POLY-VERIFICATION USER GUIDE

AutonomouStuff Map for Localization and Mission Planning

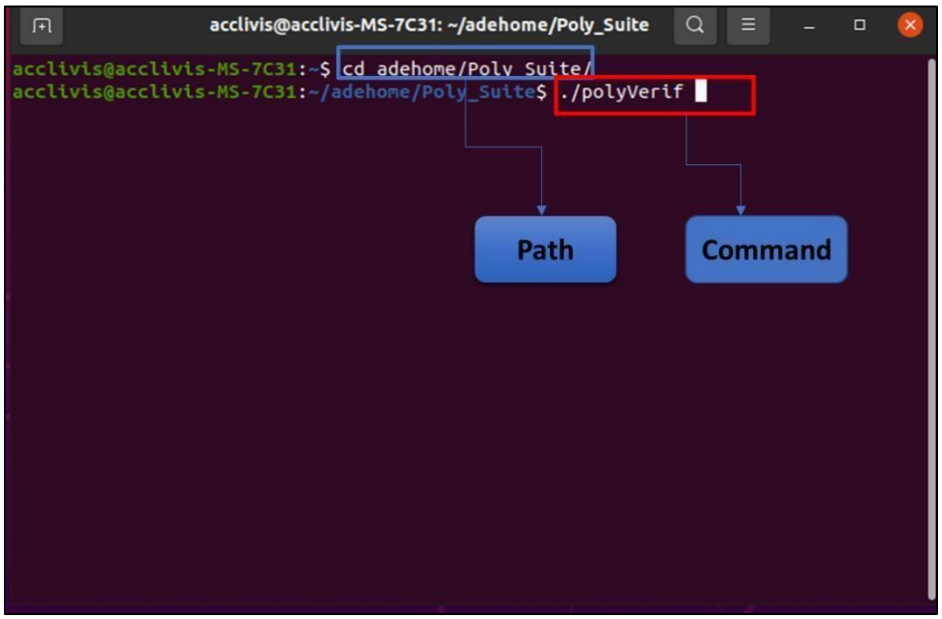
For running localization and mission planning on the AutonomouStuff map within the Poly-Verification Suite, follow these steps

Refer video link for below demo: -
https://drive.google.com/file/d/15alvt5i1edRMXgctjeCx_-OtoNJyYajE/view?usp=drive_link

Navigate to Poly_Suite Directory:

Go to the Poly_Suite directory located at adehome/Poly_Suite and execute the following command

```
$ ./polyverif
```



This command will initiate the PolyVerif framework for further configuration and execution

Select Validation Types for Localization and Mission Planning:

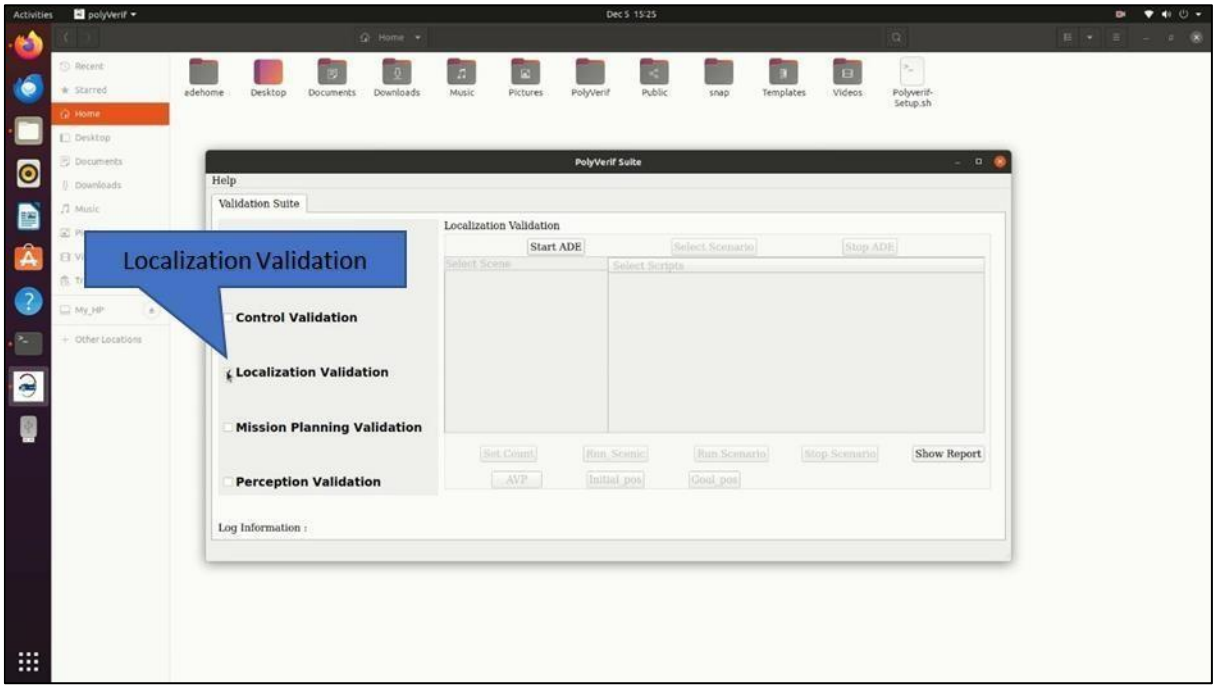
Currently, you have the option to choose from four available validations:

- Detection Validation
- Control Validation
- Localization Validation
- Mission Planning Validation

For the purpose of this guide, direct your focus towards Localization and Mission Planning Validation.

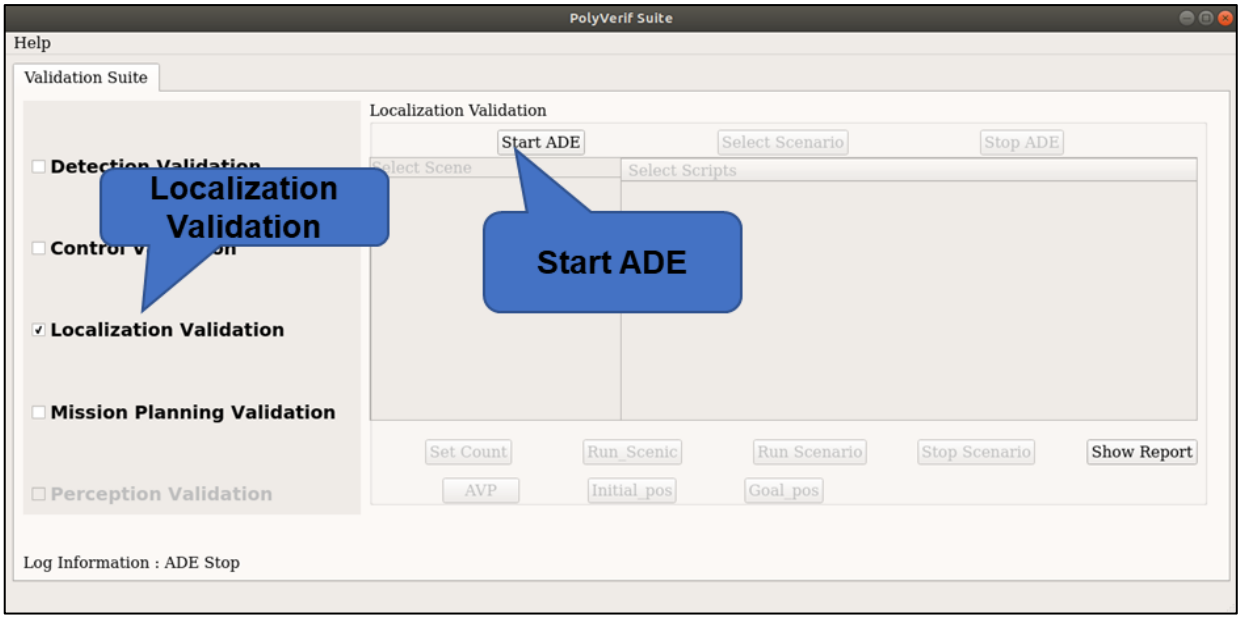
Localization and Mission Planning Setup:

Click on "Localization Validation" to proceed.



Start ADE and Required Modules:

Click on the "Start ADE" button. This initializes necessary modules, including AutowareAuto, Perception Stack, OSSDC simulator, Rviz, and Ros2-lgsvl-bridge.

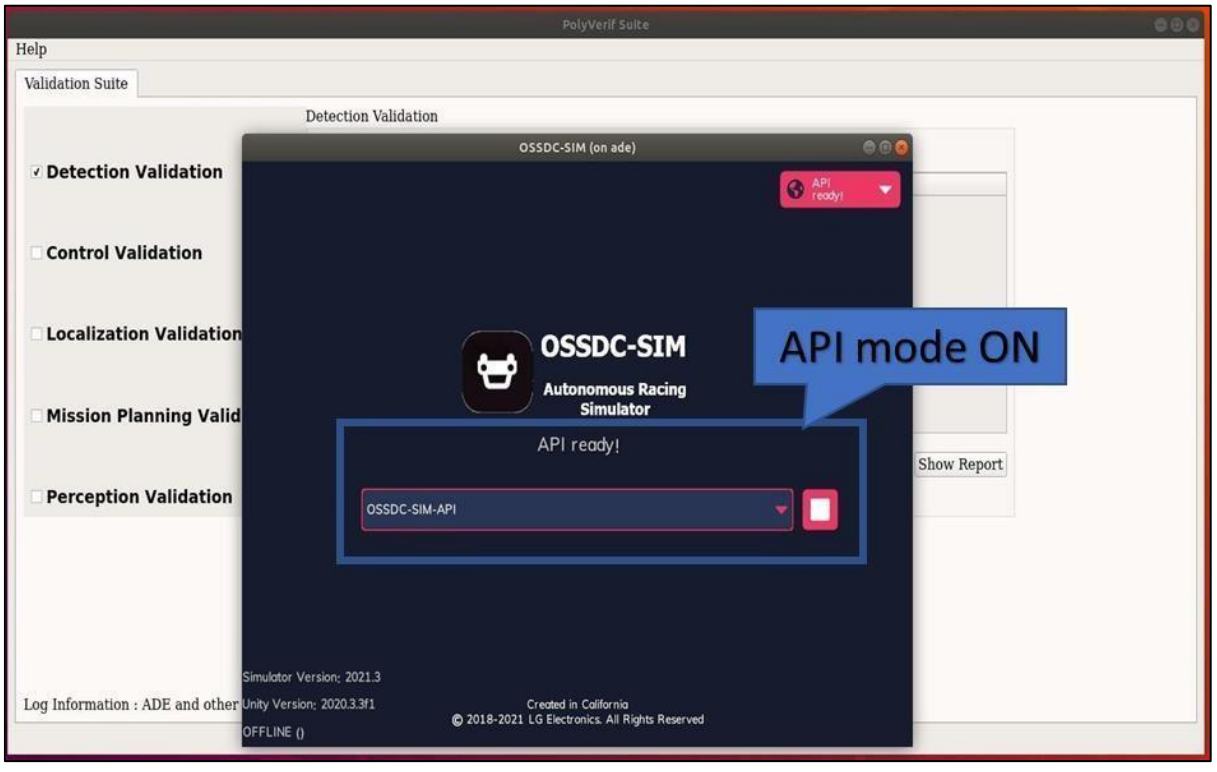


Allow some time for the ADE Docker and components to start

Simulator Configuration:

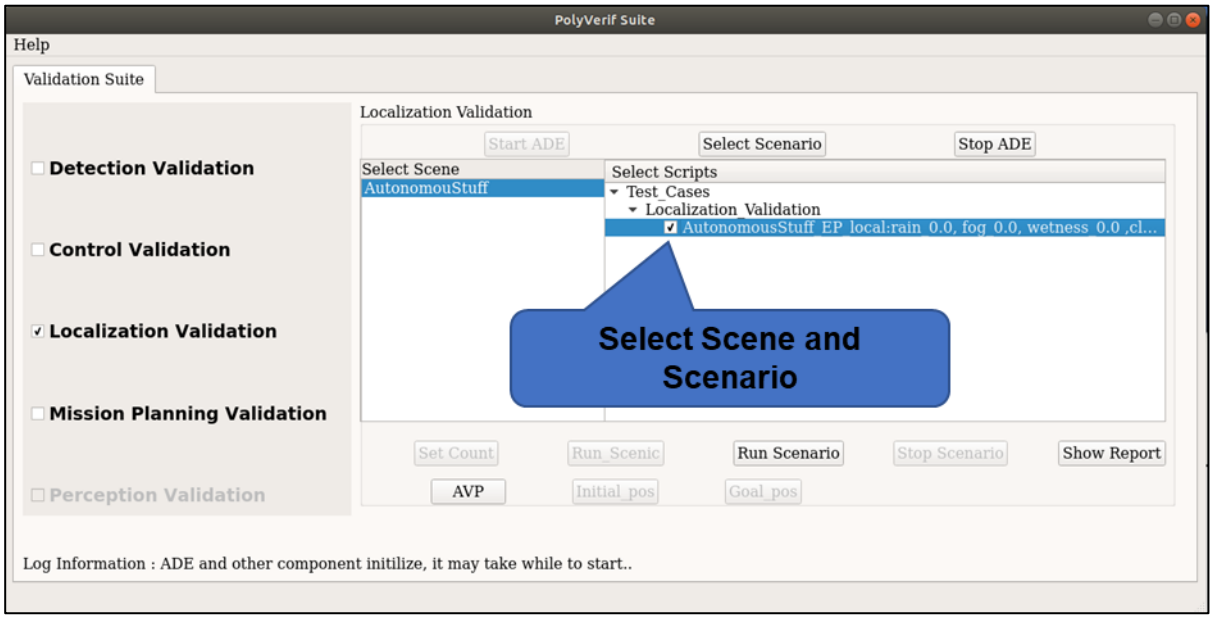
Click on API_Mode button

The simulator is now in API_Mode.



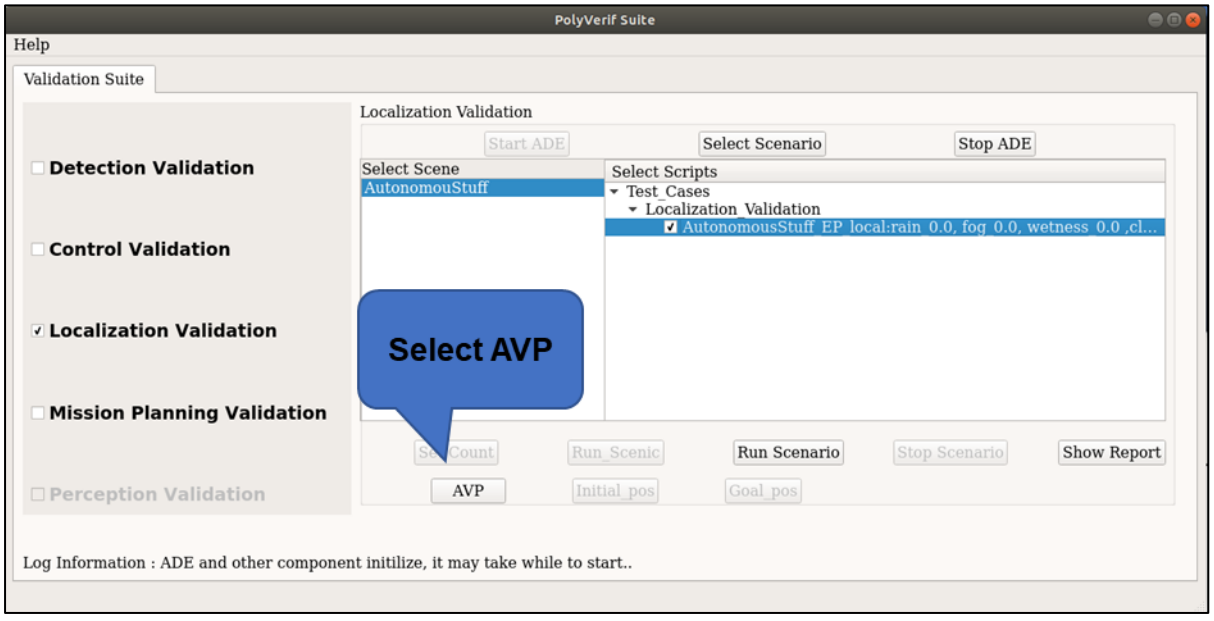
Select AutonomouStuff Map and Scenario:

Click the "Select Scenario" button, choose the "AutonomouStuff" map and select a scenario.



Run AVP Demo:

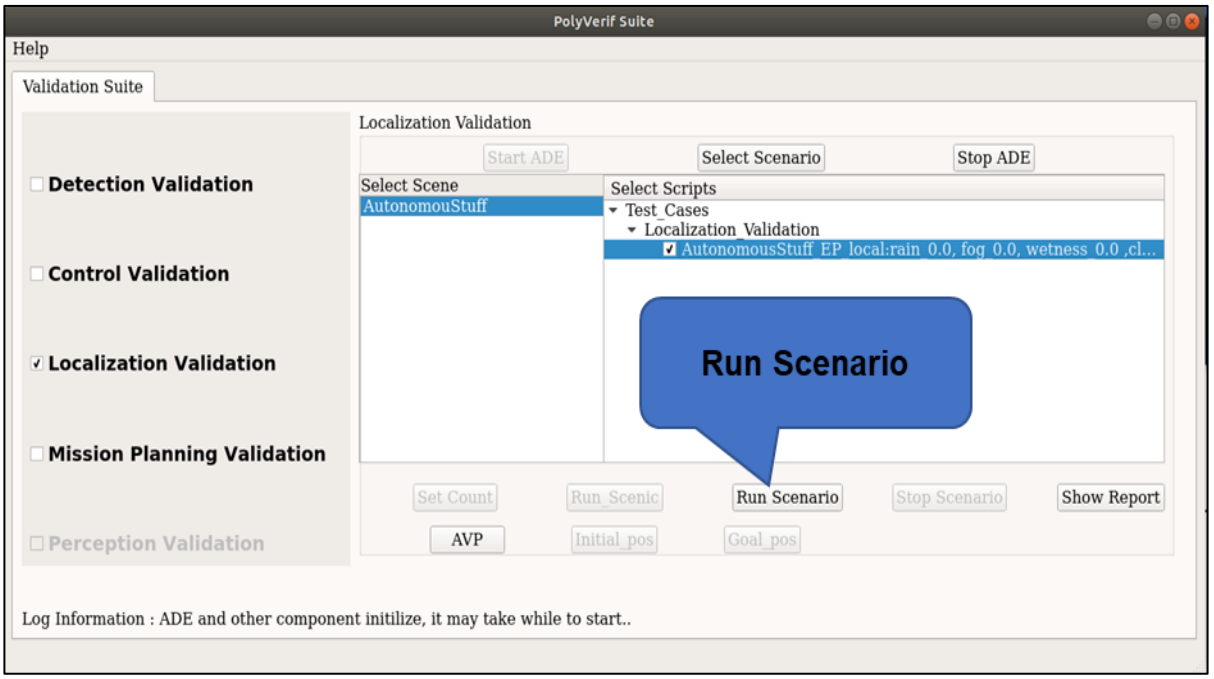
Once the script is selected, it enables the AVP button.

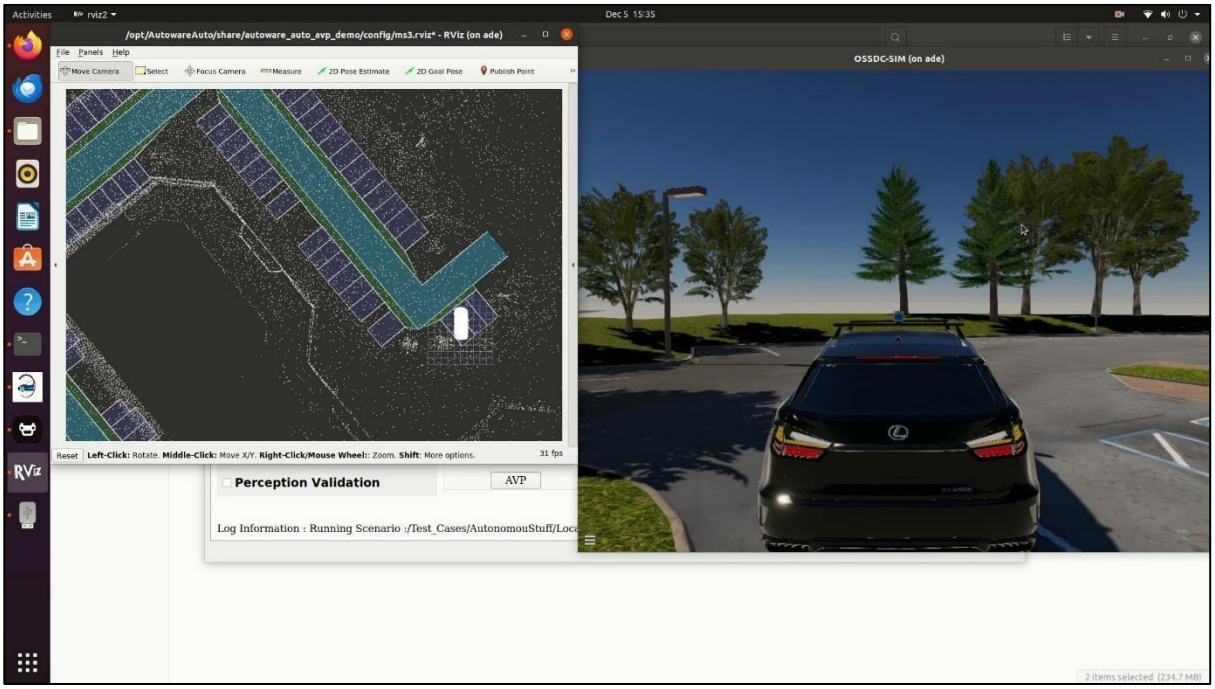


Click on the AVP button to start the modified Autoware_auto_avp demo for the AutonomouStuff map.

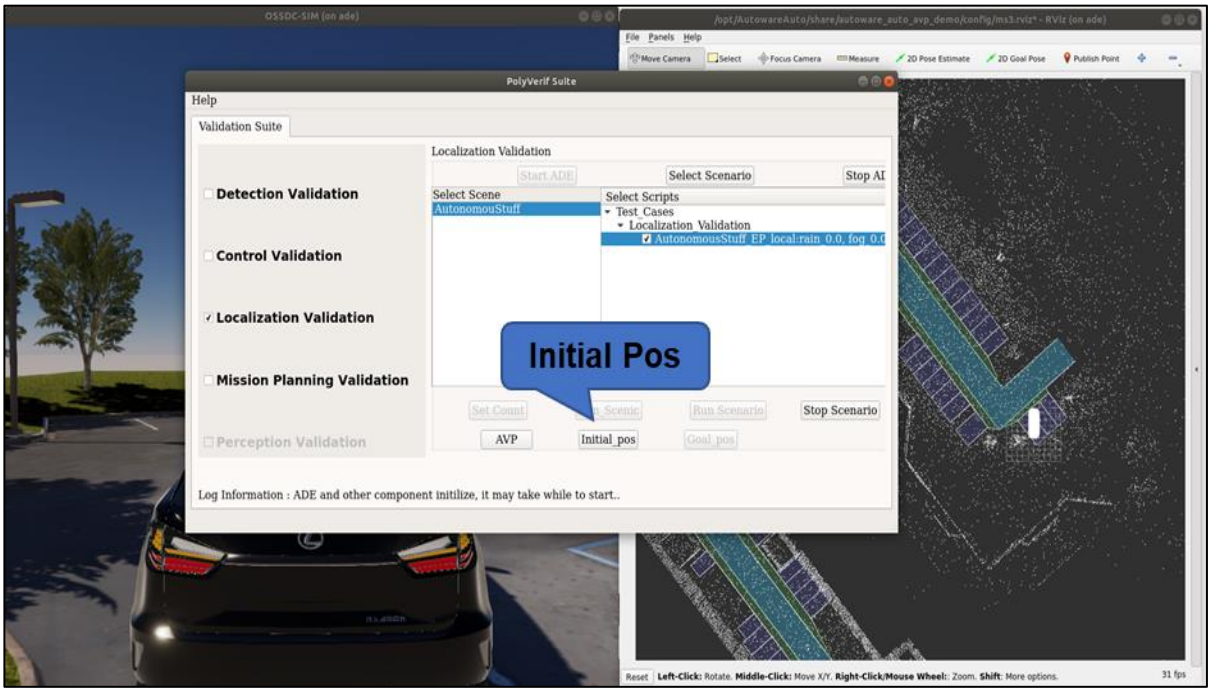
Rviz Setup and Simulation:

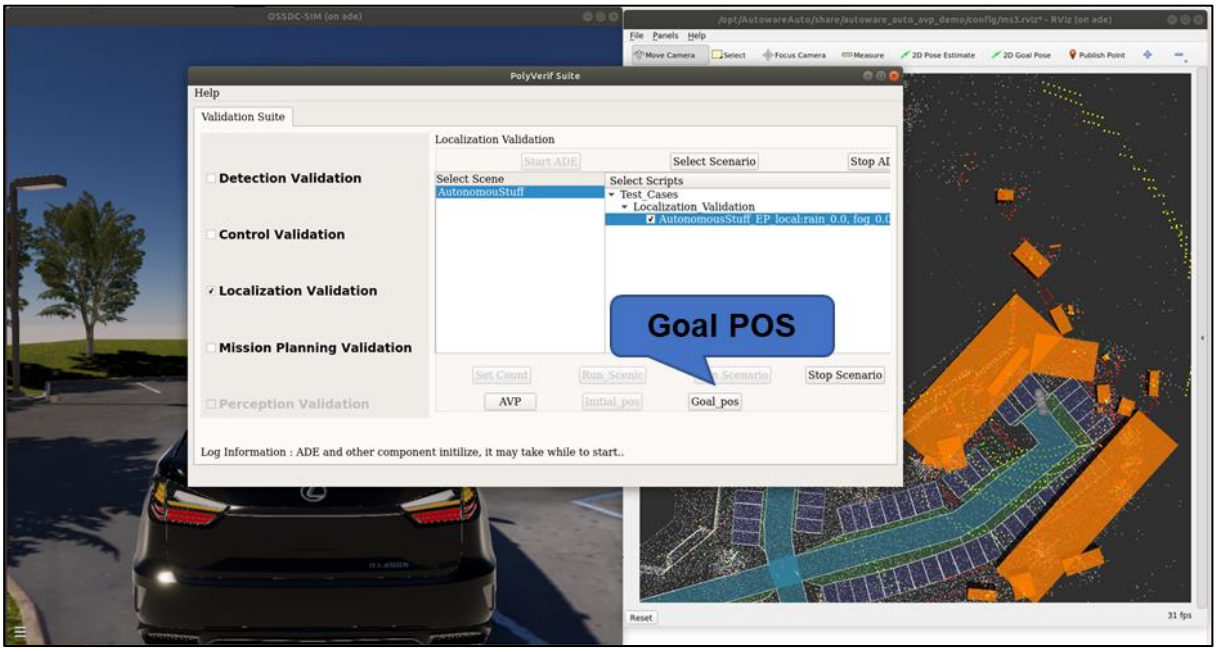
When Rviz starts, click on the "Run Scenario" button, followed by "Initial pos" and "Goal pos" buttons. This initiates the simulation in the OSSDC simulator, controlled by AutowareAuto decisions.

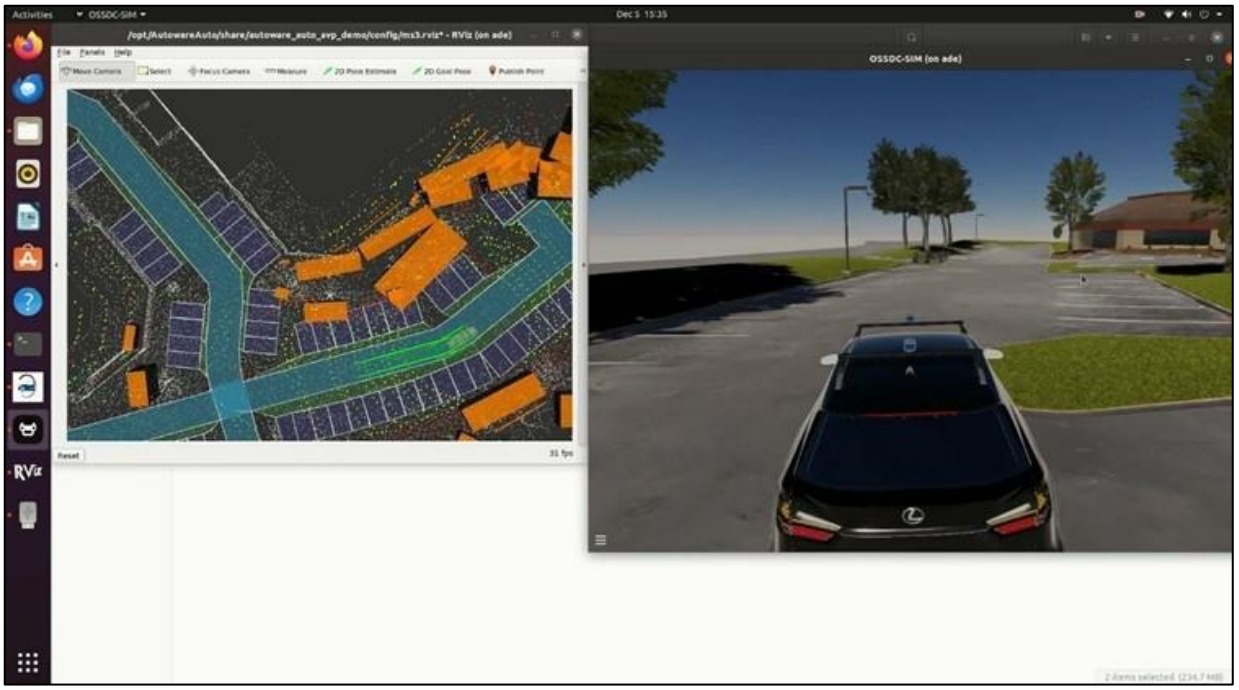




Ensure that the provided initial and goal position values are tailored for the AutonomouStuff map for accurate results.

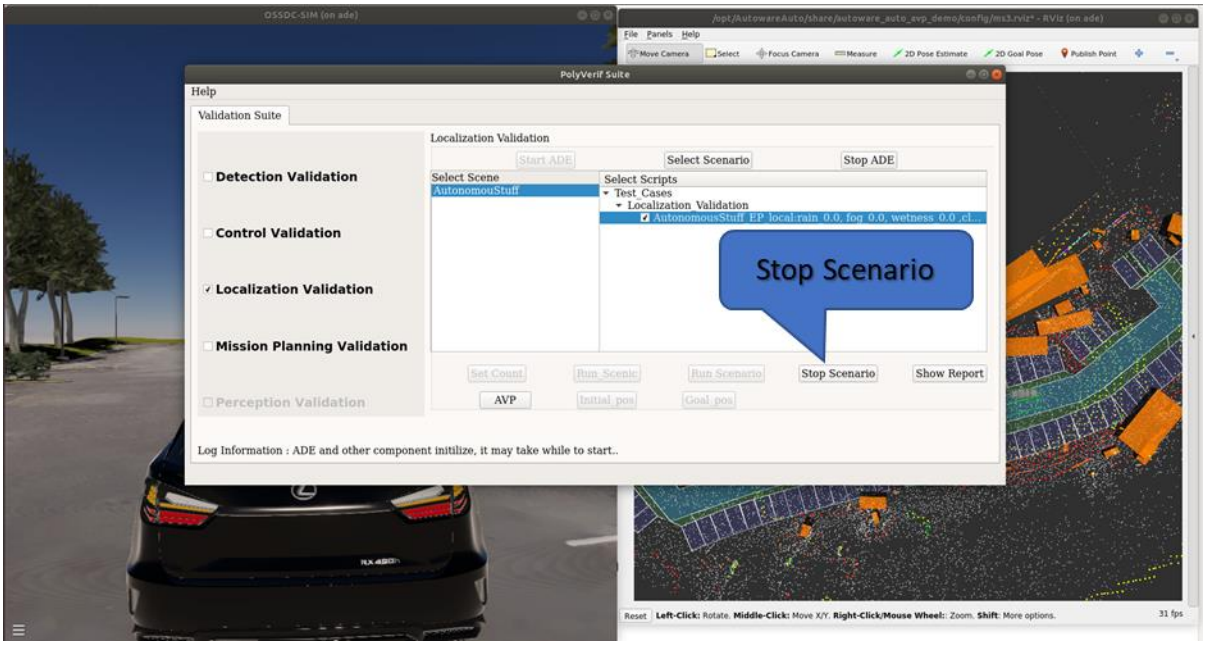



OSSDC-SIM (on ade)
/opt/AutowareAuto/share/autoware_auto_avp_demo/config/ms3.rviz* - RViz (on ade)
File Panels Help
Move Camera
Select
Focus Camera
Measure
2D Pose Estimate
2D Goal Pose
Publish Point
PolyVerif Suite
Help
Validation Suite
Detection Validation
Control Validation
Localization Validation
Mission Planning Validation
Perception Validation
Localization Validation
Start ADE
Select Scenario
Stop AI
Select Scene
AutonomouStuff
Select Scripts
Test_Cases
Localization_Validation
AutonomousStuff_EP_local:rain_0.0, fog_0.0
Goal POS
Set Count
Run_Scenario
Scenario
Stop Scenario
AVP
Initial_pos
Goal_pos
Log Information : ADE and other component initilize, it may take while to start..
Reset
31 fps


Activities
OSSDC-SIM
Dec 5 15:35
/opt/AutowareAuto/share/autoware_auto_avp_demo/config/ms3.rviz* - RViz (on ade)
OSSDC-SIM (on ade)
Reset
31 fps

Completion and Report Access:

Once the simulation is completed or to stop it, click on the "Stop Scenario" button.

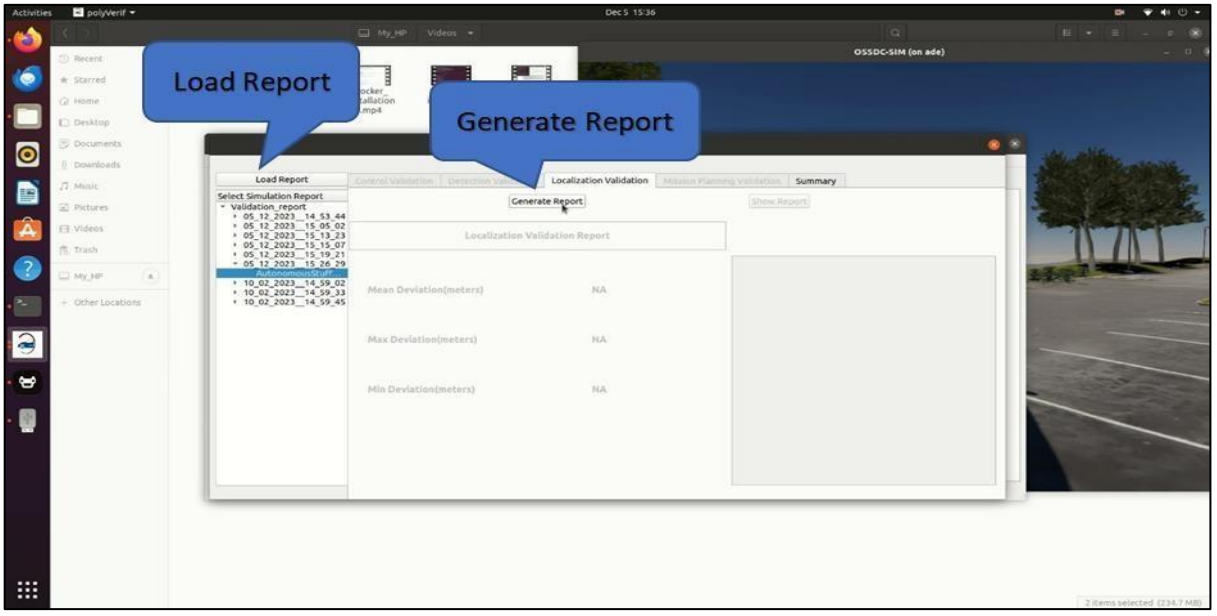


Click on the "Show Report" button to access simulation reports.

Report Insights:

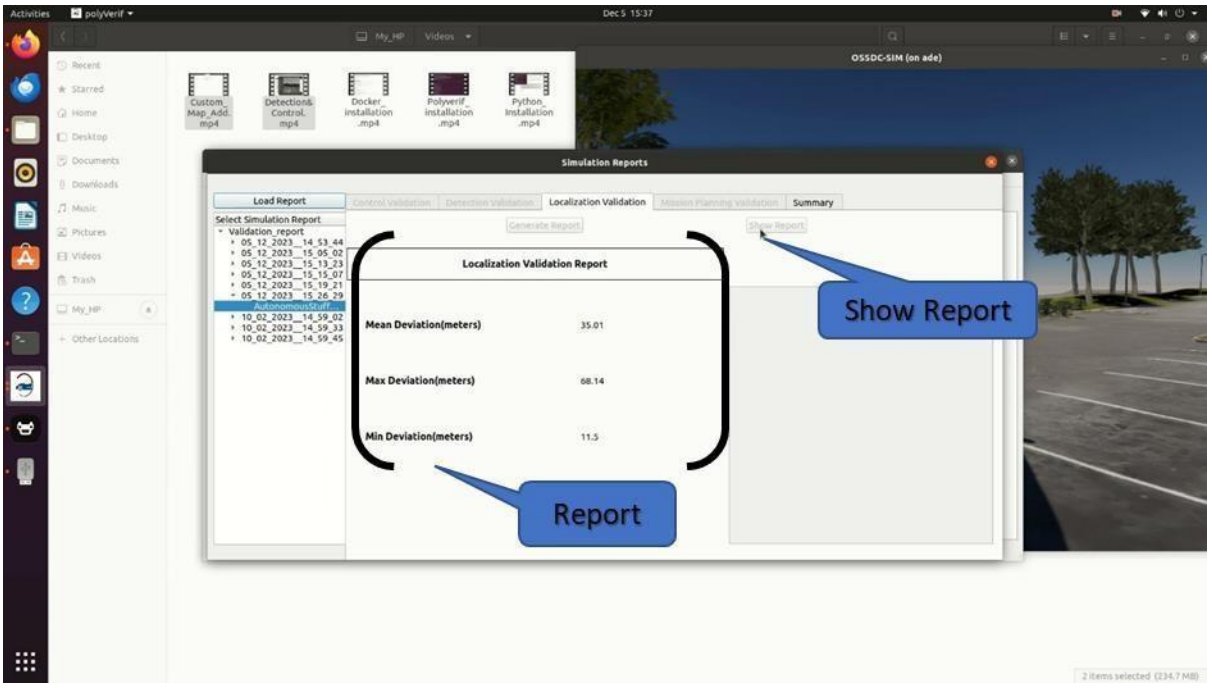
The form contains reports specific to Localization Validation. It generates and displays the Localization report.

Utilize the "Load Report" button to list all simulation reports with dates and times.
Select the last completed simulation report and click on "Generate Report."
Report generation will take 2-3 minutes, so wait for background process.



Note: It will take 2-3min to generate report

After generation, click on "Show Report" for detailed parameters.



Mean Deviation:
Average deviation between actual location i.e., ground truth location and ego vehicle location in AV stack.

Max Deviation:
Maximum deviation between actual location i.e., ground truth location and ego vehicle location in AV stack.

Min Deviation:
Minimum deviation between actual location i.e., ground truth location and ego vehicle location in AV stack.

For a thorough understanding of the reports, watch the explanatory video for detailed insights. ClickHere!

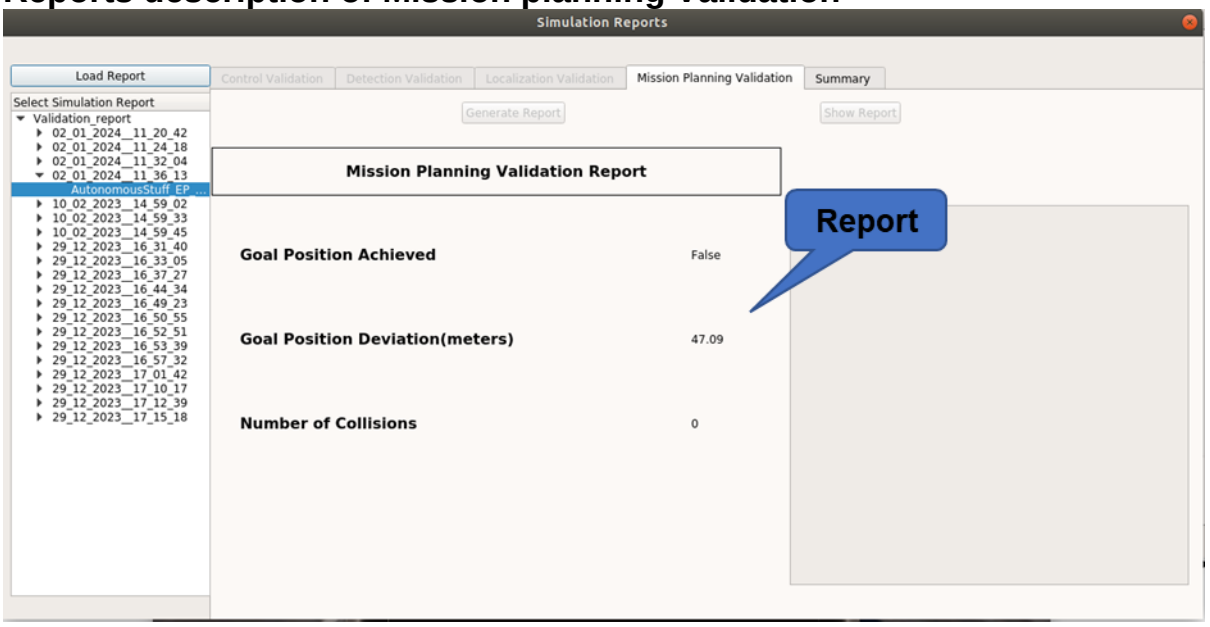
Stopping ADE:

After completing the test case runs, click on "Stop ADE" to halt the PolyVerif framework and then close the terminal.

Proceeding with Mission Planning Validation

Follow the same steps mention in Localization validation, making sure to choose "Mission Planning Validation" for simulations, especially on the Autonomous Stuff map. Keep things organized and consistent for a straightforward simulation management approach.

Reports description of Mission planning Validation



Goal Position Achieved:
Indicates whether the ego vehicle reached the goal position.
Goal Position Deviation:
Provides the range of deviation from the goal position.
Number of Collisions:
Reports the total count of collisions.

For a thorough understanding of the reports, watch the explanatory video for detailed insights. ClickHere!

Assumptions and Challenges

- **Rviz Dynamics:**

Occasional crashes may happen, but rest assured, the perception stack persists.

- **Scenario Hurdles:**

Some scenarios may experience hang-ups while connecting to the Ros2 Bridge, necessitating a restart.

- **System Configurations:**

System hangs may occur based on machine specifications.

- **Network Issues:**

If the network is not functioning properly, you may encounter issues such as scenarios not running or reports not generating. To resolve this, simply restart ADE or the PolyVerif Framework.

Learn More

For further insights and references, explore the provided links:

- **OSSDC Simulator**
- **PythonAPI**

Now, let's embark on a journey of seamless simulations with PolyVerif!!