

PHILRO RFID Inventory

Fixed Assets Inventory Solution for AUTOLIV Factories

Introduction

Radio Frequency Identification, or **RFID**, is gaining greater acceptance and adoption as the costs reduce and the technology performance improves. Similar to barcode technology, RFID is applied with a unique tag which is associated with a unique asset — however, assets can be scanned at a much faster pace as the scanner does not need a line of sight to the asset tag.

With an **RFID asset tracking system**, you don't need to see or touch each item individually. In fact, RFID has the potential to provide instant accountability with the pull of a trigger or, in the case of real-time inventory solutions, even without any kind of manual operation.

RFID enables the use of mobile computers to locate missing assets with **smartphones** coupled with **mobile RFID readers**. Mobile RFID solutions allows a user to walk through an area and quickly capture all of the

RFID tags within read-range. A painfully slow process of physically searching for an asset can be reduced to finding that asset within minutes using a mobile RFID system.

PHILRO RFID Inventory enables proximity identification of fixed assets and equipment with the use of **UHF RFID tags**. The system records all types of assortment, equipment, materials and goods associated with correspondig RFID tags.

PHILRO RFID Inventory is custom developed to respect terminology, workflows and procedures used in **AUTOLIV factories**, so integration in existing workflows is immediate and painless.

Thanks to it, you will always know the location of your property, will have access to all assets movements and will be able to check who it's current holder is.

General Description

PHILRO RFID Inventory solution has the following hardware components: **RFID reader**, **RFID tags**, **Android smartphone** (for mobile application) and **Intel NUC computer** (for web application).

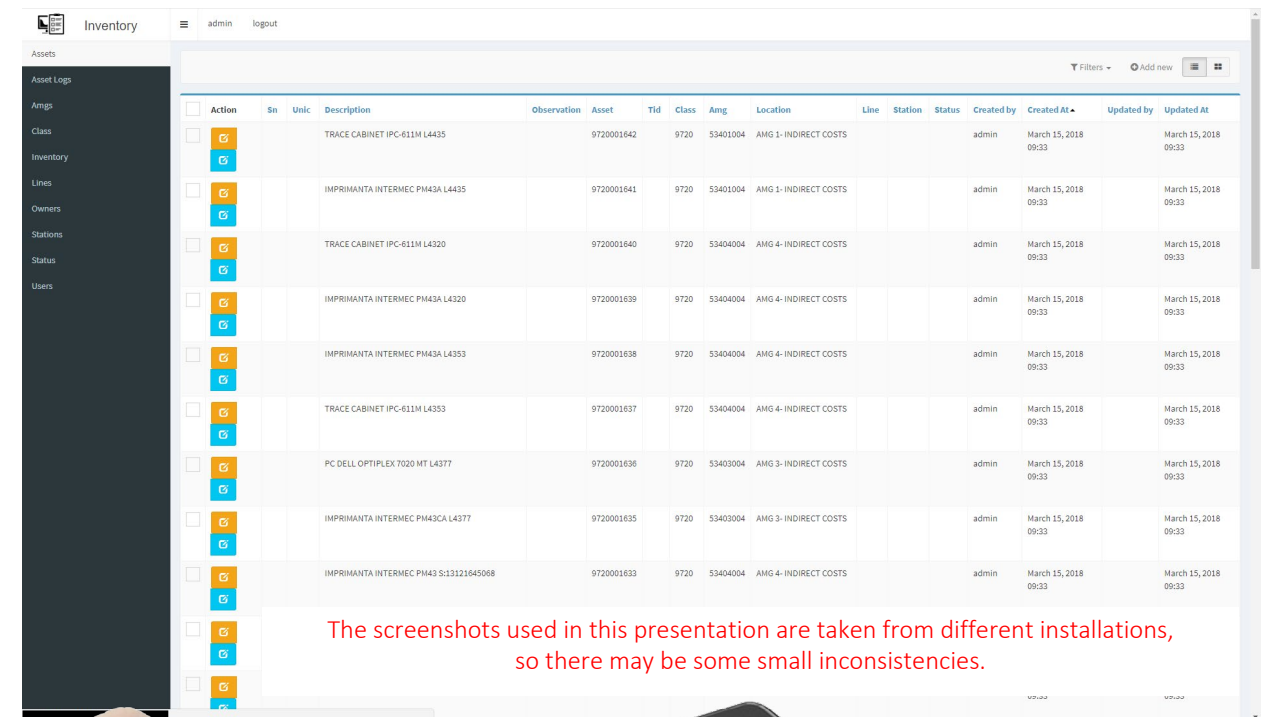
All hardware components are high quality devices, selected and tested for a reliable functionality.

PHILRO RFID Inventory solution also has two main software components: **mobile application** and **web application**.

Mobile application is installed on the Android smartphone and is connected by Bluetooth to RFID reader. Web application is installed on Intel NUC computer and connected to LAN. Web application include a web server and a database, being securely accessible from any web browser, from any type of device (Windows PC, Apple Macbook, smartphone, tablet etc.).

Each asset is associated in application with a RFID tag and has attributes which reflects the organizational structure of fixed assets in **AUTOLIV** factories: amg, location, status, class, line, owner, station etc. The interface is straightforward and the operation is simple, users learning curve being a very short one.

Assets structure and attributes are entered into the system using web application. Also, existing assets already labeled with 2D barcodes are entered thru web interface, then mobile application must be used to associate them with a RFID tag.



Action	Sn	Unic	Description	Observation	Asset	Tid	Class	Amg	Location	Line	Station	Status	Created by	Created At	Updated by	Updated At
			TRACE CABINET IPC-611M L4335		9720001642		9720	53401004	AMG 1- INDIRECT COSTS				admin	March 15, 2018 09:33		March 15, 2018 09:33
			IMPRIMANTA INTERMEC PM43A L4435		9720001641		9720	53401004	AMG 1- INDIRECT COSTS				admin	March 15, 2018 09:33		March 15, 2018 09:33
			TRACE CABINET IPC-611M L4320		9720001640		9720	53404004	AMG 4- INDIRECT COSTS				admin	March 15, 2018 09:33		March 15, 2018 09:33
			IMPRIMANTA INTERMEC PM43A L4320		9720001639		9720	53404004	AMG 4- INDIRECT COSTS				admin	March 15, 2018 09:33		March 15, 2018 09:33
			IMPRIMANTA INTERMEC PM43A L4353		9720001638		9720	53404004	AMG 4- INDIRECT COSTS				admin	March 15, 2018 09:33		March 15, 2018 09:33
			TRACE CABINET IPC-611M L4353		9720001637		9720	53404004	AMG 4- INDIRECT COSTS				admin	March 15, 2018 09:33		March 15, 2018 09:33
			PC DELL OPTIPLEX 7020 MT L4377		9720001636		9720	53403004	AMG 3- INDIRECT COSTS				admin	March 15, 2018 09:33		March 15, 2018 09:33
			IMPRIMANTA INTERMEC PM43CA L4377		9720001635		9720	53403004	AMG 3- INDIRECT COSTS				admin	March 15, 2018 09:33		March 15, 2018 09:33
			IMPRIMANTA INTERMEC PM43 S13121645068		9720001633		9720	53404004	AMG 4- INDIRECT COSTS				admin	March 15, 2018 09:33		March 15, 2018 09:33

The screenshots used in this presentation are taken from different installations, so there may be some small inconsistencies.



All images are for exemplification purpose only, the final RFID Inventory solution may have different components.

Operations

Mobile application is used to add new assets, bind assets with existing barcodes, check traceability and make inventory in specific locations. Mobile application is gathering data from RFID tags with the help of RFID reader and exchanges information with web application thru WiFi or GSM connection, all transmission being encrypted and secured with authentication credentials.

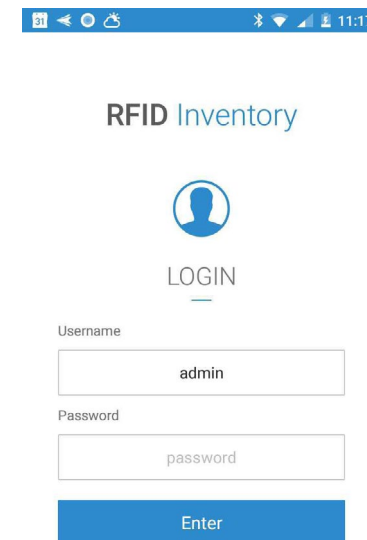
There are two ways to enter assets into mobile application: scanning existing assets' barcode (for assets already labeled with 2D barcodes) and then associating a RFID tag to them ("Bind" menu), or directly adding RFID tag to an asset ("Add" menu).

Web application is accessible only by authorized users, which may easily filter information about any asset registered in the application and export it in Excel format, may audit at any time any asset and may generate inventory reports.

Using the web application, authorized users may always add relevant information like cost centers, locations, asset statuses, owners, classes, lines, stations etc.

Checking inventory is made by locations, using the mobile application and the RFID reader. This is a simple "walk around and scan" operation, using mobile RFID reader to identify and check the presence of assets in scanned locations.

All collected informations are transmitted to the web application and store in the database, for further audits and reportings.



RFID Inventory

LOGIN

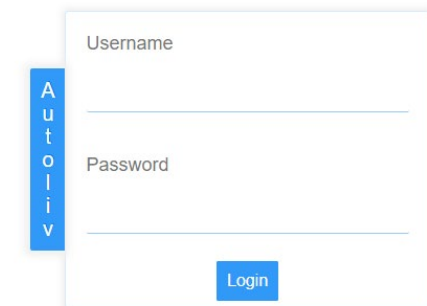
Username

admin

Password

password

Enter

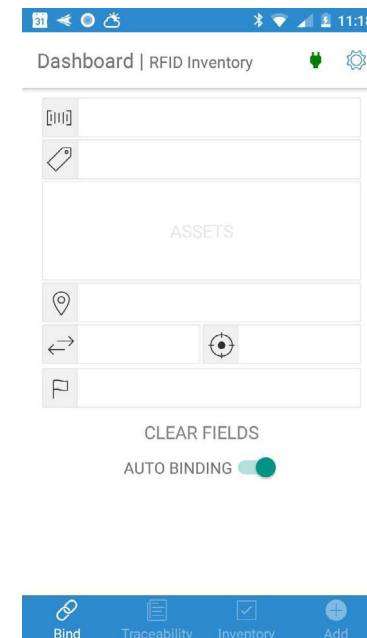


Autologin

Username

Password

Login



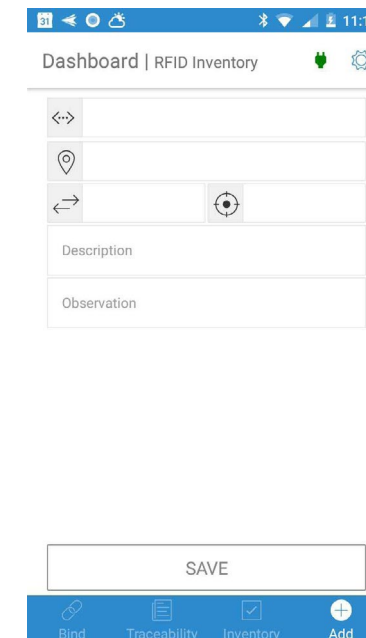
Dashboard | RFID Inventory

ASSETS

CLEAR FIELDS

AUTO BINDING

Bind Traceability Inventory Add



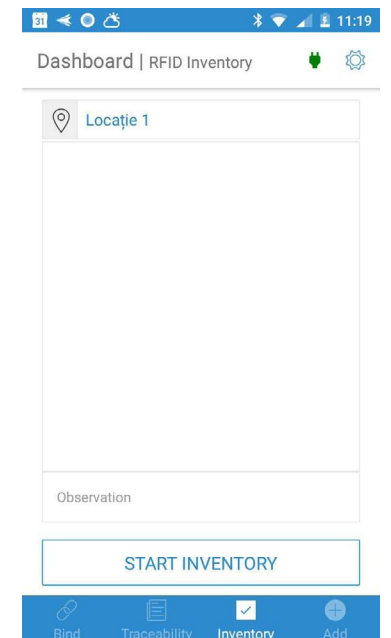
Dashboard | RFID Inventory

Description

Observation

SAVE

Bind Traceability Inventory Add



Dashboard | RFID Inventory

Locație 1

Observation

START INVENTORY

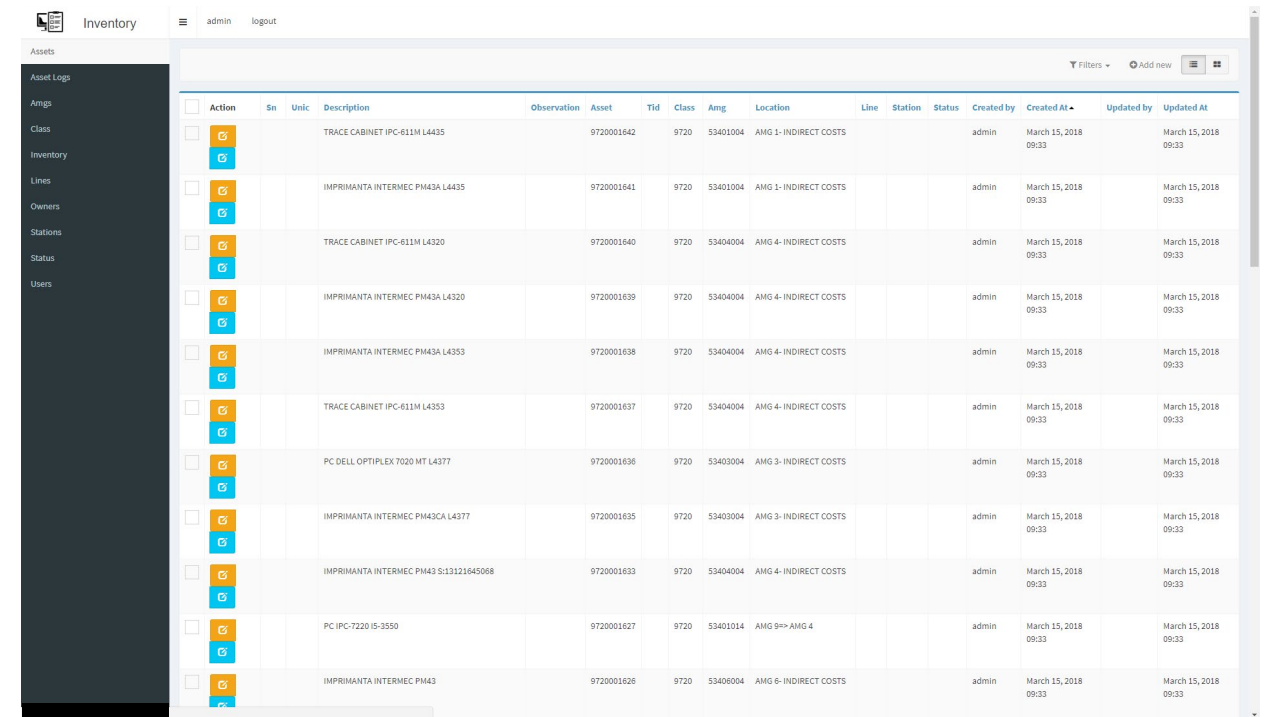
Bind Traceability Inventory Add























Web Application

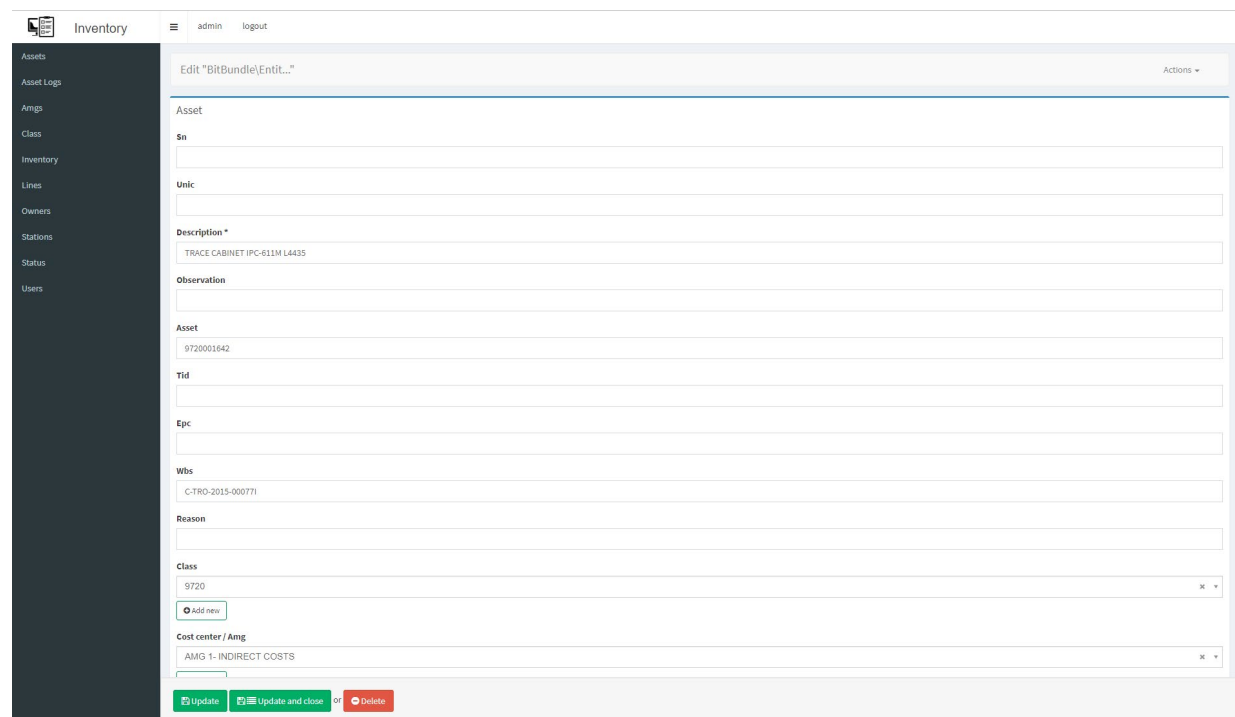
Every asset registered in application has it's own specific attributes: amg, class, line, station, owner, status etc. (up-right image).

All attributes may be entered or edited in dedicated web application's screens, accesible using the main menu, on the left side of the application's window.

Each asset line has two corresponding buttons. Using the *orange button*, the asset may be edited (down-left image). Using the *blue button*, the asset may be audited (down-right image). In this case, the application will generate an Asset Sheet in PDF format, which may then be exported or printed.



Action	Sn	Unic	Description	Observation	Asset	Tid	Class	Amg	Location	Line	Station	Status	Created by	Created At	Updated by	Updated At
 			TRACE CABINET IPC-611M L4435		9720001642		9720	53401004	AMG 1- INDIRECT COSTS				admin	March 15, 2018 09:33		March 15, 2018 09:33
 			IMPRIMANTA INTERMEC PM43A L4435		9720001641		9720	53401004	AMG 1- INDIRECT COSTS				admin	March 15, 2018 09:33		March 15, 2018 09:33
 			TRACE CABINET IPC-611M L4320		9720001640		9720	53404004	AMG 4- INDIRECT COSTS				admin	March 15, 2018 09:33		March 15, 2018 09:33
 			IMPRIMANTA INTERMEC PM43A L4320		9720001639		9720	53404004	AMG 4- INDIRECT COSTS				admin	March 15, 2018 09:33		March 15, 2018 09:33
 			IMPRIMANTA INTERMEC PM43A L4353		9720001638		9720	53404004	AMG 4- INDIRECT COSTS				admin	March 15, 2018 09:33		March 15, 2018 09:33
 			TRACE CABINET IPC-611M L4353		9720001637		9720	53404004	AMG 4- INDIRECT COSTS				admin	March 15, 2018 09:33		March 15, 2018 09:33
 			PC DELL OPTIPLEX 7020 MT L4377		9720001636		9720	53403004	AMG 3- INDIRECT COSTS				admin	March 15, 2018 09:33		March 15, 2018 09:33
 			IMPRIMANTA INTERMEC PM43CA L4377		9720001635		9720	53403004	AMG 3- INDIRECT COSTS				admin	March 15, 2018 09:33		March 15, 2018 09:33
 			IMPRIMANTA INTERMEC PM43 S:13121645068		9720001633		9720	53404004	AMG 4- INDIRECT COSTS				admin	March 15, 2018 09:33		March 15, 2018 09:33
 			PC IPC-7220 I5-3550		9720001627		9720	53401014	AMG 9** AMG 4				admin	March 15, 2018 09:33		March 15, 2018 09:33
 			IMPRIMANTA INTERMEC PM43		9720001626		9720	53406004	AMG 6- INDIRECT COSTS				admin	March 15, 2018 09:33		March 15, 2018 09:33



Inventory | admin | logout

Assets | Asset Logs | Amgs | Class | Inventory | Lines | Owners | Stations | Status | Users

Edit "BitBundle\Entit..."

Asset

Sn

Unic

Description *

TRACE CABINET IPC-611M L4435

Observation

Asset

9720001642

Tid

Epc

Wbs

C-TRO-2015-000771

Reason

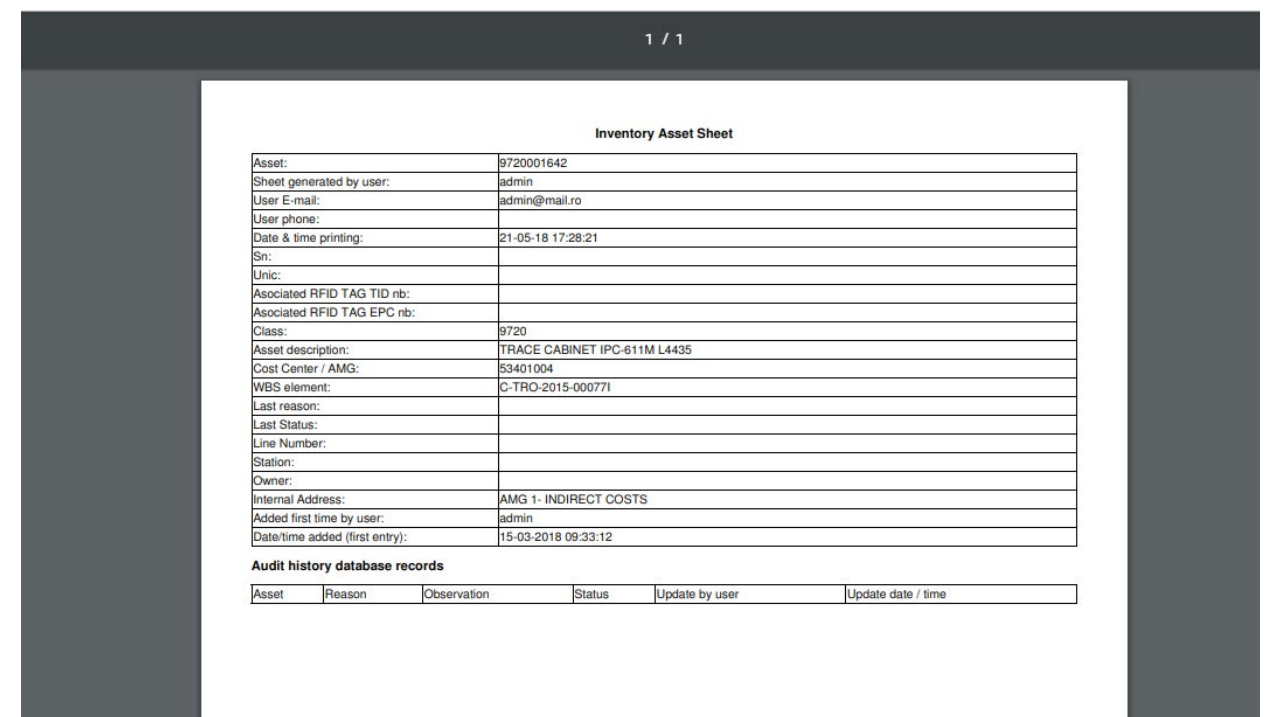
Class

9720

Cost center / Amg

AMG 1- INDIRECT COSTS

Update Update and close Delete



1 / 1

Inventory Asset Sheet

Asset:	9720001642
Sheet generated by user:	admin
User E-mail:	admin@mail.ro
User phone:	
Date & time printing:	21-05-18 17:28:21
Sn:	
Unic:	
Associated RFID TAG TID nb:	
Associated RFID TAG EPC nb:	
Class:	9720
Asset description:	TRACE CABINET IPC-611M L4435
Cost Center / AMG:	53401004
WBS element:	C-TRO-2015-000771
Last reason:	
Last Status:	
Line Number:	
Station:	
Owner:	
Internal Address:	AMG 1- INDIRECT COSTS
Added first time by user:	admin
Date/time added (first entry):	15-03-2018 09:33:12

Audit history database records

Asset	Reason	Observation	Status	Update by user	Update date / time
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Mobile Application

Using mobile application, an operator may:

1. Bind existing assets and associate them with RFID tags.

Each existing 2D barcode is associated with a corresponding RFID tag.

2. Add new assets to the application.

New assets are registered into the application and associated with RFID tags.

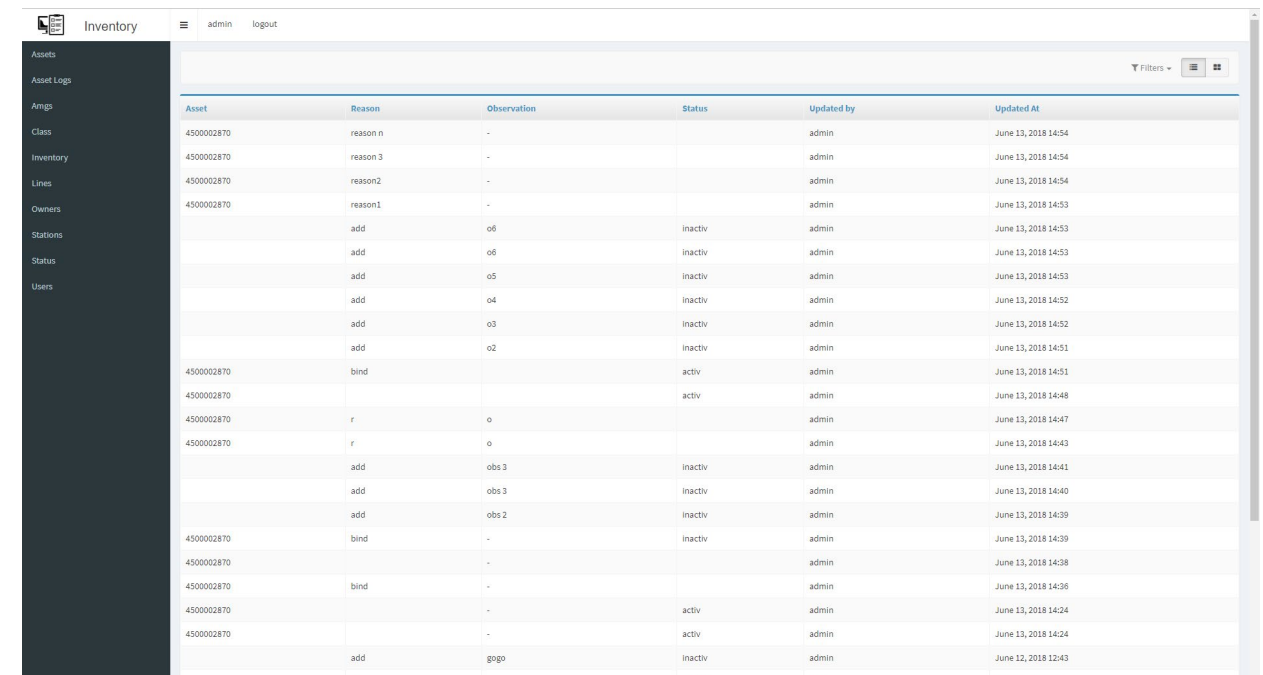
Please check [this Youtube movie clip](#) for a real time operational demo with mobile application.

3. Traceability of assets attributes.

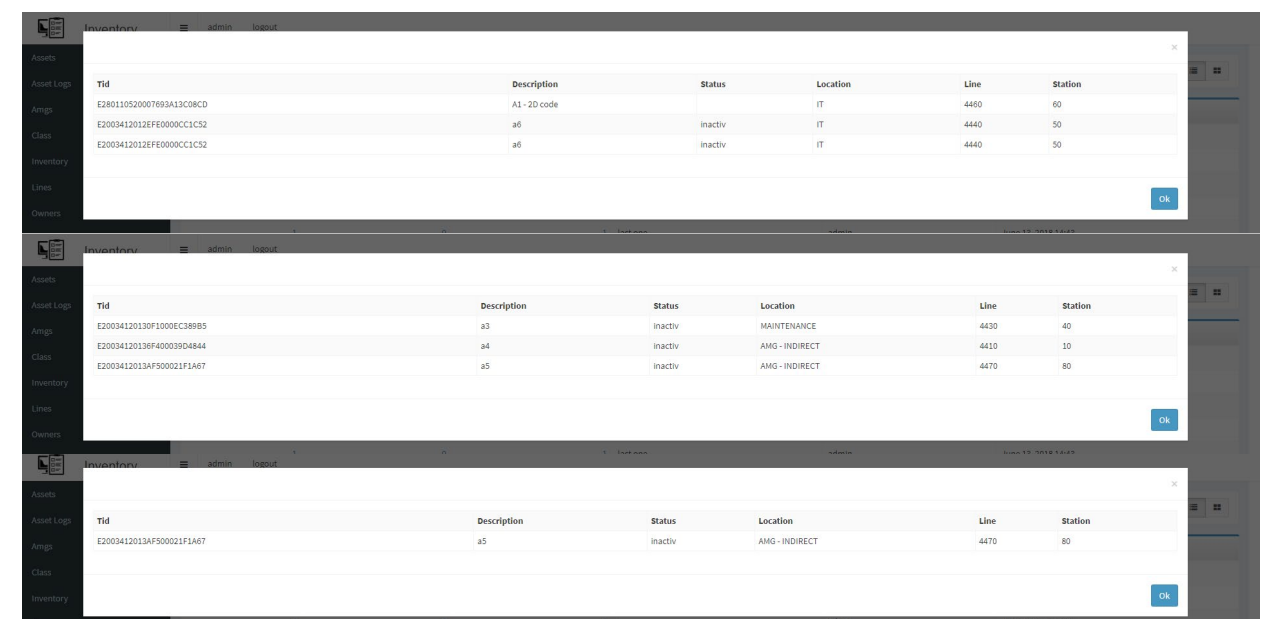
Every attribute (line, station, state etc.) may be added directly into the field, without the need to operate a computer. All editing operations are kept in the log list (up-right image) for further investigations.

4. Inventory of assets in specified location.

The mobile application is paired with a specific mobile RFID reader, the application being optimized for fast and easy inventory checks. After checking inventory in one location, assets are classified as “found” (registered as belonging to location and founded), “unfound” (registered as belonging to location but not founded) and “exception” (founded, but registered as belonging to other location). Each category may be browsed individually from the web application (down-right images).



Asset	Reason	Observation	Status	Updated by	Updated At
4500002870	reason n	-		admin	June 13, 2018 14:54
4500002870	reason 3	-		admin	June 13, 2018 14:54
4500002870	reason2	-		admin	June 13, 2018 14:54
4500002870	reason1	-		admin	June 13, 2018 14:53
	add	o6	inactiv	admin	June 13, 2018 14:53
	add	o6	inactiv	admin	June 13, 2018 14:53
	add	o5	inactiv	admin	June 13, 2018 14:53
	add	o4	inactiv	admin	June 13, 2018 14:52
	add	o3	inactiv	admin	June 13, 2018 14:52
	add	o2	inactiv	admin	June 13, 2018 14:51
4500002870	bind		activ	admin	June 13, 2018 14:51
4500002870			activ	admin	June 13, 2018 14:48
4500002870	r	o		admin	June 13, 2018 14:47
4500002870	r	o		admin	June 13, 2018 14:43
	add	obs 3	inactiv	admin	June 13, 2018 14:41
	add	obs 3	inactiv	admin	June 13, 2018 14:40
	add	obs 2	inactiv	admin	June 13, 2018 14:39
4500002870	bind	-	inactiv	admin	June 13, 2018 14:39
4500002870		-		admin	June 13, 2018 14:38
4500002870	bind	-		admin	June 13, 2018 14:36
4500002870		-	activ	admin	June 13, 2018 14:24
4500002870		-	activ	admin	June 13, 2018 14:24
4500002870	add	gogo	inactiv	admin	June 12, 2018 12:43



Tid	Description	Status	Location	Line	Station
E280110520007693A13C08CD	A1 - 2D code		IT	4480	60
E20034120128FE0000CC1C52	a6	inactiv	IT	4440	50
E20034120128FE0000CC1C52	a6	inactiv	IT	4440	50

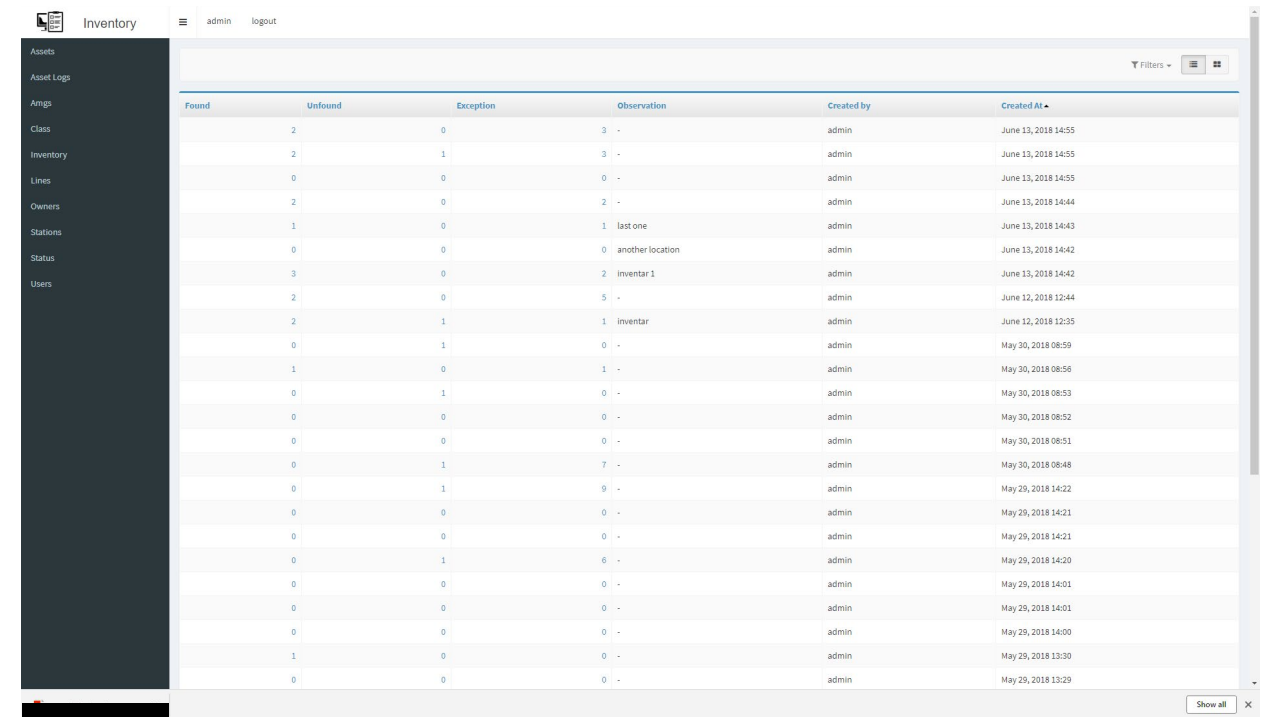
Tid	Description	Status	Location	Line	Station
E20034120130F1000EC389B5	a3	inactiv	MAINTENANCE	4430	40
E20034120136F400039D4844	a4	inactiv	AMG - INDIRECT	4410	10
E2003412013AF500021F1A67	a5	inactiv	AMG - INDIRECT	4470	80

Tid	Description	Status	Location	Line	Station
E2003412013AF500021F1A67	a5	inactiv	AMG - INDIRECT	4470	80

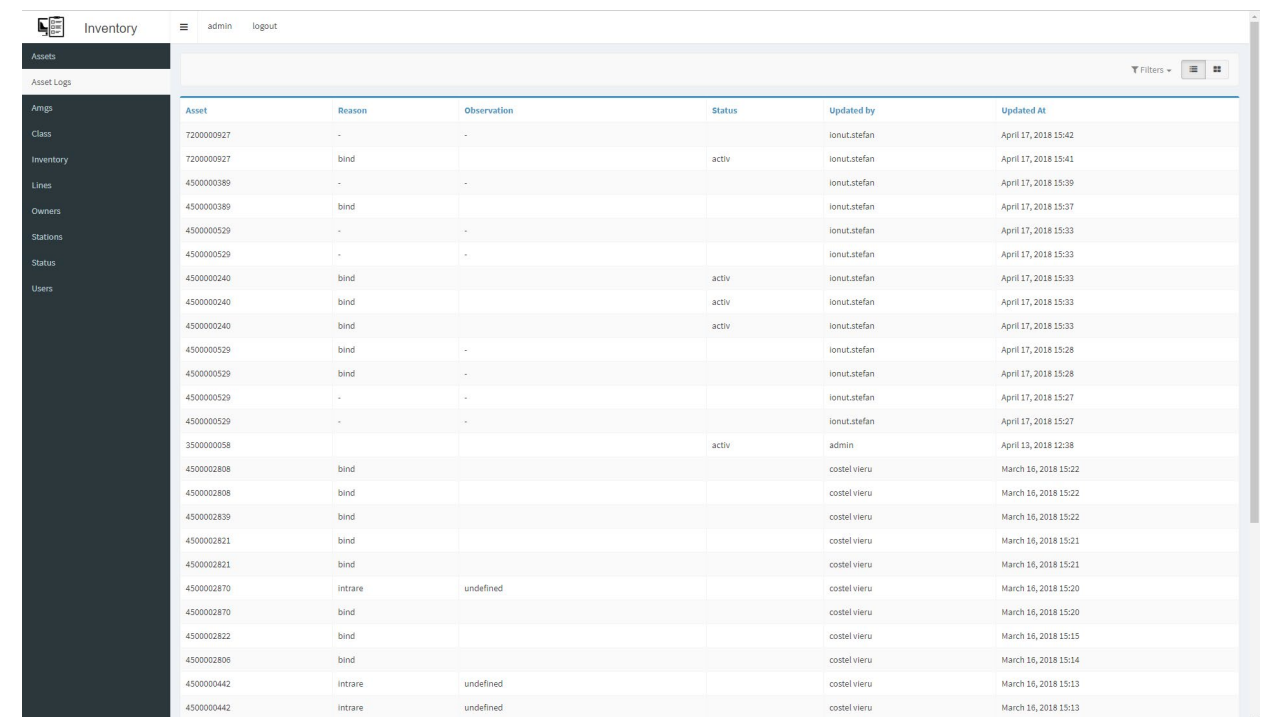
Inventory Results

From web applicaton, an authorized user may check, at any time, any inventory report log, for any inventory made with the RFID Inventory application (up-right image), thus assuring 100% traceability for every asset registered into the application. After checking inventory in one location, classified assets may be browsed individually for checking the corresponding category (down-left image). Even more, every changes made in the applicaton (a move into another location, a change in asset statuts, an owner change of a specific asset etc.) are logged and stored for any kind of future informational needs (down-right image).

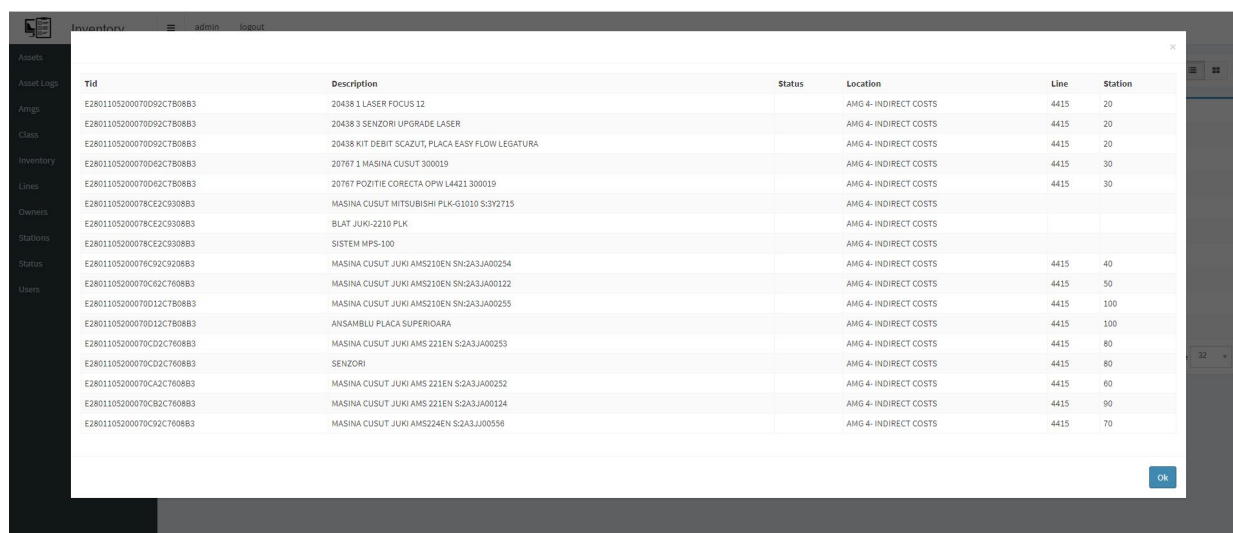
All relevant information in the database may be filtered at any time and exported in Excel format, for reportings and statistical analysis.



Found	Unfound	Exception	Observation	Created by	Created At
2	0	0	3 -	admin	June 13, 2018 14:55
2	1	0	3 -	admin	June 13, 2018 14:55
0	0	0	0 -	admin	June 13, 2018 14:55
2	0	0	2 -	admin	June 13, 2018 14:44
1	0	0	1 last one	admin	June 13, 2018 14:43
0	0	0	0 another location	admin	June 13, 2018 14:42
3	0	0	2 inventar 1	admin	June 13, 2018 14:42
2	0	0	5 -	admin	June 12, 2018 12:44
2	1	1	1 inventar	admin	June 12, 2018 12:35
0	1	0	0 -	admin	May 30, 2018 08:59
1	0	0	1 -	admin	May 30, 2018 08:56
0	1	0	0 -	admin	May 30, 2018 08:53
0	0	0	0 -	admin	May 30, 2018 08:52
0	0	0	0 -	admin	May 30, 2018 08:51
0	1	0	7 -	admin	May 30, 2018 08:48
0	1	0	9 -	admin	May 29, 2018 14:22
0	0	0	0 -	admin	May 29, 2018 14:21
0	0	0	0 -	admin	May 29, 2018 14:21
0	1	0	6 -	admin	May 29, 2018 14:20
0	0	0	0 -	admin	May 29, 2018 14:01
0	0	0	0 -	admin	May 29, 2018 14:01
0	0	0	0 -	admin	May 29, 2018 14:00
1	0	0	0 -	admin	May 29, 2018 13:30
0	0	0	0 -	admin	May 29, 2018 13:29



Asset	Reason	Observation	Status	Updated by	Updated At
7200000927	-	-		ionut.stefan	April 17, 2018 15:42
7200000927	bind		activ	ionut.stefan	April 17, 2018 15:41
4500000389	-	-		ionut.stefan	April 17, 2018 15:39
4500000389	bind			ionut.stefan	April 17, 2018 15:37
4500000529	-	-		ionut.stefan	April 17, 2018 15:33
4500000529	-	-		ionut.stefan	April 17, 2018 15:33
4500000240	bind		activ	ionut.stefan	April 17, 2018 15:33
4500000240	bind		activ	ionut.stefan	April 17, 2018 15:33
4500000529	bind	-		ionut.stefan	April 17, 2018 15:28
4500000529	bind	-		ionut.stefan	April 17, 2018 15:28
4500000529	-	-		ionut.stefan	April 17, 2018 15:27
4500000529	-	-		ionut.stefan	April 17, 2018 15:27
3500000058			activ	admin	April 13, 2018 12:38
45000002808	bind			costel vieru	March 16, 2018 15:22
45000002808	bind			costel vieru	March 16, 2018 15:22
45000002839	bind			costel vieru	March 16, 2018 15:22
45000002821	bind			costel vieru	March 16, 2018 15:21
45000002821	bind			costel vieru	March 16, 2018 15:21
45000002870	intrare	undefined		costel vieru	March 16, 2018 15:20
45000002870	bind			costel vieru	March 16, 2018 15:20
45000002822	bind			costel vieru	March 16, 2018 15:15
45000002806	bind			costel vieru	March 16, 2018 15:14
4500000442	intrare	undefined		costel vieru	March 16, 2018 15:13
4500000442	intrare	undefined		costel vieru	March 16, 2018 15:13



Tid	Description	Status	Location	Line	Station
E2801105200070092C7808B3	20438 1 LASER FOCUS 12		AMG 4- INDIRECT COSTS	4415	20
E2801105200070092C7808B3	20438 3 SENZORI UPGRADE LASER		AMG 4- INDIRECT COSTS	4415	20
E2801105200070092C7808B3	20438 KIT DEBIT SCAZUT, PLACA EASY FLOW LEGATURA		AMG 4- INDIRECT COSTS	4415	20
E2801105200070042C7808B3	20767 1 MASINA CUSUT 300019		AMG 4- INDIRECT COSTS	4415	30
E2801105200070042C7808B3	20767 POZITIE CORECTA OPW L4421 300019		AMG 4- INDIRECT COSTS	4415	30
E2801105200078CE2C9308B3	MASINA CUSUT MITSUBISHI PLK-G1010 S-3Y2715		AMG 4- INDIRECT COSTS		
E2801105200078CE2C9308B3	BLAT JUKI-2210 PLK		AMG 4- INDIRECT COSTS		
E2801105200078CE2C9308B3	SISTEM MPS-100		AMG 4- INDIRECT COSTS		
E2801105200076C92C9208B3	MASINA CUSUT JUKI AMS210EN SN:2A3JA00254		AMG 4- INDIRECT COSTS	4415	40
E2801105200070C62C7608B3	MASINA CUSUT JUKI AMS210EN SN:2A3JA00122		AMG 4- INDIRECT COSTS	4415	50
E2801105200070012C7808B3	MASINA CUSUT JUKI AMS210EN SN:2A3JA00255		AMG 4- INDIRECT COSTS	4415	100
E2801105200070012C7808B3	ANSAMBLU PLACA SUPERIOARA		AMG 4- INDIRECT COSTS	4415	100
E2801105200070C02C7608B3	MASINA CUSUT JUKI AMS 221EN S-2A3JA00253		AMG 4- INDIRECT COSTS	4415	80
E2801105200070C02C7608B3	SENZORI		AMG 4- INDIRECT COSTS	4415	80
E2801105200070CA2C7608B3	MASINA CUSUT JUKI AMS 221EN S-2A3JA00252		AMG 4- INDIRECT COSTS	4415	60
E2801105200070CB2C7608B3	MASINA CUSUT JUKI AMS 221EN S-2A3JA00124		AMG 4- INDIRECT COSTS	4415	90
E2801105200070C92C7608B3	MASINA CUSUT JUKI AMS224EN S-2A3JA00556		AMG 4- INDIRECT COSTS	4415	70