

Prepare Demonstration Data

Extract the files from the zipped file that has been downloaded and store them in a temporary location on your computer.

Create the Project

- Launch the *Projects* page (*click the Projects icon or click the Projects tab*).
- Project Title: Demo_Landfill
- Complete the fields.
- Is local system: No (*We wish to enter the locations of the sensors and display them on Google Maps.*)
- Remember to update the time zone to reflect your home time zone!
- Reference Date Mode: This defines the date which will be used to select the data to be used as the project reference data, from which the changes will be computed.
- Click *Save* and create the project.
- Now select the project from the *Project* drop down list at the top of the page or from the left hand navigation panel.



Create Sensors

- Launch the *Sensors* page (*click the Sensors icon or click the Sensors tab*).
- First step is to add the locations of the sensors for later selection (*Open the spreadsheet file Environmental_Locations.xlsx which contains the location data. This was extracted manually from Google Earth, but may be obtained more accurately from GPS readings taken on site.*)
- Click *Add* to launch the Location dialog.



- Enter each of the locations listed in the *Locations* file. In our example the location name matches the sensor name. This is not necessary. You can name give the location any meaningful name you wish (*currently this has to be done manually for each sensor*).
- Remember to *Save* the data for each location.
- When this step is completed, the *Location* drop down list will be filled with the names of your locations.

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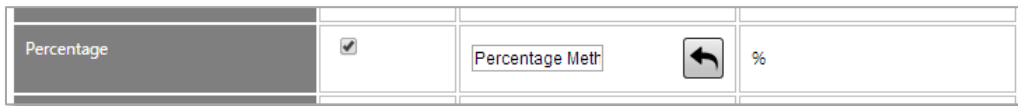
- Check that the sensor types we have are listed in the *Sensor Type* drop down menu. We will be adding gas detection sensors, borehole water level sensors and a temperature sensor.

There is no gas detection sensor. That is why we have to define a new sensor type for gas detection.

- Select the type *Generic Sensor*.

Now we link the type of data we will receive from this sensor. The closest is *Percentage*, but still not quite what we are looking for. Hover the cursor to the right of the description percentage and a spanner icon appears.

- Click this and you will be able to edit the data type description.
- Change it to *Percentage Methane*.



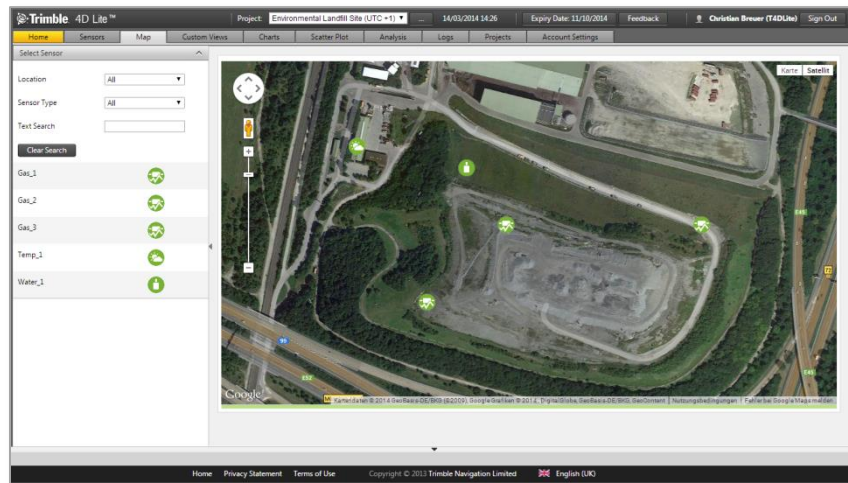
- Click the tickbox to tie this data type to the *Generic Sensor*. The result:
 - Name: Gas_1
 - Sensor Type: Position Sensor
 - Location: Gas_1
 - Reference Date: Use Project Default
 - Linked Data Types: Coordinates (click tick box)
 - Click *Save and Add Another*
- Repeat for *Gas_2* and *Gas_3*.
- For the borehole water level sensor *Water_1* select the sensor type *Water Level Gauge*. Only select *Water Depth* as the linked data type.
- For the temperature sensor *Temp_1* select the sensor type *Temperature Gauge*. Select *Temperature* as the linked data type.



- All the sensors have been added to the project now.
- There is still no data associated data with the sensors yet, but we need to check whether we have entered the location correctly!
- View the sensors in their geospatial context using the map view.

Map View – Sensor Symbols

- Launch the *Map* page (click the *Map* icon or click the *Map* tab). This opens the Google Maps View. Select the satellite image and this is what you should see:



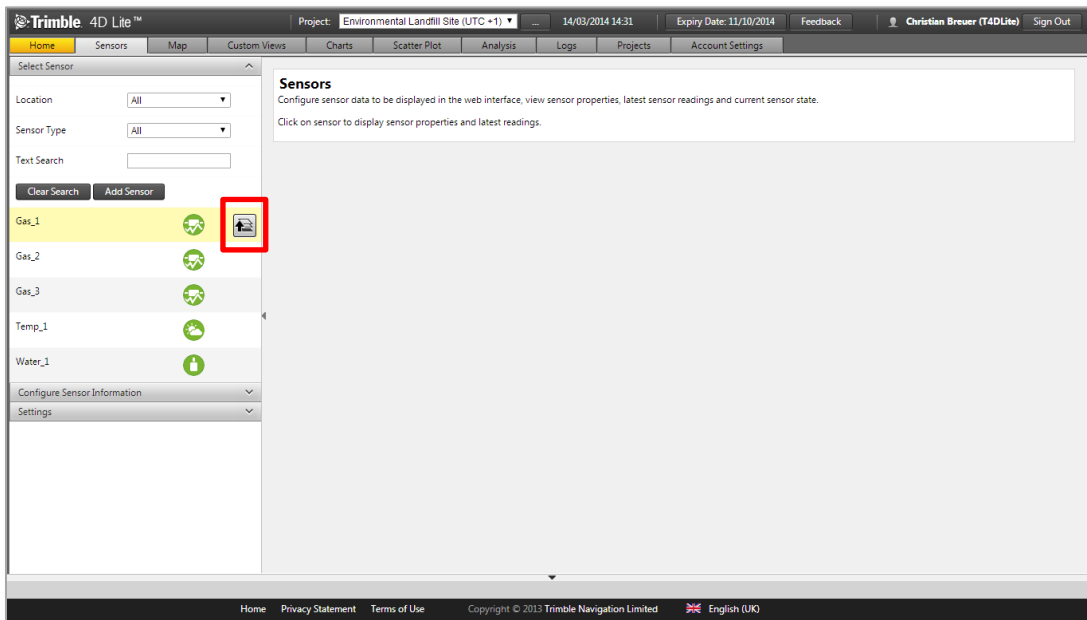
Great, the symbols are in the right place. If they are not, then go back to the *Sensors* tab, select the sensor that appears to be incorrect and edit its location using the *Edit* button.

Import Sensor Data

Once the sensors have been created successfully in the project, we can start importing data for them. There are two ways of getting data into the system. Sensor readings can either be entered manually for each sensor or they can be imported for multiple sensors of the same type by using a data file.



- Launch the *Sensors* page (click the *Sensors* icon or click the *Sensors* tab).



- Place your cursor over the sensor *Gas_1* so that the background colour turns yellow and the data upload icon appears.
- Click the data upload icon to launch the data upload screen.

Data Entry: Gas_1

Observation Date	Sensor	Percentage Methane (%)	
<input type="text" value="14/03/2014 14:35:50"/>	<input style="border: none; background-color: #f0f0f0;" type="text" value="Gas_1"/>	<input type="text"/>	
<input type="button" value="Add"/> <input type="button" value="Save"/>		<input type="button" value="Download Template Data XLSX File"/> <input type="button" value="Upload Data XLSX File"/>	

- Data can be entered manually with full flexibility over each input field.



You can also import a file containing the readings for the sensors. The limitation is that the file must contain all the readings for only one sensor **type**. In this mining example we must upload three data files: One file for the gas sensors, one file for the water level sensor and one file for the temperature sensor.

There is a template available for download for each sensor type.

[Download Template Data XLSX File](#)

- Select a gas sensor (e.g. *Gas_1*) and download the template file for it.
- Select the water level sensor and download the template file for it.
- Select the temperature sensor and download the template file for it.

The first data line in each file is an example of how the data must be presented. The field that gives some challenges is the date field. Be careful of that field and ensure that the format is the same as provided.

If you have captured data on a data logger, export the data to a text file and import it into any Microsoft Office® Excel® spreadsheet. Cut and paste the data into the T4DLite Excel template and save it in a known location.

- Upload this data into T4DLite using the upload button.

[Upload Data XLSX File](#)

If you make a mistake in filling the fields, T4D Lite will warn you and output an Excel file explaining where the possible error lies.

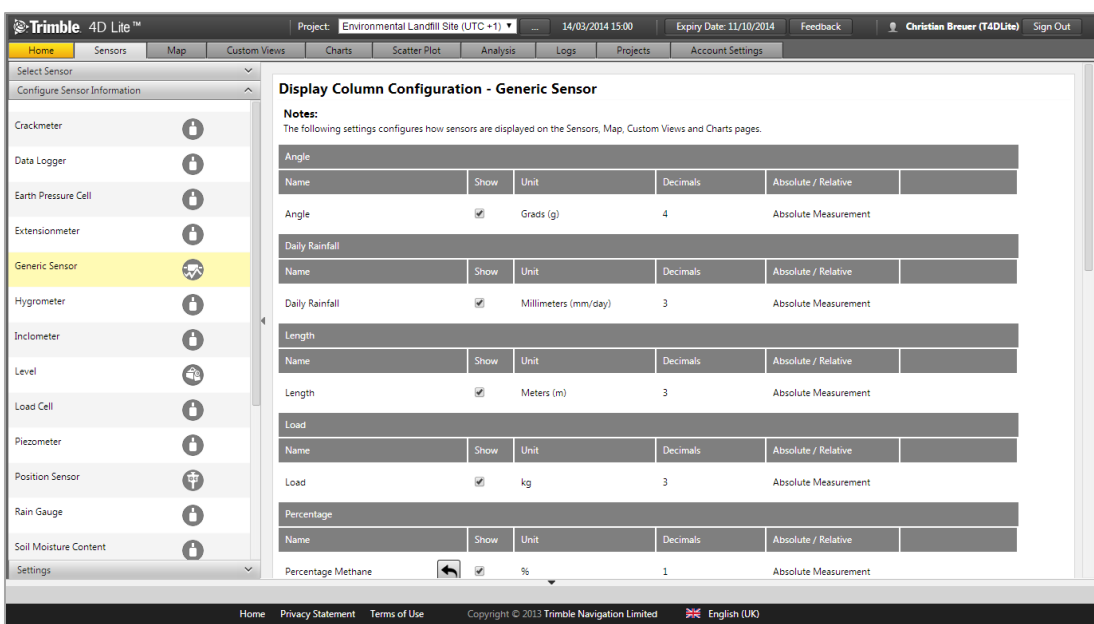
*Note: We have provided three example data files for you to upload. Examine their content and see how we have grouped the data. Select any gas sensor (e.g. *Gas_1*) and upload the provided position data file. Repeat the procedure with the provided water level sensor and temperature sensor files.*

Format Data

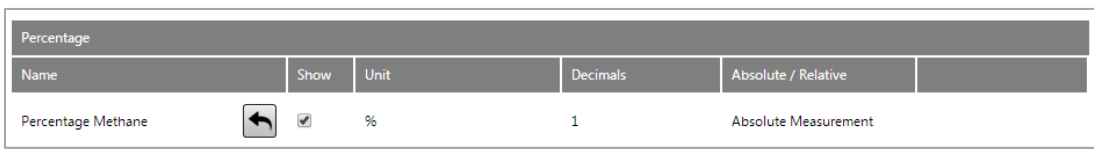
All the sensors in our project now have data associated with them. In the next step we will configure how the data is presented.



- Launch the *Sensors* page (click the *Sensors* icon or click the *Sensors* tab).



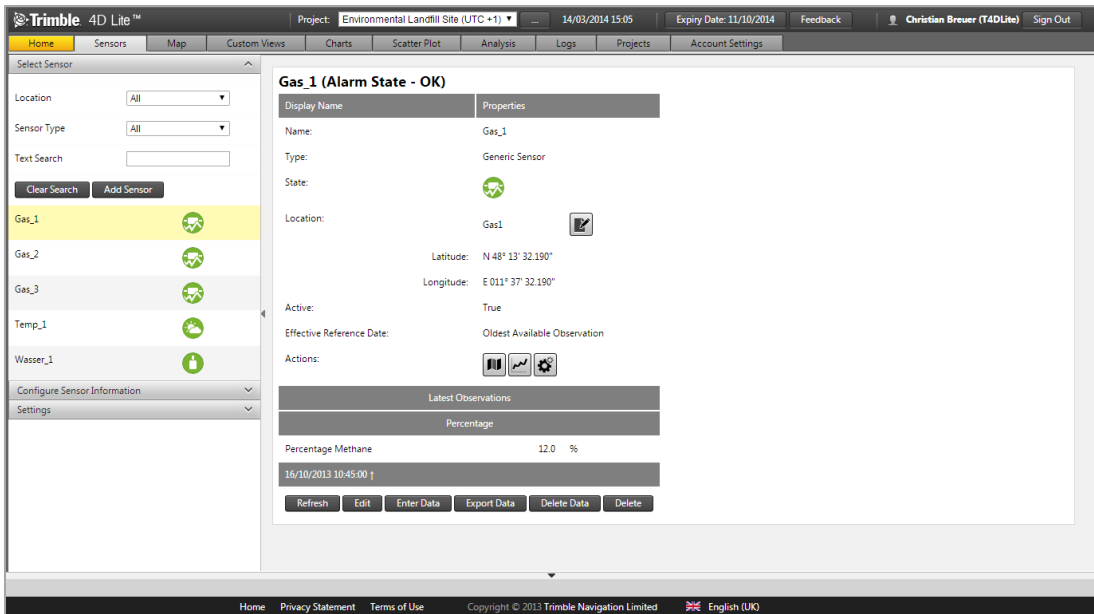
- Select *Configure Sensor Information* from the navigation panel on the left. This opens a list of all sensor types available in the system.
- Select the *Generic Sensor*. The data configuration page will be launched.
- Hover over any of the information fields. The field will turn yellow and the editing capabilities will be exposed.



- Select a data type, change the display name, enable or disable it, change units or the amount of decimal digits or change the display from absolute to relative values. You now have full control over what data is to be presented for each sensor and how the data will be formatted.



- Click *Select Sensor* from the navigation panel on the left.



- Select e.g. *Gas_1*. In addition to the location also the latest observation is now being displayed according to the settings made before.

Map View – Sensor Information

- Launch the *Map* page (click the *Map* icon or click the *Map* tab).
- Hover over the sensor symbol of e.g. *Gas_1* in the map. A sensor information dialog will appear showing the latest data for the sensors at that location, formatted as per your settings.

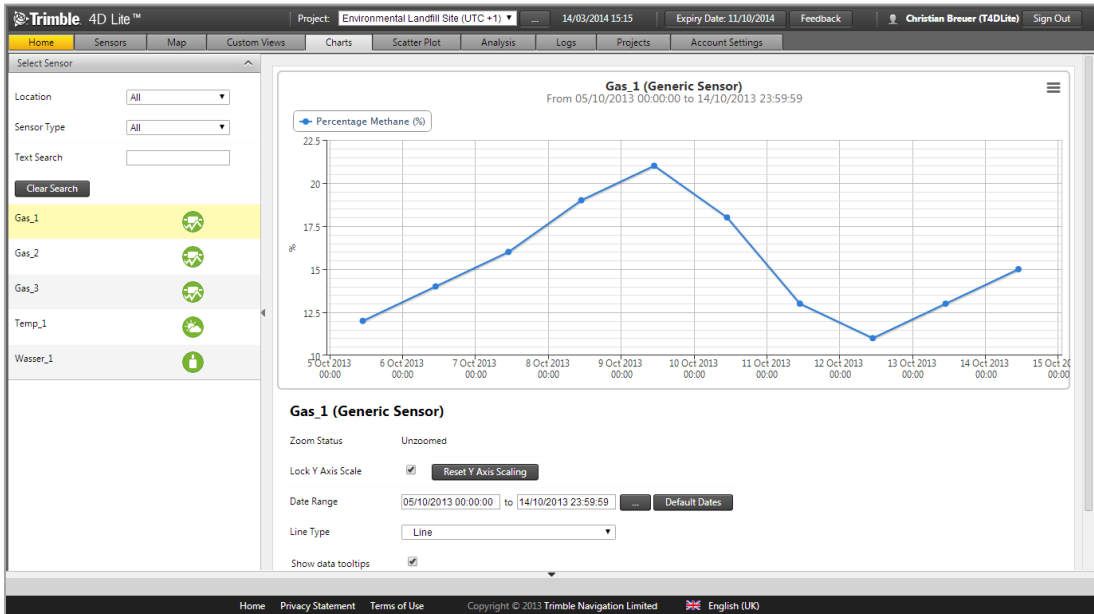


- Click the symbol (in the map or the navigation bar) and the dialog gets anchored.



Data Charting

- Launch the *Charts* page (click the *Charts* icon or click the *Charts* tab). This is the facility to give a fast and simple overview of the data related to the sensors.



- Click a sensor symbol e.g. *Gas_1*.
- Hover over the chart to open the sensor data information dialog.
- Change the time and display settings as desired.

Scatter Plot

Note: The *Scatter Plot* page is only available for *Position Sensors*. The scatter plot charting requires related data pairs and plots data type 1 against data type 2. It is generally intended to plot displacement, showing Δ Northing against Δ Easting or Δ Y against Δ X.

Analysis

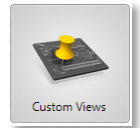
The next tab of interest is the *Analysis* tab. This is the heart of the data comparison and analysis facility of this website and is the subject of a dedicated tutorial. It is suggested that the analysis tutorial and related training video will be used to learn the power of this web page.



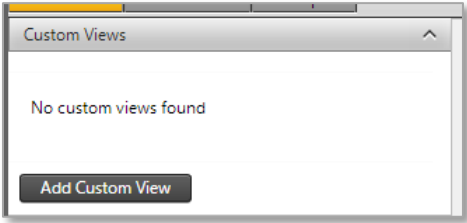


Custom Views

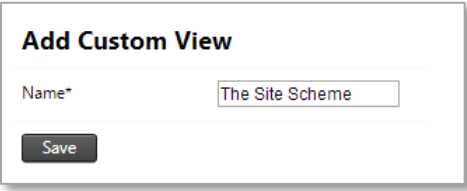
This is a facility where you can view the sensors in a context that is of interest to you. You can upload any background image and locate the sensors on this image. The background image may be a sketch, a copy of a plan, or, as is the case in our example, a photograph from you mobile phone.



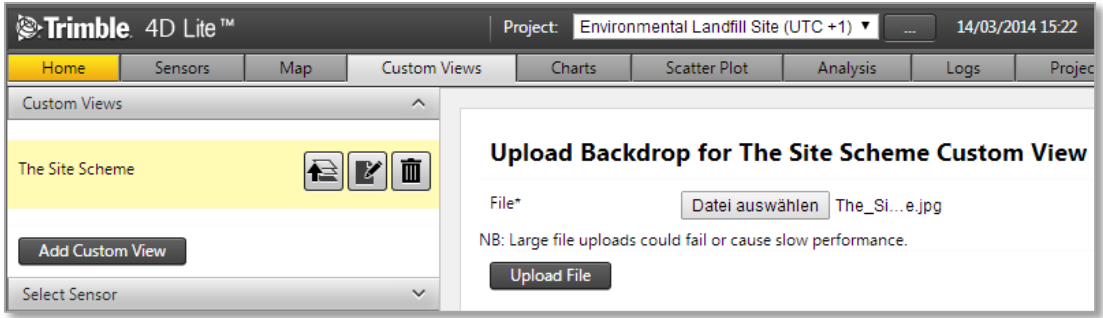
- Launch the *Custom Views* page (click the *Custom Views* icon or click the *Custom Views* tab).



- Click the *Add Custom View* button.



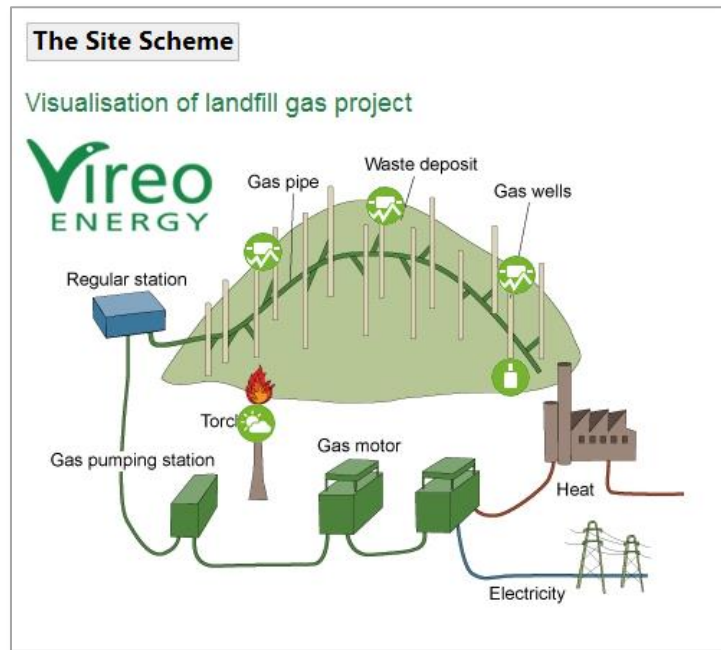
- Name the custom view *The Site Scheme* and *Save*.
- Upload the background image (click the *Upload Image* button that appeared in the centre of your screen or the *Upload Image* icon next to the name of the custom view).



- Click the *Choose File* button and locate the image file *The_Pit.jpg* which we supplied as part of the documentation for this tutorial.
- Now click *Upload File* and the image will appear as the backdrop.

Now comes the fun part. We need to position sensors on this image. This is simply a drag and drop work.

- Position your cursor on a sensor symbol, drag it (*hold left button down on your mouse*) to the required position on the drawing and drop it there (*lift your finger from left mouse button*). The symbol should disappear from the list on the left and remain fixed on your image. Slow network speeds may require you to be a little bit patient whilst the system catches up with you! The final result should look like this:



Conclusion

And, that concludes this exercise! You will now know the basics of the system, but still need to learn about the details. Please, use the appropriate tutorial!