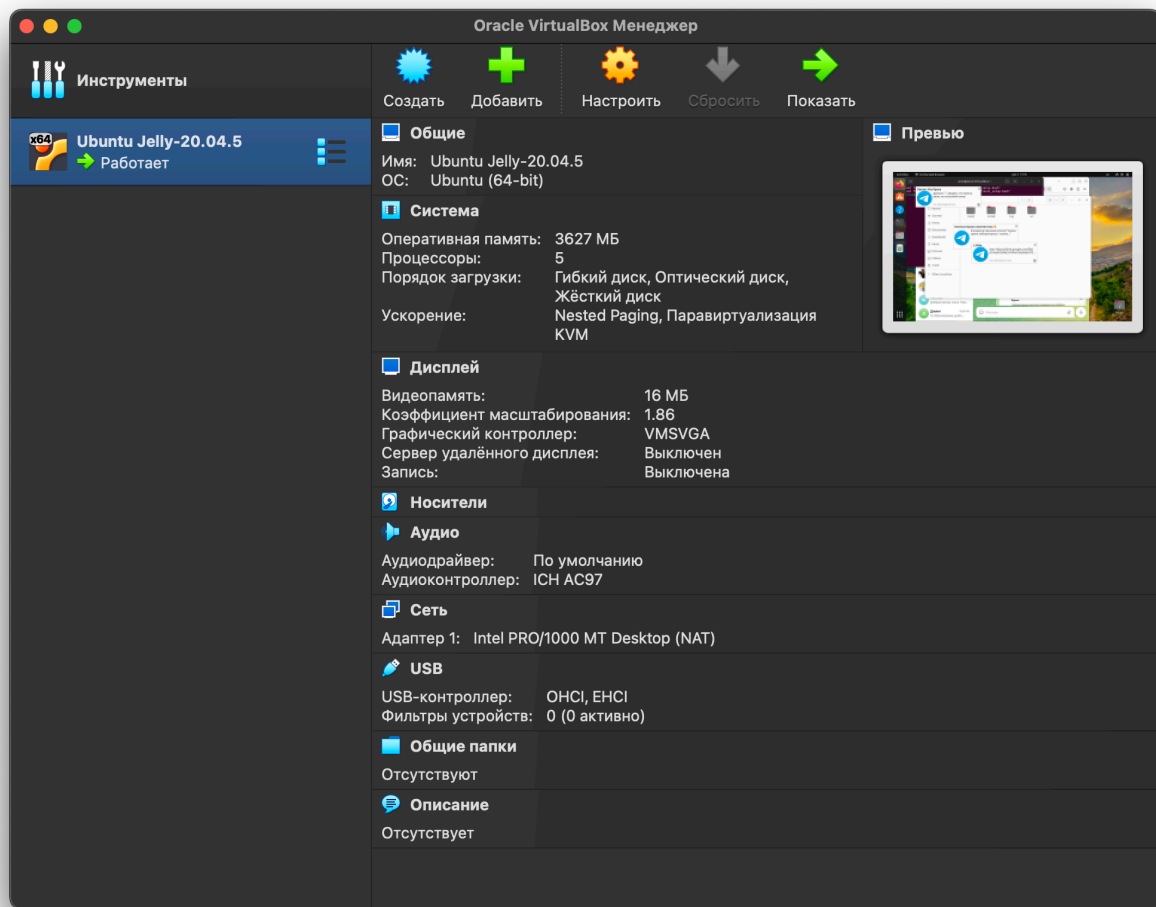


Лабораторная работа 2

1. Установка Ubuntu на виртуальную машину



2. Установка необходимых пакетов и репозиториев

```
sudo apt install software-properties-common  
sudo add-apt-repository universe
```

3. Установка ROS

```
sudo apt update && sudo apt install curl -y  
sudo curl -sSL https://raw.githubusercontent.com/ros/rosdistro/master/  
ros.key -o /usr/share/keyrings/ros-archive-keyring.gpg
```

```
echo "deb [arch=$(dpkg --print-architecture) signed-by=/usr/share/keyrings/  
ros-archive-keyring.gpg] http://packages.ros.org/ros2/ubuntu $(. /etc/os-  
release && echo $UBUNTU_CODENAME) main" | sudo tee /etc/apt/  
sources.list.d/ros2.list > /dev/null
```

```
sudo apt install ros-humble-desktop-full
```

```
sudo apt install ros-humble-ros-base
```

```
sudo apt install ros-dev-tools
```

```
source /opt/ros/humble/setup.bash
```

```
anna@anna-VirtualBox:~$ echo $ROS_DISTRO
humble
anna@anna-VirtualBox:~$
```

4. Установка pyperplan

```
Pip install pyperplan
```

5. Установка turtlebot3

```
sudo apt install ros-humble-gazebo-*
```

```
sudo apt install ros-humble-cartographer
```

```
sudo apt install ros-humble-cartographer-ros
```

```
sudo apt install ros-humble-navigation2
```

```
sudo apt install ros-humble-nav2-bringup
```

```
mkdir -p ~/turtlebot3_ws/src
```

```
cd ~/turtlebot3_ws/src/
```

```
git clone -b humble-devel https://github.com/ROBOTIS-GIT/  
DynamixelSDK.git
```

```
git clone -b humble-devel https://github.com/ROBOTIS-GIT/  
turtlebot3_msgs.git
```

```
git clone -b humble-devel https://github.com/ROBOTIS-GIT/turtlebot3.git
```

```
cd ~/turtlebot3_ws
```

```
colcon build --symlink-install
```

```
echo 'source ~/turtlebot3_ws/install/setup.bash' >> ~/.bashrc
```

```
source ~/.bashrc
```

```
echo 'export ROS_DOMAIN_ID=30 #TURTLEBOT3' >> ~/.bashrc
```

```
source ~/.bashrc
```

```
cd ~/turtlebot3_ws/src/
```

```
git clone -b humble-devel https://github.com/ROBOTIS-GIT/  
turtlebot3_simulations.git
```

```
cd ~/turtlebot3_ws && colcon build --symlink-install
```

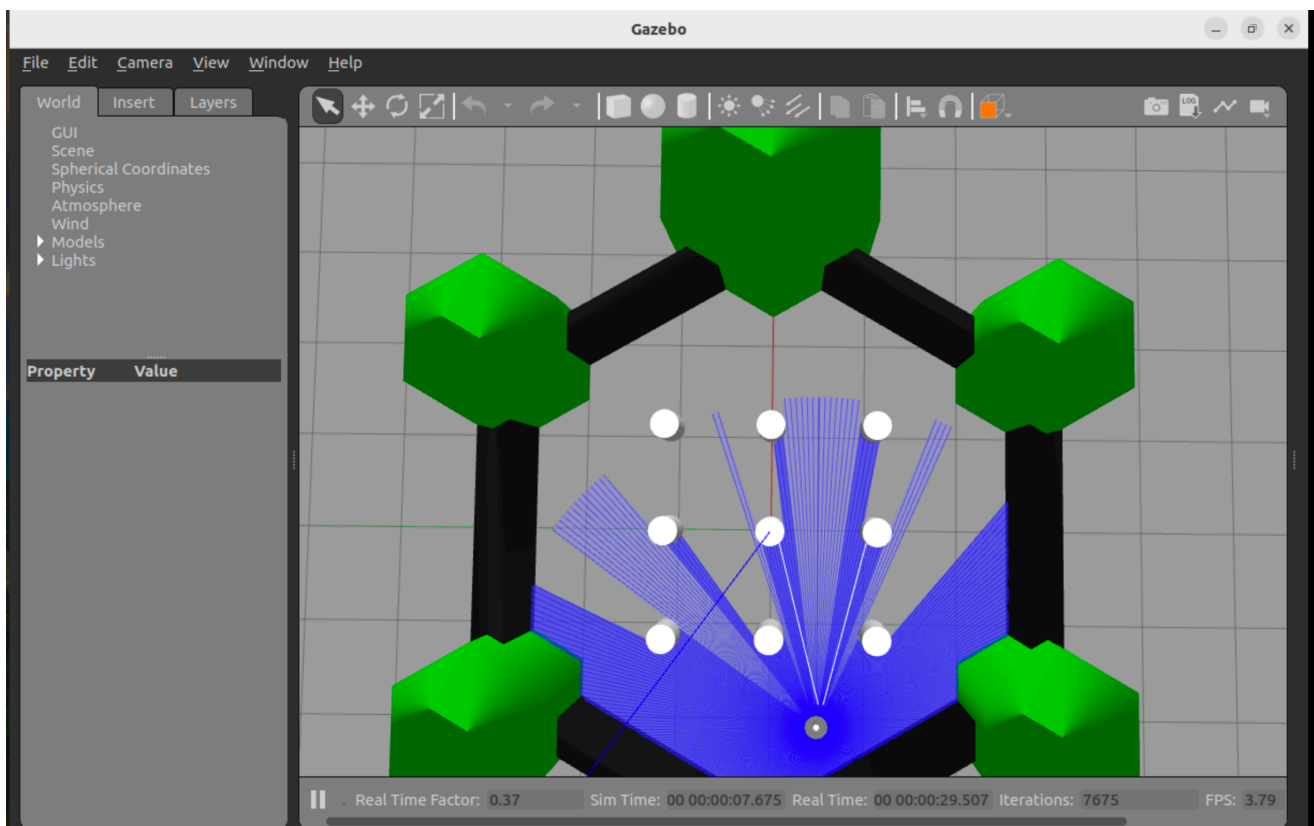
Заныск

```
source /usr/share/gazebo/setup.sh
```

```
export TURTLEBOT3_MODEL=waffle
```

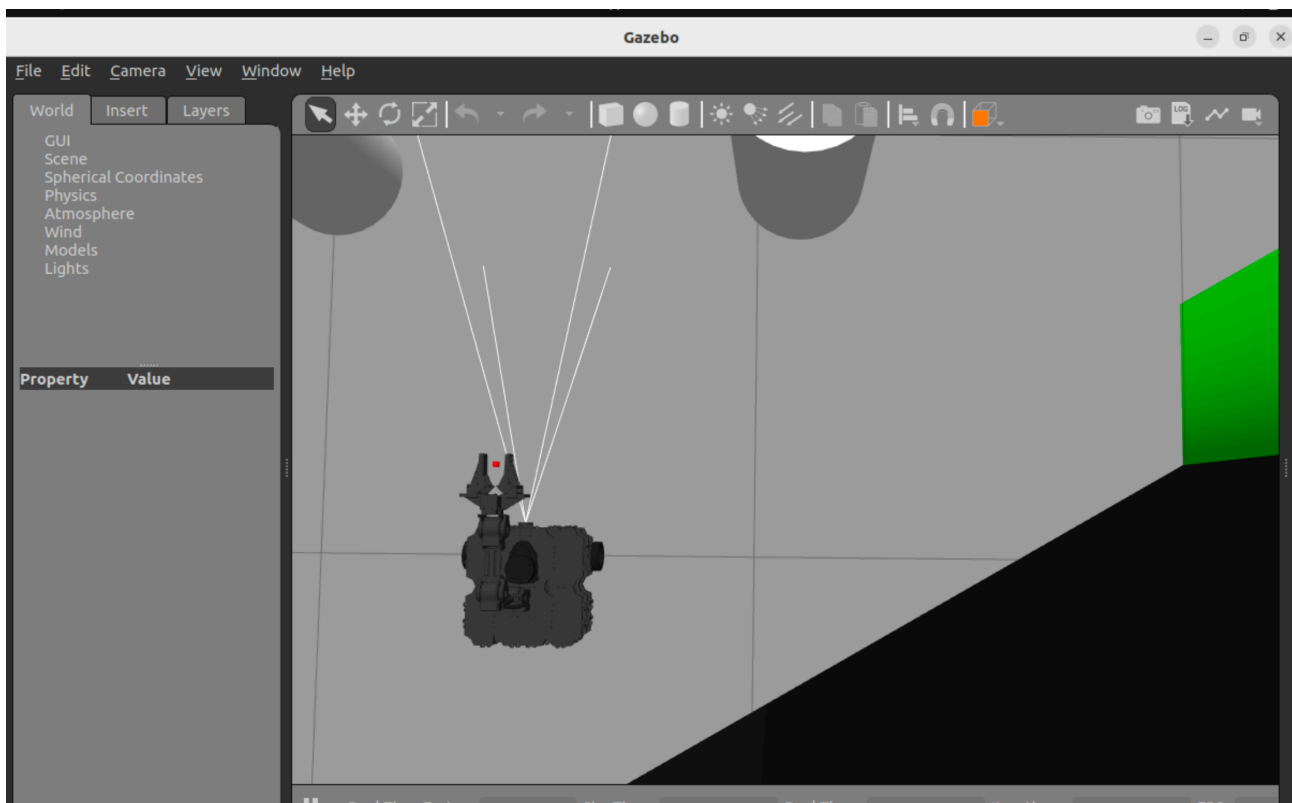
```
ros2 launch turtlebot3_gazebo turtlebot3_world.launch.py
```

```
anna@anna-VirtualBox: ~/turtlebot3_pl
erplan) (0.37.1)
anna@anna-VirtualBox:~$ cd ~/turtlebot3_pl
anna@anna-VirtualBox:~/turtlebot3_pl$ source /usr/share/gazebo/setup.sh
anna@anna-VirtualBox:~/turtlebot3_pl$ export TURTLEBOT3_MODEL=waffle
anna@anna-VirtualBox:~/turtlebot3_pl$ ros2 launch turtlebot3_gazebo turtlebot3_w
orld.launch.py
[INFO] [launch]: All log files can be found below /home/anna/.ros/log/2024-12-02
-14-10-02-875207-anna-VirtualBox-185891
[INFO] [launch]: Default logging verbosity is set to INFO
urdf_file_name : turtlebot3_waffle.urdf
urdf_file_name : turtlebot3_waffle.urdf
[INFO] [gzserver-1]: process started with pid [185894]
[INFO] [gzclient-2]: process started with pid [185896]
[INFO] [robot_state_publisher-3]: process started with pid [185898]
[INFO] [spawn_entity.py-4]: process started with pid [185900]
[robot_state_publisher-3] [INFO] [1733137809.146500624] [robot_state_publisher]:
got segment base_footprint
[robot_state_publisher-3] [INFO] [1733137809.147617350] [robot_state_publisher]:
got segment base_link
[robot_state_publisher-3] [INFO] [1733137809.147693176] [robot_state_publisher]:
got segment base_scan
[robot_state_publisher-3] [INFO] [1733137809.147714126] [robot_state_publisher]:
got segment camera_depth_frame
[robot_state_publisher-3] [INFO] [1733137809.147728947] [robot_state_publisher]:
```



6. Установка Turtlebot3 с манипулятором

```
sudo apt install ros-humble-dynamixel-sdk ros-humble-ros2-control ros-  
humble-ros2-controllers ros-humble-gripper-controllers ros-humble-moveit  
cd ~/turtlebot3_ws/src/  
git clone -b humble-devel https://github.com/ROBOTIS-GIT/  
turtlebot3_manipulation.git  
cd ~/turtlebot3_ws && colcon build --symlink-install  
  
ros2 launch turtlebot3_manipulation_bringup gazebo.launch.py
```



7. Создание узла

```
mkdir -p ~/ros2_ws/src  
cd ~/ros2_ws  
  
colcon build  
  
source ~/ros2_ws/install/setup.bash  
  
echo "source ~/ros2_ws/install/setup.bash" >> ~/.bashrc  
source ~/.bashrc  
  
cd ~/ros2_ws/src  
ros2 pkg create --build-type ament_python a_node
```

