ARDI Augmented Reality User Guide

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ABSTRACT

This document describes how to use the ARDI Augmented Reality (ARDI-AR) client.

Overview

What Does This Document Cover?

This document is designed to allow new users to become familiar with how to use the ARDI Augmented Reality (ARDI-AR) client on their mobile device to access important information about their assets.

Assumed Knowledge

Basic mobile device usage

In Other Media

This overview is also available as a video, hosted on the Optrix YouTube channel.

The video can be found at…

https://www.youtube.com/watch?v=BvcB881sflQ

Contents

Introduction

What is Augmented Reality?

Augmented reality takes your view of the real world – most often via the camera and screen of your mobile phone - and 'augments' it by adding extra detail.

In the case of ARDI-AR, it allows you to use your mobile device such as a phone or a tablet to identify and get access to critical information about your plant assets simply by looking at them.

What is an AR Marker?

AR markers are similar to barcodes in many ways, although they can be read from a much greater distance and are a little simpler.

They are used by your mobile device to recognise locations and objects in the real world, and will be placed around your location to provide points at where your AR application can give you information.

Although there is a great deal of work being done on 'Markerless AR' (the ability for your device to recognise objects without markers), commercial and industrial environments are normally not appropriate for that kind of technology as yet.
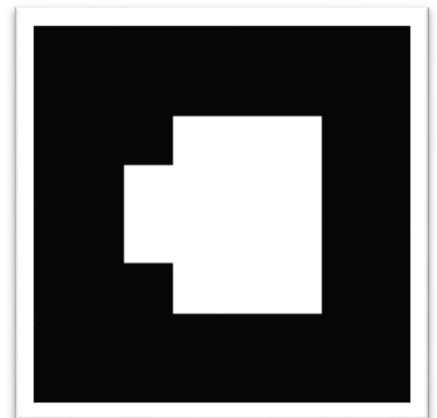

Figure 1- An Augmented Reality Marker

What is ARDI?

ARDI is the Asset Relationship and Data Integrator – a software package designed to consolidate all of the important information about your plant assets (and the plant itself) into a single, consistent location.

As well as a powerful web interface, ARDI has a variety of *clients* (of which ARDI-AR is one) that allow you to see your assets in new and easy ways.

Why would I use this?

ARDI-AR gives you access to details about your assets that otherwise would require you to be carrying a full library.

Take a look at a sensor and know what value it is reporting, even if the sensor doesn't have a local display. You can pop up a trend chart to see how the values are changing, get access to specifications, isolation procedures and drawings, find what it's connected to and more.

ARDI-AR is specifically designed to make it much simpler for the technician in the field to get access to everything they need to know about the object they are looking at, in the simplest and easiest way possible – by looking at it.

Starting ARDI-AR

Installing the App

For many people, the ARDI-AR application can be downloaded by your devices normal store – that is the Play Store for Android-powered devices, or the Apple Store for iOS devices such as the iPad and iPhone.

If so, you can easily find it by searching for 'Optrix AR' or 'ARDI AR'

Other companies may choose to distribute packages via other package-distribution systems, in which case the app will be automatically installed for you.

Launching the App

The application can be launched from your list of applications by clicking on the ARDI AR icon.

Startup

The app may take a few moments to start up. Note that your camera settings can alter your startup timing, so please see '**Error! Reference source not found.**' on page **Error! Bookmark not defined.** if your application is taking too long to start.

Connecting to ARDI

The ARDI Server

Your system administrators or management should inform you of the correct address for your ARDI server. This will usually be a normal web URL, such as **ardi.companyname.com**

The ARDI server is the repository of all of the information about your assets. Not only can you access it via the ARDI-AR client, but going to that same address in a web-browser will also allow you to access asset details from other devices, such as a desktop PC.

If this is the first time you've started ARDI-AR, you'll be asked to pick an *ARDI Server* to connect to. If you're returning to ARDI, you'll be automatically re-connected to the server you used last.

If you're installing ARDI-AR to test it out, there is a 'Sample Server' button that allows you to use our online demonstration server.

Connection Errors

If you've used ARDI-AR previously and the app is unable to connect to your previous ARDI server, you'll see an error message similar to the one below, with a button to go to the Server List and either choose or add a new server.
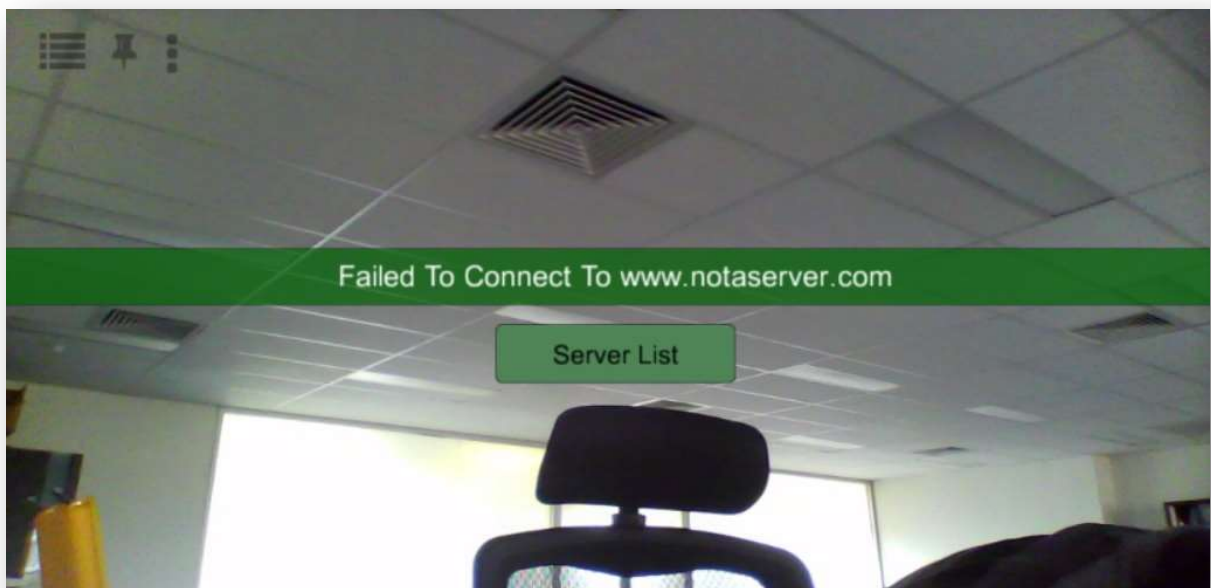
The Server List

The server list appears the first time you start ARDI and can also be accessed whenever you press the ARDI icon found in the lower-right corner of the screen.

ITEM	NAME	ACTION
1	Server Button	Click to connect to an existing ARDI server
2	Delete Button	Removes an existing server from the list
3	Add Server	Takes you to the Add Server screen to add a new server
4	Close	Closes the screen and goes back to scanning

The server list – as its name implies - is a list of all of the servers you've successfully connected to in the past.

In many cases, you'll only ever need the one server. However, contractors in particular may need the ability to switch between recently used servers when they move between companies and sites.

Connecting to an Existing Server

If you already have a server in the list, you can connect to it simply by clicking on the button with its name.

The Server List will close and you'll then be able to start scanning.

Removing a Server

If you aren't going to need a server anymore, you can press the 'X' button to the right of the server name. This will permanently remove that particular server from your list.
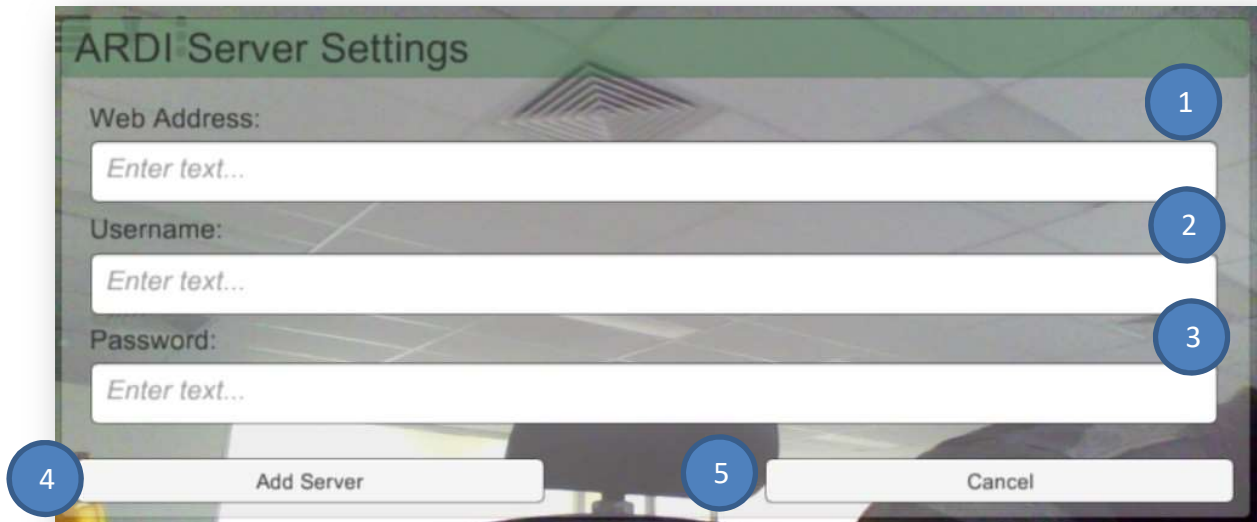
You can re-add it later using the 'Add Server' button, if required.

Adding a New Server

To add a new ARDI server to the list, press the 'Add Server' button found at the bottom of your screen in the Server List.

This will take you to the Add Server page, as described below.

Adding Servers

ITEM	NAME	ACTION
1	Web Address	The URL of your ARDI server
2	Username	Your ARDI username. *This is usually left blank.*
3	Password	Your ARDI password. *This is usually left blank.*
4	Add Server	Connects to the server you entered in Web Address.
5	Cancel	Stops adding a new server and returns you to the Server List

The image above shows the Server Settings screen, where you can connect to new ARDI servers.

The most important item to add is the web address of your ARDI server. This should be given to you by management or your IT department.

Simply touch the 'Web Address' field and your keyboard will appear (this sometime takes a few moments to come up).

Most ARDI servers are part of your *intranet* (ie. are internal to your organisation and not accessible via the Internet). As such, they will actually work in what is called 'Guest Mode', where the information is available to anyone.

Because of this, the **username** and **password** fields should normally be left blank unless you're specifically told otherwise.

This means that for most users, all that is needed is to enter the web address of the ARDI server, then press the 'Add Server' button.

The Interface

Once you've successfully connected to an ARDI server, you'll be presented with the main interface.

It's quite minimal to give you the maximum view of the environment.

You can tell you're successfully connected because the ARDI logo in the lower-right of the screen will be grey or green – when disconnected, the logo will be bright red.

NAME	ACTION
SEARCH	Searches for names or tag numbers. See 'Searching'
PINNED VALUES	A list of pinned values. See 'Pinning' for more detail.
RECENT SCANS	A list of assets you've recently scanned. See 'Recent Scan List'
CONNECTION	Connection status – click to show the Server List

The 'Search', 'Pinned Values' and 'Recent Scans' buttons are toggles – you hit them once to open their windows, then hit them again to make them disappear.

However, the main way of using ARDI is to avoid the buttons all-together and simply scan a marker, as described in the following section.

Scanning a Marker

To scan a marker, simply hold your phone up and look at the device and its marker through the camera. Unlike barcodes (which scan only when you are close), AR markers will happily scan from a distance.

Once the device has detected and scanned any marker(s) in your view, you'll see the **asset detail panel** associated with the marker.

Troubleshooting Tips

If you are having trouble getting your phone to recognise the tag, the following tips might help you read it.

- Move closer to the tag if you can. Although AR tags read from much longer distances than other types of marker, distance is still your worst enemy.
- Avoid glare. If there are bright highlights on the tag that prevent you from seeing some of the dark black, the tag won't be readable. Try moving left or right, or changing the height of the camera to avoid bright reflections.
- If your tag is in a dark area, try to avoid standing in a bright one - move into a darker or more shadowed location.
- Ensure the tag isn't warped or damaged. AR tags need to be relatively flat and in good condition to be recognised correctly.

Multiple Assets

In some cases – particularly where your assets are very dense – one AR marker will be associated with a number of different assets.

When this happens, you'll be asked to choose *which* of those assets you're interested in focusing on. This will be presented either by showing you a scrollable list of buttons, or by placing arrows on top of the assets themselves on your screen.

Asset Detail Panels

When you successfully scan a marker or search for an item, you'll see the Asset Detail Panel.

This is a panel on the screen that gives you the detailed information about the object you are interested in (known in ARDI as an 'asset').

The Details
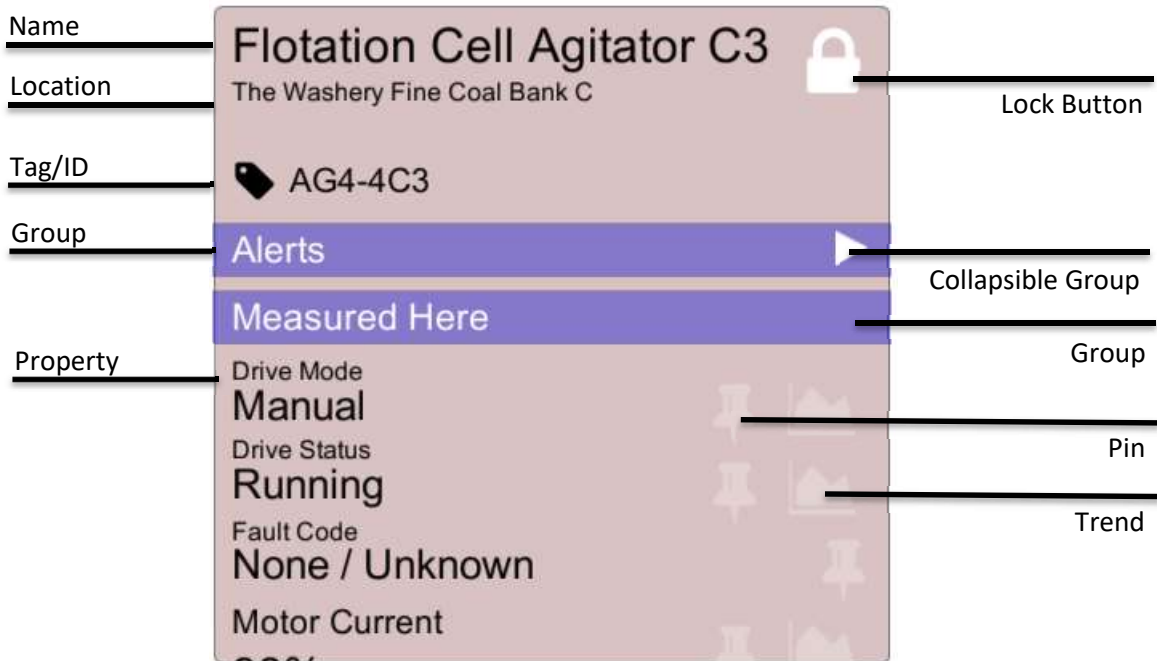
Heading

The details make up the largest part of the view.

At the top, you'll see the assets name and location, as well as the equipment reference number (if the asset has one).

The top-right corner also includes the **lock button**. By clicking on this button, the information will remain where it is, even if you look away from the tag. In most cases, we suggest using the lock button as it will give you a more comfortable experience – holding your phone out and in front of you can be awkward after a while.

Groups

All of the information about your asset falls into *groups*. There is a single group that contains all of your alerts, one that contains all of the local measurements, and some that may include information from other assets within your system.

Each group begins with a purple band. Some are *collapsible* (meaning that you can hit the white arrow to show or hide the details within the group).

Alerts

If your asset has any alerts on it, the **alerts** group will be the first after the header. This is a *collapsible group*. Normally, this will only show you those alerts that are *active* (ie. any current alarms) and will hide all those alarms that aren't.

The image on the right shows the list when it has been *expanded* (ie. the user has touched the white triangle next to the word 'Alerts').

Green alerts are inactive and usually represent a 'good' state, while red alerts indicate a problem with the asset.

Properties

After the alerts, you will find the measurements being made in and around the asset.

If anything is measured by the asset itself, those values will appear here. Properties such as mode, status, pressure, temperature etc. are all shown.

Below these properties you will find those properties being brought in from *other* assets. These are measurements taken by up-stream equipment that may be relevant to you.

For example, if you are working on a piece of equipment that is down-stream from a pressure sensor, the AR information for that filter will include that pressure reading.

Most measurements also include buttons to **pin** or **trend** your value. The trend button will take you to a webpage that allows you to see a live (or historical) chart of the value, while the pin button (see pinning on page 17) places the measurement at the top of the screen, so you can go elsewhere and scan other assets while continuing to monitor the value.

Finally, the last items in the list are the values that don't change – information such as model numbers, drawing IDs etc. that might be useful to you.

Scrolling

Remember that this panel *scrolls*. Simply touch and drag either up and down to see additional information.

If you are using the AR app on a larger screen device such as a tablet, you can try *Large Screen Mode* to fit more information on the screen at any one time.

Right-Side Icons
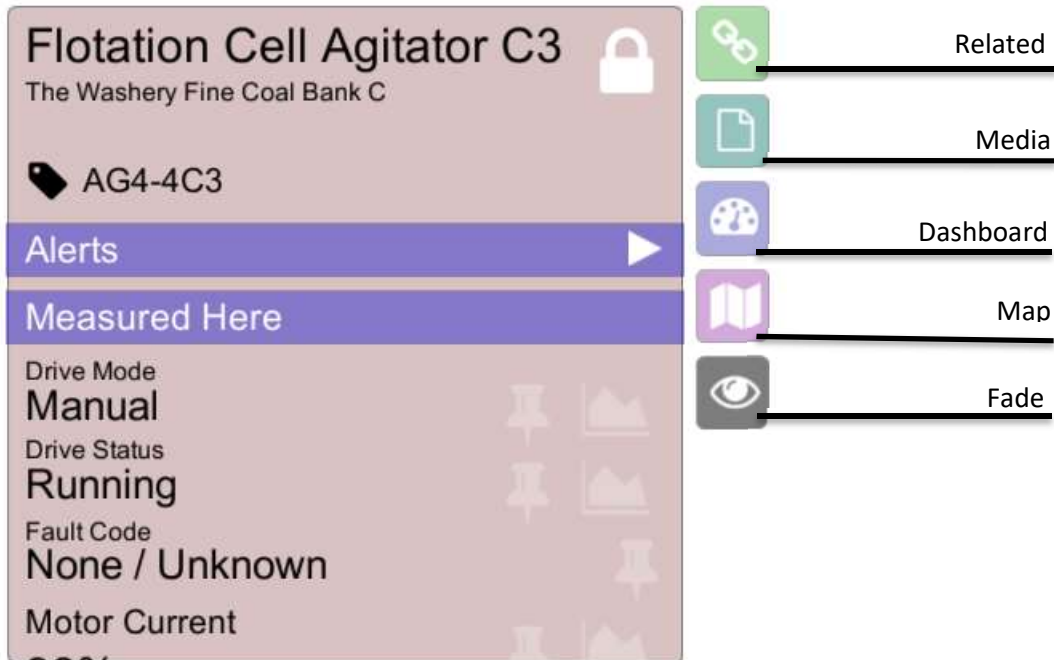
There are several buttons on the right-hand side of the details panel. These allow you to navigate through different ways of looking at your asst and its information.

The **Related** button shows a list of items that your asset is connected to. In some cases this will simply be items that are located nearby or within the same system, but if your ARDI database is more complete you'll also be able to follow your pipework to nearby, connected assets.

The **Media** button shows a list of media items - such as specifications, manuals, calibration sheets, videos or procedures – that are related to this asset.

The **Dashboard** button opens your web browser on the Dashboard page of the ARDI website. This page (and the rest of the ARDI site) is documented in the ARDI User Guide.

In some cases, the **Map** button may also be included. Clicking on this will take you to a top-down map of the location of your asset.

The **Fade** buttons is used to fade out the information on the screen so that you can see through it to any work being performed on the other side. This is extremely useful if you are performing calibration, as it allows you to watch your adjustments and its effect at the same time.

Asset Relations

By pressing on the 'Relations' button, your panel changes to show the items that the current asset is related to.
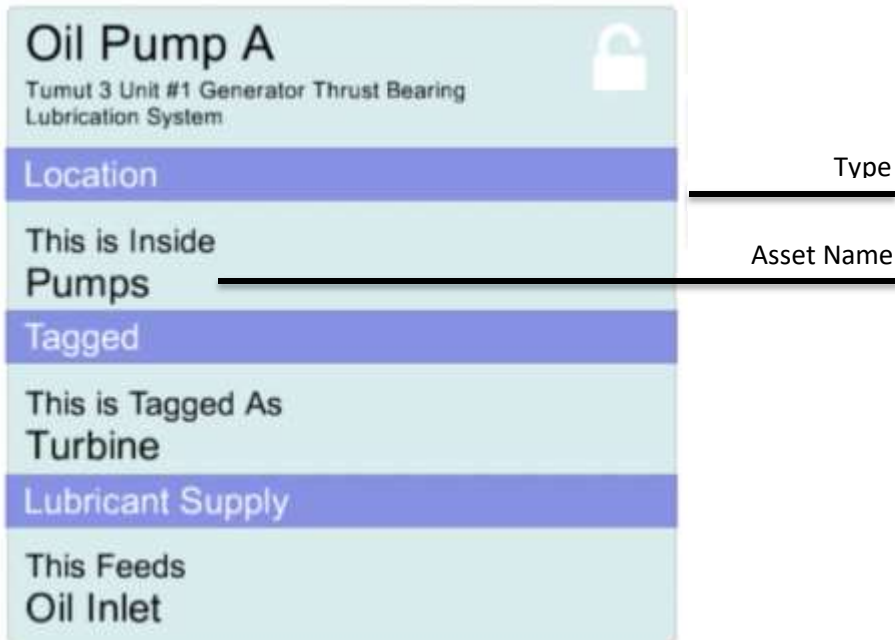
First you'll see the relationship *type* in blue, followed by all of the items that are related to the asset in that way.

Touch the name of another asset to view its asset detail panel.

Asset Media

The media list is a scrollable list of buttons, each of which opens up a different file or web link that has been associated with your selected asset.

For example, this might lead you to specifications, manuals, safe work instructions or maintenance videos.

Left-Side Indicators

The detailed scan also includes a set of status indicators on the left hand side, as shown below….
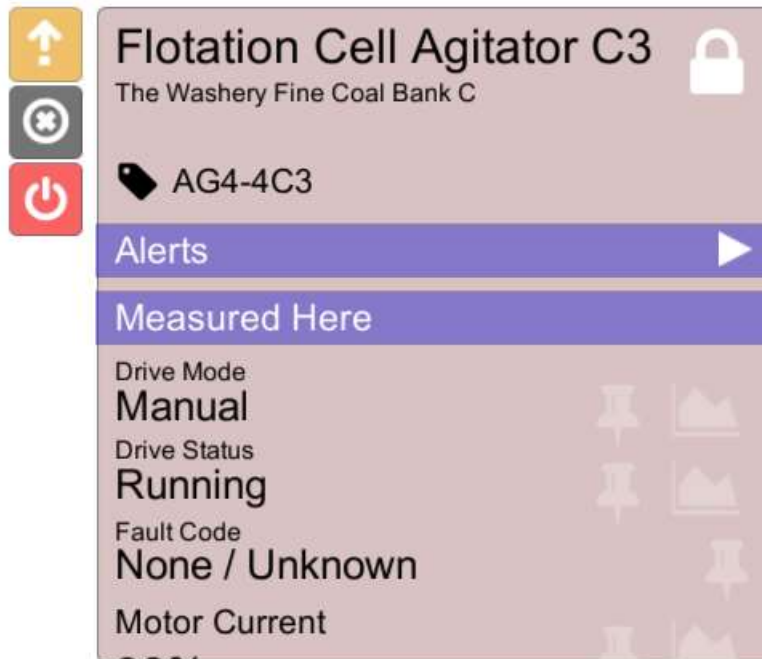
Active Alerts
There is one or more alerts that are active on this asset. This indicates a severe problem that needs attention.

Active Upstream Alerts
One or more alerts are active on assets *upstream* (ie. connected before or infront of) this asset. This can lead you to recognise the root cause of issues you are experiencing with your asset.

Not Isolated
This indicator appears when ARDI believes that the asset you are looking at is not correctly isolated. Isolation checking is optional and may not be enabled for your ARDI server. This icon will appear *grey* if the isolation status can't be determined.

Energy Present
This indicator appears when ARDI believes you have energy (such as electrical power or pressure) still within your system. Like isolation, this icon only appears on some ARDI servers.

Note that ARDI is not a safety system, thus you should **always** obey your standard safety precautions (such as manually checking for zero-energy) rather than relying on the data provided by ARDI-AR.

The Lock Button

Although mobiles are light, it's difficult to keep your hand up and device pointed at the marker for a long period of time. As mentioned previously, that is where the "Lock" button comes in.

Located in the top-right hand of the detail panel, the lock button freezes the panel in place so you can lower your arms and lose sight of the AR marker without losing the information you're looking at.

Pressing the 'Lock' button a 2nd time will unlock it, returning the panel to hovering over the marker (if the marker is still in view) or closing it (if the marker is no longer in view).

If you opened your detail panel through searching or following a relationship, pressing the unlock button closes the panel.

Recent Scans

The Recent Scans list allows you to re-open a detail panel that you've previously opened and closed.
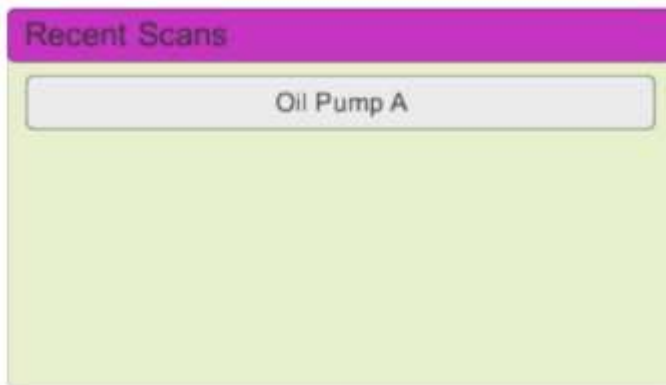
This includes items you've found by scanning, or those by searching.

Simply press the 'Recent Scans' button (see 'The Interface' on page 8) to open the Recent Scans panel.

This contains a list of all of the items you've scanned recently. The list is scrollable by touching-and-dragging.

Simply touch the name of the asset you'd like to re-open to make the asset detail panel appear.

Note that since the asset detail panel wasn't opened by scanning a marker, you will need to get rid of the detail panel by pressing the 'lock' button (see 'Asset Detail Panels' on page 10)

Press the 'Recent Scans' button again to close the Recent Scans panel.

Search

The Search panel allows you to open a detail panel about an object that you search for by name (or other data) instead of scanning its marker.

When you search, ARDI doesn't simply look up the assets name. It also searches all of the other information available in ARDI, such as equipment reference number, model numbers etc.

Simply press the 'Search' button (see 'The Interface' on page 8) to open the Search panel.

Touch the white entry field at the top of the panel to begin entering the search parameters. Note that the system will start searching as soon as you've entered three or more characters, so you don't need to enter the *whole* value of what you are looking for.

The list of results appears below the entry field and is scrollable – if you have a large number of results, you can touch-and-drag to scroll through them.

Once you've found the item you're interested in, touch it to open an asset detail panel.

Press the 'Search' button again to close the Search panel.

Pinning

In some cases you'll want to do a job that needs you to be in two places at once to watch how your actions are changing something up or downstream.

This is where pinning comes in handy.

When you have scanned (or searched for) an asset that has measurements, a 'pin' icon will appear next to the name and value of each measurement.

By clicking on the pin icon, the value of that measurement will 'pinned' onto the list that will automatically roll-down from the top of the screen. This list is called the 'Pin List'.

The measurement will remain in the pin list, even if you lose sight of your marker and go elsewhere.
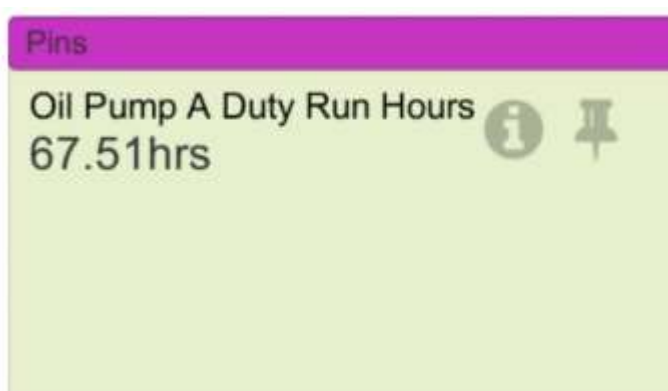
You can toggle the appearance of the Pin list by pressing the pin icon in the top-left corner of the screen. See 'The Interface' on page 8 to see the exact location of the Pin List button.

Each line in the pin list has two buttons – the 'info' button will re-open the asset detail for the asset the measurement belongs to, while the 'x' button will remove the pin from the list.

Map Controls

Opening a map in ARDI-AR brings up a new screen that controls very much like the mapping app on your phone.

Touch and swipe along the screen to move around the map, and 'pinch zoom' (touch the screen with two fingers, then slide them together to zoom out or further apart to zoom in).

The name of the level appears in the top right, and a set of buttons can be found in the top-left of the screen.
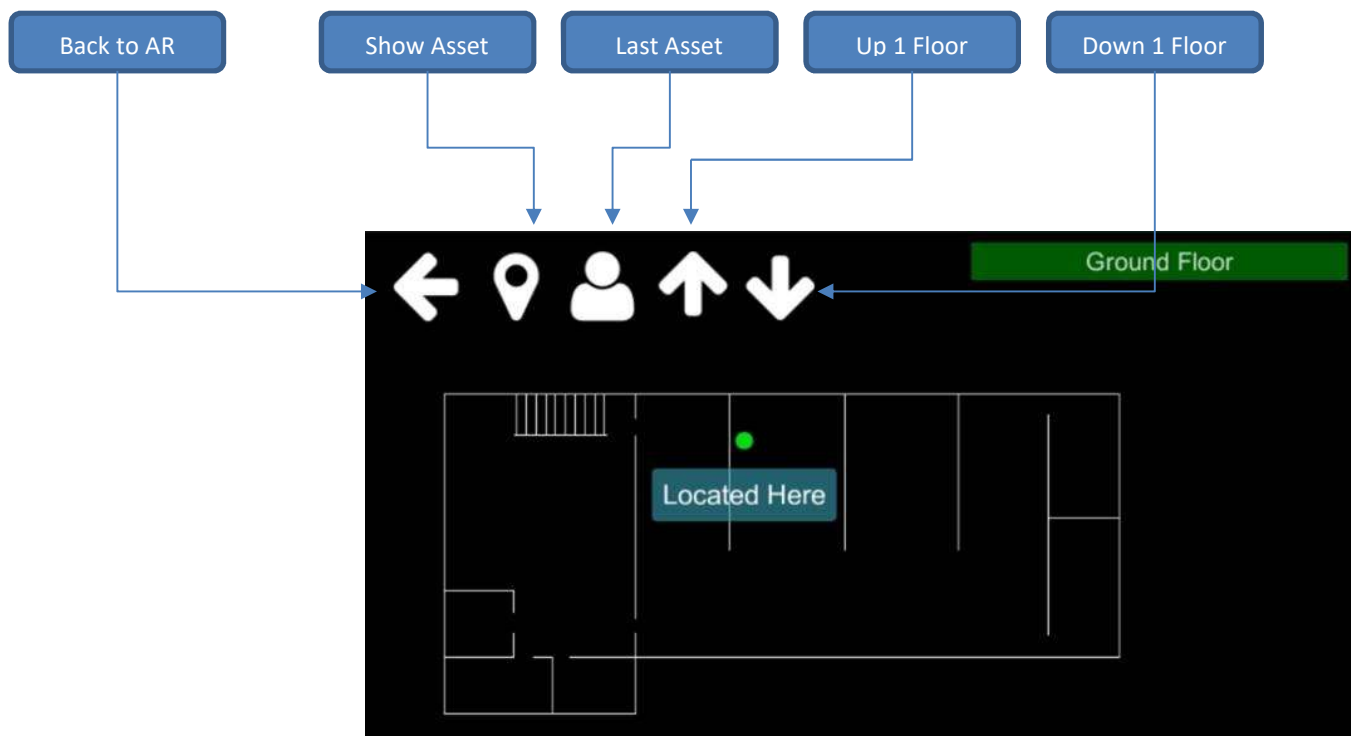
The **Back** button returns you to AR where you can scan other assets.

The **Show Asset** button takes you back to the location of your asset, which is useful if you've been navigating between levels or doing a great deal of zooming or panning around the map.

The **Last Asset** button shows you the location of the *previously scanned* item. This can be useful for figuring out the relative distance between two assets, particularly one that you've recently searched for.

Ie. if you'd like the map to give you an idea of where an asset is based on your current location, scan something nearby, then search for the asset you'd like to find and press 'Map'. You'll be able to see *both* assets on the map, giving you a relative distance (and in the future, ARDI-AR will give navigation instructions).

The **Up 1 Floor** button opens the map one floor above the one you're looking at, in multi-level environments. The **Down 1 Floor** button does the opposite.

Options

To access options, you'll need to press on the 'gear' icon in the top-right of your screen.

Camera Settings

On Android devices, you can adjust your camera settings to best balance distance and performance.

The *resolution* of your camera represents how detailed the picture from the video camera is. The higher your resolution, the more detailed the picture and the further from the marker you'll be able be to successfully read it.

However, increasing the resolution has a major impact on the performance of the application. The higher the resolution, the longer the app will take to start, and the 'jerkier' the video will be, as your device works harder to recognise tags within the image.

We suggest leaving the default settings, but you are welcome to take some time to adjust your camera to best balance image quality and performance.

Scan Mode

Most of the time, you'll want to use a 'normal' scan – this shows you all of the properties, media and relationships your asset has.

However, we do support a few alternate 'scan modes' for use during installation or when confused about the location of a piece of equipment.

By pressing on the 'Scan Mode' button (the picture of an eye) in the Options menu, you can change what happens when you scan an AR marker.

Normal Mode

As you'd expect, this provides all of the detail about your asset.

Marker Mode

This shows the unique ID number of the AR marker, allowing you to double-check the identity of the marker and assist if you are getting false readings because of bad lighting conditions or a warped marker.

Identification Mode

Rather than displaying all of the properties of your asset, ID mode simply shows you the most basic information about the marker – the tag number, asset name and description.

This is helpful to initially identify the asset you're looking for when the markers (and the assets themselves) may be close to one-another.

One-Handed Mode

In some cases, due to very thick work gloves or the fact that you're holding tools, you won't have a second hand available to lock your scanned assets or scroll through the information on the screen.

Turning on one-handed mode uses the tilt of your device to control the interface, allowing you to scroll, lock and unlock scans to your screen with only a single hand.

To do so, simply tilt your device. There are four distinct angles you can hold your device on to interact with it, as pictured below.
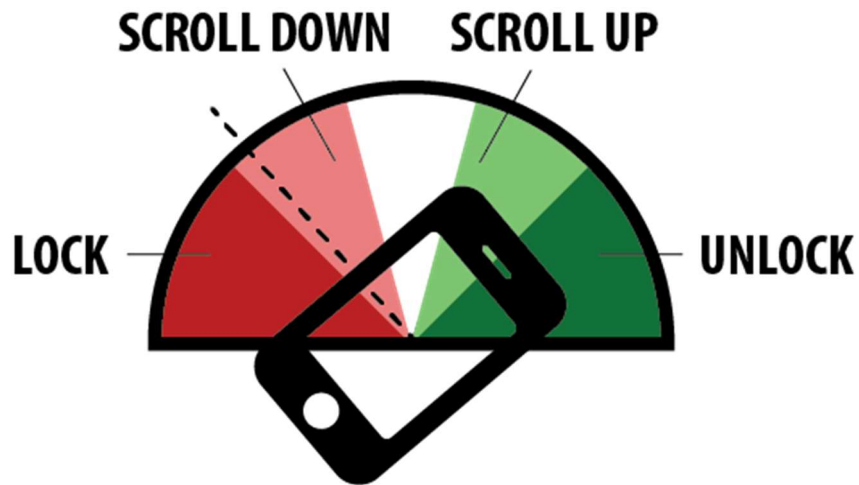
Large Screen Mode

When using ARDI-AR on a large-screen device such as a tablet, the text may appear way too large, wasting space.

By turning on Large Screen Mode (the magnifying glass in the Options menu), you will be able to choose reduce the size of the information ARDI displays, allowing you to show a great deal more.

The ARDI Button

The ARDI icon found in the bottom-right of the screen performs two functions.

Connecting to Other Servers

If you'd like to change the ARDI server you're connected to, simply touch the icon. It will pop open your list of recent servers and allow you to add new ones if you wish. See 'Connecting To ARDI'.

Connection Status

The colour of your ARDI icon also gives you the current *connection status*.

Note that ARDI-AR doesn't maintain a permanent connection to ARDI - it only connects **when you are looking at an asset**. For this reason, it will spend quite a lot of time in the grey (disconnected) state.

Colour	Meaning	Description
Black/Grey	Disconnected	The connection is either not needed, or has failed.
Green	Connected	Live data is arriving. Flashes white when data updates occur.
Red	Connecting	Trying to connect to ARDI
Purple	Server Full	Exceeded ARDI server simultaneous user limits

If you are nearing the maximum number of concurrent users on your ARDI server, ARDI-AR may begin to 'fight' other clients, trying to get new data updates. In this case, you will see the icon occasionally flash green (*connected*) as it briefly connects, then fall back to flashing purple (*server full*).