

# Saab TransponderTech

# R5 SUPREME Upgrade Instruction





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### **iii Manual Part Number and Revision**

Part number 7000 118-344, revision E1.

### **iv Contact Information**

For installation, service, ordering info and technical support please contact your local Saab TransponderTech representative. A list of dealers and service stations can be found on the corresponding product page at [www.saabgroup.com/transpondertech](http://www.saabgroup.com/transpondertech).



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## 1 R5 SUPREME CDU SOFTWARE UPGRADE

*Note: After updating the software add a sticker stating the new software version close to the product label for future reference.*

### 1.1 Normal Upgrade

The R5 SUPREME CDU is easily upgradable through the USB host interface located behind the front hatch. To upgrade the software in the R5 SUPREME CDU, perform the following steps:

- Unzip the R5 SUPREME CDU upgrade package in the root folder of an USB memory stick (must be FAT32 formatted). There should now be a folder called cduswload in the USB root folder.
- Insert the USB memory stick in the USB host interface located behind the front hatch.
-  **OPTION 1:** Hold down the 'Down Arrow'-button on the front of the R5 SUPREME CDU and reboot the CDU.
- **OPTION 2:** Navigate to **Main Menu → Maintenance → System Update → Update CDU SW** and follow the instructions. The CDU will then automatically reboot.

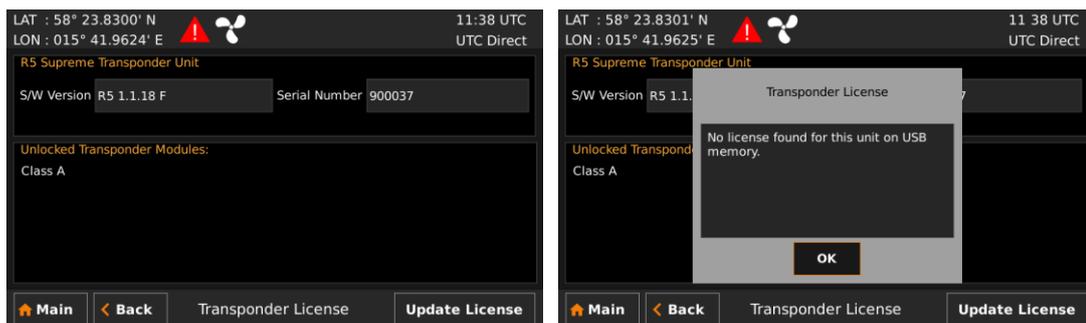


Figure 1 – Update Software

- **IMPORTANT:** The 'Down Arrow'-button must be held down until the **STATUS LED** is lit green and the **RAIM LED** is lit yellow.

The software upgrade is complete when the **STATUS LED** is lit green, this normally takes a couple of minutes. The R5 SUPREME CDU will automatically reboot after 3 seconds. Check that correct SW has been loaded in the SW/HW Info view which can be accessed through **Main Menu → Status → SW/HW Info**.

If the upgrade process fails, The **STATUS LED** will be lit red and one of the **RAIM LED** or **MODE LED** starts blinking; see Table 1 for reason of failure. Should this happen, trouble shoot according to error code. Hold down the 'Down Arrow'-button and reboot the R5 SUPREME CDU to try again.



	MODE LED	RAIM LED	STATUS
Upgrade mode started		YELLOW	GREEN
Upgrade in progress		Blinking YELLOW	
Upgrade complete (automatic reboot after 3 sec)			GREEN
Error: USB Not Found		Blinking YELLOW 0.5Hz	RED
Error: No SW found on USB		Blinking YELLOW 4Hz	RED
Error: Flash erase failed	Blinking RED 0.5 Hz		RED
Error: Flash write failed	Blinking RED 4 Hz		RED

Table 1 – CDU LED Indicators during Software Upgrade

Troubleshooting:

**Error: No USB Found** – Try a different make or model of USB memory. Format as FAT32.

**Error: No SW found on USB** – Verify SW folder structure on USB memory.

## 1.2 Upgrade with Clearing of CDU File System

In certain cases, the CDU file system may become corrupt. Problems with the CDU touch screen is an indication of this issue. This can be remedied with a software upgrade (or re-installation) combined with clearing of the file system as follows:

- Locate the “CDU file system reset files” folder in the upgrade package
- Follow instructions in the README file located in the folder

This is not a standard procedure. A number of settings may be lost e.g.

- Messages
- Tidal data
- Waypoints and routes



## 2 R5 SUPREME TRANSPONDER SOFTWARE UPGRADE

**Note: After updating the software add a sticker stating the new software version close to the product label for future reference.**

The Transponder can be upgraded over Ethernet via the R5 CDU USB port or from the R5 AIS Junction box USB port.

### 2.1 Upgrade via Junction Box

The R5 SUPREME Transponder can be upgraded through the USB host interface located in the R5 AIS Junction Box. To upgrade the software in the R5 SUPREME Transponder, perform the following steps:

- Unzip the R5 SUPREME Transponder upgrade package in the root folder of an USB memory stick (must be FAT32 formatted). There should now be a folder called swload in the USB root folder.
- Insert the USB memory stick in the USB host interface in the R5 AIS Junction Box.
- Make sure that the R5 SUPREME Transponder's 26-pin **I/O** port is connected to the R5 Junction Box.
- Hold down the 'SW-LOAD'-button in the R5 AIS Junction Box. The R5 SUPREME Transponder will reboot and start the software upgrade. The 'SW-LOAD'-button must be held down until the transponder **STATUS LED** is lit green and the transponder **Rx LED** is lit yellow.

The software upgrade is complete when the **STATUS LED** is lit green, this normally takes a couple of minutes. The R5 SUPREME Transponder will automatically reboot after 3 seconds.

**NOTE:** If the upgrade process fails, The **STATUS LED** will be lit red and one of the **Rx LED** or **Tx LED** starts blinking; see Table 1 for reason of failure. Should this happen, trouble shoot according to error code. Hold down the 'SW-LOAD'-button and reboot the R5 SUPREME to try again.

	STATUS	Rx	Tx
Upgrade mode started	GREEN	YELLOW	
Upgrade in progress		Blinking YELLOW	
Upgrade complete (automatic reboot after 3 sec)	GREEN		
Error: USB Not Found	RED	Blinking YELLOW 0.5Hz	
Error: No SW found on USB	RED	Blinking YELLOW 4Hz	
Error: Flash erase failed	RED		Blinking RED 0.5 Hz
Error: Flash write failed	RED		Blinking RED 4 Hz



Table 2 – LED Indicators during Software Upgrade

Troubleshooting:

**Error: No USB Found** – Try a different make or model of USB memory. Format as FAT32.

**Error: No SW found on USB** – Verify SW folder structure on USB memory.

## 2.2 Upgrade via R5 SUPREME CDU

It is also possible to upgrade the R5 SUPREME Transponder via Ethernet interface by using the R5 SUPREME CDU. Perform the following steps to initiate the transponder software upgrade from the R5 SUPREME CDU:

- Unzip the R5 SUPREME Transponder upgrade package in the root folder of an USB memory stick (must be FAT32 formatted). There should now be a folder called swload in the USB root folder.
- Insert the USB memory stick in the USB host interface in the USB port located behind the front hatch of the R5 SUPREME CDU.
- Make sure that the R5 SUPREME CDU and R5 SUPREME Transponder communicates with each other via Ethernet. Several R5 Transponders may be available on the network. The currently selected transponder is marked with green colour in the *Select Transponder* view which can be accessed from **Main Menu → Maintenance → Configuration → Interface → Network → Select Transponder**.

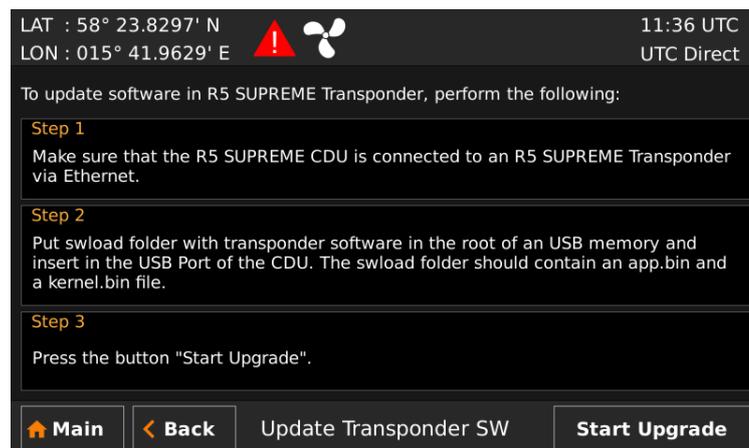


Figure 2 – Select Transponder

- Start the upgrade procedure by following the on screen instructions in the *Update Transponder SW* view which can be accessed from **Main Menu → Maintenance → Update Transponder SW**.

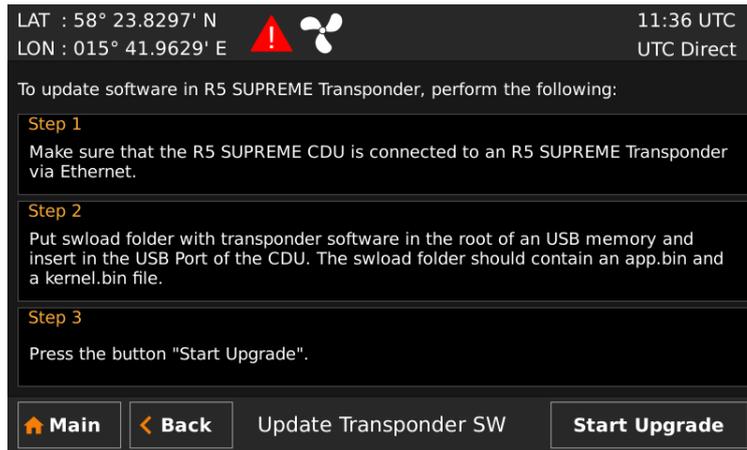


Figure 3 –Update Transponder SW

- The R5 SUPREME Transponder will reboot when the new software has been loaded so the connection will temporarily be lost. When the transponder has rebooted with the new software and connection is established again, the following view will be shown, indicating that the upgrade is complete:

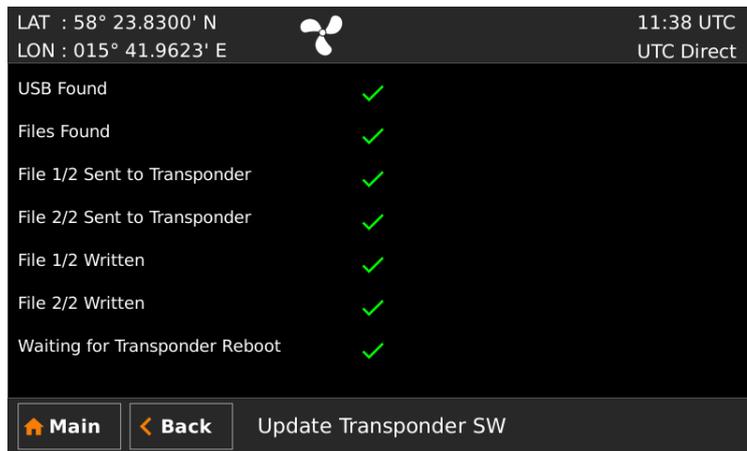


Figure 4 –Update Transponder SW , Complete



## 3 LICENSE UPGRADE TRANSPONDER

Some features in the R5 SUPREME System are license controlled and needs to be unlocked by a special license file. A license file is unique for each single R5 SUPREME Transponder. The license file name has the following structure;

200001 - 7000 118-613 [Class A].lic

In this example:

200001 – The serial number of the R5 SUPREME Transponder unit this key works with.

7000 118-613 – The part number of this license key.

To upgrade the license in the R5 SUPREME AIS System, perform the following:

- Place the license file in the root of a FAT32 formatted USB memory. It is possible to put many license files on the same USB memory if upgrading several units.
- Make sure that the R5 SUPREME CDU and R5 SUPREME Transponder communicates with each other via Ethernet. Several R5 Transponders may be available on the network. The currently selected transponder is marked with green colour in the *Select Transponder* view which can be accessed from **Main Menu → Maintenance → Configuration → Interface → Network → Select Transponder**.
- Insert the USB memory in the USB host interface located behind the front hatch of the R5 SUPREME CDU.
- Enter the view **Main Menu → Maintenance → System Update → License** and press the button “Update License”.
- If the license is successfully set, a number of unlocked modules will appear:

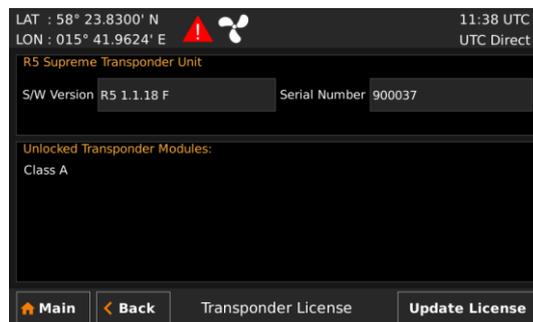


Figure 5 –License Upgrade Successful

- If a correct license file cannot be found on the USB memory, the following will appear:

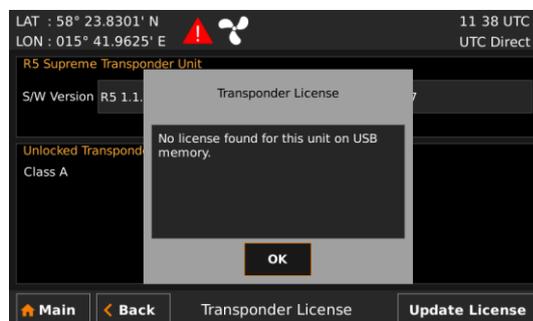


Figure 6 – No License File Found



### 4 R4 NAVIGATION SENSOR SOFTWARE UPGRADE

**Note: Make sure the sensor unit is marked on the back plate with 7000 109-140 or 7000 109-141 before attempting to upgrade! There are several previous versions of the R4 Sensor with different part numbers. Those will be PERMANENTLY DAMAGED if an upgrade is attempted.**

The R4 GPS Navigation Sensor consists of two components which are upgraded separately. The components are a routing processor and a GPS module. The R4 DGPS Navigation Sensor also contains a beacon module. This instruction describes how to update the firmware of the routing processor and the GPS module. Update is done through the serial interfaces of the unit.

#### 4.1 Equipment Needed

In this document it is assumed that the following equipment is available:

- A PC.
- An R4 Navigation Sensor unit to be updated.
- Power supply for the R4 Navigation Sensor (24V power source).
- Software and software tools for the update, included in the R5 SUPREME Upgrade Package.
- An RS422 interface adapter for the PC, see APPENDIX A - USB to RS422 I/O Adapter/Cable Ordering Info.
- An R4 Navigation Sensor Update Cable. The sensor update cable has part number 7000 109-098 and can be ordered from Saab TransponderTech. It is also possible to manufacture an update cable from a standard R4 Navigation Sensor power and data cable, part number 7000 109-011, by following the instructions specified in APPENDIX B - Update Cable Specification.

#### 4.2 Connecting the R4 Navigation Sensor

To connect the R4 Navigation Sensor with a RS422 interface, follow these steps:

- Make sure that the RS422 interface is properly installed and that it is configurable for 19200bps, 8 data bits, 1 stop bit, no parity and no flow control.
- Connect the update cable to the R4 Navigation Sensor.
- Make sure that the power wires of the update cable can be connected to a 24V power source. **Do not apply power yet.**

#### 4.3 Install the Firmware Update Software

Create a new folder on your hard drive and copy the contents of the "R4 Sensor" directory of the R5 SUPREME Upgrade package to it.

Determine the COM port used by the RS422 interface (check interface installation guide).

#### 4.4 Update GPS Module Firmware

Follow the steps below to update the GPS module firmware in the R4 Navigation Sensor.

1. Make sure no power is applied and that no antenna cable is connected to the R4 Navigation Sensor.
2. Connect the System Port interface to an available RS422 COM port on your PC

### R4 NAVIGATION SENSOR SOFTWARE UPGRADE



3. Go to the directory where the firmware update was copied. Enter the directory named "GPS".
4. Double-click on the file "rightarm.exe". The tool *RightARM* should start.
5. In the menu bar, select "Receiver" and then "Connect..."
6. Select the COM port that corresponds to the port you have connected the System Port interface to. Make sure the baud rate is set at 19200. Press "OK".
7. In the menu bar, select "Receiver" and then "Program..."
8. If not entirely shown, maximize the new window.
9. Select "Application" in the window.
10. Click on "Select File..." and select the .bin present in the "GPS" directory.
11. Check the "Start Application After Programming" checkbox. Make sure the "Activate Loader" checkbox is checked as well.
12. Click on the button "Erase and Program" in the window.
13. Apply power to the R4 Navigation Sensor.
14. Erase of flash and download of firmware should begin once the R4 Navigation Sensor has been started. The status bar in the *RightARM* tool will indicate the progress of the update.
15. When software is downloaded this is indicated by the *RightARM* tool (Status = 'Application Started').

The GPS module firmware of your R4 Navigation Sensor is now upgraded.

Following upgrade of GPS software, the routing processor software needs to be loaded. That applies even if the routing software not is to be updated to a new version. That is because a number of system settings are defined during the routing processor software installation.

### 4.5 Update Routing Module Firmware

Follow the below steps to update the routing module firmware in the R4 Navigation Sensor.

1. Connect the User 1 interface on the update cable to an available RS422 COM port on your PC.
2. Start a command prompt, and go to the directory where the firmware update was copied. Enter the directory named "Routing".
3. Make sure no power is applied and that no antenna cable is connected to the R4 Navigation Sensor.
4. The "Routing" folder shall include a file named loader\_nnn.bat where nnn may be any number. Run the command "loader\_nnn X" where X corresponds to the number of the COM port to which the User 1 interface is connected.

**Example: If nnn = 107 and the User 1 interface is connected to COM 8 on your PC, the following command should be issued: loader\_107 8**

A screen as illustrated below should be shown.

```
C:\Routing>loader_107 8
C:\Routing>dl 8:D 9600 saab_104.s19
CSI Wireless Bootloader for Freescale Microcontroller - $Ver
Waiting for HC08 reset ACK...
```



5. Apply power to the R4 Navigation Sensor.

Note: Do not apply power by connecting the update cable to the R4 Navigation Sensor – it should be connected during the whole update procedure. Instead, apply power by connecting the power wires to the power source or by turning on your power source itself.

6. The loader program should start download software to the R4 Navigation Sensor in a few seconds after power has been applied to it, showing a screen as illustrated below.

```
Acceptable overwrite (at address 0xFFBD)  
Memory programming: W 0x2A80 27%
```

If the loader program fails to start downloading software, remove and reapply power.

If the loader program should hang or stop functioning, abort it by pressing Ctrl-C and restart on step 3 above.

7. Wait until the program says that configuration and programming is complete.

The routing firmware of your R4 Navigation Sensor is now upgraded. To verify the version of the software loaded into the R4 Navigation Sensor, perform the steps described in the next chapter below.



## 5 R5 NAVIGATION SENSOR SW AND GNSS FW UPGRADE

The R5 Navigation Sensor’s software and GNSS firmware can easily be upgraded via the USB Host interface located behind the front hatch on the CDU, or the “Maintenance” view in the sensor’s web-interface.

### 5.1 Upgrade by CDU

To perform a software update via the CDU, follow the instructions in the “Update Navigation Sensor SW” view, which is accessible by **Main Menu → Maintenance → System Update → Update Navigation Sensor SW** or to update the Internal GNSS Firmware **Main Menu → Maintenance → System Update → Update Navigation Sensor → Update GNSS FW**.

**Note:** Both the views has the same structure and looks the same but has different upgrade procedures. Each view only accepts files of accurate type (.bin/.gnssfw) and if both these upgrades performed at the same time, the recommendation is to start with the R5 Navigation Sensor software before the GNSS Firmware.

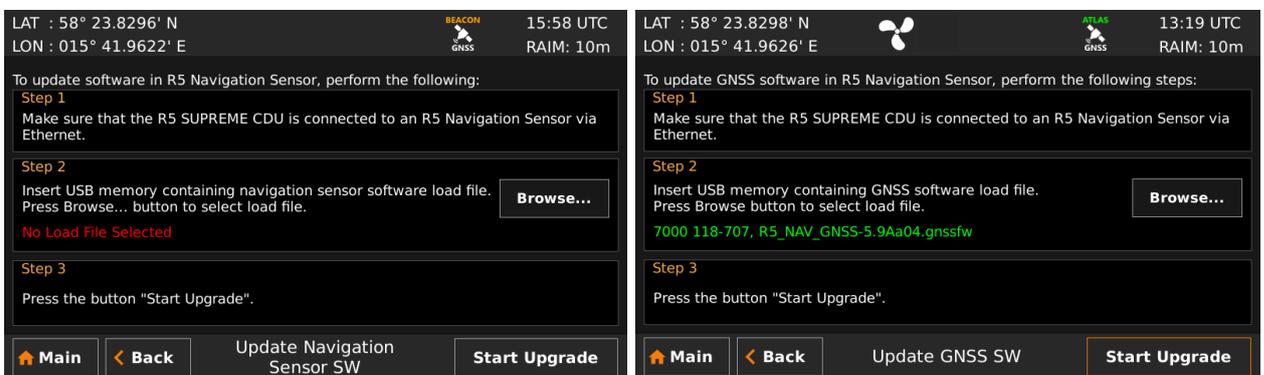


Figure 7 – Update Navigation Sensor Software/GNSS Firmware

Insert an USB memory into the CDU’s front hatch, including the latest software version, click on the button “Browse...” and select the load file.

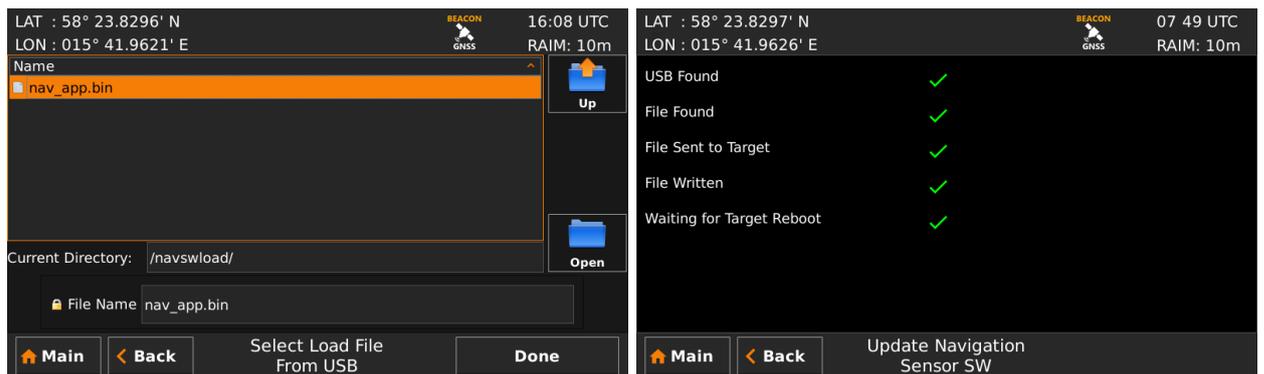


Figure 8 – Select Load File From USB / Update process

When the load file been selected press the “Done” button followed by the “Start Upgrade” button in the “Update Navigation Sensor SW” / “Update GNSS SW” view and wait for the update process to finish.



## 5.2 Upgrade by WEB

The R5 Navigation Sensor has a web interface, just requiring an Ethernet connection, which gives the user a possibility to operate and configure the sensor without needing a R5 SUPREME CDU. The interface is accessible by the most commonly browsers, by only enter the R5 Sensor's IP address which in default is set to be 172.16.0.4 on *Eth1* and 172.17.0.4 on *Eth2*.

The "Maintenance" view's functionalities are the uploading of Sensor Software/GNSS Firmware, saving/loading/restoring configuration settings, alarm logging and processing of password.

To perform an upgrade press either the "Select software file" or "Select GNSS firmware file" button and browse to the folder containing the upgrade file.

During upgrades, a process bar is shown that also notice the user when the upgrade is finished.

**Note:** It is not recommended to close the browser window during an upgrade. After both these kind of upgrade the unit will reboot causing a temporary disconnection for the web interface, but automatically reconnects as soon as it is up and running again.

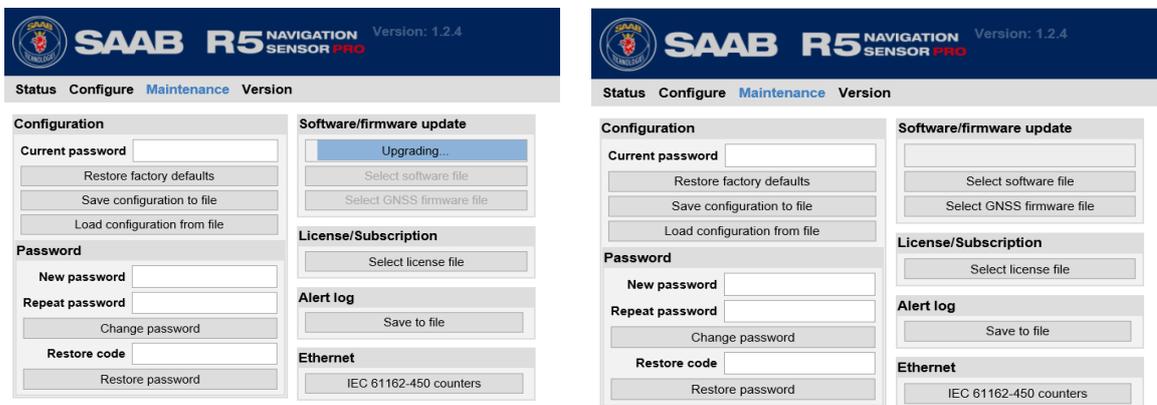


Figure 9 - Web Interface, Maintenance view



## 6 LICENSE UPGRADE R5 NAVIGATION SENSOR

### 6.1 License Input by CDU

Some features in the R5 Navigation Sensor are license controlled and needs to be unlocked by a special license file. A license file is unique for each single R5 Navigation Sensor. The license file name has the following structure;

In this example: 200001 - 7000 118-790 [DGNSS Nav Pro Sensor].lic

200001 – The serial number of the R5 Navigation Sensor the key works with.

7000 118-773 – The part number of this license key.

To upgrade the license in the R5 Navigation Sensor, perform the following:

- Place the license file in the root of a FAT32 formatted USB memory. It is possible to put many license files on the same USB memory if upgrading several units.
- Make sure that the R5 SUPREME CDU and R5 SUPREME Transponder communicates with each other via Ethernet. Several R5 Transponders may be available on the network. The currently selected transponder is marked with green colour in the *Select Transponder* view which can be accessed from **Main Menu → Maintenance → Configuration → Interface → Network → Select Navigation Sensor**.
- Insert the USB memory in the USB host interface located behind the front hatch of the R5 SUPREME CDU.
- Enter the view **Main Menu → Maintenance → System Update → Update Navigation Sensor → Sensor License** and press the button “Update License”.
- If the license is successfully set, a number of unlocked modules will appear:

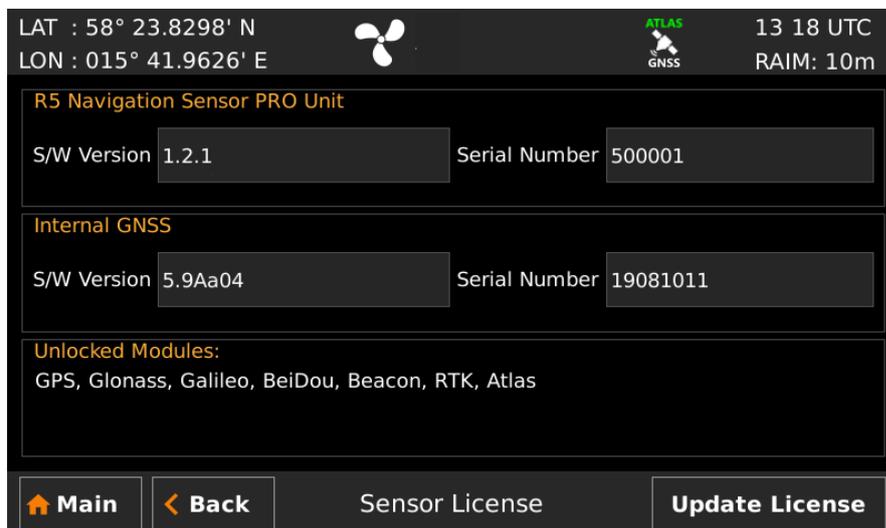


Figure 10 – Sensor License

- If a correct license file cannot be found on the USB memory, a warning pop-up will appear.



### 6.2 License Input by Web

The R5 Navigation Sensor has a web interface, which shown in Figure 9, just requiring an Ethernet connection and gives the user a possibility to operate and configure the sensor without need of the R5 SUPREME CDU. The interface is accessible by the most commonly browsers, by only enter the R5 Sensor's IP address which in default is set to be 172.16.0.4 on *Eth1* and 172.17.0.4 on *Eth2*.

The “*Maintenance*” view's functionalities are the uploading of Sensor Software/GNSS Firmware, saving/loading/restoring configuration settings, alarm logging and processing of password.

To perform a license update press the “*Select license file*” button and browse to the folder containing the license file (.lic).

When input a license file the interface will instantly report if it was accepted or denied.

By go to the “*Version*” view the user can also control that the correct functionalities has been activated.



### APPENDIX A - USB TO RS422 I/O ADAPTER/CABLE ORDERING INFO

A USB to RS422 Interface Cable with part number 7000 107-396 or a VSCom USB-COM-I RS422 I/O adapter with part number 7000 000-181 is available from Saab TransponderTech AB.

The VSCom USB-COM-I RS422 I/O adapter can also be ordered from the locations listed below.

Note: Make sure that the adapter ordered is the USB to RS422/RS485 Adapter (COMi) and not the USB to RS232 Adapter (COM).

#### Asia

<http://esysmall.com>

<http://www.dawoonet.co.kr>

#### Australia

<http://www.dontronics.com>

#### Europe

<http://www.easysync.co.uk>

#### USA

<http://www.saelig.com>



### APPENDIX B - UPDATE CABLE SPECIFICATION

A cable is needed to connect to the 18-pin ConXall connector on the R4 Navigation Sensor. On the cable, the *System port* and *User 1 port* interfaces need to be available for connection to the RS-422 interface adapter/cable and the power wires available for connection to a 24 VDC power source.

An update cable may also be manufactured from a standard *R4 Navigation Sensor power and data cable*, part number 7000 109-011, by following the instructions below.

Column 1 and 2 in the below tables specifies which pin on the 18-pin ConXall connector that correspond to which function in the interface. Column 3 specifies the color in the *R4 Navigation sensor power and data cable* (part number 7000 109-011 rev B) of the wires that are connected to the corresponding pin. The tables also specifies the relevant functions for the RS-422 interface adapter/cable and the specific pin for each function in the male, 9 pole D-Sub connector on the interface adapter/cable. Note that the Tx lines of the R4 Navigation sensor ports are to be connected to the Rx lines of the RS-422 interface adapter/cable and vice versa.

18-pin ConXall connector	User port 1 function	Color in cable 7000 109-011 rev B	RS-422 serial port adapter/cable function	USB-COM-I serial adapter/cable 9-pole D-sub pin
pin 1	RX A	White	TX A	1
pin 3	RX B	Brown	TX B	2
pin 7	TX A	Gray	RX A	4
pin 8	TX B	Pink	RX B	3

Table 3: R4 Navigation Sensor User 1 port to RS-422 serial port adapter/cable interface specification

18-pin ConXall connector	System port function	Color in cable 7000 109-011 rev B	RS-422 serial port adapter/cable function	USB-COM-I serial adapter/cable 9-pole D-sub pin
pin 2	RX A	Green	TX A	1
pin 5	RX B	Yellow	TX B	2
pin 10	TX A	Black	RX A	4
pin 11	TX B	Purple	RX B	3

Table 4: R4 Navigation Sensor System port to RS-422 serial port adapter/cable interface specification



<b>18-pin ConXall connector</b>	<b>Power function</b>	<b>Color in cable 7000 109-011 rev B</b>
pin 17	Power +	Red
Pin 9	Power - / GND	Blue

Table 5: R4 Navigation Sensor power wires Specification