ENPM 663: RWA-2
Group 4

Charu Sharma, Chris Neil D Souza, Girish Ethirajan, Vivek Sood

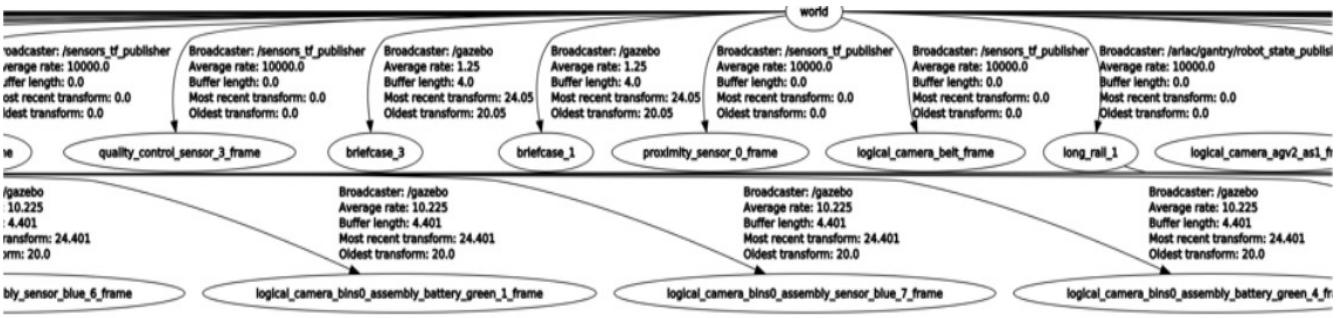
Sensor/Camera setup

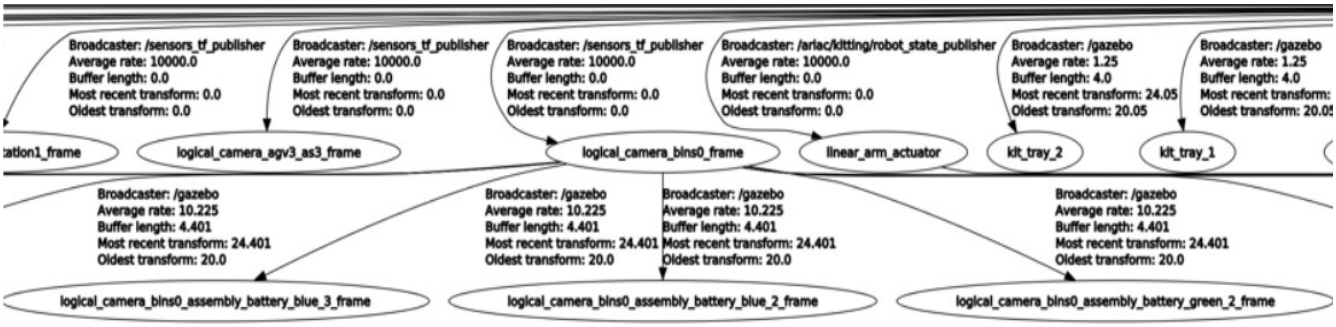
The following image shows our ARIAC workspace with all the logical cameras at its appropriate locations to capture all the 16 parts in the workspace.

There are 18 logical cameras:

- 2 over the bins
- 4 on each of the AGVs at ks1, ks2, ks3 and ks4
- 4 for the AGVs at as1 and as3
- 4 for the AGVs at as2 and as4 and 4 for the briefcases.

The following graphs are the rqt graphs for the 16 frames of the input of the 16 logical cameras:

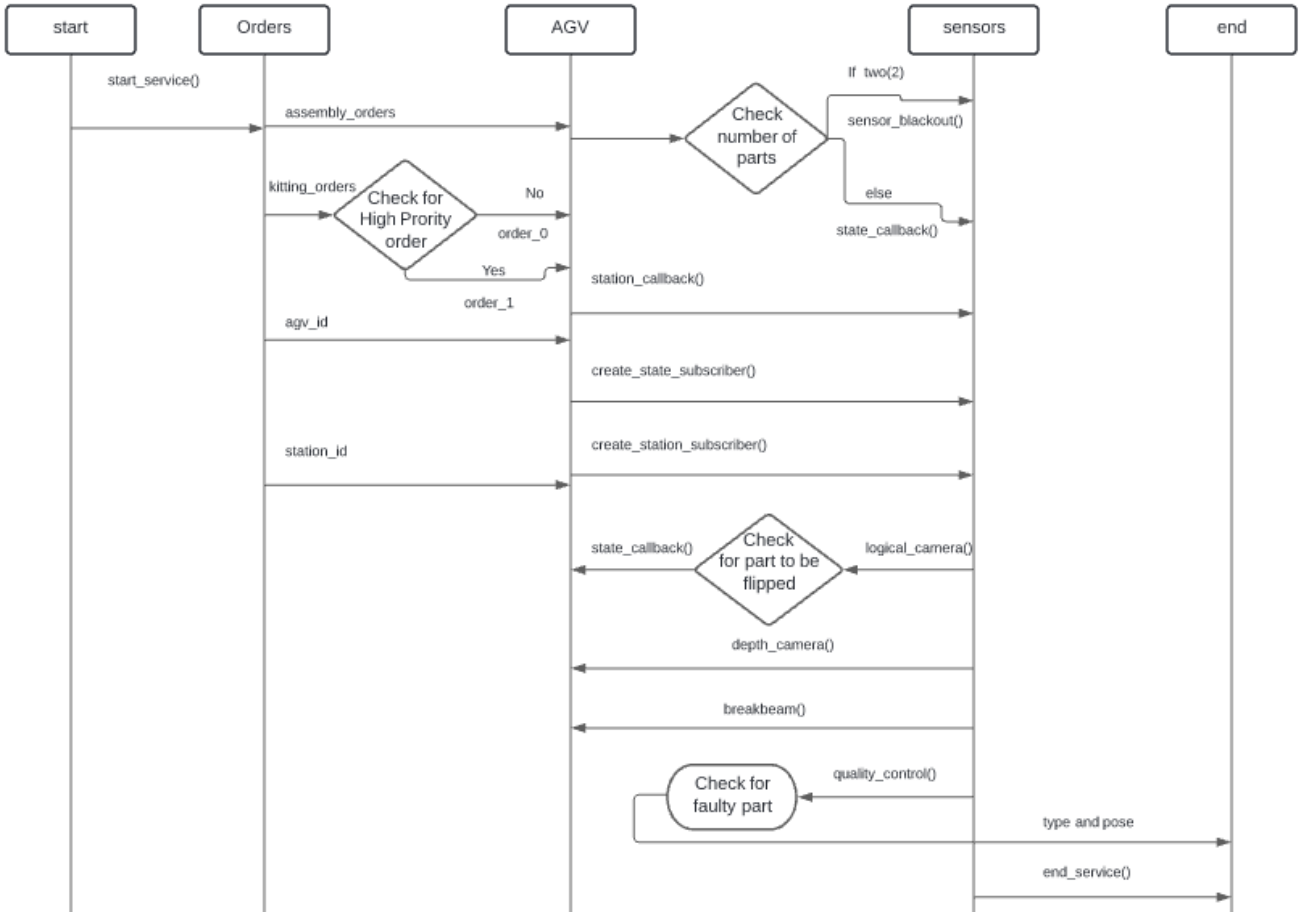




Agility Challenges

Sequence Diagram

The following diagram represents our Sequence diagram:



The following are the ability challenges introduced:

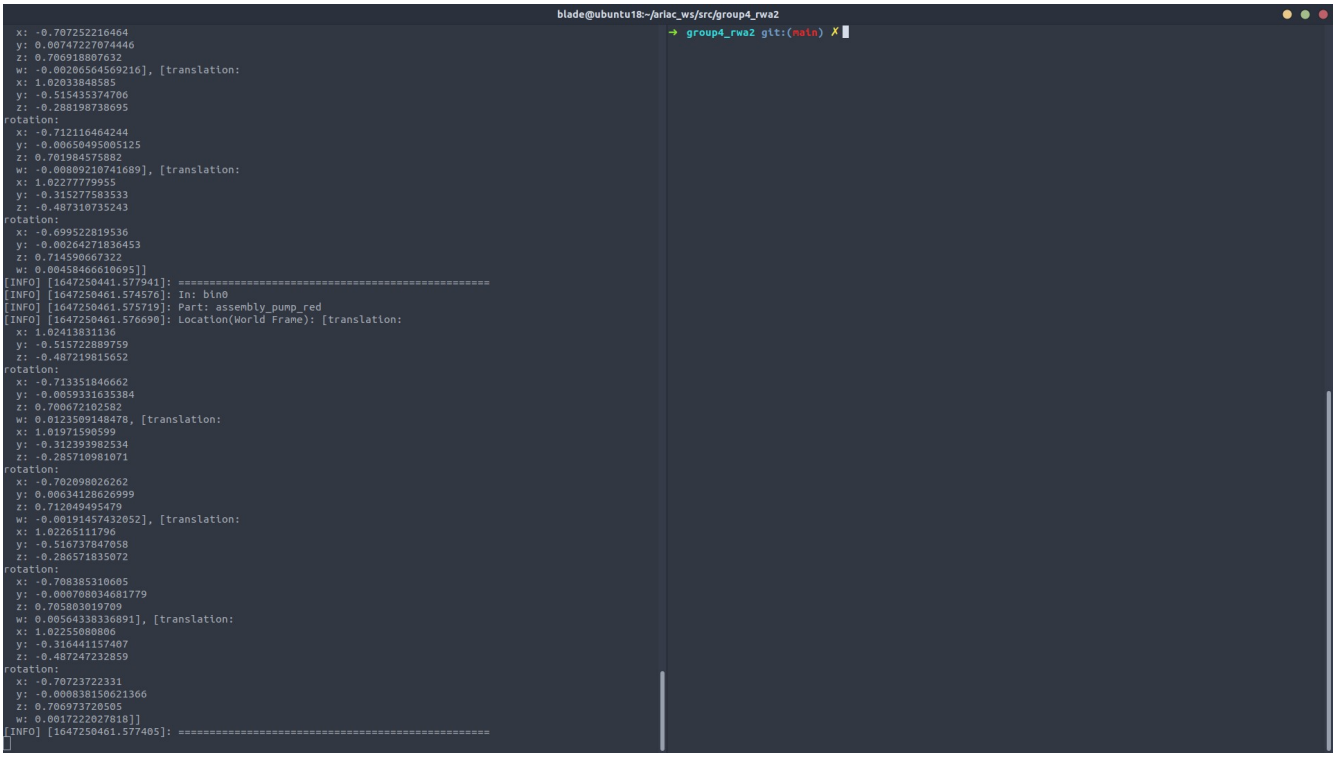
1. In-process Order Change
    - After order_0 is passed, the kitting operation takes place.
    - Once the first red pump is placed, order_1 is announced as a high priority order.
    - Since order_1 had higher priority, order_0 is put on hold and order_1 is initiated.

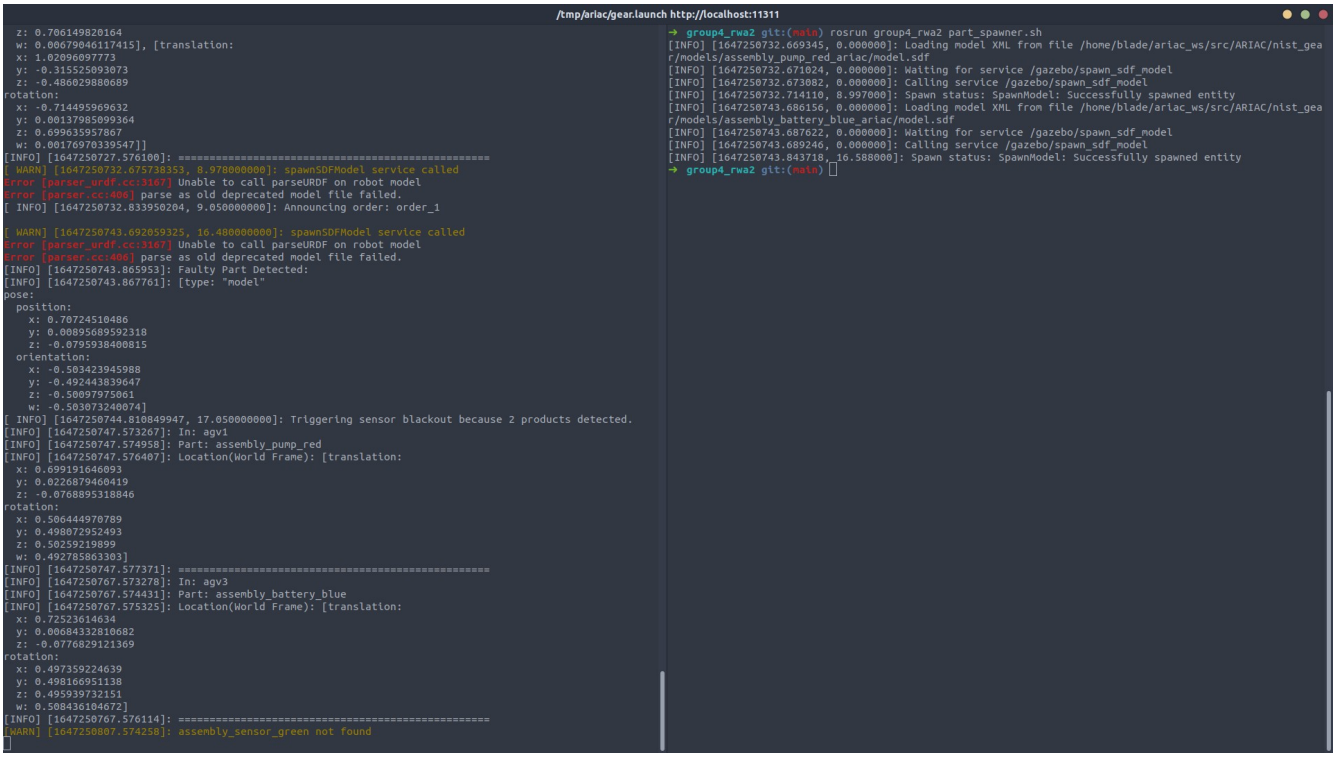
2. Sensor blackout
    - Sensor blackout takes place for 10 simulation seconds if the number of parts on any AGV is 2.

3. Faulty Part
    - The faulty part is detected
    - The type of product and its appropriate pose in the workspace is identified, which describes the pose of the sensor itself in the world frame.

4. Flipped part
    - The logical camera checks the orientation of the parts placed and gives the order to flip to the desired orientation.

The following is the output of our ARIAC launch file, after the competition starts:




/tmp/ariac/gear.launch http://localhost:11311
z: 0.706149820164
w: 0.006790461174715], [translation:
x: 1.02096097773
y: -0.31552093073
z: -0.486029880689
rotation:
x: -0.714495969632
y: 0.00137985099364
z: 0.699635957867
w: 0.0017697833954 7]]
[INFO] [1647250727.576100]: ==========
[WARN] [1647250732.675738353, 8.978000000]: spawnSDFModel service called
Error [parser_urdf.cc:3167] Unable to call parseURDF on robot model
Error [parser.cc:406] parse as old deprecated model file failed.
[INFO] [1647250732.833950204, 9.050000000]: Announcing order: order_1
[WARN] [1647250743.692059325, 16.480000000]: spawnSDFModel service called
Error [parser_urdf.cc:3167] Unable to call parseURDF on robot model
Error [parser.cc:406] parse as old deprecated model file failed.
[INFO] [1647250743.865953]: Faulty Part Detected:
[INFO] [1647250743.867761]: [type: "model"
pose:
position:
x: 0.70724510486
y: 0.00895689592318
z: -0.0795938400815
orientation:
x: -0.503423945988
y: -0.492443839647
z: -0.50097975061
w: -0.503073240074]
[INFO] [1647250744.810849947, 17.050000000]: Triggering sensor blackout because 2 products detected.
[INFO] [1647250747.573267]: In: agv1
[INFO] [1647250747.574958]: Part: assembly_pump_red
[INFO] [1647250747.576407]: Location(World Frame): [translation:
x: 0.699191646093
y: 0.0226879460419
z: -0.0768895318846
rotation:
x: 0.506444970789
y: 0.498072952493
z: 0.50259219899
w: 0.492785863303]
[INFO] [1647250747.577371]: ==========
[INFO] [1647250767.573278]: In: agv3
[INFO] [1647250767.574431]: Part: assembly_battery_blue
[INFO] [1647250767.575325]: Location(World Frame): [translation:
x: 0.72523614634
y: 0.00684332810682
z: -0.0776829121369
rotation:
x: 0.497359224639
y: 0.498166951138
z: 0.495939732151
w: 0.508436104672]
[INFO] [1647250767.576114]: ==========
[WARN] [1647250807.574258]: assembly_sensor_green not found
→ group4_rwa2 git:(main) rosrun group4_rwa2 part_spawner.sh
[INFO] [1647250732.669345, 0.000000]: Loading model XML from file /home/blade/ariac_ws/src/ARIAC/nist_gear/models/assembly_pump_red_ariac/model.sdf
[INFO] [1647250732.671024, 0.000000]: Waiting for service /gazebo/spawn_sdf_model
[INFO] [1647250732.673082, 0.000000]: Calling service /gazebo/spawn_sdf_model
[INFO] [1647250732.714110, 8.997000]: Spawn status: SpawnModel: Successfully spawned entity
[INFO] [1647250743.686156, 0.000000]: Loading model XML from file /home/blade/ariac_ws/src/ARIAC/nist_gear/models/assembly_battery_blue_ariac/model.sdf
[INFO] [1647250743.687622, 0.000000]: Waiting for service /gazebo/spawn_sdf_model
[INFO] [1647250743.689246, 0.000000]: Calling service /gazebo/spawn_sdf_model
[INFO] [1647250743.843718, 16.588000]: Spawn status: SpawnModel: Successfully spawned entity
→ group4_rwa2 git:(main)