NORTEK MANUALS

Nortek VM Service

N3015-045 | V3.1

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1 Introduction

The Nortek VM Service is a version of the software that can run unattended on a computer that has no monitor, keyboard or mouse attached. This will allow users to write their own control software and use the processed data as input to their system as if the Nortek VM-ADCP was just another sensor.

Communication to this 'black box' is done through ethernet. If a serial connection is required, this may be done through an external converter box. Using these interfaces and text-based commands it is possible to configure the system, issue start and stop commands and collect data.

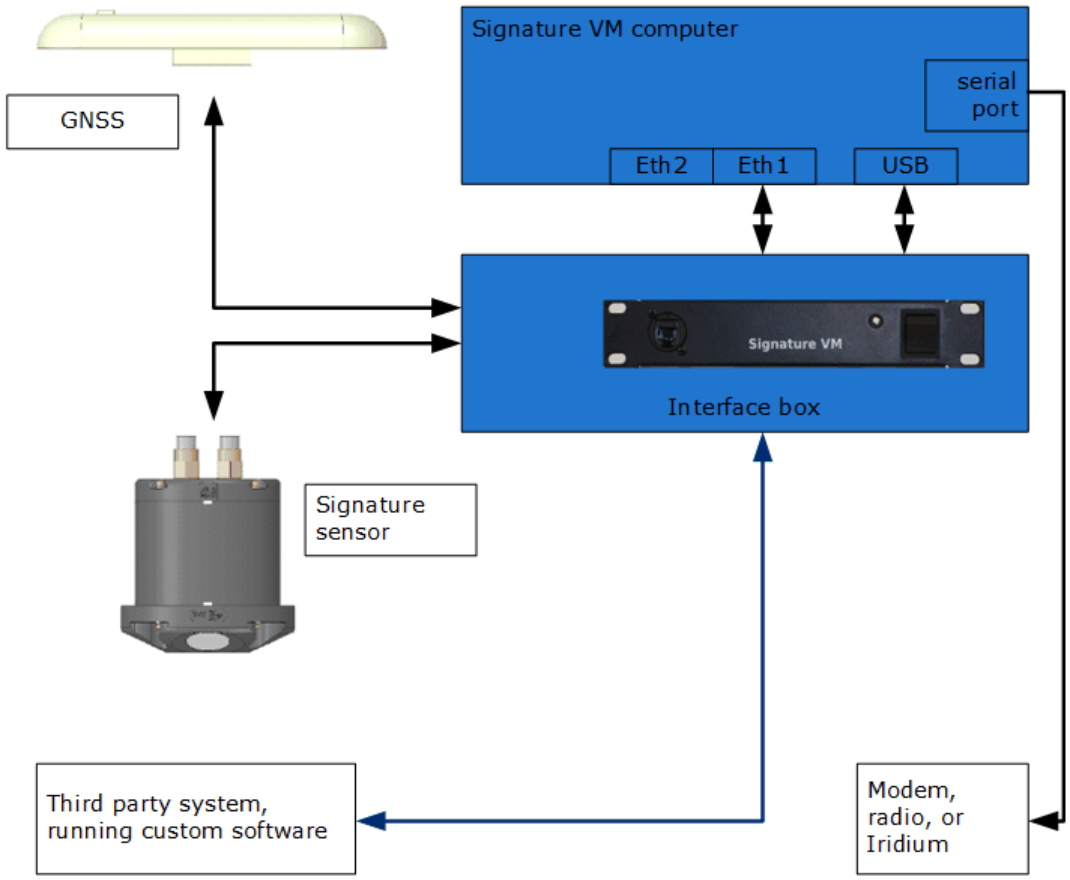

Figure 1: Nortek VM stand-alone interconnections

2 Nortek VM Service

The Nortek VM Service runs a service on Windows computers. This means it will always run in the background, unless explicitly disabled using the 'Task Manager' or from the command line. Note that this is a risk when installing this version on a desktop PC. The service will always run, hidden from the user, and if it is configured for 'AutoStart' try to connect to the nearest VM-ADCP. This might cause problems when running any other Nortek software like Signature Deploy or Midas.

When the service is started it will read its settings from the file 'SignatureVM.config', located in 'C:\Nortek\SignatureVM_Service\'. One of these settings is 'AutoStart'. If this is enabled, the service will automatically try to connect to a specified VM-ADCP and start measuring. If the connection is lost or interrupted, the service will keep retrying to connect and start the sensor.

When the system is measuring the data will be stored on a local hard disk. Data is also available in text format (NMEA style) on a different ethernet port.

2.1 Installing

The Nortek VM Service has a separate installer (see figure 2), with an option to start the service right after the installation.

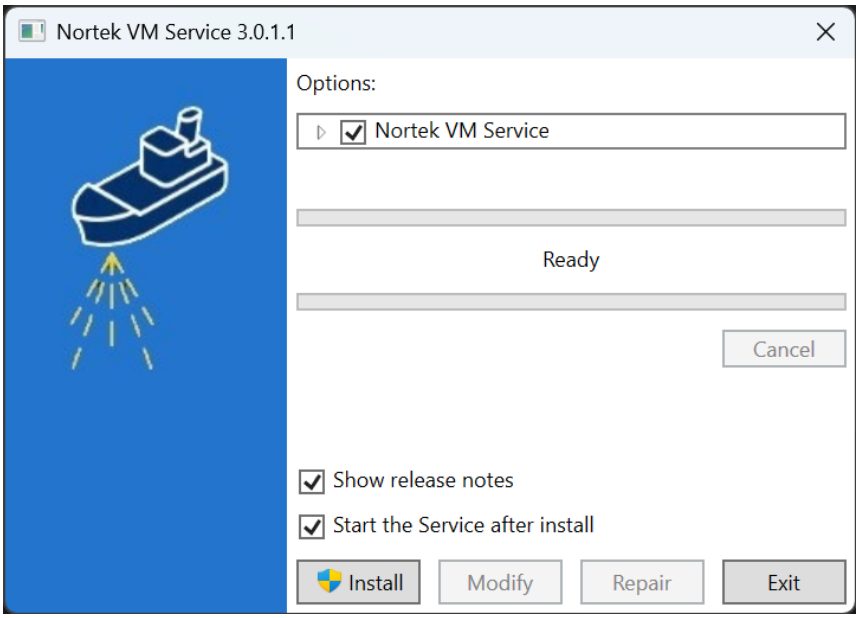

Figure 2: Nortek VM Service installer

2.2 Checking or Starting the service

When the service is installed it will be visible in the 'Services' manager. This can be checked by opening the 'Task Manager' and clicking 'Services'. Search for 'NortekVMService'. The service can now be started manually (from the right-click context menu), or you can open the Services console ("Open Services"), and set the 'Startup Type' to Automatic so it will automatically start when the computer starts up (in the Services console, search for "Nortek VM Service"). Figure 3 shows the Services console.

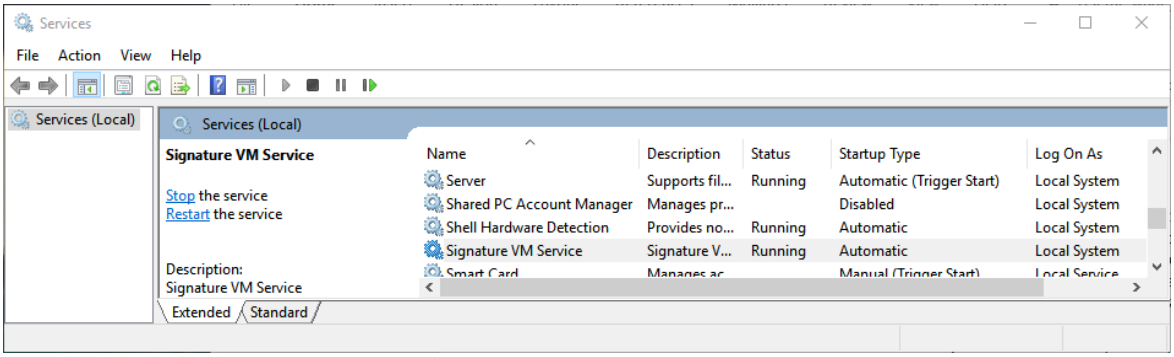

Figure 3: Services - Nortek VM Service is running

It is also possible to start or stop the service from an elevated PowerShell window by typing:

```
Start-Service NortekVMService
```
or

```
Stop-Service NortekVMService
```

The Command Prompt equivalents are '`net start NortekVMService`' and '`net stop NortekVMService`', or alternatively, `'sc start NortekVMService` and `'sc stop NortekVMService`. (Use an elevated command prompt, i.e., 'Run as Administrator'.)

2.3 Configuring the service

When the service is running it may be configured using the command line interface as described in section Command Line Interface - Telnet 9 . Settings are stored in the 'SignatureVM.config' file, which is in the main data folder: 'C:\Nortek\SignatureVM_Service'. It is an XML based text file which can be opened and edited using a standard text editor.

Note: If the .config file does not yet exist, create it by typing 'save' from the command line !

2.3.1 Location of files

The service itself is in :

```
C:\Program Files\Nortek\Signature.VM.Service
```

Default deployment files are in :

```
C:\Program Files\Nortek\Signature.VM.Service\Deployment
```

Configuration, data and log files:

```
C:\Nortek\SignatureVM_Service
```

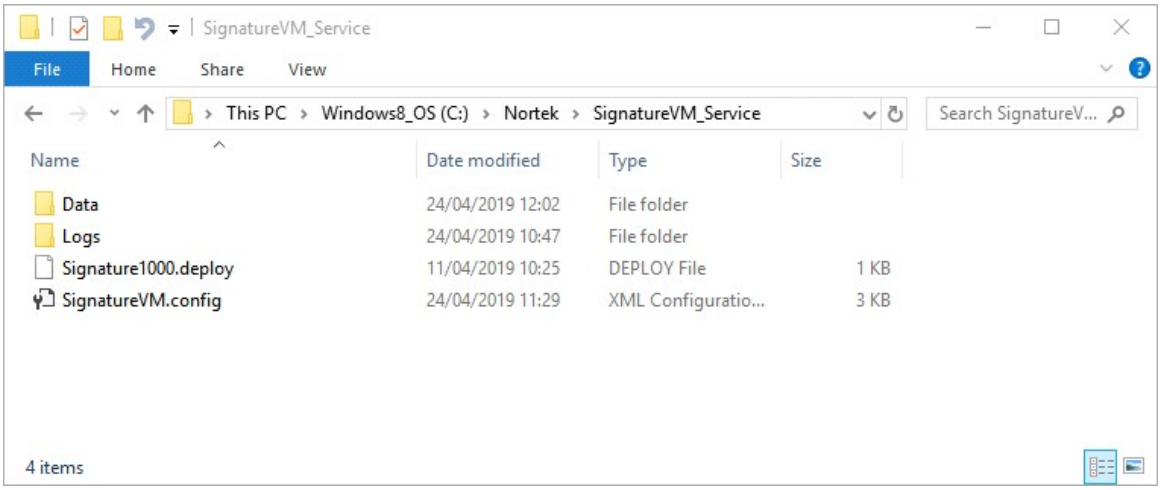

Figure 4: Deployment files in Explorer

The location of the deployment file and where the data is recorded can be changed by setting the 'deploymentfile' and 'recorderpath'. For example, by editing the .config file:

```
<DeploymentFile>
   C:\Nortek\SignatureVM_Service\Signature1000.deploy
</DeploymentFile>
<RecorderPath>C:\Nortek\SignatureVM_Service\Data</RecorderPath>
```

3 Web Interface

When the service is running, there is a basic web-interface available. Open a browser and access 'localhost:80'. Figure 5 shows an example.

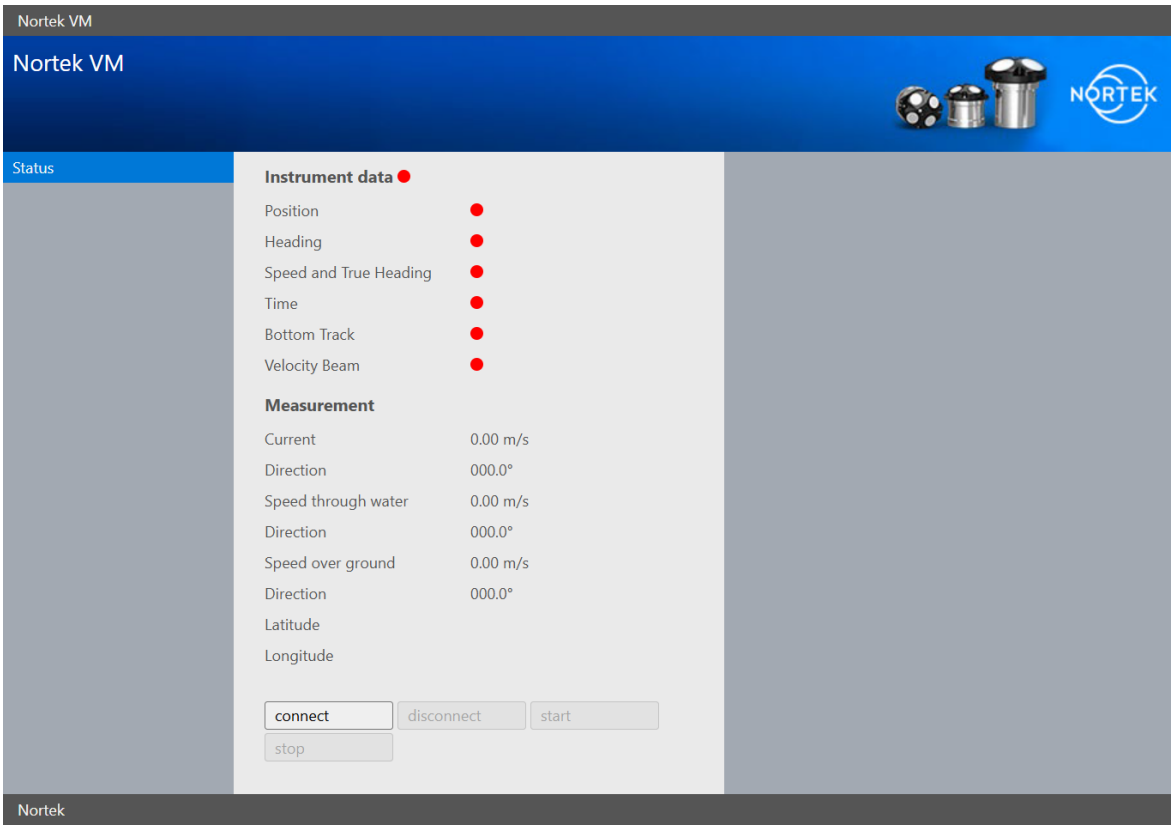

Figure 5:Nortek VM Service web interface

This only has a few basic controls, but it does allow you to see the status of the instrument and some of the key parameters.

4 Command Line Interface - Telnet

When the Nortek VM Service is running it can be controlled using the command-line interface (CLI). The CLI version of Nortek VM is based on Telnet. Telnet is a protocol used on a network to provide bidirectional communication using a virtual terminal connection. The Telnet interface is available on port 9010.

Port numbers:
9010 Telnet-protocol ASCII Command interface
9011 RESERVED
9012 NMEA style data output

Commands are ASCII based, line oriented and terminated with CR/LF. Commands are not case sensitive, so '`deploy`', '`DEPLOY`' or '`DePloy`' are all treated the same.

4.1 Command interface

Connect to the Nortek VM Service over Ethernet using a Telnet client, like PuTTY, or the built-in client for Windows. The Telnet Client can be enabled in 'Turn Windows features on or of'. Using the '`telnet`' command, you can connect to the service using '`telnet localhost 9010`'.

After a Telnet connection is made to the Nortek VM Service it will ask for a username and password. The Username is 'nortek' and there is no password so you can just hit enter. All commands consist of one or two words, separated by a comma or space.

A 'help' command is available that will show all possible commands. To get help on an individual command, type 'help *command'*. Note that any changes made to the settings will only be stored to the 'SignatureVM.config' file after the 'save' command.

A note about 'on'/'off' values: When used on the command-line, 'on', 'true', 'T', and 1 are all equivalent to each other; 'off', 'false', 'F' and 0 are all equivalent to each other. However, in the XML configuration file, use only 'true' and 'false'.

Table 1 shows an overview of available commands.

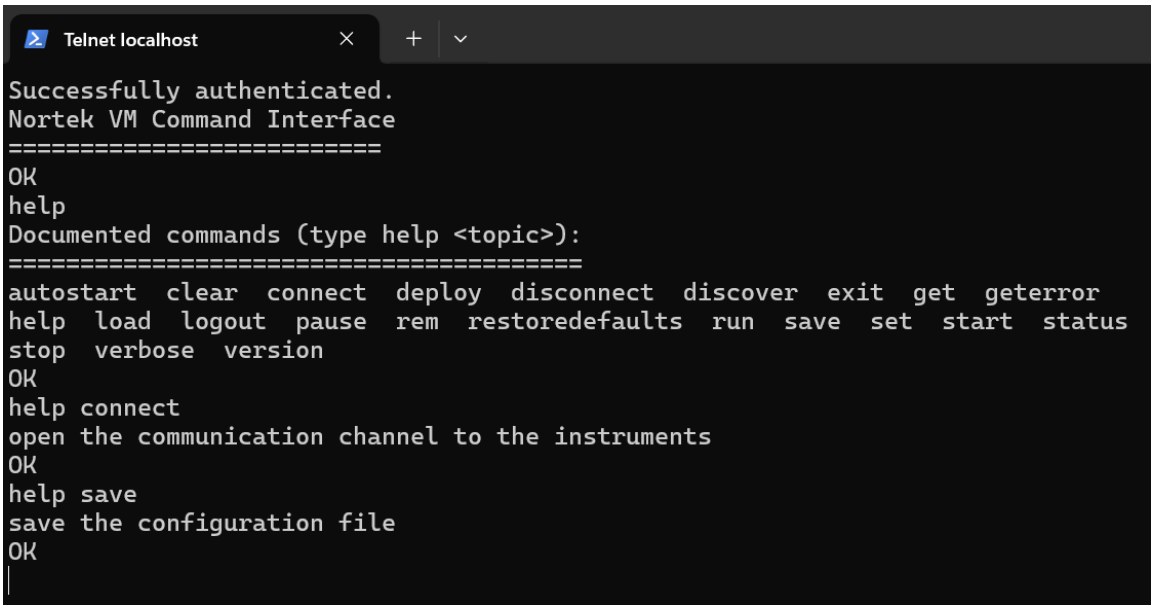

Figure 6: Telnet session showing the Help command

Table 1: Available commands

Command	*parameter*	*description*
		No parameter → shows current setting or related status
		(get / set / help: show all settings or commands)
	—	Command does not take a parameter
	<xxx>	Mandatory argument
	[xxx]	Optional argument
	—*—	Any argument is ignored
		See note (x) below for prerequisites/notes (x)
autostart	on / off	Switch the autostart task on or off. If this is 'true' the service will always try to connect to the instrument.
clear	—*—	Clears the screen
connect	—*—	Open the communication channel to the instruments
deploy	—*—	Send deployment parameters for the measurement to the VM-ADCP
disconnect	—*—	Disconnect the instruments (Close the communication channel) (2)
discover	—*—	Discover connected VM-ADCP sensors (Try to discover all available VM-ADCP sensors on this network.)
exit		Closes the Telnet session (The service will still be running.)
get		Get an environment variable (the value of a program setting)
geterror	—*—	Get the latest error message. When a command fails or an error occurs, and verbose is off, the service just returns the word 'ERROR'. Use 'geterror' to read the error message.
help		List available commands with "help" or detailed help with "help cmd".
load	[filename]	Load the 'SignatureVM.Config' configuration file (4)
logout		Closes the Telnet session (same as exit)
pause	<ms>	Pause <milliseconds>
rem	—*—	Remark

Command	*parameter*	*description*
restoredefaults		Restore the default settings of the service (not the VM-ADCP)
run	<script>	Run a script
save	[filename]	Save all the settings to the 'SignatureVM.config' configuration file (4)
set		Set an environment variable (the value of a program setting)
start	—*—	Starts the measurement (1)
status	—*—	Show the status of the system
stop	—*—	Stop the measurement (3)
verbose	on / off	Verbose on or off. If this is set to 'on' the messages and warnings will be displayed.
version	—*—	Show program version information

Notes:

(1): needs a connected, deployed instrument (first use connect, then deploy)

(2): need to stop measurement first

(3): Note that following a stop you can immediately send a 'start'. No need to 'connect' or 'deploy' again.

(4): default: c:\Nortek\SignatureVM_Service\SignatureVM.config
If you specify a filename, that file will be used instead. Note that you cannot specify a different directory-path, and you have to specify the file-extension, too.

4.1.1 AutoStart

This is one of the top-level settings that controls the behaviour of the service on startup. When set tot 'true' the service will continuously try to connect to the specified VM-ADCP (or when not found, to the first VM-ADCP sensor available on the network), and when it is connected it will try to deploy and start. So, when an error occurs, or the instrument is temporarily disconnected the system will automatically try to reconnect and restart the measurement.

4.1.2 Deploy

Send the deployment information to the VM-ADCP. This is basically the content of the 'Signature.deploy' file and it configures things like averaging, cellsize, blanking distance etc.

If a location is specified for the deploy file (e.g. 'C:\Nortek\SignatureVM_Service\Signature1000_SpecialSettings.deploy'), this will be used. If no file is specified, the system will use the default file which is in the 'Deployment' sub-folder of the Nortek.VM.Service.exe file location.

4.1.3 Discover

When a VM-ADCP is connected for the first time to a network it will be assigned an IP address. The service will automatically scan for a sensor on start-up, but sometimes it may be useful to run the discover command manually, for example when there is more than one sensor on the

network. The discover command scans the network for VM-ADCP sensors and shows their serial number and IP address.

4.1.4 Start / Stop

When the 'connect' and 'deploy' commands have completed, the instrument is ready to start measuring. If the deployment is also set for continuous measurement the 'start' and 'stop' command may be used to instantaneously start and stop measuring.

4.2 Processing and calculation settings

These variables should be changed using the 'Set' command, or you can use 'Get' to see the current value. Any changes made here will not be written to the 'SignatureVM.config' file unless you type 'save'!

All settings as described here are stored in the config file as standard XML tags with the same name.

(For on/off / true/false settings, see the remark in section Command interface 9 .)

Example:

```
<CorrectionSource>None</CorrectionSource>
<EnableAltimeter>true</EnableAltimeter>
```

Or with settings that have additional parameters:

```
<PrimaryChannel>
    <LinkType>UdpAn</LinkType>
    <NetworkSettings>
      <Address>239.192.1.1</Address>
      <Adapter>Ethernet</Adapter>
      <Port>9002</Port>
    </NetworkSettings>
</PrimaryChannel>
```

After changing and saving a new value, make sure you stop -> disconnect and then connect –> deploy -> start to make sure the new settings are applied.

Note that the table of settings on the next pages contains settings that have changed name and/or sub-options with respect to the older versions of the Service/CLI module. The table indicates how these settings need to be used now.

As a simple example, the old setting 'amplimit' is now called 'amplitudelimit'.

A more complicated example is the old settings 'outputformats', used to select what NMEA strings to send out. This is now a sub-option of 'output', as the number of settings and options for output has grown significantly. The new syntax for 'set outputformats' is now 'set output nmeaformat' (followed by further options).

There are a couple of settings marked 'deprecated'. Although it looks like you can still set these variables to some value, for these settings the Service/CLI interface no longer replies with the value that you tried to set it to, and you can no longer use 'get' to retrieve the current setting for these variables. But using these variables with 'set' or 'get' will not result in an error condition.

Table 2: Overview and description of options/setttings and sub-settings

setting		***description***
options / sub-settings		
amplimit	× → **amplitudelimit**	
amplitudelimit	double / “”	'Remove data in processing if amplitude is less than this value' "" for none
averageinterval	int32	'Interval to calculate average velocity'
blankingdistance	double / “”	'Blanking distance [m]' "" for none NOTE: This overrules the setting in the .deploy file.
cellsize	double / “”	'Cell Size in meters' "" for none NOTE: This overrules the setting in the .deploy file.
clocksource	*select one of these options:*	'Use this source for the clock'
auto		× this option has been removed
primarychannel		
secondarychannel		
correctionsource	*select one of these options:*	'Choose source for correction of velocity value.'
gnss		
bottomtrackxyz		
bottomtrackenu		
none		
correlationlimit	double / “”	'Remove data in processing if correlation is less than this value' "" for none

setting *options / sub-settings*			*description*
corrlimit		× → **correlationlimit**	
deploymentfile		string	'default Deployment file' (including path)
depthrange		double	'Range to average the velocity'
depthsource		*select one of these options:*	'Select the source for water depth '
	automatic		
	altimeter		
	bottomtrackbeamdistance		
	velocityamplitude		
	lastcell		
displayunits			[deprecated]
echosounder1calibration			'Settings factors for the echosounder channel1'
	a	double	'A from Ax^2+Bx+c' × this option has been removed
	b	double	'B from Ax^2+Bx+c' × this option has been removed
	c	double	'C from Ax^2+Bx+c' × this option has been removed
	noiselevel	double	'The noise level is affected by instrument-generated electronic noise (thermal noise) and environmental noise in the measured frequency range Minimum noise level, cells with lower amplitude will be filtered out Leave blank for default.'

setting *options / sub-settings*			*description*
			"" for none
	units	*select one of these options:*	'Change units to sediment concentration when volume backscattering is converted using the above constants.' [deprecated]
		db	decibels [dB] [deprecated]
		kgm3	kilogram per cubic meter [kg/m^3] [deprecated]
echosounder2calibration		[see echosounder1calibration for options and sub-settings]	Settings factors for the echosounder channel2'
echosounder3calibration		[see echosounder1calibration for options and sub-settings]	Settings factors for the echosounder channel3' *Note: the third echosounder channel is for experimental purposes only.*
enablealtimeter		on / off	'Enable Altimeter'
enablebottomtrack		on / off	'Disable the bottom track when the bottom is out of range or to increase the velocity ping rate'
enablebroadband		on / off	'Enable BroadBand'
fomthreshold		double / ""	'Remove data in processing if FOM is more than this value Leave blank for default (1000)'' "" for none
frequency		*select one of these options:*	'Frequency'
	f0		
	f55		

setting			*description*
	options / sub-settings		
	f75		
	f100		
	f250		
	f333		
	f500		
	f1000		
gnssmounting			'GNSS mounting offset and orientation'
	x	double	'X offset'
	y	double	'Y offset'
	z	double	'Z offset'
	orientation	double	'Orientation angle, relative to the bow'
headingsource			'Use this source for heading'
	source	*select one of these options:*	'Primary channel'
		primarychannel	
		secondarychannel	
	headingtype	*select one of these options:*	'Heading type'
		avd	
		hdt	
		ths	
		nthpr	
instrumentinterface			'Instrument settings'
	instrumentlocation	*select one of these options:*	'InstrumentLocation'
		none	

setting				*description*
	options / sub-settings			
		local		
		remote		
	speedlogtypesettings	× → **remotetypesettings**		(renamed)
	remotetypesettings			'Remote Settings'
		deviceid	string	'DeviceID'
		address	string	'IP Adress'
		adapter	string	'Network Adapter'
		port	int32	'UDP Port'
	signaturetypesettings			'VM-ADCP Settings'
		address	string	'IP Adress' [or serial nr]
		useptp	× → **timesynctype ptp**	
		timesynctype	*select one of these options:*	'Select the type of clock source used to synchronize the VM-ADCP'
			none	
			ptp	
			ntp	
		ntpserveraddress	string	'IP address of the NTP server'
		dataformatbottomtrack21	on / off	'Output DF21 Bottomtrack Dataformat The data will be sent on the VM-ADCP's serial output at 115.2 KBaud.'
		dataformatwatertrack22	on / off	'Output DF22 Watertrack Dataformat The data will be sent on the VM-ADCP's serial output at 115.2 KBaud.'
		ahrsfaststartup	on / off	'When a VM-ADCP is powered up on a fast

setting / *options / sub-settings*				*description*
				moving platform the internal AHRS can fail to initialize properly. Selecting "Fast startup" can resolve this.'
internalrecording			on / off	'Enable Recording on the VM-ADCP's internal disk'
longrange			on / off	'Long Range'
magneticdeviation				[deprecated]
maxdepth			double	'Maximum depth'
maxrecordinglength			string	'Max recording length, leave blank for infinite or dd.hh:mm:ss'
mindepth			double	'Minimum depth'
navigationsource			*select one of these options:*	'Use this source for navigation'
	primarychannel			
	secondarychannel			
nmeaoutputmaxcells			**× → output nmeaformat maxcells**	
nmeasource			**× → headingsource source / navigationsource / speedovergroundsource**	
notequalifiers				[deprecated]
numoutputchannels			int	
output(n)				'Data Output channel' n is a number up to 3
	device		*select one of these options:*	[deprecated; use output link device (option)]
		none		
		serial		
		udp		

setting							*description*
	options / sub-settings						
		file					
	format			*select one of these options:*			'Format'
		none					
		nmea					
		ad2cp					
	link						'Link'
		device			*select one of these options:*		'Device for output'
			none				
			serial				
			udp				
			file				
		serialsettings					'SerialSettings'
			port		string		'Port'
			baudrate		int32		'Baud rate'
			parity		*select one of these options:*		'Parity'
				none			
				odd			
				even			
				mark			
				space			
			databits		int32		'Data bits'
			stopbits		*select one of these options:*		'Stop bits'
				none			
				one			

setting						*description*
options / sub-settings						
				two		
				onepointfive		
			handshake		*select one of these options:*	'Handshake'
				none		
				xonxoff		
				requesttosend		
				requesttosendxonxoff		
		networksettings				'NetworkSettings'
			deviceid		string	'DeviceID'
			address		string	'IP Address'
			adapter		string	'Network Adapter'
			port		int32	'UDP Port'
		filesettings				'FileSettings'
			nameorpath		string	'File Name or Path'
			autoname		on / off	'AutoName'
			append		on / off	'Append'
	nmeaformat					'Output strings for NMEA Formats may be combined.
		Timetags			on / off	'Add IEC 61162-450 Time tags'
		maxcells			int32 / ""	'Maximum number of cell to output' "" for none If set to 0 this is always the maximum number of cells.

setting				*description*
	options / sub-settings			
		nmeacompliant	on / off	'Output IEC 61162-1 compliant NMEA. The Nortek proprietary NMEA messages will be sent with: Checked a $PNRT prefix (IEC 61162-1 compliant) Unchecked a $PNOR prefix (for legacy systems)'
		i1	on / off	'Output on NMEA I1'
		s1	on / off	'Output on NMEA S1'
		cv	on / off	'Output on NMEA CV'
		c1	on / off	'Output on NMEA C1'
		bt4	on / off	'Output on NMEA BT4'
		qa	on / off	'Output on NMEA QA'
		vl	on / off	'Output on NMEA VL'
		sdgga	on / off	'Output on NMEA $SDGGA'
		sdvtg	on / off	'Output on NMEA $SDVTG'
		sddbt	on / off	'Output on NMEA $SDNDBT'
		vdvdr	on / off	'Output on NMEA $VDVDR'
		vdvhw	on / off	'Output on NMEA $VDVHW'
		vdvbw	on / off	'Output on NMEA $VDVBW'
		primarynmea	on / off	'Forwarded Primary NMEA Channel'
		secondarynmea	on / off	'Forwarded Secondary NMEA Channel'
	interval		int32	'Interval in milliseconds for output messages '

setting				*description*
options / sub-settings				
outputchannel			**× → output link device**	
outputformats			**× → output nmeaformat**	
outputinterval			**× → output interval**	
pitchandrollsource			*select one of these options:*	'Use pitch and roll from this source'
	internal			
	primarychannel			
	secondarychannel			
pitchoffset				[deprecated]
primarychannel				'Primary Channel settings'
	linktype		*select one of these options:*	'LinkType'
		none		
		serial		
		udp		
		udpan		
	serialsettings			'SerialSettings'
		port	string	'Port'
		baudrate	int32	'Baud rate'
		parity	*select one of these options:*	'Parity'
			none	
			odd	
			even	
			mark	
			space	
		databits	int32	'Data bits'

setting					*description*
options / sub-settings					
		stopbits		*select one of these options:*	'Stop bits'
			none		
			one		
			two		
			onepointfive		
		handshake		*select one of these options:*	'Handshake'
			none		
			xonxoff		
			requesttosend		
			requesttosendxonxoff		
	networksettings				'NetworkSettings'
		deviceid		string	'DeviceID'
		address		string	'IP Address'
		adapter		string	'Network Adapter'
		port		int32	'UDP Port'
recorderpath				string	'Location To save recorded files; when blank, default location'
rolloffset					[deprecated]
salinity				double / ""	'Salinity in ppt (parts per thousand), affects echosounder amplitude'
secondarychannel				[see primarychannel for options and sub-settings]	'Secondary Channel settings'
sensortimeout				double / ""	'Time interval of bottom track or velocity ping Leave blank for instrument default' "" for none

setting *options / sub-settings*				*description*
signature		× → **instrumentinterface signaturetypesettings**		
signaturemounting				'VM-ADCP mounting offset and orientation'
	x		double	'X offset'
	y		double	'Y offset'
	z		double	'Z offset'
	orientation		double	'Orientation angle, relative to the bow'
soundvelocity		double / “”		'Sound Velocity [m/s]' "" for none
speedovergroundsource		*select one of these options:*		'Use this source for speed over ground'
	primarychannel			
	secondarychannel			
trigger		× → **triggersettings signaturetriggersettings**		
triggersettings				'Configures the instrument for triggering'
	triggertype		*select one of these options:*	'Trigger type'
		none		
		signature		
		serial		
		udp		
		hardware		
	serialsettings			'Serial settings'
		port	string	'Port'
		baudrate	int32	'Baud rate'

setting				*description*
	options / sub-settings			
		parity	*select one of these options:*	'Parity'
			none	
			odd	
			even	
			mark	
			space	
		databits	int32	'Data bits'
		stopbits	*select one of these options:*	'Stop bits'
			none	
			one	
			two	
			onepointfive	
		handshake	*select one of these options:*	'Handshake'
			none	
			xonxoff	
			requesttosend	
			requesttosendxonxoff	
	networksettings			'Network settings'
		deviceid	string	‘DeviceID’
		address	string	'IP Address'
		adapter	string	'Network Adapter'
		port	int32	'UDP Port'
	hardwaresettings			'Hardware settings'
		port	string	'Port'

setting				*description*
	options / sub-settings			
		triggerlevel	*select one of these options:*	'Trigger Level'
			low	
			high	
		busylevel	*select one of these options:*	'Busy Level'
			low	
			high	
		readylevel	*select one of these options:*	' Ready Level' × this option has been removed
			low	
			high	
	signaturetriggersettings			'VM-ADCP trigger settings'
		mode	*select one of these options:*	'Mode'
			disabled	
			slave	
			master	
		option	*select one of these options:*	'Select the type of trigger'
			command	
			rs485edge	
			rs485rise	
			rs485fall	
useburst			on / off	'Provides better accuracy or resolution in time or space, reduced depth range'
usedepthrange			on / off	'If true, the Maximum Depth is not in depth units but in fraction of actual depth (0-1)'

setting		*description*
options / sub-settings		
usenmeaoutputchannel	**×→ output format nmea**	
useoutputchannel	on / off	'Use Output channel'
usesecondarychannel	on / off	'enables an additional input for navigation data'
usesensorheading		[deprecated]
usesoundvelocity	on / off	'Select salinity or speed of sound'
velocitycorrection	double / “”	'Velocity correction for Bottom-Track' "" for none
waterline	double	Vertical distance between current water line and reference point (equal to VM-ADCP mounting depth when VM-ADCP is at (0, 0, 0))
Don’t forget to type ‘SAVE’ after setting a new value !		

4.2.1 Output Formats

Several NMEA based output formats are available. For a detailed description refer to the Nortek VM Acquisition Software Manual.

Please note that as of release 2.6, by default the NMEA messages are sent with the $PNRT prefix; these messages are compliant with the NMEA IEC61162-1 standard. For compatibility with existing equipment that uses the nonstandard $PNOR messages the output format can be changed using the nmeacompliant option. The difference is only in the prefix, otherwise the message details are the same. (However, the checksum will be different, due to the difference between NRT and NOR.)

Note that “NOR” is not our officially registered manufacturer’s mnemonic code, but has been used historically.

To enable a specific format, use the ‘set output nmeaformat <format> on’ command.

Example:

```
set output nmeaformat sdvtg on
OK
```

In the .config file:

```
<Output>
	<NMEAFormat>
		<CV>true</CV>
		<VDVDR>true</VDVDR>
		<SDVTG>true</SDVTG>
	</NMEAFormat>
</Output>
```

Formats like CV and C1 are used to output data for each individual cell. By default, this outputs data for all available cells, which might be more than needed. Use 'set output nmeaformat maxcells' to limit this to the number of cells required.

4.2.2 AverageInterval

The 'averageinterval' is specified in milliseconds and sets the time over which the measurements are averaged when data is displayed or sent to an output.

If the AverageInterval is set to 30000 (30 seconds) and an NMEA message is created, the data in the NMEA message is the average of all data from this moment up to 30 seconds in the past.

4.2.3 Output Interval

Interval in milliseconds for output messages. If this is greater than 0, output message(s) as specified in 'output nmeaformat' will be transmitted on the selected channel every nnnn milliseconds. The data in this message will be the average over the last 'averageinterval' milliseconds.

4.2.3.1 Output Interval = 0, Burst mode

If it is set to 0, the output will be generated at the end of the Burst interval. This requires that the VM-ADCP is configured for a specific burst period that is shorter than the measurement interval, which can be specified in a custom '.deploy' file.

For example:

```
SETPLAN,MIAVG=1,AVG=0,MIBURST=60,BURST=1,FN="SurveyVM.ad2cp",FREQ=500
SETBURST,NC=120,NB=4,CS=0.5,BD=0.5,VR=5,CY="BEAM",SR=8,DF=3,VR5=5,NS=80,BT=1
```

Here the burst interval is set to 60 seconds (MIBURST=60), the sample rate is set to 8 (SR=8) and the number of samples per burst is 80 (NS=80) so the burst length is 10 seconds (80 samples at 8 samples per second). The instrument will now only be measuring 10 seconds every 60 seconds. And if the 'output interval' is set to 0, the data will be transmitted at the end of the 10 seconds burst. If the 'averageinterval' time is now set equal to the burst length, this will be the averaged data over the full burst.

4.2.4 'Primary' or 'Secondary channel' settings.

These settings refer to the communication channel used for reading the GNSS or GPS receiver. Theoretically there can be two GNSS or GPS receivers connected to the system where the first system provides for example just position and time information and a second system only has heading information. If the 'usesecondarychannel' setting is now set to true, the information from both channels will be used. Note that his might cause problems if the systems both output time information and are not exactly synchronized.

Each channel has its own options for the actual communication as used.

'Linktype' – This can be 'serial' for NMEA formatted data over a standard RS232 or RS422 serial port, 'Udp' which accepts standard NMEA messages over UDP, or it can be 'UdpAn' which refers to the UDP channel on the Advanced Navigation GNNS compass and so will only accept the 'anpp' binary format.

Example:

```
Set secondarychannel linktype serial
OK
```

Depending on the 'linktype' the settings for this specific link must be specified.

If linktype is 'serial' it will need 'SerialSettings', which contains 'Port', 'BaudRate', 'Parity', 'DataBits' 'StopBits' and 'HandShake'. Note that if all these must be set using the console, each setting needs to be specified in full, like shown here for setting the COM port:

```
Set PrimaryChannel SerialSettings Port COM1
OK

Set PrimaryChannel SerialSettings Baudrate 9600
OK
```

If 'linktype' is Udp or UdpAn the 'networksettings' must be set, which consist of 'Address' (the IP address), 'Adapter' (the name of the network adapter) and 'Port' (network port number)

Example in the .config file:

```
<PrimaryChannel>
    <LinkType>UdpAn</LinkType>
    <NetworkSettings>
      <Address>239.192.1.1</Address>
      <Adapter>Ethernet</Adapter>
      <Port>9002</Port>
    </NetworkSettings>
</PrimaryChannel>
```

5 Data storage

Data is stored on the Nortek VM PC in the directory as specified in the 'RecorderPath' setting, which is by default: 'C:\Nortek\SignatureVM_Service\Data'. There is no command line option to retrieve this data. So if this is required it may be convenient to install an FTP server (like 'FileZilla Server' - https://filezilla-project.org/) on the computer which can be used to transfer the files.

5.1 Limiting the amount of files

If the system is used on an autonomous system with limited hard disk capacity it is best to limit the number of stored files, since a full harddisk could possibly crash the system.

The easiest way to do this is by using an automated task as controlled by Windows Task Scheduler. To set this up, press the Windows key, and type 'task scheduler'. In the Task Scheduler window, select 'Task Scheduler Library' in the left pane (see figure 7).

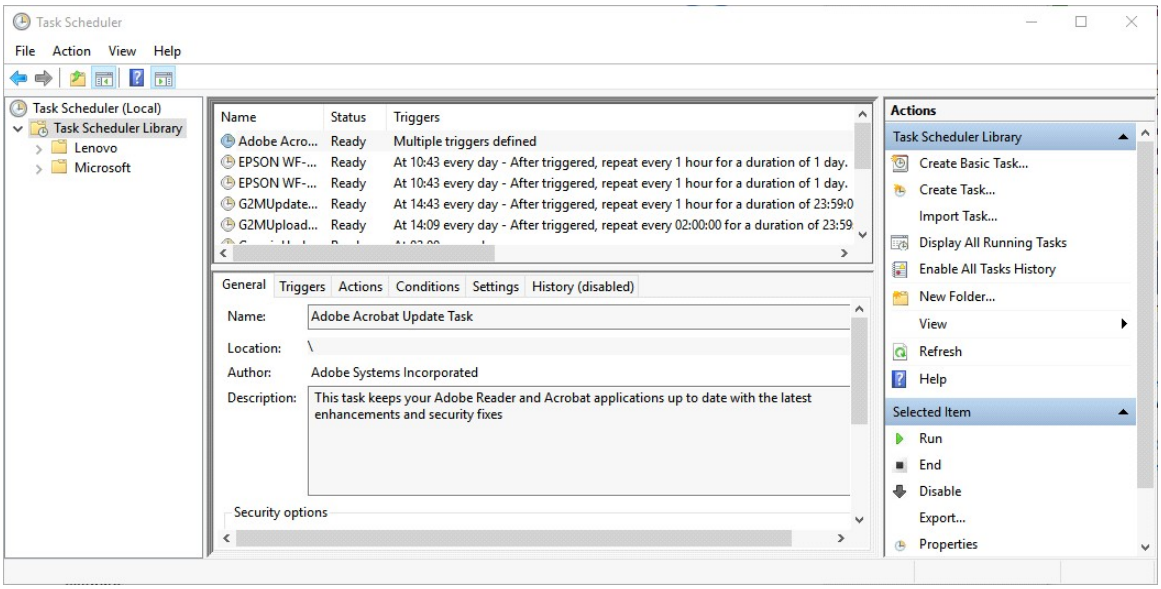

Figure 7: Task Scheduler window

Now click 'Import Task' and find the file 'DeleteOldVMRecordings.xml' (This should be in 'C:\Program Files\Nortek\Signature.VM.Service) . An automatic task will be imported that erases all files older than 30 days from the folder 'C:\Nortek\SignatureVM_Service\Data'. If you have selected another folder for data-storage this should obviously be changed as well.

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