

# User Guide

IRIS Focus Lightning  
Version 6.0



PUBLISHED BY

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# 1. About this document

## 1.1 Version information

This document provides information for using IRIS Focus Lightning software.

Table 1 Document versions (English)

Document Code	Date	Description
M212544EN-A	November 2020	First version of this document. For IRIS Focus 6.0.

## 1.2 Related documents

Table 2 Related documents

Document code	Name
M211850EN	<i>IRIS Focus Administrator Guide</i>
M211849EN	<i>IRIS Focus User Guide</i>
M212545EN	<i>IRIS Focus Lightning Administrator Guide</i>
M212544EN	<i>IRIS Focus Lightning User Guide</i>
M211904EN	<i>IRIS Focus Release Notes</i>
M211315EN	<i>IRIS and RDA Software Installation Guide</i>

## 1.3 Trademarks

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## 1.4 Documentation conventions



**WARNING! Warning** alerts you to a serious hazard. If you do not read and follow instructions carefully at this point, there is a risk of injury or even death.



**CAUTION! Caution** warns you of a potential hazard. If you do not read and follow instructions carefully at this point, the product could be damaged or important data could be lost.



**Note** highlights important information on using the product.



**Tip** gives information for using the product more efficiently.

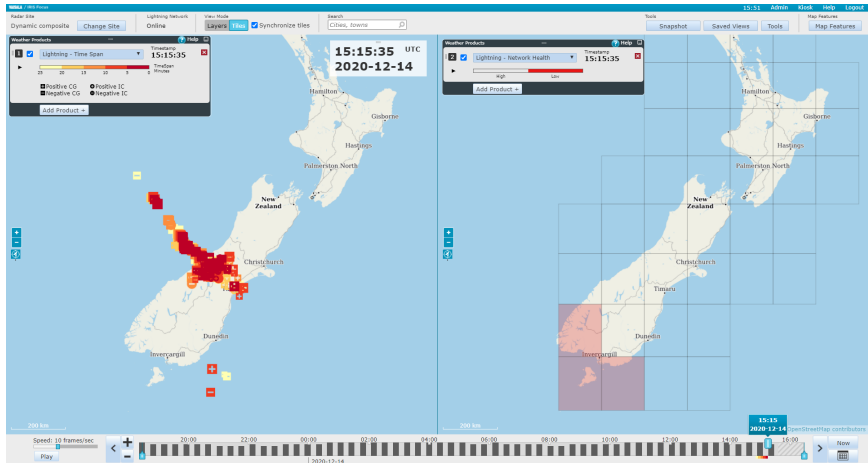


Lists tools needed to perform the task.



Indicates that you need to take some notes during the task.

## 2. IRIS Focus overview



1) *Lightning data: courtesy of Transpower New Zealand Ltd.*

Figure 1 IRIS Focus main view

IRIS Focus provides user-friendly, browser-based tools for viewing and analyzing lightning data received from a sensor network.

Lightning data is overlaid on a customizable geographical map. The data is visualized through products such as the **TimeSpan**, which provides information about recent lightning events.

With the zoomable animation timeline, you can easily visualize and animate recent data.

IRIS Focus can also be used to visualize weather radar data from a weather radar network. The application was initially designed for handling weather data, but it is suitable for visualizing any remotely sensed map-based data.

### 2.1 Lightning product generation

The data for lightning products in IRIS Focus originates from a Vaisala Lightning Detection System which uses multiple, remote sensors to detect signals emitted by lightning discharges, while filtering out the signals from non-lightning sources. Each sensor sends its data to the central processor (the **Total Lightning Processor, TLP**) where lightning locations are determined.

To ensure that the data set applies to the same lightning event, the TLP compares the time at which the event was recorded by each sensor, and then calculates the precise location of the lightning event. The TLP also records several other descriptive characteristics of each lightning event.

The data from the TLP is delivered to IRIS Focus. The data is ingested to the system in real time, after which it can be requested across specific time frames by lightning products.

#### Lightning sensor network

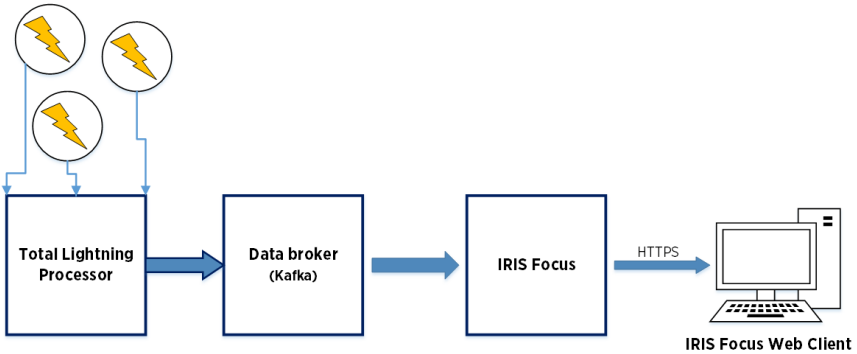
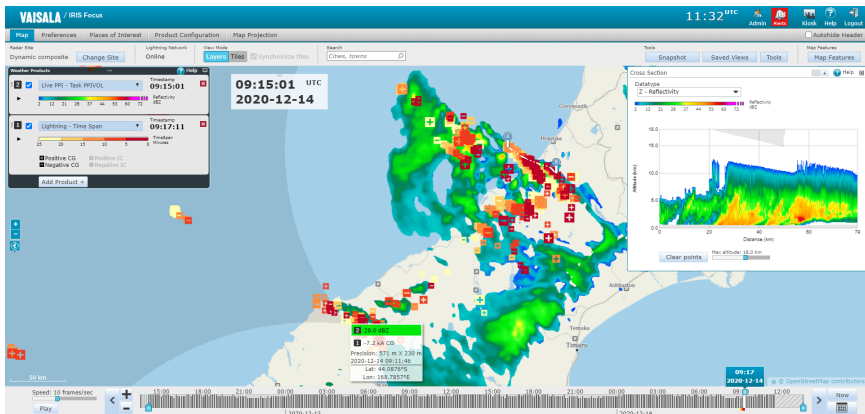


Figure 2 IRIS Focus lightning architecture

## 2.2 Weather radar data visualization



- 1) *Weather radar data: courtesy of Meteorological Service of New Zealand Ltd. Lightning data: courtesy of Transpower New Zealand Ltd.*

Figure 3 IRIS Focus main view with weather products

IRIS Focus can also be used to visualize weather radar data. The data comes from a single radar or a network of radar sites. With the zoomable animation timeline, you can easily visualize and animate recent or nowcasted data.

Nowcasting performs advection calculations on motion data from radar products to predict weather movement and severity up to 2 hours in the future.

Significant weather events such as hail, wind shear, or heavy rain are automatically detected when they enter a pre-defined area of interest.

## 2.3 Licensing

IRIS Focus requires a software license to run. To activate the license, you need a product key.

Vaisala delivers the product key when you purchase the software. If you have purchased the software and you have not received the product key, please contact Vaisala.

For server deliveries, Vaisala activates the product key in the factory, and a Vaisala representative sends you the key for future reference.

The license is mapped to the hardware of your IRIS Focus server or the ID of your virtual environment. If your hardware configuration changes and you need to re-install IRIS Focus, you must request a replacement license from your Vaisala representative, unless you have a USB license key.

If you have a USB license key, IRIS Focus runs when the USB drive is inserted in the server. If you install IRIS Focus on another server, you can move the USB license key to that server.

### License options

IRIS Focus has a basic license called *IRIS Focus Light*. This license enables users to view certain weather data on the map, but gives limited interaction with the tools. The full license is called *IRIS Focus*. This license provides access to the interactive features of IRIS Focus. The *IRIS Focus* license includes all the features of *IRIS Focus Light*.

There are separate licenses for weather radar data visualization and for lightning data visualization, but users can have access to both licenses. Access to licenses is defined in the user profile.

### IRIS Focus Light

*IRIS Focus Light* licenses have an unlimited number of seats. If there are no *IRIS Focus* license seats available, the user will be logged in with an *IRIS Focus Light* license. If the license is missing, users cannot log in. Administrators can log in even when the license is missing, but they have no access to the map view.

There are two variants of the *IRIS Focus Light* license:

- ***IRIS Focus Light\_LGT***

This license is for viewing lightning data. It enables users to view lightning data visualization in real time and the TimeSpan product, use map search and other map options, and edit user preferences.

- **IRIS Focus Light\_WR**

This license is for viewing weather radar data. It enables users to view IRIS Analysis products, use map search and other map options, and edit user preferences.

The *IRIS Focus Light\_WR* licenses apply for a defined number of radar sites. If a new radar is added to the radar network, a new license needs to be acquired for this site.

## IRIS Focus

*IRIS Focus* licenses are based on a floating seat pool.

There are two variants of the *IRIS Focus* license:

- **IRIS Focus Lightning**

This license enables users to view visualizations of lightning network sensor data, and to use related interactive tools.

- **IRIS Focus Weather Radar**

This license enables user to view visualizations of weather radar data, and to use related interactive tools.

## Advanced feature licenses

In addition to the *IRIS Focus light* and *IRIS Focus* licenses, the following advanced feature licenses are available. The seat pool does not apply to these licenses; if the advanced feature license is present in the system, users can access these features when they have an *IRIS Focus* seat.

- **IRIS WMS layer**

With the *IRIS WMS layer* license, external WMS layers can be added to the system. Users can then access the layers through the weather product panel.

- **IRIS Lightning Network Health**

With the *IRIS Lightning Network Health* license you can get the network performance information from the **Total Lightning Processor** and display it as a product in the product pane. Using this feature requires the *IRIS Focus Lightning* license.

- **IRIS Radar Nowcast**

With the *IRIS Radar Nowcast* license you get access to the nowcast algorithm for creating forecasts based on weather radar data up to 2 hours into the future. Using this feature requires the *IRIS Focus Weather Radar* license.

## Seat-based license pool

*IRIS Focus* licenses are available in different configurations. To increase your seat count, you must replace the current license with a new one by contacting your Vaisala representative.

The seat count defines how many users can access *IRIS Focus* at the same time. When logged in, each user occupies a seat. When a user logs out, the seat is released, and the next user can take it. If a user logs in when all the licenses are reserved, the user is given the *IRIS Focus Light* license until an *IRIS Focus* license is released.

Seat counts within a workstation are browser-based. For one license reservation, users may view IRIS Focus in as many instances or tabs of one browser, such as Firefox®, as they like. If a user opens IRIS Focus in a different browser, such as Google Chrome™, they reserve one license for each browser.

## 3. Using IRIS Focus

### 3.1 User roles

Access to IRIS Focus features depends on the roles enabled for each user account. Each user account belongs to one or more organizations.

For example, the administration features are available to user accounts with the **administrator** role.

Table 3 IRIS Focus user roles

Role	Description
<b>administrator</b>	Can access administration features.
<b>Focus Lighting User</b>	Can access the full IRIS Focus feature set for visualizing lighting data.
<b>Focus Weather Radar User</b>	Can access the full IRIS Focus feature set for visualizing weather radar data.
<b>User</b>	Can access the limited set of features available with <i>IRIS Focus Light</i> .
<b>Poweruser</b>	Can access the full IRIS Focus feature set. Can select an organization-level map projection.
<b>Kiosk user</b>	Can only access the non-interactive full-screen mode.

### Seat Allocation and Restrictions

Each logged-in user account with a **focus** or **poweruser** role reserves one IRIS Focus seat from the license pool. When the user logs out, the seat is released.

A user account that has **user** or **administrator** role, or another role without a **focus** role, enters IRIS Focus Light, which has a map view with limited features and does not provide access to features such as cross-section or on-demand radar products.

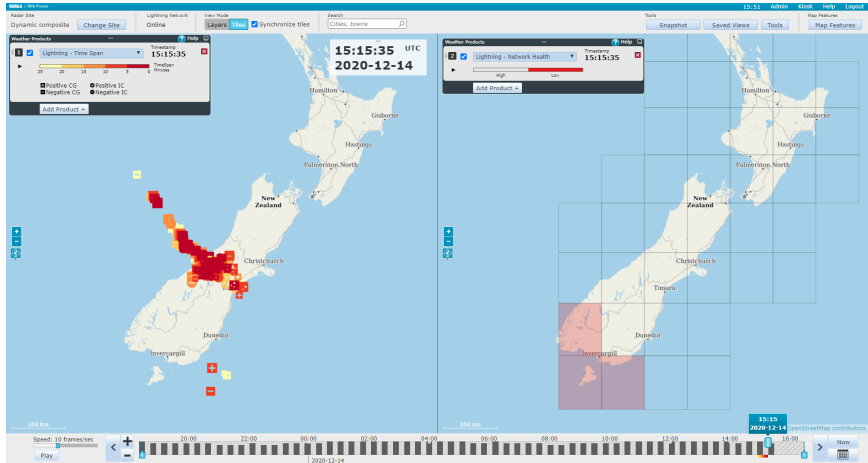
If a user with a **focus** role logs in and there are no IRIS Focus seats available, the user enters IRIS Focus Light. When a seat is available, the user is provided with an opportunity to switch to IRIS Focus.

### 3.2 Map view

The IRIS Focus main view is a scrollable map area. By default, it is drawn using azimuthal equidistant projection. Azimuthal equidistant projection has the useful properties that all points on the map are at proportionally correct distances from the center point, and that all points on the map are at the correct azimuth (direction) from the center point.

In the map view, you can select multiple simultaneous products, and display them on separate tiled windows, or on a combined layer overlay view.

The products include products generated by IRIS software, such as the **TimeSpan** product, and optionally WMS layers from external sources.



1) *Lightning data: courtesy of Transpower New Zealand Ltd.*

Figure 4 IRIS Focus map view

The map engine in IRIS Focus runs on the open source [GeoServer](#) map server. The map data is gathered from the collaborative [OpenStreetMap](#) project, and the JavaScript user interface is built with the [OpenLayers](#) library. To improve performance, map data is cached as bitmap tiles with [GeoWebCache](#).

### 3.2.1 Map layers

The background map and the weather data visualizations are drawn as individual layers and then combined to form an overview of current weather conditions.

You can also view WMS layers from external sources, such as satellite image layers, as layers on the map.

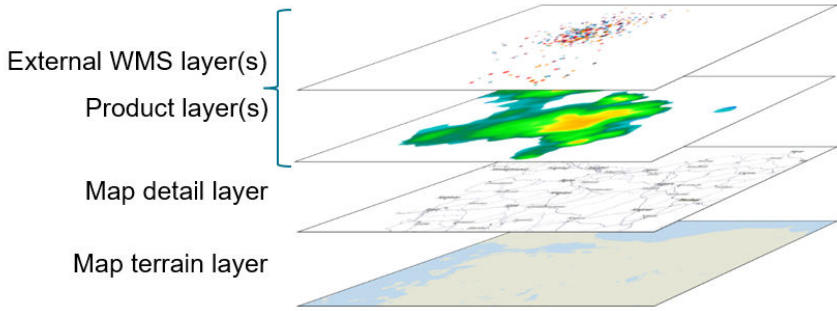


Figure 5 IRIS Focus product layers

### Base layers

The background (also known as base) consists of a number of non-interactive layers. At the bottom is a terrain map that can be enhanced with additional layers containing roads, province boundaries, and other similar terrain features.

### Lightning product layers

The interactive lightning product layers are drawn on top of the background layers.

### External WMS layers

You can add WMS layers from external sources to the map. They are shown as product layers.

## 3.2.2 Editing base layers

To manage map settings, styles, and additional map layers, such as roads, select **Map Features** on the top right corner of the UI.

Available **Base Map** styles include:

- **Standard**  
Basic terrain with oceans, lakes, rivers, landmasses, and islands. All waters are blue, and all land areas gray. Cities and dense settlement areas are brown. This is the default map view.
- **Simplified**  
Same as **Standard**, without cities.
- **Terrain**  
Same as **Standard**, with landforms added so mountain ranges and other terrain features are more visible.



You can also load in your own layers to IRIS Focus.



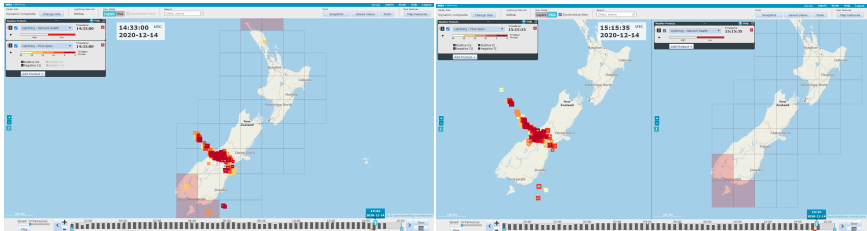
Changing from one map style to another takes some time while the new terrain assets are cached.

Table 4 Map detail settings

Map detail	National borders	Province borders	Airports	Roads	Labels
None					
Minimal	✓				
Aviation	✓		✓		
Roads	✓			✓	
General	✓	✓			✓
Full	✓	✓	✓	✓	✓

### 3.2.3 Product layers

IRIS Focus supports up to 4 simultaneous lightning product and external WMS layers that can be displayed on top of each other (**Layers mode**) or in separate tiles (**Tiles mode**).



1) *Lightning data: courtesy of Transpower New Zealand Ltd.*

Figure 6 Layered and Tiled view modes

The **Weather Products** pane lists the active product layers.



Each additional layer requires more processing capacity from the system. To improve performance, avoid showing unnecessary product layers on screen.

#### Tiles Mode

In **Tiles** mode, the tiles are synchronized by default.

When synchronized, all tiles pan and zoom automatically to the same coordinates when you interact with one of the tiles.

To disable the synchronization, deselect the **Synchronize tiles** check box.

### Layers Mode

In **Layers** mode, the layers are drawn on the screen in the same order as they are listed on the **Weather Products** pane. The top layer in the pane is also drawn on top in the map view.

To change the order of the layers, drag them to new positions in the pane. IRIS Focus re-draws the products on the map view using the new layer order.

## 3.2.4 Product layer settings

The **Weather Products** pane includes settings for product layers.

The contents of the pane depend on the product.

## 3.2.5 Map units

IRIS Focus supports the following unit sets. To change them, select **Preferences**.

Unit	Metric	Imperial	Aviation
Distance	km	miles	nmi

## 3.3 Animation timeline

With the zoomable animation timeline, you can easily visualize and animate recent data.

The histogram provides at-a-glance information on the amount and intensity of weather for points in time.

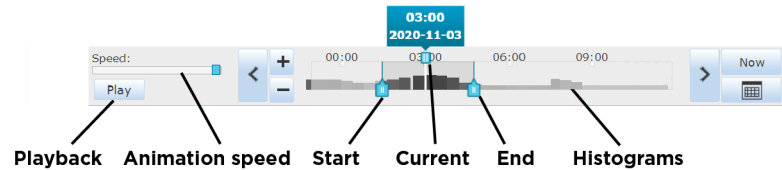


Figure 7 Animation controls

- ▶ 1. On the animation timeline, select the time of the data you want to view:
  - a. To find an approximate time, pan the indicator back and forth.
  - b. To zoom in and out on the level of detail, scroll the mouse wheel.
  - c. To select a time, select the search icon on the right of the time line.
  - d. To return to the current time, select **Now**.
- 2. To start a looping animation of the data, select **Play**.
  - a. Move the start and end time indicators along the time line.
  - b. Adjust the animation speed with the controls on the left side of the timeline.
  - c. To set only a part of the weather history to be animated, drag the start and end points to the desired positions on the timeline. The animation settings update in real time.
  - d. By default, the animation stops for 1 second before looping back to the beginning. To change this, select **Preferences**.

## 3.4 Map tools

### 3.4.1 Cursor tool

The cursor tool shows information about the latest lightning event when hovering over the icon on the map.

The cursor tool shows the time, location, amplitude, and type of the lightning event. Additionally, the error ellipse is shown, and this represents the location accuracy of the lightning event.

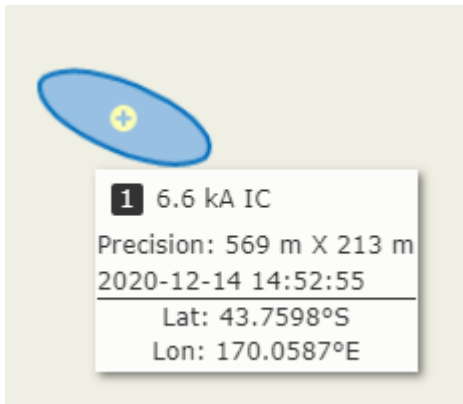


Figure 8 Cursor tool example for TimeSpan

When you select multiple products, the cursor tool lists values for each product in the same order they are displayed on the screen.

The cursor tool works in both layered and tiled modes. In tiled modes, the overlay box displays values for each product at the current position, even if the tiles are not synchronized.

For external WMS layers, the availability of cursor tool data depends on the layer provider. In order for the system to query for the cursor tool data, the **Usable in map cursor** checkbox must be selected in the **Map Layer Information** screen of the admin view.

### 3.4.2 Color scale editor

To access the editor, select **Edit** on a product pane.

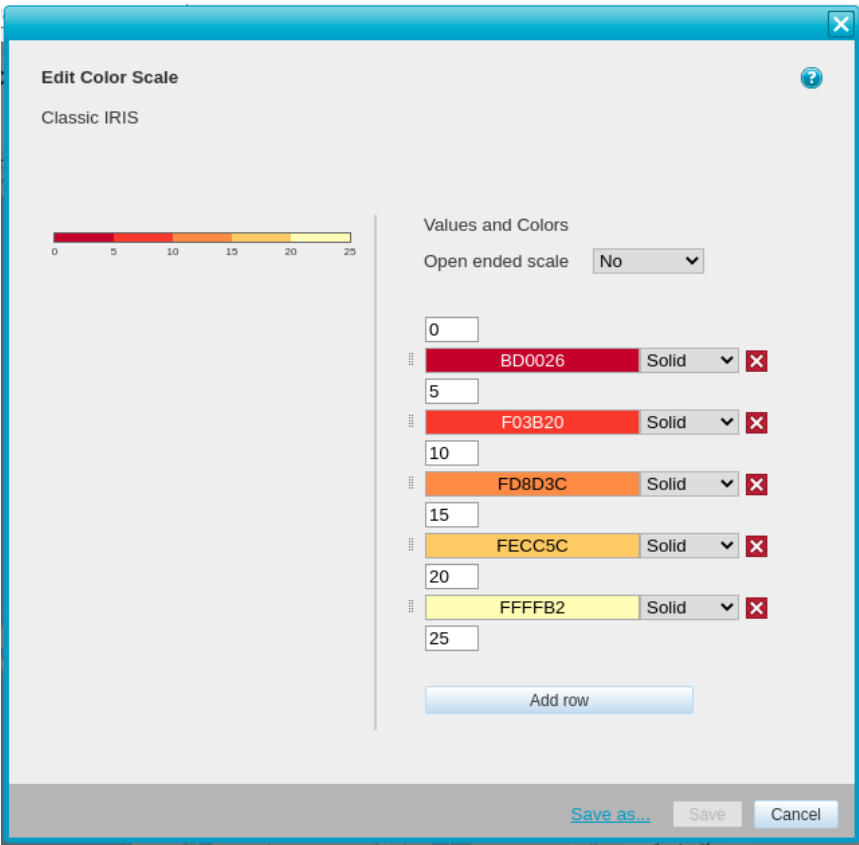


Figure 9 Color scale editor for lightning products

Use the color scale editor to create your own color scales. The editor displays the current color scale gradient and presents a preview on the left. On the right side is a list of the keypoints of the color scale.

### 3.4.3 Ruler Tool

Use the **Ruler Tool** to measure the distance between points on the map.

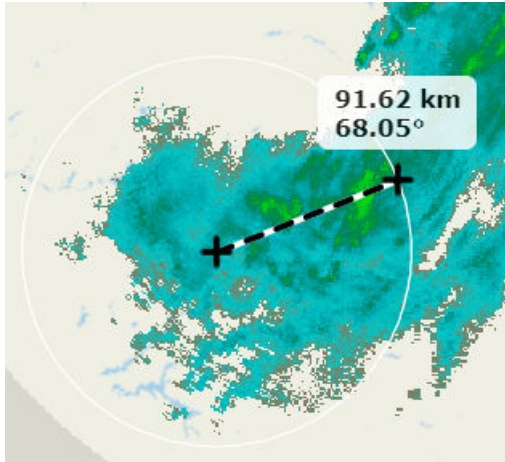


Figure 10 **Ruler Tool** example

1. On top right of the main UI, select **Tools > Ruler Tool**.



Press **SHIFT**+click to snap to the radar center.

2. On the map view, click the start point, slide the mouse, and click the end point. The map shows the distance between the 2 points.
3. When you are finished, on the menu bar, select **Ruler Tool** to disable the tool.

### 3.4.4 Snapshot tool

You can use the **Snapshot** tool to capture interesting weather events in an image.

1. On the **Map** view, select **Snapshot**.  
A PNG file of the current screen is downloaded to your computer.

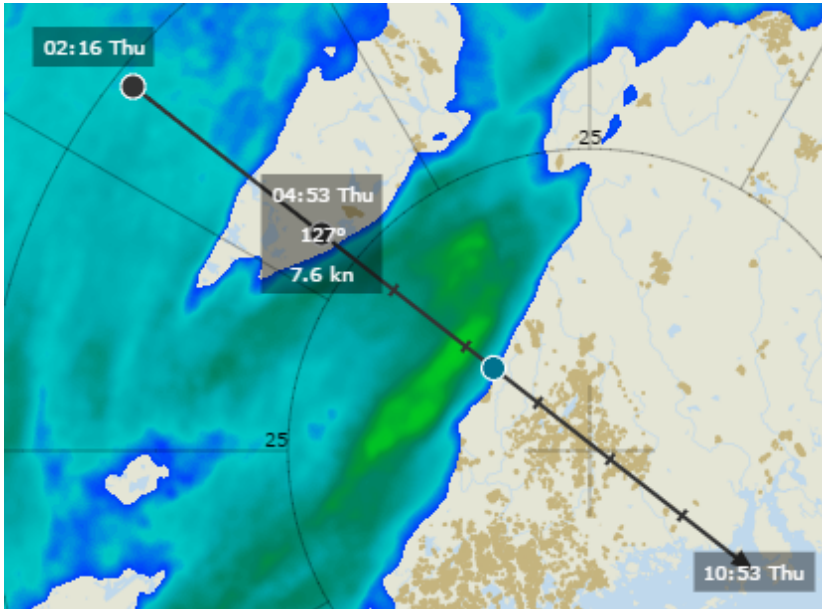
### 3.4.5 Tracking Tool

Use the **Tracking Tool** to track the movement of weather elements in products.

- ▶ 1. On top right of the main UI, select **Tools > Tracking Tool**.
- 2. On the animation timeline, drag the playback slider to the time where you want start tracking something.
- 3. On the map view, click the position you intend to track.
- 4. Drag the playback slider forward and add a second tracking point to where the tracked event appears to have moved.

The **Tracking Tool** draws a line by continuing with the same path and speed. The first 6 estimated hours are always drawn on the screen. To run the tracking point further, drag the playback slider onwards.

In the following image, the black circles are tracking points and blue is a future estimate point based on the tracking points. The floating overlay box next to the tracking points shows a timestamp.



- 5. When you are finished or want to start another tracking event, clear the tracking points by selecting **Tracking Tool > Clear tracking points**.

## 3.5 User preferences

To view and change user-specific settings, select **Preferences**.

You can change:

- Your password
- Default animation settings
- Interface language
- Measurement units used in IRIS Focus.

### User Settings

Username: user

[Change password](#)

---

### Animation

Animation pause  seconds (0-3600) i

Default animation speed  FPS (1-25) i

---

### Language

English (en)

Español (es)

Português (pt)

Русский (ru)

Français (fr)

---

### Units

Metric

Imperial (miles)

Aviation (nmi / knots)

Figure 11 User preferences

## 3.6 Saved Views

Many IRIS Focus users work from the same **Map** views from one session to the next.

You can use **Saved Views** to save your frequently used views so they are available each time you log in to IRIS Focus.

- ▶ 1. In the IRIS Focus **Map** view, set-up the view you want to save.  
For example, you can save the settings for:
  - **Weather Products**
  - Map tools such as the cross-section and tracking tools
  - Zoom level
2. Select **Saved Views > Save**.
3. Name the view and select **Save**.  
The new view is added to the **Saved Views** list for your future use.
4. To update a saved view:
  - a. Under **Saved Views**, select the view you want to update.
  - b. On the **Map**, update the view settings.  
For example, change the zoom level or the product data type.
  - c. Select **Saved Views > Save**.
  - d. Save the view with the same name as the view you want to update.
5. To delete a saved view, in the list of saved views, select the **X** next to the view you want to delete.

## 3.7 Supported browsers

IRIS Focus data is available through a secure network connection, and can be displayed on multiple client workstations across your organization.

IRIS Focus supports current Microsoft Edge®, Mozilla Firefox®, and Google Chrome™ browsers.

## 4. Products in IRIS Focus

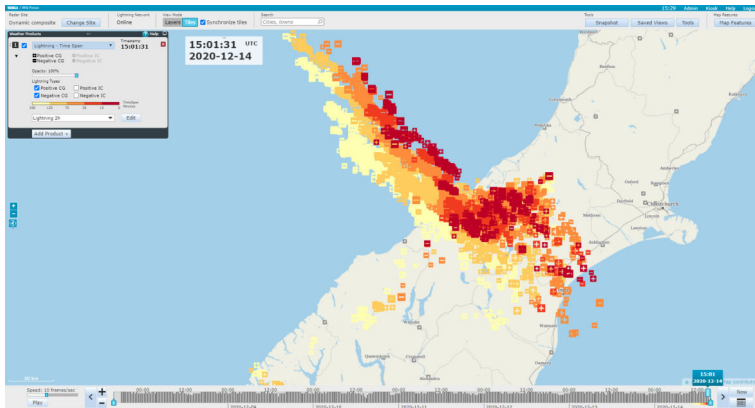
### 4.1 TimeSpan

The **TimeSpan** product is a data visualization of recent lightning events. It visualizes lightning events as color-coded icons, which change color at user-defined intervals. The size of the lightning icon indicates the type, amplitude, and polarity of the lightning event. You can choose a default or a customized color scheme.

When a new lightning event occurs, it is indicated with an animated circle around the lightning, if you are viewing the current time.

On the timeline, you can view information about lightning events up to 72 hours in the past.

The **Total Lightning Processor** can be configured to provide either flashes or strokes to IRIS Focus.



1) *Lightning data: courtesy of Transpower New Zealand Ltd.*

Figure 12 **TimeSpan** product

#### More information

- ▶ [Animation timeline \(page 16\)](#)
- ▶ [Color scale editor \(page 18\)](#)
- ▶ [Map view \(page 12\)](#)

## 4.1.1 TimeSpan product configuration

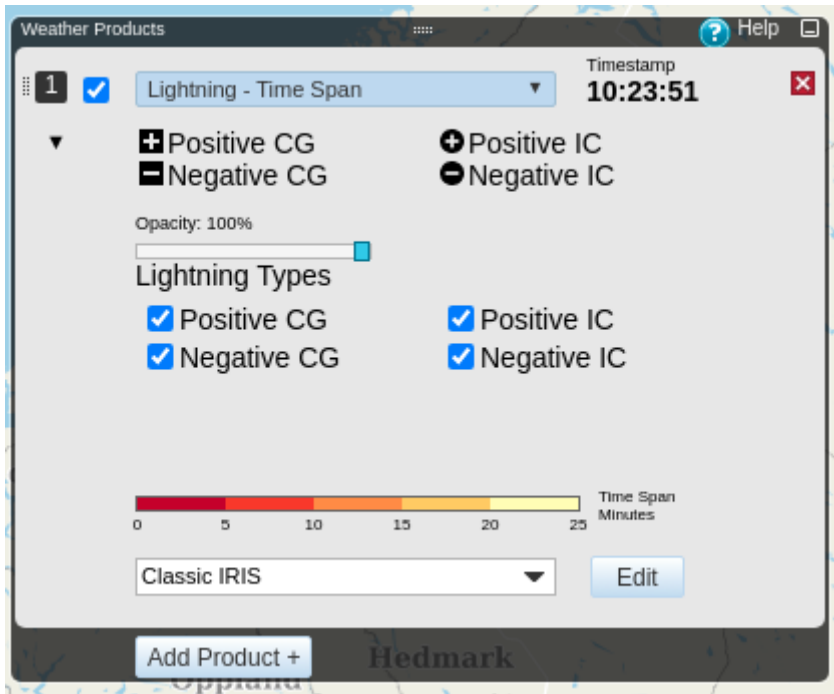


Figure 13 The **TimeSpan** product in the **Weather Products** pane

Choose the product from the **Weather Products** pane.

- ▶ 1. Click **Show details** to show the detailed product settings.
2. Use the **Opacity** slider to adjust the opacity of the TimeSpan layer.  
The opacity can be set in the range of 0 percent (completely transparent) to 100 percent (completely opaque).
3. Choose the lightning types you want to have visualized in **Lightning types**.
4. Choose the color scale from the **Color scale** pull-down bar.  
Click **Edit** to edit the selected color scale.
5. Click **Hide details** to hide the detailed product settings.

## 4.2 Network Health

### 4.2.1 Network Health product overview

With the **Network Health** product you can visualize the performance of the lightning sensor network. The product uses a color-coded, gridded representation of the performance estimate generated by the **Total Lightning Processor**.

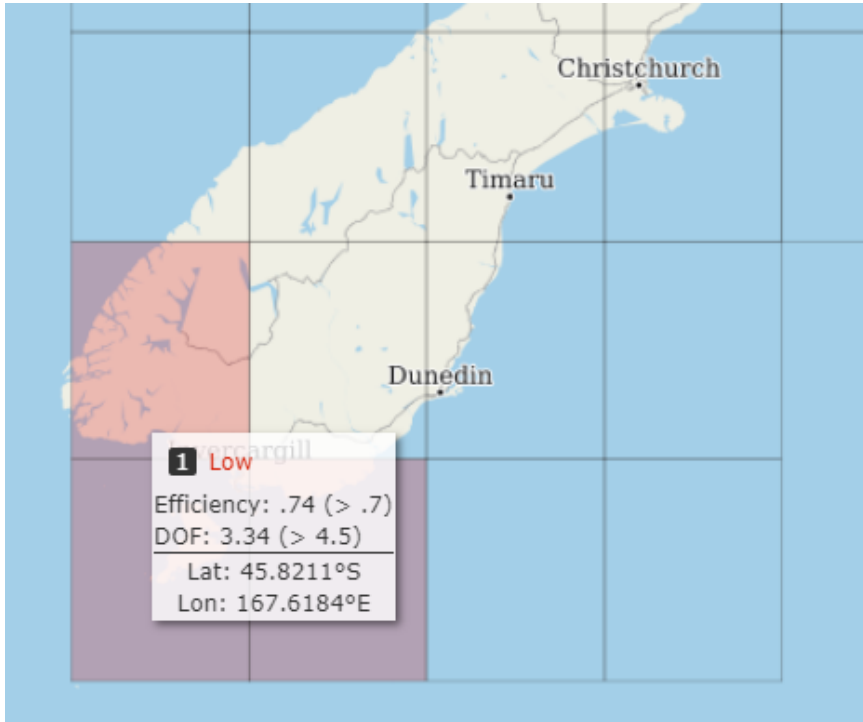
Performance statistics are obtained in two ways:

- If enough lightning is present in a region, performance metrics are obtained from the lightning location data.
- If lightning is not present, sensor status is based on the sensors that can participate in that region.

A full active display IRIS Focus license with an advanced feature IRIS Lightning Network Health license is required to run the **Network Health** product.



The **Network Health** product data is provided by your local **Total Lightning Processor** system. It uses statistical information derived from the lightning data produced by the system, as well as the status and configuration of LF lightning sensors connected to the TLP. **Network Health** is not available for lightning data brought in from external providers such as the **GLD360**.



1) Lightning data: courtesy of Transpower New Zealand Ltd.

Figure 14 Network Health visualization

## 4.2.2 Visualizing Network Health

The lightning **Network Health** product displays a grid of cells and provides a visual indication as to whether the lightning network has a sufficient detection efficiency (DE) and average degrees of freedom (DOF) for lightning occurring in each cell. If the estimated detection efficiency or average degrees of freedom drops below threshold, the cell will be flagged (filled with a color) indicating that it had low DE or low DOF.

Cells that are flagged should be regarded as being less reliable at detecting lightning events. This does not mean that the network is failing to detect lightning events in the region, just that it is more likely that events will be missed.

- ▶ 1. To view **Network Health** on the map, select it on the weather product pane.
2. Hover your cursor over a cell to see a short description of its status.

- Use the **Opacity** field to adjust the opacity of the colored cells.  
The opacity can be set in the range of 0 percent (completely transparent) to 100 percent (completely opaque).

You can not adjust the colors or thresholds associated with **Network Health**. These values are determined and set by the system administrator in the `vsoweb-override.ini` file based on the number and spacing of lightning sensors in the network. If **Network Health** is always showing down, ask your system administrator to review the threshold settings.

## 4.3 External WMS product layers

WMS layers from external sources, such as satellite images and radar data from an external radar network, can be added to IRIS Focus and viewed on the map exactly like other radar product layers. Many characteristics of the external product layers, such as the availability of the color legend, depend on the layer providers.

The external WMS layers are images, and only available in certain projections. You can only view those external WMS layers that support the projection you are currently viewing.

For example, if the requested WMS layer is only available in Web Mercator projection, and the radar site is configured in azimuthal equidistant projection, the WMS layer will not be shown.

IRIS Focus supports both WMS and WMS-T layers. WMS-T layers are layers with time parameters included in the request.



For more information on adding WMS layers, see *IRIS Focus Lightning Administrator Guide*.

### 4.3.1 GLD360

Vaisala Global Lightning Dataset **GLD360** provides real-time lightning data for accurate, early detection and tracking of severe weather. You can view the **GLD360** data in IRIS Focus as an external WMS layer.

The **GLD360** layer is a visualization of weather data provided by a uniform, global network owned and operated by Vaisala. Cloud-to-ground and cloud lightnings are detected instantly, and data is delivered in less than one minute.

You will have access to a 24/7 stream of lightning data from any location you choose. Similarly to the other external WMS layers, the **GLD360** is an image layer which you can combine with other product layers and map layers.

The **GLD360** layer is projected as a Web Mercator projection.

The detection accuracy of the **GLD360** exceeds other long-range systems, including satellite data. It detects about 8 out of 10 cloud-to-ground lightning flashes worldwide and a significant fraction of cloud lightning flashes, with a location accuracy of 2 to 3 km.

To take the **GLD360** layer into use, the IRIS Focus server must be online, and your organization must have an active subscription to **GLD360** data. A system administrator needs to enable the layer.

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