

Fusion 360 to RViz using lidar_description (ROS 2)

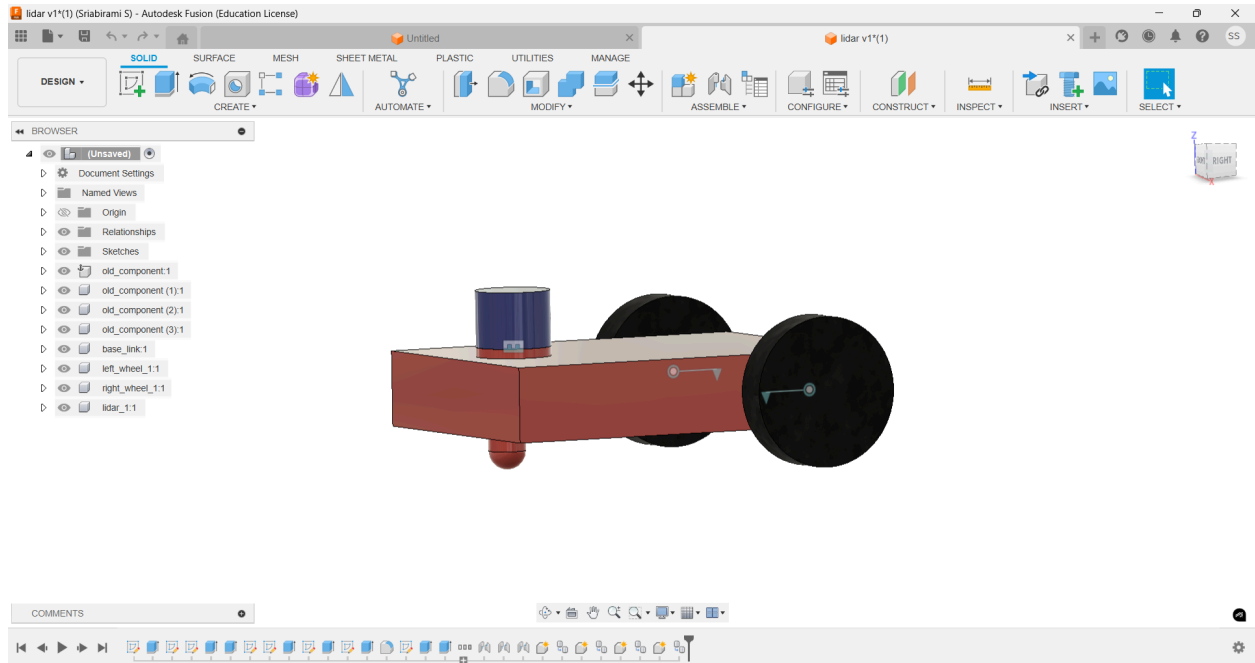
PART 1: Exporting URDF from Fusion 360

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).

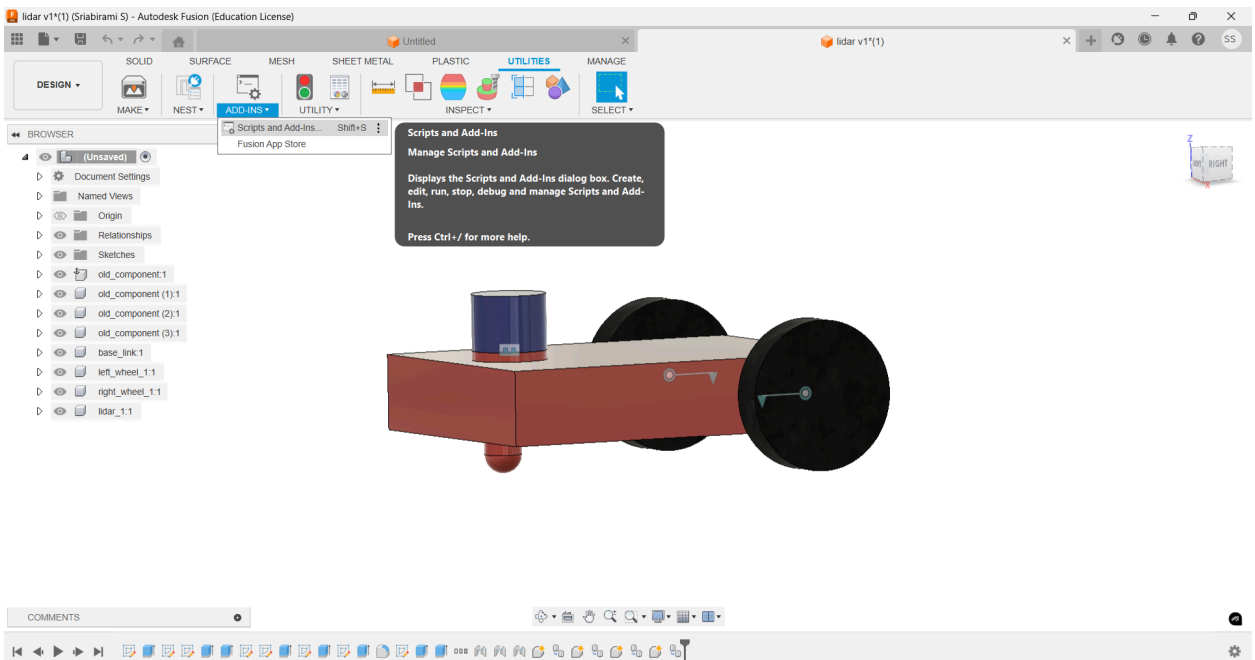


Step 3: Export URDF from Fusion 360

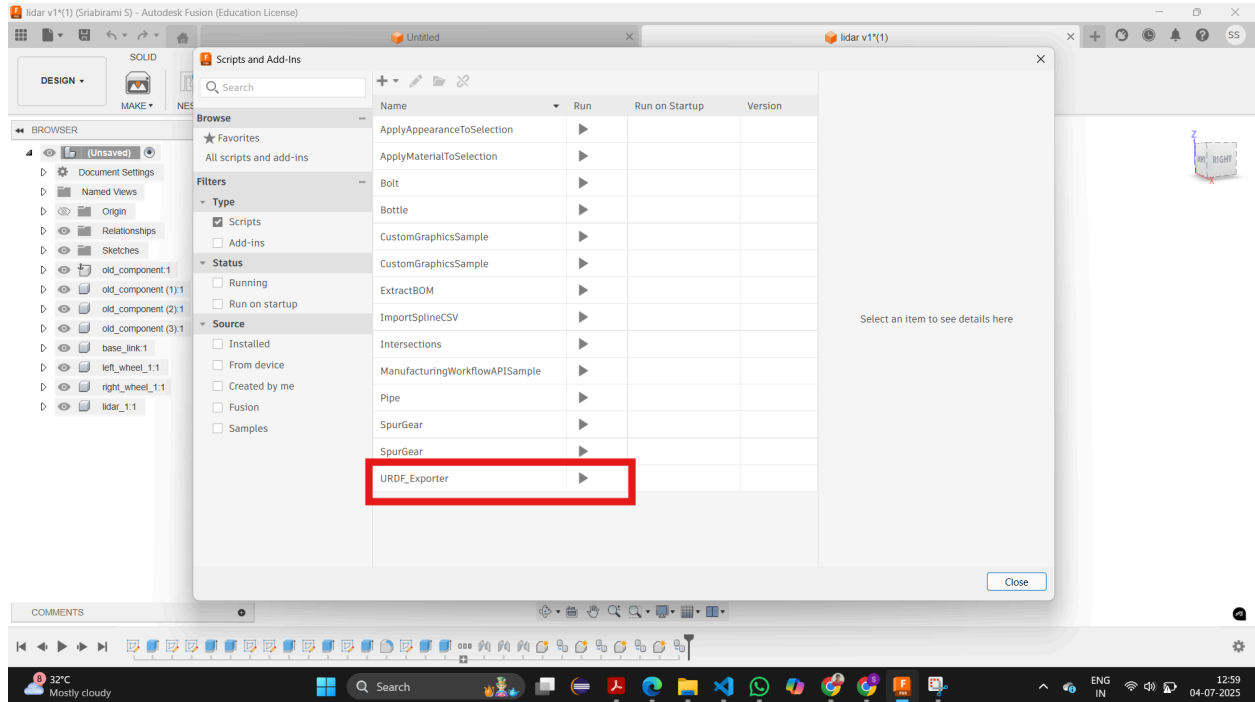
Once your robot model is fully assembled in Fusion 360 and the **URDF Exporter Add-In** is installed and running, follow these steps to export the URDF and mesh files correctly.

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

```
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()`:

None

```
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',  
    )  
l)
```

Step 5: Build and Source

Shell

```
cd ~/ros2_ws  
colcon build --packages-select lidar_description  
source install/setup.bash
```

Step 6: Launch RViz

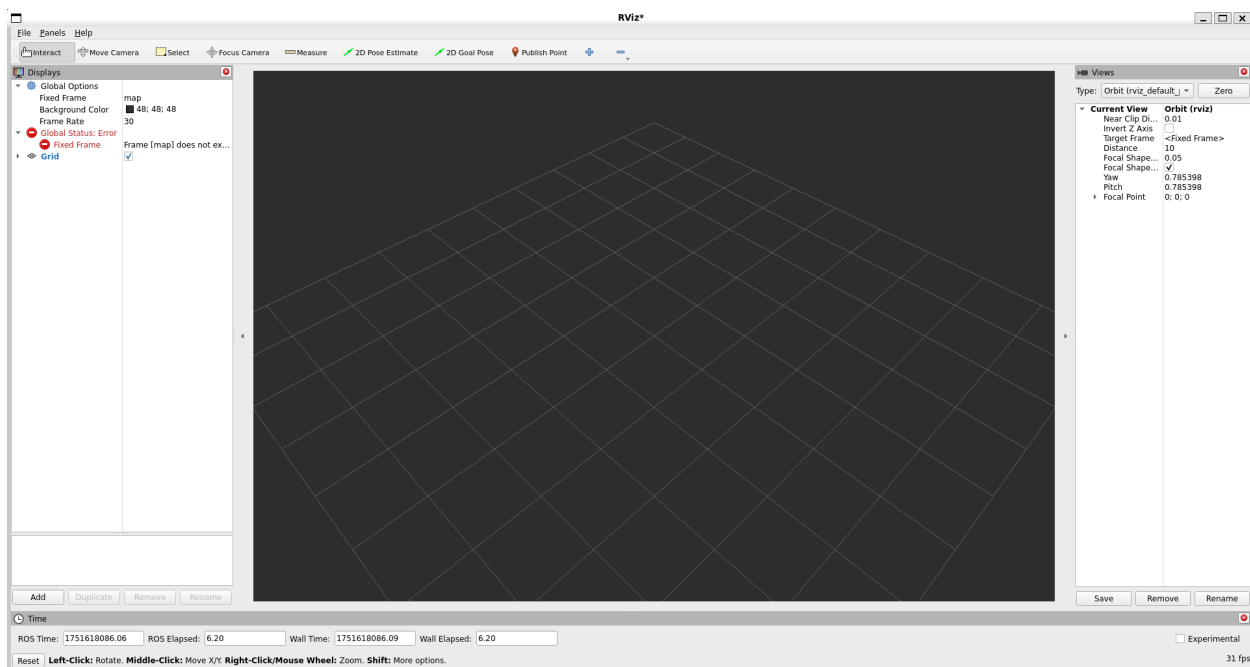
Shell

```
ros2 launch lidar_description display.launch.py
```

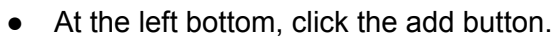
```
sriabirami@Sriabirami: ~/ros2$ cd ~/ros2_WS
-bash: cd: /home/sriabirami/ros2_WS: No such file or directory
sriabirami@Sriabirami:~$ cd ~/ros2_ws
sriabirami@Sriabirami:~/ros2_ws$ cd src
sriabirami@Sriabirami:~/ros2_ws/src$ cd ..
sriabirami@Sriabirami:~/ros2_ws$ colcon build
Starting >>> lidar_description
Starting >>> my_lidar_description
Starting >>> my_robot_controller
Finished <<< lidar_description [0.31s]
Finished <<< my_lidar_description [0.31s]
Finished <<< my_robot_controller [0.89s]

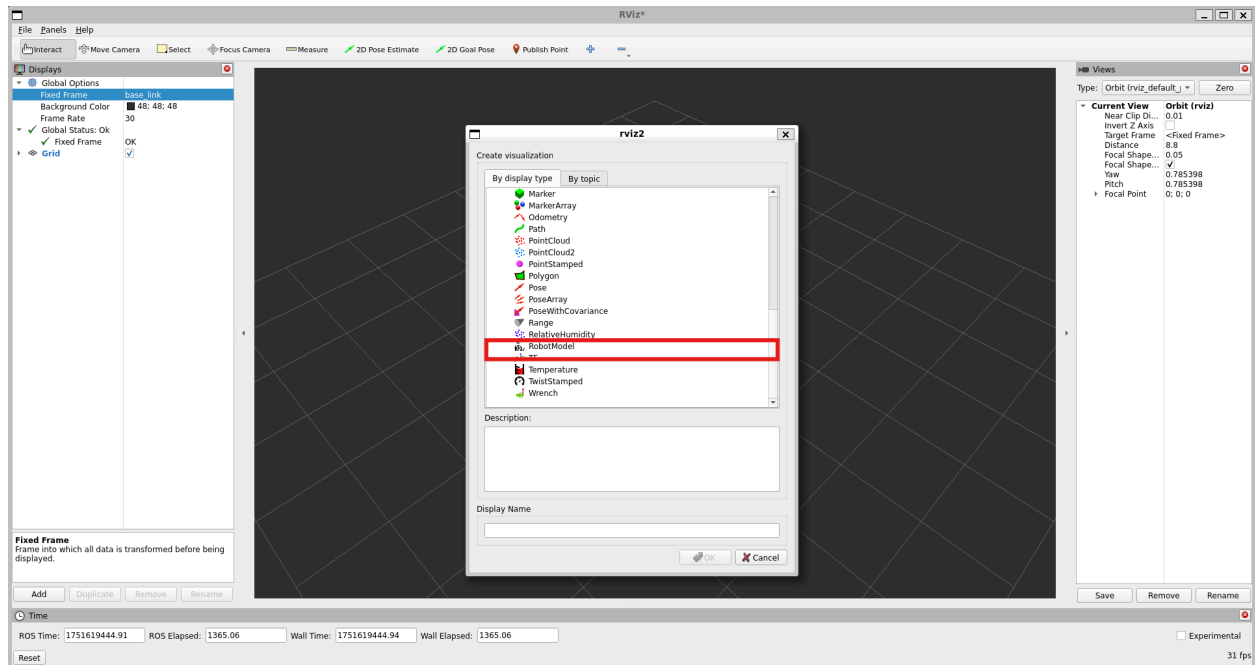
Summary: 3 packages finished [1.44s]
sriabirami@Sriabirami:~/ros2_ws$ source install/setup.bash
sriabirami@Sriabirami:~/ros2_ws$ cd src
sriabirami@Sriabirami:~/ros2_ws/src$ code .
sriabirami@Sriabirami:~/ros2_ws/src$ cd lidar_description
sriabirami@Sriabirami:~/ros2_ws/src/lidar_description$ cd ../../
sriabirami@Sriabirami:~/ros2_ws$ ros2 launch lidar_description display.launch.py
[INFO] [launch]: All log files can be found below /home/sriabirami/.ros/log/2025-07-04-14-04-36-802698-Sriabirami-982
[INFO] [launch]: Default logging verbosity is set to INFO
[INFO] [robot_state_publisher-1]: process started with pid [984]
[INFO] [joint_state_publisher_gui-2]: process started with pid [986]
[INFO] [rviz2-3]: process started with pid [988]
[robot_state_publisher-1] [WARN] [1751618077.053731288] [kdL_parser]: The root link base_link has an inertia specified i
n the URDF, but KDL does not support a root link with an inertia. As a workaround, you can add an extra dummy link to y
our URDF.
[robot_state_publisher-1] [INFO] [1751618077.054216885] [robot_state_publisher]: got segment base_link
[robot_state_publisher-1] [INFO] [1751618077.054323586] [robot_state_publisher]: got segment left_wheel_1
```

- The above command opens rviz window

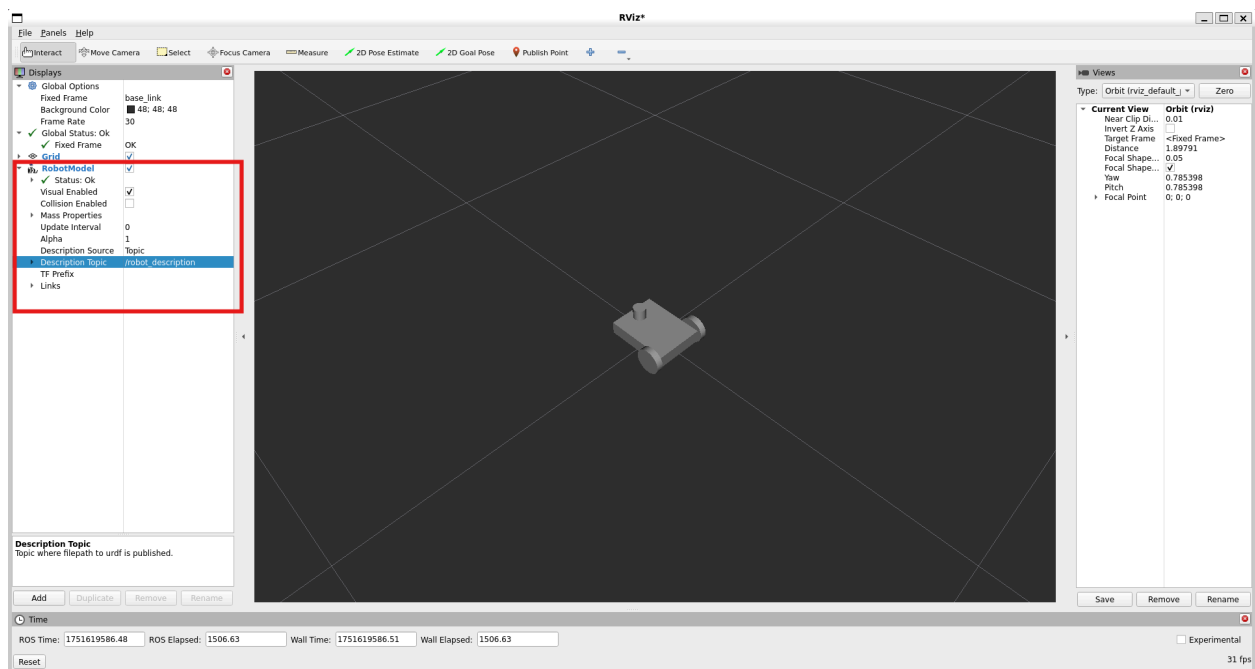


- Set the fixed frame to base_link





- 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

```
<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

```
ls install/lidar_description/share/lidar_description/meshes/
```

Error: “No link elements found”

Fix:

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

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`