Understanding the edrone model in gazebo

blogpost-style

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Understanding the edrone model in gazebo

In this tutorial you will learn how to use the e-Drone model for Task 1

> NOTE: This task requires sentinel_drone package, make sure you have it in the src folder of catkin workspace, if not, follow the installation instructions in Task 1A document

- Launch the following command to see the gazebo world. Make sure there are

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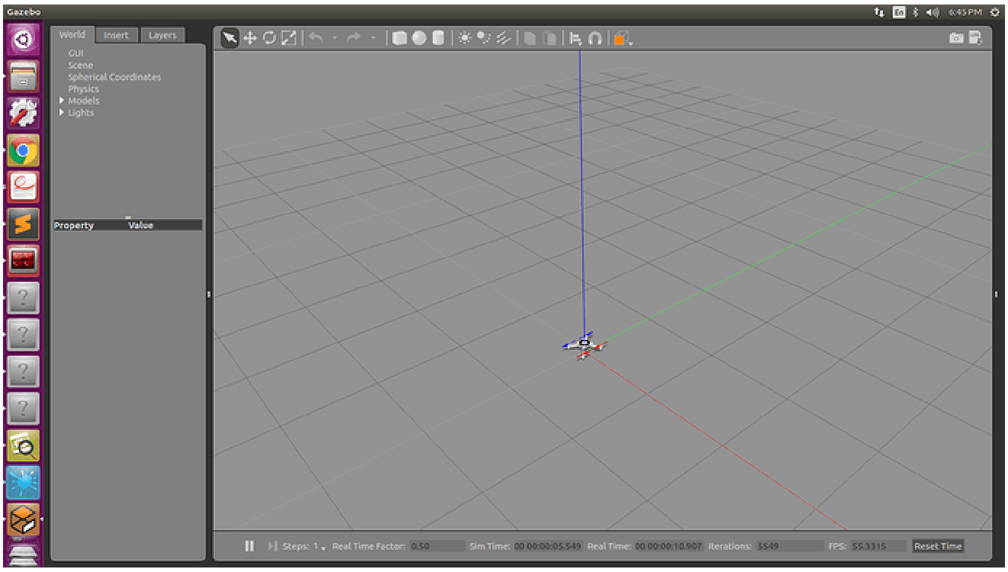
gazebo windows opens.

```
roslaunch rotors_gazebo edrone_with_edrone_msg.launch
```

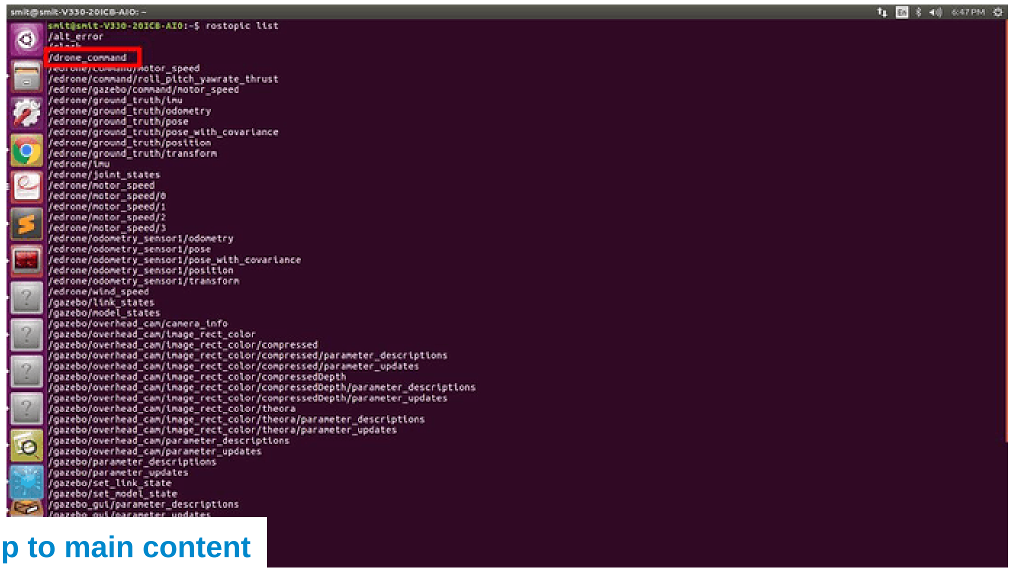
> NOTE: To kill it use CTRL+C (Kill command) rather than CTRL+Z (hibernating command), it will
> take some time but wait patiently.



- Check all the topics published by gazebo. Run the following command in the terminal to check all
  the topics published by Gazebo

```
rostopic list
```

You should find the topic "/drone_command"



```
smit@smit-V330-20ICB-AIO: ~
smit@smit-V330-20ICB-AIO:~$ rostopic list
/alt_error
/clock
/drone_command
/edrone/command/motor_speed
/edrone/command/roll_pitch_yawrate_thrust
/edrone/gazebo/command/motor_speed
/edrone/ground_truth/imu
/edrone/ground_truth/odometry
/edrone/ground_truth/pose
/edrone/ground_truth/pose_with_covariance
/edrone/ground_truth/position
/edrone/ground_truth/transform
/edrone/imu
/edrone/joint_states
/edrone/motor_speed
/edrone/motor_speed/0
/edrone/motor_speed/1
/edrone/motor_speed/2
/edrone/motor_speed/3
/edrone/odometry_sensor1/odometry
/edrone/odometry_sensor1/pose
/edrone/odometry_sensor1/pose_with_covariance
/edrone/odometry_sensor1/position
/edrone/odometry_sensor1/transform
/edrone/wind_speed
/gazebo/link_states
/gazebo/model_states
/gazebo/overhead_cam/camera_info
/gazebo/overhead_cam/image_rect_color
/gazebo/overhead_cam/image_rect_color/compressed
/gazebo/overhead_cam/image_rect_color/compressed/parameter_descriptions
/gazebo/overhead_cam/image_rect_color/compressed/parameter_updates
/gazebo/overhead_cam/image_rect_color/compressedDepth
/gazebo/overhead_cam/image_rect_color/compressedDepth/parameter_descriptions
/gazebo/overhead_cam/image_rect_color/compressedDepth/parameter_updates
/gazebo/overhead_cam/image_rect_color/theora
/gazebo/overhead_cam/image_rect_color/theora/parameter_descriptions
/gazebo/overhead_cam/image_rect_color/theora/parameter_updates
/gazebo/overhead_cam/parameter_descriptions
/gazebo/overhead_cam/parameter_updates
/gazebo/parameter_descriptions
/gazebo/parameter_updates
/gazebo/set_link_state
/gazebo/set_model_state
/gazebo_gui/parameter_descriptions
/gazebo_gui/parameter_updates
```

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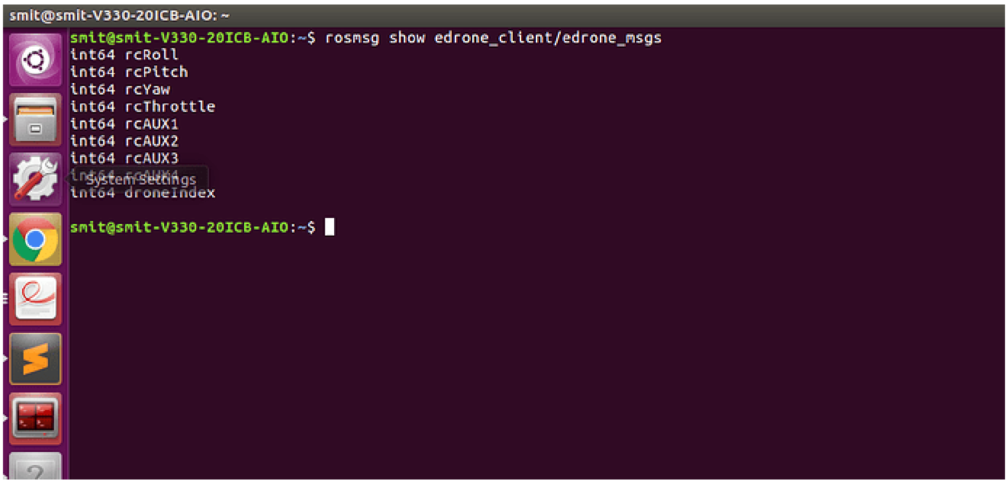
"/drone_command" is a topic subscribed by the e-Drone model. It commands the drone's motion
in terms of roll, pitch, yaw and throttle.

- Check the type of messages accepted by the "/drone_command" topic. Run the following
command in the terminal to check:

```
rostopic info /drone_command
```

Your output will display the topic type as "edrone_client/edrone_msgs".
Check the structure of the message by typing the following command in the terminal:

```
rosmsg show edrone_client/edrone_msgs
```



```
smit@smit-V330-20ICB-AIO: ~
smit@smit-V330-20ICB-AIO:~$ rosmsg show edrone_client/edrone_msgs
int64 rcRoll
int64 rcPitch
int64 rcYaw
int64 rcThrottle
int64 rcAUX1
int64 rcAUX2
int64 rcAUX3
int64 rcAUX4
int64 droneIndex

smit@smit-V330-20ICB-AIO:~$
```

The values for rcRoll, rcPitch, rcYaw and rcThrottle range from 1000 to 2000

- Arming the Drone:
An armed drone means the drone is ready to take commands from a user or software to fly.
The condition to arm the drone is rcThrottle = 1500 and rcAUX4 = 1500. To test arming the drone
model, publish the following message to the topic "/drone_command" by typing the command (do
not copy-paste, see video tutorial for better alternative):

```
rostopic pub /drone_command edrone_client/edrone_msgs "{
```

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The propellers should start rotating.

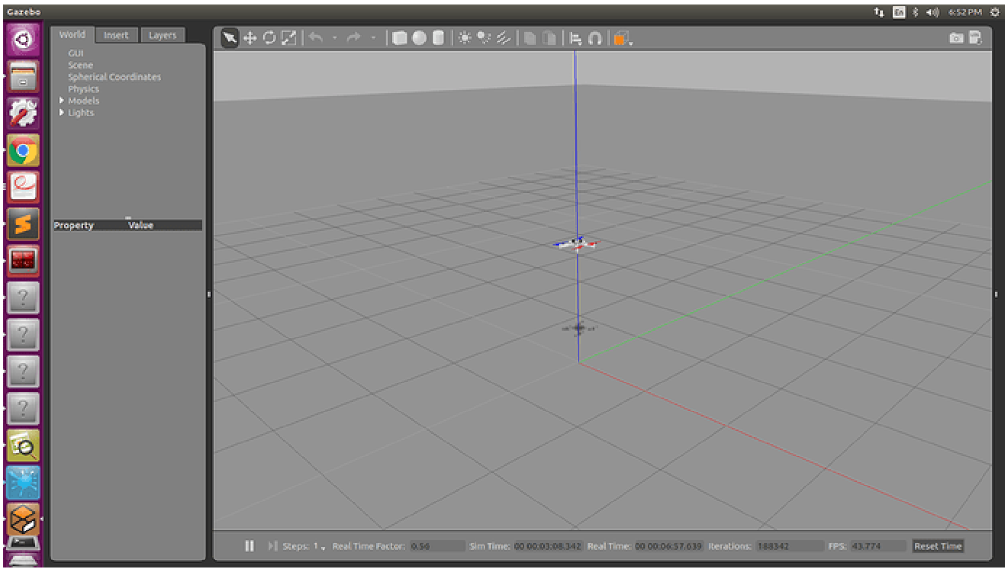
> NOTE: After publishing any command to the drone, before entering new command press
> Ctrl+C and then enter next command.

- Flight (Take-Off):

  The condition for the drone to take-off is rcThrottle ≥ 1500, after arming. To test the drone's take-off, publish the following message to increase the throttle:

```
rostopic pub /drone_command edrone_client/edrone_msgs "{r
```

The drone should now steadily rise until a new command is given, as shown in figure 4.



Steps: 1 Real Time Factor: 0.56 Sim Time: 00 00:01:08.342 Real Time: 00 00:06:57.639 Iterations: 188342 FPS: 43.774

> NOTE: If the drone goes up and gets stuck to the camera, you can bring it down by resetting the
> world, to do that go to Edit and click on Reset Pose or you can also press Ctrl+Shift+R

- Disarming the Drone:

  A disarmed drone means the drone is in stop state.
  The condition to disarm the drone is rcThrottle = 1000. To test disarming the

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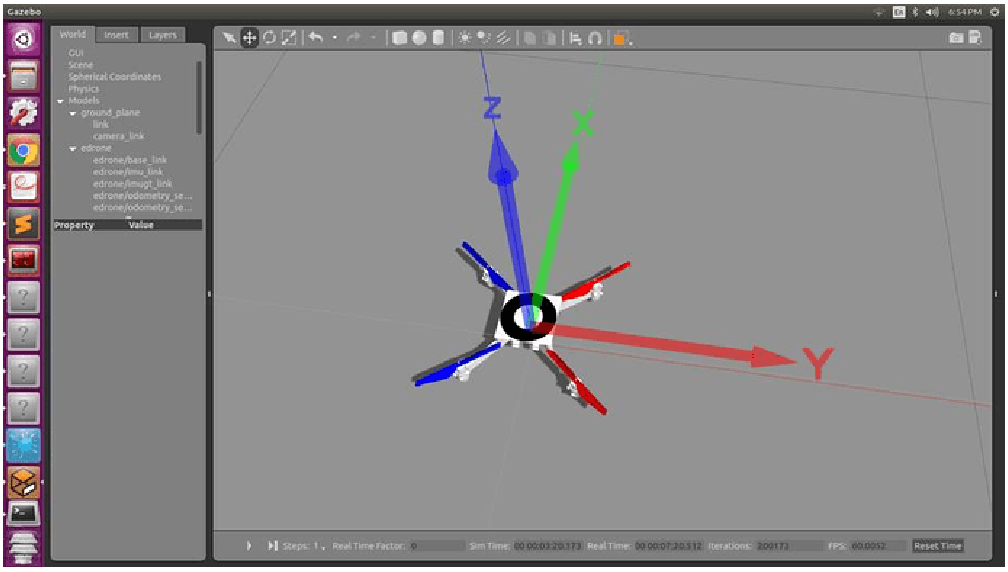
the following message to the topic “/drone_command” by typing the command:

```
rostopic pub /drone_command edrone_client/PlutoMsg "{rcRo
```

The drone should now be disarmed. And come back to the ground

- Heading if the Drone:

  It is important to understand the heading direction of the drone with respect to world. Refer to
  Figure 5 to check the heading of drone.



  Red Arrow: Positive Y-axis (Roll)
  Green Arrow: Positive X-Axis (Pitch)
  Blue Arrow: Positive Z-axis (Throttle)

> Prev **Task 1A : Building a Control System**

Not getting /drone_commands in rostopic lists

CLOSED ON SEP 24

UNLISTED ON SEP 24