Sharing is Caring - Software

Deployment tracker

What we needed to support

Carbon deployment operations where a vessel is loaded with coated substrate, the vessel leaves to a predetermined location and offloads the substrate.

What we built

A software solution that models the processes used on site. The solution provides capabilities to capture various events throughout the lifecycle of each intervention. The primary focus of the solution is the tracking of carbon deployments but also has capabilities for research deployments such as macroalgae deployments and sensor only deployments. Each Intervention could have associated

- batches representing different recipes substrate being deployed
- events
- buoys
- lab experiments
- automatically generated reports
- results from data model runs.

An animated map of the 13th deployment out of Iceland in 2023

We also built software to track individual buoys, permits and lab experiments into the deployment tracker. We did this both to better facilitate data capture and do get the results into our databases so we could connect them to our deployments and other records.

What we would’ve wanted to build next

With new locations would come different processes that would need to be handled with different events and different data visualisations. More automation when it comes to publishing quantification results and generating carbon ledger transactions. More data model results would have been automatically published to individual interventions.

How it’s all connected

The deployment tracker serves as the context for different sources of data. From sensor data to user inputs and references on our carbon ledger.

Quantification tracker

What we needed to support

The core of the carbon deployment methodology is a formula that is used to calculate the net co2e moved from the fast cycle to the slow cycle by each of our interventions.

What we built

The Quantification tracker is a solution built to facilitate user inputs for variables, collecting evidence for each input, provide traceability and capture comments.

To improve the process of quantifying a deployment we also built project management capabilities like associating individual variables to the person responsible for inputing its value.

The Quantification tracker implements a formula validation features.

What we would’ve wanted to build next,

An updated methodology would have us define an updated formulae. More advanced visualizations were planned and automation of publishing quantification results for interventions for carbon accounting purposes were all planned for 2024.

How it’s all connected

The quantification tracker is tied to the deployment tracker by capturing the quantified impact of each recipe used in each deployment.

Credit delivery

What we needed to support

Our customers were initially receiving a PDF report with a certificate when accepting deliveries of credits. We wanted that process to be easier, more automated and visually pleasing.

What we built

A site that gave users access to their deliveries through a logged in experience. The user could access all relevant data from that site as well as share individual reports with different users.

What we would’ve wanted to build next

An extended version of this would have been tied directly to user orders and would be showing published quantification results.

How it’s all connected

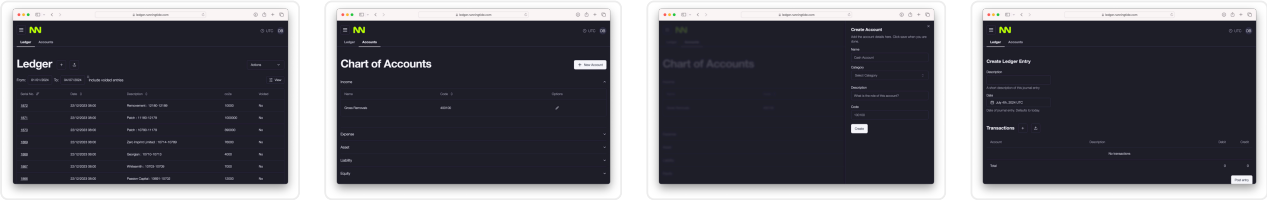
Reports are generated based on data about interventions from the deployments tracker.

Carbon Ledger

What we needed to support

To accurately track Running Tides carbon impacts we needed a single source of truth that we can rely on.

What we built



What we would’ve wanted to build next

Ultimately the idea was to have the ledger be fully automated with entries being created when ceratin events triggered in other systems.

For instance when a deployment is quantified, credits issued or delieverd.

How it’s all connected

The Ledger references external systems on an entry level so when a ledger entry is created as a consequence of a record being kept in a different system we can connect the two to maintain the chain of custody.

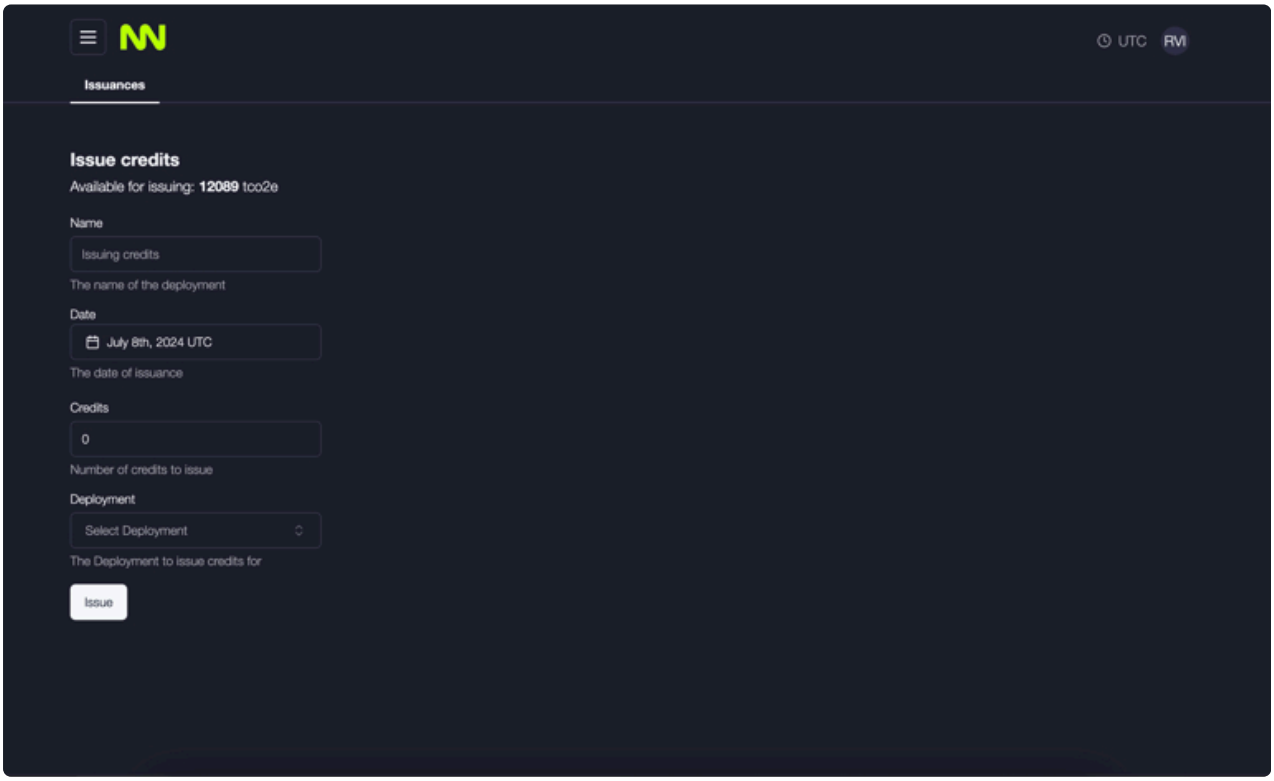
Internal Credit Registry

What we needed to support

Minting carbon removal credits needs to happen in a traceable way, we need to be able to keep track of individual serialised credits and whether they have been delivered or retired. We also need to be absolutely certain that we only mint one credit for every tonne of carbon removed.

What we built

A centralised Credit Registry for internal tracking of credits being minted and delivered. The registry does automatic validation of the available balance of co2e from our ledger as well as making sure the deployments we are issuing credits from have not been fully spent, i.e. that there is still balance available for the credits being minted.



Sensor Data Ingestion

What we needed to support

With a broad range of sensors being deployed in our custom built buoys, we needed to capture and organize that data. We needed to make the data easily accessible for both users through interfaces as well as making large data sets accessible for out ocean models.

What we built

A cloud based reception system that processed raw sensor data into database records we could query and build interfaces and modelling solutions on top of.

Impact Tracker

What we needed to support

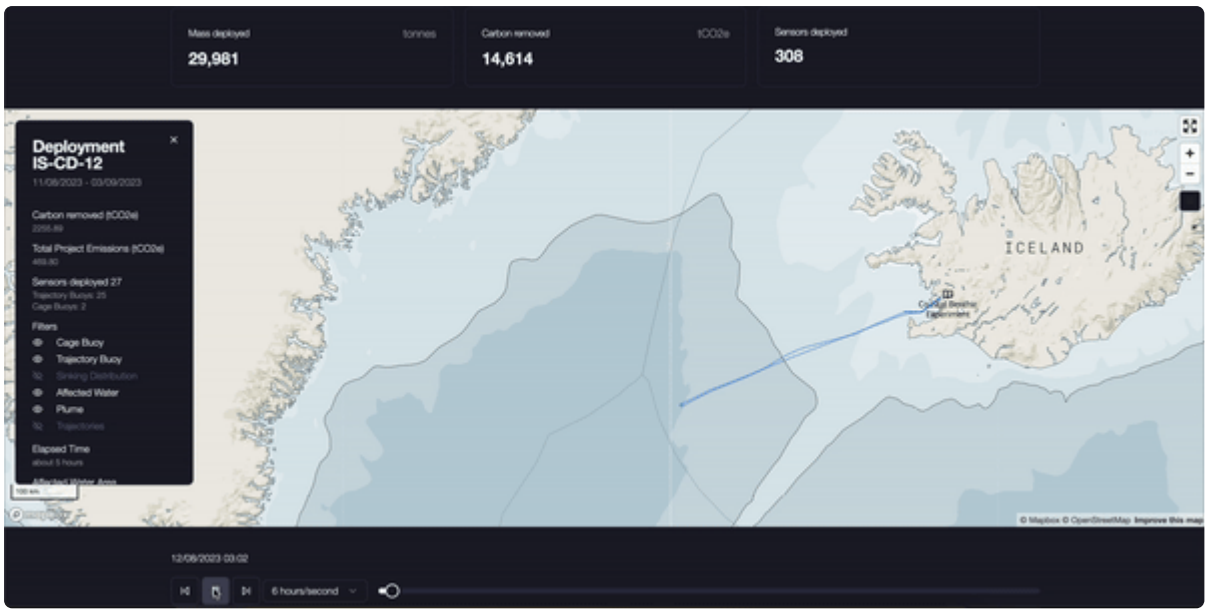
Once we had started operations there was a greater need to visually understand the impact of our activity.

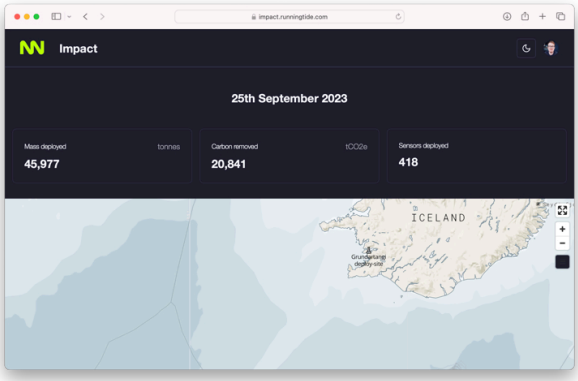
What we built

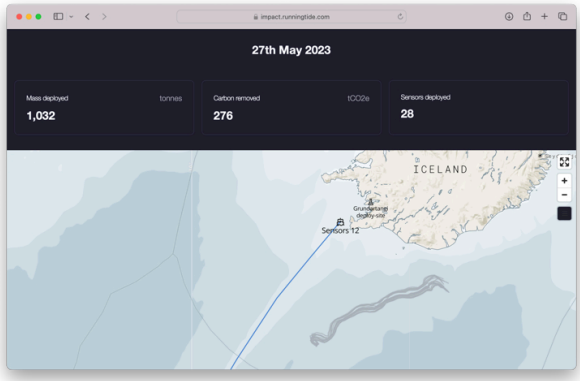
A web app that captures much of our research and deployment data and presents it all on a single map.

The web app lets you inspect

- Deployment vessel paths
- Path of all buoys
- Modelled benthic density of deployed substrate
- Modelled visual of the plume of deployed substrate
- Modelled trajectories
- Running Tides different operating locations
- Simulated paths of materials being transported


Mass deployed
29,981
tonnes
Carbon removed
14,614
tCO2e
Sensors deployed
308
Deployment
IS-CD-12
11/09/2023 - 03/09/2023
Carbon removed (tCO2e)
Total Project Emissions (tCO2e)
Sensors deployed 27
Trajectory Buoys: 25
Cage Buoys: 2
Filters
Cage Buoy
Trajectory Buoy
Sinking Distribution
Affected Water
Plume
Trajectories
Elapsed Time
about 5 hours
ICELAND
12/09/2023 03:02
6 hours/second


impact.runningtide.com
Impact
25th September 2023
Mass deployed
45,977
tonnes
Carbon removed
20,841
tCO2e
Sensors deployed
418
ICELAND


impact.runningtide.com
27th May 2023
Mass deployed
1,032
tonnes
Carbon removed
276
tCO2e
Sensors deployed
28
ICELAND
Sensors 12

Site Selection and Map Visualization

What we needed to support

A large part of Running Tides methodology is deciding where to deploy our substrate to maximise the amount of materials sinking below a 1000m threshold. We also have a wide range of geospatial data that is a necessary input for our research and modelling work.

What we built

A single map application that captured all of the data we had for different operational areas. Under the hood there was a dedicated tile server that was kept up to date when new records were created in the source systems.

What we would’ve wanted to build next

The map application was ultimtely supposed to contain "all geospatial data" we had either procured or created to give both operations and science teams a single point of entry for geospatial data.

From there we also intended the map application to be a point for initiating model runs that generated geospatial data, such as heatmaps and benthic densities.

How it’s all connected

The tile server read data from our operational systems and generated the tiles data on a schedule.

Data Models