



NavView User Guide – Table of Contents

Document: 4DN_NVUG_TOC_01A

Release: 01

Revision: A

Released: 6/19/2024

4D Nav, LLC

Rel	Rev	Issue Description	Prepared	Reviewed	Approved	Date
01	A	Initial release	SW	GAW	GAW	June 19, 2024

© Copyright 2024 4D Nav LLC

Unless explicitly stated otherwise, all rights including those in copyright in the content of this document are owned or controlled by 4D Nav LLC (4D Nav). Except as otherwise expressly permitted under copyright law or by 4D Nav, the content of this document may not be copied, reproduced, republished, downloaded, posted, broadcast, or transmitted in any way without the written permission of 4D Nav.

Table of Contents

1.	Introduction	1-1
1.1	Software.....	1-1
1.1.1	NavView Installation Package.....	1-2
1.1.2	NavView - First Time Installation and Major Upgrades.....	1-3
1.1.3	NavView - Minor Upgrades.....	1-6
1.1.4	Optional Software - SQL Server Management Studio	1-9
1.1.5	Optional Software - SQL Server Maintenance Solution.....	1-9
1.1.6	Optional Software - SQL Server Express.....	1-10
1.1.7	Optional Software - MongoDB and Redis	1-20
1.2	Software Upgrades.....	1-21
1.2.1	NavView	1-21
1.2.2	NavView Device Drivers	1-21
1.2.3	RealDWG.....	1-22
1.2.4	Microsoft Software.....	1-22
1.3	License Security	1-22
1.3.1	USB Dongle	1-23
1.3.2	Updating a Dongle	1-24
1.3.3	Cloud Controlled Network Floating License.....	1-25
1.4	User Roles and Privileges.....	1-37
1.4.1	Roles Status/Access	1-38
1.4.2	Roles Log In/Out	1-38
1.5	Navigating NavView.....	1-38
1.5.1	Quick Access Toolbar.....	1-39
1.5.2	File Menu.....	1-39
1.5.3	Workspace Status/Access	1-40
1.5.4	Ribbons.....	1-40
1.5.5	Workspace	1-48
1.6	Technical Support.....	1-50
1.6.1	How to Sign on to the Help Desk	1-50
1.6.2	How to Submit a Request.....	1-52
1.6.3	How to Track a Request.....	1-53

2.	NavView Basics	2-1
2.1	Pub/Sub Design	2-1
2.2	Vehicle Local Coordinate Reference Frame and CRP.....	2-1
2.3	Pitch and Roll Sign Convention	2-2
2.4	Units of Measure	2-2
2.5	Active Station.....	2-2

3.	Geodesy	3-1
3.1	EPSG Database	3-1
3.2	Coordinate Reference Systems	3-1
3.3	Transformations	3-2
3.4	Coordinate Operations	3-3
3.5	Access Geodesy Configuration	3-3
3.6	Using the Horizontal CRS View.....	3-4
3.6.1	Horizontal CRS Tab	3-4
3.6.2	Transformations Tab	3-6
3.6.3	Add a Horizontal CRS to NavView	3-6
3.6.4	Create and Change a User Projected CRS.....	3-9
3.6.5	Set the Working Projected CRS.....	3-12
3.6.6	Remove a Horizontal CRS from NavView	3-13
3.6.7	Delete a User Projected CRS	3-13
3.6.8	Configure Transformations	3-13
3.6.9	Create and Change a User Transformations.....	3-15
3.6.10	Delete a User Transformation	3-17
3.6.11	Test Coordinate Operations.....	3-18
3.6.12	Horizontal CRS Test Coordinate Operations.....	3-20
3.6.13	Transformations Test Coordinate Operation.....	3-20
3.7	Using the Vertical CRS View.....	3-21
3.7.1	Vertical CRS Tab	3-21
3.7.2	Transformation Tab	3-22
3.7.3	Add a Vertical CRS.....	3-23
3.7.4	Create and Change User Vertical CRS	3-25
3.7.5	Set the Working Vertical CRS	3-26
3.7.6	Remove a Vertical CRS from NavView	3-27
3.7.7	Delete a User Vertical CRS from EPSG Database.....	3-27
3.7.8	Configure Vertical Transformations	3-27
3.7.9	Create and Change a User Vertical Transformation.....	3-28
3.7.10	Delete a User Vertical Transformation from EPSG Database.....	3-29
3.7.11	Vertical Transformation Tests.....	3-30

4.	Projects.....	4-1
4.1	Overview.....	4-1
4.1.1	Project.....	4-1
4.1.2	Station	4-1
4.2	Project Folder.....	4-2
4.2.1	Local > Station Folder	4-3
4.2.2	Shared > Data Folder	4-3
4.2.3	Shared > SyncFolder	4-3
4.2.4	Shared > Visuals Folder.....	4-4
4.2.5	Shared > Working Folder.....	4-4
4.3	Create a New Project.....	4-5
4.4	Open an Existing Project.....	4-9
4.5	Launch a Project on Start Up	4-10
4.6	Launch a Project From the Command Line	4-11
4.7	Import a Station	4-11
4.8	Edit a Project.....	4-12
4.8.1	Geodesy	4-12
4.8.2	Project Configuration.....	4-12
4.8.3	Active Station	4-12
4.8.4	Configuration Tab.....	4-12
4.8.5	Preferences	4-13
4.8.6	Units of Measure	4-14
4.8.7	Display Format	4-14
4.8.8	Other	4-14
4.9	Project – Save As	4-14

5.	Devices	1
5.1	Overview.....	1
5.2	IO Devices Window	1
5.3	Add a Device	3
5.4	Remove a Device	5
5.5	Move Devices.....	6
5.6	Configure Device Communication Parameters	6
5.6.1	Serial	7
5.6.2	UDP Client	9
5.6.3	TCP Client.....	10
5.6.4	TCP Server.....	11
5.6.5	Remote Serial	11
5.6.6	File	11
5.6.7	Client Web Socket	14
5.7	Configure Device Application	15
5.8	Monitoring a Device	15
5.8.1	Device Status Window.....	15
5.8.2	Device Terminal Window	18
5.9	Raw Data Logging.....	18

6. Calculations	1
6.1 Overview.....	1
6.2 Calculation Types.....	1
6.3 Error Propagation	2
6.4 Managing Calculations.....	3
6.4.1 Add a Calculation.....	3
6.4.2 Remove a Calculation.....	5
6.4.3 Edit a Calculation.....	5
6.5 Configuring Calculation Input Observations.....	6
6.6 Automatic Failover	9
6.7 Rigid Body Calculation.....	10
6.7.1 Multiple Observation Sources and Automatic Failover	10
6.7.2 Horizontal Velocity.....	10
6.7.3 Configure the Rigid Body Calculation.....	11
6.7.4 Monitoring the Rigid Body Calculation	11
6.8 USBL Calculation.....	13
6.8.1 Beacon Data Sources	14
6.8.2 Using USBL Position Data.....	15
6.8.3 Using USBL Cartesian Data	16
6.8.4 Using Beacon Geographic2D and Elevation Observations	21
6.9 Kalman Filter Calculation	21
6.9.1 Multiple Observation Sources and Automatic Failover	22
6.9.2 Configure the Kalman Filter Calculation	22
6.9.3 Monitoring the Kalman Filter Calculation	23
6.10 Static Draft Calculation	26
6.10.1 Configure the Static Draft Calculation	27
6.10.2 Monitoring the Static Draft Calculation.....	27
6.11 Seabed Elevation Calculation	28
6.11.1 Configure the Seabed Elevation Calculation	28
6.11.2 Monitoring Seabed Elevation Calculation.....	29
6.12 Relative Lever Arm Calculation	29
6.12.1 Configure the Relative Lever Arm Calculation	29
6.12.2 Relative Lever Arm Monitoring	30
6.13 Predicted Position	30
6.13.1 Configure the Predicted Position	30

6.13.2	Monitoring Predicted Position Calculation	31
6.14	Depth From Pressure Calculation	31
6.14.1	Configure the Depth From Pressure Calculation	32
6.14.2	Monitoring Depth From Pressure Calculation	35
6.15	Generic Calculation.....	35
6.15.1	Configure the Generic Calculation.....	35
6.16	Heading From Positions Calculation.....	36
6.16.1	Configure the Heading From Position Calculation.....	36
6.16.2	Monitoring the Heading from Position Calculation.....	37
6.17	Lookup.....	38
6.17.1	Configure the Lookup Calculation	38
6.18	DTM Elevation Calculation.....	38
6.18.1	Configure the DTM Elevation Calculation.....	39
6.19	Relative Position (Dynamic Body) Calculation	39
6.19.1	Configure the Relative Position (Dynamic Body) Calculation	40
6.20	Rigid Transform (Local) Calculation	41
6.20.1	Configure the Rigid Transform (Local) Calculation.....	41
6.21	Rigid Transform (Geographic) Calculation	42
6.21.1	Configure the Rigid Transform (Geographic) Calculation	42
6.22	Relative Position (Static) Calculation	43
6.22.1	Configure the Relative Position (Static) Calculation	43
6.23	Angular Acceleration Algorithm Calculation	44
6.23.1	Configure the Angular Acceleration Algorithm Calculation	45
6.23.2	Monitoring the Angular Acceleration Algorithm Calculation.....	46
6.24	Remote Motion Algorithm Calculation	46
6.24.1	Motion Sensor Configuration and Output	47
6.24.2	Configure the Remote Motion Algorithm Calculation	47
6.24.3	Monitoring the Remote Motion Algorithm Calculation.....	49

7.	Vehicles	1
7.1	Overview.....	1
7.2	Vehicle Static Offsets and Tracking Points	1
7.3	Realtime, Remote and Remote Telemetry Vehicles	1
7.4	Vehicle Management.....	2
7.4.1	Add a Vehicle	3
7.4.2	Import a Vehicle	15
7.4.3	Edit Vehicle.....	16
7.4.4	Remove Vehicle	17
7.5	Monitoring.....	17
7.6	Vehicle Data Tab	19

8. Windows.....	4
8.1 Overview.....	4
8.1.1 Open a Window	4
8.1.2 Configure a Window	4
8.1.3 Close a Window	4
8.1.4 Window Configuration Files	5
8.1.5 Available Windows.....	5
8.2 Log Window	6
8.3 Text Windows.....	6
8.3.1 Available Data.....	6
8.3.2 Tabular Text Window	8
8.3.3 Custom Text Window	14
8.3.4 Text Templates.....	19
8.3.5 Text Layouts	23
8.4 2D Map Window.....	25
8.4.1 Background Displays	26
8.4.2 GIS	30
8.4.3 2D Map Configuration.....	32
8.4.4 Tools.....	35
8.4.5 Short Cuts	42
8.5 3D Map Window.....	49
8.5.1 Basic Operations.....	50
8.6 3Dx Map Window.....	59
8.6.1 Basic Operations	60
8.7 Archive Monitoring Window.....	63
8.8 Time Sync Window.....	64
8.9 AIS Window	64
8.10 Explorer Window	66
8.11 Logbook Window	66
8.12 Web (View).....	67
8.13 Network Services Window.....	69
8.14 Chat Window	70
8.15 QC Widgets Windows.....	71
8.15.1 Position QC Widget.....	71
8.15.2 Time Series QC Widget	73

8.15.3	Bar Chart QC Widget	75
8.15.4	Inclination QC Widget.....	77
8.16	Documents	78
8.16.1	Project Documents	78
8.16.2	All Documents	80
8.16.3	Manage Tags.....	80
8.17	GPS Status.....	80
8.18	GPS Satellite Status	82

9.	Pipelines	3
9.1	Overview.....	3
9.2	Pipelines Window.....	3
9.3	Add a Pipeline	11
9.3.1	Add a Pipeline from the Pipelines Window	11
9.3.2	Add a Pipeline from the Map View	11
9.4	Create a Route Alignment from a Pipeline.....	13
9.5	Remove a Pipeline.....	13
9.6	Edit a Pipeline.....	14
9.6.1	Edit a Pipeline from the Pipelines Window	14
9.6.2	Edit a Pipeline from the Map View	15
9.7	Export Pipelines	16
9.8	Import Pipelines	17

10.	Survey Lines.....	1
10.1	Overview.....	1
10.2	Survey Lines Window	1
10.3	Add a Survey Line	5
10.3.1	Add a Survey Line from the Survey Lines Window.....	5
10.3.1.1	Add a Single Survey Line.....	5
10.3.1.2	Add a Grid.....	5
10.3.1.3	Add a Parallel Line.....	6
10.3.1.4	Add a Perpendicular Line	7
10.3.2	Add a Survey Line from the Map View	8
10.3.2.1	Using a Map Tool.....	8
10.3.2.2	From a Polyline.....	9
10.4	Remove a Survey Line.....	10
10.5	Edit a Survey Line	10
10.5.1	Edit a Survey Line from the Survey Lines Window.....	10
10.5.2	Edit a Survey Line from the Map View	11
10.6	Export Survey Lines.....	12
10.7	Import Survey Lines	12

11.	Waypoints	1
11.1	Overview.....	1
11.2	Waypoints Window	1
11.3	Add a Waypoint	7
11.3.1	Add a Waypoint from the Waypoints Window	7
11.3.2	Add a Waypoint from the Map View	7
11.4	Copy a Waypoint	8
11.5	Remove a Waypoint.....	8
11.6	Edit a Waypoint	8
11.6.1	Edit a waypoint from the Waypoint Window	8
11.6.2	Edit a Waypoint from the Map View	8
11.7	Export Waypoints.....	9
11.8	Import Waypoints	9

12.	Guidance Calculations	1
12.1	Overview.....	1
12.2	Guidance Calculations Window	1
12.3	Add a Guidance Calculation	3
12.4	Remove a Guidance Calculation	4
12.5	Edit Guidance Calculation.....	4
12.6	Guidance Displays.....	9
12.6.1	Guidance in the Text Windows.....	9
12.6.1.1	Point to Point Guidance Text	10
12.6.1.1.1	Relative Velocity	11
12.6.1.2	Time of Intercept	12
12.6.1.3	Time to Intercept	12
12.6.1.4	Point to Route Guidance Text	12
12.6.1.5	Point to 3D Line/3D Line to 3D Line.....	13
12.6.1.6	Guidance Text Window	14
12.6.2	Guidance Tracking Window	15
12.6.2.1	Configuring the Guidance Tracking Window	16
12.6.3	Offline Display.....	17
12.6.3.1	Configuring the Offline Display	18
12.6.3.1.1	Adding a Range Threshold	19
12.6.3.1.2	Removing a Range Threshold	20

13.	Timing.....	1
13.1	Synchronization.....	1
13.2	Configuring Time Synchronization.....	1
13.2.1	Synchronize PC Time	4
13.3	SNTP Server.....	7
13.4	GNSS Time (GPS Leap Seconds)	9
13.5	Monitoring Synchronization	9
13.6	Data Time Stamping.....	10

14.	Database Services	1
14.1	Overview.....	1
14.2	Configuring Database Services.....	1
14.2.1	Configure Server	2
14.2.2	Configure Database Services for localdb	4
14.2.3	Configure Database Services for SQL Server or SQL Express.....	5
14.2.4	Test and Apply Database Service Connection	6
14.3	Digital Terrain Model (DTM)	7
14.3.1	DTMs, CRSs and Units	7
14.3.2	Load a DTM	8
14.3.3	Managing DTMs	13
14.3.4	Contours from a DTM	14
14.3.4.1	Generating Contours from a DTM	14
14.3.4.2	Contour Layers in Map Views.....	16
14.4	Project Databases	16
14.4.1	Database Backup	17
14.4.2	Database Archive.....	18
14.4.3	Database Detach	19
14.4.4	Add Database From Server	19
14.5	Quick Fixes	20
14.5.1	Quick Fix Configuration.....	20
14.5.2	Take a Quick Fix.....	29
14.5.3	Accessing Quick Fix Data.....	29
14.6	Tides	35
14.6.1	Management	35
14.6.2	Query	38
14.7	Data Recording	39
14.7.1	Configure Data Recording.....	39
14.7.2	Start/Stop Recording.....	43
14.7.3	Monitor Recording	43
14.7.3.1	Explorer View	43
14.7.3.2	Text Views	45
14.7.3.3	Data Archive View.....	45
14.7.4	Data Query	46
14.7.4.1	Data Formatters	53

14.7.4.2	Query Control.....	55
14.7.4.2.1	Time Series - Timing Control	55
14.7.4.2.2	Selected Datasource Timing.....	55
14.7.4.2.3	Fixed Interval Timing.....	56
14.7.4.2.4	Manual Times.....	56
14.7.4.2.5	Minimum Interval	57
14.7.4.2.6	Statistical Options	57
14.7.4.3	Export/Import of Query Settings.....	58
14.7.5	Query Schedule.....	58
14.8	Position Fix	59
14.8.1	Add a Position Fix.....	60
14.8.2	Position Fix Profiles	64
14.8.2.1	Adding a Position Fix Profile.....	65
14.8.3	Edit Position Fix Settings.....	65
14.8.3.1	Remove a Position Fix.....	67
14.8.3.2	Configure Position Fix report.....	67
14.8.4	Active Position Fix View	69
14.8.4.1	Position Fix View Tool Bar.....	70
14.8.4.2	Position Fix Data View	70
14.8.4.2.1	Results Tab	70
14.8.4.2.2	Sessions Tab	71
14.8.4.2.3	Data Tab.....	71
14.8.4.2.4	Details - Time Series Tab	75
14.8.4.2.5	Details - Y Time Series	76
14.8.4.2.6	Details - Histogram Tab	77
14.8.4.2.7	Details - Y Histogram Tab	78
14.8.5	Query Position Fix View.....	79
14.9	Configuration History	81
14.10	DVL Calibration.....	81
14.10.1	Recording DVL Calibration Data.....	82
14.10.2	Data Query	82
14.10.3	Calibration.....	84
14.10.4	Methodology	86
14.10.5	Workflow	87
14.10.6	Example	87
14.11	USBL Calibration	89

15. Connections	1
15.1 Overview.....	1
15.2 Add a Connection.....	2
15.3 Remove a Connection	3
15.4 Configure a Connection	3
15.4.1 Straight Line Connection	3
15.4.1.1 Configuring a Straight Line Connection	3
15.4.2 3D Polyline Connection	6
15.4.2.1 Configuring a 3D Polyline	6
15.4.3 User Observation Source Connection	10
15.4.3.1 Configure a User Observation Source	10
15.4.4 Towed Body Connection	10
15.4.4.1 Configure a Towed Body.....	11
15.4.5 Observation Distributor.....	14
15.4.5.1 Configure observation distributor	14
15.4.6 Cable Distance To Go (DitGo) Connection	15
15.4.6.1 Configure DitGo Connection	15
15.4.7 Articulated Frame Connection	20
15.4.7.1 Configure an Articulated Frame	20
15.4.8 Crane Connection	24
15.4.8.1 Configure a Crane	24
15.4.9 Layback Connection.....	28
15.4.9.1 Configuring a Layback Connection.....	28

16.	USBL Boxin and Calibration.....	1
16.1	Overview.....	1
16.2	USBL Calibration	1
16.2.1	Accessing the USBL Calibration Feature.....	1
16.2.2	USBL Calibration States: Active & Completed	2
16.2.3	USBL Data Collection Planning.....	3
16.2.4	Edit an Active Calibration's Settings.....	6
16.2.5	USBL Calibration Data Collection	8
16.2.6	Finalizing an Active Calibration.....	11
16.2.7	USBL Calibration Processing.....	11
16.2.7.1	USBL Calibration Data View.....	13
16.2.7.1.1	List tab	14
16.2.7.1.2	Slant Range Tab.....	16
16.2.7.1.3	Beacon Tab	18
16.2.7.1.4	USBL XYZ Tab.....	19
16.2.7.2	Calibration Parameters Tab	21
16.2.7.3	Offsets Tab.....	21
16.2.7.4	Beacon Info Tab	22
16.2.7.5	Boxin Only.....	23
16.2.7.6	Solve For USBL Calibration Values	24

17.	Beacons.....	1
17.1	Beacon Configuration.....	1
17.1.1	Add a Beacon.....	2
17.1.1.1	HPR Beacon.....	2
17.1.1.2	Generic USBL Beacon	3
17.2	Using Beacons.....	4

18.	ADCP	1
18.1	Overview.....	1
18.2	ADCP Device Configuration.....	1
18.2.1	Add ADCP Device	1
18.2.2	RDI Device Communication.....	4
18.3	Logging ADCP Profiles	8
18.3.1	Continuous Profile.....	8
18.3.2	Static Profile.....	13
18.4	ADCP Capture	14
18.5	ADCP Visuals	17
18.5.1	View Saved ADCP Profiles	17
18.5.2	View Live ADCP Profile	18

19.	Exclusion Zones	1
19.1	Managing Exclusion Zones	1
19.1.1	Exclusion Zones Configuration.....	1
19.1.1.1	Dynamic Objects Tab	2
19.1.1.2	Regions Tab	3
19.1.1.2.1	Static Region.....	4
19.1.1.2.2	Dynamic Body Region.....	9
19.1.1.2.1	Dynamic Line Region.....	10
19.1.1.3	Graphics Tab	11
19.2	Monitoring Exclusion Zone Alerts.....	12
19.2.1	Map View	12
19.2.2	Alert List Window	13
19.2.3	Alert List Configuration.....	13
19.2.4	Acknowledging Alerts	15

20.	Watch Regions.....	1
20.1	Managing Watch Groups.....	1
20.2	Basic Configuration.....	2
20.2.1	Configure Dynamic Objects.....	2
20.2.2	Configure Regions.....	4
20.2.2.1	Static Region.....	4
20.2.2.2	Dynamic Body Region.....	8
20.2.2.3	Dynamic Line Region	10
20.2.3	Graphics.....	11
20.3	Monitoring Watch Region Alerts	11
20.3.1	Map View	11
20.3.2	Alert List Window:.....	12
20.3.3	Alert List Configuration.....	13
20.3.4	Acknowledging Alerts	15

21.	Alerts	1
21.1	Managing Alerts	1
21.1.1	Add/Remove an Alert Group	1
21.1.2	Configure Alerts in a Group.....	2
21.2	Monitoring Alerts.....	6
21.2.1	Monitoring Alerts Locally	6
21.2.2	Monitoring Alerts – Remotely.....	7

22.	JSON Exchange	1
22.1	Overview.....	1
22.2	Published Data.....	1
22.3	Configuring JSON	1
22.4	Monitoring JSON	3

23.	Network Services.....	1
23.1	Overview.....	1
23.2	Software.....	1
23.3	Configuring Network Services (Network Server).....	1
23.4	Configuring Network Services (Remotes)	2
23.5	Monitoring Network Services.....	3
23.6	Time Sync	6

24.	Alarms	1
24.1	Managing Alarms	1
24.2	Adding Alarms.....	1
24.3	Configuring Alarms	2
24.3.1	Data Sources	2
24.3.2	Conditions	5
24.4	Monitoring Alarms	7
24.4.1	Alarms Status.....	7
24.4.2	Alarm Console	8
24.4.3	Text Window.....	9