

Tracking Installation Guide

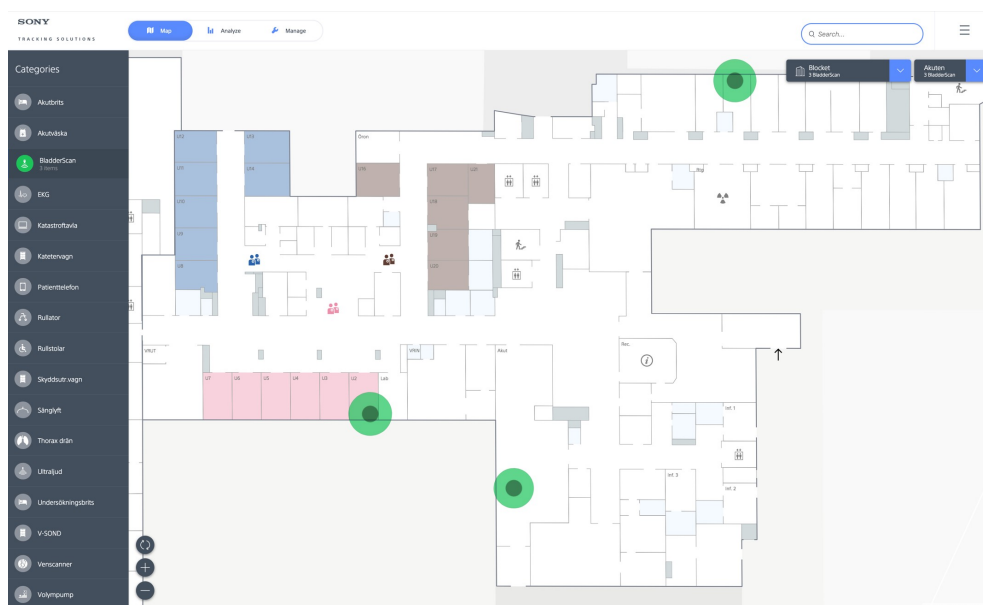


Fig 1. Tracking application, user view

This installation guide focuses first on the preparation and then on the installation steps that need to be performed on-site.

The Tracking web application is used for performing the installation. The app is located at <https://tracking.sonymobile.com>. Login with credentials received from the Sony Tracking team.

1. Preparations

Maps

When preparing for an installation, maps in paper or digital formats are required. These are needed for Sony to generate the digital maps that are then used in the web application. For an intuitive and relevant map, you need to have an understanding of the places and activities that are most important to the staff. Which places are central to their work flows? Where do they spend most of their time? What text or symbols should be used on the map? Should some rooms/spaces be color-coded by type of team or activity etc? One tip is to photograph the maps that the staff have posted on the wall and are familiar to. It can indicate which names that are given to surfaces and which areas that are important. It is common that reconstructions have been made since the first building map was created and these are often best reflected by the maps on the walls. Interview the staff about all these things and provide input to Sony's map-writer. Together we can then create an easy-to-use and relevant map that the staff feel familiar with.

Observers

Before the installation, you should plan where the Observers should be placed. It's good to have checked if a wall socket is available at these locations. To determine how closely Observers are to be placed, a rule of thumb can be used that the accuracy of the positioning corresponds to approximately half the distance between observers. If observers are placed 10 meters apart, positioning will result in approximately 5 meters accuracy. Observers should be positioned so that they surround the surface that they are going to position. That is, please place observers close to the outside walls. However, locations exactly in a corner should be avoided since radio waves often are amplified there. When installing on several floors, it is advisable to strive for an as identical placement of observers as possible between the floors. This increases the accuracy when determine on which floor the tags are on.

Reference tags

Placement of reference tags should also be planned. However, this is easier since no sockets are needed and full flexibility in the placement is available. The amount of reference tags should be at least 10 and approximately 20-40% of the number of observers. The reference tags should be placed within the area covered by observers. Try to place tags in the middle between Observers for a more challenging positioning situation. Preferably use tags of model Large as reference tags. Be sure to distribute the reference tags evenly across the premises and the different floors.

2. Mount observers



Fig 2. Observer

To mount observers you need the following:

1. Pre-configured observers for the specific customer
2. A computer logged in to tracking application as root for the specific customer
3. An observer placement plan (digitally or on paper)

It is recommended to make a quick observer test before final mounting on target locations.

A quick check can be done by inserting one or two observer in any power socket at the site location to verify that the observer is active in the install view of the tracking application. Wifi for the target installation should be available. The observer can be (temporarily) placed anywhere on the map and it should show up as "green" on the map. If there is any problem with observer configuration it is much easier to fix this problem before all observers are spread out to target locations.

An observer test may even be performed before installation day if 1-2 observers are sent to the customer some days before. As different customer network policies vary, this is an easy way to reduce risks at installation day.

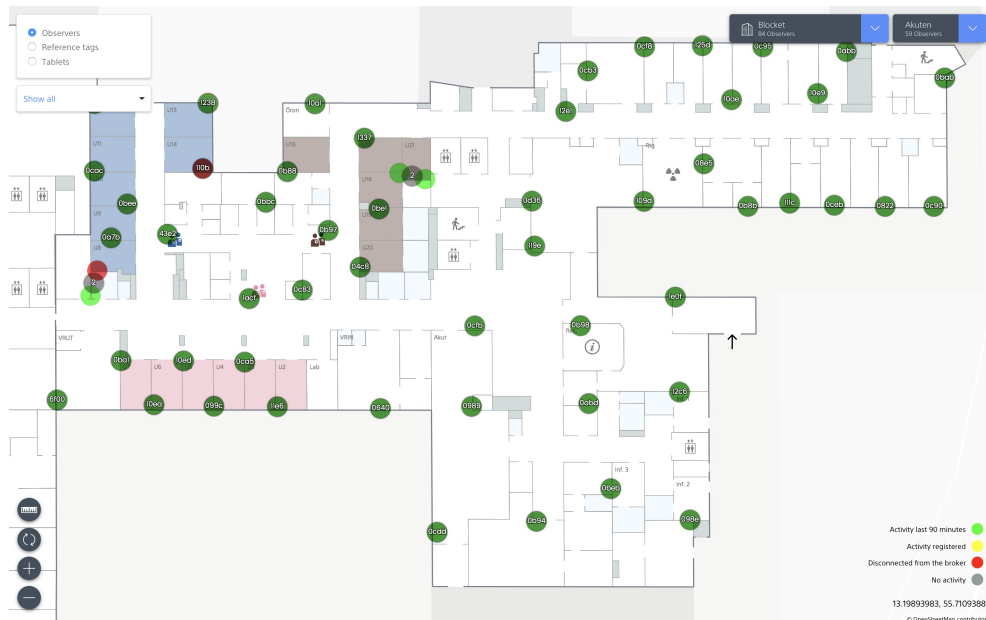


Fig 3. Tracking application, install view

During installation the following steps are recommended:

1. Find a suitable power socket according to planned placement
2. Mount any (pre-configured) observer and check its identity printed the side. At some installation sites it is recommended to attach an information sticker on the observer with contact information to local administrator.
3. Determine the mount location of the observer. Location precision should be as good as possible as any error here will directly affect the positioning accuracy.
4. Specify the mount location for the specific observer in the installation view of the tracking application
 1. Select observer identity (printed on observer) in the drop down menu
 2. Place observer hair cross on identified mount location
 3. Accept new location in dialog
5. It is recommended to additionally mark the observer identity and location on paper for physical reference

3. Install batteries in tags



Fig 4. Small and large tag

The supported tags has the following batteries:

- Large tag - CR2477
- Small tag - CR2032

The small tag has a closure of bayonet type. It is opened by twisting, with help of a coin or similar, and then pulling. If needed a small screw driver could be used to remove the battery.

The large tag is opened by screwing off the bottom of the tag e.g. by using a coin or similar.

Battery is inserted with the minus pole facing towards the PCB of the tag on both tags. Flat side (plus pole) of the coin cell is facing towards plastic cover of the tag.

4. Mount reference tags

The procedure for mounting reference tags is almost identical to mounting observers.

Make sure "Reference tags" radio button is selected in "Install" tab of the tracking application. See figure 3.

It is assumed that tags are registered to the tracking service for the specific customer.

Reference tags should be placed in areas where most tracked equipment will be placed. Some tags can also be placed in locations where positioning is believed to be difficult. This will give a good understanding about the worst case location performance.

Try to place reference tags on roughly the same height as tracked equipment.

5. Mount tags on equipment

Mounting tags on equipment should be possible for a local administrator on the customer site. It is still useful to install tags on some equipment at installation day both for educational purposes, and also as an opportunity to test the system on moving equipment. Note that positioning performance will improve after some time (a few hours) after the system has adapted to the specific radio signal attenuation profile of the site.

It is assumed that tags have been registered to the tracking service for the specific customer.

First step is to define categories which tags should be associated with. It is usually recommended to have discussed and configured which categories to use with the customer before installation.

The image shows two side-by-side screenshots of a web application interface. The left screenshot is titled 'Add category' and contains three sections: '1. Name' with a text input field, '2. Icon' with a grid of 48 icons, and '3. Color' with a color picker showing '#116AD9'. The right screenshot is titled 'Add item' and contains six sections: '1. Category' with a dropdown menu showing 'BladderScan', '2. Tag' with a dropdown menu, '3. Name' with a text input field showing 'Not entered', '4. Short name (max 8 characters)' with a text input field showing 'Not entered', '5. Reference number' with a text input field showing 'Not entered', and '6. Description' with a text input field showing 'Not entered'. Both forms have 'Cancel' and 'Save' buttons at the bottom.

Fig 6. Tracking application, add item and category.

Click on "Add category" in the manage tab of the tracking application to create a new category.

Tags are mounted and associated with equipment in the following steps:

1. Log in to the tracking application as administrator for the specific customer
2. Select the manage tab
3. Click on "Add article" button
4. Enter equipment data
(name, short name, reference number, category and description)

5. Select the mounted tag in the drop down. Tag name should match printed identity
6. Save
7. Attach the tag to the equipment. Try to place the tag in a protected location but not enclosed by metal (to allow BLE signal to come through)

6. Tablets

If wall mounted tablets are a part of the installation these will be prepared by the Sony Tracking team.

1. Mount the tablet to the wall
2. Connect the power supply
3. Start the tablet
4. The Sony Tracking application should start and login automatically. If not log in with the standard user account given
5. If running the standard UI, open the menu and tap the lock icon to lock the tablet. If running the grid UI tap 'Choose category' 10 times to lock the tablet.
6. Make sure the Android status and navigation bar is not displayed
7. Place the tablet on the digital map by tapping and holding ~1 second on the correct place on the map. A red 'My Location' icon should be displayed on the map.

7. Check system status

Before leaving the site it is useful to check the positioning of the reference tags and a few tagged equipment.

First check that all observers are active under the install tab in the tracking application.

Also check that accuracy of reference tags seems reasonable. Select reference tag radio button.

Tagged equipment can be seen in the map tab of the tracking application. Try to see if accuracy and latency seems reasonable.

8. Monitoring and maintaining the system

For the system to provide the best possible accuracy it is important that all or most of the observers are functional. The same view used for installation is also used for monitoring the system. The Sony Tracking system will detect if an observer or tablet stops working and visualize this in the installation UI. An email to a preregistered email will also be sent when this occurs.

Observers

If an observer stops communicating with the Sony Tracking backend it will be displayed with red color in the installation view. If an observer is connected to the backend but has not sent data in a long time it is displayed with yellow color. Observers in these states should be investigated.

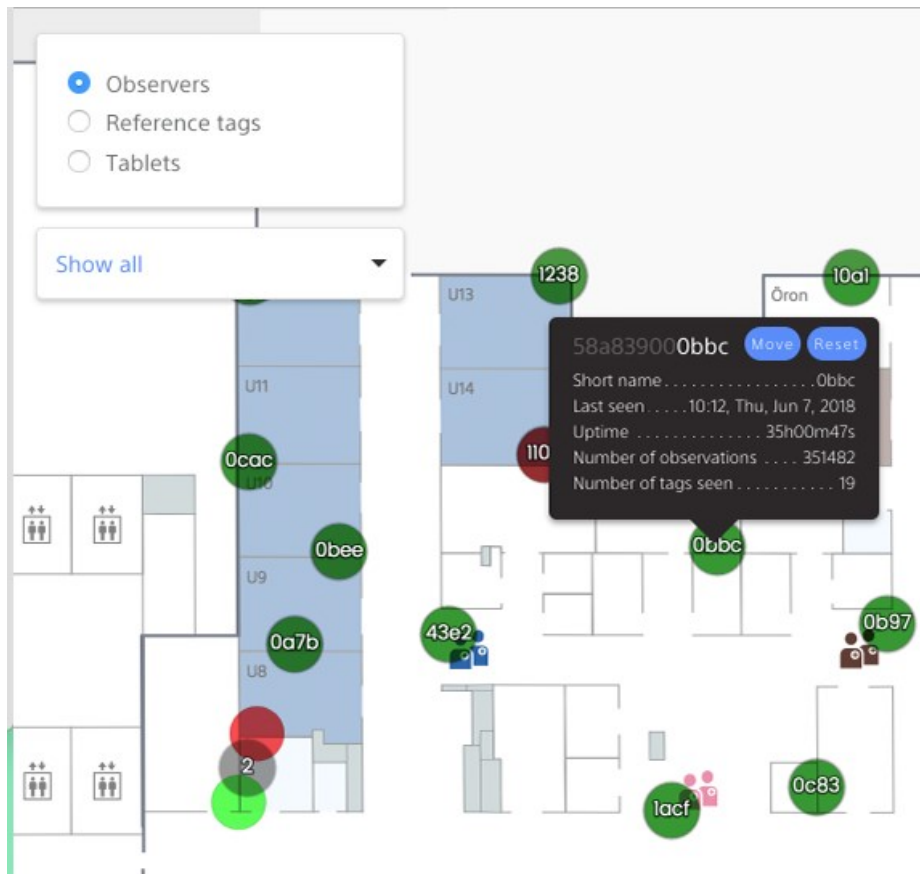


Fig 7. Observer status UI.

Troubleshooting guide

- Unplug and plug in the observer. Wait a couple of minutes for the observer to turn green in the UI
- Make sure that the power socket is working. If not, try a different socket. For the US version of the observer, there is an LED on the front of the observer that will light green if it has power.
- If the observer is still not healthy it should be replaced by a spare one. Select the old one in the UI and click 'reset'. Find the new one in the drop down list of observers and place it on the map. Send the broken observer to Sony Tracking team for root cause analysis

Tablets

Tablets that has enabled 'my location' regularly reports its status to the Sony Tracking backend. A tablet that is disconnected is displayed with red color in the UI.

Troubleshooting guide

- Make sure the tablet is running, the Tracking application is in the foreground and signed in
- Try to reboot the tablet and log in again

Sony Tracking backend

The status of the Sony Tracking backend is reported at <http://status.tracking.sonymobile.com>. If a negative status is reported please contact Sony Tracking team for more details and estimated time for recovery.