

AsteRx SB

User Manual





User Manual Revision 1.1 Applicable to version 4.4.0 of the AsteRx SB firmware

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1 Introduction

1.1 User Notices

1.1.1 CE Notice



AsteRx SB receivers carry the CE mark and are as such compliant with the 2004/108/EC - EMC Directive and amendments, 2006/95/EC - Low Voltage Directive, both amended by the CE-marking directive 93/68/EC.

With regards to EMC, these devices are declared as class B, suitable for residential or business environment.

1.1.2 ROHS/WEEE Notice



AsteRx SB receivers comply with European Union (EU) Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS Directive).



AsteRx SB receivers comply with the European Union (EU) Directive 2002/96/EC on waste electrical and electronic equipment (WEEE). The purpose of this Directive is the prevention of waste electrical and electronic equipment (WEEE), and in addition, the reuse, recycling and other forms of recovery of such wastes so as to reduce the disposal of waste. If purchased in the European Union, please return the receiver at the end of its life to the supplier from which it was purchased.

1.1.3 Safety information



Statement 1: The power supply provided by Septentrio (if any) should not be replaced by another. If you are using the receiver with your own power supply, it must have a double isolated construction and must match the specifications of the provided power supply.



Statement 2: Ultimate disposal of this product should be handled according to all national laws and regulations.



Statement 3: The equipment and all the accessories included with this product may only be used according to the specifications in the delivered release note, manual or other documents delivered with the receiver.



1.1.4 Support

For first-line support please contact your AsteRx SB dealer.

Additional documentation can be found in the following manuals:

- **The AsteRx SB Reference Guide** (contained inside the Firmware Package zip on our website) includes information on the receiver operation, the full list of receiver commands and a description of the format and contents of all SBF (Septentrio Binary Format) blocks.
- The **RxTools Manual** covers the RxTools software suite, including RxControl and RxLogger.

The Septentrio website has a dedicated Support section

(http://www.septentrio.com/support), where the User Manual, the Firmware Reference Guide and the latest officially supported Firmware version are readily available for download.

Further information can be found on our website or by contacting Septentrio's Technical Support department.

In case the AsteRx SB does not behave as expected and you need to contact Septentrio's Technical Support department, you should attach a short SBF log file containing the support blocks and a Diagnostic Report of the receiver (see Section 7.2).



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2 AsteRx SB Overview

The AsteRx SB is an IP68 compliant, multi-constellation, multi-frequency GNSS receiver ideal for rapid integration into machine control or sensor fusion applications. It offers an extensive range of cable and wireless connections for maximum flexibility.

2.1 Key features

- Quad-constellation, multi-frequency all-in-view RTK receiver
- Robust and compact IP68 weatherproof housing
- AIM+ interference monitoring and mitigation system
- Base and Rover operation
- Bluetooth, WiFi, Ethernet, Serial and USB communications

2.1.1 GNSS specifications

448 hardware channels to track the following supported signals:

- GPS: L1CA, L1PY, L2PY, L2C, L5
- GLONASS: L1CA, L2P, L2CA, L3
- Galileo¹: E1 BC (CBOC), E5 (a, b, AltBoc)
- BeiDou¹: B1, B2
- SBAS: EGNOS, WAAS, GAGAN, MSAS, SDCM (L1, incl. L5 tracking)
- IRNSS¹: L5
- QZSS: L1CA, L2C, L5
- Integrated dual-channel L-band tracking

¹Optional feature

Navigation performance

	Horizontal	Vertical
Standalone	1.2 m	1.9 m
SBAS (WAAS, EGNOS, MSAS)	0.6 m	0.8 m
DGPS	0.4 m	0.7 m
RTK (Fixed)	0.6 cm + 0.5 ppm	1 cm + 1 ppm
SeCoRx (PPP)	4 cm	6 cm



Time to first fix

Cold Start ²	<45s
Warm Start ³	<20s
Re-acquisition	avg. 1s

² No information available (no almanac, no approximate position)

³ Ephemeris and approximate position known

2.1.2 Physical and Environmental

Size:	102 x 36 x 111 mm (4.0 x 1.4 x 4.4 in)
Weight:	460 g (1.01 lb)
Input voltage:	5 to 36 V DC
Power consumption:	1.5 W typical
Operating temperature:	-30 °C to +65 °C (-22 °F to +149 °F)
Storage temperature:	-40 °C to +75 °C (-40 °F to +167 °F)
Ingress Protection:	IP68
Humidity	MIL-STD810G, Method 507.5, Procedure I
Dust	MIL-STD-810G, Method 510.5, Procedure I
Shock	MIL-STD-810G, Method 516.6, Procedure I/II
Vibration	MIL-STD-810G, Method 514.6, Procedure I



2.2 AsteRx SB variants

The AsteRx SB is available in two variants:

Variant (Part number)	Connections	
AsteRx SB PRO Connect (410228)	 Serial USB and micro-USB Ethernet Bluetooth WiFi External Power 	PRO Connect
AsteRx SB Wireless (410227)	 micro-USB (powered by USB OTG) Bluetooth WiFi 	Wireless

Certain receiver features are controlled by permissions, which can be purchased via our Sales department.

2.3 Shipping case contents

Cables for the AsteRx SB system are not included but a cable kit, extra cables and accessories are available:



Figure 2-1: The AsteRx SB available items



ltem	Purpose
(Part Number)	
AsteRx SB PRO Connect Cable kit (410284)	Basic cable kit for AsteRx SB PRO Connect model
AsteRx SB Wireless Cable kit (410285)	Basic cable kit for AsteRx SB Wireless model
CBL_AxSB_PWR_ADPT_EU (215607)	Power adapter with EU power cable for AsteRx SB (using ODU connector)
CBL_AxSB_PWR_ADPT_UK (215608)	Power adapter with UK power cable for AsteRx SB (using ODU connector)
CBL_AxSB_PWR_ADPT_AUS (215609)	Power adapter with AUS power cable for AsteRx SB (using ODU connector)
CBL_AxSB_PWR_ADPT_USA (215610)	Power adapter with USA power cable for AsteRx SB (using ODU connector)
CBL_MicroUSB_1M (214855)	Micro-USB cable to USB Type A male
CLB_AxSB_USB (215656)	ODU to USB Type A male
CBL_MicroUSB_OTG (215661)	Micro-USB male to USB female Type A (OTG cable) for connecting external memory
CBL_MicroUSB_PWR_ADAPT (215641)	USB Power adaptor - recommended adaptor for powering the unit via USB - comes with adapters for EU, UK, AUS and USA.
CBLe_COM_DUO_7 (201204)	ODU to 2 serial ports (DB9) COM2 & COM3, no RTS/CTS for AsteRx SB
CBL_AxSB_OPEN1 (215424)	ODU to open ended cable for the <i>PWR</i> <i>COM2&3/USB</i> connector of the AsteRx SB PRO Connect model (usable for Power, COM2 & COM3 RS232 serial communication or USB communication)
CBLe_COM_1,8 (200416)	ODU to serial (DB9) - COM1 (Female) cable to connect to a PC. With RTS/CTS. Receiver is seen as a DCE (Data Control Equipment)
CBL_AxSB_OPEN2 (215559)	ODU to open ended cable for the <i>COM1-GPIO</i> connector of the AsteRx SB PRO Connect model (usable for EVENTA, 5V Power output, COM1 RS232 serial communication with CTS/RTS or EVENTB & PPS-Out signals)
CBLe_ETH_MS (200418)	ODU to Ethernet cable (for Hub/switch) (RJ45)



Item	Purpose
(Part Number)	
AxSB_MOUNT_ACCESSORY (215662)	Flexible mount accessory for AsteRx SB
AxSB_SHIPPING_CASE (410262)	Pelican shipping case for 1 AsteRx SB receiver and space for cables. Dimensions: 10.62" x 9.68" x 6.85" (27.0 x 24.6 x 17.4 cm) (Pelican 1300)



2.4 AsteRx SB design

2.4.1 Front Panel

The AsteRx SB has an intuitive front panel with status LEDs and a central power button.



Figure 2-2: The front panel of the AsteRx SB

Tables 2.4-1 below provides an overview of the LED indicators.



lcon	LED Behaviour
WiFi	Off: WiFi disabled Access point: Green, Blinking slow: No connected Green, On: Connected Client mode: Yellow: Not connected / Connection error Green, On: Connected
Bluetooth	Off: Not connected Blue, Blinking fast: Not discoverable Blue, Blinking slow: Discoverable Blue, On: Connected
Ethernet	Off : Not connected Green, On : Connected
Positioning Mode	Off : No position can be calculated Green, On : The reported position is 'RTK Fixed or PPP' Green, Blinking slow : Static Base station Yellow, On : SBAS, DGPS or RTK Float Red, On : Stand alone
Power Button	Off : Receiver is powered off White : Receiver is booting Blue : Power-over-Ethernet (PoE), powered Green : VIN, USB or OTG powered
Function Button	Off : There is currently no functionality linked to to toggling the function button
Failsafe Mode	Blinking White: All RGB LEDs are blinking white

Table 2.4-1: AsteRx SB LED Behaviour



2.4.2 Rear Panel

Figure 2-4 shows the layout of the rear-panel connectors on the PRO Connect variant of the AsteRx SB. The rear panel of the Wireless variant only has the antenna TNC connector. A description of the connector PIN layout and cable-colour assignments can be found in Appendix A.



Figure 2-3: The rear panel of the PRO Connect variant of the AsteRx SB



Figure 2-4: The rear panel of the Wireless variant of the AsteRx SB



3 Getting started with the AsteRx SB

This section details how to power-up, connect to and communicate with the AsteRx SB. The AsteRx SB has an on-board web interface which you can connect to in three ways: Ethernet, USB or WiFi. The AsteRx SB is fully configurable using the web interface. Please note that older versions of certain browsers may not properly display the web interface. In addition, the AsteRx SB can also be configured using the RxTools Software which is included in the standard package delivery.

3.1 **Powering the AsteRx SB**

You can power the AsteRx SB by connecting the micro-USB cable between the front panel of the receiver and either the recommended Septentrio USB adapter or the USB socket of a PC as shown in Figure 3-1. If the AsteRx SB was turned on before last power outage, it will start up automatically otherwise, press firmly on the power button.



Figure 3-1: Front-panel power socket

The AsteRx SB can also be powered over Ethernet (PoE) as described in Appendix B or by supplying 5 to 36 V via the open-ended power cable connected to PIN 1 of the rear-panel PWR connector as detailed in Appendix A.

3.2 Connecting an antenna

The rear panel of the AsteRx SB has a TNC connector labelled **ANT** to connect a GNSS antenna. Connect an antenna to the AsteRx SB using an antenna cable as shown in Figure 3-2. The connector can provide 3.3V or 5V DC and 200 mA to power an antenna (see Appendix A.4 for more information).





Figure 3-2: Rear-panel antenna connector

After connecting an antenna, the AsteRx SB will start to track satellites and be able to calculate the position of the antenna. When the AsteRx SB has a position fix, the front-panel Positioning Mode LED will be lit (see Section 2.4.1 for LED behaviour).

3.3 Connecting to the AsteRx SB via the Web Interface

You can connect to the receiver on any device with a web browser using the receiver's on-board Web Interface. The connection can be made over USB, Ethernet or WiFi. The following sections describe each of the connection methods.

3.3.1 Using the micro-USB cable

Connect the micro-USB cable to the front panel of the AsteRx SB and to your PC as in Figure 3-3.



Figure 3-3: Connecting to the front-panel USB socket

The first time that the USB cable is connected to your PC, you may be prompted to allow installation of drivers which can take several minutes. When the drivers have been installed, it is recommended to unplug then re-plug the USB cable into your PC and make sure the drivers are fully activated.



If the USB drivers do not install automatically, they can be installed manually by double clicking on the executable installer file found in the folder **driver** as shown in Figure 3-4.

Image: Second	This PC		- 🗆 X	D			
\leftarrow \rightarrow \checkmark \uparrow $>$ This PC $>$		v 0	Search This PC 👂	1			
 ✓ Quick access ▲ OneDrive 	 Folders (6) Devices and drives (2) Windows (C:) 	CD Drive (G:) Septe	ntrio Drivers	2			
S This PC	150 GB free of 235 GB	640 KB free of 5,18	MB				
🐝 Network	Image: Image	e (G:) Septentrio Drivers > driver			~ Ŭ	- 🗆 Search driver	× ح 10 م
13 items 1 item selected	Desktop Documents Downloads Music Pictures Releases (releases) Windows (C) Otive (G) Septentrio Drivers	Name	Dat	e modified J6/2018 16:48	Type Applic	ation	Size 4 43
	1 item	× <					>

Figure 3-4: Manually installing the USB drivers

Again, when the drivers have been installed, it is recommended to unplug then re-plug in the USB cable on your device to fully activate the drivers.

The USB connection on the AsteRx SB functions as network adapter and the DHCP server running on the receiver will always assign the AsteRx SB the IP address 192.168.3.1.

To connect to the AsteRx SB, you can then simply open a web browser using the IP address **192.168.3.1** as shown in Figure 3-5.



Figure 3-5: Connect to the Web Interface of the AsteRx SB over USB using the IP address 192.168.3.1 on any web browser



3.3.2 Over WiFi

The Web Interface can also be accessed over a WiFi connection when the WiFi Mode of the receiver is configured in Access Point Mode (default setting). However, to access the Web Interface when your receiver has been configured as a Client, you will have to follow the steps as detailed in Appendix D.

The WiFi modem is turned on by default and is indicated by the green WiFi led indicated in Figure 3-6.



Figure 3-6: The green WiFi LED indicates that the WiFi modem is turned on

On your PC or tablet, search for visible WiFi networks: the AsteRx SB identifies itself as a wireless access point named 'AsteRx_SB-*serial number*'. The serial number of the AsteRx SB can be found on an identification sticker on the receiver housing. Select and connect to the AsteRx SB as shown in Figure 3-7.



Figure 3-7: Select the AsteRx SB from the list of detected wireless signals and connect

When your PC has connected to the AsteRx SB WiFi signal, you can open a web browser using the IP address **192.168.20.1** as shown in Figure 3-8 or by entering **http://asterxsb.local** or **http://asterxsb-xxxxxx.local** where xxxxxxx' is the 7-digit serial number of the receiver.





Figure 3-8: Connect to the Web Interface of the AsteRx SB over WiFi using the IP address 192.168.20.1 on any web browser

3.3.3 Using the Ethernet cable

Connect the Ethernet cable to the socket labelled **ETH** on the rear panel of the AsteRx SB as shown in Figure 3-9.



Figure 3-9: Connecting to the rear-panel Ethernet socket

For the most straightforward setup, the RJ45 socket of the Ethernet cable should be connected to a network running a DHCP server. The IP address assigned to the receiver will be associated with the hostname 'AsteRxSB-*xxxxxxx*', where *xxxxxxx* are the 7 digits of the AsteRx SB serial number. The serial number can be found on a WiFi identification sticker on the receiver housing. You can then make a connection to the receiver using the web address **http://asterxsb-xxxxxxx** or using its IP address. How to configure IP settings of the AsteRx SB is explained in Section 8.4



Figure 3-10 shows a screenshot of an Ethernet connection to an AsteRx SB receiver with serial number 3024596 using **http://asterxsb-3024596**.



Figure 3-10: Connecting to the Web Interface over Ethernet



2

3

3.4 Basic operational monitoring

The 'Overview' page of the web interface in Figure 3-11 shows at a glance a summary of the AsteRx SB's operational status.



Figure 3-11: Overview page of the web interface

The main information bar at the top of the window gives some basic receiver information: receiver type, serial number and position, the length of time since the last power cycle (Uptime) and the total number of satellites tracking. The temperature of the receiver board and the voltage supplied is also shown.

The icons to the right of the information bar show that, in this example, the position of the receiver is fixed, the overall performance (signal quality and CPU) is Excellent (5 out of 5 bars) and the receiver is logging to the internal disk. The Corrections icon indicates that differential corrections are being sent out to a rover receiver. The active WiFi icon shows that the on-board WiFi modem is turned on. A detailed overview of the status icons can be found in Appendix C.

The Quality indicators give a simple overview of signal quality, RF antenna power and CPU load of the receiver.

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The GNSS field details how many satellites for each constellation are being tracked and used in the position solution (PVT). A green line indicates that at least one satellite in the constellation is being used in the PVT, a blue line indicates that satellites are being tracked but not used and a grey line that there are no satellites from that particular constellation in tracking. More information can be found in the **Satellites and Signals** page on the **GNSS** menu.

⁵ The **Data Streams** field gives an overview of the data streams into (green lines) and out from (blue lines) the receiver. In this example, the receiver is logging SBF data to the internal memory (DSK1) and sending out RTCMv3 differential correction data over the IPS1 port.

⁶ The Logging field summarises the current logging sessions and disk capacities. The complete logging information and configuration windows can be found via the **Logging** menu.



3.5 Connecting the AsteRx SB to the internet

While Differential corrections can be received via a communication port (e.g. serial communication), in some cases it might be practical to be able to get corrections over the Internet. Getting Differential corrections over the Internet can be achieved using either the WiFi, Ethernet or USB connectivity of the receiver.

3.5.1 Connecting the AsteRx SB over WiFi

Connecting the AsteRx SB to a WiFi Access Point

If you can connect to the receiver over WiFi using the Web Interface then it is already configured in Access Point mode. Configuring the Base station receiver as an Access Point will allow Rover receivers to connect to it. The Access Point setting is the default configuration however, if your receiver has been configured as a Client you can reconfigure it over USB. To do this, connect the AsteRx SB to your PC using the (micro) USB cable. You can now open an internet browser and connect to Web Interface using the IP address **192.168.3.1** as shown in Figure 3-12



Figure 3-12: Connecting over USB to the Web Interface using the URL 192.168.3.1

In the **Communication/WiFi** window **AccessPoint** can then be selected as the WiFi mode as indicated in Figure 3-13.



Overview	GNSS	SECORX	Communication	Corrections	NMEA/SBF	Out Logg	ing Admin
Communication > WiFi		Ethernet					
-W	iFi		WiFi			_	
[· · ·			Bluetooth				
	0		Dynamic DNS				
			IP Ports	pc139 192.168.20.21	1		
19	2.168.20.1 / Aste	Rx_SB-3024596	Firewall				
W E M	riFi Mode nable ○ off (lode ● Acce riFi Access Poir SID	• on ssPoint • Client	Web Server	Fi Access Point Sta de address mber of attached clie Connected Clients Mac Address	Access Point 192.168.20.1 ents 1 IP Address	Hostname	
A	ctual SSID	AsteRx_SB-3024596		44:03:2C:66:73:80	192.168.20.211	pc139	
P	assword)
C	hannel	6					
De	fault Ok						

Figure 3-13: Select 'AccessPoint' in the WiFi Mode field

Configuring the AsteRx SB in a WiFi Client mode

In case the receiver is configured in WiFi client mode you will need to access the Web Interface using the USB connection. You will not be able to connect using **192.168.20.1**. Appendix D describes how to access the web interface once in Client WiFi mode configuration.

- 1. Connect the Rover unit over a USB cable to your PC and connect to the web interface using **192.168.3.1**
- 2. On the **Communications/WiFi** window, enable the Client WiFi mode and click on **OK** as shown in Figure 3-14



Figure 3-14: WiFi client mode of the Web Interface



 Click on **Configure Networks** in the WiFi Client Config panel. This will display a list of reachable WiFi networks. From the list of networks, select to connect to the internet network or mobile device hotspot network by clicking **Add**. Confirm by **OK** as shown in Figure 3-15.

WiFi Client Config Configure Networks			
Retrieving WiFi network list	Configure WiFi Networks		
	Reachable networks		
	Septentrio_WIFI Connected		
	PolaRx5e-3024910	C ^{WiFi}	
	ᅙ PolaRx5-3018468	8	
	F AsteRx-U-3025336	172.16.50.198	Septendno_WIF1
	\x00\x00\x00\x00\x00\x00\x00\x00\x00		
	Unreachable networks		
	* Altus_NR3-3023677		
<u> </u>	Add network Refresh Close		

Figure 3-15: Connect to Septentrio WiFi network

3.5.2 Connecting the AsteRx SB over a network with internet access

An internet connection can also be achieved by using the Ethernet connector or the USB connector (OTG socket or rear-panel USB connector) of the AsteRx SB. When using Ethernet, make sure your network has internet access. Contact your system administrator to confirm that your network is a properly configured. Extra settings are available on the Ethernet settings menu as explained in Section 8.4.

Internet access can be enabled via USB (RNDIS IP interface), however this will depend on the PC or device you are connected to. Specific settings on the PC or device will be necessary so that internet can be shared over USB (e.g. by ssh port forwarding). Please contact your system administrator or PC/device manufacturer to guide you in realizing this connectivity.



4 Configuring the AsteRx SB as a Rover

The configurations described in the manual cover both AsteRx SB variants, however some configurations are only applicable to the AsteRx SB PRO Connect.

Step 1: Preparing the AsteRx SB as an RTK Rover

Configuring the Rover general settings

The AsteRx SB can use correction data to calculate a cm-level RTK position.

For the AsteRx SB to operate as a Rover and accept differential correction data from a Base station, check that **Rover** and **RTK** are selected in the **Position Mode** field in the **GNSS** menu as shown in Figure 4-1. This is the default operating mode of the AsteRx SB.

Overview	GNSS	SECORX	Communication	Corrections	NMEA/SBF Out	Logging	Admin
GNSS > Positio	Position						
-	SA Satellites and Signa	ls					
	Spectrum	and the second second	GPS (Pos	ition: 11, Track: 12)	1		
	PPS/Timing		GLONASS Galileo (F	6 (Position: 7, Track: Position: 0, Track: 6)	11)		
	PinPoint-GIS Web		SBAS (Po	sition: 0, Track: 4) Position: 0, Track: 8)			
	PPP		QZSS (PO	sition: 0, Track: 0)			
	Position Mode						
	Mode	Static Rover					
	■ RTK	×					
	SBAS						
	DGPS						
	PPP						
	Reference position	auto 🔻					

Figure 4-1: Setting the AsteRx SB Rover and RTK positioning mode



Configure input of differential corrections

The format of the differential corrections output by the Base station should be compatible with what is accepted by the Rover. In the **Corrections Input** window of the **Corrections** menu, you can configure the AsteRx SB to only accept differential corrections of a particular format. The default 'auto' setting will accept correction data format RTCMv2, RTCMv3 or CMR+.

Overview	GNSS	SECORX	Communication	Corrections	NMEA/SBF Out	Logging	Admin
Corrections >	Corrections Input			NTRIP			
				Corrections Input			
ſ	Data Streams						
				Corrections Output			
	~						
	3						
	Input Streams	_					
	Innut						
	COM1 auto V	1					
	COM2 auto V	i l					
	COM3 auto 🔻						
	USB1 auto 🔻]					
	USB2 auto 🔻						
	IP10 auto 🔻						
	IP11 auto 🔻						
	IP12 auto 🔻						
	IP13 auto V						
	IP14 auto V						
	IP15 auto V						
1	IP16 auto •						
	NTP1 auto						
	NTR1 auto	-					
	NTR3 auto	-					
	IPS1 auto Y						
	IPS2 auto T	=					
	IPS3 auto V	i l					
	IPS4 auto 🔻						
	IPS5 auto 🔻						
	BT01 auto 🔻						
	IPR1 auto 🔻	3					
	IPR2 auto 🔻						
	IPR3 auto 🔻						
	OTG1 auto 🔻						
	OTG2 auto V						
-							
	Default Ok						

Figure 4-2: With the default 'auto' setting, AsteRx SB will accept RTCMv2, RTCMv3 or CMR+ format as incoming differential corrections.

Step 2: Configure internet connection

Section 3.5 details how to connect the AsteRx SB to the internet.



Step 3a: Configure the NTRIP Client settings

1. On the Corrections/NTRIP window, click on New NTRIP client as shown in Figure 4-3

Overview	GNSS	SECORX	Communication	Corrections	NMEA/SBF Out	Logging	Admin
Corrections > NTF	liP.			NTRIP			al a se se la fai
- Ntr	in			Corrections Input	<u> </u>		
	·P			Corrections Output			
	RIP Settings	NTRIP connec	tions defined. verver				

Figure 4-3: NTRIP tab of the Web Interface

3. Enter the NTRIP caster details as shown in Figure 4-4 and click **Ok**. The mount point list will only be populated when the caster details have been entered correctly and when you have an active internet connection.

× ,	Itrin disabled		
~			
Edit NTRIP Connect	ion		
Mode	Client	T	
Caster	ntrip.flepos.be		
Port	2101		
User name			
Password	0		
Mount point	FLEPOSVRS31GLO	•	
Send GGA to caster	auto	•	
SELIC OCA LO CASLEL	auto		

Figure 4-4: NTRIP client mode settings



4. If the configuration is correct, the graphic should show a green line to the NTRIP Caster, indicating a successful connection with the NTRIP Caster, as in Figure 4-5, with details of the correction stream.



Figure 4-5: Receiving differential corrections via NTRIP

If the NTRIP Mode Field is set to **Client** and the configuration saved to boot, the AsteRx SB will auto-connect to the NTRIP Caster each time it is powered.

If the Mode Field is set to **Off**, no corrections will be received and the AsteRx SB will not auto-connect to the Caster when switched on.

Step 3b: Configure corrections using an IP connection

Configure the IP connection of the Rover receiver

Alternatively, corrections can also be received using an IP connection in which case no internet connection is required but an IP connection to a Base station is necessary.

On the **IP Ports** window of the Rover receiver, click on **C New IP Receive Connection** as shown in Figure 4-6 to start the connection configuration sequence. The **Port** and **TCP Address** should match the port and IP address of the Base station receiver.



Overview	GNSS	SECORX	Communication	Corrections	NMEA/SBF Out	Logging	Admin
Communication	> IP Ports		Ethernet		and the second second		
			WiFi				
[-	CP/IP Port Settings	20704	Bluetooth				
	ETP control port	20704	Dynamic DNS				2
_			IP Ports				IP adress of
C1	P Server Settings		Firewall	- Edit IP Receive	Setting		Base station
г	here are currently r	io server ports def	Web Server	Port	500		
•	New IP Server		NTRIP Caster	Mode	CP2Way (receive an	nd send) 🔻	
G	P Receive Settings-	o receive ports de	Serial Port	TCPAddres	Ok Cancel		
5	New IP Receive Co	onnection		- IP Receive Set	tings		
O	k			ID Port	Mode	TC	Address
Dec	oce "OK" to apply t	the changes		IPR1 500	TCP2Way (receive	and send) 192	.168.110.222 📝 🗙
PIC	is on to apply	the changes.		S New IP Rec	eive Connection		
				Ok			

Figure 4-6: In the **IP Ports** window, click on **CONTENTION** IP Receive Connection to configure the connection with the Base station

Verifying the configuration

If the Base station and Rover receivers have been configured correctly then graphics in the Communication Ethernet windows of the Rover and the Base station should appear similar to those shown in Figures 4-7 and 4-8.

Communication > Ethernet



Figure 4-7: Ethernet window of the **Base station receiver** showing an active output of RTCMv3 differential corrections on server port IPS1



Figure 4-8: Ethernet tab of the **Rover receiver** showing a fixed RTK position in the header and reception of RTCMv3 differential corrections on receiver port IPR1



Step 4: Configure data output

Section 6.2 details the settings needed to configure data output.

Step 5: Configure any additional settings

Chapter 6 details some additional settings that you may need.



4.1 Using L-band PPP correction data with the AsteRx SB

PPP (Precise Point Positioning) is high-accuracy positioning without the need for a local Base station or VRS service. PPP uses precise satellite clock and orbit corrections computed by a global network of reference stations and broadcast in real time by geostationary satellites transmitting in the L-band. To receive PPP correction data, your receiver will need to be connected to an L-Band capable antenna¹. The AsteRx SB can use PPP correction data from SECORX ² as described in the steps below.

Step 1: Check you have PPP permissions on your AsteRx SB

The use of PPP services is permission-file controlled on the AsteRx SB. You can make sure that you have PPP permissions enabled on the **About** page selected from the **Admin** menu. Click on **Permitted Capabilities** and scroll down the list of permissions: **PPP** and **Augmentation Data Svc** will appear as permitted as shown in Figure 4-9.



Figure 4-9: Check that PPP is enabled in the AsteRx SB permission file

If you don't have PPP permissions on your AsteRx SB, you can purchase this option from the Septentrio Sales department: sales@septentrio.com.

¹Please note that PPP correction data is also available over an Ethernet connection using NTRIP and for this, an L-Band antenna is not required

²SECORX uses TerraStar technology and brings sub-decimeter positioning to applications on land and with an extension to nearshore (SECORX-60).



Step 2: Activating SECORX

SECORX is a PPP service aimed at land and on-shore applications and SECORX-60 at applications up to 60 km offshore.

SECORX activation

To be able to get PPP correction data from SECORX, you will also have to have a SECORX subscription which can be purchased from your AsteRx SB dealer or from Septentrio Sales department: sales@septentrio.com. To activate SECORX you will need to provide the **Product Activation Code** (PAC) of the receiver. The PAC can be found on the **Admin, About** window as shown highlighted in Figure 4-10. This PAC code will only be visible if you have purchased and installed the PPP permissions.

Overview	GNSS	SE	CORX	Communication	Corrections	NMEA/SBF Out	Logging	Admin
Admin > About	NI							Configurations
-F	Receiver Identific	cation						Reset
	Component	Attribute	Descrip	tion				Power Mode
9	hwplatform	product	AsteRx S	B				Upgrade
9	firmware files	version	4.4.x				12 . is	User Administration
	·				-		eptent	Expert Control
	SECORX	PAC	QQ530:2	2514:8956	ontontru		2	Receiver Messages
-		usenu	53025	5	eptentin			receiver Pressages
								About
					Support Pag	e		
					Contact Diagnostic F	Report		
					Permitted C	apabilities		

Figure 4-10: The Product Activation Code (PAC) required for SECORX activation

SECORX services are activated over the air at a scheduled activation time. The AsteRx SB needs to know the GPS time and will therefore have to be powered on with an antenna connected and tracking L-Band satellites (see Steps 3 and 4) in a clear sky view, starting just before the scheduled activation time, in order to compute GPS time and to receive the activation signal. In case the activation is missed, please keep the receiver running for minimum of 4 hours (the activation is sent out every 3.5 hours). To guarantee successful activation, the LBand signal should be received with a carrier-to-noise ratio of 36 dB-Hz or higher. In case of any issues, please contact Septentrio Support department on support@septentrio.com.



Step 3: Connect an L-Band antenna

Ensure that you have an L-band capable antenna connected to the main antenna rear-panel connector as shown in Figure 4-11.



Figure 4-11: Rear panel antenna connectors

Step 4: Select PPP positioning

Ensure that PPP is selected as a positioning mode in the GNSS Position tab as shown in Figure 4-12. The PPP mode is enabled by default on the AsteRx SB.

Overview	GNSS	SECORX	Communication	Corrections	NMEA/SBF Out	Logging	Admin
GNSS > Position	Position						
GN	Satellites and Signal	s					
	Spectrum	10.00	GPS (Pos	ition: 9, Track: 10)			
	PPS/Timing		Galileo (F	5 (Position: 6, Track: Position: 0, Track: 6)	10)		
	PinPoint-GIS Web		BeiDou (I	osition: 0, Track: 5) Position: 0, Track: 10))		
	PPP		QZSS (Po	osition: 0, Track: 1)			
CPC	sition Mode						
M	lode	Static Rover	r l				
	RTK						
St	tandAlone						
SI	BAS						
	070	2					
PI	PP						
R	ererence position	auto •					

Figure 4-12: Enable PPP positioning mode



Step 5: Beam Selection Mode and Service

For SECORX configuration, select the tab named **SECORX** in the web interface.

The default L-band beam selection mode is **auto** as shown in Figure 4-13. In this mode, the demodulator will try to lock on to a visible beam, preferring beams to which access has been granted.

In **manual** mode, the demodulator will attempt to lock on to the beam selected from the **Manual beam selection** drop-down list ignoring all other beams. The beams in this list can be pre-set in the **Advanced Settings** expandable field. A beam is characterized by a frequency and data rate.



Figure 4-13: Select L-Band beam

Without a SECORX subscription, the AsteRx SB will still be able to track visible L-Band signals. Figure 4-14 shows the L-Band Tracker Status field when the AsteRx SB is locked onto signals from the AORE satellite which transmits at 1545.8550 MHz. After purchasing a subscription you will need to track one of the beams for activation over the air.

Status Settings	
L-Band Tracker	Status
Frequency (Hz)	1545855000
Baudrate (baud)	1200
ServiceID	LBAS1
FreqOffset (Hz)	-956.627
CN0 (dB-Hz)	43.60
Mode	normal
Status	Locked
Lock Time (s)	65535

Figure 4-14: L-Band Tracker Status field when locked on to an L-Band signal



Step 6: Verifying the configuration

With an activated, valid SECORX subscription, the AsteRx SB will be able to decode PPP correction data. The **Access** line in the **L-band decoder Information** field should shows **Access Enabled** as in Figure 4-15.

After a few moments, the AsteRx SB positioning mode should change to PPP as indicated by the highlighted icon in the upper status field.

	Receiver	Position	Status		agent.
3	AsteRx 5B - 3024596 (v4.4.x)	Lat: N50°50'55.0466" 0.043m	Tracked Sats: 45	@ PPP	Vin
-	IP Address (Eth):	Lon: E4°43'55.6419" 0.055m	Time: 2018-06-06 09:31:26	Corrections	 Ext. Logging
eptentrio	Uptime: 0d 00:27:50	Hgt: 128.779m 0.069m	Temp: 48.00 °C - V: 15.20 volts	X Bluetooth	F WiFi
Overview	GNSS SECOR	Communication	orrections NMEA/SBF 0	ut Logaina	Admi
	CLUD DECOID			Lugging	
<pre>SECOR)</pre>	(
- SECOND				1	
	(R)	-			
(🗧 sec	orx		
	1005	TE	RRADTAR		
Bei	am: AORE				
Status	Sattinas				
I Day	S Settings				
CL-Bar	nd Tracker Status	1			
Frequ	rency (Hz) 1545855000				
Sonvie					
Fren	Offset (Hz) -951 751				
CN0	(dB-Hz) 44.20				
Mode	normal				
Statu	s Locked				
Lock	Time (s) 1595				
LBAS	1 L-band Decoder Informa	ation	-		
Prod	uct Activation Code	QQ530:2514:8956			
Augr	mentation User ID	53025			
Acces	as	Access enabled			
Juba	inpuon Enu Date	10/00/15 00.00			
Servi	ce	SECORX-C	-		
GeoG	ating Mode Co	astal and non-maritime usag	e		
Geog	ating Status	129	-		
Roma	vining Losso Timo	N/A	-		
Local	Area Contor Latitudo	N/A			
LOCAL	Area Center Lauluue	N/A N/A			
Local	Area Radius (m)	N/A	-		
Local	Area Status	Local area disabled	-		
I Ev	ents				

Figure 4-15: L-Band decoder Information field showing that SECORX decoding is enabled


Step 7: Additional optional settings: RTK seeding

The AsteRx SB can use an RTK or DGPS position to reduce the PPP convergence time: a process known as seeding. The configuration fields for seeding can be found in the **GNSS**, **Position** window as shown in Figure 4-16.

RTK positions are typically expressed in a regional datum which depends on the local RTK provider whereas SECORX PPP positions relate to the global ITRF2014 reference frame. To avoid coordinate jumps each time the PVT engine switches between RTK and PPP modes and to ensure accurate seeding of the PPP engine from RTK, the regional datum used by your RTK provider must be provided to the receiver. This can be done in the **Geodetic Datum** field using the drop-down datum list.

Overview	GNSS	SECORX	Communication	Corrections	NMEA/SBF Out	Logging	Admin
GNSS > Position	Position						
- GN	iatellites and Signals						
- Cit	Spectrum	in the second	GPS (Pos	sition: 10, Track: 12)			
	PPS/Timing		Galileo (I	S (Position: 7, Track: Position: 0, Track: 8)	9)		
	PinPoint-GIS Web		A SBAS (Po	osition: 0, Track: 4) Position: 0, Track: 7)			
	PPP		A QZSS (P	osition: 0, Track: 0) Position: 0, Track: 2)	20.		
(- Geodetic Da Datum De - PPP Seeding DGPS RTKFixed	atum fault • g Mode					

Figure 4-16: Configuration fields of RTK/DGPS seeding



5 Configuring AsteRx SB as a Base station

The configurations described in the manual cover both AsteRx SB variants, however some configurations are only applicable to the AsteRx SB PRO Connect.

The AsteRx SB can be set up as a Base station receiver and provide differential correction data to one or more Rover receivers.

Step 1: Preparing the AsteRx SB as a Base station

Set the Base station position as static

To work as a Base station, the position of the AsteRx SB should be set to static. The **Static** position mode can be selected in the **GNSS** tab as shown in Figure 5-1.

Overview	GNSS	SECORX	Communication	Corrections	NMEA/SBF Out	Logging	Admin
GNSS > Posit	ion		1. Contract 1. Con				
	- Position Mode						
	Mode	Static ORover					
	w KIK	Ma					
	StandAlone	8					
	SBAS	8					
	DGPS	2					
	ррр	1					
	Reference position	auto					

Figure 5-1: Setting the AsteRx SB Base station position to static

Set the correct position

An accurate position of the antenna that is connected to the AsteRx SB should also be set (see Section 6.1). A Rover receiver in RTK mode calculates a position relative to the Base station receiver. The default setting of 'auto' can be used for demonstrations however, for most other purposes, a properly surveyed position is advisable. In the example shown in Figure 5-2, the position stored under 'Geodetic1' is used. The stored positions can be entered via the **Advanced Settings** menu on the same page. Pre-set positions can be entered in either Geodetic or Cartesian coordinates as shown.

In the **Datum** field, you can select the datum to which the antenna coordinates refer. The selected value is stored in the Datum field of position-related SBF blocks (e.g. PVTCartesian) and also in any output differential corrections. Please note that the **Datum** setting does not apply any datum transformation to the antenna position coordinates.

Click **OK** to apply the new settings



3

11 J	(C) (C)										
Mode	@ St	atic 🔍 Ro	over								
B RTK	×.										
StandAlone	1										
SBAS	1										
DGPS	(<u>@</u>) .										
PPP	1										
Reference pos	ition Geod	letic1	•								
Antenna Infori	na p <mark>i Geoc</mark>	letic1									
Marker to ARF	- Eas Geod	letic3	m								
Marker to ARP	- No Geod	letic4	m								
Marker to ARE	Geod	letic5	m		-						
Antenna tuno	OP Carte	esian1	-								
Corial number	Carte	sidh2									
Cature ID	Carte	esian4	-		-						
Secup ID	Carte	esian5			- J						
Datum Defau	ter										
Datum Defau PPP Seeding M DGPS RTKFixed Advanced Se Differential (Antenna Refere	Iode Itings Corrections	Usage-	n - 2000	Jetic	11						
Datum Defau PPP Seeding M DGPS RTKFixed Advanced Se Differential (Antenna Refere	ttings Corrections	Usage-	n - 200 Geo let	Jetic	Geod	etic3		Geodetic4		Geodeti	ic5
Datum Defau DPP Seeding N DGPS RTKFixed Advanced Se Differential (Antenna Refere ARP Latitude	ttings Corrections nce Point Sta Geodetic1 50.84	Usage- atic Position	n - Leod Geo let	Jetic ic2 00000000 deg	Geod	etic3	00 deg	Geodetic4 0.0000	00000 deg	Geodeti	ic5
Datum Defau DPP Seeding N DGPS RTKFixed Advanced Se Differential (Antenna Refere ARP Latitude ARP Longitude	ttings Corrections nce Point Sta Geodetic1 50.84 4.7	Usage atic Position 48231/deg	n - 200 Geo et 0.0	ietic ic2 00000000 deg	Geod	etic3	00 deg	Geodetic4 0.0000 0.000	00000 deg	Geodeti 0.00	i c5 00000000 de
Datum Defau DPP Seeding N DGPS RTKFixed Advanced Se Differential (Antenna Refere ARP Latitude ARP Latitude ARP Altitude	ttings Corrections nce Point Sta Geodetic1 50.84 4.7 130	Usage atic Position 48231 deg 731798 deg 0.81 m	n - 200 Geo let 0.0	ictic ic2 000000000deg 0.0000m	Geod	etic3	00]deg	Geodetic4 0.0000 0.000 0.000	000000 deg 000000 deg 000 m	Geodeti 0.00	i c5 000000000de 000000000d
Datum Defau PPP Seeding M DGPS RTKFixed Advanced Se Differential O Antenna Refere ARP Latitude ARP Latitude ARP Altitude Datum	ttings Corrections Corrections Geodetic1 50.84 4.7 130 WGS84	Usage atic Position 48231 deg 731798 deg 0.81 m	n - 1 200 Geo let 0.0 0.1 Wr 84	tetic ic2 00000000 deg 00000000 deg 0.0000 m	Geod 0 WGS8	etic3 0.0000000 0.000000 0.0000	00]deg 000]deg 0m	Geodetic4 0.0000 0.000 0.000 0.000 0.000 0.000	000000 deg 0000000 deg 0000 m	Geodeti 0.00 0.0	i c5 000000000de 000000000d 0.0000m
Datum Defau PPP Seeding M DGPS RTKFixed Advanced Se Differential Advanced Se Differential Antenna Refere ARP Latitude ARP Altitude Datum Antenna Refere Cartes ARP X ARP X ARP Y	ttings Corrections Corrections Corrections Geodetic1 50.84 4.7 130 WGS84 nce Point Sta ian1 0.0000m 0.0000m	Usage atic Position (31798)deg (31799)deg (31799)deg (31799)deg (3	n - 2000 Gec let 0.0 0.1 WC 84 n - Carte 2 0.0000 m 0.0000 m	tetic ic2 000000000deg 0.0000m ▼ esian Cartesian3 0.000	Geod 0 WGS8	etic3 .0000000 0.000000 0.00000 34 Cartesia	00 deg 000 deg 0m • •	Geodetic4 0.0000 0.000 0.0 WGS84 Cartesia m m	000000 deg 000000 deg 0000 m • • •	Geodeti 0.00 0.0 WGS84	i c5 00000000]de 000000000]d 0.0000]m
Datum Defau PPP Seeding M DGPS RTKFixed Advanced Se Differential Advanced Se Differential Antenna Refere ARP Latitude ARP Altitude Datum Antenna Refere Cartes ARP X ARP X ARP Z	ttings Corrections Corrections Corrections Geodetic1 50.84 4.7 130 WGS84 nce Point Sta ian1 0.0000 m 0.0000 m 0.0000 m	Usage atic Position (31798)deg (31799)deg (3	n - 2000 Gec let 0.0 0.1 WC 84 n - Carte 0.0000 m 0.0000 m 0.0000 m	tetic ic2 000000000deg 0.0000m v cartesian3 0.0 0.0 0.0 0.0 0.0	Geod 0 WGS8 0000m 0000m	etic3 .0000000 0.000000 0.00000 34 Cartesia	00 deg 000 deg 0m • • • • • • • • • •	Geodetic4 0.0000 0.000 0.000 0.0 WGS84	000000 deg 000000 deg 0000 m • • • • • • • • • • • • • • • • • • •	Geodeti 0.00 WGS84	i c5 00000000]de 000000000]d 0.0000]m

Figure 5-2: Setting the static position to the pre-set 'Geodetic1' position



Set Marker/Station name

A **Marker name** and **Station code** can also be defined through the **GNSS/Name and Marker** menu as shown in Figure 5-3.

Marker name	SEPT
Marker number	Unknown
Marker type	Unknown
Station code	
Monument index	0
Receiver index	0
Country code	
Observer Paramet	ters
Observer name	Unknown
Observer agency	Unknown
Observer Comme	nt

Figure 5-3: Setting the Station settings

Step 2: Configure internet connection

Section 3.5 details how to connect the AsteRx SB to the internet.



Step 3a: Configure the output of differential corrections using an NTRIP Caster

The AsteRx SB includes a built-in NTRIP Caster that makes correction data from the AsteRx SB available to up to 10 NTRIP clients over the internet. The caster supports up to three mount points and can also broadcast correction data from a remote NTRIP server.

All settings relating to the AsteRx SB NTRIP Caster can be configured on the **NTRIP Caster** window from the **Communication** menu.

Communication Communication > NTRIP Caster tatus Settings General Settings Enable NTRIP caster off on IP Port 2101 Caster identifier default Mount Points ount points Edit Mount Point New mount point Enabled Mount point name Leuver Client Users Allow external serv Server user name There are currently no users defined. **Configure NTRIP Output** Server password C New user Client authentication Enable Local Server RTCMv3 Data format . Manual format stri Enable Local Server on • Format details rtcmv3 Output Type The internal caster mount point is configured to distribute RTCMv3 Currently, no RTCMv3 output is configured. Settings Messages to Output-General Settings Which RTCMv3 messages do you want to Enable NTRIP caster O on output? IP Port Edit Mount Point B MSM1 Caster identifier default Yes Enabled B MSM2 Mount Points Mount point name Leuven B MSM3 Allow external server No R X . MSM4 Server user name Server password MSM5 . New mount point Client authentication B MSM6 Data format RTCMv3 Client Users B MSM7 Manual format string There are currently no users defined. RTCM1001 Format details rtcmv3 New user RTCM1002 RTCM1003 1 **RTCM1004** Press "OK" to apply the changes. RTCM1005 • RTCM1006

Define a new mount point

Figure 5-4: The configuration sequence for defining a new mount point

In the NTRIP Caster window, click on the **Settings** tab.

In the General Settings field, enable the NTRIP Caster and select the IP port over which you wish to send correction data: the default port is 2101.



Click on **Click mount point** as indicated in Figure 5-4. Select **Yes** to enable the mount point and give it a name. This is the name that will appear in the caster source table. Up to 3 mount points can be defined each with a different name. You can also select the type of **Client authentication** for the mount point: **none** - any client can connect without logging in or, **basic** - clients have to login with a username and password.

By default, the field **Allow external server** is set to **No**. By setting **Allow external server** to **Yes** the mount point can receive a stream from a remote NTRIP server.

Click on the **Configure Output** ... button to enable the local NTRIP server of the AsteRx SB and to select the individual messages you want to broadcast. By default, correction messages necessary for RTK are pre-selected. Click **Ok** to apply the settings.

Define a new user

If you selected **basic** client authentication when configuring the mount point in the previous step, you will need to define at least one user. The user name and password are the credentials needed for the NTRIP client to access the correction stream.

In the **Client Users** section, click on **C New User** as shown in Figure 5-5. Enter a User Name and Password for the user and select the mount points that they will have access to. Up to 10 NTRIP clients can log in as a particular user. Click **Ok** to apply the settings.

IP Port 2101 Caster identifier default			Status Settings General Settings
Name Format Enabled Auth Leuven RTCMv3 Yes basic	entication		Enable NTRIP caster off on IP Port 2101 Caster identifier default
Client Users There are currently no users defined.	Edit User User Name Password	Mildred •••• • • Leuven ·	Name Format Enabled Authentication Leuven RTCMv3 Yes basic
New user	Allowed Mount Points Max number of clients	Unused/MP3 Cancel	Client Users User Name Allowed Mount Points of Clients Mildred All N
ess OK to apply the changes.		Cancer	New user

Figure 5-5: Configuring the login credentials for a user



Is the NTRIP Caster working?

In the **Status** tab of the NTRIP Caster window, you can see a summary of the NTRIP Caster to make sure that it has been properly configured. In the example shown in Figure 5-6, a client is connected to the mount point named **Leuven** as user **Mildred**.

If the client receivers are configured to send a GGA message to the caster (as was the case in Figure 5-7), then their position will also be visible.

Mountpoint	Server Connecte	Cor d Ti	nnect ime	Rate	e Clients
Leuven	Yes	1h11	lm40s	435 Bp	os 1
Connected Clie	ents	nnect			
Connected Clie	ents User Co	onnect	Lati	tude	Longitude

Figure 5-6: Connecting as a client to the AsteRx SB NTRIP Caster

On the NTRIP Client side

Rover receivers can connect to the NTRIP Caster by entering its IP address and Port as shown in Figure 5-7. After clicking **Ok**, the mount point source table will be filled and a mount point can be selected. The user name and password can then be entered and within a few seconds, the Rover receiver should report an RTK fixed position.

00			
(N) -		In:RTCMv3	
		192.168.110.227:	Leuv
Edit NTRIP Connect	ion		
Mode	Client	•	
Caster	192.168.110.227		
Port	2101		
User name	Mildred		
Password			
Mount point	Leuven		
Mount point	Details		
Send GGA to caster	10 sec	· ·	

Figure 5-7: Connecting as a client to the AsteRx SB NTRIP Caster



Step 3b: Configure the output of differential corrections using a TCP/IP in a closed network

Configure the IPS connection

Setup an IPS connection over which the differential corrections can be streamed. On the **IP Ports** page, click on **New IP Server** as shown in Figure 5-8, then insert the port number and mode of the connection. When choosing a port number avoid conflicts with other applications such as the commands port (28784), the webserver port (80), the FTP port (21) as well as the default NTRIP port (2101) and the NTP port (123).



Figure 5-8: Select and configure an IP Server port on which to output differential corrections



Configure the correction stream

On the **Corrections Output** window, click on **New RTCM3 output** as shown in Figure 5-9. You can then select the IPS connection configured in the previous step. The messages necessary for RTK and DGNSS are selected by default¹ but you can select any combination of correction messages that you want to output. A summary of other RTCM messages can be found in the 'AsteRx SB Reference Guide'.



Figure 5-9: Output RTCMv3 differential corrections on the configured TCP/IP server port of the Base station receiver

¹Note that if you do not have permissions for RTK Base corrections, you will only be allowed to output RTCM2 DGPS messages



Verifying the configuration

Having configured the settings and clicked **Ok** to apply them, you can now connect to the configured Ethernet port of the AsteRx SB using a terminal emulator tool such as Data Link². The Ethernet IP address is the WiFi IP address **192.168.20.1**.

This IP address and the port number 600 can then be used to configure a Data Link connection as shown in Figure 5-10.

File Tools Help	
Connect Show Data	TCP/IP Client 192. 168. 20. 1:600
$Link \rightarrow \boxed{1} \boxed{2} \boxed{3} \boxed{4} \boxed{1}$	Select the connection ×
$\begin{array}{c} \text{GGA} \rightarrow \begin{array}{c} 1 \\ \text{Send every 10'th received GGA} \end{array}$	Serial TCP/IP UDP NTRIP
Connect Script: gurations)\Assignme	Connection Modes OrcP/IP Client O TCP/IP Server
Send every 1,00 s.	Host Name or IP-Address 🚽 🥔 Data Link
Log File:	192.168.20.1 File Tools Help
Press Connect	Port Number Connection 1 600 Connect TCP/IP Client 192.168.20.1:600
	$Link \rightarrow 1 \ 2 \ 3 \ 4 \ 5 \ 6$ $GGA \rightarrow 1 \ 2 \ 3 \ 4 \ 5 \ 6$
	Send every 10'th received GGA
	Send every 1,00 s.
	OK Close Script:

Figure 5-10: Configure the Data Link terminal emulator tool to connect to the AsteRx SB Ethernet port over which differential corrections have been configured

When connected to the output correction stream, click on the **Show Data** button on Data Link and you should see output similar to that shown in Figure 5-11.

²Data Link is part of Septentrio's RxTools suite of GUI Tools supplied with the AsteRx SB



>àDM(\õ>D€EKAú∰vZ×8zDHÓ»?@pbOD、DD4œÀSAúzÀD∂ `ÿD Ê àDúc€D1DÅúC townDSEPT ASTERXD4.4.xD3024596ÌGàÓLà≿à?aÓ¥>À4D、T]æ ¿Ñ°¿ÚvËý*€: öÈl ÚÄú6OùXDDÿ;DD、∰D`Ôm?iÀŸ¯û[áR`@D∰tþ{ÿÿÑ¿à@Õ%zÓD>àDM(\õ>D€EkAú∰vZ ∰€Mú 24596ÌGàÓLà≿à?aÓ¥>À4+"T1D Ѱ¿Úv£ý*€lûp!æb£EÿÜDè?ÕalDbô_Ő:∰D [¬] (8D9, ÒDÚÅD DD4?;Ò,D>oeD ≿6Ìbý≿èlNÄ×ýAÀL\$Ä@L+ú InknownDSEPT ASTERXD4.4.xD3024596ÌGàÓLà≿à?aÓ¥>À4: TD: c Ѱ¿ÚAwGý*€)	ÅúC\$#m)Ì có(«Ξ : aþ£ΞyÐ⊡ÉyÖ) ÅvZ×8zŒHÓ»?0pb ΩŪÕéþ,ÚG®C;SW *€)öÅ! þ£ΞÿÖ⊡Ý
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öžl ŰÄúGOùXDDÿ;DD、∰D* Ôm?îÀݯû[áR`@D∰b{ÿSyŇ¿à@Õ4xzÓD>àD∰\ö»D€ÆkAú∰vZ ∰€Mú 24596ÎGāÓLà≀à?aÓ¥>À4+" TID Ѱ¿Űv£ý*€lúp!æb£EÿÜDê?ÕalDbó_ö:∰D⊤ (8D9,ÒDÜÅD D4?;Ò,D»osDł6Îpý≀èlNÄ×ýAÀLSÅ@L+ú InknownDSEPT ASTERXD4.4.xD3024596ÎGãÓLà≀à?aÓ¥>À4: TD: cѰ¿ŰAwGý*€)	tvZ×8zOHÓ≫?@pb to⊤óêp,úc®o,sw *€)öà! ptzÿöDý
∰€Mú 24596ÌGāÓLā čā?aÓ¥>À4+"T1O Ѱ¿Úv£ý*€lúp!æþ£EÿÜDê?ÕalDþ6_Ö:∰D⊤ (8D9,ÒDÚÅD D4?;Ò,D≫osD č6Ìþý čèlNÄ×ýAÀL\$Å8L+ú InknownDSEPT ASTERXD4.4.xD3024596ÌGãÓLā čà?aÓ¥>À4:ÂTD: cѰ¿ÚAwGý*€)	to⊤ó≙p,úcøo,sw ws,sec,ies,íes(€*
2459€ÌGảÓLả čả?aÓ¥>À4+" TIO Ѱ;Úv£ý*€lúp!æþ£EÿÜDê?ÕalDþô_õ:∰D (8D9,ÒDÚảD HD4?;Ò,D≫o∞D čeĺþý čèlNÄ×ýAÀL\$Å@L+ú InknownDSEPT ASTERXD4.4.xD3024596ÌGäÓLàčà?aÓ¥>À4: TD: cѰ;ÚAwGý*€)	to⊤óêþ,úc®oc;sw *€)öÀ!∣þ£Eÿö⊡ý
(8⊡9,ÓDÚÅD ⊡4?;Ò,D≫o©D ≿ GÌþý ≿ èlNÄ×ýAàL\$Å@L+ú InknownDSEPT ASTERXD4.4.xD3024596ÌGäÓLà ≿ à?aÓ¥>À4: TD: ¢ Ѱ¿ÚAwGý*€)	*€)öÀ! þ£EÿÖDÝ
ID4?;Ò,D»o∞D ≿ 6Ìþý ≿ èlNÄ×ýAÀL\$Ä@L+ú InknownDSEPT ASTERXD4.4.xD3024596ÌGäÓLà≿à?aÓ¥>À4: TD: ¢ Ѱ¿ÚAwGý*€)	*€)öÀ! þ£EÿÖ⊡Ý
nknownDSEFT ASTERXD4.4.xD3024596ÌGäÓLà≿à?aÓ¥>À4: TD: c Ѱ¿ÚAwGý*€)	*€)öÀ! þ£EÿÖ⊡Ý
N 8 90 80	
è0@□('ü欷□:@麽;úkĐ□□fñÿV9謊).Ep□ppà ì□ ÿÑ¢]VQ麽(;;ò¶□,?ø□と6,Xøïè1@OÃ>ýAÀL	AÀLÁÝKKú0
nown⊡SEPT ASTERX⊡4.4.x⊡3024596ÌGäÓLà≿à?a	
<	>

Figure 5-11: The RTCMv3 differential correction stream output from the IPS1 Ethernet connection of the AsteRx SB

When a connection to the configured Ethernet port has been established, in this example using Data Link, the **Data Streams** field on the Corrections Output window should now show the active blue connection shown in Figure 5-12 and the corrections output icon in the information panel should appear active.

Ş septentrio	Receiver AsteRx SB - 3024596 (v4.4.x) IP Address (Eth): 0.0.0.0 Uptime: 4d 05:41:27	Position Lat: N50°50'55.0447" 0.000m Lon: E4°43'55.6423" 0.000m Hgt: 130.262m 0.000m	5 Tracked Sats: Time: 2018-06 Temp: 50.00 °	tatus 44 -12 13:17:38 C — V: 15.23 volts	Fixed Corrections	 Vin Int. Logging Ext. Logging WiFi
Overview	GNSS SECORX	Communication	Corrections	NMEA/SBF Out	M Internet	SECORX
Corrections > Correctio	reams					
Corrections > Correction	reams	IPS1	(Out:RTCMv3 0.4;	7kB/s)		
Corrections > Co	ttial Corrections Output TCP 2-Way Server on port 600	Type Messages RTCMv3 1004, 1006, 1012,	(Out:RTCMv3 0.4; 1033, 1230	7kB/s)		

Figure 5-12: Web Interface showing differential corrections output over an Ethernet connection



6 Other receiver operations

6.1 Setting the antenna height

The antenna height is the offset between the height of the measured position and the Antenna Reference Point which is usually the length of the survey pole.

- 1. Click on the GNSS/Status tab and enter the antenna height
- 2. Click **Apply** when finished. In the example shown in Figure 6-1, an offset of 2.0 meters was used.

Overview	GNSS	SECORX	Communication	Corrections	NMEA/SBF Out	Logging	Admin
GNSS > Position	Position						
Ch	Satellites and Signals						
CON	Spectrum		& GPS (Pos	ition: 7. Track: 11)	Ì		
			GLONASS	(Position: 8, Track: 9)	r		
	PPS/ Timing		Galileo (F	osition: 0, Track: 9) sition: 0, Track: 6)			
	PinPoint-GIS Web		BeiDou (I	Position: 0, Track: 8)			
	RTK Fixed		RNSS (P	osition: 0, Track: 1)			
	sition Made			De sition Tof			
(PO	sition Mode)	Position Inf	ormation		
M	ode (Static Rover		GNSS Time	2018-	06-20 13:45:25	
±-	RIK			Latitude	IN50	050 55.0314	
St	andAlone			Longitude	cieht	43 55.6231	
SE	BAS 🖉			Datum	Baco	station datum	
DO	GPS 🖉	0		Height abox	MSL (+)	81 197m	
PP	pp 🦉			Position mo		RTK Fixed	
Re	eference position	auto 🔻		HDOP	uc	0.71	
	tanan Tafamatian		2	VDOP		1.10	
CAN	itenna information.			Correction a	age	1.00s	
		Main		Sats Positio	n	15	
Ma	arker to ARP - East	0.0000	m	Reference I	D	515	
	arker to ADD Nort	0.0000	m	Baseline ler	igth	0.790m	
Ma	arker to ARP - Up	2.0000 SEPALTUS NR	M 3 NONE	Antenna ph	ase center und	compensated	
	iterina cype	oerneroo_nit		offset	(10	unknown)	
50		O					
50	stup ID	U					
Ge	odetic Datum	_					
D	Default						
Da	atum Delauit						
- PP	P Seeding Mode						
D	SDS						
рт	[KFixed						

Figure 6-1: GNSS Tab: setting Antenna Offset

By selecting the correct antenna type, the AsteRx SB will automatically compensate for the Antenna Phase Centre offset using the approved calibration of the product in order to provide the most accurate position out of the box.



6.2 How to configure SBF and NMEA output

The AsteRx SB can output position and GNSS data in both standard NMEA format and Septentrio's proprietary compact binary format SBF. This following sections detail how to configure connections to other devices in order to send data.

SBF and NMEA can also be logged on the internal 16 GB disk of the AsteRx SB. Section 6.3.1 and 6.4 detail how to log data on the receiver and how to download data logged on the receiver.

6.2.1 Output over a serial COM connection

The AsteRx SB can be connected via a serial COM cable to an RS-232 compatible secondary device.

Step 1: Configure the serial COM port

The COM port of the AsteRx SB should be configured with the same baud rate and flow control setting of the coupled device. These settings can be configured via the **Communication/Serial Port** tab as shown in Figure 6-2. In this example, COM3 is set with a speed of 19200 baud.

	GNS		CORX	Communication	Corrections	NMEA/SBF	Out Loggi	ng Adı	min	
Communication	n > Serial Port			Ethernet						
C	COM Port Set	tinas —		WiFi						
		COM1	COM2	Bluetooth						
	Baud rate	115200 baud 🔻	115200 ba	Dynamic DNS	ud 🔻					
	Data bits	8 bits 🔹	8 bits	IP Ports	•					
	Parity	No 🔻	No		•					
	Stop bits	1 bit 🔹	1 bit	Firewall	COM Port Set	tings)	
	Flow control	none 🔻	none	Web Server		COM1	COM2	сомз		
C				NTRIP Caster	Baud rate	115200 baud V	115200 baud V	115200 baud		
D	Default Ok			Serial Port	Data bits	ö Dits	ö bits	2400 baud		
_					Parity	No V	NO V	4800 baud		
					Stop bits			9600 baud		
					Default Ok	J		57600 baud 115200 baud 230400 baud		
							COM Port Se	ettings		
								COM1	COM2	COM3
							Baud rate	115200 baud 🔻	115200 baud 🔻	19200 bau
							Data bits	8 bits 🔻	8 bits 🔹	8 bits
							Parity	No 🔻	No 🔻	No
							Stop bits	1 bit 🔹	1 bit 🔹	1 bit
							Flow contro	none 🔻	none 🔻	none

Figure 6-2: Configure the baud rate and flow control of the AsteRx SB



Step 2: Configure data output

NMEA

In the **NMEA/SBF Out** tab, clicking on **New NMEA Stream** will guide you through the steps needed to configure NMEA output as shown in Figures 6-3 and 6-4.

Overview	GNSS	SECORX	Communication	Corrections	NMEA/SBF Out	Logging	Admin
	Ata Streams MEA/SBF Output St New NMEA stream Advanced Settings- fault Ok	treams o data streams de New SBF stre	fined. am Select of USB Blue NTR IP s IP r Back	MEA Output connection type: al port port 6 On-The-Go port etooth IP server erver eccive (2-way) onnection		New NMEA Outp Select connection © COM1 © COM3 Back Next	ut- h/port: Finish Cance

Figure 6-3: Selecting to output NMEA data on COM3

New NMEA	Output		CNMEA/SE	F Outpu	It Streams						
Interval	1 sec	•	COM3	Type NMEA	Messages GGA+ZDA	Interva 1 sec		×			
DIM		-	C New N	MEA str	eam 🛟 New SBF	stream					
GGA			Streams	repared	d, press "OK" to a	pply the changes	5.				
GNS			—⊞ Advance	d Settin	ngs—						
GRS		-	Default	Ok							
GST		-	Press "OK	to app	bly the changes.						
HDT			-Data Stre	ame							
RMC ROT			/ Data Sire	1115							
ZDA					-			COM3 (Dut:NMEA 0.	12kB/s)	
HUU											
Back	Next Finish	Cancel	-NMEA/SB	F Outpu	it Streams			_			
			Port	Туре	Messages	Interva	1				
			• СОМЗ	NMEA	GGA+ZDA	1 sec	14	×			
			C New N	MEA str	eam 🛟 New SBF	stream					
			- Advance	d Settin	igs—						
			Defeut	OL							
			Delauit	OK							

Figure 6-4: Selecting to output the GGA and ZDA NMEA message every second

50



SBF

By clicking **New SBF stream** in the **NMEA/SBF Out** window, a second output stream can be configured. In the example shown in Figures 6-5 and 6-6 the PVTCartesian SBF data block will be output over COM1 once per second.

Figure 6-5: Selecting to output SBF data on COM1

New SBF Output	J							
elect messages to out	tput:							
nterval 1 sec	•							
Rinex (meas3)								
Support								
Hide detailed selection								
Measurements								
Meas3		NM	IEA/SBI	F Outpu	it Streams		-	_
RawNavBits		-	Port	Туре	Messages	Interval		
GPS		۲	COM1	SBF	PVTCartesian	1 sec	2	×
GLO		۲	COM3	NMEA	GGA+ZDA	1 sec		X
GAL		0	Now NR	MEA str		E stream		
GEO		Ch	INCOV INI	ILA SU				
BDS		Sur	eams p	repared	, press OK to	apply the changes.		
075			dvance	d Settin	nas-			
				a south	the second se			
PVTCart					3			

Figure 6-6: Selecting to output the PVTCartesian SBF block every second



Step 3: Verifying the configuration

Having configured data output and clicked on **Ok** the **NMEA/SBF Out** page will now display a summary of all data output as shown in Figure 6-7.



Figure 6-7: Summary of all configured data output streams

Figure 6-8 shows the actual data output. NMEA is in ASCII and is thus readable unlike SBF which is formatted in binary. In this example, the serial COM was connected to a PC via a USB adapter which maps the serial connection to a virtual COM9 of the PC.

👑 COM9:19200baud - Tera Term VT		
File Edit Setup Control Window Help		
\$GPGGA,120709.00,5050.89397,N,0 \$GPGGA,120710.00,5050.89396,N,0 \$GPGGA,120711.00,5050.89396,N,0 \$GPGGA,120712.00,5050.89396,N,0	0443.90772,E,2,24,0.6,81.52,M,47.39,M,3.1, 0443.90773,E,2,24,0.6,81.53,M,47.39,M,1.4, 0443.90773,E,2,24,0.6,81.52,M,47.39,M,2.4, 0443.90773,E,2,24,0.6,81.53,M,47.39,M,2.4,	0136*79 0136*77 0136*74 0136*73
\$GPGGA, 120713.00, 5050.89396, N, 0	🚇 COM9:115200baud - Tera Term VT	
\$GPGGH, 120715, 00, 5050, 89396, N, 0 CCCC0, 120715, 00, 5050, 89396, N, 0	File Edit Setup Control Window Help	
• • • • • • • • • • • • • • • • • • •	>1?L?>* ॥85'ÍBo8C8⊧•9 ¢±f8¥ŋ-#¥ý0=9╢á=kEÀ8ú{À, ╚À║ ' ÍB╢∭í%fý?<áîP\$Á? ±0*'@╢=B╝╖)2r:?û║~&┘LWD'? °∎>\$@±	?Á¢M \$@ýB8UíBò>´ 07-⊤8\$@EA ^J \$'ÍB4\$@OÈ,\$'ÍB _á⊤ _á⊤ _á⊤ ^J \$@O≏O'Od -?K?>B b¢M \$@{80díB=>í∎ ¢DQ8¥%#¥ -0=∎ôá= >L.?½∎Á>j ¢=8¥-"¥id0= í=h∎>\$@à
	D80díBO_8IC89?8`À0Àr∭\\ÁA77ñ,07u¶\%\$@Bª0dí ?íP\$A?x*'@ =BN0\+!9\~\$3'??¢z \$@ý8áhíB\ô> 8àfµà-]÷A÷¥ 7d\7-E=8\$@ŏbªáhíB4\$@L{è,áhíB ?VWi>`§Þª┐&`¥¥ª«º=?#'?+=°ъ&>\$@ ,гíB [⊥] 28N _á⊤ _á⊤ T#	B4\$@P M È,@díB _á⊤ _á⊤ _á⊤ Á ^t \$@¥ _I ≏O`ẵĥíBô@í%fý?6 bS²=ìG ?¿>W¤¦J\$;!¥H¥ _á⊤ _á⊤ _á⊤ @\$@A#≏OlíB〒┼í%fý?"y∭ïP\$A?MóG*'@¶= !D8?9⊊08?ĨÀ ^L ²À·MA~=¦7J╣7A0∥8\$@líB4\$@@ÈlíB _á⊤ _ ▼

Figure 6-8: Example showing output NMEA GGA (left panel) and SBF PVTCartesian (right panel)



6.2.2 Output over Ethernet

SBF and NMEA data can be sent over an Ethernet connection from the AsteRx SB. Ethernet settings are explained in Section 8.4.

Step 1: Configure an IP connection on the AsteRx SB

The Ethernet port settings can be configured by selecting **IP Ports** from the **Communication** menu. In the example shown in Figure 6-9, port 600 has been configured as connection IPS1 in **TCP2Way** mode so data can be received as well as transmitted over the connection. When choosing a port number avoid conflicts with other applications such as the commands port (28784), the webserver port (80), the FTP port (21) as well as the default NTRIP port (2101) and the NTP port (123).

Note that a new IP port can also be configured by followings the sequence of settings for NMEA output described in *Step 2*.



Figure 6-9: Configure the TCP/IP server port setting for data output



Step 2: Configure output of NMEA messages

In the **NMEA/SBF Out** window, click on **New NMEA stream** and follow the sequence of windows to configure the data you want to output. In the example shown in Figure 6-10, the NMEA GGA message will be output every second. Ensure that the previously configured IPS1 port is selected for output as highlighted.

Overview	GNSS	SECORX	Communication	Corrections	NMEA/SBF Out	Logging	Admin	
	MEA/SBF Output Stere are currently New NMEA stream Advanced Settings	Streams no data streams de Point Streams New SBF stre	fined. am	MEA Output connection type: al port port On-The-Go port tooth ID conver erver erver erver cerver (2-way) onnection Next Finist	Cancel	New NMEA Outp Coloct connection IPS1: TCP 2-V New 1r Serve Back Next	Nay Server on po connection New NMEA Select messa Interval ALM	rt 600 Output ages to output:
		Port Des	cription 2-Way Server on	Type Message NMEA GGA	es In	terval sec 📝 🗙	GGA	
		Streams prepar	stream 😷 New SBF ed, press "OK" to a	⁼ stream apply the changes			GNS GRS	
		-	tings— pply the changes				GSA GST GSV HDT RMC ROT	
							Back	lext Finish Canc

Figure 6-10: Select to output NMEA GGA over the configured IPS1 connection

Similar steps can be followed to output SBF messages.



Step 3: Configure Data Link to listen for NMEA output

The screenshots in Figure 6-11 show how the Septentrio GUI tool Data Link can be configured to listen for the AsteRx SB GGA output.

Click on the **TCP/IP Client** button to configure the connection. In the highlighted fields insert the IP address or hostname of the receiver and the port number configured in *Step 1*. Click on **Connect**.

Connection 1		
Connect	TCP/IP Client 92, 168, 110, 227;600	
Show Data	Select the connection	×
$ GGA \rightarrow \boxed{1} \boxed{2} \boxed{3} \boxed{4} $	Serial TCP/IP UDP NTRIP	
Send every 10'th received GGA 🗦	Connection Modes	
Connect Script: gurations)\Assig	TCP/IP Client TCP/IP Server	
Close Script:	Host Name or IP-Address	Data Link Tools Help nnection 1 Disconnect TCP/IP Client 192.158.110.227:600 Show Data $ak \rightarrow 1 2 3 4 5 6$ $aA \rightarrow 1 2 3 4 5 6$ end every 10'th received GGA $$
	ок Сан	Send every 1,00 s. Close Script: Log File:

Figure 6-11: Configure the TCP/IP connection settings in Data Link

The info line at the bottom of the window should indicate that a connection has been made. Click on the **Show Data** button to display the GGA data from the receiver as in Figure 6-12.



 Data Link File Tools Help 					
Connection 1					
Disconnect	TCP/IP Client 192.168.110.227:600				
Show Data	nata Link: Connection 1				×
GGA → 1 2 3 4 Send every 10'th received GGA ♀ Connect Script: gurations)/Assig Send every 1,00 s. ♀ Close Script: Log File:	\$GPGGA,14444.00,5050.9174778,N,00443.927 \$GPGGA,14444.00,5050.9174774,N,00443.927 \$GPGGA,14444.00,5050.9174777,N,00443.927 \$GPGGA,144447.00,5050.9174773,N,00443.927 \$GPGGA,14444.00,5050.9174774,N,00443.927 \$GPGGA,14449.00,5050.9174767,N,00443.927	4464, E, S, 15, 0.7, 01.2305, M 4468, E, S, 15, 0.7, 01.2412, M 4469, E, S, 15, 0.7, 01.2400, M 4460, E, S, 15, 0.7, 01.2401, M 4471, E, S, 15, 0.7, 01.2302, M 4403, E, S, 15, 0.7, 01.2392, M	,47.39 ,47.39 ,47.39 ,47.39 ,47.39 ,47.39	42, M, 12 42, M, 13 42, M, 14 42, M, 14 42, M, 14 42, M, 14 42, M, 2	2.0,0 3.0,0 4.0,0 5.0,0 5.0,0 2.0,0 2.0,0 2
Connected to 192.168.110.227					
	<				>
	I Show All data Auto completion for None Clear Free	eze Close			

Figure 6-12: The Show data window of Data Link showing GGA from the AsteRx SB

🗧 septentrio

6.2.3 Output over Bluetooth

Step 1: Connect Bluetooth

- 1. Select the **Communications/Bluetooth** tab on the AsteRx SB's Web Interface.
- 2. The Bluetooth tab shows the Device name and Pairing code used to connect to your Bluetooth device.
- 3. On your Bluetooth device, open the Bluetooth application and find the Bluetooth device name of your AsteRx SB and pair. By default, the Bluetooth device name is **AsteRx_SB**-serial-number.

The device name and pairing code may be changed for user preference. Also, the Bluetooth module may be powered on/off and set to discoverable from this tab. It is however advised to leave the Discoverable option switched on.



Figure 6-13: Configuring the Bluetooth connection to an external device

Step 2: Configure data output

Similar steps as in Section 6.2.1 Step 2 can be followed to configure data output, by selecting Bluetooth in the **NMEA/SBF Output** connection type



6.3 How to log data

The AsteRx SB has a 16 GB memory for internal data logging. Data can also be logged to an external USB memory disk of up to 128 GB. Logging to an external disk is an optional feature and can be purchased via our Sales department.

6.3.1 Internal logging

Step 1: Defining the Disk Full action

When setting up a logging session for the first time, it is a good idea to define what you would like to happen when the internal memory is full. This can be configured on the **Disk Full Action** of the **Global Log Settings** page of the **Logging** menu as shown in Figure 6-14. There are two options, either the receiver stops logging when the memory is full or it continues logging by making space for new files by deleting the oldest. The default setting is 'Stop logging in all sessions'.



Figure 6-14: Selecting what you wish to happen when the internal 16 GB memory is full

Step 2: Configuring a logging session

On the **Log Sessions** window of the **Logging** menu you can check which logging sessions have already been defined and define new ones. Up to 2 simultaneous logging sessions can be defined independently. Basic logging functionality for logging Septentrio Binary Format (SBF) and NMEA is always included. The Advanced Logging option, requiring a special permission, allows RINEX¹ onboard logging, FTP Push and USB Host external disk function.

¹RINEX is an optional feature. If you don't have this permission on your AsteRx SB, you can purchase this option from the Septentrio Sales department: sales@septentrio.com



To define a new logging session, click on a **Create** button as shown in Figure 7-7.



Figure 6-15: Click on a 'Create' button to start defining a new logging session

You can then follow the sequence of steps shown in Figure 6-16 selecting the various configuration settings for the logging session. In the **SBF Logging Parameters** field you can select the naming convention. The **IGS** options names files according to IGS convention but files can also be freely named using either **Filename** or **Incremental** options. In this example, the default settings of 'Internal' Disk and 'Never' for Auto-Delete² have been selected. In the **Edit SBF Stream** window, the messages required for RINEX generation have been selected as well as those useful for the Support department for diagnosing problems. SBF messages can also be selected individually.

Edit Session LOG1 Session SBF NMEA RINEX Session name my_loggin_session Disk Internal Never Never	
Ok Cancel Edit Session LOG1 Streams Streams There are currently no St Interval 1 sec PostProcess Rinex Rinex (meas3) Support Hide detailed selection # Measurements # Meas3 # RawNavBits © GLO # GLO # GLO <td>Image: Stream stream</td>	Image: Stream

Figure 6-16: Follow the sequence of windows to fully configure the logging session

²Please note that, this setting is overruled by the **Disk Full Action** setting defined in the **Global Log Settings** window.



Step 3: Verifying the configuration

When you have finished configuring the logging session, the **Log Sessions** window will show a summary of the defined logging sessions as in Figure 6-17. An estimate of the daily size of data generated with the current logging configuration is also given.



Figure 6-17: A summary of the newly defined logging sessions showing the expected amount of data generated daily



6.3.2 Logging to an external USB memory device

The AsteRx SB can also log data to an external memory device³. To connect the device, you will need a micro-USB cable (CLB_OTG_USB_Micro) to connect to the front-panel socket indicated by the USB icon.

A high-quality memory device is recommended for external logging as multiple logging sessions can result in a large throughput of data. The 4K random write speed should be greater than 0.1 MBps, and the 4K random read speed should be at least 2 MBps⁴.

With an external memory device connected, the new device should be visible in the **Log Sessions** window. If the device is not formatted or the formatting is not compatible with the receiver file system, you will be prompted to format the device. This can be done by clicking on the **Format** button as shown in Figure 6-18

Overview	GNSS	SECORX	Communication	Corrections	NMEA/SBF Out	Logging	Admin
Logging > Log Ses	sions					Log Sessions	
C Disl	k Usage					Disk Contents	
	Inmount Format	Internal Disk (13.7 used (29%, 4.0 GE free (71%, 9.7 GB)	GB)	External I used (2 free (98	Disk (1.8 GB) 1%, 36.4 MB) 8%, 1.8 GB)	Global Log Settings	

Figure 6-18: With a 2 GB external USB memory device connected to the AsteRx SB

New logging sessions can then be defined in a similar way as in Section 6.3.1 making sure to select **External** from the drop-down list in the **Disk** field as shown in Figure 6-19.

Session na	ame	external l	ogging_session	
Disk		External		۲
Auto-delet	e	Never		۲



³If you don't have permissions to log data to an external memory device on your AsteRx SB, you can purchase this option from the Septentrio Sales department: sales@septentrio.com

⁴The 4K random read/write speed is a standard specification for memory devices. More information and a list of benchmarked devices can be found on: http://usb.userbenchmark.com



6.4 Downloading logged data from the receiver

Data files logged by the AsteRx SB, both on its internal memory and to an external USB device, can be downloaded using the web interface on the **Disk Contents** window of the **Logging** menu. Each logging session is logged to a separate folder. Individual files can be downloaded by clicking on the green download arrow () next to the file name as shown in Figure 6-20. Obsolete files can be deleted by clicking the **X**.

	GNSS S	ECORX	Communication	Corrections	NMEA/SBF Out	Logging	Admin
ging > Disk Co	ntents					Log Sessions	
- Dis	k Usage					Disk Contents	
	it obuge	10:-1 (12.7)				Global Log Settings	
	Intern	al Disk (13.7 (GB)	Exte	rnal Disk		
	□ use	e (71%, 9.7 GB)			isk not present		
		,,,					
	inmount Format						
And a state of the	the second se						
	townal Dick External	Diek					
	ternal Disk External	Disk					
In	ternal Disk External	Disk					
	ternal Disk External ime Internal Disk (13.7 GB)	Disk Size 4.0 GB	*				
	ternal Disk External ime Internal Disk (13.7 GB) LOG1_my_loggin_ses	Disk Size 4.0 GB	×				
	ternal Disk External Ime Internal Disk (13.7 GB) LOG1_my_loggin_ses 18162	Disk Size 4.0 GB sion	×				
	ternal Disk External Internal Disk (13.7 GB) LOG1_my_loggin_ses 18162 Ing.sbf	Disk Size 4.0 GB sion 4.0 G	×				
	ternal Disk External Internal Disk (13.7 GB) LOG1_my_loggin_ses Internal Disk (13.7 GB) LOG1_my_loggin_ses LOG1_my_loggin_ses LOG2_	Disk Size 4.0 GB sion 4.0 G	××××				
	ternal Disk External ime Internal Disk (13.7 GB) LOG1_my_loggin_ses 18162 I log.sbf LOG2_ effesh	Size 4.0 GB sion 4.0 G	× ×				

Figure 6-20: Downloading logged files



6.4.1 How to FTP push logged data to a remote location

SBF and RINEX files can also be automatically sent to a remote FTP server (FTP push⁵). A different FTP server can be configured for each logging session and, SBF and RINEX files logged in the same session can be sent to different servers.

The FTP server settings can be entered in the **Edit Session** window, after configuring SBF or RINEX logging, as shown in Figure 6-21. FTP push will create the folder **data** on the remote server if it does not yet exist. If file transfer fails, the receiver will retry after the **Retry Interval** which has been selected as 15 minutes in this example.

Type RINEX v2x	Signals GPS L1CA,L1P Glonass L1CA,	Y,L2PY,L2C,L5 L2CA,L3	Interval 1 sec	Duration 1 hour	
	Galileo L1BC,E SBAS L1,L5 BeiDou B1,B2 QZSS L1CA,L2 IRN L5	5a,E5b,E5 C,L5			
RINEX F	TP Push Settir	ngs			
Enable		on		T	
Server		pc139devlin2	00		
Remote d	irectory	data			
Login nan	ne	anonymous			
Password			0		
Server FT	P control por	21			
		15 min		-	

Figure 6-21: Configure pushing of RINEX files to an external FTP server

You can check that the FTP server credentials are correct by clicking on the **Test** button. This will push a small test file to the remote folder and then delete it. The receiver reports whether or not the file was successfully sent and deleted as shown in Figure 6-22. If the server is configured such that files cannot be deleted then the receiver will also report this and the test file will remain in the remote folder.

⁵FTP push is an optional feature. If you don't have this permission on your AsteRx SB, you can purchase this option from the Septentrio Sales department: sales@septentrio.com





Figure 6-22: Testing the remote FTP server credential are correct



7 Receiver Monitoring

7.1 AIM+: Using the spectrum analyser to detect and mitigate interference

The AsteRx SB is equipped with a sophisticated RF interference monitoring and mitigation system (AIM+). To mitigate the effects of narrow-band interference, 3 notch filters can be configured either in auto or manual mode. These notch filters effectively remove a narrow part of the RF spectrum around the interfering signal. The L2 band being open for use by radio amateurs is particularly vulnerable to this type of interference. The effects of wideband interference both intentional and unintentional can be mitigated by turning on the WBI mitigation system. The WBI system also reduces, more effectively than traditionally used pulse-blanking methods, the effects of pulsed interference.

The spectrum view plot

In the Spectrum window of the GNSS menu, you can monitor the RF spectrum and configure three separate notch filters to cancel out narrowband interference. Figure 7-1 shows the L2 frequency band with the GPS L2P signal at 1227.60 indicated. Different bands can be viewed by clicking on the 'Show table' button as shown. The spectrum is computed from baseband samples taken at the output of the receiver's analog to digital converters.



Figure 7-1: The RF spectrum of the L2 Band



7.1.1 Narrowband interference mitigation

Configuring the notch filters

In the default auto mode of the notch filters, the receiver performs automatic interference mitigation of the region of the spectrum affected by interference. In manual mode as shown configured for Notch1 in Figure 7-2, the region of the affected spectrum is specified by a center frequency and a bandwidth which is effectively blanked by the notch filter.

Notch Filters				
	Notch1	Notch2	Notch3	
Mode	manual 🔹	auto 🔹	auto 🔹	
Center frequency	1235.000 MHz	1100.000 MHz	1100.000 MHz	
Double-sided bandwidth	80 kHz	30 kHz	30 kHz	
Wideband Interference M	litigation			
Enable WBI mitigation	off on			
Default Ok				

Press "OK" to apply the changes.



With the Notch1 settings as shown in Figure 7-2, the L2-band after the notch filter (After IM) is shown in Figure 7-3 with the blanked section clearly visible.



Figure 7-3: The RF spectrum of the L2 Band after applying the notch filter at 1235 MHz



7.1.2 Wideband interference mitigation

Wideband interference of GNSS signals can be caused unintentionally by military and civilian ranging and communication devices. There are also intentional sources of interference from devices such as chirp jammers. The wideband interference mitigation system (WBI) of the AsteRx SB can reduce the effect of both types of interference on GNSS signals.

Configuring WBI mitigation

The wideband interference mitigation system (WBI) can be enabled by selecting 'on' as shown in Figure 7-4.

	Notch1	Notch2	Notch3
Mode	manual 🔹	auto •	auto 🔹
Center frequency	1235.000 MHz	1100.000 MHz	1100.000 MHz
Double-sided bandwidth	80 kHz	30 kHz	30 kHz
MACHER AND A TARAGE AND A MA	the second s		
Wideband Interference M	off on		

Figure 7-4: Select 'on' to enable wideband interference mitigation then 'OK' to apply the new setting.

WBI mitigation in action

The GPS L1 band interference shown in Figure 7-5 is produced by combining the GNSS antenna signal with the output from an in-car GPS chirp jammer.



Figure 7-5: Simulated wideband interference in the GPS L1 band using an in-car chirp jammer.



When WBI mitigation is enabled, the effect of the interference is dramatically reduced to the extent that, the small signal bump at the GPS L1 central frequency of 1575 MHz is clearly visible as Figure 7-6 shows.

In this particular test, the interference signal caused the receiver to fall back to the less precise DGNSS or standalone positioning modes. With WBI mitigation enabled however, the receiver was able to maintain an RTK fix position throughout.



Figure 7-6: Enabling WBI interference mitigation greatly reduces the effect of the interference caused by the chirp jammer.



7.2 How to log data for problem diagnosis

If the AsteRx SB does not behave as expected and you need to contact Septentrio Support Department, it is often useful to send a short SBF data file that captures the anomalous behaviour, as well as a Diagnostic Report from the receiver.

7.2.1 Support SBF file

Step 1: Configuring a logging session

On the menu bar select **Logging** then the **Log Sessions** window where you can define a new logging session.





Step 2: Select to log the Support data blocks

In the **Edit Session** click on **SBF** and **New SBF stream**. In the final **Edit SBF Stream** field, make sure to select the **Support** option as shown in Figure 7-9. This option automatically selects all the SBF blocks that are useful for the Support Department to help diagnose receiver problems. If you suspect interfering signals, as described in Section 7.1, it can be useful to provide SBF log files before/after and during the interference, by logging the **BBSamples** blocks located in the **Detailed selection**, in addition to the **Support** blocks.



H

Session SRF NMEA RINEX Session nam Disk Auto-delete Ok Cancel	Session SBF NMEA RINEX Streams There are currently no SBF streams defined. Wew SBF stream	Clar Sof Steam
	Edit Session LOG2 Session SBF NMEA Streams PostProcess+Support New SBF stream Streams prepared, pri	RINEX Interval t 1 sec P X ess "OK" to apply the changes.
	SBF Logging Parame	eters

Figure 7-8: Configure a logging session selecting Support in the Edit SBF Stream field

Interval 1 sec		۲
⊞ Time		
Event	1	
DiffCorr	1	
Status	1	
🗄 LBand		
UserGroups		
PosCart		
ReceiverSetup		
Commands		
Comment		
BBSamples		
ASCIIIN		
PosProjected		
RxMessage		-

Figure 7-9: Selecting BBSamples in the Edit SBF Stream field for logging interference

Please note that logging the **Support** data blocks requires a large throughput of data that may not be compatible with other CPU-intensive tasks such as data output at higher rates.



When data logging has been correctly configured, the **Logging** window will show the newly defined session as active as indicated in Figure 7-10.

Overview		NSS S	ECORX	Communication	Corre	ctions	NMEA/SBF Ou	t Logging	Admin
ogging > Log Se	essions							Log Sessions	
-D	ick Lispar							Disk Contents	
	Unmount	Format 1.8 GB/	al Disk (13.7 GB d (29%, 4.0 GB) (71%, 9.7 GB) SBF day [uncompress	ed]		External I	Disk of present	Global Log Settings	
CLO	og Sessio	ons							
	ID	Name	Data	Auto-Delete	Disk	FTP	Constrained in the		
9	LOG1	my loaain sessio	n RINEX, SBF	Never	Internal		X OOFF		
	1000	1	CDE		T		¥ ()		



Step 3: Downloading the logged SBF file

To download a data file logged on the AsteRx SB, click the download icon **()** next to the filename on the **Disk Contents** page as shown in Figure 7-11

Overview	GNSS	SECORX	Communication	Corrections	NMEA/SBF Out	Logging	Admin
Logging > Disk Co	ontents					Log Sessions	
- Die	le licado					Disk Contents	
C DIS	ok Usage	L. S. Star and Star Mandalance			Sime Indexe	Global Log Settings	
	Int	ernal Disk (13.7	GB)	Exte	rnal Disk		
		used (29%, 4.0 GE free (71%, 9.7 GB			isk not present		
	Unmount Format						
		1					
I	nternal Disk Exter	nal Disk					
Na	ame	Size	-				
9	Internal Disk (13.7 G	B) 4.0 GB					
	LOG1_my_loggin_	session	×				
	LOG2_support		×				
	H 18156		×				
	H 📕 18166		×				
	log.sbf	2.1 M	0 < -				
	lefresh						

Figure 7-11: Click the 🚺 icon next to the file you want to download



7.2.2 Diagnostic Report

A **Diagnostic Report** can be generated under the **Admin/About** tab on the Web interface as shown in Figure 7-12 and saved to your PC.

Overview	GNSS	SE	CORX Comm	unication Correctio	ns NMEA/SBF Out	Logging	Admin	
min > About	811						Configurations	
C	Receiver Identific	ation					Reset	
	Component	Attribute	Description				Power Mode	
	 hwplatform firmware 	product	AsteRx SB	-			Upgrade	
	■ files					T. and	User Administration	
	components SECORX	PAC	00530-2514-895	6 T		secte	Expert Control	
	SECOND	userid	53025	septent	rio 💦		Receiver Messages	
-				_ ·			About	
				Suppor	A	dmin > About > Dia	nostic	
				Suppor	LEays	Diagn	ostic Report	
				Diagno	stic Report			
				CPU Lo	ad	Save	As	
							le, Identification	
						<rxmi <rxpr< td=""><td>oduct xmlns="http://septentrio.com/ns/ProductDescription/2.9"></td><td></td></rxpr<></rxmi 	oduct xmlns="http://septentrio.com/ns/ProductDescription/2.9">	
							hwplatform product="AsteRx SB"	
							name="SSRC12" serialnr="3024596"	
							<mainboard type="GRB00431000AB0202"></mainboard>	
							<usb host="disabled" speed="full speed"></usb>	
							THE PROPERTY AND A DESCRIPTION OF A	
						<	<pre>firmware version="4.4.x" date="180531" rev="r5638"></pre>	
							<pre><os <="" date="180529" model="ASB" pre="" type="ssn-linux" version="5.2.0-g55950c9"></os></pre>	
						upgra	<pre>debaud= scs sufformat= signed ></pre>	
							<pre><augm_data_dec <="" dbase="found" id="Version 7.10" pre="" userid="53025"></augm_data_dec></pre>	
						PAC="	QQ530:2514:8956"/>	
							<failsafe date="180405" type="ssn-linux" version="5.1.0-g9bb3dd9"></failsafe>	
							/firmware>	
							<pre><pre><pre>cpermfile permid="20181303c-3024596-1"/></pre></pre></pre>	
							<pre><antinfo antcount="659" format="antex 1.4" ngs2bin="2.0"></antinfo> /filec></pre>	
							components>	
						4	somponents a	

Figure 7-12: Generate a Diagnostic Report


7.3 Activity logging

The AsteRx SB reports various events in the **Receiver Messages** window of the **Admin** menu that can be used to check receiver operations. The example in Figure 7-13 shows that four, 15 minutes SBF files have been successfully FTP pushed to a remote location.

Overview	GN	SS	TERRASTAR	Communication	Corrections	NMEA/SBF Out	Logging	Admin
Admin > Receiv	er Messages							Configurations
								Reset
G	Receiver Me	ssages —		10110-0110-0100-000-000-000-000-000-000				Upgrade
	[1:Sun 198 [2:Sun 198	0-01-06	00:00:17] Mour	nt : Success on mont : Success on mont	ounting internation	l disk l disk		User Administration
	[3:Thu 2016-02-25 14:45:25] LOG1 SBF:[16056/SEPT056o30.16_ => sarah@pc60devlin200:21 (data)							
	[4:Thu 201 [5:Thu 201	6-02-25	15:00:28] LOG 15:15:26] LOG	1 SBF:[16056/SEPT0 1 SBF:[16056/SEPT0	056045.16_ => s 056p00.16 => s	arah@pc60devlin20 arah@pc60devlin20	0:21 (data)] 0:21 (data)]	Receiver Messages
	[6:Thu 201	6-02-25	15:30:31] LOG	L SBF: [16056/SEPT	056p15.16_ => s	arah@pc60devlin20	0:21 (data)]	About
	7 7			Clear	Freeze			

Figure 7-13: Events reported by the AsteR SB in the Receiver Messages window

8 **Receiver Administration Operations**

8.1 Configurations

A configuration is a collection of all settings and values that determine the behaviour of the receiver. The table below gives an overview of the AsteRx SB's configurations.

Configuration	Persists after power cycle	Writable	Description
RxDefault	Yes	No	The factory default configuration
Current	No	Yes	Settings that are actually being used
Boot	Yes	Yes	The receiver configuration on start up
User1, User 2	Yes	Yes	Two configurations can be stored for later use

With the Web Interface, you can perform the following operations on configurations:

Сору	The Copy operation allows the user to copy any of the five configurations into another configuration
Download	The Download operation allows the user to export a selected configuration to a text file
Upload	The Upload operation allows the user to import a selected configuration from a text file



8.1.1 Saving the configuration

After each change made to the configuration of the AsteRx SB, the pop-up shown in Figure 8-1 will appear. Clicking on 'Save' will cause the new configuration to be applied the next time the receiver is powered. Configurations can also be saved as text files and uploaded to other receivers. See Section 8.1.2 for more information on managing configurations.

Save current configuration to boot configuration.									
	Show	Save	Ignore						

Figure 8-1: The 'save to Boot' pop-up

If you have consistently pressed 'Save' when the pop up appears on the screen, all settings will be persistent and will be applied again when the device powered on.

You can also save the current configuration as the boot configuration on the **Admin/Configurations** window as shown in Figure 8-2. Select **Current** and **Boot** from the drop-down lists as shown then click on **Ok** to apply the setting.

Overview	GNSS	Communic	ication Corrections		NMEA/SBF	PinPo	oint-GIS	Admin
Admin > Configurat	ions							Configurations
Cop	User Administration							
Sou	Irce Current V		■ Current	Different f	rom factory default	0		
Tar	get Boot 🔻		Boot	Equal	to factory default	(
			User1	Equal	to factory default	(Expert Control
Defa	ult Ok		User2	Equal	to factory default	(Receiver Messages
Press '	'OK" to apply the ch	anges.						

Figure 8-2: Select 'Current' as Source and 'Boot' as Target to save the current configuration



8.1.2 Managing Configurations

In the **Admin Configurations** tab, the configuration of an AsteRx SB can be easily saved to a PC as a text file. A saved configuration can also be uploaded to an AsteRx SB.

- 1. Click the **Admin** tab.
- 2. Select **Configurations**. The Configurations tab will resemble Figure 8-3.

Admin > Configurations

-Copy Co	onfiguratio	on File	-Receiver Con	figurations		
Source	Current	•	E Current	Different from factory default	0	0
Target	Current	-	⊞ Boot	Different from factory default	0	0
			User1	Equal to factory default		0
			User2	Equal to factory default		0
Default	Ok					



Copy Configuration File

- 1. Select the configuration to be copied in the Source drop down box.
- 2. Select where the Source configuration is to be copied into using the Target drop down box.
- 3. Click OK

Download Configuration

- 1. Click the **()** next to the configuration to be downloaded.
- 2. The download is started immediately.
- 3. The configuration will be saved as a .txt file in the browser's download folder.

Upload Configuration

- 1. Click the \bigcirc next to the configuration to be uploaded.
- 2. A window pops up for the user to select a file.
- 3. After a file has been selected the upload is started immediately.

If the uploaded file contains invalid commands, the complete file is ignored and the configuration remains unchanged.



8.1.3 How to set the AsteRx SB to its default configuration

You can set the AsteRx SB configuration to its default settings via the **Admin Configurations** tab as shown in Figure 8-4. Select **RxDefault** from the **Source** drop-down list and either **Current** or **Boot** in the **Target** menu. You will then be prompted to Save or Ignore the new current configuration as the boot configuration.

Overview	GNSS	TERRASTAR	Communic	ation Correc	tions	NMEA/SBF O	ut	Logging	Admin
Admin > Configur	ations								Configurations
~ [0	ny Configuration Fil		Receiver Con	figurations					Reset
Sc			E Current	Different from	n factory	default 🚺	$\mathbf{\Omega}$		Upgrade
Ta	arget Current •		⊞ Boot	Different from	n factory	default 🔮	õ		User Administration
			User1	Equal to factory	/ default		\mathbf{O}		Expert Console
Def	ault Ok		User2	Equal to factory	/ default		\mathbf{O}		About
Press	s "OK" to apply the o	changes.	Save conf conf Sa	e current iguration to boo iguration. ve Ignore	t				

Figure 8-4: Setting the AsteRx SB to the default configuration

Please note that this procedure will not erase the IP settings of the receiver. This can only be done on the **Ethernet** page of the **Communication** menu.



8.2 Resetting the AsteRx SB

When the AsteRx SB is not operating as expected, a simple reset may resolve matters. The AsteRx SB can be fully power-cycled using the front-panel button, however via the **Admin Reset** tab, different functionalities can be individually reset as shown in Figure 8-5. The reset options are described in Tables 8.2-1 and 8.2-2.

Level	○ Soft ● Hard
Config	
PVTData	
SatData	
BaseStations	
Bluetooth	
WiFiAccessPoints	
HTTPSCertificate	

Figure 8-5: Admin - Reset

Level	Description
Soft	This is a reset of the receiver's firmware. The receiver will restart operating in the same configuration as before the command was issued, unless the 'Config' option has been ticked.
Hard	This is similar to a power off/on sequence. After hardware reset, the receiver will copy the Boot configuration into the Current configuration

Table 8.2-1: AsteRx SB Reset Levels



Table 8.2-2: AsteRx SB Reset- Memory Erase Options



8.3 Upgrading the firmware or upload a new permission file

The AsteRx SB firmware and permission files both have the extension .suf (Septentrio Upgrade Format). Firmware upgrades for the AsteRx SB are freely available for the lifetime of the receiver and can be downloaded from the Support section of the Septentrio website. All upgrade files and documentation relating to the upgrade are bundled together in a single upgrade zip file. We recommend that you read the release notes for the firmware upgrade beforehand in case there are any changes that may affect your use of the receiver. Permission files enable additional features on the AsteRx SB and can be purchased via our Sales department.

On the **Admin** menu select **Upgrade** and then click the **Choose file** button. You can then select the upgrade .suf file. For major upgrades, two or more files may have to be upgraded separately. The files to be upgraded and the order for upgrading is documented in release notes. After selecting the upgrade .suf file click on **Start upgrade**.

Overview	GNSS	SECORX	Communication	Corrections	NMEA/SBF Out	Logging	Admin			
Admin > Upgra	de						Configurations			
							Reset			
Upgrade Receiver Firmware										
	Select upgrade (*.suf) file:									
	Choose File AsteRx SB-firmware-4.4.0-full.suf									
	Start upgrade						Expert Control			
	Description: Kernel, Root Filesystem, GNSS Firmware and Antenna Information									
	Cine		About							
If you are upgrading the receiver using its WiFi network, please reconnect once this WiFi network becomes available again after the upgrade.										

Figure 8-6: Upgrading the AsteRx SB firmware

Upgrading firmware can take several minutes during which the receiver will reset. When connected via WiFi, the connection may not be automatically re-established.



Overview		Commu	aication	Corrections	MMEA/SRE	DinBoint-GIS	Admin
Admin > Upgrade	Writing data to	block	Upgrad Please w	ling receiver vait while the receive	er is upgraded.		
[143 [143 [143	3] Writing data to 3] Writing data to 3] Writing data to	block block	resetuplo	tting receiver to up <u>c</u> Dading SUF file an	ırade mode d upgrading		
[14: [144 [144 [144 [144	 Writing data to 39416251/394 Writing data to Writing data to Writing data to 	b block 16205 b block b block b block	If yo usin reco beco upg	ou are upgrading Ig its WiFi networ onnect once this V omes available ag rade.	the receiver k, please ViFi network ain after the		
[14+ [144 [144 [144 [145]	 Writing data to Writing data to Processing file Processing exectly Processing filt Processing filt Processing filt 	e paylo e paylo er paylo erdata	• upgr	rade complete			
[145 Reb	of SUF fully pro- ooting to normal	cessed. l firmwar	e.				

Figure 8-7: The AsteRx SB upgrade procedure

If there were no problems with the upgrade the message **Upgrade successful** will appear. You can then check on the **Admin About** tab that the AsteRx SB firmware or permission file has the correct, new version.



8.4 How to change IP settings of the AsteRx SB

The IP settings of the AsteRx SB can be configured on the **Ethernet** window of the Web Interface. By default, the AsteRx SB is configured to use DHCP to obtain an IP address but, a static IP address can also be configured as shown in Figure 8-8. The *lif,ipparameters* command shows the current ip configuration available and can be helpful for debugging network issues.

In Static mode, the receiver will not attempt to request an address via DHCP but will use the specified IP address, netmask, gateway, domain name and DNS. DNS1 is the primary DNS, and DNS2 is the backup DNS. In DHCP mode, the arguments IP, Netmask, Gateway, Domain, DNS1, and DNS2 are ignored.

Overview	GN	SS TERRASTAR	Communication	Corrections	NMEA/SBF Out	Logging	Admin
Communication >	Communication > Ethernet						
- Ett	hornot-		Ethernet				
CEU	lienet		WiFi]		
			Cellular				
	65	3	Dynamic DNS				
			TP Ports				
			Firewall				
CEt	hernet Inf	erface Mode	NTRIP Castor St	atus			
Po	ower 🔍 o	ff 🖲 on	S S S S S S				
			Senal Port Hostname				
C III	P/IP Sett	DUCD @ Chatia	Netmask				
M	oue address	102 169 111 62	Gateway				
IP N	otmack	192.100.111.02	MAC Address	5			
Ne	eundsk	200.200.202.0					
Gi	ateway	192.168.108.1					
D	omain	septentrio.local					
DI	NS1	192.168.100.96					
DI	NS2	192.168.100.88	(
Det	fault O	apply the changes.		TCP/IP Set Changing TC connection t	ttings CP/IP settings may c to the receiver to be Proceed Car	ause the lost! cel	

Figure 8-8: Configuring a static IP address

The new IP address should now appear in the **Ethernet Status** field as shown in Figure 8-9.

IP Address	192.168.111.62
Hostname	
Netmask	255.255.252.0
Gateway	192.168.108.1
MAC Address	00:50:C2:36:39:4F

Figure 8-9: TCP/IP settings

Note that the IP settings will keep their value after a power cycle and even after a reset to factory default in order to avoid accidentally losing an Ethernet connection to the receiver.



8.5 How to configure Dynamic DNS

Dynamic DNS allows remote contact with the AsteRx SB using a hostname.

When devices are connected to the internet, they are assigned an IP address by an internet service provider (ISP). If the IP address is *dynamic*, then it may change over time resulting in a loss of connection. Dynamic DNS (DynDNS or DDNS) is a service that addresses this problem by linking a user-defined hostname for the device to whichever IP address is currently assigned to it.

Step 1: Open a Dynamic DNS account

To make use of this feature on the AsteRx SB, you should first create an account with a Dynamic DNS provider to register a hostname for your receiver. The AsteRx SB supports the following two services:

- Dyn DNS: http://dyn.com/
- No IP: http://www.noip.com/

Having opened account, you can then create a host service for which you will need to specify a URL or hostname for the receiver (e.g. axsb.ddns.net).

Step 2: Configure the Dynamic DNS settings of the receiver

In the **Dynamic DNS** window of the **Communication** menu, the hostname of the receiver and other Dynamic DNS settings can be entered.

In the example shown in Figure 8-10, the hostname *axsb.ddns.net* has been registered with ddns.net. The *Bind* option tells the Dynamic DNS provider to automatically update IP addresses assigned over either an Ethernet or WiFi connection.



Figure 8-10: Configuring Dynamic DNS



H

8.6 How to control access using the AsteRx SB Firewall

You can control access to the AsteRx SB using the receiver's firewall in the **Firewall** window. By default, all Ethernet and WiFi ports are open (i.e. those defined on the **IP Ports** menu).

In the example shown in Figure 8-11, Ethernet ports 2101, 2102 and 2103 are accessible but only from devices with the IP address 84.199.9.148. Similarly, all WiFi ports are open but only those from IP 84.199.9.148.

Please note that the firewall settings do not apply when connecting to the web interface using USB. In the case of WiFi, firewall settings only apply when the receiver is in WiFi client mode.

Overview		GNSS		SECORX	Communication	Corrections	NMEA/SBF Out	Logging	Admin
Communication > Firewall			Ethernet						
-	- Firewall S	ettinas-			WiFi				
		Open po	orts	IP port list	Bluetooth				
	Ethernet	PortList	۲	2101 2102 2103	Dynamic DNS				
	WiFi	all	×		IP Ports				
	(separated by spac		Firewall						
l	Default: a	ll ports of	ben		Web Server				
C	- IP Addres	s Filtering	,—		NTRIP Caster				
	Mode			● off ● on	Serial Port				
	Allowed IP addresses 84.199.9.148								
	(separated by space		es)						

Press "OK" to apply the changes.

Figure 8-11: Configuring the Firewall of the AsteRx-U



8.7 Using the Expert Console

Commands can be sent to the AsteRx SB using the **Expert Console** window on the accessible via the **Admin** menu as shown in Figure 8-12

- The command responses will be shown the window below the label 'Expert Console'.
- Clicking the up and down arrows of your keyboard will allow you to scroll through previously entered commands
- Specific messages may be viewed via the Message Inspector
- The command set of the AsteRx SB is described in the 'Command Line Interface Reference Guide.pdf'

verview	GNSS	SECORX	Communication	Corrections	NMEA/SBF Out	Logging	Admin
nin > Expert C	ontrol						Configurations
	mort Concolo	Control Danol M	logrado Tecnostor				Reset
	xpert console	control Paner M	essage inspector]		Power Mode
>	\$R: getSatellite	eTracking					Upgrade
GØ	SatelliteTrackin 1+G02+G03+G04+G0	ng, 05+606+607+608+60	09+G10+G11+G12+G13+	G14+G15+G16+G17	+G18+G19+G20		User Administrati
+6	21+G22+G23+G24+(525+G26+G27+G28+	529+G30+G31+G32+R01	+R02+R03+R04+R0	5+R06+R07+R0		Expert Control
28	+R29+R30+E01+E02	2+E03+E04+E05+E0	5+E07+E08+E09+E10+E	11+E12+E13+E14+	E15+E16+E17+		Pereiver Messar
E1	8+E19+E20+E21+E2 5121+5122+5123+5	22+E23+E24+E25+E: 5124+5125+5126+5	26+E27+E28+E29+E30+ 27+5128+5129+5130+	E31+E32+E33+E34 S131+S132+S133+	+E35+E36+S12 S134+S135+S1		iveccivel messag
36	+\$137+\$138+\$139-	+5140+5141+5142+	5143+5144+5145+5146	+5147+5148+5149	+S150+S151+S		About
	2+5153+5154+5154	5+S156+S157+S158-	+C01+C02+C03+C04+C0	5+C06+C07+C08+C	09+C10+C11+C		
15							
15	+C13+C14+C15+C10	5+C17+C18+C19+C20	0+C21+C22+C23+C24+C	25+C26+C27+C28+	C29+C30+C31+ 🍸		

Figure 8-12: Web Interface Admin-Expert Console

9 Security

Admin

9.1 How to manage access to the AsteRx SB

You can manage the access that users have to the AsteRx SB in the **User Administration** window of the **Admin** menu. By default, all communication interfaces are assigned User-level access as shown in Figure 9-1. 'User' level allows full control of the receiver while 'Viewer' level only allows viewing graphics and configurations.

-Users			
There are curren	tly no us	ers defined	
New user			
-Default Access L	evel Per	Interface —	
Web	none	Viewer	Use
Disk	none	Viewer	• Use
IP ports	none	O Viewer	• Use
COM ports	none	O Viewer	• Us
USB ports	none	O Viewer	• Use
Bluetooth ports	none	Viewer	● Use
OTG ports	none	O Viewer	• Use

Figure 9-1: The default access levels of the AsteRx SB

To configure a new user, click on the **New user** button as shown in Figure 9-1 and enter the name and password of the user as well as their access level. For added security, an SSH key can be used. This is described in Section 9.1.1.

In the example shown in Figure 9-2:

Web Interface: Anonymous users (without password) can connect to the receiver via the web interface as Viewers. They can browse the various windows but cannot change any of the settings. Only George, who has User access, can change receiver settings via the web interface.

FTP: Anonymous users have full access over FTP so can download and delete logged data files.

IP, COM, USB, and Bluetooth ports: Only George has User access to these ports so can change receiver settings over these connections. Mildred has only viewer access, so can only send commands to show the configuration. Anonymous users can neither change or view the receiver configuration over these connections.



C New user	ay no abe	activities									
Default Access Le Web Disk IP ports COM ports	evel Per I o none o none o none o none	 Niewer Viewer Viewer Viewer Viewer 	 User User User User User 	CEdit User			- Users				
USB ports	none	O Viewer	User	User name	George		User Name	Access Leve	SSH K	ey	
Bluetooth ports	none	Viewer	User	Password	••••• 0		George	User	No		×
OTG ports	none	O Viewer	User	User access level	User	•	Mildred	Viewer	No	2	×
				Ok	Cancel		- Default Acces	s Level Per Int	erface —	_	
							Web	🔍 none 🖲	Viewer	0 User	
							Disk	🔍 none 🔍	Viewer	• User	
							IP ports	🖲 none 🧉	Viewer	🔍 User	
							COM ports	🖲 none 🤅	Viewer	O User	
							USB ports	🖲 none 🤅	Viewer	User	
							Bluetooth por	rts 🖲 none 🤅	Viewer	O User	1
							OTG ports	🖲 none 🔘	Viewer	User	

Figure 9-2: Defining user access

After defining the Users/Viewers and their access levels, they can then login on the web interface by clicking on **Log in** on the upper-right corner as shown in Figure 9-3.



Figure 9-3: Logging in to the Web Interface



9.1.1 SSH key authentication

By default, anonymous users have full access over FTP, SFTP and rsync to the files logged on the AsteRx SB. FTP, SFTP and rsync access can be limited by configuring user access, as described in Section 9.1. For added security, user authentication for SFTP and rsync access can be configured using an SSH public key. When an SSH key is defined, the configured user can download files using SFTP or rsync without entering a password provided of course, that the matching private key is known by the key agent running on the same PC.

You can generate public and private keys using for example, **PuTTY Key Generator** as shown in Figure 9-4.

PuTTY Key Generator				8	
ile Key Conversions	Help				
Key					
Public key for pasting i	nto OpenSSH authorized	_keys fil	e:		
ecdsa-sha2-nistp521					*
+rEwQSDtUEpBwQ9Q	Y HtbmlzdHA1MjEAAAA YWBh2HiiAQutB786F17	IbmizdF a5euagi	A1MjEAAACFBAF1 5T9iaHX4sGhfk/nSF	rQTpH1zgK802a HG9aoewGaYGN	
15AAL2EsHNVysLhX	/VRmDzA9WyAqUjgqO	DqZ4pfin	nbHxWJJ95zFu		
+Z1IUxR7VXb8AgffH//	AwyDemiKuhTC77kgad	NA== ec	dsa-key-20161027		*
Key fingerprint:	ecdsa-sha2-nistp521	521 2f.49	b5:96:b2:8e:8c:be:5	3:61:ec:0e:64:ad:2b	:12
Key <u>c</u> omment	ecdsa-key-20161027				
Key p <u>a</u> ssphrase:	•••••				
C <u>o</u> nfirm passphrase:	•••••				
Actions					
Generate a public/priv	ate key pair		[<u>G</u> enerate	
Load an existing privat	e key file		[Load	
Save the generated ke	y	Sa	ave p <u>u</u> blic key	<u>Save private key</u>	/
Parameters					
Type of key to generat	e:		0 5005545	000114	
<u>K</u> SA	<u>D</u> SA O <u>E</u> CL	SA	─ ED <u>2</u> 5519	⊖SSH- <u>1</u> (RS/	4)
Curve to use for genera	ating this key:			nistp521	•

Figure 9-4: Generating SSH keys using the PuTTY Key Generator. The public key is highlighted.

The generated public key is the highlighted text that can be pasted directly into the **SSH Key** field of the AsteRx SB Web Interface as shown in Figure 9-5.

-Edit User					
User name	George				
Password	••••••	0			
User access level	User	•			
SSH Key	AAAAE2VjzZHNhLXNoYT				
Ok Cancel					

Figure 9-5: Using an SSH Key for access for user George

521-bit ECSDA keys offer the best security however, ECSDA 256 and 384-bit keys can also be used. Alternatively, RSA 512 and 1024 key encryption is also supported.



10 GIS Collection with PinPoint-GIS or other applications

10.1 Introduction

Key Features

- Access to your ArcGIS Online maps on the field
- Straightforward GIS data collection
- Reliability and scalable accuracy guaranteed
- Any platform, any where

PinPoint-GIS is a powerful utility software suite enabling straightforward GIS data collection of accurate and reliable GNSS positioning from your Septentrio receiver. It provides seamless integration of this data directly into GIS database workflows.

PinPoint-GIS exists in 2 forms:

- PinPoint-GIS Web: which allows use of ArcGIS Online maps
- **PinPoint-GIS Rx**: a generic GIS system independent of any GIS tool set allowing you to store data into CSV files

PinPoint-GIS is an extension of Septentrio's web interface with a direct link to ArcGIS. Online via PinPoint-GIS Web and with a generic on-board data collection mechanism for any GIS workflow thanks to PinPoint-GIS Rx (not linked to ArcGIS accounts). It offers a unique solution with the power to run GIS collection inside Septentrio GNSS receivers. No extra applications are needed, simply use your preferred web browser for full GIS workflow - from accurate data collection in the field directly to either the ArcGIS Online Cloud or to your preferred GIS toolset.

PinPoint-GIS Rx also allows integrators to implement their own collection system by using the command line interface of the receiver to easily allow data collection in their own applications while benefiting from all receiver fields and internal memory.



10.2 Using the AsteRx SB on-board simple data collector

To be able to use PinPoint-GIS Web, your browser should be connected to the internet and the receiver should have the Data Collection permission option.

10.2.1 Designing a collection project

On the **GNSS** menu of the Web Interface, select **PinPoint-GIS Web**, click on **PinPoint-GIS Rx** to select and to edit a collection project. There are three collection projects that can be configured. Select the project you want to edit and click **Manage** then **Designer**.





Adding a user-defined attribute

On the project pop-up, click **Designer/New attribute** then select **User** to define a user-defined attribute. Fill in the name of the attribute and default value you want it to take.



Adding a receiver output attribute

Click on **New attribute** again, then select **Receiver**. This will generate a drop-down list from which you can select the receiver data output that you want to collect.

When all attributes have been added, click on Save and close the project design window.





10.2.2 Performing a collection

On the **GNSS** menu of the Web Interface, select **PinPoint-GIS Web**, click on **PinPoint-GIS Rx** and then the **Manage** button next to the project you want to use. You can then click on the **Collector** button to start a collection.



At each collection point, click on **collect** and enter the details of the user-defined attribute then click **Save**. When the collection is finished, you can click on **Close** to close the collection window.

Please note that, points cannot be collected at more than 1 point per second.

Collector Close	Point Details Save Cancel Project CollectDB1 Attributes	
	colour blue Latitude 0.887476065773	
	Properties	Г
	Date Tue 2017-10-10 Time 11:33:08 GMT+02:00 Latitude N50°50'55.0788" Longitude E4°43'55.6594" Height 128.402 m	
		Collecto Close
		CollectDB1
		Collect



10.2.3 Downloading collected data

On the **GNSS** menu of the Web Interface, select **PinPoint-GIS Web**, click on **PinPoint-GIS Rx** and then the **Manage** button next to the project you want download. The project window will pop-up where you can click on the **CSV Export** button.



In the export pop-up window, enter a name for the file and select the column separator. Click on **Export** to generate the file and then on **Download**.

The file can be opened in Excel or any text editor.





10.3 Using PinPoint-GIS Web

PinPoint-GIS Web allows you to access your ArcGIS Online maps. It works on any platform with a web browser and makes the bridge between GIS and accurate data collection.



The following steps will guide you through the main functionalities of PinPoint-GIS Web.

GNSS menu of the Web Interface, select PinPoint-GIS Web

The PinPoint-GIS view is located in the **GNSS/PinPoint-GIS Web** menu of the web interface. Within this view you have full access to your ArcGIS Online user maps. The system allows you to select your ArcGIS Online user maps, change the background of your user map using the multiple Basemaps available from Esri, Display or hide the different layers and filters of your map, and will allow you to have configurability for Portal for ArcGIS in the case your data is located in a specific secured ArcGIS Server.

Navigation within the PinPoint-GIS Web view is straightforward and allows you to visualize all the main GIS and GNSS information in a single view. The view can easily be maximized using the maximize/minimize button in the right corner of the map **T**. This is handy when working in the field with tablet screens.



Figure 10-8: Functions within PinPoint-GIS Web



A Rear-panel port descriptions

A.1 PWR-COM2&3/USB



Figure A-1: Solder view of the 7-pin female PWR-COM2&3/USB socket on the rear panel of the AsteRx SB

The 7-pin connector type is an ODU MINI-SNAP F Circular Connector Series S40F1C-P07MCD0-500S.

PIN #	Colour	COM mode	USB mode	Comment
1	Red	PWR	Not connected	5-36 VDC input (1.3A) Pink wire with Red heat-shrink tube
2	Black	GND	GND	Ground Brown wire with Black heat-shrink tube
3	Green	RxD3	USB D-	EITHER Serial COM3 receive line OR Negative USB 2.0 FS device node. Selection is done via pin 7.
4	Yellow	TxD3	Not connected	Serial COM3 transmit line
5	Grey	RxD2	USB D+	EITHER Serial COM2 receive line OR Positive USB 2.0 FS device node. Selection is done via pin 7.
6	White	TxD2	Not connected	Serial COM2 transmit line
7	Blue	Not connected	VBus	4.4-5.25 V input. If present , USB-mode is selected. If not present , UART Serial COM mode is selected.



A.2 COM1-GPIO



Figure A-2: Solder view of the 7-pin female COM1-GPIO socket on the rear panel of the AsteRx SB

The 7-pin connector type is an ODU MINI-SNAP F Circular Connector Series S40F1C-P07MCD0-500S.

PIN #	Colour	Name	Comment
1	Pink	EVENTA	First EVENT input (Max. V_{IL} = 1V, Min. V_{IH} = 2V, Max. V_{IH} = 24V, Internal delay to detection < 1 μ s, 15 K Ω pull-down)
2	Black	GND	Ground Brown wire with Black heat-shrink tube
3	Green	COM1 CTS/ EVENTB	COM1 Clear to Send. This also connects to the second event EVENTB input. It has the same electrical specifications as EVENTA (see pin 1).
4	Yellow	COM1 RTS/ PPS_OUT	COM1 Request To Send or PPS_OUT (PPS_OUT low = 0V, PPS_OUT high = 5V). PPS_OUT polarity is consistent with command line reference of OEM module.
5	Grey	RxD1	Serial COM1 receive line
6	White	TxD1	Serial COM1 transmit line
7	Red	5V OUT	5V +/- 5%, 300 mA DC output Blue wire with Red heat-shrink tube







Figure A-3: Solder view of the 4-pin female ETH socket on the rear panel of the AsteRx SB

The 4-pin connector type is an ODU MINI-SNAP F Circular Connector Series S40F1C-P04MFG0-50OO.

PIN #	Name	Description
1	ТХР	Ethernet TX+
2	TXN	Ethernet TX-
3	RXP	Ethernet RX+
4	RXN	Ethernet RX-

A.4 MAIN (TNC)

Connect an active GNSS antenna to this connector. The gain at the connector (antenna gain minus cable losses) must be in the range 15 to 50dB.

By default, the receiver provides a 3.3V DC supply on the MAIN connector to feed the antenna. The supplied antenna voltage can be changed to 5V DC with the command *setAntennaVoltage*. The maximum supported current is 200mA.



Never inject a DC voltage into the MAIN connector as it may damage the receiver. When using a splitter to distribute the antenna signal to several receivers, make sure that no more than one output of the splitter passes DC. Use DC-blocks otherwise.



B Powering the AsteRx SB

There are 4 ways to power the AsteRx SB:

- The PWR connector (5-36 VDC)
- The Ethernet connector (Power over Ethernet PoE, 37-57 VDC). Please note that only mode A, as specified in the 802.3af standard, is supported.
- The rear-panel USB connector connected to a PC or a USB adapter.
- The front-panel USB OTG socket connected to either a PC or a USB adapter. A micro-USB cable and adapter are supplied as standard.

If power is provided through the Ethernet, the PWR or USB connectors

- If PWR voltage is above 12V, PWR takes precedence.
- If PWR voltage is below 12V, Ethernet takes precedence.
- If power is supplied through USB, together with any other supply (Ethernet or PWR), USB is always used as backup power supply.
- For delivering power through USB, both USB ports are considered equal.

If the receiver is supplied from a voltage source > 5.5V:

- The USB OTG port is only usable as USB device (not as USB host).
- No power should be drawn from the 5V OUT pin of the COM1-GPIO connector.

When powered via Ethernet, this allows the connection of a back-up battery to the ODU PWR connector. The battery will only be used in case of an outage of the power over Ethernet.

The current power source (PWR or Ethernet connector) and the voltage at the PWR connector are reported in the <code>PowerStatus SBF bock</code>.



Be aware that if you are using your own cables for powering the AsteRx SB at low voltage (5V), care should be taken of voltage drops if the cables are too thin.



C Status icons and front-panel LEDs

C.1 Status Icons on the Web Interface

The icons on the right-hand side of the top banner quickly show the user the status of the AsteRx SB.



Table C.1-1: Web Interface Status Icons

¹ By default the Internet access is continuously checked every 1 minute and one of the icons will show up. The check can be enabled or disabled with the command *setCheckInternetAvailability*. When this setting is disabled the icons will disappear.



D Connecting to the Web Interface in Client WiFi mode

Using your iOS mobile device as a personal hotspot can be useful for sharing the internet connection of your mobile device to the AsteRx SB. In this case you need to configure the receiver in WiFi client mode and the web interface needs to be accessed in a different way (you will not be able to connect using **192.168.20.1**).

The following steps describe the way the AsteRx SB can be configured for using the mobile connection of your mobile device and the way to connect to the web Interface.

- 1. Make sure your mobile device has been configured with personal hotspot (a user and a password will be displayed to the user)
- 2. Plug the USB cable of the Rover unit and connect to the web interface using 192.168.3.1
- 3. On the **Communications/WiFi** window, enable the Client WiFi mode and click on **OK** as shown in Figure D-1



Figure D-1: WiFi client mode of the Web Interface

2. Click on **Configure Networks** in the WiFi Client Config panel. This will display a list of reachable WiFi networks. From the list of networks, select to connect to the mobile device by clicking **Add**. Confirm by **OK** as shown in Figure D-2.



Figure D-2: Connect to WiFi network



- 3. Access the web interface via your mobile device:
 - **iOS devices**: You can easily access the web interface by using **http://asterxsb.local** or **http://asterxsb-xxxxxx.local** in your web browser. Where 'xxxxxxx' is the 7-digit serial number of the receiver.
 - Android and Windows devices: To access web interface you need to know the IP address assigned to the receiver by your mobile device. Most Android devices allow you to see the assigned IP address within the network settings. Alternatively, you can connect to the receiver using USB in order to find the IP address assigned to the receiver (displayed in the WiFi graphical widget).