Fusion 360 to RViz using `lidar_description` (ROS 2)
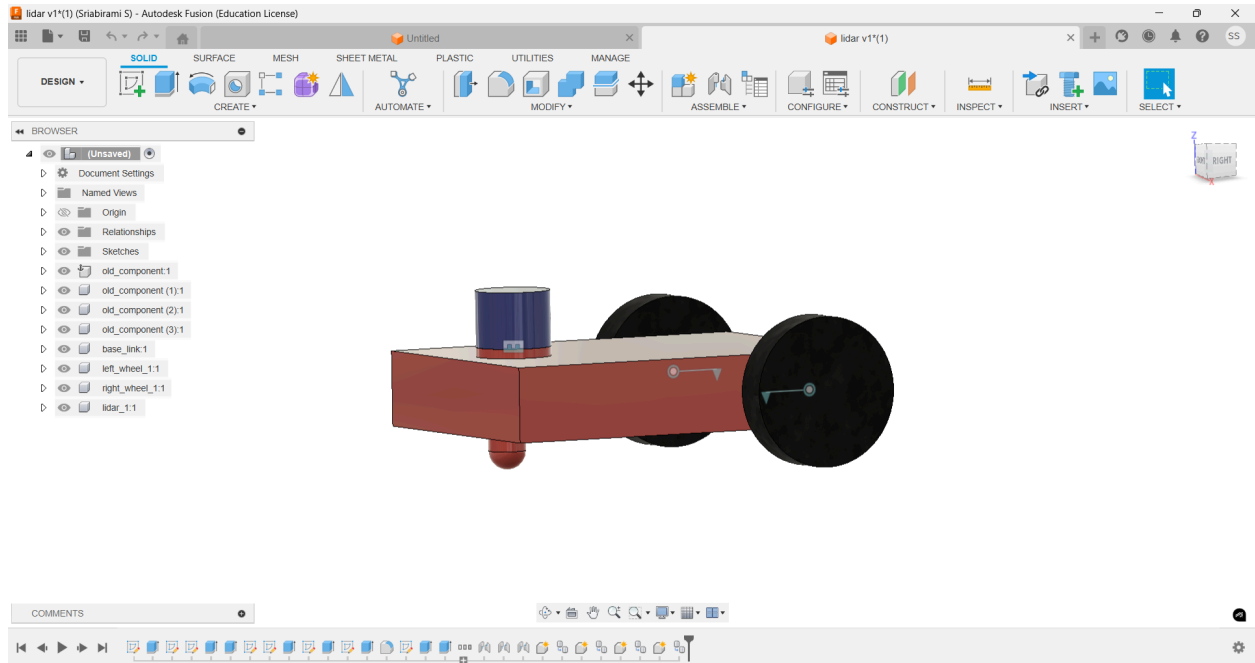
PART 1: Exporting URDF from Fusion 360

Step 1: Install the URDF Exporter Add-In

1. Open Fusion 360.

2. Go to **Tools > Scripts and Add-Ins**.

3. Click **Add-Ins** tab → Click **+** to add a local script.

4. Download URDF Exporter:

   ○ GitHub: https://github.com/ros-industrial/fusion360_urdf_exporter

5. Select the folder and load it.

6. Click **Run**.

Step 2: Prepare Your Fusion 360 Model

● Ensure each **robot part is a component** (e.g., base, wheels, sensors).

● Use **joint constraints** between parts (revolute, rigid, etc.).

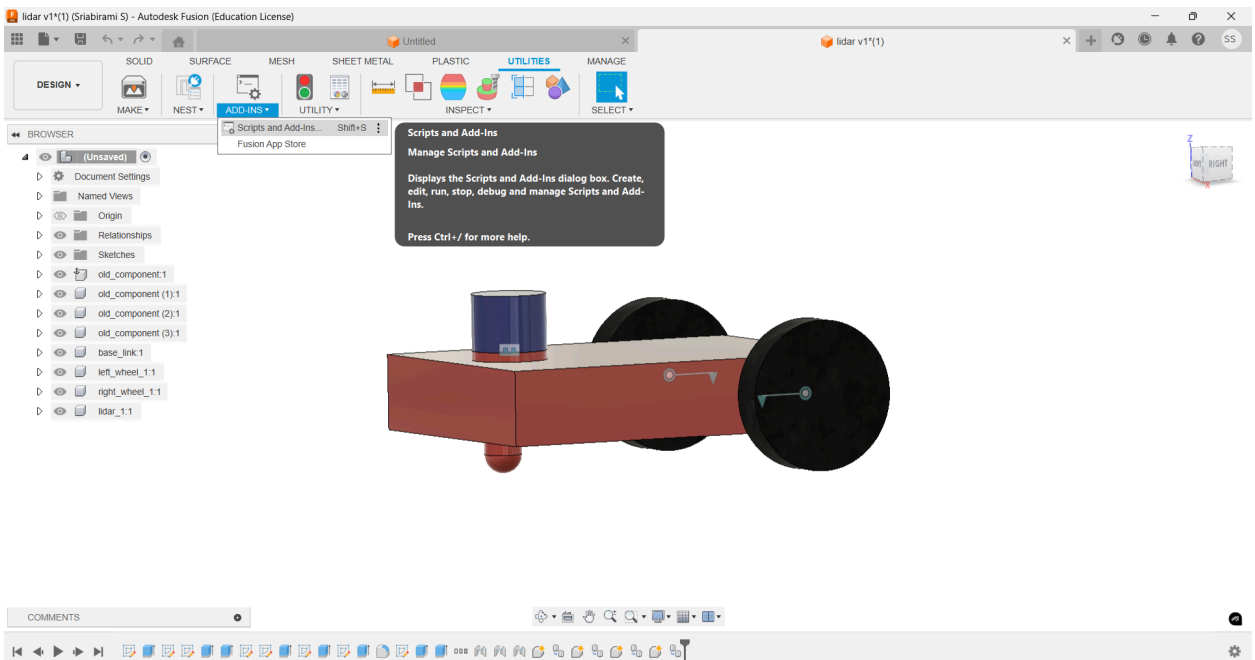● Set **origin and orientation** correctly (Z-up is preferred in ROS).

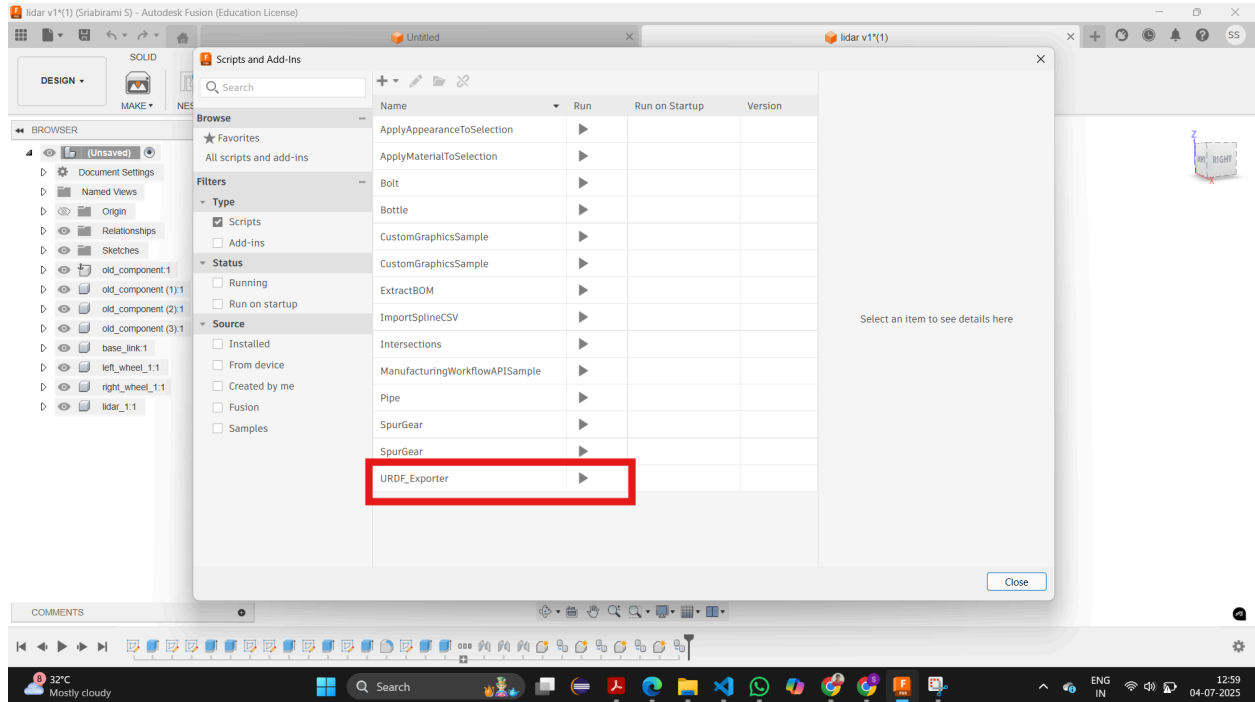# Step 3: Export URDF from Fusion 360

Once your robot model is fully assembled in Fusion 360 and the **URDF Exporter Add-In** is installed and running, follow these steps to export the URDF and mesh files correctly.

1. Open the URDF Exporter

- In Fusion 360, go to the **"Utilities"** tab.
- Click on **"Scripts and Add-Ins"**.

- Select the **URDF Exporter** from the Add-Ins tab.

- Click **"Run"**. This will open a dialogue box to select the folder where the urdf files will be saved.

lidar_description folder: 📁 lidar_description

PART 2: Create ROS 2 Package `lidar_description`

Step 1: Create Package

```shell
Shell
cd ~/ros2_ws/src
ros2 pkg create --build-type ament_cmake lidar_description
```

Step 2: Organize Files

Move your exported files:

```shell
cd ~/ros2_ws/src/lidar_description
mkdir urdf meshes launch

# copy files
cp "/mnt/c/Users/abira/OneDrive/Desktop/ros
protosem/lidar_description/urdf/lidar.xacro"
~/ros2_ws/src/lidar_description/urdf/
cp "/mnt/c/Users/abira/OneDrive/Desktop/ros
protosem/lidar_description/urdf/materials.xacro"
~/ros2_ws/src/lidar_description/urdf/
cp "/mnt/c/Users/abira/OneDrive/Desktop/ros
protosem/lidar_description/urdf/lidar.gazebo"
~/ros2_ws/src/lidar_description/urdf/
cp "/mnt/c/Users/abira/OneDrive/Desktop/ros
protosem/lidar_description/urdf/lidar.trans"
~/ros2_ws/src/lidar_description/urdf/
```

- Similarly copy all the files and folder into the lidar_description folder created in the ros2_ws

Step 3: Edit CMakeLists.txt

Add at the bottom before ament_package():

```
install(DIRECTORY meshes/
  DESTINATION share/${PROJECT_NAME}/meshes
```

```
)

install(DIRECTORY urdf/
  DESTINATION share/${PROJECT_NAME}/urdf
)
```

Step 4: Create `display.launch.py`

Create `launch/display.launch.py` with:

```python
from launch import LaunchDescription
from launch_ros.actions import Node
from launch.substitutions import Command, PathJoinSubstitution
from launch_ros.substitutions import FindPackageShare

def generate_launch_description():
    return LaunchDescription([
        Node(
            package='robot_state_publisher',
            executable='robot_state_publisher',
            output='screen',
            parameters=[{
                'robot_description': Command([
                    'xacro ',
                    PathJoinSubstitution([
                        FindPackageShare('lidar_description'),
                        'urdf',
                        'lidar.xacro'
                    ])
                ])
            }]
        ),
        Node(
```

```
            package='rviz2',
            executable='rviz2',
            name='rviz2',
            output='screen',
        )
    ])
```

Step 5: Build and Source

```
Shell
cd ~/ros2_ws
colcon build --packages-select lidar_description
source install/setup.bash
```
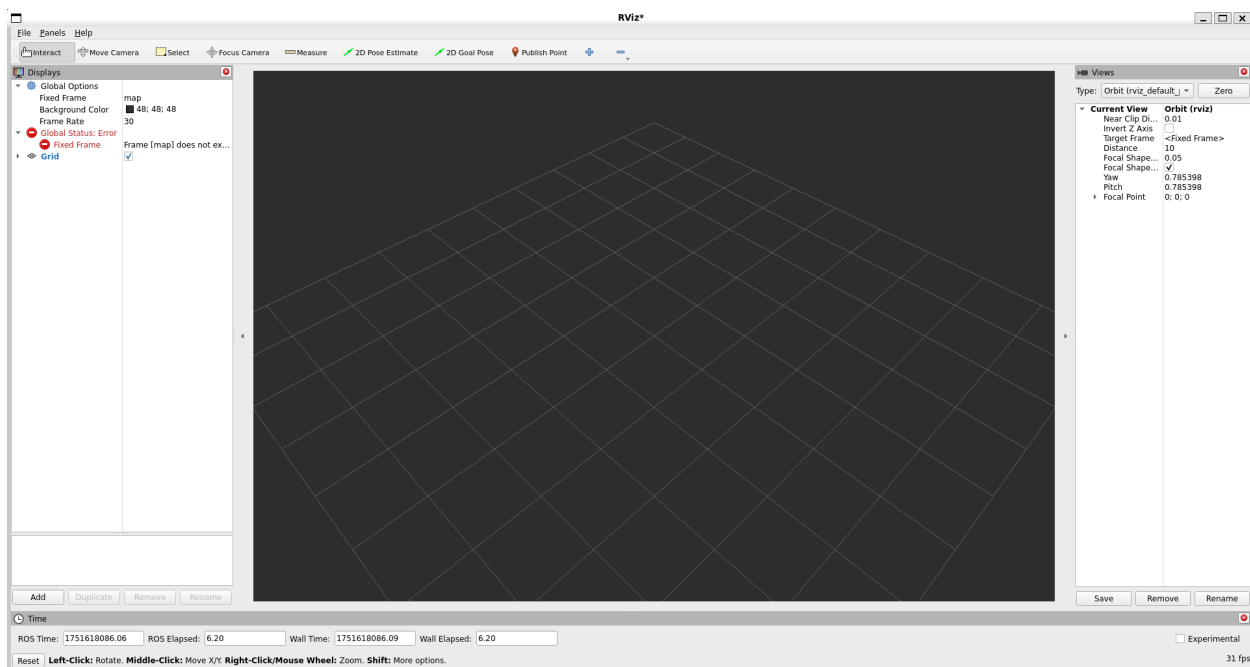
Step 6: Launch RViz

```
Shell
ros2 launch lidar_description display.launch.py
```
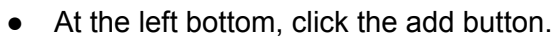
- The above command opens rviz window

- Set the fixed frame to base_link

- At the left bottom, click the add button.

- In the new window opened, select RobotModel
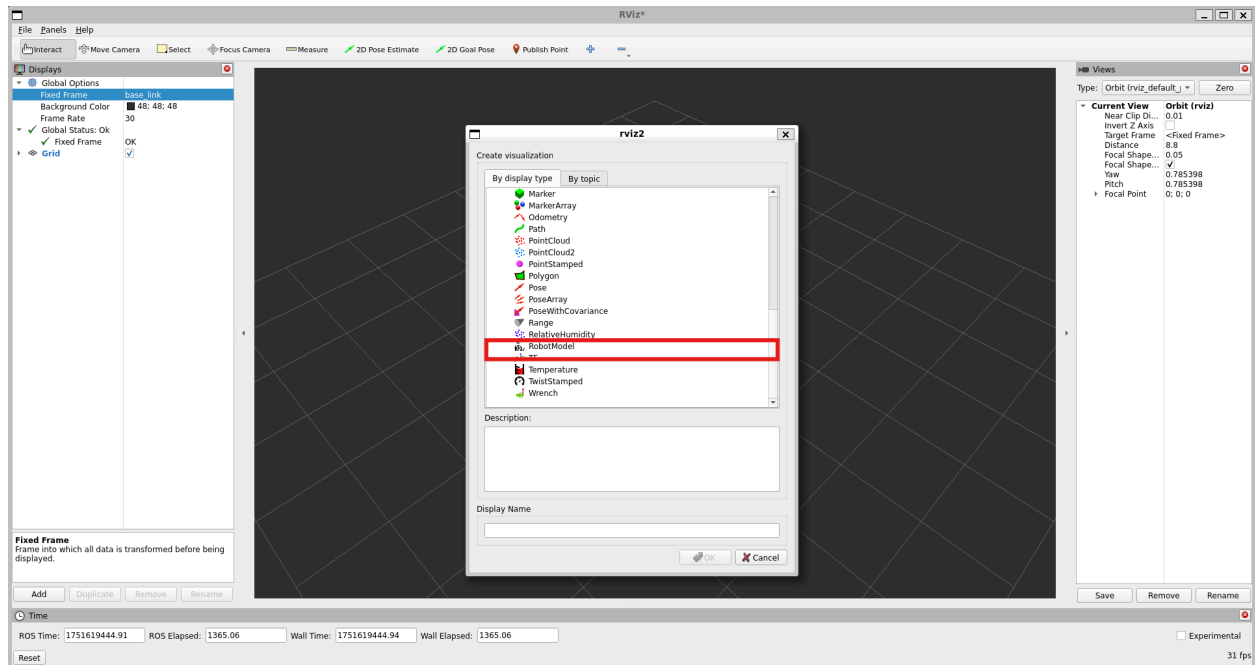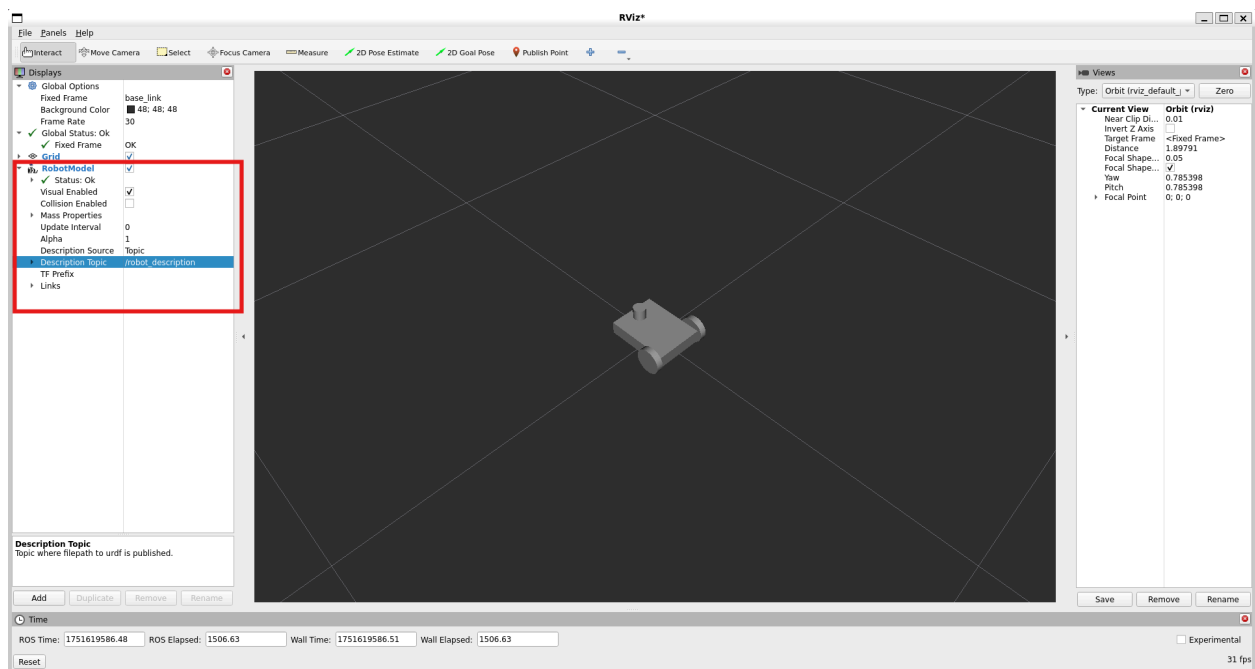
- In the left panel, click on the drop-down menu near RobotModel and then make the **description topic as /robot_description**. This now brings the robot model into rviz.

Common Errors and Fixes

Error: Mesh not found

Fix:

- Mesh paths in URDF must use:

```xml
XML
<mesh filename="package://lidar_description/meshes/base_link.stl"
scale="0.001 0.001 0.001"/>
```

-
    Add install rule for meshes in `CMakeLists.txt`

- Rebuild and check with:

```shell
Shell
ls install/lidar_description/share/lidar_description/meshes/
```

Error: "No link elements found"

Fix:

- Check for valid XML format in `lidar.xacro`

- Run:

```shell
Shell
xacro urdf/lidar.xacro
```

Error: Robot not visible in RViz

Fix:

- Ensure Fixed Frame is set to `base_link`
- `Ensure the joints are properly defined in the design`
- Check orientation in Fusion 360 before export
- After adding the RobotModel, change the description topic as /robot_description