Veronte VSA

Release 6.12.13/1.0

Embention Sistemas Inteligentes, S.A.

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Scope of Changes

- Version 1.0
  - Added:
    - First version issued

Introduction

VSA is the Veronte application to visualize an aircraft in a simulator. This application takes information from a real autopilot (**1x** or **4x**) and sends it to the simulator in real time, such that remote pilots can visualize the aircraft and control it easier. In addition, **VSA** can play recorded flights, making it the perfect tool to assess previous missions.

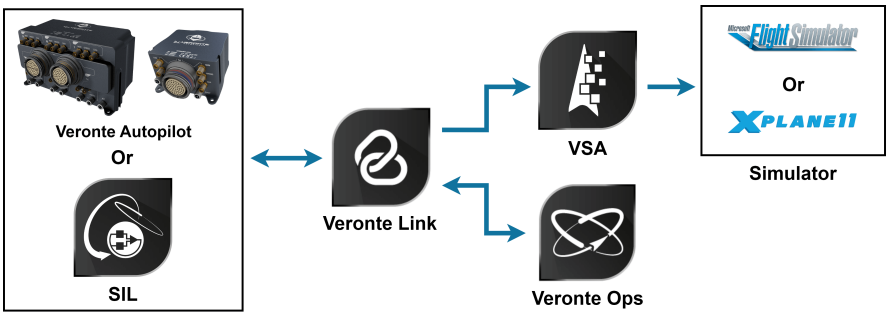
VSA can also be employed to visualize **SIL** simulations, having a complete simulation environment for testing and prototyping.

VSA is designed for applications such as:

- Remote piloting.
- Aircraft performance assessing.
- Simulation in full virtual environments.

VSA is employed along with:

- **Veronte Link** to establish communication between the autopilot and a computer or play recorded missions. To read the user manual click here.
- **Veronte Ops** to operate the autopilot during flights or simulations. To read the user manual click here.
- **Simulators**
- **Microsoft Flight Simulator 2020**
- **X Plane 11**
- **SIL** to use a simulated autopilot instead of a real one. To read the user manual click here.



Application Diagram

Quick Start

System Requirements

Before executing this software, users should check the following sections with the minimum and recommended PC hardware requirements.

Minimum requirements

- CPU: Intel Core i5-8365UE
- RAM: 8 GB DDR4
- STO: 256 GB SSD

Recommended requirements

- CPU: 12th Gen Intel(R) Core(TM) i7-12700H 14 cores up to 4,70 GHz
- RAM: 32 GB
- STO: 1 TB SSD M.2 NVMe PCIe

Download and Installation

Veronte VSA software is available in the **Veronte Toolbox** platform. From there, users can download and install the application. For more information, please refer to the Veronte Toolbox user manual.

A **personal account** is required to access **Veronte Toolbox**; create a Ticket in the user's **Joint Collaboration Framework** and the support team will create it for you.

Operation

Veronte VSA can be used for three different applications:

- Visualize an aircraft in real time with a real autopilot.
- Display previous recorded missions.
- Simulate with SIL visualizing an aircraft.

The following steps explain how to configure **VSA** to visualize the aircraft in a simulator.

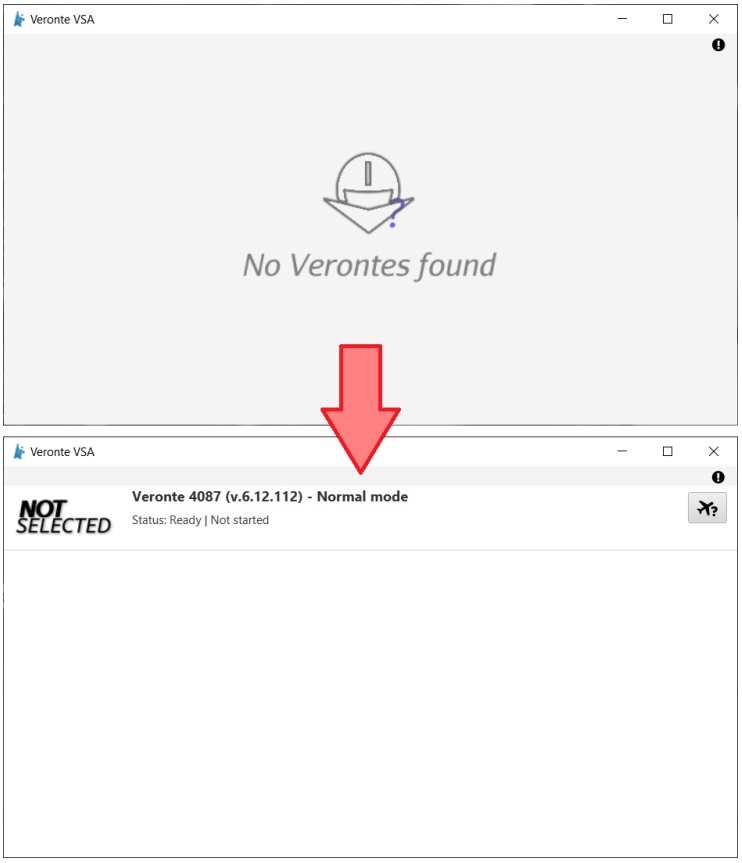
1. Establish the connection through **Veronte Link**.

   > **Note**
   > This first step varies depending on the application. Nonetheless, the rest of the steps to operate **Veronte VSA** are the same for all applications.

   - In case of using a **real autopilot**:
     - Connect it to the computer, in case of any doubt, read the Software Installation section of **1x Hardware Manual**.
     - Then, establish communication between the autopilot and the computer using **Veronte Link** as detailed in the Serial connection - Integration examples section of the **Veronte Link** user manual.
     - In addition, it has to be configured reading 1x navigation variables subsection of this manual.
   - In case of **displaying previous recorded missions**, users have to play the desired session from **Veronte Link sessions**, as the recorded mission information is stored and managed as such. For this application, start playing the desired session before proceeding to step 2.

     To know more about these sessions, read the Sessions - Operation section of **Veronte Link** manual.
   - In case of using **SIL**, read the Configuration section of **SIL Simulator** manual.

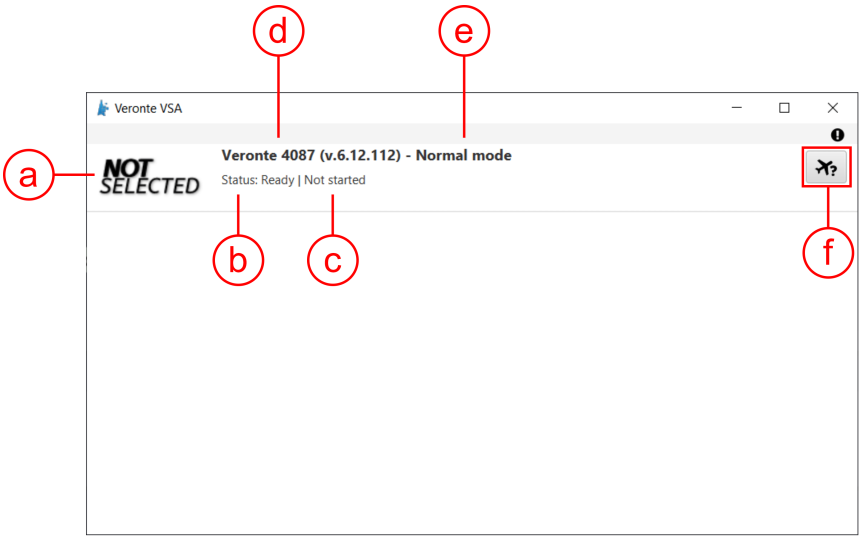
2. **Open VSA** and wait a few seconds until the autopilot (real or simulated) is detected.



VSA detection of connected autopilot

> **Note**
>
> **VSA** will run minimized in the System Tray:
>
> 
>
> **Minimized running**

Once the autopilot has been detected, **VSA** will display the following menu:



Veronte VSA - Main menu

a. **Simulator icon**: The icon of the selected simulator is displayed.

b. **Status of the autopilot**: Ready, Running, Failed load conf, Maintenance mode or Offline.

> **Note**
>
> In case of connecting an **Autopilot 4x** instead of a **1x**, the displayed 'Status' of the **4x** will correspond to the status of **the selected UAV**. In addition, the index of the **1x** selected by the arbiter with its unit name will also be displayed.

c. **Status of the simulation**:

- Not started.
- Once started, simulation frequency parameters are displayed.
  - To Simulator: Frequency of data transmission to the external simulator selected.
  - To Platform: Frequency of data transmission to the autopilot.

d. **Autopilot ID and firmware version**

> **Note**
>
> In case of connecting an **Autopilot 4x** instead of a **1x**, this will be replaced by the **Autopilot 4x name** as “Veronte Group (4x)” and its ID.

e. **Autopilot mode**

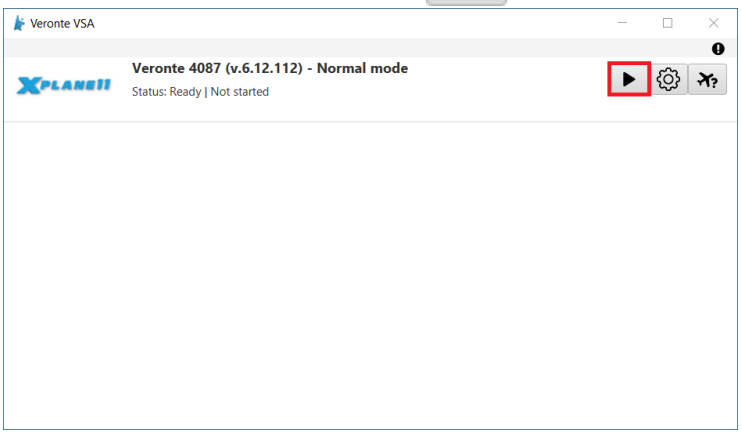
> **Important**
>
> The autopilot must be in **Normal Mode** to start the simulation. For further details, refer to the Unable to start VSA - Troubleshooting section of this manual.

f. **Select simulator** button.

3. **Choose a simulator.**
   Click on  to choose a simulator.

4. **Configure VSA simulation parameters (optional).**
   Default configuration parameters are recommended. To change them, click on  .

5. **Configure the simulation parameters in the selected simulator software**. The selected simulator must be configured with the same **IP** and **port** as **VSA**.
6. **Run the selected simulator software**.
7. **Start VSA clicking on**  .



1x navigation variables

A real **Autopilot 1x** must be configured to send position and orientation variables to the selected simulator.

To do so, use **1x PDI Builder** and configure a data vector to send the following variables:

RVar ID	Name	Units
6	Yaw	rad
7	Pitch	rad
8	Roll	rad
8192	UAV position	[rad, rad, m]

The variable "8192 UAV position" can be replaced with the following ones:

RVar ID	Name	Units
500	Longitude	rad
501	Latitude	rad
503	MSL (Height Above Mean Sea Level) – Altitude	m

Nonetheless, "8192 UAV position" is recommended instead, because it is more accurate.

> ⓘ **Note**
>
> For further information on Veronte variables, please read the Real variables list of the **1x Software Manual**.

X-Plane 11

Configuration

X-Plane 11 communications settings shall be configured to link with Veronte systems.

> **Important**
>
> For low-performance computers, it may be needed to reduce the graphics quality on the simulator, as described below.

Follow the next steps to configure X-Plane 11 to perform simulations through **VSA**.

1. **Aircraft Model Installation**

   X-Plane 11 simulator is compatible with a wide variety of platforms: airplane, helicopter, multicopter, surface vehicle, etc. In order to create the platform model, Plane Maker tool provided by X-Plane 11 must be used. Once the aircraft model has been created, it can be integrated on the X-Plane 11 simulator by following the next sub steps:

   - 1.1: Copy the model folder to the “Aircraft” folder within the X-Plane 11 installation directory.
   - 1.2: Copy the content in the “Airfoils” folder, available in the aircraft model folder, to the “Airfoils” directory within the X-Plane 11 installation directory.

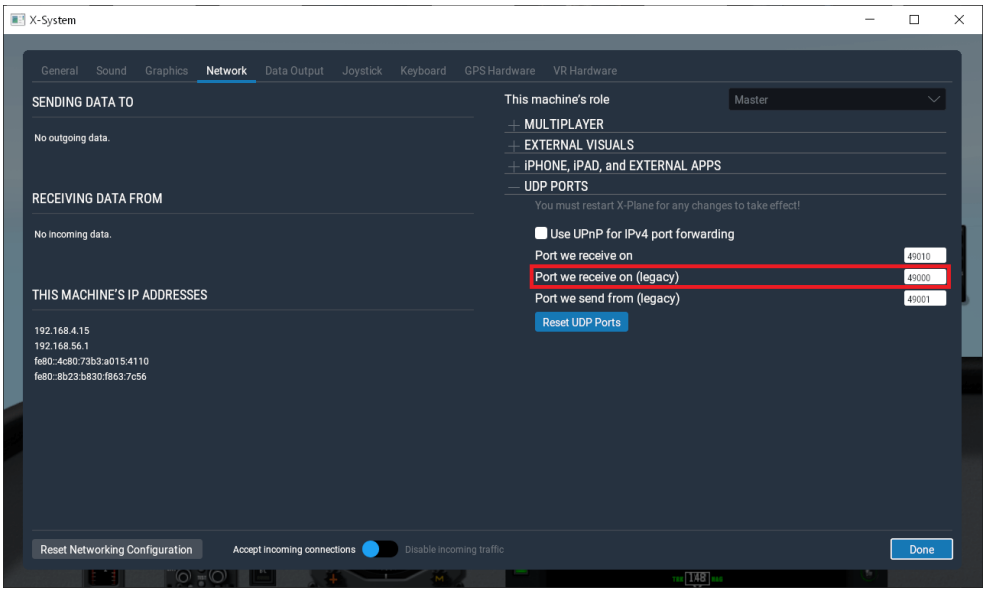
2. **Custom airport**

   X-Plane flight starts from an airport; a custom airport must be defined for simulating in case of not having available airports. In addition, it is possible to create a new airport. In order to do that, the user should follow the X-Plane tutorial presented in the next link. Once the airport has been created, copy the model folder to the X-Plane 11 installation directory.

3. **X-Plane Settings**

To receive data in X-Plane from **Veronte VSA**, only one parameter needs to be edited on **Settings** ⇒ **Network** ⇒ **UDP PORTS**.

Here, the "Port we receive on (legacy)" entered must match the one configured in **Veronte VSA** as "Send port".



X-Plane 11 - Port configuration

Visualization

To visualize the autopilot (real or simulated) in X-Plane 11 software follow the steps below.

1. **X-Plane 11 Setup**

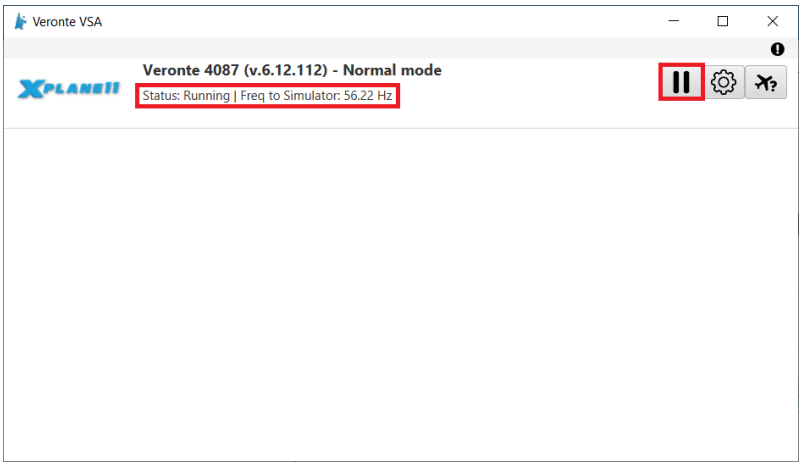
   Open X-Plane 11. In this **Main menu**, click on **New Flight** to start a simulation:

2. Select which **aircraft** to use, the starting **airport** and weather conditions to simulate. Then, click on **Start Flight** to start the simulation:

   X-Plane 11 Setup

3. **Start VSA**

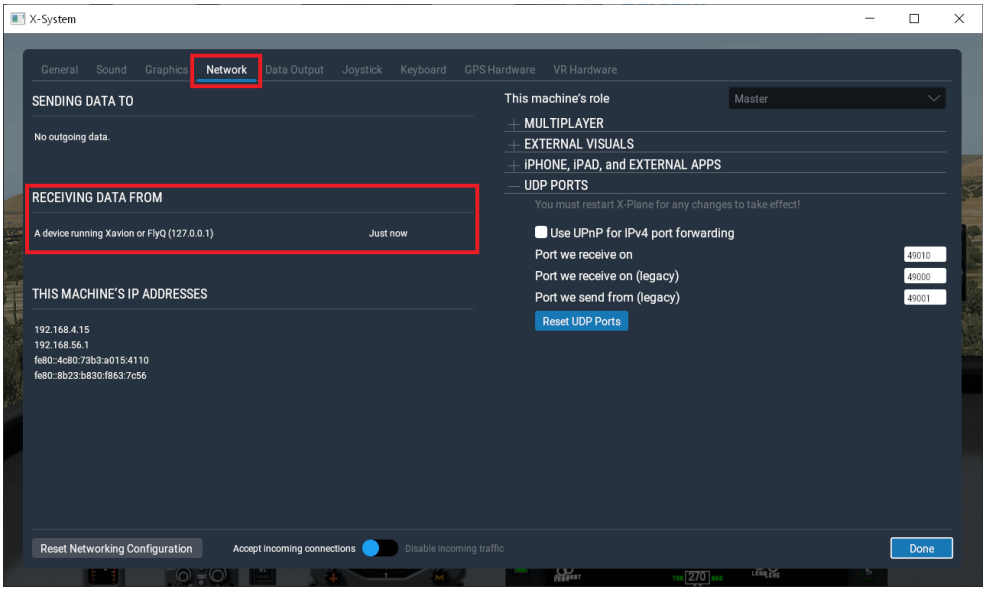
   Once X-Plane is configured and running, click on  of **VSA** to enable the sending of commands.



VSA - Run visualization

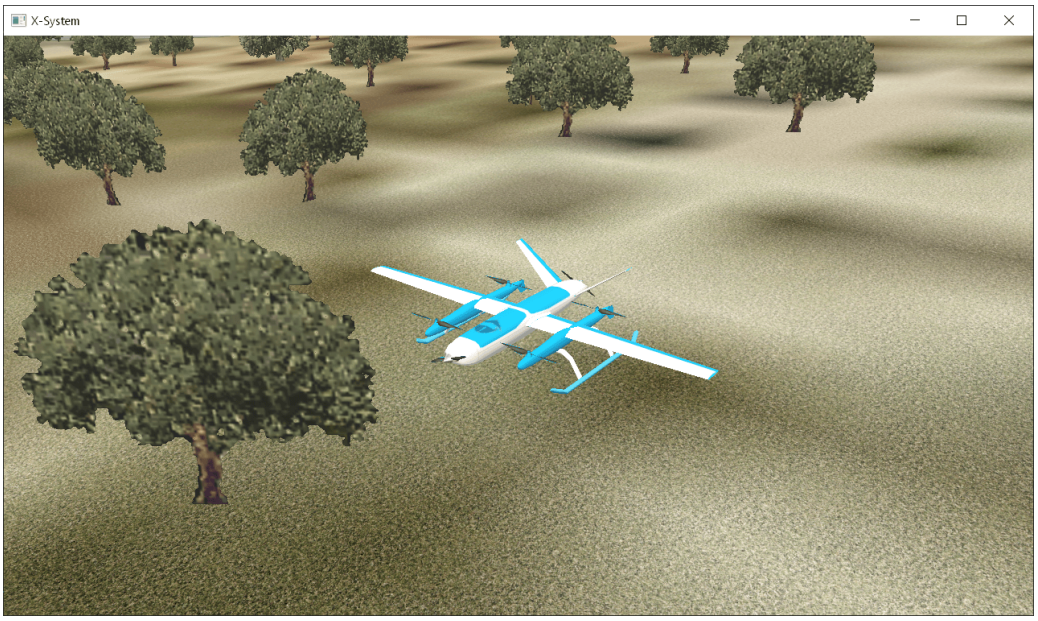
4. **Check receiving data**

   Go to **Settings** ⇒ **Network tab**. Check that the receiving data from is correct:



Check receiving data

Once the hardware has been connected and the software has been configured, operation can start and the system can be operated as a real flight.



The UAV should be visible on **Veronte Ops** in the selected airport, with a colored icon as follows:

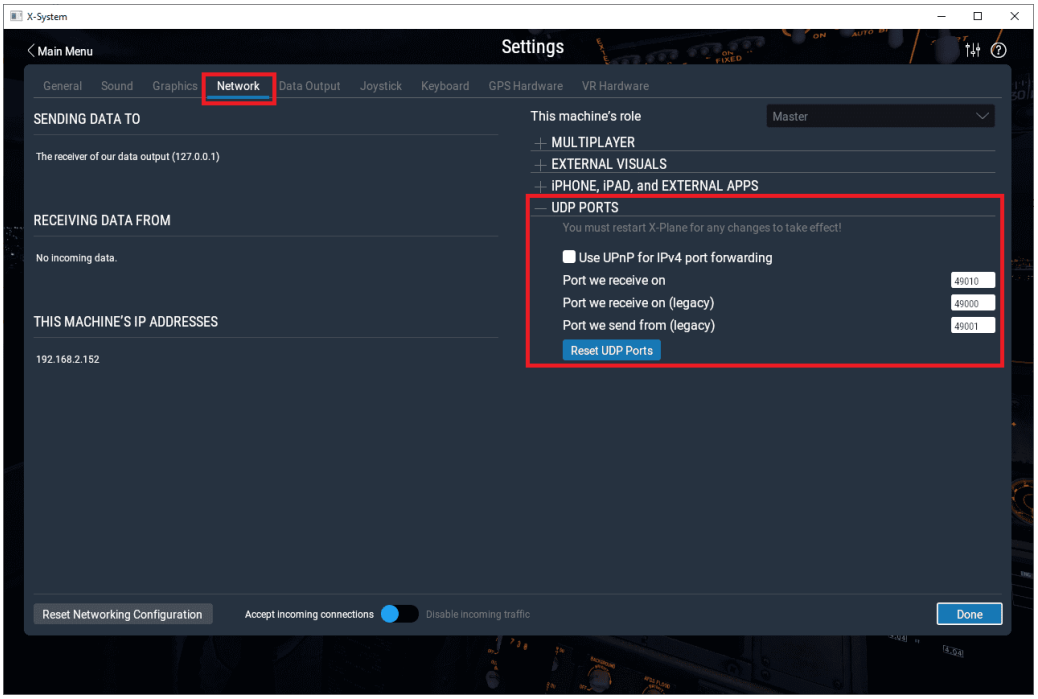
> **Note**
>
> For more information, read the Veronte Ops user manual.

Troubleshooting

Communication with X-Plane does not start

The first time users run **VSA** with X-Plane 11, the simulation may not start. This is usually caused by a misconfiguration, please check the following settings in **X-Plane**:

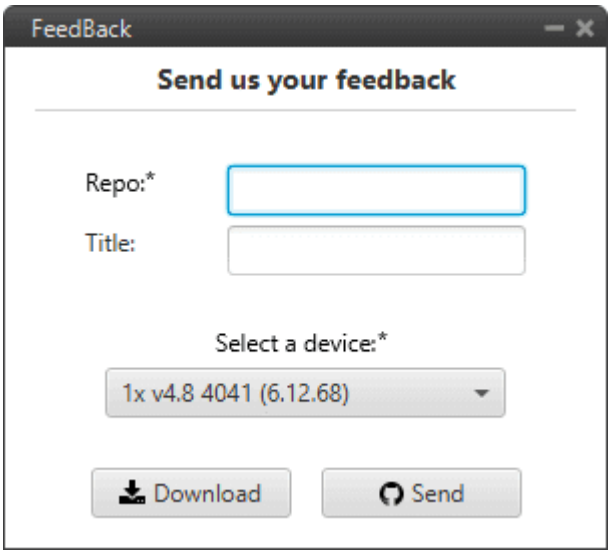
- In **Setting** ⇒ **Network** ⇒ **UDP PORTS**:
  - Use UPnP for IPv4 port forwarding: **Disabled**
  - Port we receive on: **49010**
  - Port we receive on (legacy): **49000**
  - Port we send from (legacy): **49001**



Network settings

Feedback

Press the ❗ button to access the Feedback menu:



Feedback menu

Users can report a problem they have encountered by **creating an issue in their own 'Joint Collaboration Framework'**.

The '**Download**' button downloads a zipped folder with the current **Autopilot** configuration and more information needed for Embention to resolve the issue. It is advisable to attach this folder when creating the issue.

Finally, by clicking on the **'Send' button**, a Github window will open in the browser with an issue.

> ⓘ **Note**
>
> The user's '**Joint Collaboration Framework**' is simply a **own Github repository for each customer**.
>
> If the user has any questions about this Joint Collaboration Framework, please see Joint Collaboration Framework user manual or contact sales@embention.com.

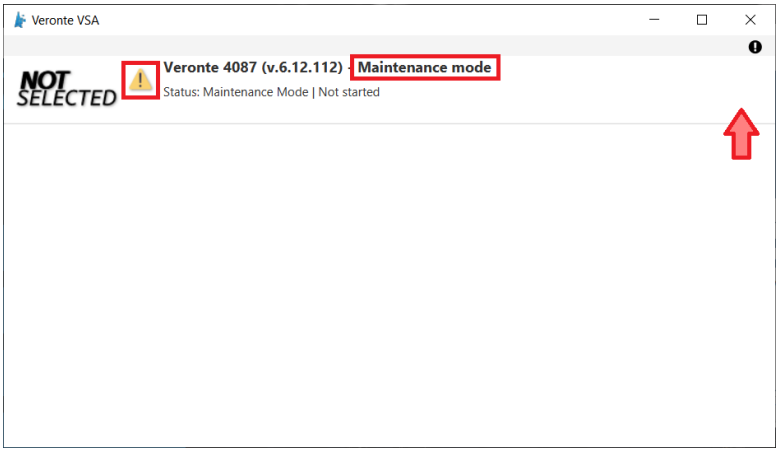
Unable to start VSA

VSA can only start if the autopilot is in **Normal mode**.

In the main page of **VSA**, the autopilot mode is indicated:

- Normal mode

- Maintenance mode
- Maintenance mode (loaded with errors)



Autopilot 1x mode

For further information on how to proceed to set the autopilot to Normal mode, please consult the Maintenance mode and Maintenance mode (loaded with errors) - Troubleshooting sections of the **1x PDI Builder** user manual.

VSA malfunction

The application may not work properly if the '**position fix**' bit is not set to true.

Therefore, to ensure proper operation, users must have a true '**position fix**'. This requires either connecting a **GNSS antenna** to the system or simulating an **external GNSS** through other means.