

```
<!-- DO NOT EDIT: Generated from boat.sdf.jinja -->
<sdf version='1.6'>
  <model name='boat'>
    <link name='base_link'>
      <pose>0 0 0 0 -0 0</pose>
      <inertial>
        <pose >0 0 0.124229 0 -0 0</pose>
        <mass>227</mass>
        <inertia>
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          <ixz>0</ixz>
          <iyy>408.203</iyy>
          <iyz>0</iyz>
          <izz>495.037</izz>
        </inertia>
      </inertial>
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        <pose >-0.4 1.03 0.2 3.14159 1.57079 3.14159</pose>
        <geometry>
          <cylinder>
            <length>4</length>
            <radius>0.2</radius>
          </cylinder>
        </geometry>
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      <collision name='base_link_fixed_joint_lump__left_mid_float_collision_1'>
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        <geometry>
          <cylinder>
            <length>0.5</length>
            <radius>0.17</radius>
          </cylinder>
        </geometry>
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        <geometry>
          <cylinder>
            <length>0.45</length>
            <radius>0.12</radius>
          </cylinder>
        </geometry>
      </collision>
      <collision name='base_link_fixed_joint_lump__front_left_beam_lower_collision_3'>
        <pose>0.9 0.85 1 0.78 -0 0</pose>
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    </cylinder>
  </geometry>
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  <pose>-0.57 0.87 1.05 0.75 0.25 0</pose>
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      <radius>0.03</radius>
    </cylinder>
  </geometry>
</collision>
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    </cylinder>
  </geometry>
</collision>
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    <cylinder>
      <length>0.45</length>
      <radius>0.03</radius>
    </cylinder>
  </geometry>
</collision>
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  <geometry>
    <cylinder>
      <length>0.32</length>
      <radius>0.03</radius>
    </cylinder>
  </geometry>
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      <radius>0.03</radius>
    </cylinder>
  </geometry>
</collision>
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  <pose>0.58 1.03 0.6 0 -0.6 0</pose>
  <geometry>
    <box>
      <size>0.65 0.2 0.1</size>
    </box>
  </geometry>
</collision>
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<collision name='base_link_fixed_joint_lump__right_float_collision_12'>
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  <geometry>
    <cylinder>
      <length>4</length>
      <radius>0.2</radius>
    </cylinder>
  </geometry>
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      <radius>0.17</radius>
    </cylinder>
  </geometry>
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  <geometry>
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      <radius>0.12</radius>
    </cylinder>
  </geometry>
</collision>
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name='base_link_fixed_joint_lump__front_right_beam_lower_collision_15'>
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  <geometry>
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      <length>0.5</length>
      <radius>0.04</radius>
    </cylinder>
  </geometry>
</collision>
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      <length>0.2</length>
      <radius>0.04</radius>
    </cylinder>
  </geometry>
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<collision name='base_link_fixed_joint_lump__mid_right_beam_lower_collision_17'>
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      <radius>0.03</radius>
    </cylinder>
  </geometry>
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name='base_link_fixed_joint_lump__mid_right_beam_medium_collision_18'>
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        <radius>0.03</radius>
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        <radius>0.03</radius>
      </cylinder>
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        <radius>0.03</radius>
      </cylinder>
    </geometry>
  </collision>
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name='base_link_fixed_joint_lump__rear_right_beam_medium_collision_21'>
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      </cylinder>
    </geometry>
  </collision>
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        <radius>0.03</radius>
      </cylinder>
    </geometry>
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      </box>
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        <size>1.85 1 0.1</size>
      </box>
    </geometry>
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  <collision
name='base_link_fixed_joint_lump__left_battery_collision_collision_25'>
    <pose>0 1 0.6 0 -0 0</pose>
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    <geometry>
      <box>
        <size>0.6 0.4 0.31</size>
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  <collision
name='base_link_fixed_joint_lump__right_battery_collision_collision_26'>
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    <geometry>
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      </box>
    </geometry>
  </collision>
  <visual name='base_link_fixed_joint_lump__dummy_link_visual'>
    <pose>0 0 0 0 -0 0</pose>
    <geometry>
      <mesh>
        <scale>1 1 1</scale>
        <uri>model://boat/meshes/body.dae</uri>
      </mesh>
    </geometry>
  </visual>
  <visual name='base_link_fixed_joint_lump__left_battery_visual_visual_1'>
    <pose>0 -0.03 0 0 -0 0</pose>
    <geometry>
      <mesh>
        <scale>1 1 1</scale>
        <uri>model://boat/meshes/battery.dae</uri>
      </mesh>
    </geometry>
    <material>
      <script>
        <name>Gazebo/DarkGrey</name>
        <uri>__default__</uri>
      </script>
    </material>
  </visual>
  <visual name='base_link_fixed_joint_lump__right_battery_visual_visual_2'>
    <pose>0 -2.03 0 0 -0 0</pose>
    <geometry>
      <mesh>
        <scale>1 1 1</scale>
        <uri>model://boat/meshes/battery.dae</uri>
      </mesh>
    </geometry>
    <material>
      <script>
        <name>Gazebo/DarkGrey</name>
        <uri>__default__</uri>
      </script>
    </material>
  </visual>
  <visual name='right_engine_link_visual'>
    <pose>-2.37378 -1.02713 0.318237 0 -0 0</pose>
    <geometry>
      <mesh>
        <scale>1 1 1</scale>
        <uri>model://boat/meshes//engine.dae</uri>
      </mesh>
    </geometry>
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</visual>
<visual name='left_engine_link_visual'>
  <pose>-2.37378 1.02713 0.318237 0 -0 0</pose>
  <geometry>
    <mesh>
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      <uri>model://boat/meshes//engine.dae</uri>
    </mesh>
  </geometry>
</visual>
</link>
<link name='left_propeller_link'>
  <pose>-2.65193 1.02713 -0.191134 0 1.57079 0</pose>
  <inertial>
    <pose>0 0 0 0 -0 0</pose>
    <mass>0.5</mass>
    <inertia>
      <ixx>0.008545</ixx>
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  </inertial>
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        <length>0.18</length>
        <radius>0.24</radius>
      </cylinder>
    </geometry>
  </collision>
  <visual name='left_propeller_link_visual'>
    <pose>0 0 0 0 -1.57079 0</pose>
    <geometry>
      <mesh>
        <scale>1 1 1</scale>
        <uri>model://boat/meshes/propeller.dae</uri>
      </mesh>
    </geometry>
  </visual>
</link>
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  <child>left_propeller_link</child>
  <parent>base_link</parent>
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    <limit>
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      <upper>1e+16</upper>
    </limit>
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      <friction>0.05</friction> -->
      <spring_reference>0</spring_reference>
      <spring_stiffness>0</spring_stiffness>
    </dynamics>
    <use_parent_model_frame>1</use_parent_model_frame>
  </axis>
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</joint>
<link name='right_propeller_link'>
  <pose>-2.65193 -1.02713 -0.191134 0 1.57079 0</pose>
  <inertial>
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      <iyy>0.008545</iyy>
      <iyz>0</iyz>
      <izz>0.0144</izz>
    </inertia>
  </inertial>
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    <geometry>
      <cylinder>
        <length>0.18</length>
        <radius>0.24</radius>
      </cylinder>
    </geometry>
  </collision>
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    <pose>0 0 0 0 -1.57079 0</pose>
    <geometry>
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        <scale>1 1 1</scale>
        <uri>model://boat/meshes/propeller.dae</uri>
      </mesh>
    </geometry>
  </visual>
</link>
<link name='boat/imu_link'>
  <pose>0 0 0 0 0 0</pose>
  <inertial>
    <pose>0 0 0 0 0 0</pose>
    <mass>0.015</mass>
    <inertia>
      <ixx>1e-05</ixx>
      <ixy>0</ixy>
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      <iyy>1e-05</iyy>
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      <izz>1e-05</izz>
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  <parent>base_link</parent>
  <axis>
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    <limit>
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      <upper>1e+16</upper>
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    <friction>0.05</friction> -->
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        <spring_stiffness>0</spring_stiffness>
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</axis>
</joint>
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  <child>boat/imu_link</child>
  <parent>base_link</parent>
  <axis>
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    <limit>
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      <effort>0</effort>
      <velocity>0</velocity>
    </limit>
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      <spring_stiffness>0</spring_stiffness>
    </dynamics>
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  </axis>
</joint>
<include>
  <uri>model://gps</uri>
  <pose>0 0 0.12 0 0 0</pose>
  <name>gps</name>
</include>
<joint name='gps_joint' type='fixed'>
  <child>gps::link</child>
  <parent>base_link</parent>
</joint>
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  <robotNamespace></robotNamespace>
  <linkName>boat/imu_link</linkName>
  <imuTopic>/imu</imuTopic>
  <gyroscopeNoiseDensity>0.0003394</gyroscopeNoiseDensity>
  <gyroscopeRandomWalk>3.8785e-05</gyroscopeRandomWalk>
  <gyroscopeBiasCorrelationTime>1000.0</gyroscopeBiasCorrelationTime>
  <gyroscopeTurnOnBiasSigma>0.0087</gyroscopeTurnOnBiasSigma>
  <accelerometerNoiseDensity>0.004</accelerometerNoiseDensity>
  <accelerometerRandomWalk>0.006</accelerometerRandomWalk>
  <accelerometerBiasCorrelationTime>300.0</accelerometerBiasCorrelationTime>
  <accelerometerTurnOnBiasSigma>0.196</accelerometerTurnOnBiasSigma>
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  <robotNamespace/>
  <pubRate>100</pubRate>
  <noiseDensity>0.0004</noiseDensity>
  <randomWalk>6.4e-06</randomWalk>
  <biasCorrelationTime>600</biasCorrelationTime>
  <magTopic>/mag</magTopic>
</plugin>
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  <robotNamespace/>
  <pubRate>50</pubRate>
  <baroTopic>/baro</baroTopic>
</plugin>
<static>0</static>
<plugin name='left_motor_model' filename='libgazebo_motor_model.so'>
  <robotNamespace></robotNamespace>
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<jointName>left_engine_propeller_joint</jointName>
<linkName>left_propeller_link</linkName>
<turningDirection>cw</turningDirection>
<timeConstantUp>0.0125</timeConstantUp>
<timeConstantDown>0.025</timeConstantDown>
<maxRotVelocity>1100</maxRotVelocity>
<motorConstant>8.54858e-03</motorConstant>
<momentConstant>0.01</momentConstant>
<commandSubTopic>/gazebo/command/motor_speed</commandSubTopic>
<motorNumber>0</motorNumber>
<rotorDragCoefficient>0.000806428</rotorDragCoefficient>
<rollingMomentCoefficient>1e-06</rollingMomentCoefficient>
<motorSpeedPubTopic>/motor_speed/0</motorSpeedPubTopic>
<rotorVelocitySlowdownSim>10</rotorVelocitySlowdownSim>
</plugin>
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  <motorConstant>8.54858e-03</motorConstant>
  <momentConstant>0.01</momentConstant>
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  <motorNumber>1</motorNumber>
  <rotorDragCoefficient>0.000806428</rotorDragCoefficient>
  <rollingMomentCoefficient>1e-06</rollingMomentCoefficient>
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  <rotorVelocitySlowdownSim>10</rotorVelocitySlowdownSim>
</plugin>
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filename='libgazebo_usv_dynamics_plugin.so'>
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  <waterDensity>997.8</waterDensity>
  <xDotU>0.0</xDotU>
  <yDotV>0.0</yDotV>
  <nDotR>0.0</nDotR>
  <xU>51.3</xU>
  <xUU>72.4</xUU>
  <yV>40.0</yV>
  <yVV>0.0</yVV>
  <zW>500.0</zW>
  <kP>50.0</kP>
  <mQ>50.0</mQ>
  <nR>400.0</nR>
  <nRR>0.0</nRR>
  <hullRadius>0.213</hullRadius>
  <boatWidth>2.4</boatWidth>
  <boatLength>4.9</boatLength>
  <length_n>2</length_n>
  <wave_model>ocean_waves</wave_model>
</plugin>
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  <robotNamespace></robotNamespace>
  <imuSubTopic>/imu</imuSubTopic>
  <gpsSubTopic>/gps</gpsSubTopic>
  <magSubTopic>/mag</magSubTopic>
  <baroSubTopic>/baro</baroSubTopic>
  <mavlink_addr>INADDR_ANY</mavlink_addr>
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<mavlink_tcp_port>4560</mavlink_tcp_port>
<mavlink_udp_port>14560</mavlink_udp_port>
<serialEnabled>>false</serialEnabled>
<serialDevice>/dev/ttyACM0</serialDevice>
<baudRate>921600</baudRate>
<qgc_addr>INADDR_ANY</qgc_addr>
<qgc_udp_port>14550</qgc_udp_port>
<sdk_addr>INADDR_ANY</sdk_addr>
<sdk_udp_port>14540</sdk_udp_port>
<hil_mode>>false</hil_mode>
<hil_state_level>>false</hil_state_level>
<enable_lockstep>>true</enable_lockstep>
<use_tcp>>true</use_tcp>
<motorSpeedCommandPubTopic>/gazebo/command/motor_speed</
motorSpeedCommandPubTopic>
<control_channels>
  <channel name="left_rotor">
    <input_index>0</input_index>
    <input_offset>0</input_offset>
    <input_scaling>100</input_scaling>
    <zero_position_disarmed>0</zero_position_disarmed>
    <zero_position_armed>0</zero_position_armed>
    <joint_control_type>velocity</joint_control_type>
    <joint_name>left_engine_propeller_joint</joint_name>
  </channel>
  <channel name="right_rotor">
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    <input_offset>0</input_offset>
    <input_scaling>100</input_scaling>
    <zero_position_disarmed>0</zero_position_disarmed>
    <zero_position_armed>0</zero_position_armed>
    <joint_control_type>velocity</joint_control_type>
    <joint_name>right_engine_propeller_joint</joint_name>
  </channel>
</control_channels>
</plugin>
</model>
</sdf>
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