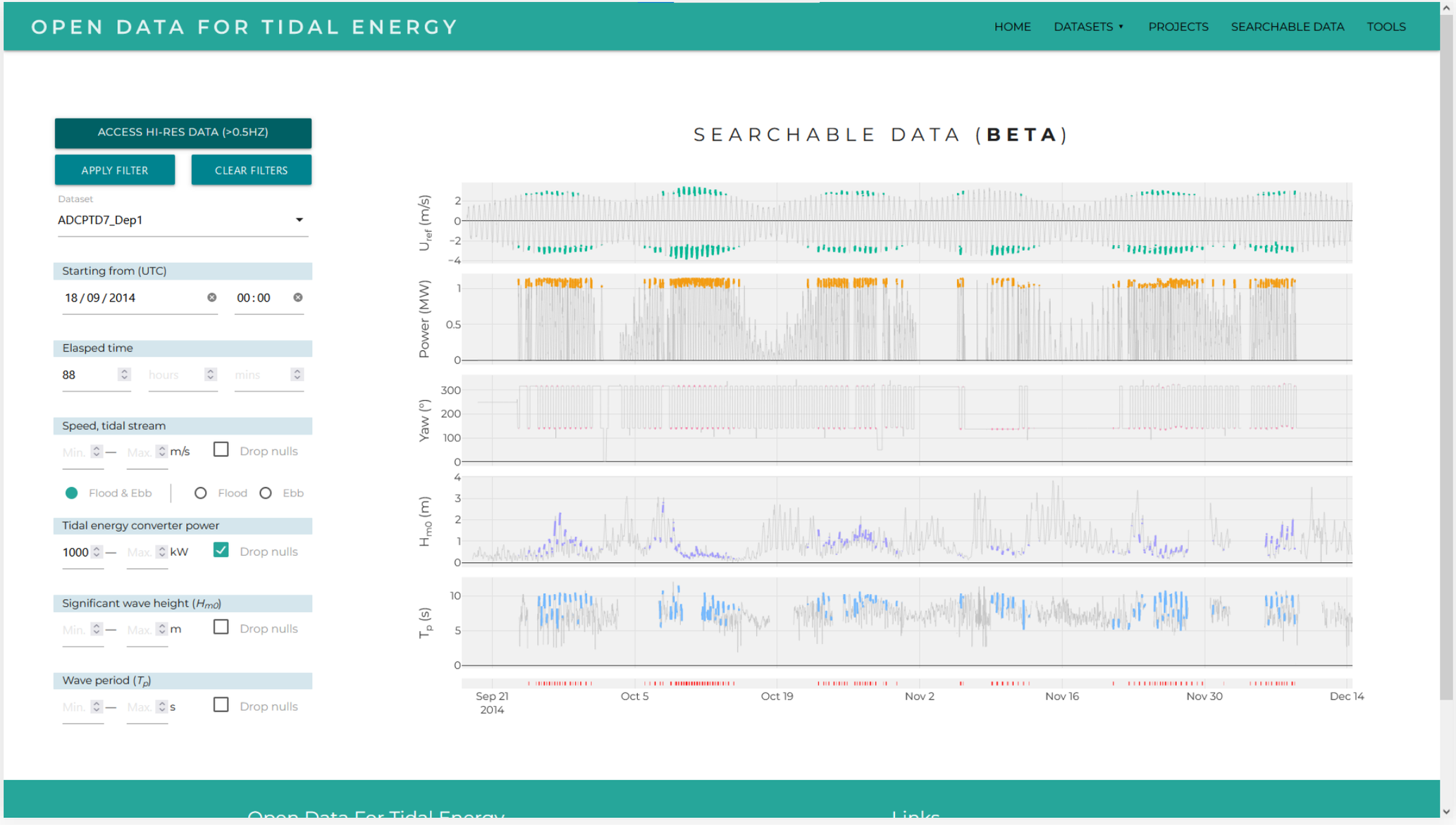
RealTide D2.2 (2021)

ReDaPT (2014)

Open Data for Tidal Energy



Open Data for Tidal Energy



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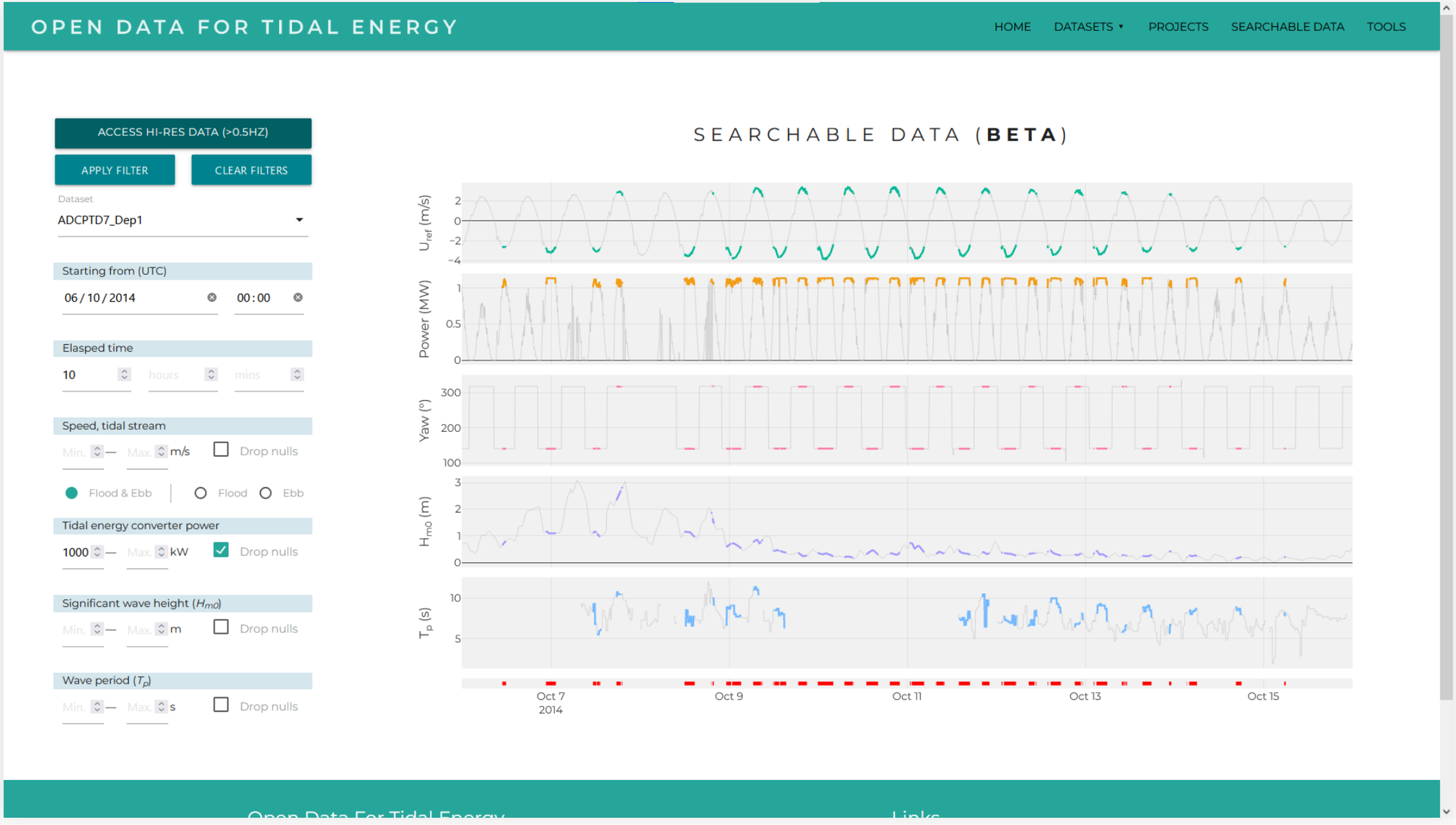

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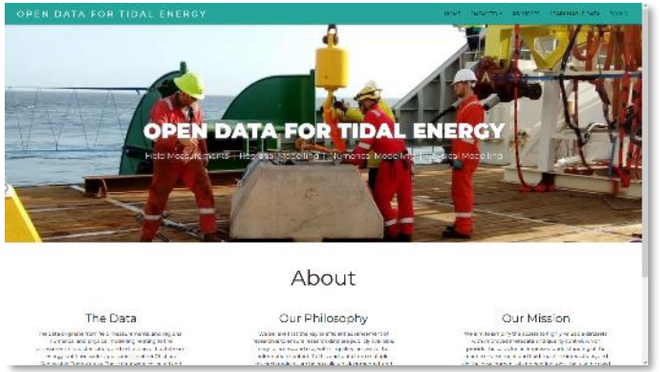
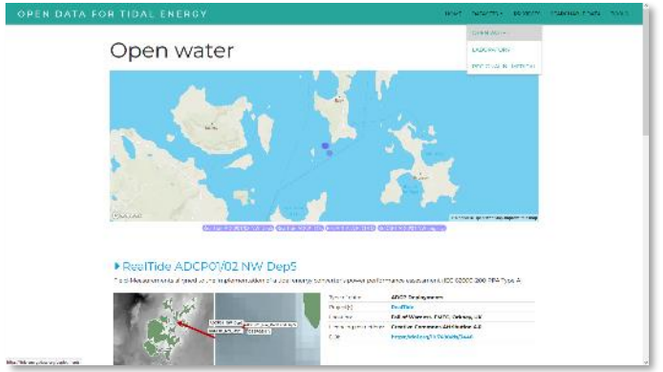
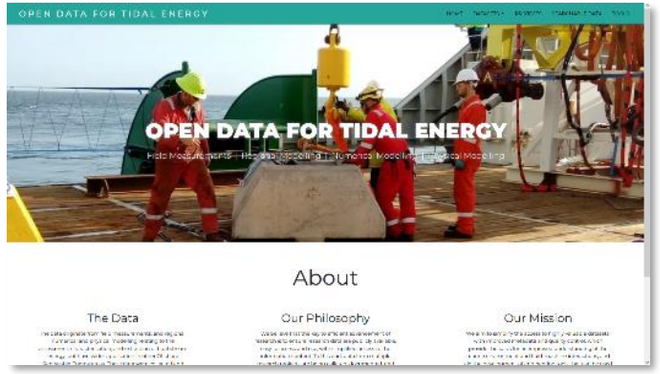
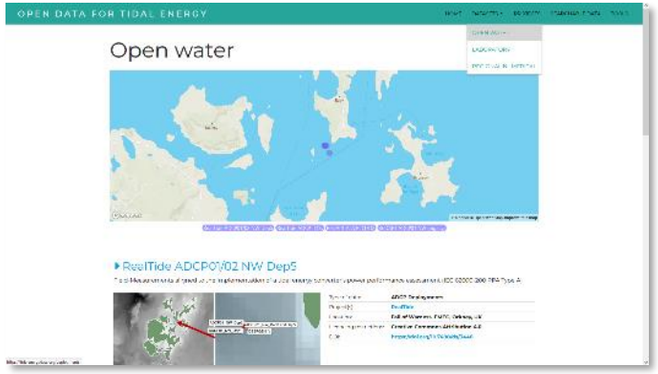


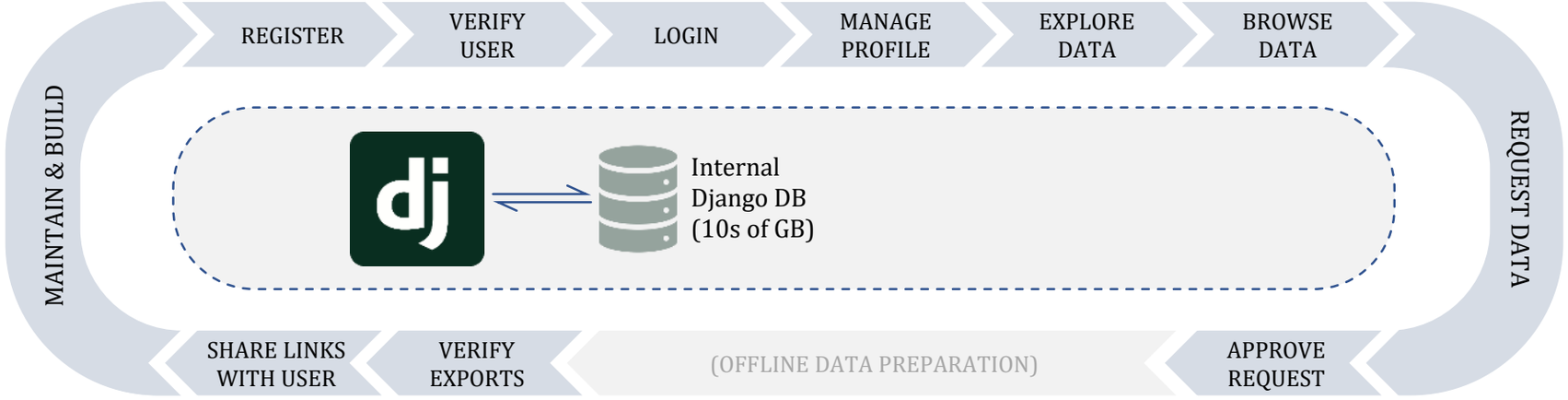


Edinburgh DataSync

Edinburgh DataShare

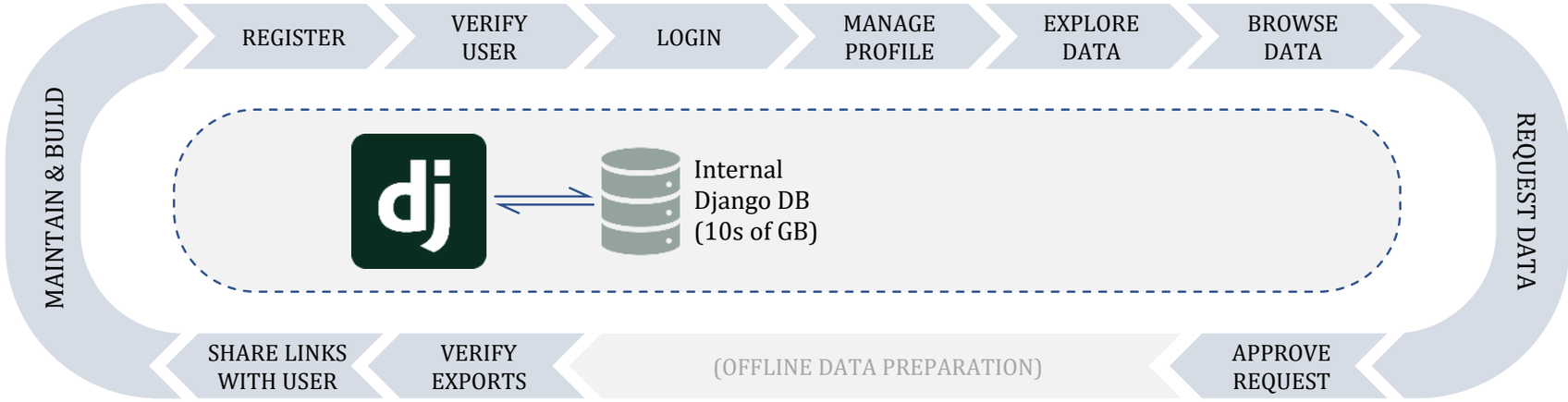


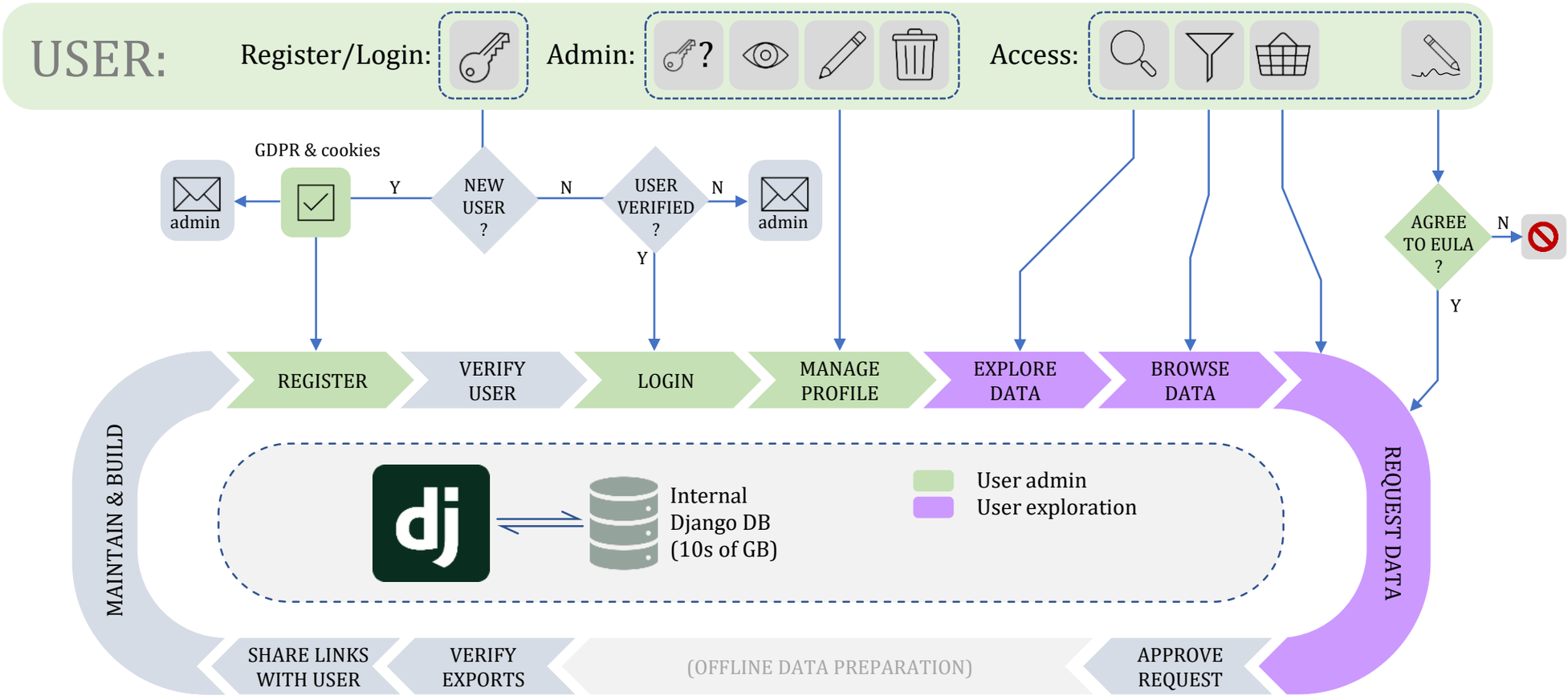




Edinburgh DataSync

Edinburgh DataShare


REGISTER
VERIFY USER
LOGIN
MANAGE PROFILE
EXPLORE DATA
BROWSE DATA
MAINTAIN & BUILD
REQUEST DATA
Internal
Django DB
(10s of GB)
SHARE LINKS WITH USER
VERIFY EXPORTS
(OFFLINE DATA PREPARATION)
APPROVE REQUEST


USER:
Register/Login:
Admin:
Access:
GDPR & cookies
admin
Y
NEW USER ?
N
USER VERIFIED ?
N
admin
Y
AGREE TO EULA ?
N
Y
REGISTER
VERIFY USER
LOGIN
MANAGE PROFILE
EXPLORE DATA
BROWSE DATA
REQUEST DATA
MAINTAIN & BUILD
Internal
Django DB
(10s of GB)
User admin
User exploration
SHARE LINKS WITH USER
VERIFY EXPORTS
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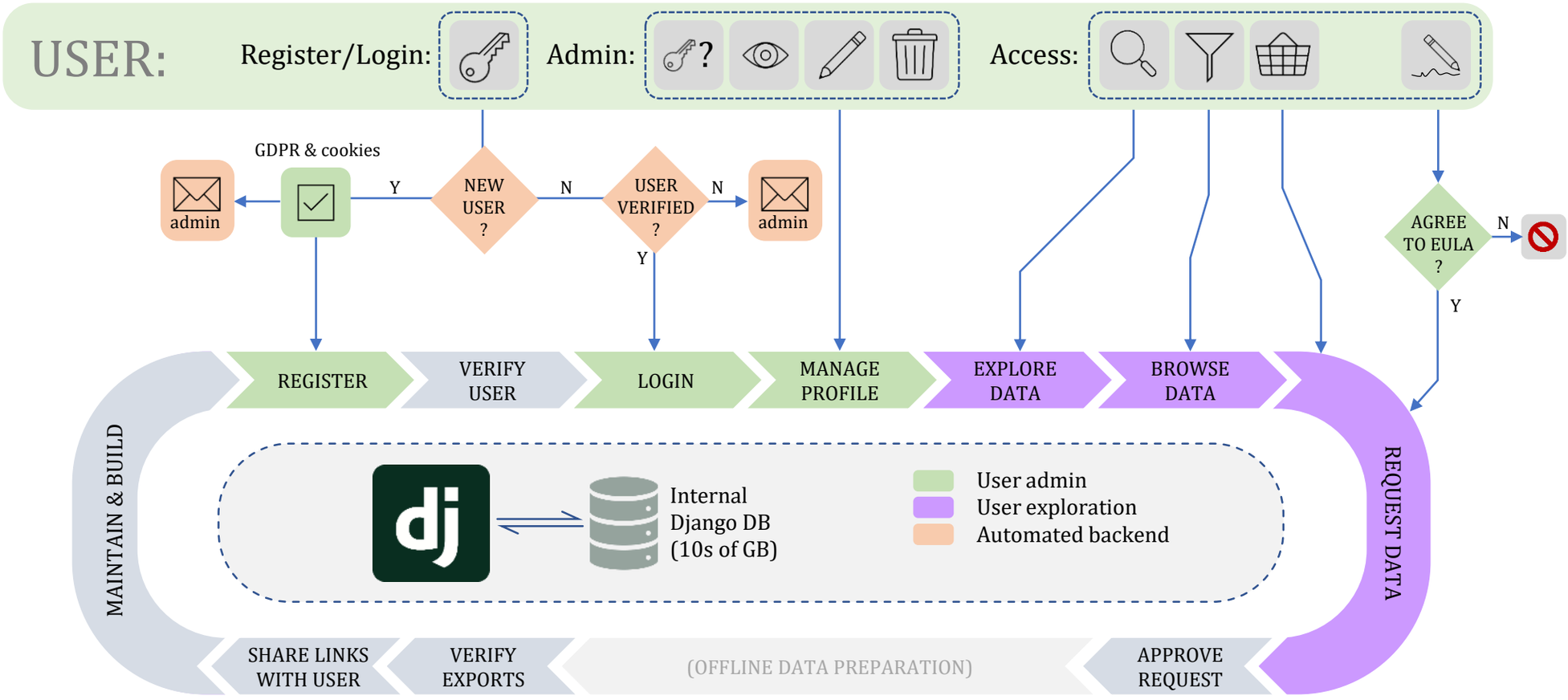
APPROVE REQUEST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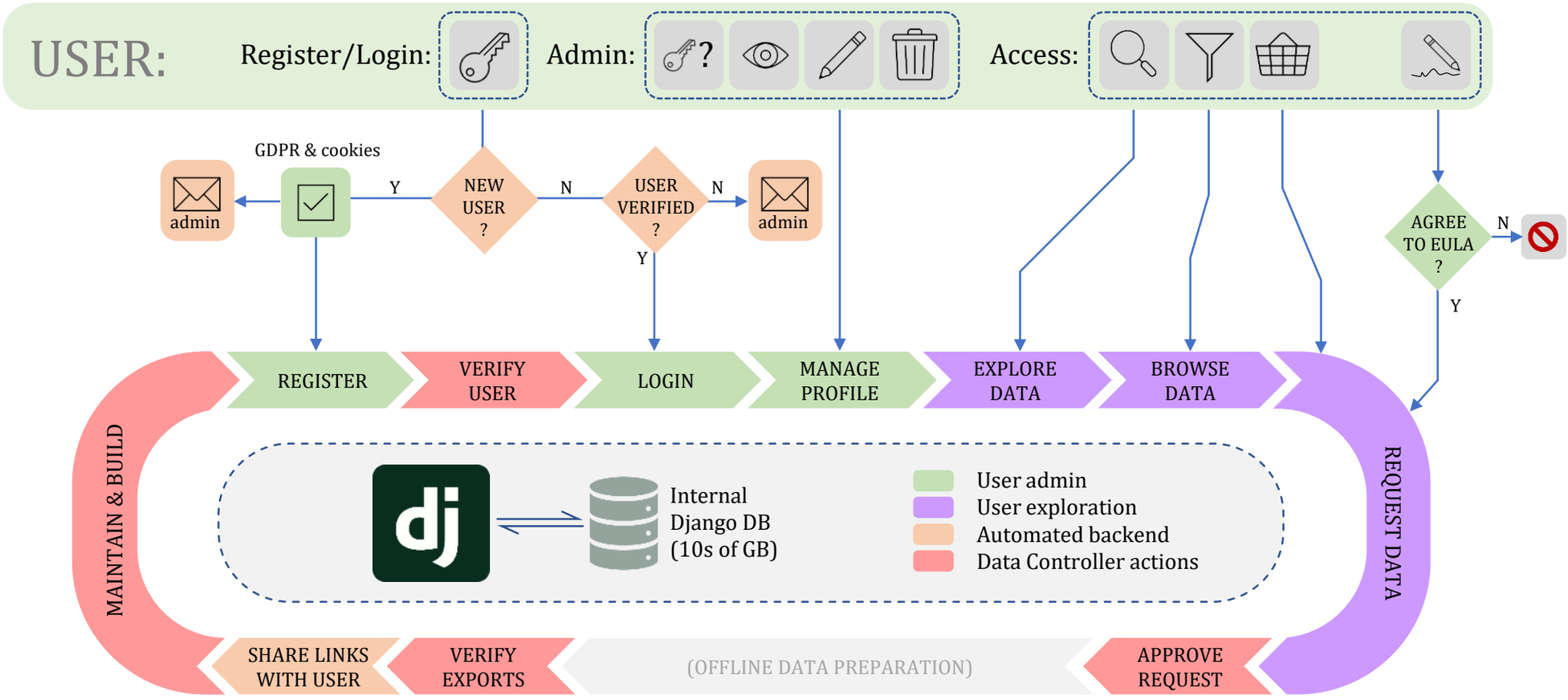
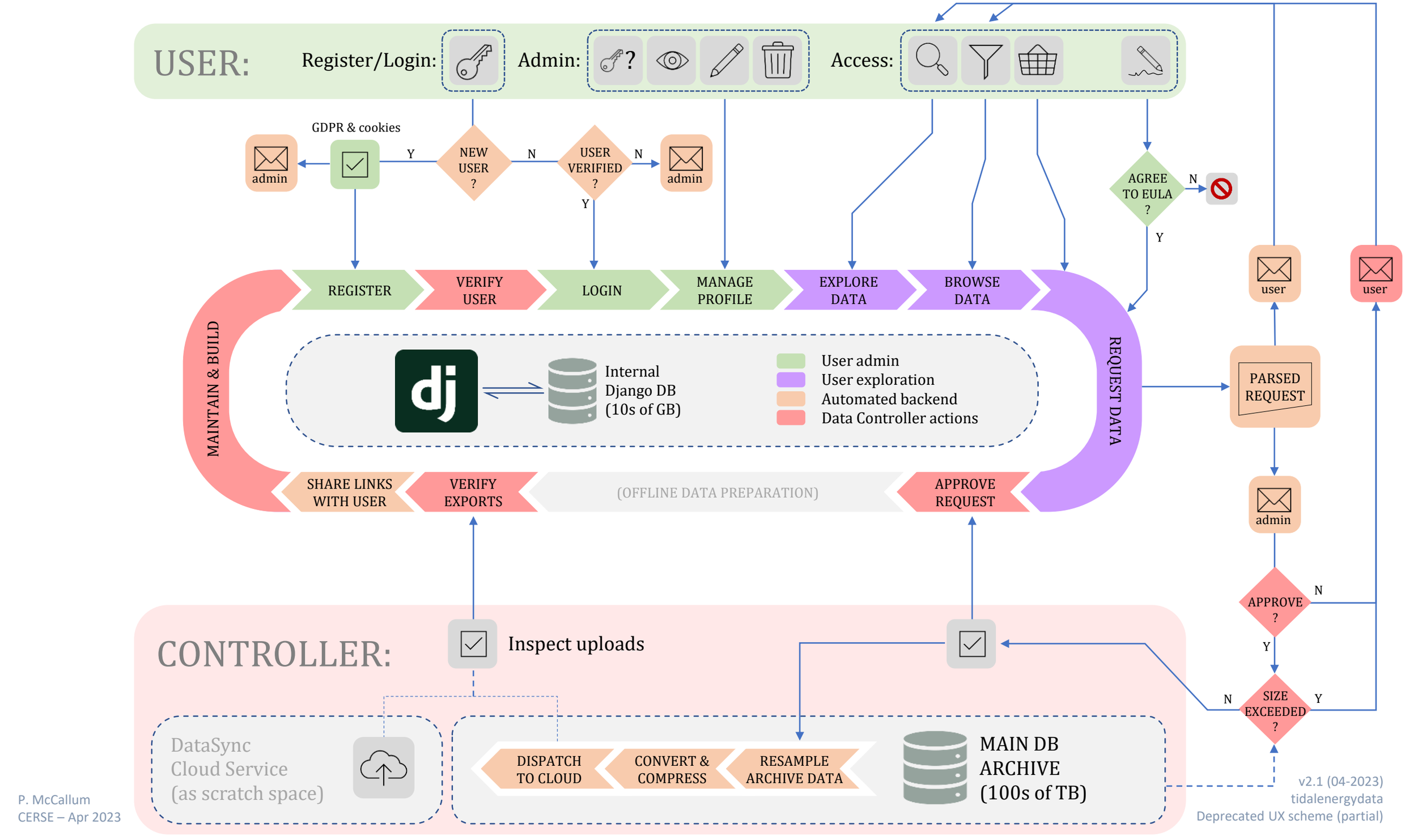
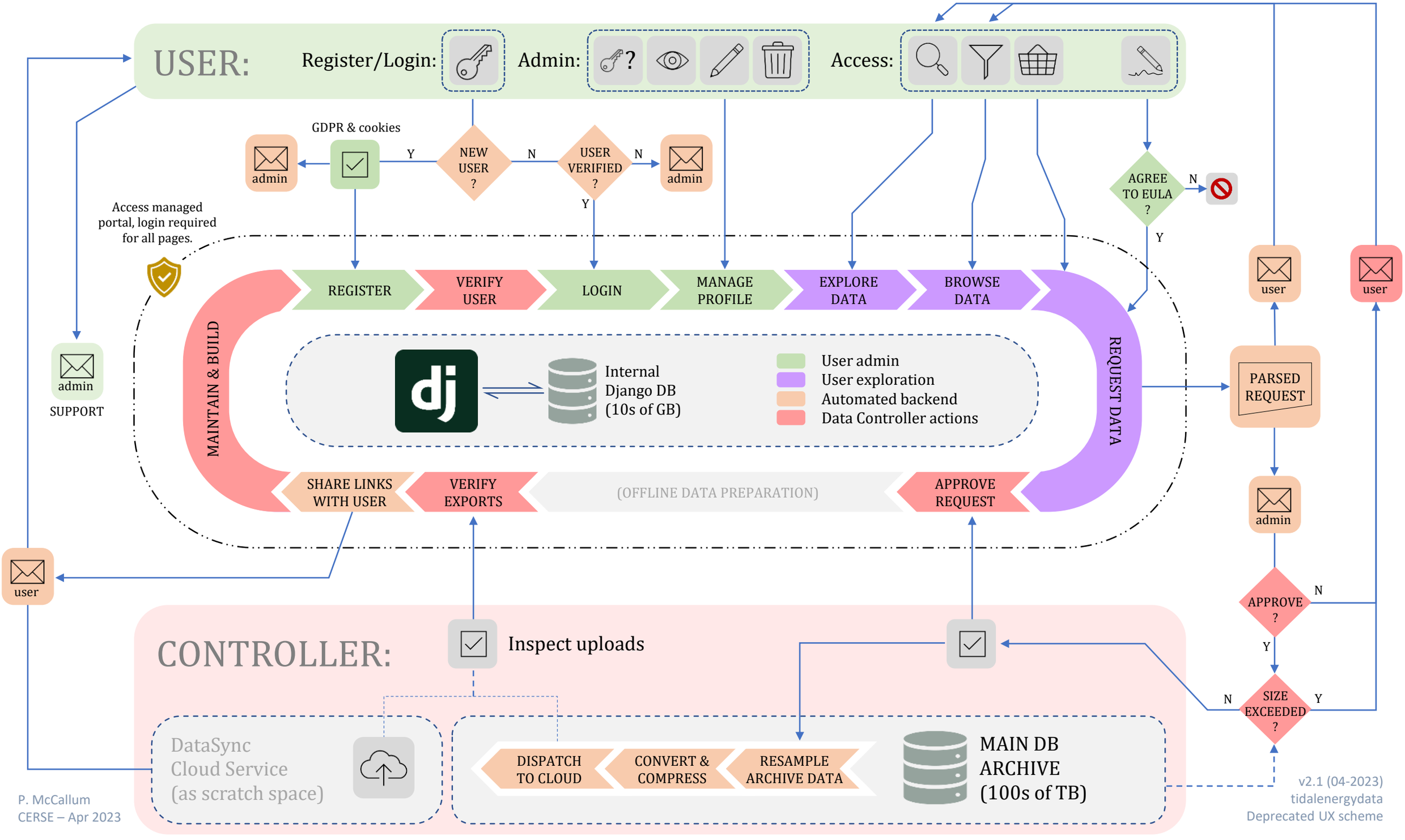


P. McCallum
CERSE – Apr 2023



P. McCallum
CERSE – Apr 2023

v2.1 (04-2023)
tidalenergydata
Deprecated UX scheme (partial)


USER:
Register/Login:
Admin:
Access:
GDPR & cookies
admin
Y
NEW USER ?
N
USER VERIFIED ?
N
admin
Y
AGREE TO EULA ?
N
Y
Access managed portal, login required for all pages.
admin
SUPPORT
REGISTER
VERIFY USER
LOGIN
MANAGE PROFILE
EXPLORE DATA
BROWSE DATA
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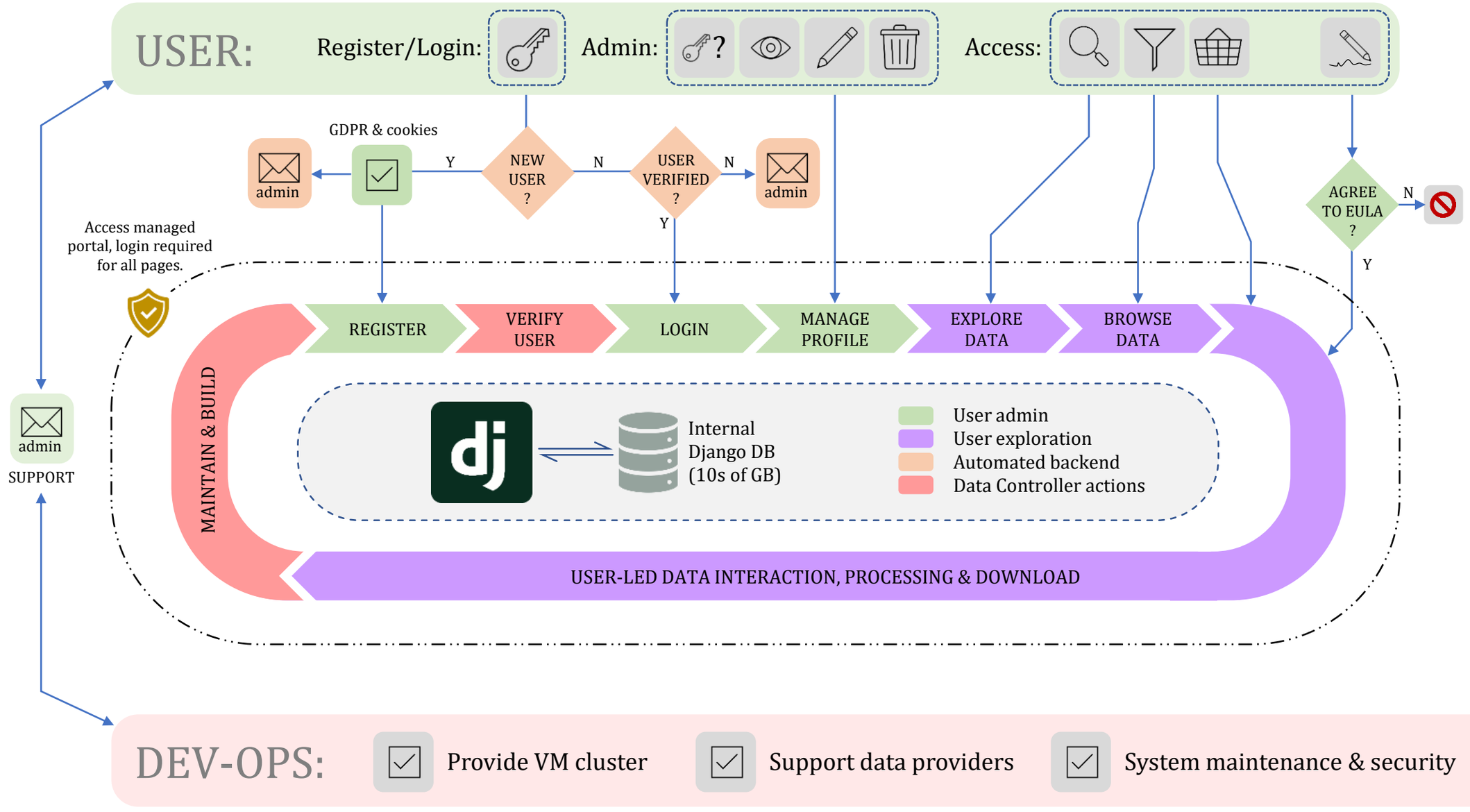
REQUEST DATA
Internal Django DB (10s of GB)
User admin
User exploration
Automated backend
Data Controller actions
SHARE LINKS WITH USER
VERIFY EXPORTS
(OFFLINE DATA PREPARATION)
APPROVE REQUEST
user
user
PARSED REQUEST
admin
APPROVE ?
N
Y
SIZE EXCEEDED ?
N
Y
user
CONTROLLER:
Inspect uploads
DataSync Cloud Service (as scratch space)
DISPATCH TO CLOUD
CONVERT & COMPRESS
RESAMPLE ARCHIVE DATA
MAIN DB ARCHIVE (100s of TB)
P. McCallum
CERSE – Apr 2023
v2.1 (04-2023)
tidalenergydata
Deprecated UX scheme



↑ Version 2:

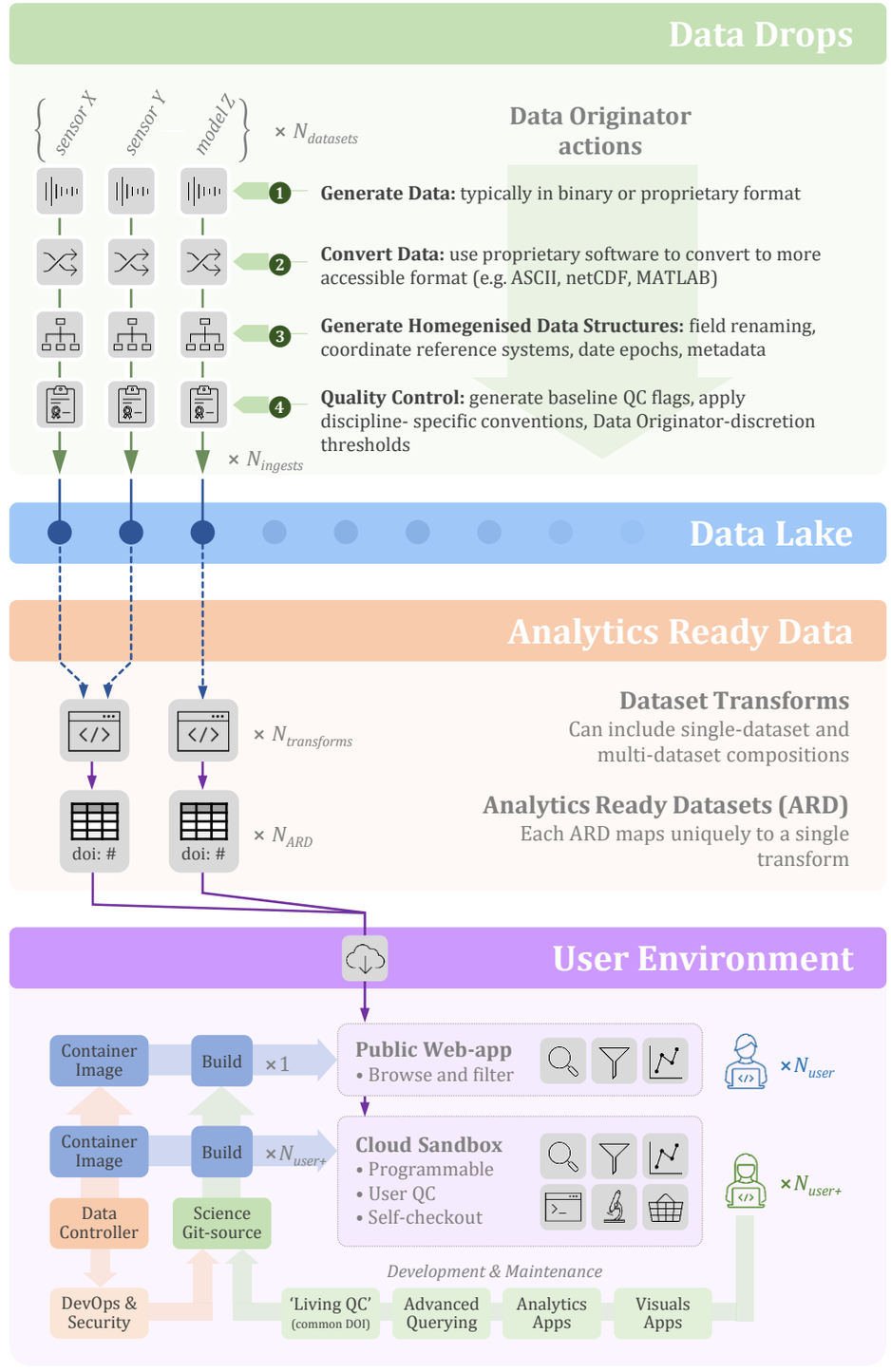
.... scaled-back Data Controller actions + larger scope for user control

Planned Architecture

School of Eng.

EIDF

EPCC & School of Eng.



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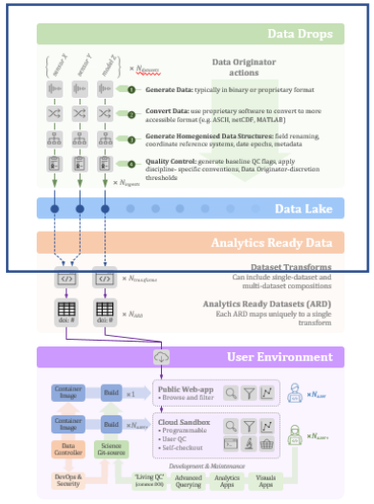
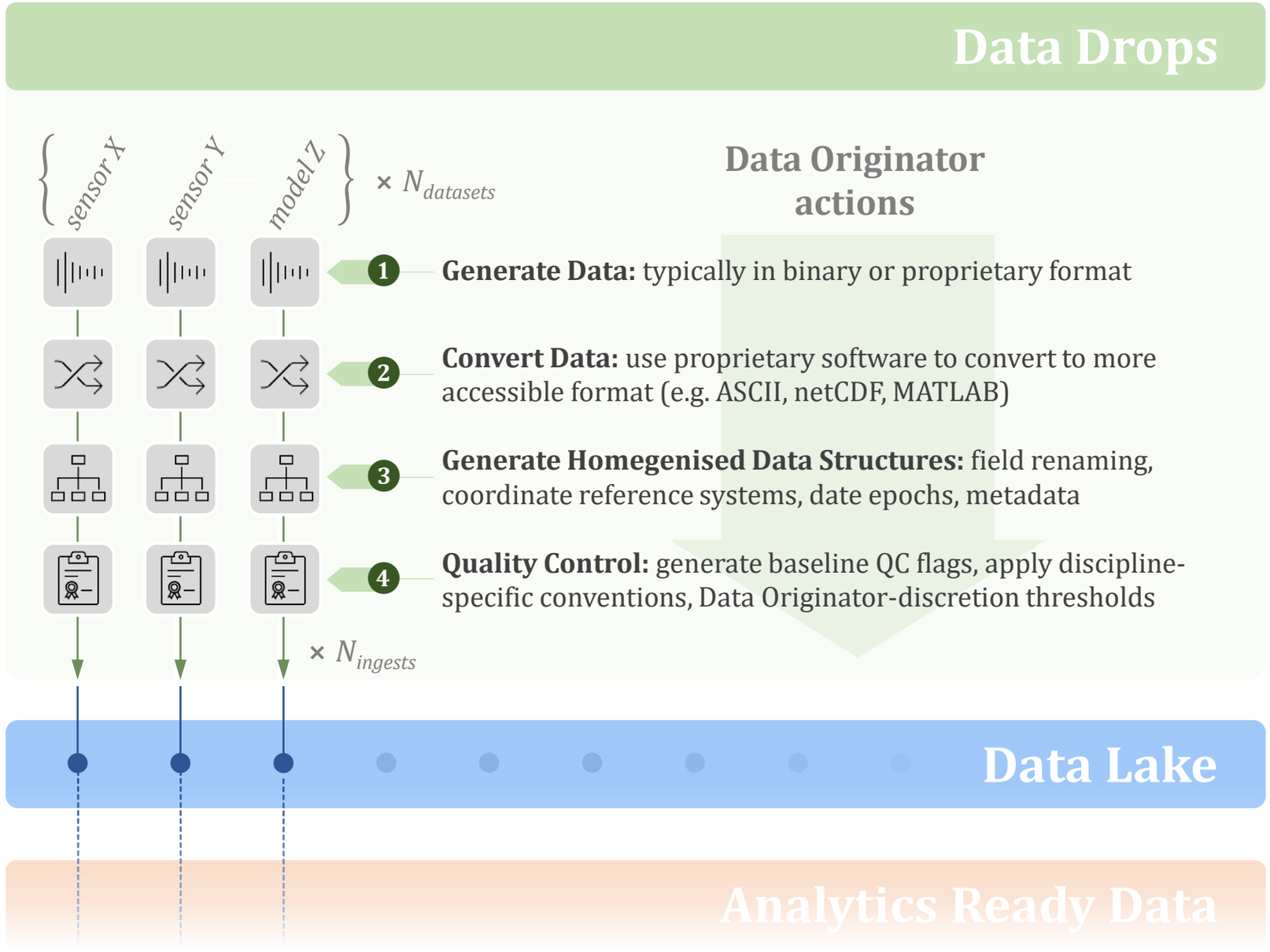
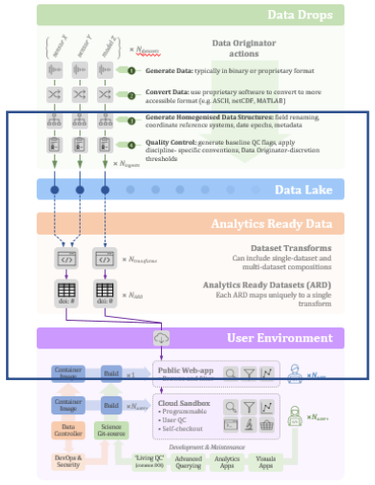
Planned Architecture





Planned Architecture



coordinate reference systems, date epochs, metadata

4 **Quality Control:** generate baseline QC flags, apply discipline-specific conventions, Data Originator-discretion thresholds

$\times N_{ingests}$

Data Lake

Analytics Ready Data

Dataset Transforms
Can include single-dataset and multi-dataset compositions

$\times N_{transforms}$

doi: #

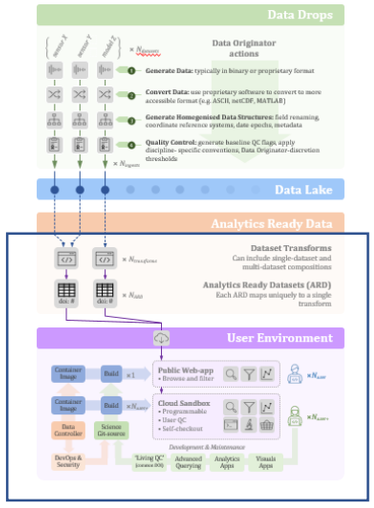
doi: #

$\times N_{ARD}$

Analytics Ready Datasets (ARD)
Each ARD maps uniquely to a single transform

User Environment

Planned Architecture



× $N_{transforms}$

Can include single-dataset and multi-dataset compositions

doi: #

doi: #

× N_{ARD}

Analytics Ready Datasets (ARD)

Each ARD maps uniquely to a single transform

User Environment

Container Image

Build

× 1

Public Web-app

• Browse and filter

× N_{user}

Container Image

Build

× N_{user+}

Cloud Sandbox

• Programmable

• User QC

• Self-checkout

× N_{user+}

Data Controller

Science Git-source

Development & Maintenance

DevOps & Security

'Living QC' (common DOI)

Advanced Querying

Analytics Apps

Visuals Apps

P. McCallum
CERSE – Apr 2023