



EX-200
Single-Ant GNSS/INS



EXLP-200
Single-Ant GNSS/INS



gX-200
Single-Ant GNSS/INS

Navigation Manual

VERSION 1.00

AUGUST 2025

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ABBREVIATIONS

Abbreviation	Description
AHRS	Attitude Heading Reference System
BIN Message	Binary Message
CEP	Circular Error Probability
CSEP	Calculated Separation
IMU	Inertial Measurement Unit
INS	Inertial Navigation System
MSEP	Measured Separation
N/A	Not Available
N/C	Not Connected
PVT	Position, Velocity, Time
RMS	Root Mean Square
TBD	To Be Determined
UKF	Unscented Kalman Filter
VG	Vertical Gyro

TABLE OF REVISIONS

Ver. #	Description	Author/s	Date
1.00	Nav Eval SW Manual (xX200)		August 2025

1. INTRODUCTION

The arazim evaluation Navigation software is based on the SDK provided and is used to evaluate arazim Navigation systems.

Figure 1 shows sample evaluation kits for xX200 devices.



Figure 1. Sample Evaluation Kits for xX200 Devices

2. GETTING STARTED

Table 1 lists the area names and functions in the arazim navigation evaluation software home screen. Figure 2 shows the location of each area referred to in Table 1.

The information displayed in the home screen depends on the selected/detected system.

Table 1. arazim Navigation System Evaluation Software Home Screen

No.	Name	Purpose
1	Main Menu	Menu item navigation
2	Toolbar	Includes icons to control: • Navigation device comm port • Recording • Playback • Single sample viewing
3	Message View	• Graphic view • Numeric view (default)
4	Message Selector	• Changes frame lock and updates "Message Content" depending on selected message. The default is NAVIGATIONs Average (6-DOF)
5	Message Content	Information on: • Field name • Field value • Eng units • Notes
6	System BIT Flags Information	System built-in test, performed before data frame transmission. The color indicators to the left of each item indicate whether those items are functioning properly and are communicating with the host controller. • Green = Functioning Properly • Red = Error • Black = Default, before beginning communication with the device

No.	Name	Purpose
7	Incoming Messages	Indicates the detected incoming Navigation messages. You can only select messages from Reference 4, that match one of the incoming messages.
8	Message Information	Incoming messages Status-bar, Includes information on: • Message Type selected • Message Rate • Message Error • Total Messages Rate (user and system messages)
9	Status Information	Information on: • Device Comm port Status • GPS Comm port Status • Navigation System Platform name (Reference 10) • DLL Version • Device Status (for example, "Waiting for GPS Lock")
10	Platform Name	The platform name changes according to which INS two-antenna device is connected.

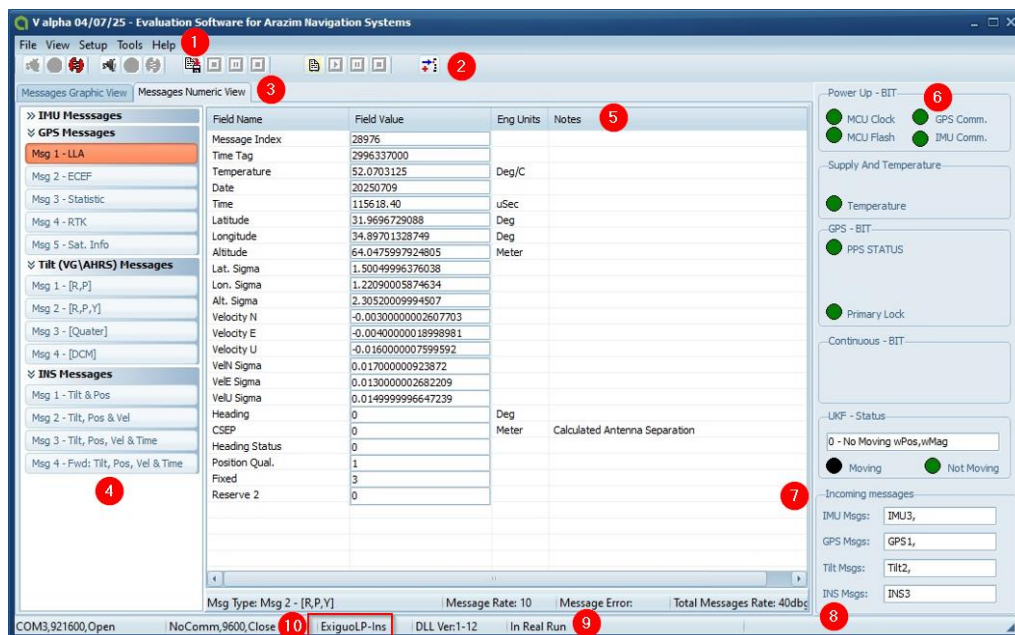


Figure 2. arazim Navigation Evaluation Software Home Screen

3. DATA VIEW

The evaluation software features both a **Messages Numeric View** tab (the default – to view the data fields of one selected message) and a **Messages Graphic View** tab (to view the data fields as numeric and graphic of more than one selected message).

3.1. BIT Indicator Panels

The BIT indicators display the statuses of the built-in tests. The status of tests performed only during system initialization does not change. These BIT indicators should be tested only after system initialization. Other BITs are continuous, and the application should be aware of their status as long as the device is active.

Table 2. BIT Indicator Panel Comparisons

gX200	EXLP200
Power Up - BIT MCU Clock GPS Comm. MCU Flash IMU Comm. Supply And Temperature Vin Temperature GPS - BIT PPS STATUS Primary Lock Continuous - BIT UKF - Status 0 - No Moving wPos,wMag Moving Not Moving Incoming messages IMU Msgs: GPS Msgs: GPS1, Tilt Msgs: INS Msgs: INS3	Power Up - BIT MCU Clock GPS Comm. MCU Flash IMU Comm. Supply And Temperature Temperature GPS - BIT PPS STATUS Primary Lock Continuous - BIT UKF - Status 0 - No Moving wPos,wMag Moving Not Moving Incoming messages IMU Msgs: IMU3, GPS Msgs: GPS1, Tilt Msgs: Tilt2, INS Msgs: INS3

Supply And Temperature

Vin

Temperature

GPS - BIT

PPS STATUS

Primary Lock

Continuous - BIT

UKF - Status

0 - No Moving wPos,wMag

Moving

Not Moving

Incoming messages

IMU Msgs:

GPS Msgs:

GPS1,

Tilt Msgs:

INS Msgs:

INS3

The BIT indicators may be:

- **Black** to indicate that the test was not performed
- **Green** to indicate that the test succeeded
- **Red** to indicate that the test failed

3.1.1. Power-Up BIT

The BIT indicators in the Power-up BIT (built-in tests) section display the status of the built-in tests, which are only performed during system initialization. The statuses of these BIT indicators remain the same while the device is active.

Each of the BIT tests are discussed below.

- If the **MCU Clock** indicator is **green**, the system has finished configuring the system-clock and all MCU peripherals have completed the configuration and initialization processes.
- If the **GPS Comm.** indicator is **green**, the device is communicating with the GPS, based on the checksum result of incoming messages. The indicator is **green** as long as at least one message has been received properly during the BIT test.
- If the **MCU Flash** indicator is **green**, the data checksum in user flash memory is correct. However, if the MCU Flash BIT is **red**, meaning that the checksum is incorrect, the system loads the default configuration.



A **red** MCU Flash indicator may also mean that no configuration was burned to flash memory. If that is the case, click **Burn to Flash** (in configuration mode) to burn the configuration to flash memory.

- If the **IMU Comm.** indicator is **green**, the device is communicating with the IMU. During system initialization, the system checks the IMU configuration regarding sampling rate, frame rate, and other factors. This indicator is **green** only if all the communication checks pass.

3.1.2. Supply and Temperature BIT

The BIT indicators in the Supply and Temperature BIT (built-in tests) section display the statuses of continuous monitoring of power and temperature. These built-in tests are performed while the device is active, and its value/state may change according to the measured conditions.

- The **Vin** indicator is shown and relevant in the gX200 platform. If the **Vin** indicator is **green**, the system's voltage-in is within the allowed threshold range.
- If the **Temperature** indicator is **green**, the system's environment-temperature is within threshold range, configured by the user, using the Configuration form.

3.1.3. GPS BIT

The BIT indicators in the GPS BIT (built-in tests) section display the statuses of continuous monitoring of GPS lines and messages. These built-in tests are performed while the device is active, and its value/state may change according to the measured conditions.

- If the **PPS Status** indicator is **green**, this indicates that the GPS receiver has sent a PPS pulse. If the GPS has not sent a PPS pulse, it may be due to lack of a line of sight to the satellites, a small number of received satellites, and so on.
- If the **Primary Lock** indicator is **green**, the latitude and longitude values are valid.

3.1.4. Continuous BIT

Continuous BIT is not relevant to EX200, EXLP200, gX200.

3.1.5. UKF Status BIT

The BIT indicators in the UKF Status BIT (built-in tests) section continuously display the statuses of the UKF. These built-in tests are performed while the device is active, and its value/state may change according to the measured conditions.

The UKF status indicates using two BIT flags whether the state detected is static (not Moving) or dynamic (Moving). Any of these statuses is supported by a numeric value that describes the current system state.

Table 3 lists the optional numeric state values.

Table 3. UKF status – Numerical State Value

Value	Value Indication	Description
0	Non-Moving	System has detected static condition (wPOS, wMag, woVel)
1	Non-Moving	System has detected static condition (wPOS, woMag, woVel)
2	Non-Moving	System has detected static condition (woPOS, wMag, woVel)
3	Non-Moving	System has detected static condition (woPOS, woMag, woVel)
4	Moving	System has detected dynamic condition (wPOS, wMag, Vel>Th)
5	Moving	System has detected dynamic condition (wPOS, woMag, wVel)
6	Moving	System has detected dynamic condition (wPOS, wMag, Vel<Th)
7	Moving	System has detected dynamic condition (wPOS, woMag, woVel)
8	Moving	System has detected dynamic condition (woPOS, wMag, woVel)
9	Moving	System has detected dynamic condition (woPOS, woMag, woVel)

3.2. Messages Numeric View

The **Messages Numeric View** tab is the system default view.

1. The left portion of this view shows a list of messages available for a selected Navigation device (Figure 2, Reference 4)

For example:

- a. IMU Messages
 - i. Raw Data (factory use)
 - ii. 6DOF – IMU 3xAcc + 3xGyro
 - iii. 9ODF – 6DOF + 3xMag (+ Baro)
 - iv. Misc. Sensors
- b. GPS Messages
 - i. LLA – GNSS position given in Lat, Lon, Alt coordinates

- ii. ECEF – GNSS position given in ECEF coordinates
 - iii. Statistic – Extra GNSS information
 - iv. RTK – GNSS Real-Time-Kinematics information
 - v. Sat. Info – Extra GNSS information on satellites in view
- c. Tilt (VG/AHRS) Messages
 - i. [R, P] – Tilt information: Roll & Pitch
 - ii. [R, P, Y] – Tilt information + Yaw
 - iii. [Quater] – Quaternion information
 - iv. [DCM] – DCM information
- d. INS Messages
 - i. Tilt & Pos – UKF position and tilt information
 - ii. Tilt, Pos & Vel – UKF position, velocity, and tilt information
 - iii. Tilt, Pos, Vel & Time – UKF position, velocity, tilt, and time information.
2. The main portion of this view (Figure 2, Reference 5) shows:
 - a. **Field Name:** the sensor source name
 - b. **Field Value:** the current sample value
 - c. **Eng. Units:** the engineering unit for the field value
 - d. **Notes:** general remarks about this field
3. The Status Bar of the main portion of this view shows:
 - a. **Message Rate:** the number of times a selected message was received per second (Figure 2, Reference 4)
 - b. **Message Error:** the number of times an error message was received per second (Figure 2, Reference 5)
 - c. **Total Messages Rate:** the total number of user and system messages received per second (Figure 2, Reference 6).
4. Platform Name

The platform name (Figure 2, Reference 10) can be valid for Exiguo (EX200), ExiguoLP (EXLP200), and gINS (gX200), which all use the INS Dual Antenna algorithm.
5. The right portion of this view shows a panel with all BIT indicator information (Figure 2, Reference 6). These indicators are arranged in user-friendly groups

3.3. Messages Graphic View

The **Message Graphic View** provides a graphic view of the real-time values of message information. Some views show information from multiple messages (for example, INS + GNSS information).

The four tabs under **Messages Graphic View** are arranged by interest and message type as follows:

- **VG/AHRS** shows Roll, Pitch and Yaw fields both numerically and graphically.
- **IMU** shows IMU raw data fields both numerically and graphically.
- **GPS** shows numeric fields of GPS message 1, message 3 and masks.
- **INS** shows UKF information both numerically and graphically and GPS message 3 information numerically.

To view **VG/AHRS** messages:

1. Make sure that messages Tilt [R, P] or Tilt [R, P, Y] are enabled in the device configuration.
2. Select **Messages Graphic View**.
3. Select the **VG/AHRS** tab.
 - a. Under **Attitude [Deg]**, the numerical values for the roll, pitch, and yaw are displayed in addition to being displayed in the graphs to the right.
 - b. Under **Temperature [Deg/C]**, a numerical temperature value is displayed

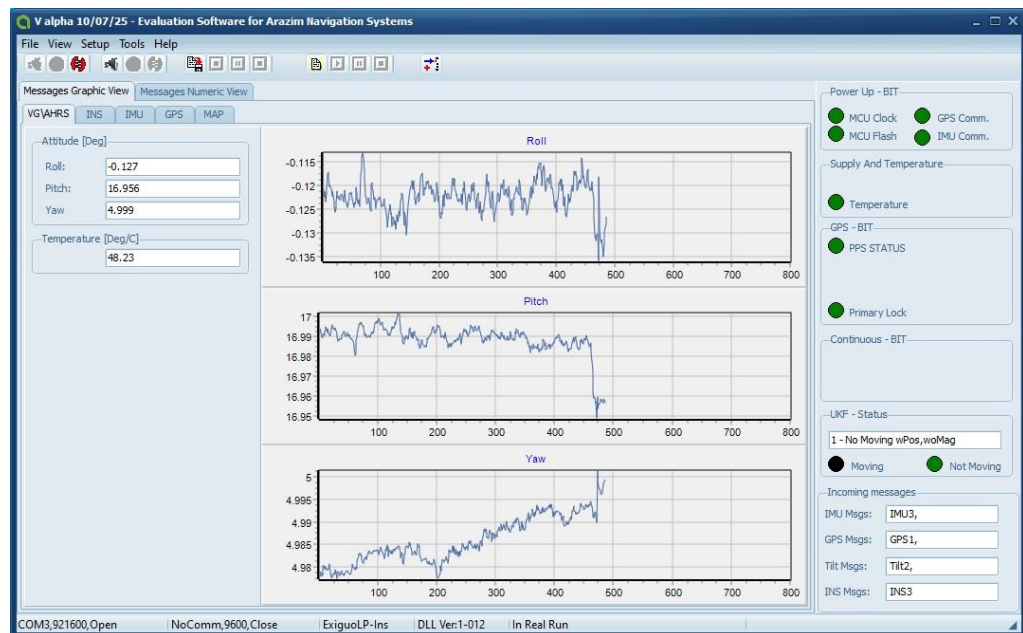


Figure 3. Messages Graphic View – VG/AHRS

To view **INS** messages:

1. Make sure that any INS [Tilt...] message is selected with or without a GPS_3 message in the device configuration.
2. Select **Messages Graphic View**.
3. Select the **INS** tab.
 - a. **Position** shows the numerical values for latitude, longitude, and altitude.
 - b. **Velocity** shows the numerical values for Velocity N, Velocity E, and Velocity U.
 - c. **Tilt** shows the numerical values for the roll, pitch, and yaw.
 - d. **Date and Time** shows the date and time.
 - e. **GNSS Info [GPS MSG 3]** shows the number of each type of satellite, as well as the number of satellites tracked, in use, and above a specific elevation.
 - f. Under **Sig. Mask**, check the types of satellites to be filtered (masked) from this view.

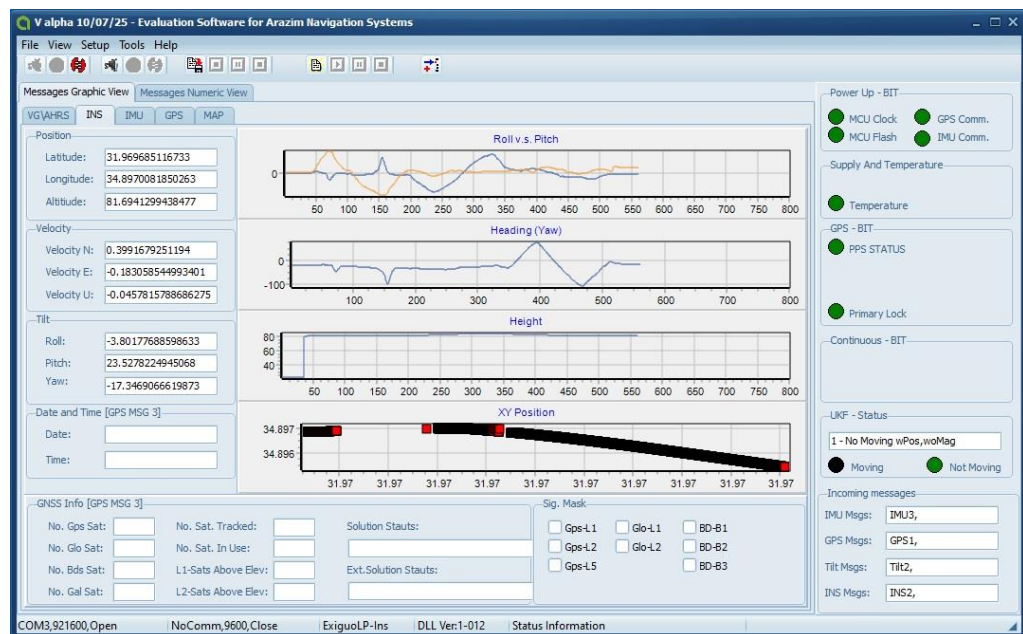


Figure 4. Messages Graphic View – INS

To view **IMU** messages:

1. Make sure that IMU_2 or IMU_3 messages are selected in the device configuration.
2. Select **Messages Graphic View**.
3. Select the **IMU** tab.
 - a. **Acceleration [g]** shows the numerical values for Acc-X, Acc-Y, and Acc-Z. These values are also displayed in the graph to the right.
 - b. **Gyros [Deg/Sec]** shows the numerical values for Gyro-X, Gyro -Y, and Gyro -Z. These values are also displayed in the graph to the right.
 - c. **Magnetometers [Raw]** shows the numerical values for Mag-X, Mag -Y, and Mag -Z. These values are also displayed in the graph to the right.
 - d. **Other Sensors** shows the numerical values for temperature (Temp [Deg/C.]), Odometer (Odo [Km/H]), and Barometer (Baro [P]). These values are also displayed in the graph to the right.



Figure 5. Messages Graphic View – IMU

To view **GPS** messages:

1. Make sure that GPS_1 or/and GPS_3 messages are selected in the device configuration.
2. Select **Messages Graphic View**.
3. Select the **GPS** tab.
 - a. Under **GPS Position [Msg-1]**, the numerical values for Latitude, Longitude, Altitude, Lat_Sigma, Lon_Sigma, and Alt_Sigma (position accuracy indicators) are displayed, where Sigma is standard deviation.
 - b. Under **GPS Velocity [Msg-1]**, the numerical values for Velocity N, Velocity E, Velocity U, VelN_Sigma, VelE_Sigma, and VelU_Sigma (velocity accuracy indication) are displayed, where N = north, E = east, and U = up and, where Sigma is standard deviation).
 - c. Under **Date and Time**, the date and time are displayed.
 - d. Under **Heading**, any value displayed is invalid since systems with a single antenna do not have a GPS heading.
 - e. Under **Real Time Kinematic (RTK) Base Position**, the latitude, longitude, and altitude of the base station are displayed. Under **Base to Rover**, Line N, Line E, and Line U are displayed. These fields are relevant only when RTK is activated and the rover receives corrections from a local base station.
 - f. Under **GNSS Info [GPS MSG 3]**, general GNSS receiving status information is displayed, including the number of satellites from each constellation, the number of tracked satellites, and the number of satellites used to calculate PVT.
 - g. Under **Sig. Mask**, the GNSS signal mask information is displayed.

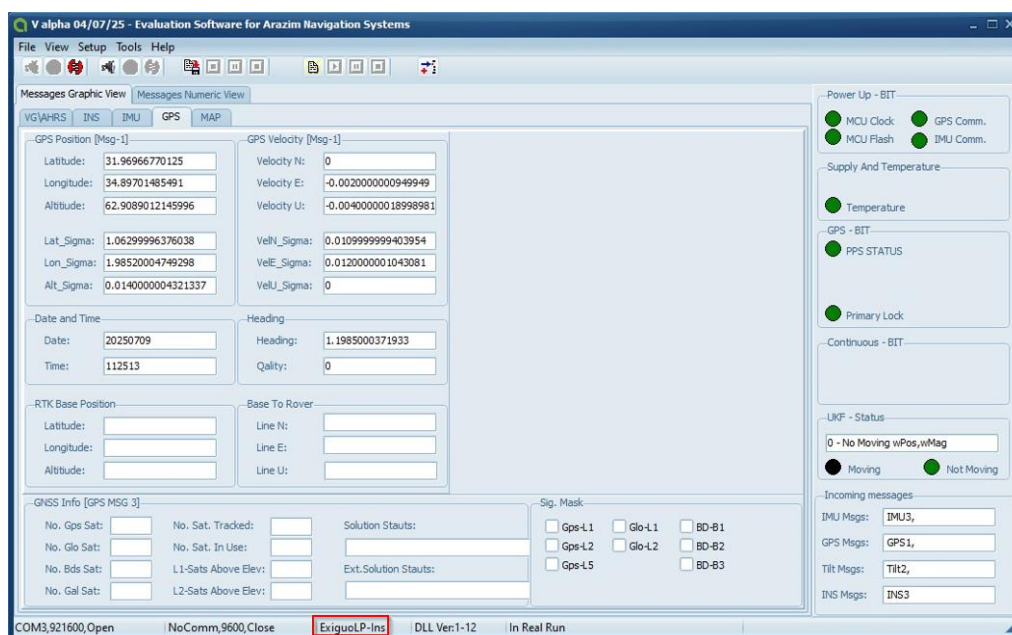


Figure 6. Messages Graphic View – GPS

3.4. Connect to a Navigation Device

Verify that:

- The Host (PC running Windows 10 or above) is connected to the navigation device via a USB to an RS-232/RS-422 converter. The type of converter depends on the device communication channel type.
- The navigation device is connected to two GPS antennas, located under a clear open sky.
- The navigation device is connected to an active and adequate energy source (according to the Navigation Platform specifications).

Before working with a navigation device, the evaluation software must be aware of that device either:

- Automatically – The navigation software automatically detects the device (default) or
- Manually – You select the connected device from the menu of available devices.

3.4.1. Automatic Device Detection

1. Go to **Tools>Developer>Enable System Detection** and verify that **Enable System Detection** is checked to automatically detect a navigation device when a communication port is opened.
2. To select communication port, go to **Setup>Device Comm. Port>Select Port...** or click **Select Comm Port for Nav Device** in the toolbar ( (Figure 1 and Figure 2, Reference 1).
In the dialog box:
 - a. Select a communication port.
 - b. Select a baud rate (default baud rate is 921,600).
3. To open the communication port, go to **Setup>Device Comm. Port>Open Port** or click **Open Nav Device Comm Port** in the toolbar ( (Figure 1 and Figure 2, Reference 2).
4. Wait for device to reach “In Real-Time” status.
5. Check the incoming messages (Figure 2, Reference 7).
6. Select a message view (default = **Messages Numeric View**). (Figure 1, Reference 9).
7. Select a message to view (Figure 2, Reference 4).

3.4.2. Manual Device Configuration

1. Go to **Tools>Developer>Enable System Detection** and verify that **Enable System Detection** is unchecked so that a Navigation device is not automatically detected when the communication port is opened.
2. Go to **Tools>Developer>Select System** and select a Navigation device from the list.
3. Verify that the selected Navigation device is in the list.
4. To select the communication port, go to **Setup>Device Comm. Port>Select Port...** or click **Select Comm Port for Nav Device** () in the toolbar (Figure 1 and Figure 2, Reference 1).
In the dialog box that is displayed:
 - a. Select a communication port.
 - b. Select a baud rate (default baud rate = 921,600).
5. To open the communication port, go to **Setup>Device Comm. Port>Open Port** or click **Open Nav Device Comm Port** () in the toolbar (Figure 1 and Figure 2, Reference 2).
6. Wait for device to reach “In Real-Time” status.
7. Check the incoming messages (Figure 2, Reference 7).
8. Select a message view (default = **Messages Numeric View**). (Figure 1, Reference 9).
9. Select a message to view (Figure 2 – Reference 4).

3.4.3. Post-Selection and Detection Phases

After the device is turned on, the antennas are connected and located under open sky, and the selected communication port is correctly connected and open, the device goes through the following phases:

1. Waiting for GPS lock (valid latitude and longitude)
2. Waiting for Heading lock (valid heading value)
3. Bias estimation
(Do not move the device until after the device sends a notification that bias estimation has finished.)
4. In Real-Run (the device is activated and can begin sending messages)

3.5. Recording and Saving Messages

To record incoming message information:

1. Click  (Select Destination File Name for Recording).
 - a. Select or enter a file name.
 - b. Save the file as either a *.dat file or a *.bin file.

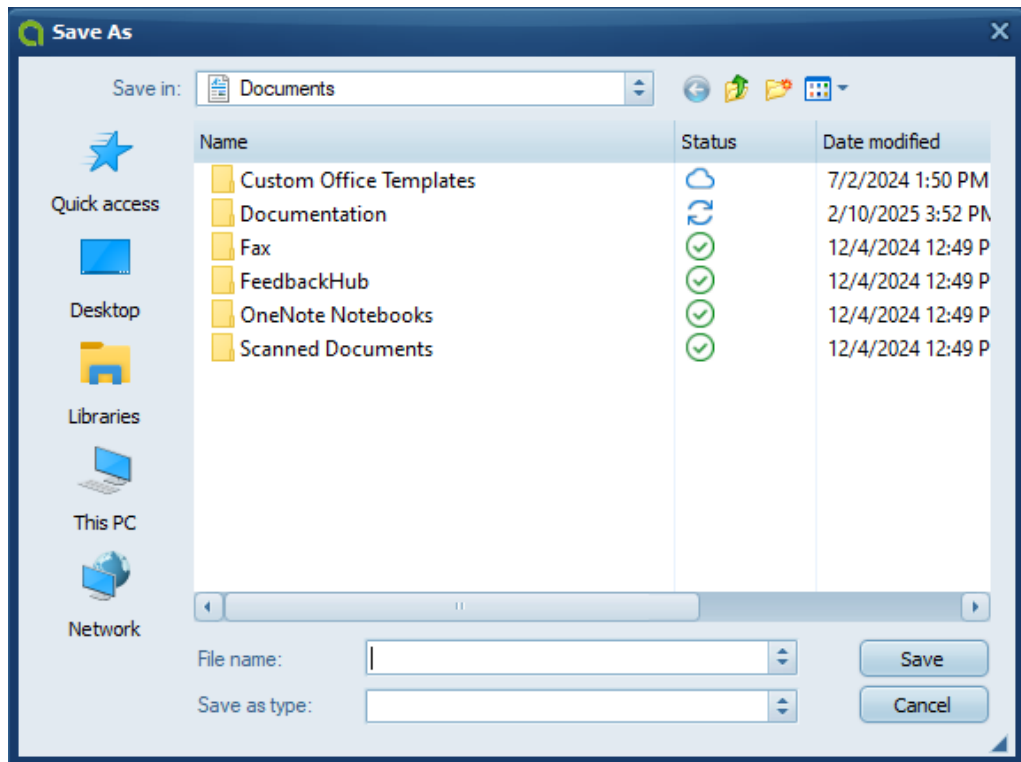


Figure 7. Save File

2. Click **Start Recording** (Figure 1 and Figure 2, Reference 3) to record incoming messages to the file you created.
3. Click **Stop Recording** (Figure 1 and Figure 2, Reference 5) when you have finished recording.

 Note	Recording length is unlimited and depends on your needs. Since the file you recorded is in a proprietary format, you must export it to a comma-delimited file in order to use it with other software.
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To export the recorded file to a comma-delimited file:

1. In the main menu, go to **File>Export**. **Open Dialog** is displayed.
2. Double click on the file name you created (*.dat or *.bin extension) or select the file and click **Open** to create a text file (*.txt or *.csv extension).

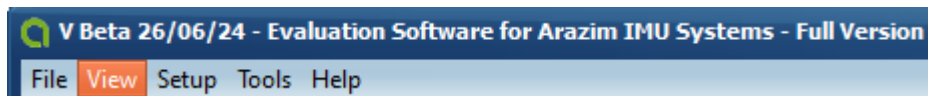
3. If the export succeeds, an “Export Complete” notification is displayed.
Figure 8 shows a sample *.txt file.

SysType	MsgType	Flag1	Flag2	Flag3	Index	TimeTag	Temperature	Roll	Pitch	Yaw	Lat	Lon	Alt	VeN	VeE	VeU	Date	Time
136.82	51.97	1.2970	333169000	39.6797	2.256005	0.530768	77.874847	31.96965124760	34.89700480943	88.381760	-0.000399	-0.000198	0.002030	20250422	110644	400000		
136.82	51.97	1.2971	333289000	39.6797	2.255827	0.532912	77.874718	31.96965124644	34.89700480876	88.381859	-0.000432	-0.000151	0.002174	20250422	110644	500000		
136.82	51.97	1.2972	333369000	39.6719	2.256407	0.534091	77.872749	31.96965124535	34.89700480802	88.381935	-0.000431	-0.000128	0.002148	20250422	110644	600000		
136.82	51.97	1.2973	333469000	39.6953	2.257522	0.534319	77.873611	31.96965124430	34.89700480726	88.382027	-0.000510	-0.000224	0.002142	20250422	110644	700000		
136.82	51.97	1.2974	333569000	39.6875	2.255854	0.533355	77.872650	31.96965124329	34.89700480641	88.382103	-0.000516	-0.000232	0.002102	20250422	110644	800000		
136.82	51.97	1.2975	333669000	39.6797	2.256164	0.533853	77.874146	31.96965124234	34.89700480552	88.382179	-0.000487	-0.000254	0.002076	20250422	110644	900000		
136.82	51.97	1.2976	333769000	39.6562	2.257939	0.534475	77.874374	31.96965124143	34.89700480455	88.382263	-0.000479	-0.000221	0.002142	20250422	110645	000000		
136.82	51.97	1.2977	333869000	39.6094	2.258948	0.535359	77.874107	31.96965124096	34.89700480427	88.382050	-0.000555	-0.000349	0.002074	20250422	110645	100000		
136.82	51.97	1.2978	333969000	39.6797	2.257337	0.535590	77.873611	31.96965123983	34.89700480252	88.382416	-0.000556	-0.000286	0.002108	20250422	110645	200000		
136.82	51.97	1.2979	334069000	39.6719	2.256015	0.535068	77.873367	31.96965123930	34.89700480214	88.382195	-0.000657	-0.000393	0.002227	20250422	110645	300000		
136.82	51.97	1.2980	334169000	39.7109	2.256960	0.535376	77.874420	31.96965123838	34.89700480026	88.382576	-0.000588	-0.000349	0.002283	20250422	110645	400000		
136.82	51.97	1.2981	334269000	39.6641	2.256661	0.535167	77.874840	31.96965123769	34.89700479901	88.382629	-0.000554	-0.000304	0.002088	20250422	110645	500000		
136.82	51.97	1.2982	334369000	39.6562	2.252807	0.533368	77.875694	31.96965123705	34.89700479780	88.382713	-0.000521	-0.000360	0.002274	20250422	110645	600000		
136.82	51.97	1.2983	334469000	39.7109	2.252091	0.535214	77.876059	31.96965123646	34.89700479650	88.382782	-0.000516	-0.000414	0.002202	20250422	110645	700000		
136.82	51.97	1.2984	334569000	39.6562	2.249365	0.534383	77.876350	31.96965123594	34.89700479518	88.382866	-0.000520	-0.000444	0.002482	20250422	110645	800000		
136.82	51.97	1.2985	334669000	39.6484	2.247512	0.537030	77.875275	31.96965123539	34.89700479376	88.382904	-0.000483	-0.000472	0.002398	20250422	110645	900000		
136.82	51.97	1.2986	334769000	39.6875	2.245922	0.534905	77.873901	31.96965123491	34.89700479235	88.382965	-0.000438	-0.000480	0.002152	20250422	110646	000000		
136.82	51.97	1.2987	334869000	39.6641	2.243977	0.533299	77.873749	31.96965123450	34.89700479178	88.382736	-0.000467	-0.000676	0.002523	20250422	110646	100000		
136.82	51.97	1.2988	334969000	39.6562	2.245195	0.532186	77.877716	31.96965123405	34.89700478952	88.383095	-0.000335	-0.000713	0.002391	20250422	110646	200000		
136.82	51.97	1.2989	335069000	39.7031	2.248058	0.531384	77.878189	31.96965123370	34.89700478876	88.382851	-0.000351	-0.000731	0.002435	20250422	110646	300000		
136.82	51.97	1.2990	335169000	39.6719	2.246035	0.530297	77.879593	31.96965123329	34.89700478626	88.383202	-0.000313	-0.000696	0.002525	20250422	110646	400000		
136.82	51.97	1.2991	335269000	39.7031	2.244709	0.528825	77.879463	31.96965123299	34.89700478460	88.383247	-0.000326	-0.000678	0.002422	20250422	110646	500000		
136.82	51.97	1.2992	335369000	39.7031	2.244303	0.526652	77.880493	31.96965123282	34.89700478305	88.383278	-0.000380	-0.000721	0.002387	20250422	110646	600000		
136.82	51.97	1.2993	335469000	39.6953	2.244838	0.525811	77.881218	31.96965123271	34.89700478149	88.383324	-0.000414	-0.000777	0.002548	20250422	110646	700000		
136.82	51.97	1.2994	335569000	39.7031	2.243544	0.526127	77.878622	31.96965123254	34.89700477973	88.383369	-0.000389	-0.000721	0.002613	20250422	110646	800000		
136.82	51.97	1.2995	335669000	39.6797	2.245255	0.527448	77.880666	31.96965123235	34.89700477803	88.383400	-0.000315	-0.000735	0.002598	20250422	110646	900000		
136.82	51.97	1.2996	335769000	39.6875	2.243917	0.528767	77.884668	31.96965123228	34.89700477635	88.383446	-0.000325	-0.000783	0.002753	20250422	110647	000000		
136.82	51.97	1.2997	335869000	39.6641	2.246046	0.527354	77.884712	31.96965123197	34.89700477546	88.383163	-0.000356	-0.000632	0.002843	20250422	110647	100000		
136.82	51.97	1.2998	335969000	39.6797	2.247584	0.529011	77.884842	31.96965123211	34.89700477272	88.383514	-0.000247	-0.000806	0.002717	20250422	110647	200000		
136.82	51.97	1.2999	336069000	39.7266	2.248474	0.529234	77.885696	31.96965123185	34.89700477186	88.383224	-0.000279	-0.000828	0.003006	20250422	110647	300000		
136.82	51.97	1.3000	336169000	39.7031	2.247261	0.530984	77.885406	31.96965123225	34.89700476871	88.383583	-0.000264	-0.000689	0.002986	20250422	110647	400000		
136.82	51.97	1.3001	336269000	39.6719	2.246076	0.530081	77.884786	31.96965123233	34.89700476695	88.383614	-0.000280	-0.000758	0.003056	20250422	110647	500000		
136.82	51.97	1.3002	336369000	39.6875	2.247248	0.530122	77.885834	31.96965123254	34.89700476493	88.383636	-0.000329	-0.000788	0.002992	20250422	110647	600000		
136.82	51.97	1.3003	336469000	39.7031	2.247243	0.529462	77.885689	31.96965123277	34.89700476308	88.383659	-0.000338	-0.000804	0.002973	20250422	110647	700000		
136.82	51.97	1.3004	336569000	39.6953	2.247718	0.529334	77.886551	31.96965123284	34.89700476108	88.383690	-0.000278	-0.000846	0.003100	20250422	110647	800000		
136.82	51.97	1.3005	336669000	39.7109	2.245192	0.527168	77.886880	31.96965123301	34.89700475891	88.383705	-0.000270	-0.000796	0.003092	20250422	110647	900000		

Figure 8. Sample *.txt File

4. VIEW CONTROL

Go to the **View** tab in the main menu to control the view as described below.



4.1. Form Style

You can edit the screen display style, based on your preferences.

To edit the screen presentation style:

1. In the main menu, go to **View** and select **Form Style**.
The **Form Style** dialog is displayed (Figure 9).

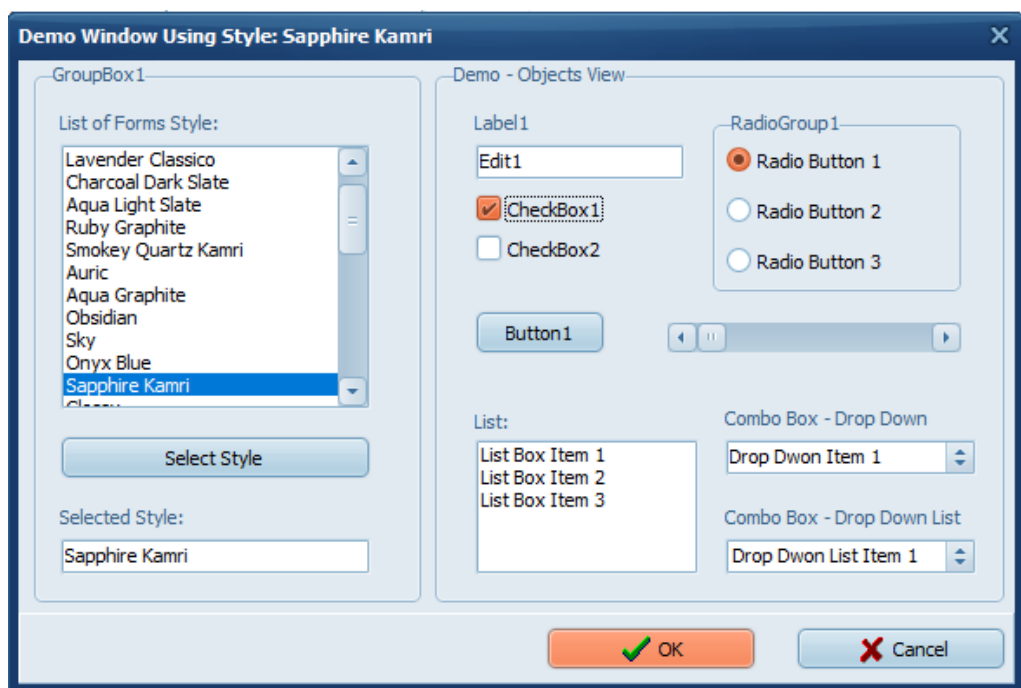


Figure 9. Forms Style

2. Under **GroupBox1>List of Forms Style**, select a style and click **Select Style**.
The style you selected is displayed in the **Selected Style** field.
3. Under **Demo-Objects View**, you can select the appearance of:
 - a. Check boxes
 - b. Radio buttons
 - c. List items
 - d. Combo boxes
4. Click **OK** to save your form style selections.

4.2. Monitor Communication with Device

You can view the communication process between the device and the software.

To view communications:

1. In the main menu, go to **View** and select **Monitor Device Comm. Track Process Information** is displayed, where you can view all device communication actions.
2. Click **Clear** to clear all displayed actions.
3. Click **Pause** to pause the display of all actions to focus on specific items.
4. Click **Release** to restart the display of all actions.
5. Click **Close** to close the **Track Process Information** window.



Note

By default, the Monitor is set to be: Stay On Top. The user can disable this view mode by selecting from the Main Menu: Tools->Developer->Monitor View->Normal

4.3. Show/Hide BIT Flags Panel

Use the **Built-in Test (BIT)** panel to detect any failed test. Table 2 shows the BIT panel (displayed by default).

To hide the displayed BIT panel, from the **View** menu un-check the **Show BIT Flags** menu item.

To display the hidden BIT panel, from the **View** menu check the **Show BIT Flags** menu item

4.4. Show 3D Form

To view the Navigation device in three dimensions form:

1. Configure the system to send either "Tilt-1" ([R, P]) or Tilt-2 ([R, P, Y]) messages. (If both message types are configured, the system selects Tilt-2).
2. From the **View** menu, select **Show 3D Form**.
You can now see the device movement in three dimensions.

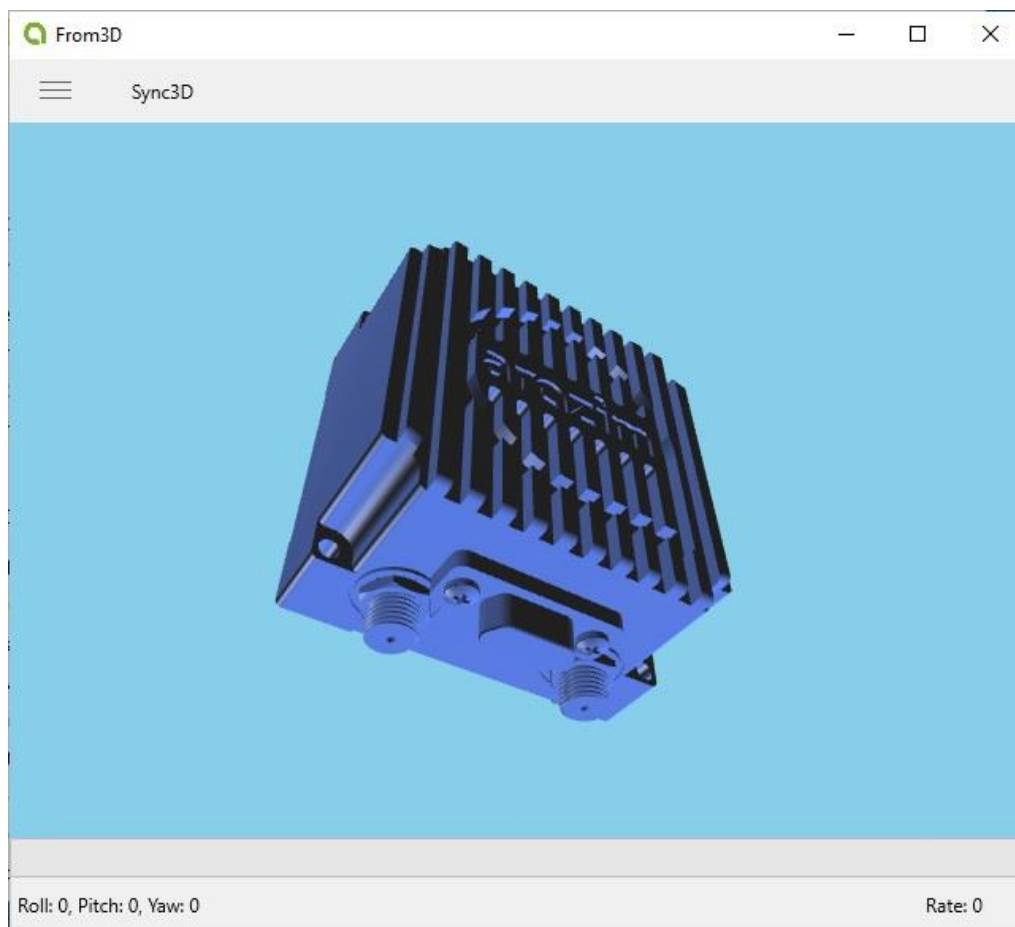


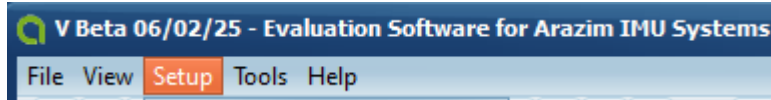
Figure 10. 3D Form

 Note

- If you only select the "Tilt-1" message, the 3D view is limited to Roll and Pitch rotation.
- The 3D form also supports dynamic simulation (Section 6.1.2).

5. SETUP

Go to the **Setup** tab in the main menu to perform the operations described in the following subparagraphs.



5.1. Device Communication Port

You can select, open, and close the device communication port, using either the communication port buttons, described in Section 2, or via the Setup tab.

To select the port using the **Setup** tab:

1. In the main menu, go to **Setup** and select **Device Comm Port**.
 - a. Click **Select Port** to select a communication port.
 - b. Click **Open Port** to open the selected communication port.
 - c. Click **Close Port** to close the selected communication port.

5.2. GPS Communication Port

You can select, open, and close the GPS communication port, using either the communication port buttons, described in Section 2, or via the Setup tab.

To select the port using the **Setup** tab:

1. In the main menu, go to **Setup** and select **GPS Comm Port**.
 - a. Click **Select GPS Port** to select a communication port.
 - b. Click **Open GPS Port** to open the selected communication port.
 - c. Click **Close GPS Port** to close the selected communication port.

5.3. Device Configuration

You can configure several parameters of the Navigation device and change or update them to suit your needs.

To configure the Navigation device:

1. Verify that the Navigation device is connected and sending messages.
2. In the main menu, go to **Setup** and select **Device Configuration**. **Configuration Form** is displayed.

Param Name	Current Value	New Value	Description
General Settings			
Comm Type	RS-232	RS-232	Active Communication Channel...
Comm Channel	1	1	Active Communication Channel
Comm Speed	921600	921600	Active Communication BaudRate
Operation Mode	Do Static On PowerUP	Do Static On PowerUP	Start Immediate = load old stat...
Sample Mode	Continuous	Continuous	
IMU Settings			
IMU Sample Rate [Hz]	100	100	
Acceleration Range	16g	16g	
Gyros Range	500 Deg/Sec	500 Deg/Sec	
Magnetometers Range	2 G	2 G	
UKF Settings			
IMU Orientation	1	1	
Static Samples	2000	2000	Min=1000, Max=9000
Enable Filter	Enabled	Enabled	Using Filter Adds a Latency of: ...
Use Magnetic Sensors	Disabled	Disabled	When enabled, the UKF will Us...
Latitude	0	0	[deg]
Longitude	0	0	[deg]
Altitude	0	0	[meters]
Shift Values Mode	Disabled	Disabled	Mode of using Shift Values
Roll Shift	0	0	[deg]
Pitch Shift	0	0	[deg]
Yaw Shift	0	0	[deg]
Enable LeverArm	Disabled	Disabled	enable/disable use of leverArm
Distance X	0	0	[meters]
Distance Y	0	0	[meters]
Distance Z	0	0	[meters]
Optimization Block	6	6	index: 0-14, Read User Manual

Figure 11. Configuration Form – Navigation Device

5.3.1. Configuration Form

The Configuration Form (Figure 11) includes the following areas:

- The left area contains a panel with control buttons and general information about the connected device. Section 5.3.1 has more information.
- The bottom area contains a panel with the **Save Settings** and **Load Settings** buttons. Section 5.3.2 has more information.
- The configuration parameters area is the main area, located above the bottom area and it contains three tabs to handle settings:
 - Factory Settings – For factory use only
 - Flags & Alarms – To configure temperature thresholds and enable the special “debug-message”. (The remaining alarms are for factory use only).
 - User Settings – To determine what settings to use. Section 5.3.1.1 has more information.

Before putting the device in **Configuration** mode, make sure the connected device is powered up, correctly detected, and transmitting messages.

To put the device in **Configuration** mode, go to **General Control** and select **Enter Config**.

Once the device is in **Configuration** mode, the Navigation device stops sending messages.

 Note	• Device Configuration is available only if a connection was established with the device. • After each General Control panel operation, check the Command Status to verify that the operation succeeded.
---	--

After entering Configuration mode, select Read All Settings to read the device's current settings.

5.3.1.1. User Settings

The main section of the form shows the settings registers and values. **User Settings** are displayed as a list of registers, grouped by association. For example, the **Messages Out** group gathers all messages that can be activated.

The register list consists of four columns:

- **Param Name** – the name of the register
- **Current Value** – the current register value
- **New Value** – the last register value that you set
To write all changes to the device registers, select **Write All Settings**. Verify that all changes were made to all device registers.
- **Description** – Register supply information

The registers and optional parameter values in the list depend on navigation platform that is connected.

5.3.1.2. General Settings Registers

Users may change the following parameter values (unless they are Read-Only values):

- **Comm Type** – This Read-Only parameter displays the hardware selected communication interface (which may be RS-232 or RS-422).
- **Comm Channel** – This Read-Only parameter always displays “1” (saved for multi-port devices).
- **Comm Speed** – This Read/Write parameter displays the communication speed in bauds (default = 921,600).
- **Operation Mode** – This Read/Write parameter displays how the device is initialized at power-up:
 - **Start Immediate** – The system starts right away (using saved bias estimation parameters).
 - **Do Static on Power-up** – The system, first, runs the bias estimation to reduce sensor biases.

- **Sample Mode** – This Read/Write parameter displays how the system sends data samples (default = Continuous).
 - **Continuous** – Data samples are sent according to the defined frame-out rate.
 - **Polling** – Data samples are sent only when the Host device requests them.

5.3.1.3. Inertial Measurement Unit (IMU) Settings Registers

- **IMU Sample Rate (Hz)** (default = 100Hz) This Read/Write parameter displays the IMU message rate (range = 1 to 1000).
- **Acceleration Range** – This Read-Only parameter displays the current accelerometers full scale in [g] units (hardware dependent).
- **Gyros Range** – This Read-Only parameter displays the current rate-gyros full scale in [Deg/Sec] units (hardware dependent).
- **Magnetometers Range** – This Read-Only parameter displays the current magnetic full scale in [Gauss] units (hardware dependent).

5.3.1.4. Unscented Kalman Filter (UKF) Settings Registers

- **IMU Orientation** – This Read/Write parameter displays how the IMU is oriented with respect to the platform X,Y,Z axes (range = from 1 to 16). Table 4 shows all the available IMU orientations.
(The default IMU orientation value is 1, which is equivalent to index 0 in Table 4.)

Table 4. Optional Parameter Values for Set Orientation

0	1	2	3
4	5	6	7
8	9	10	11
12	13	14	15

- Static Samples** – This is a Read/Write parameter (default = 2000), which displays the number of static samples used to compute the bias estimation at power-up.
The optional values are from 1000 to 9000
The computation time can take from 10-90 seconds, assuming an IMU sampling rate of 100Hz.
- Enable Filter** – This is a Read/Write parameter (default = Disabled). When enabled, the IMU data is filtered with IIR LPF 10hz, which creates a latency of three samples.
- Use Magnetic Sensors** – This is a Read parameter (default = Enabled).
It allows the UKF to use magnetic sensors only in static conditions.
- Latitude** – This is a Read/Write parameter (default = 0).
It determines the initial latitude in degrees.
When the system's Operation mode is configured as immediate, the system initializes the UKF latitude with this value.

- **Longitude** – This is a Read/Write parameter (default = 0).
It determines the initial longitude in degrees.
When the system's Operation mode is configured as immediate, the system initializes the UKF longitude with this value.
- **Altitude** – This is a Read/Write parameter (default = 0).
It determines the initial altitude in degrees.
When the system's Operation mode is configured as immediate, the system initializes the UKF altitude with this value.
- **Shift Values Mode** – This is a Read/Write parameter (default = Disabled).
It determines whether or not a manual shift of roll, pitch, and yaw values is used to correct the device orientation with respect to the platform X,Y,Z axes...
If disabled, the mechanism uses the IMU orientation value to make the shift.
The optional modes are:
 - **Disabled** - use the IMU orientation with respect to platform X,Y,Z
 - **Auto** (not operational)
 - **Manual** – use the Roll, Pitch Yaw shift fields with respect to platform X,Y,Z axes.
- **Roll Shift** – This is a Read/Write parameter (default = 0).
It determines the roll shift, in degrees, and is only used when the **Shift Values Mode** is **Manual**.
- **Pitch Shift** – This is a Read/Write parameter (default = 0).
It determines the pitch shift, in degrees, and is only used when the **Shift Values Mode** is **Manual**.
- **Yaw Shift** – This is a Read/Write parameter (default = 0).
It determines the yaw shift, in degrees, and is only used when the **Shift Values Mode** is **Manual**.
- **Enable Lever Arm** – This is a Read/Write parameter (default = Disabled).
It enables or disables calculation of the distance from the primary antenna to the IMU device.
- **Distance X** – This Read/Write parameter (default = 0).
It determines the distance X, in meters, from the primary antenna to the IMU device. If the X-Axis points to the primary antenna location, use a positive value; otherwise, use a negative value (Figure 12).
- **Distance Y** – This Read/Write parameter (default = 0).
It determines the distance Y, in meters, from the primary antenna to the IMU device. If Y-Axis points to the primary antenna location, use a positive value; otherwise use a negative value (Figure 12).
- **Distance Z** – This Read/Write parameter (default = 0).

It determines the distance Z, in meters, from the primary antenna to the IMU device. If the primary antenna is above the Nav platform use a negative value; otherwise, use a positive value (Figure 12).

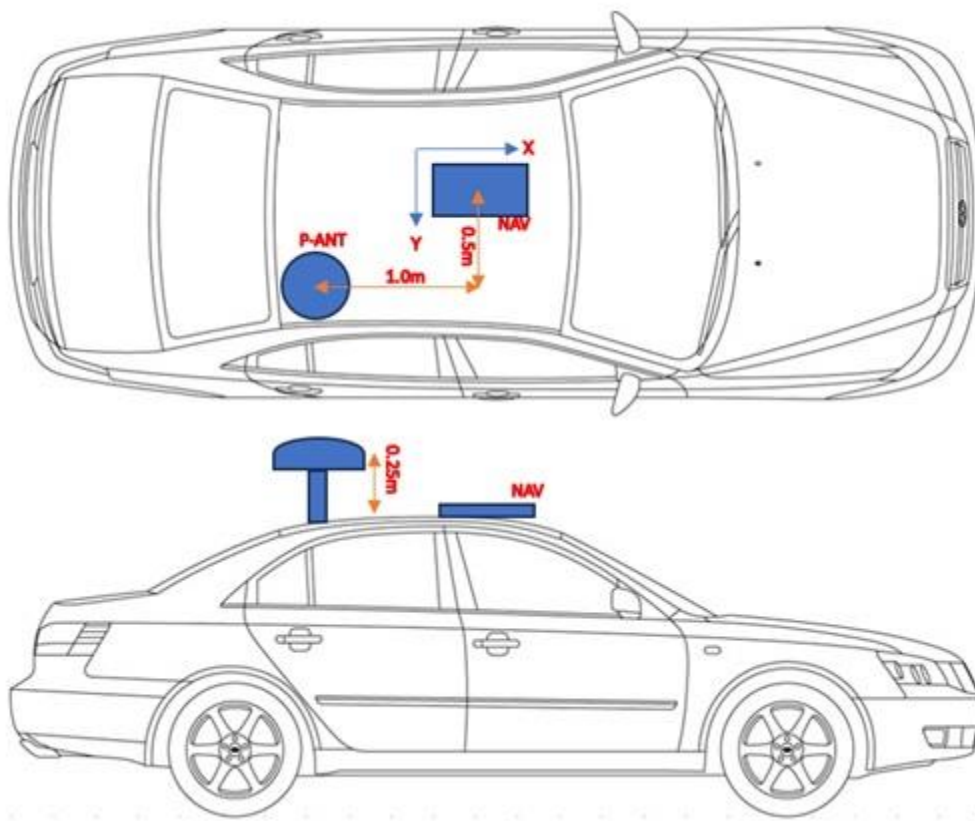


Figure 12. Primary Antenna Location

In Figure 12, when:

- The primary antenna is in the negative direction of the navigation X-axis, X-distance = -1.0m.
- The navigation Y-axis points to the primary antenna location, Y-distance = +0.5m.
- The primary antenna is above the navigation platform, Z-distance = -0.25m
- **Optimization Block** – This is a Read/Write parameter (default for EX200 = 6, default for gX200 = 9). It ranges from 0-14 and assists in achieving more accurate road/track results.
For example, you can choose a better optimization block when a device is assembled on a platform with a high volume of engine noise.
Table 5 has more information on which scale factor level to use.

Table 5. Scale Factor Values Used by Optimization Block Level

Scale Factor Level	Remarks
0 – 3	Other platforms
4	EX200 and EXLP200 scale factors, IMU & GPS Receiver's low-level factors.
5	EX200 and EXLP200 scale factors, IMU & GPS Receiver's medium-level factors.
6	EX200 and EXLP200 scale factors, IMU & GPS Receiver's high-level factors.
7	gX200 scale factors, IMU & GPS Receiver's low-level factors.
8	gX200 scale factors, IMU & GPS Receiver's medium-level factors.
9	gX200 scale factors, IMU & GPS Receiver's high-level factors.
10 - 12	Other platforms

5.3.1.5. Messages Out

Users may configure the system to send several message types, at different frame rates, simultaneously.

All the messages frame out rates (except for the GPS messages), rely on the IMU sampling rate. The messages frame out rates are limited to the IMU sampling rate.

The IMU sampling rate is configurable up to 1KHz.

The maximum INS messages frame out rate is limited to 100Hz.

To increase the frame out rate of these messages, users must configure the IMU sample-rate to a higher value, first.

The frame-rates available for:

- IMU Messages
- Tilt Messages
- INS Messages

are the following:

1Hz, 2Hz, 5Hz, 10Hz, 25Hz, 50Hz, 100Hz, 200Hz, 250Hz, 500Hz, 1KHz

Since GPS messages sent from the GPS unit, are received at a rate of 10Hz, the maximum configured value of GPS messages framerate should be 10Hz. If you configure the GPS messages at a higher frame rate, the information given in the frames will repeat itself.

The frame out rates recommended for the GPS messages are the following:
1Hz, 2Hz, 5Hz, 10Hz

The following is a list of message-groups and the messages they contain:

- **IMU Messages** (default = 0) – Information collected directly from IMU sensors (If active, this information is filtered.)
 - IMU_1 – RAW (Factory use)
 - IMU_2 – 6DOF, IMU 3xAcc, + 3xGyro
 - IMU_3 – 9DOF, 6DOF + 3xMag (+Baro)
 - IMU_4 – Misc Sensors
- **GPS Messages** – Information collected directly from the GNSS server
 - GPS_1 – GNSS position given in Lat, Lon, Alt Coordinates
 - GPS_2 – GNSS position given in ECEF coordinates
 - GPS_3 – Extra Statistic Information
 - GPS_4 – GNSS Real Time Kinematics (RTK) information
- **Tilt Messages** – Computed results
 - Tilt [R, P] – Tilt information: Roll & Pitch
 - Tilt [R, P, Y] – Tilt information + Yaw
 - Tilt (Quater) - Quaternions
 - Tilt [DCM] – DCM information
- **INS Messages** – Computed results
 - INS [Tilt, Pos] – UKF position and Tilt Information.
 - INS [Tilt, Pos, Vel] – UKF Position, Velocity and Tilt Information.
 - INS [Tilt, Pos, Vel, Time] – UKF Forward Level ARM information.

 Note	While it is possible to send multiple messages, be careful when configuring the output rates of those messages. If the message output rate exceeds the COM port bandwidth, the system may become unstable and messages may be lost. The PC software notifies you if the total messages (and their frame rates) exceed the COM port's maximum bandwidth. In addition, if the message output rate exceeds sensor output (IMU or GPS), the message output will be repeated.
---	---

5.3.1.6. Control Buttons/General Information

This section describes the buttons and fields in the left of the Configuration Form:

- General Control (Figure 13, Reference 1) – These buttons are used to activate transactions with the Navigation device.
- Device information (Figure 13, Reference 2) – These are identification parameters.
- Command Status (Figure 13, Reference 3) – This is the result status of the last transaction activated by the general control buttons.

The screenshot displays a web-based interface for controlling a navigation device. It is divided into three main sections, each highlighted with a red box and a label:

- General Control:** This section contains several buttons for managing the device's configuration and settings:
 - Enter Config
 - Exit Config
 - Read All Settings (highlighted in orange)
 - Write All Settings
 - Save Settings as Default
 - Soft Reset
 - Reset To Factory
 - Enter Transparent Mode
 - Start GPS Test
 - Get GPS Test Res
- Device Information:** This section displays various identification parameters in a key-value format:
 - Name: EXIGUO_LP_INS
 - Type: Navigation
 - Version: v2.00
 - HW Version: EXIGUO-v1.00
 - FW Version: v1.02_b0021
 - Serial Num: 101
- Command Status:** This section shows the result of the last command executed:
 - Command: Get UKF Debug MSG Rate
 - Result: Ack Received

Figure 13. Settings Control

5.3.1.7. General Control

You can perform the following functions in the **General Control** section:

1. Click **Enter Config** to enter **Configuration** mode – The navigation device stops sending messages and waits for further configuration commands.
2. Click **Exit Config** to exit **Configuration** mode – The navigation device returns to real-time mode and starts sending selected message at the selected rate (unless you are working in polling mode).
3. Click **Read All Settings** to read all configuration values from the device RAM.
4. Click **Write All Settings** to write the settings to the Navigation device RAM.
5. Click **Save Settings as Default** to burn all RAM values to flash memory. It may take a few seconds to receive an ACK.
6. Click **Soft Reset** to reset the system – The reset is effective only after exiting **Configuration** mode.
7. Click **Reset to Factory** to reset the default configuration. This operation does not reset the calibration values.

5.3.1.8. Device Information

The connected **Device Information** is displayed when you are in **Configuration** mode and click **Real All Settings**.

5.3.1.9. Command Status

Command Status displays the last message sent to the system and indicates whether that message was acknowledged (ACK).

5.3.2. Save Settings and Load Settings

You can save the current configured settings for future use and later load saved settings.

To save the settings:

1. Click **Save Settings**.
2. In the **Save As** dialog displayed, go to the **Save in** field and select a location to save the file.
3. Go to the **File name** field and enter the file name and click **Save**.

To load the saved settings:

1. Click **Load Settings**.
2. In the **Open** dialog displayed, go to the **Look in** field and select the saved file location.
3. Select the file from the file list and click **Open**.

5.4. Device Calibration

You can calibrate several parameters of the Navigation device and change or update them as needed.

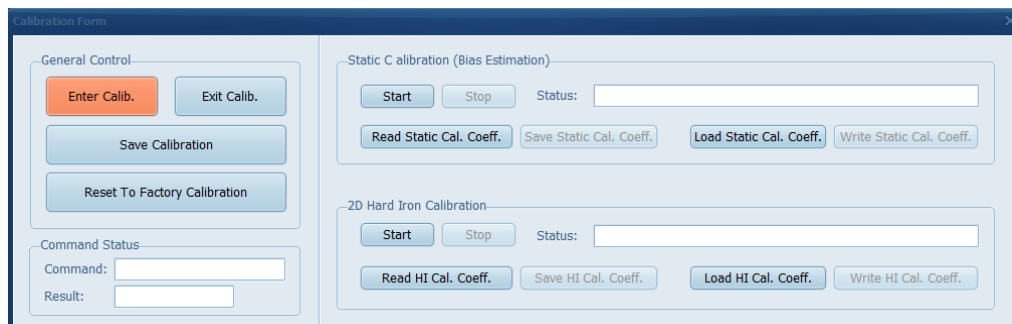


Figure 14. Device Calibration

5.4.1. General Control

You can perform the following functions with the General Control section buttons:

1. Click **Enter Calib** to enter Calibration mode – The Navigation device stops sending messages and waits for further calibration commands.
2. Click **Exit Calib** to exit Calibration mode – The Navigation device returns to real-time mode and starts calibrating for the selected parameters.
3. Click **Save Calibration** to save the calibration values from the device RAM.
4. Click **Reset to Factory Calibration** to erase user calibration information.

5.4.2. Static Calibration (Bias Estimation)

Static calibration is based on a fixed number of configured static samples, which you can configure in the **Configuration Form** under **UKF Settings > Static Samples**.

To start static calibration:

1. Click **Start** to begin the calibration, which stops automatically when it has finished.
The **Status** field indicates calibration progress.
2. Click **Stop** to stop the calibration before it has finished, for example, if you would like to use a shorter period than the period defined in the configuration form.
3. When the calibration has finished, click **Read Static Cal. Coeff.** to read the calculated calibration coefficients from the device.
4. Click **Save Static Cal. Coeff.** to save the read static calibration information on the Host drive.

5. Click **Save Calibration (General Control)** to save the new calibration results in the device flash for use in the next power-up if you select **Immediate Power-Up**.

Otherwise, to load a previously saved static calculation file to a device:

1. Click **Load Static Cal. Coeff.** to load the static calibration from a selected file.
2. Click **Write Static Cal. Coeff.** to write to RAM memory.
3. Click **Save Calibration** under **General Control** to save the new calibration results in the device flash to use in the next power-up if you select **Immediate Power-Up**.

5.4.3. 2D Hard Iron Calibration

Unlike static calibration, 2D hard iron calibration is not configured, but is calibrated continuously. This calibration procedure involves rotating the platform on which the device is assembled horizontally 720 degrees.

To start 2D hard iron calibration:

1. Click **Start** to begin the calibration, which will continue calibrating until you click **Stop**.
The **Status** field indicates calibration progress.
2. Click **Stop** when you have finished rotating the platform.
3. Click **Read HI Cal. Coeff.** to read calibration coefficients from the device RAM.
4. Click **Save HI Cal. Coeff.** to save the calibration coefficient on the Host drive.
5. Click **Save Calibration** under **General Control** to save the new calibration results in the device flash, to use in the next power-up, if you selected **Immediate Power-Up**.

Otherwise, you can load the previous HI coefficients from a selected file as follows:

1. Click **Load HI Cal. Coeff.** to load the calibration coefficients from a selected file.
2. Click **Write HI Cal. Coeff.** to write to RAM memory.
3. Click **Save Calibration** under **General Control** to save the new calibration results in the device flash, to be used in the next power-up, if you do not intend to perform a new HI calibration during the next power-up.

5.4.4. Command Status

The name and results of the last command sent are displayed in **Command Status**. This single transaction status changes rapidly for **Read All Settings** and **Write All Settings**.

5.5. Device Optimization

Optimize the device only with the assistance of an arazim representative.

5.6. GPS Configuration

The Navigation device is equipped with a secondary serial port dedicated to GNSS message outputs. You can configure several GNSS parameters and update them later to meet your needs.

The screenshot shows the 'Exiguo GNSS Configuration' window. It features a tabbed interface with 'Configuration' selected. The main area contains a table for configuring GNSS messages. The table has five columns: 'Constellation' (all set to 'GPS'), 'Message' (listing GGA, GSV, GSA, GST, GLL, RMC, VTG, ZDA, and HDT), 'Rate' (all set to 0), 'Last Sent' (empty), and a 'Send' button for each row. Below the table, there is a 'Port' dropdown menu currently set to 'Current', and two buttons: 'Read Settings' and 'Unlog All'. At the bottom of the window, there is a 'Monitor' section with two text input fields labeled 'Command Sent' and 'Command Reply', and a 'Close' button with a small icon.

Figure 15. GNSS Configuration

To configure GNSS:

1. Select a port from the **Port** dropdown menu.

NMEA Tab

1. In this TAB we exhibit the messages that the user can configure to emit at a specific rate
2. **Constellation** – Select one of the available constellation values.



Note

If you select any constellation other than GPS, the message sent will be based on that constellation.

For example, if you configure the GGA message for GPS and Glonass, two messages will be sent.

3. **Message** – This field is a static value that indicates the message being configured.
4. **Rate** – This field, selected from the dropdown menu, determines the frequency that the system uses to broadcast the current message.
5. **Last Sent** – This field shows the last rate value you sent.
6. Click **Read Settings** to read the GNSS configuration settings from the GPS.
7. Click **Unlog All** to stop all message broadcast on the chosen COM port.
8. Under **Monitor** (Section 4.20), view the sent commands and their respective replies.

Configuration Tab

1. Enter values for each of the fields in the tabs listed below.
2. Click **Read Configuration** before making your selections to read the last configuration set.
3. Set the baud rate for each of the comm ports
4. Click **Send**.
5. View the sent commands and their respective replies under **Monitor**.

Mask

1. Use this TAB to Mask and UnMask specific frequencies, an entire constellation, or just the elevation.
2. View the sent commands and their respective replies under **Monitor**.

Offsets

1. Enter a **Heading angle correction** value (between -180° and $+180^{\circ}$). The value reflects how the heading is viewed.
2. Enter a **Pitch angle correction** value (between -90° and $+90^{\circ}$). The value reflects how the heading is viewed.
3. Click **Send Command**.
4. View the sent commands and their respective replies under **Monitor**.

Mask Tab

Use this tab to Mask and UnMask specific frequencies, the elevation, or an entire constellation.

1. View the sent commands and their respective replies under **Monitor**.

Working Mode Tab

Use this tab to configure how the end unit (which should always be the rover) works.

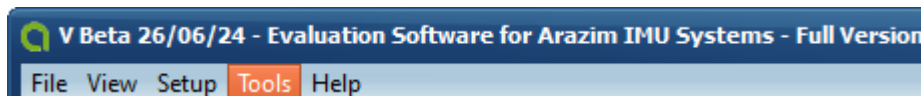
1. View the sent commands and their respective replies under **Monitor**.

Save & Reset Settings Tab

1. Under **Save GNSS Current Settings to Flash** section, click **Save Current Settings As Default**.
This command burns the last configuration (temporarily in RAM) into FLASH memory.
2. Under **Reset Settings**, select an item from the **Reset** dropdown menu (optional memory information blocks), then click **Build Cmnd**.
3. Under **Reset All Settings**, click **Reset All Settings** to reset all memory information blocks.
4. View the sent commands and their respective replies under **Monitor**.
5. When all configurations under all tabs have been set, you can close the Configuration Form.

6. TOOLS

Go to the **Tools** tab in the main menu to perform the following operations:



6.1. Simulation

You can simulate device messages without using the device.

For example, when a programmer wants to develop an application that can receive messages without the Navigation device, the programmer can connect a cross-cable between two serial ports, one that simulates outgoing messages, and the other to develop code to receive messages

6.1.1. Simulation Setup – Ext Frame Player

To set up the arazim Data Packet Recorder and Player with an actual device:

1. Go to **Tools>Simulation**.
2. Select **Ext Frame Player**.

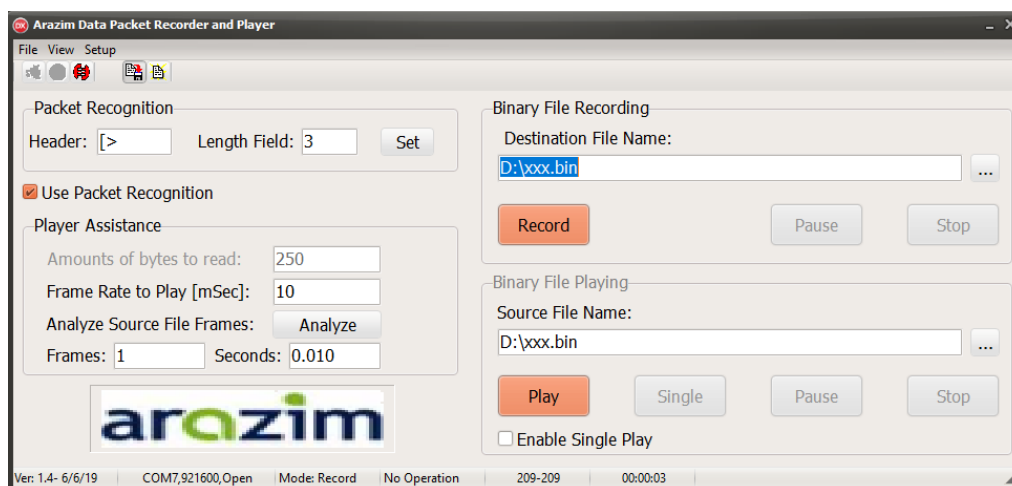


Figure 16. arazim Data Packet Recorder and Player

3. In the three buttons on the left of the Toolbar (Figure 16):
 - a. Click **Select Comm Port for Nav Device** .
 - b. Click **Open Nav Device Comm Port** .
4. Under **Packet Recognition**:
 - a. Verify that the Header is "[>".
 - b. Verify that the Length Field is in the "3" byte of the incoming message.
 - c. Click **Set**.
5. Check **Use Packet Recognition**.

Recording

1. To enable recording, click **Select Destination File Name for Recording** .
2. Under **Binary File Recording**, click  to save a file.
A **Save As** window is displayed.
3. Select a folder and enter a file name (with either a *.bin or a *.dat suffix).
The file is displayed under **Destination File Name** in the **Binary File Recording** section.

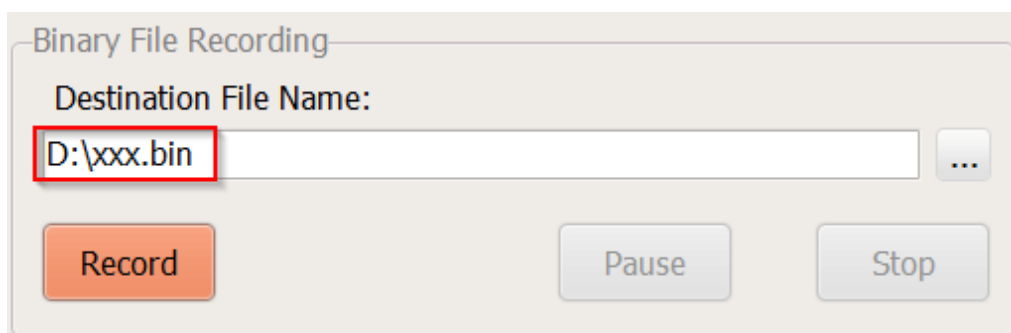
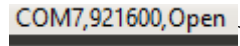


Figure 17. Destination File Name

4. At the bottom of the screen, verify the device to which the communication port is connected, the baud rate, and the status, as shown below (in this example, COM7, 921600, Open):
).
5. Click **Record**.
If you selected a destination file name that already exists, a notification popup informs you that the file already exists and asks if you want to overwrite it.
6. Verify that the mode is **Record** and that the status is **Recording**.
The number of packets recorded and the recording time elapsed are also displayed, as shown below (where 40 packets were recorded in 4 seconds):

Mode: Record	Recording	40	00:00:04
--------------	-----------	----	----------
7. Press **Pause** to record specific intervals of the recording.
8. Press **Stop** to stop recording.

Playing

1. Click **Enable Binary File Play Options**  to play the recording.
2. Under **Binary File Playing**, click  to select a file to play.
An **Open** window is displayed.
3. Select a file from the displayed list and click **Open**.
The file is displayed under **Source File Name** under **Binary File Playing**.
4. Under **Player Assistance**, enter the frame rate for outgoing messages, then press **Analyze** to obtain the number of frames in the file and the playback duration.

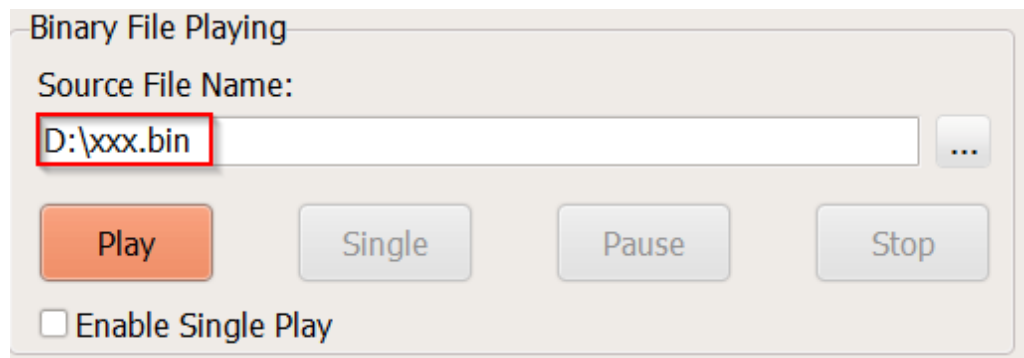


Figure 18. Source File Name

5. Click **Play** for continuous play
 - a. Verify that the mode is **Play** and the status is **Playing**.
The number of packets playing and the playing time elapsed are also displayed, as shown below:
- | | | | |
|------------|---------|------|----------|
| Mode: Play | Playing | 0-95 | 00:00:00 |
|------------|---------|------|----------|
6. Check **Enable Single Play** to send a single packet only when you press **Single** , for example, when you want to check for bugs in the recording of a packet.
 7. Hit **Pause** to pause play.
 8. Hit **Stop** to stop playback and return the file pointer to the first frame.

6.1.2. Dynamic Tilt Simulation

Select the **Dynamic Tilt Simulation** so the software can send “Tilt2” ([R, P, Y]) simulated message.

The messages simulate, one axis after the other, a slow movement, from 90 degrees to -90 degrees.

The simulation stops once all the axes have completed their movement.



Note

To view the simulated tilt-messages as a 3-D graphic image, select **Show 3D Form** from the **View** menu before running the simulation.

6.1.3. NavSim Test

Select **NavSim Test** to run a simulated test on data saved to a specific file.

1. Select **NavSim Test**.

The **Testing Nav Systems** window is displayed with fields for the simulation source and simulation information.

2. Under Simulation Source, enter a source file path in the **Select source file name** field.
3. Under Simulation Information, enter a number from 1 to 1000 in the **Output Frame Rate** field.
4. Click  to enter navigation UKF mathematics works properly.
5. Click .

6.2. Developer

You can use the Developer functions to select a system and simulate system operations without using an actual device.

6.2.1. Enable System Detection

When this menu item is checked, the system is configured to detect the type of connected device automatically, when you click **Open Communication Port**. Section 3.4 contains additional information.

If this menu item is unchecked, you should define the type of connected device manually. Section 6.2.2 contains additional information.

6.2.2. Select System

Use these menu options to select the type of connected device manually.
Section 3.4 contains additional information.

The systems currently available are:

- **ExiguoLP (VG, AHRS, INS, INS2ANT) – use INS for EX200 & EXLP200.**
- **Gins (VG, AHRS, INS, INS2ANT) – use INS for gX200.**
- Others:
 - Exiguo (VG, AHRS, INS, INS2ANT)
 - ArSys (INS2ANT_05)
 - MiniExiguo (INS)

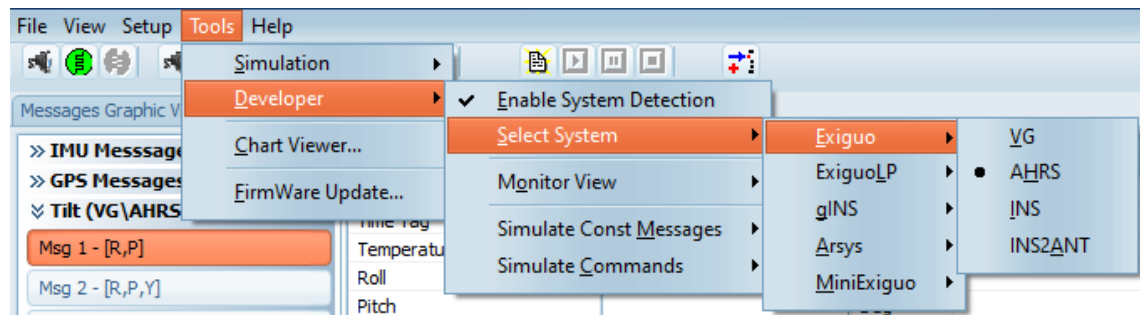


Figure 19. Tools>Developer>Select System Path

6.2.3. Monitor View

Set whether the monitor view is the top-most window.

To set the monitor view:

1. Go to **Tools>Monitor View**.
2. Select one of the following:
 - **Normal** – The monitor is not the top-most window.
 - **Stay on Top** –The monitor is the top-most window (default).

6.2.4. Simulate Const Messages

To simulate **const** (constant value) messages:

1. Go to **Tools>Simulate Const Messages**.
2. Click on one of the available selections.



Note

Make sure to simulate a const message that matches the selected navigation device and selected message.

6.3. Chart Viewer

To open charts in the arozim Graph View application without leaving the Navigation device Evaluation Software:

1. Go to **Tools>Chart Viewer**.
The arozim Graph View application opens for use with the arozim Navigation device.
2. Refer to the **GraphViewer User Guide** for more information.

6.4. Firmware Update

To update the system firmware:

1. Go to **Tools>Firmware Update**.
The Firmware Upgrade window is displayed.
2. Verify that all communication ports are closed.
3. In the group of three left-most buttons (Figure 20):
 - a. Click **Select Comm Port for Nav Device** .
 - b. Click **Open Nav Device Comm Port** .
4. Verify that the **Burning flow state** is **Read**.
5. Under **Firmware File**, click  to select a file.
An **Open-File** dialog is displayed.
6. Select a file from the displayed list and click **Open**.
The file is displayed under **Firmware File**.
7. Check **Enable Power Reset**.
The device enters a firmware upgrade mode, once it is turned on.
(The PC software sends an ACK response within 200 mS)
8. Power up the device.
Under **Firmware Actions**, **Burn Firmware** is enabled.
9. Click **Burn Firmware**.

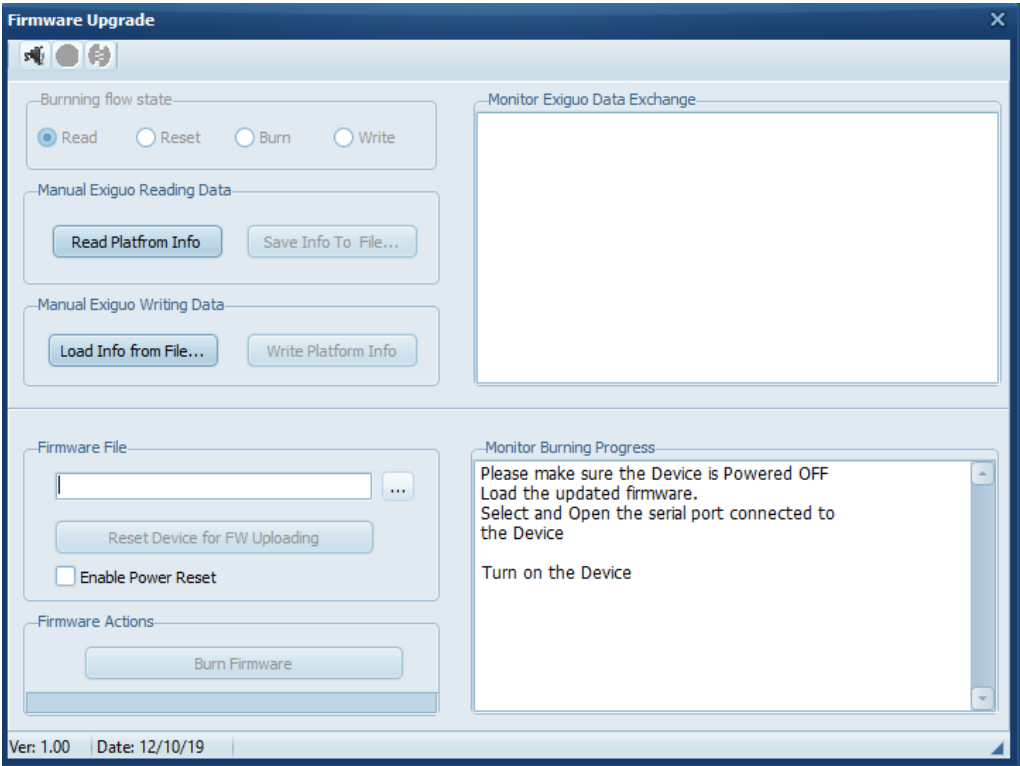


Figure 20. Firmware Update