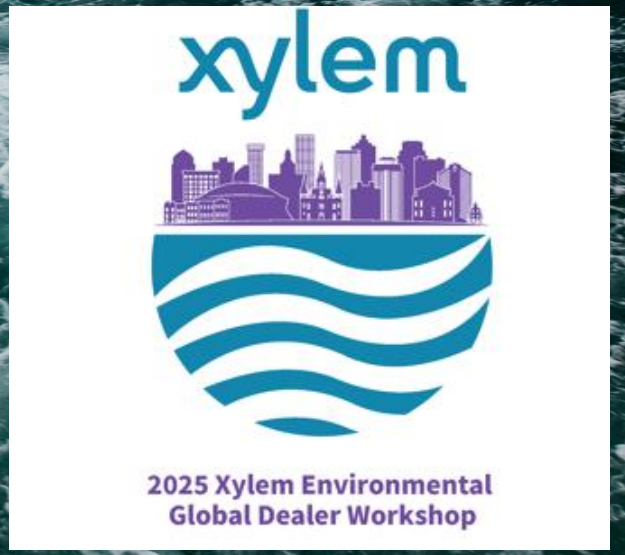
Aanderaa 250 kHz ADCP and Seaguard II DCP Wave

Jon Fajans, Ocean & Coastal Applications Manager

Xylem Analytics, Americas



October 5-8, 2025

Key value propositions

Building on DCPS successes

existing DCPS advantages

+

increased range

+

improved connectivity &
power options

competitive advantages focused on user needs

AutoBeam: If object (mooring chain/float/animal) is obstructing one of the beams, the three remaining are used for current calculations.

FlexiColumn: In upward facing applications, built-in pressure sensor measures the distance to the surface, enabling simultaneous surface referenced and instrument referenced current meaurement:

1. Surface current (cm thick layer)
2. Currents in multiple layers, referred to the surface
3. Currents in multiple layers, referred to the instrument

Incurs no additional power usage. Valuable in applications like; aquaculture, surface transport, currents around the bottom of

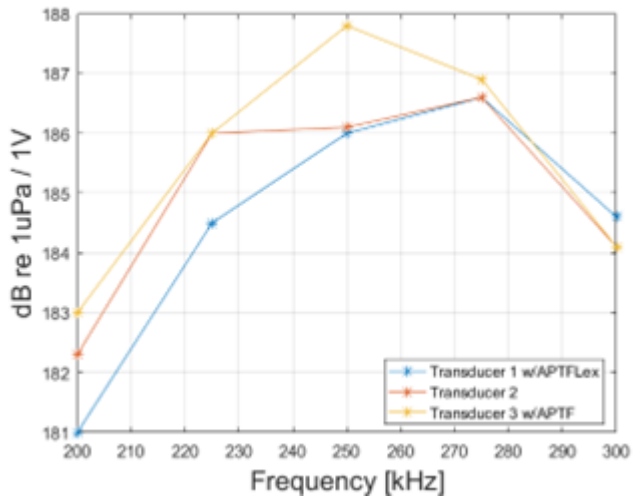
MotionComp: Fourth-generation Doppler current sensing technology featuring automatic dynamic tilt and heading compensation. It delivers high-quality current measurements from moving/tilting platforms. When used in combination with AutoBeam, it ensures full measurement range.

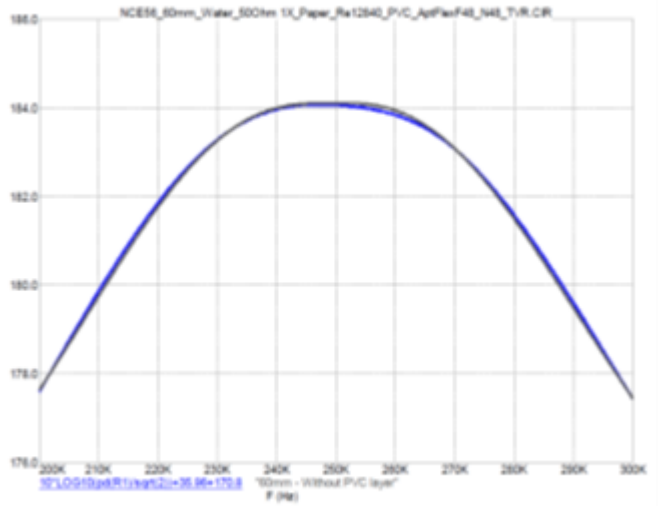
Smart Data: The instrument delivers processed engineering data. Tilt, heading & sound speed compensated vector averaged current in real-time. Real-time data control ensures efficient bandwidth use without losing insight.

See data sheet and Aanderaa app notes for more detailed explanation of features. Also more info in this presentation.

Range vs. Precision (single ping standard deviation)

- Lowering the frequency increases range. DCPS600 ~75 m, CP250~150m.
- The precision in Broadband depends on the bandwidth used
  - Normally lower center frequency would give equally reduced precision.
  - DCPS has approximately 15% bandwidth of centre frequency ~ span 90 kHz
  - 250 ADCP has about 35% bandwidth ~span 87.5 khz
- Bandwidth measurements conducted in local tests (Dolviken) supports these figures.





Figur 2- Frekvensrespons med PVC lag på 10mm.

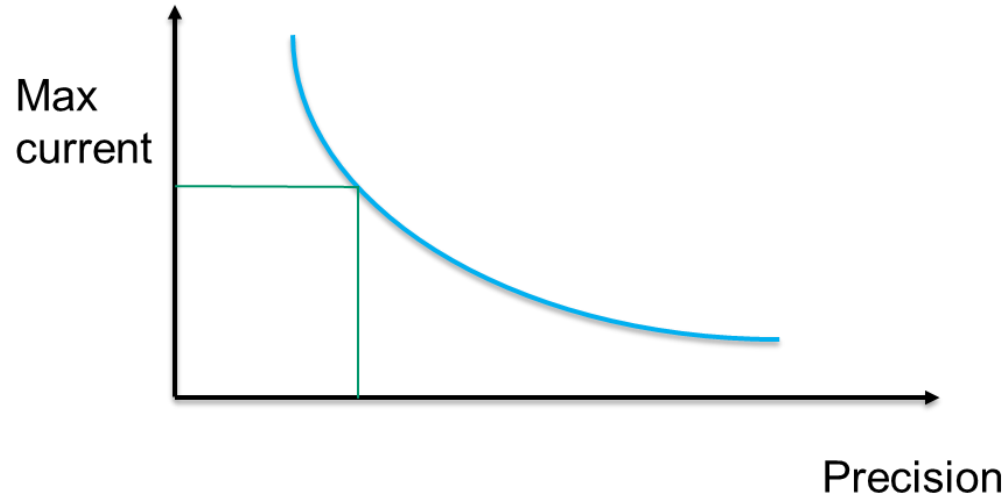
Selling points

- Least amount of pings for given precision
- Lowest battery consumption
- Best wave estimates
  - Can measure shorter wavelengths for a given depth

Autoscale broadband

New autoscale Broadband mode (for both current and wave solution)

- The sensor will always use the most optimum Tx (transmit) pulse depending on the ocean current situation
- It will select the Tx pulse with the best precision in the given ocean current situation.



Selling points

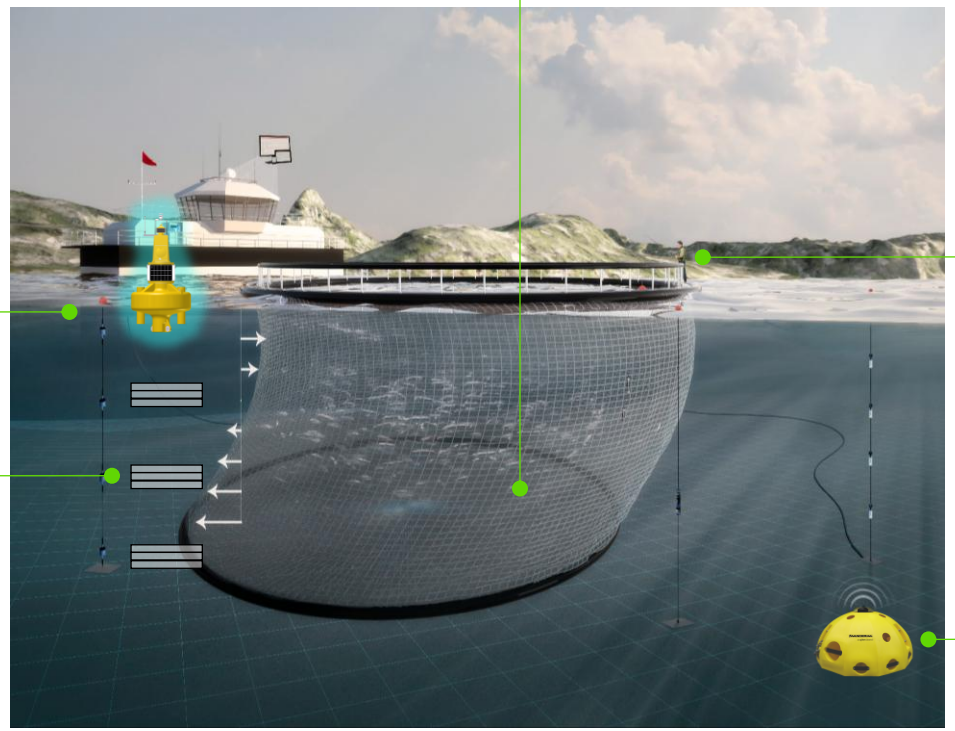
- No need to set maximum current measurement limit prior to deployment (**simple** setup, **best quality** for ocean currents measured)
- Instrument automatically selects best available quality (tradeoff of **precision vs. max current**)

Aanderaa 250 ADCP

Application example, advantages in use

Expandability
SmartGuard connectivity
Data & power expansion
Multi-parameter WC

Buoy installed
AutoBeam advantage
MotionComp advantage



Operations Focus
WiFi connectivity
LED indicator
PowerSwap

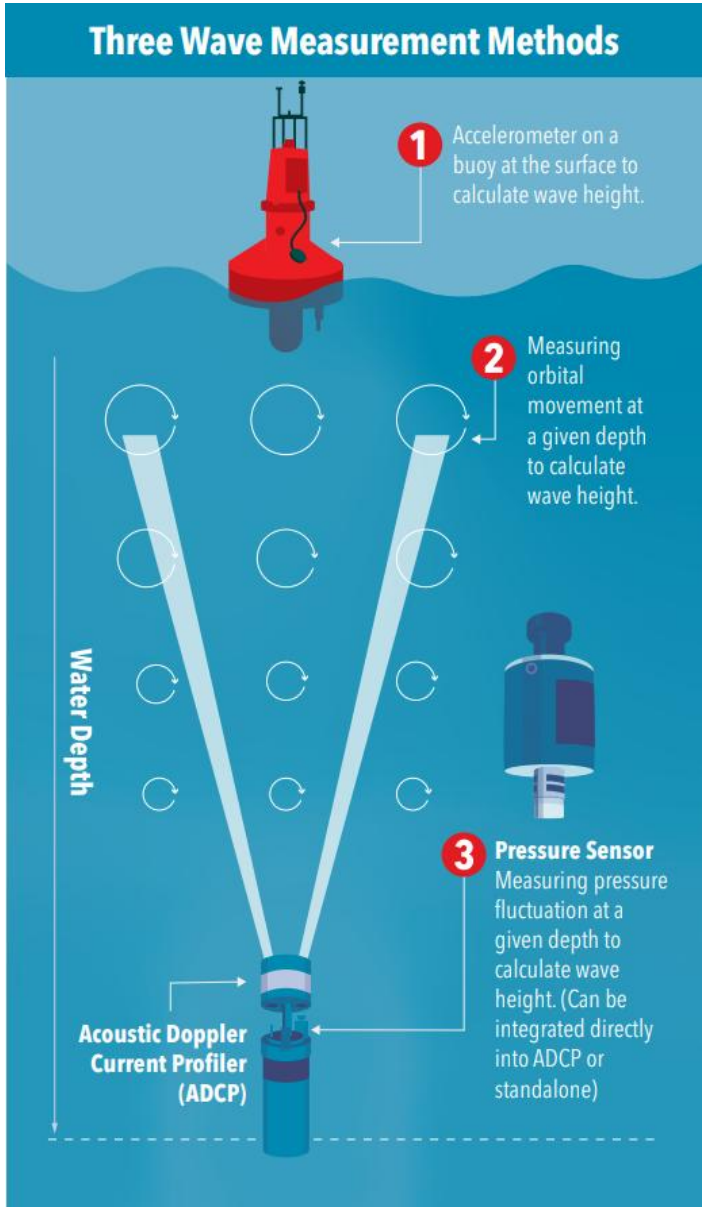
Auto scaling
Max quality vs. velocity

Bottom mounted
FlexiColumn advantage
Data recording
Temperature
Depth / pressure

Improved features with user-focus on operation simplification.

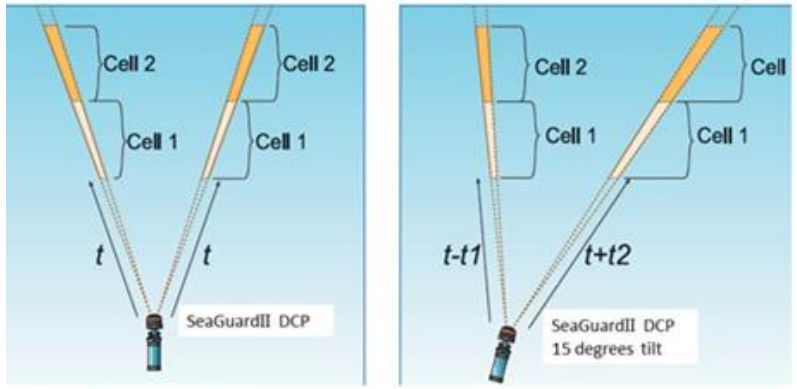
Dynamic cell location during Wave measurement

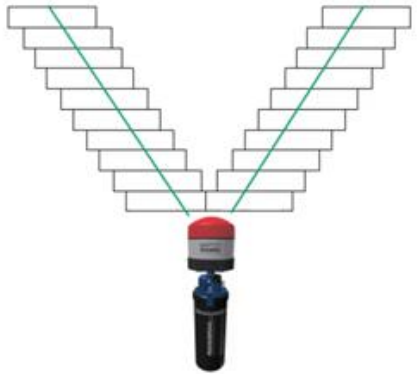
- Due to depth dependent attenuation, the cell used for wave measurement should be as close to the surface without interfering with the surface
- When the significant wave height increases, a deeper cell should be selected to avoid surface interference
- In DCPS and 250 ADCP this depth cell is selected automatically.



Dynamic cell location based on profiler Pitch/Roll

- At every ping-to-ping the orientation of the profiler is calculated.
- On a ping-to-ping basis the correct depth location is identified along every beam.
- For this reason, there will be no smearing of depth cells when using a moving platform like a buoy or in-line mooring frame.





SeaGuard II DCP Wave

xylem
Let's Solve Water

Data sheet
D409

SeaGuard*II* DCP (doppler current profiler)

A powerful tool for site surveys, aquaculture, research, marine transport, offshore energy, and environmental monitoring

The Aanderaa Seaguard*II* DCP is an acoustic Doppler current profiling (ADCP) instrument, with four beams. It operates at 600kHz (broad/narrow band), has embedded tilt and magnetic heading, a range of up to 70 m, and a depth rating of up to 6000 m. Data can be stored internally and can can also be sent in real time over wireless or cabled communications.

- **Automatic Movement** compensation assures accuracy in dynamic applications.
- **Smart Data** provides engineering data without post-processing, and configurable data output.
- **FlexiColumn** function offers simultaneous surface and instrument-referenced columns.

The profiler is optimized for low power use and can be used in both upward and downward orientation with up to 35° inclination. It delivers real-time data or operates autonomously on battery. Optional smart sensors include salinity, wave/tide, oxygen, and turbidity. SeaGuard*II* features 4 analog inputs, 2 serial ports with power control for sensor input, or direct modem connection for real-time transmission.

Low power use
No difference in power consumption between burst and spread mode

Expandable platform
Multi-parameter monitoring hub & logger for water quality sensors

One instrument
Measure waves, currents, and water quality– all with one easy-to-use instrument

AANDERAA xylem

SeaGuard*II* DCP specifications

Velocity profile measurement	
Orientation	Down/up, bottom, mooring or buoy
Current speed	0–500 cm/s (vector averaged)
Range	30–70 m, scatter dependent
Resolution	0.1 cm/s
Accuracy	± 0.3 cm/s or ± 1% of reading
Precision	<3.3 cm, BB 3 m cell size

Acoustics	
Frequency	600 kHz, Broadband (BB), Narrowband (NB)
Transducers	4 (25°) beam with 2.5°
Burst/spread	User selectable
Cell size	0.5–5 m, 0.1 m with overlap
Blanking zone	cell distance down to 0.1m with overlap
Cells	Max 150
Columns	3 simultaneous + surface currents
Ping rate	Up to 10 Hz (config. dependent)
Measurement interval	30 seconds to 2 hours

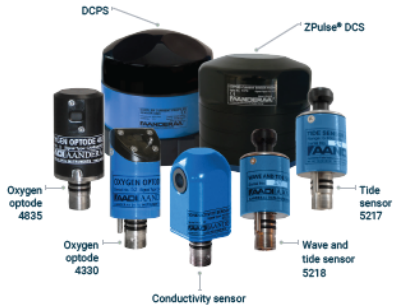
Integrated sensors	
Temperature	-4° to +40°C, accuracy ±0.05°C (optional)
Pressure	0–500 kPa, ±0.2% accuracy (optional)
Tilt	Accelerometer, <0.5°(RMS) accuracy
Compass	<2°accuracy (RMS)

Data	
Interfaces	USB, RS-232, RS-422
Storage	SD card (4 GB)
Set-up	Real Time Collector software (free)
Data plotting	Data Studio 3D (free)
Additional data	Backscatter, Stdev, cross difference

Physical	
Depth capability	300 m, 3000 m, 6000 m
Material and finish	PET, PUR, POM, Titanium
Size (mm)	D: 160 mm, H: 585 mm
Weight (kg)	300 m: 10.8 kg in air; 3.6 kg in water 3000 m: 14.3 kg in air; 6.6 kg in water 6000 m: 15.0 kg in air; 7.2 kg in water
Operating temp.	-5° to +40°C

Power	
Supply voltage	12–30V
Battery	**Rechargeable ~100Wh** Alkaline: 9V@30Ah / Lithium: 7V@70Ah

Optional accessories	
Inline frame	**5744**
Bottom frame	**3448**
AC/DC adapter	**4908 (Lab use only)**
Maintenance/Tool kit	3813 / 3813A / 3986



AutoBeam: If object (mooring chain/float/animal) is obstructing one of the beams, the three remaining are used for current calculations.

FlexiColumn: In upward facing applications, built-in pressure sensor measures the distance to the surface, enabling simultaneous surface referenced and instrument referenced current meaurement:

1. Surface current (cm thick layer)
2. Currents in multiple layers, referred to the surface
3. Currents in multiple layers, referred to the instrument

Incurs no additional power usage. Valuable in applications like; aquaculture, surface transport, currents around the bottom of

MotionComp: Fourth-generation Doppler current sensing technology featuring automatic dynamic tilt and heading compensation. It delivers high-quality current measurements from moving/tilting platforms. When used in combination with AutoBeam, it ensures full measurement range.

Smart Data: The instrument delivers processed engineering data. Tilt, heading & sound speed compensated vector averaged current in real-time. Real-time data control ensures efficient bandwidth use without losing insight.

*SeaGuard*II* DCPS with mooring frame dropped overboard for autonomous deployment.*

Aanderaa Data Instruments AS
Sanddalsringen 5b, PB 103 Midtun,
N-5843 Bergen, Norway
+47 55604800
aanderaa.info@xylem.com
aanderaa.com

AANDERAA xylem

xylem
Let's Solve Water

Data sheet
D411

Doppler current profiler sensor – DCPS

Medium range, 600kHz current profiler smart sensor

The Doppler Current Profiler Sensor (DCPS) features innovative development of the acoustic profiling ability to collect high quality current information also on moving and tilting platforms.

The DCPS can be connected to a SeaGuard*II* or SmartGuard using the CANbus based AiCaP protocol. It can also be connected to a PC or third party systems through the RS-232 interface. This makes the DCPS the ideal cost effective solution for obtaining current profiles in systems already containing a Datalogger. The R-version is equipped with RS-422 interface suitable for communication over longer cables. Available as 300m depth rated (5400/5400R), 4500m (5402/5402R), 6000m (5403/5403R). The 5400P/5400PR is furnished with an internal pressure sensor rated to 100m depth.

Advanta
- Tilt-cor
- 3-beam
- Flexible
- Custom
- Energy-

Doppler current profile sensor specifications

Velocity profile measurement	
Acoustic frequency	600 kHz
Typical profiling range	Broadband: 30–70m Narrowband: 35–80m[1]
Cell size	0.5m–5m
Cell spacing	0.1–30m
Velocity range	Narrowband: 0–500cm/s (up to 1000cm/s for tilt less than ±5°) Broadband: 0–400cm/s
Velocity accuracy	0.3cm/s or ±1% of reading
Velocity resolution	0.1cm/s
Velocity precision	<3,3cm[2]
Ping rate	Up to 10Hz (depends on config)
Output interval	30s to 2h
Cell positioning	Static (instrument referred) and/or Dynamic (surface referred)[3]
Number of columns	3 simultaneous columns + Surface cell[3]
Max. number of cells	150 total, 75 for first column, 50 for the second and 25 for the third
Blanking zone	1m (5400/5400P) 2m (5402, 5403)

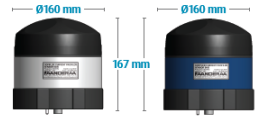
Transducers	
Number of beams	4
Beam angle	25°
Beam width	2.5°

Echo intensity	
Dynamic range	>50dB
Resolution	<0.1dB
Accuracy	<0.1dB

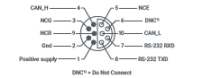
Tilt and compass	
Type	Internal 3-axis tilt solid state
Pitch/roll range	±90°[4] / ±180°[4]
Tilt accuracy	<0.5°(RMS), ±1.5°
Heading accuracy	<2°(RMS), ±3.5° (0–15° tilt), ±4.5° (15–35° tilt)
Tilt/heading resolution	<0.1°

Interfaces	
5400/5400P/5402/5403/5400P/5402R/5403R	AiCaP protocol, RS-232
5400PR	RS-422

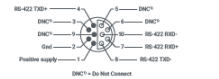
Maximum cable length	
RS-232	15m
RS-422	1500m



Pin configuration 5400/5400P/5402/5403
Receptacle, exterior view; pin = ● bushing = ○



Pin configuration 5400R/5402R/5403R
Receptacle, exterior view; pin = ● bushing = ○



Power	
Supply voltage	6–30 Vdc
Current drain example	4.2mA[4]

Environmental		
Depth rating	PGW/PRGW: 100m SW/RSW: 300m IW/RIW: 4500m DW/RDW: 6000m	
Operating temperature	-5 to +40°C	
Dimensions	D: 160mm H: 167mm	
Weight	*In air*	*In seawater*
S/W	5.1kg	1.8kg
IW/DW	7.2kg	4.0kg

Embedded temperature sensor (4080 optional)	
Range	-4 to +40°C
Resolution	0,001°C
Accuracy	±0,05°C
Response time	<5 sec

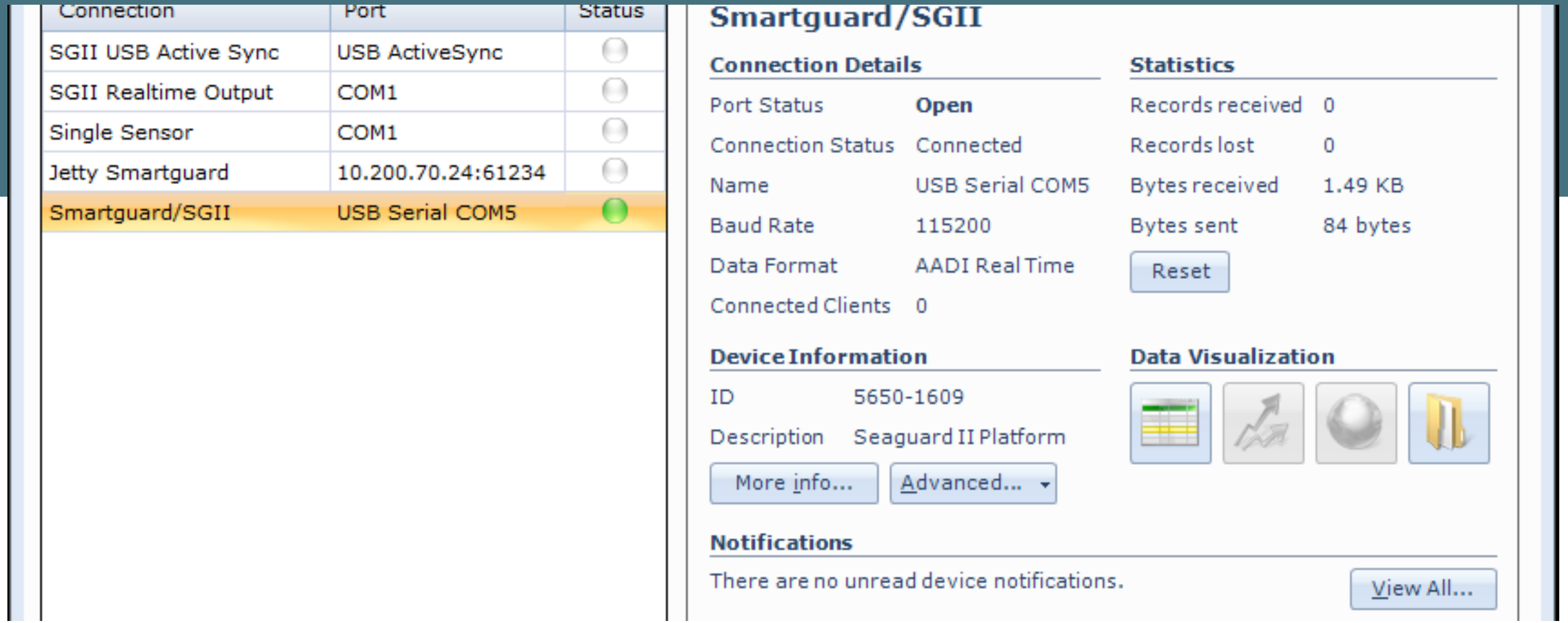
Embedded pressure sensor (5400P/PR only)	
Range	0–1 M Pa
Resolution	<0,001%
Accuracy	<0,3%

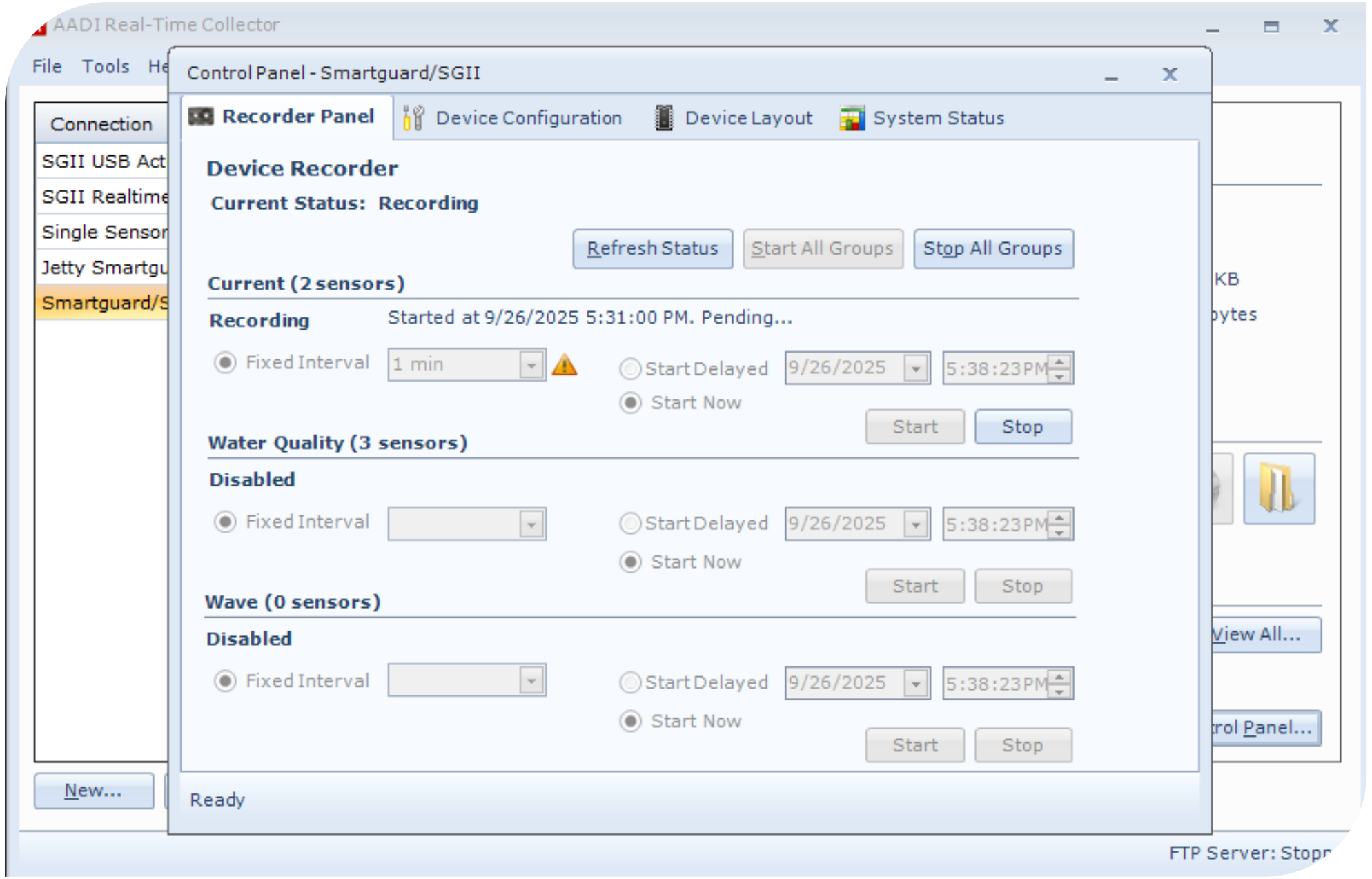
[1] Typical range with normal backscatter conditions. The measurement range is highly dependent on the scattering conditions. For waters with low amount of scatters, expect a shorter range than for waters with a high amount of scatters.
[2] Standard deviation for the horizontal velocity in broadband mode, 3m cell size.
[3] Requires pressure data, only available for 5400P/PR or when the DCPS connected to a SmartGuard or SeaGuardII data logger with pressure sensor.
[4] Compensation calibrated up to ±35°.
[5] In Broadband mode, 30min. Interval, 20x2 pings, 2m cell size, 20 cells.

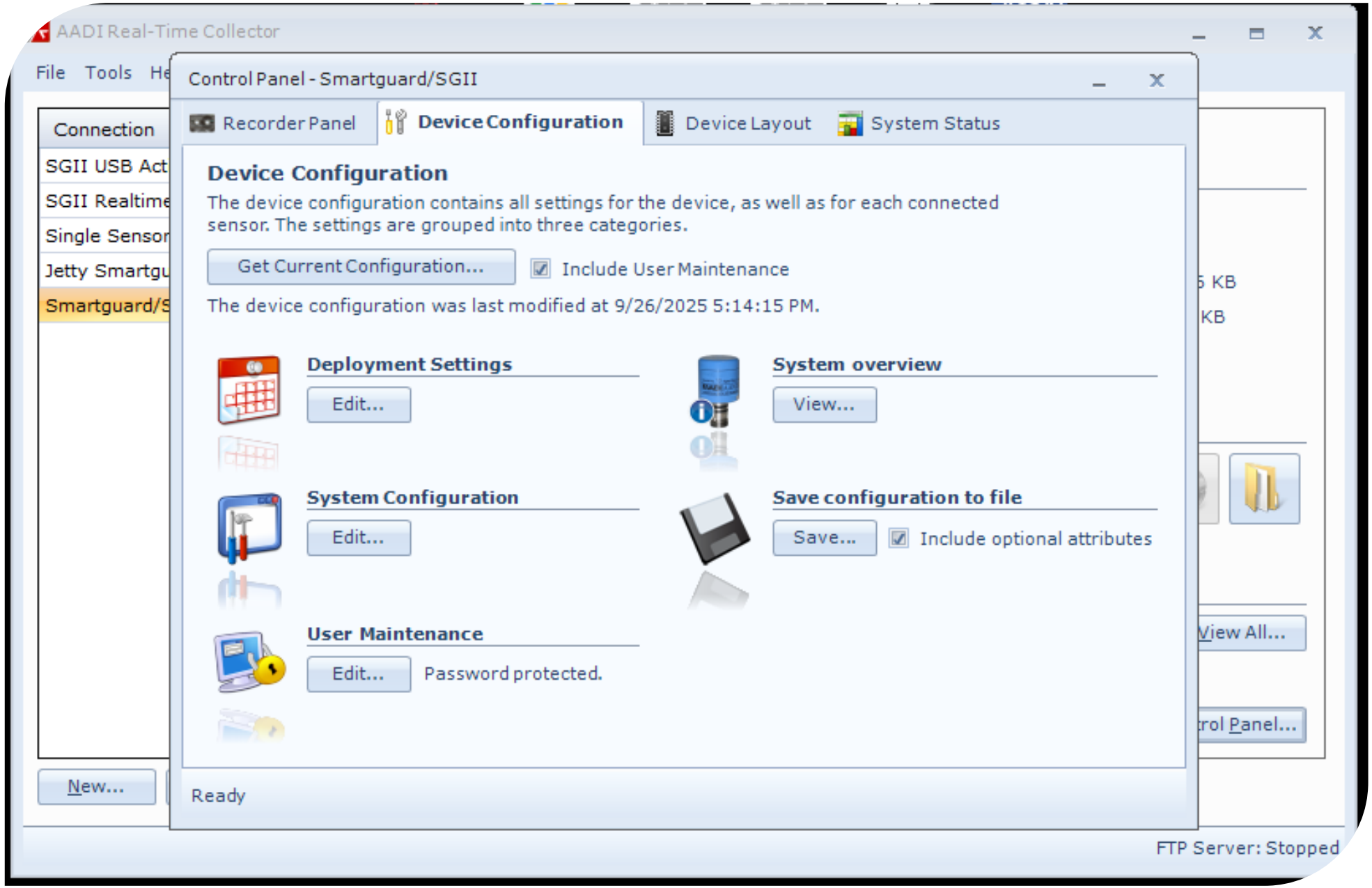
Aanderaa Data Instruments AS
Sanddalsringen 5b, PB 103 Midtun,
N-5843 Bergen, Norway
+47 55604800
aanderaa.info@xylem.com
aanderaa.com

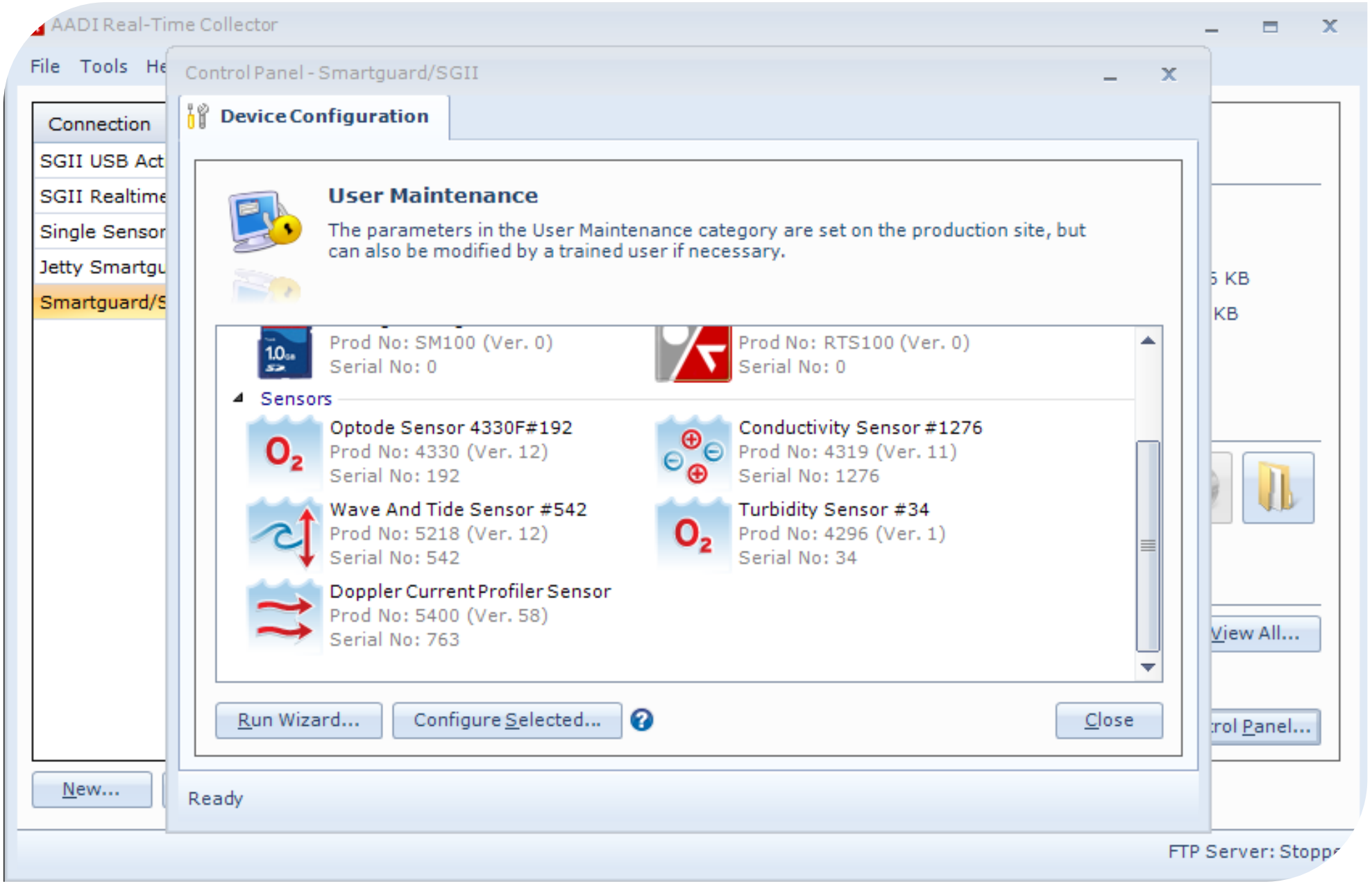
AANDERAA xylem

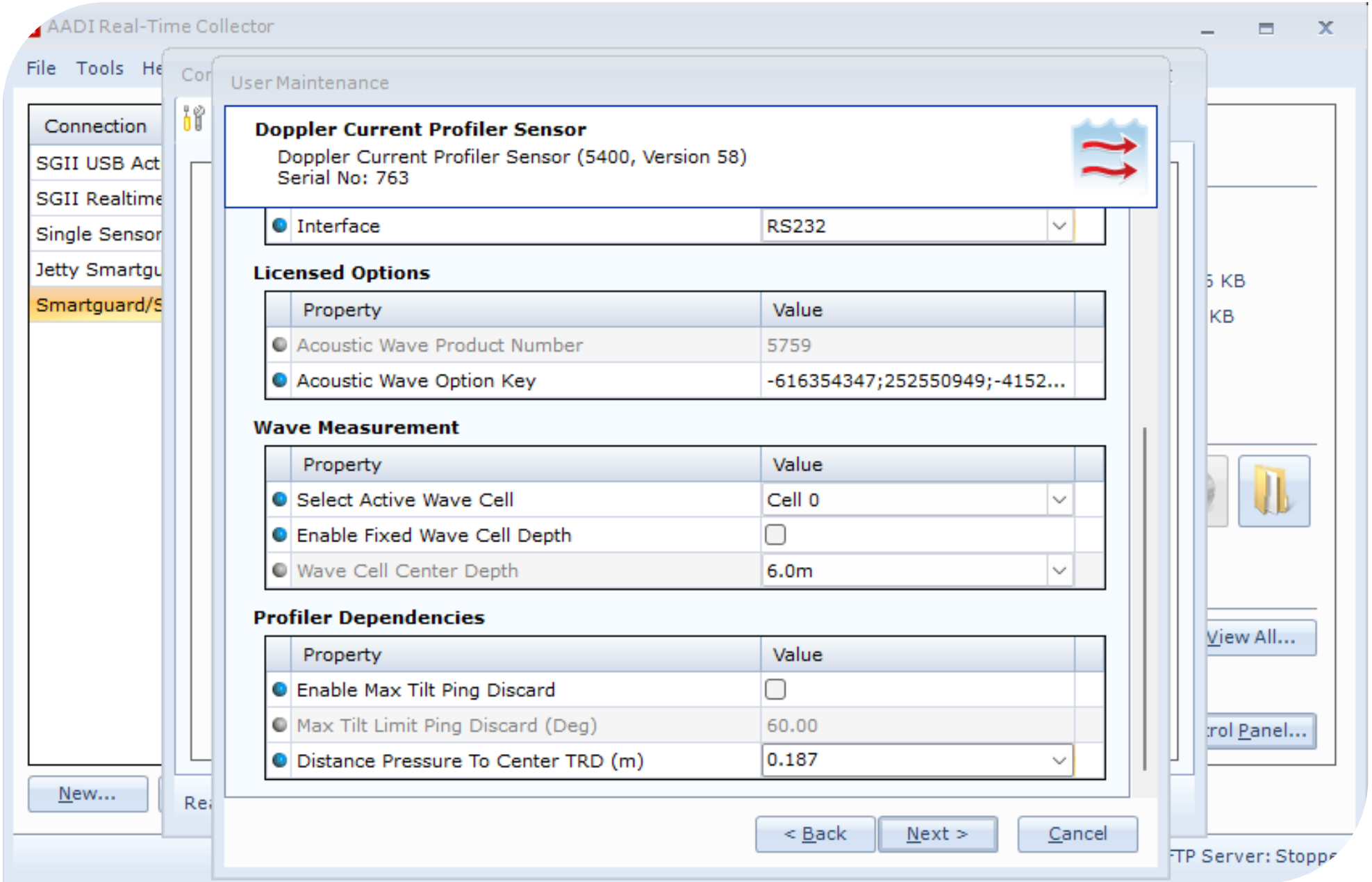
Seaguard II DCP Wave Configuration

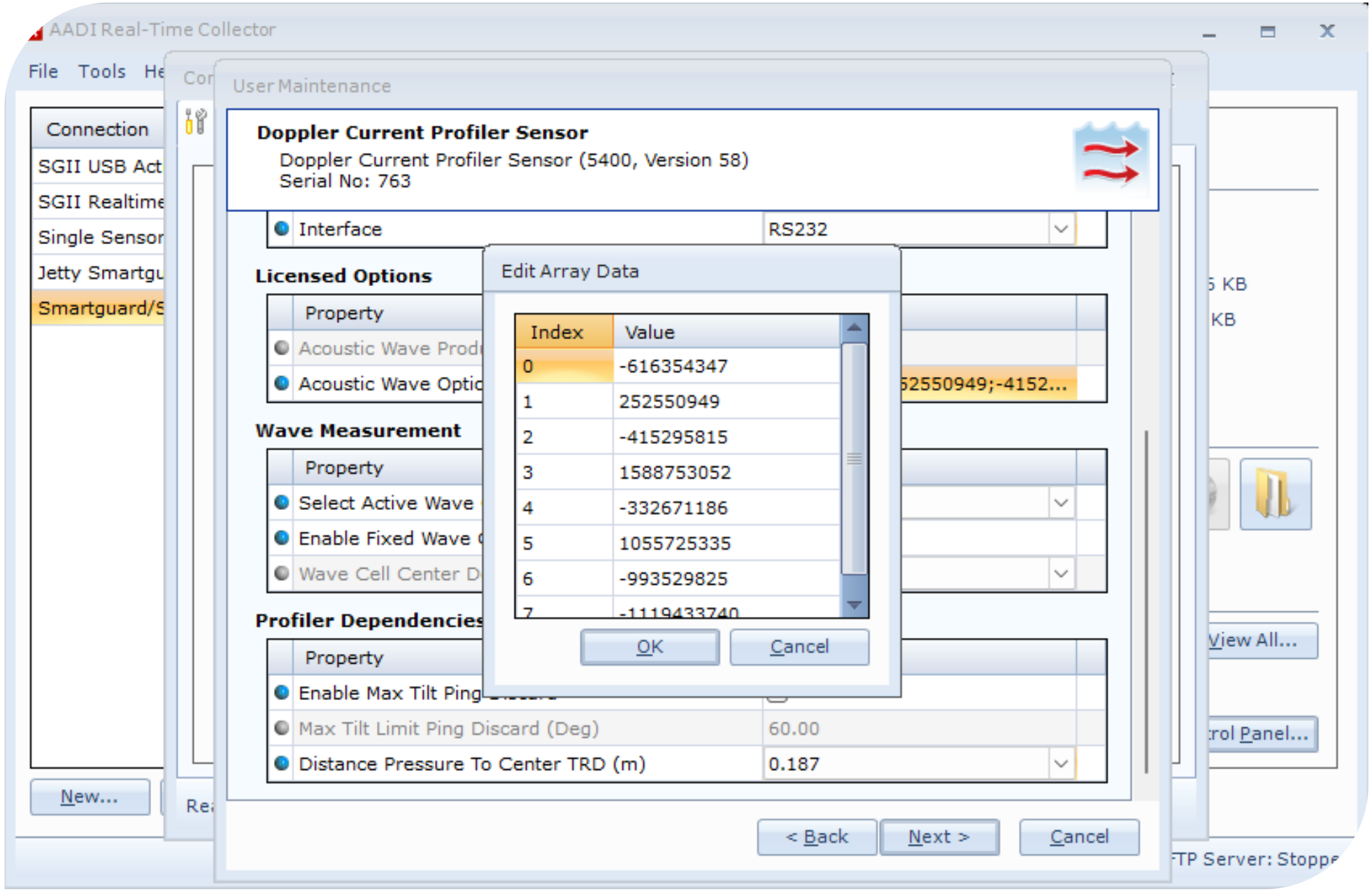



AADI Real-Time Collector
File
Tools
Control Panel - Smartguard/SGII
Recorder Panel
Device Configuration
Device Layout
System Status
Device Recorder
Current Status: Recording
Refresh Status
Start All Groups
Stop All Groups
Current (2 sensors)
Recording
Started at 9/26/2025 5:31:00 PM. Pending...
Fixed Interval
1 min
Start Delayed
9/26/2025
5:38:23PM
Start Now
Start
Stop
Water Quality (3 sensors)
Disabled
Wave (0 sensors)
Ready
Connection
SGII USB Act
SGII Realtime
Single Sensor
Jetty Smartgu
Smartguard/S
New...
View All...
FTP Server: Stopr


AADI Real-Time Collector
File
Tools
Control Panel - Smartguard/SGII
Recorder Panel
Device Configuration
Device Layout
System Status
Device Configuration
The device configuration contains all settings for the device, as well as for each connected sensor. The settings are grouped into three categories.
Get Current Configuration...
Include User Maintenance
The device configuration was last modified at 9/26/2025 5:14:15 PM.
Deployment Settings
Edit...
System overview
View...
System Configuration
Edit...
Save configuration to file
Save...
Include optional attributes
User Maintenance
Edit...
Password protected.
Ready
Connection
SGII USB Act
SGII Realtime
Single Sensor
Jetty Smartgu
Smartguard/S
New...
View All...
trol Panel...
FTP Server: Stopped

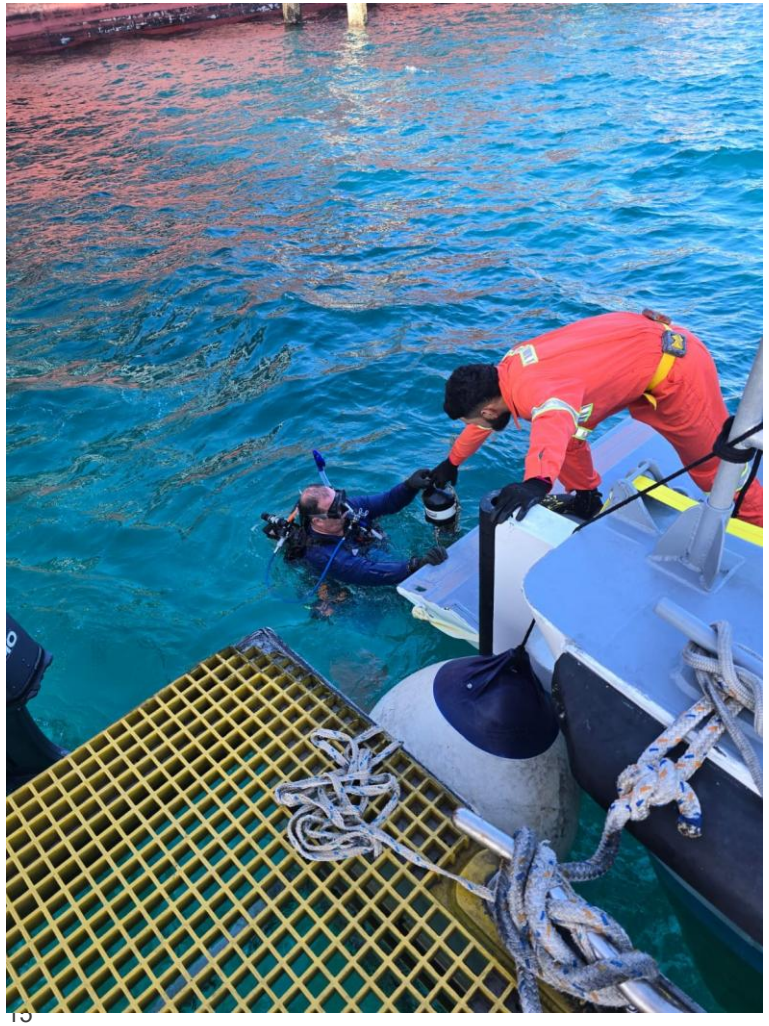

AADI Real-Time Collector
File
Tools
Control Panel - Smartguard/SGII
Device Configuration
Connection
SGII USB Act
SGII Realtime
Single Sensor
Jetty Smartgu
Smartguard/S
User Maintenance
The parameters in the User Maintenance category are set on the production site, but can also be modified by a trained user if necessary.
Prod No: SM100 (Ver. 0)
Serial No: 0
Prod No: RTS100 (Ver. 0)
Serial No: 0
Sensors
Optode Sensor 4330F#192
Prod No: 4330 (Ver. 12)
Serial No: 192
Conductivity Sensor #1276
Prod No: 4319 (Ver. 11)
Serial No: 1276
Wave And Tide Sensor #542
Prod No: 5218 (Ver. 12)
Serial No: 542
Turbidity Sensor #34
Prod No: 4296 (Ver. 1)
Serial No: 34
Doppler Current Profiler Sensor
Prod No: 5400 (Ver. 58)
Serial No: 763
Run Wizard...
Configure Selected...
Close
Ready
New...
View All...
FTP Server: Stopp

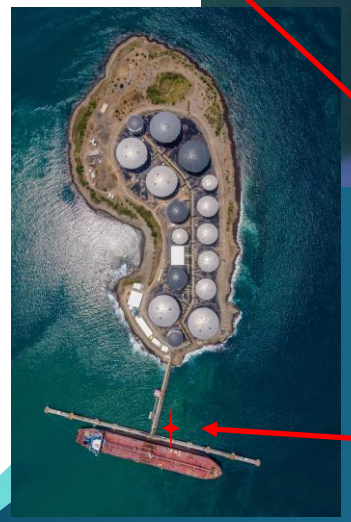

AADI Real-Time Collector
File
Tools
User Maintenance
Doppler Current Profiler Sensor
Doppler Current Profiler Sensor (5400, Version 58)
Serial No: 763
Interface
RS232
Licensed Options
Property
Value
Acoustic Wave Product Number
5759
Acoustic Wave Option Key
-616354347;252550949;-4152...
Wave Measurement
Select Active Wave Cell
Cell 0
Enable Fixed Wave Cell Depth
Wave Cell Center Depth
6.0m
Profiler Dependencies
Enable Max Tilt Ping Discard
Max Tilt Limit Ping Discard (Deg)
60.00
Distance Pressure To Center TRD (m)
0.187
< Back
Next >
Cancel
Connection
SGII USB Act
SGII Realtime
Single Sensor
Jetty Smartgu
Smartguard/S
New...
View All...
rol Panel...
FTP Server: Stopp


AADI Real-Time Collector
File
Tools
User Maintenance
Doppler Current Profiler Sensor
Doppler Current Profiler Sensor (5400, Version 58)
Serial No: 763
Interface
RS232
Licensed Options
Property
Wave Measurement
Select Active Wave
Profiler Dependencies
Enable Max Tilt Ping
Max Tilt Limit Ping Discard (Deg)
60.00
Distance Pressure To Center TRD (m)
0.187
Edit Array Data
Index
Value
0
-616354347
1
252550949
2
-415295815
3
1588753052
4
-332671186
5
1055725335
6
-993529825
OK
Cancel
< Back
Next >
Cancel
Connection
New...
View All...

Real-time Connection Case Study……

422 to 232…





xylem

Thank You

Jon.Fajans@xylem.com