

Tello Driver V

Pedro Arias

Novedades TelloDriver

- Topics
- Mask
- Coordination Frame
- Control por velocidad
- Estudio latencia

PoseStamped

```
position.x = self.x
position.y = self.y
position.z = h
orientation.x = qx
orientation.y = qy
orientation.z = qz
orientation.w = qw
```

```
mask = msg.type_mask
mask = "{0:012b}".format(int(mask))
if not bool(int(mask[-1])):...
if not bool(int(mask[-2])):...
if not bool(int(mask[-3])):...
if not bool(int(mask[-4])):...
if not bool(int(mask[-5])):...
if not bool(int(mask[-6])):...
if not bool(int(mask[-7])):...
if not bool(int(mask[-8])):...
if not bool(int(mask[-9])):...
if not bool(int(mask[-10])):...
if not bool(int(mask[-11])):...
if not bool(int(mask[-12])):...
```

```
uint8 coordinate_frame
uint8 FRAME_LOCAL_NED = 1
uint8 FRAME_LOCAL_OFFSET_NED = 7 } ⇒ FRAME_LOCAL_FRD
uint8 FRAME_BODY_NED = 8
uint8 FRAME_BODY_OFFSET_NED = 9 } ⇒ FRAME_BODY_FRD
```

¿OFFSET?

Timer: cmd vel

```
if not bool(int(mask[-10])):
    if not bool(int(mask[-11])):
        if is_abs:
            target_yaw = degrees(msg.yaw)
            yaw = target_yaw - self.__yaw
            self.__yaw = target_yaw
        else:
            target_yaw = degrees(msg.yaw)
            yaw = target_yaw
            self.__yaw += target_yaw

    if yaw > 0:
        self.__send_cmd("cw {}".format(abs(yaw)), False) # degrees
    elif yaw < 0:
        self.__send_cmd("ccw {}".format(abs(yaw)), False) # degrees
    else:
        pass # already at target yaw
        # print("Already at target yaw")

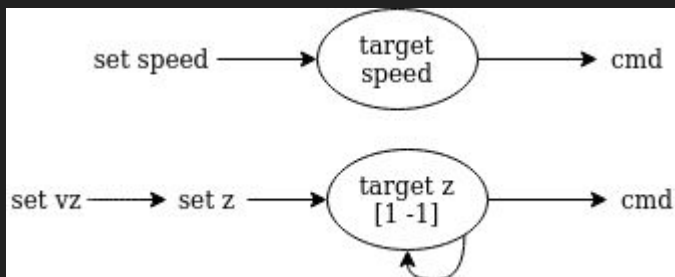
if not bool(int(mask[-12])):
    yaw_rate = degrees(msg.yaw_rate)
    self.__yaw_rate = yaw_rate
    self.__hold_vel()
```

```
def __send_fake_vel(self, event):
    vx = self.__vx
    vy = self.__vy
    vz = self.__vz
    yaw_rate = radians(self.__yaw_rate)

    mask = 3064 + 1 if vx == 0 else 0 + 2 if vy == 0 else 0 + 4 if vz == 0 else 0 + 1024 if yaw_rate == 0 else 0
    if mask == 4095:
        self.fake_vel_timer.shutdown()
        self.fake_vel_status = False
        return

    setpoint = PositionTarget()
    setpoint.coordinate_frame = 12
    setpoint.type_mask = mask
    setpoint.position.x = vx
    setpoint.position.y = vy
    setpoint.position.z = vz
    setpoint.yaw = yaw_rate
    self.fake_vel_pub.publish(setpoint)

def __hold_vel(self):
    if not self.fake_vel_status:
        self.fake_vel_timer = rospy.Timer(rospy.Duration(secs=1), self.__send_fake_vel)
        self.fake_vel_status = True
```



Latencia

```
msg = PositionTarget()
msg.coordinate_frame = 8
msg.type_mask = 3064 # xyz yaw

msg.position.x = 0
msg.position.y = 0
msg.position.z = 0
msg.yaw = 2

for i in range(1000):
    setpoint_raw_publisher.publish(msg)
    time.sleep(0.01)
time.sleep(1)

for i in range(100):
    setpoint_raw_publisher.publish(msg)
    time.sleep(0.1)
time.sleep(1)

for i in range(10):
    setpoint_raw_publisher.publish(msg)
    time.sleep(1)
time.sleep(1)
```

Filtro color + control en guiñada

The screenshot displays a ROS2 GUI titled "drone_teleop_vel_cam.perspective - rqt" running within a Visual Studio Code environment. The GUI is divided into several sections:

- Velocity Control:** Features two side-by-side camera views of a drone. Below them, numerical data is shown:
 - Angular Velocity in Z: -0.00
 - Linear Velocity in Z: -0.00
 - Linear Velocity in X: -0.00
 - Linear Velocity in Y: -0.00A table displays the current state:

Position (m):	0.0	0.0	0.7
Velocity (m/s):	0.0	0.0	0.0
Angular velocity (rad/s): Yaw:	nan		
- Controls:** Includes buttons for "Land", "Stop Drone", "Sensors", and a prominent red "Stop Code" button. The JdeRobot logo is also present.
- Status Message:** A text box displaying "Taking off" and "Executing student code".
- Cameras:** A section titled "Cameras" containing four sub-images:
 - Camera Frontal: A live video feed of a person sitting at a desk.
 - Camera Ventral: A live video feed of the same scene from a different angle.
 - Filtered image: A processed version of the camera feed.
 - Thresholded image: A binary (black and white) thresholded version of the camera feed.
- Terminal:** At the bottom, a terminal window shows the execution of ROS2 commands:

```
tello_driver_sdk_node.py ~/repos/2021-tfm-pedro-arias/h  
test_tello_driver.py ~/repos/2021-tfm-pedro-arias/tello_driver/test  
test_wrapper.py ~/repos/2021-tfm-pedro-arias/tello_driver/test
```

The bottom status bar of the application indicates the time is 82:28, the file encoding is UTF-8, and the current tab is "Tab*". It also shows the Git status as "main" and the Python version as "Python 3.6".

DroneWrapper

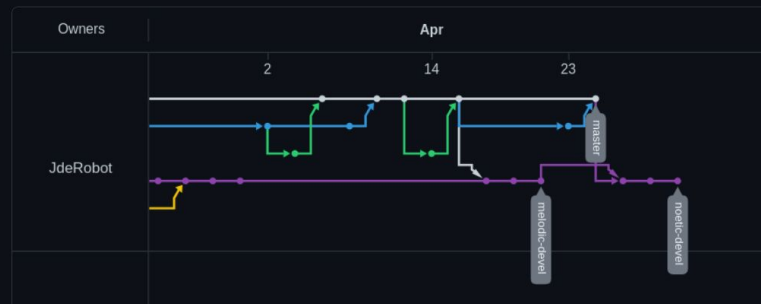
- Eliminada dependencia de gazebo_ros [1]
- Versión Noetic



cv_bridge	converts between ROS Image messages and OpenCV images.
geometry_msgs	msgs for geometric primitives such as points, vectors and poses.
mavros_msgs	messages for MAVROS.
rospy	Python client library for ROS.
sensor_msgs	msgs for commonly used sensors: cameras.
tf	keep track of multiple coordinate frames over time.
mavros	MAVLink extendable communication node for ROS with proxy for GCS.

Network graph

Timeline of the most recent commits to this repository and its network ordered by most recently pushed to.



Trabajo de Investigación Tutelado

- Introducción
 - Robótica Aérea
 - Motivación
 - Problema
- Estado del Arte
 - Herramientas
 - Plataformas aéreas
- Github [\[1\]](#)
- Drive

Pedro Antas Pérez - NIA 100421902

uc3m | Universidad
Carlos III
de Madrid

Introducción

Este trabajo propone un estudio previo y diseño de un sistema para la programación y navegación de drones. Se persigue una estructura modular donde los diferentes bloques que constituyen el sistema puedan sustituirse para adaptarlos al problema, y que a su vez, permita la reutilización del código en diversas circunstancias.

Este primer capítulo recoge una introducción a la materia de estudio, la robótica aérea. Además, se responde la motivación cuyo resultado ha derivado en este estudio, junto al problema concreto al cual se le quiere dar solución.

Robótica Aérea

Este trabajo se enmarca dentro de la robótica móvil, y más en concreto, dentro de la robótica aérea. La robótica aérea es la rama de la robótica que se encarga del estudio del comportamiento autónomo de aeronaves no tripuladas. Se entiende como una aeronave no tripulada (UAV, *Unmanned Aerial Vehicle*, o más recientemente UAS, *Unmanned Aircraft System*) a aquella que es capaz de realizar una misión sin necesidad de tener una tripulación embarcada [1]. Otro término que también se utiliza con frecuencia es VANT, *Vehículo Aéreo No Tripulado*.

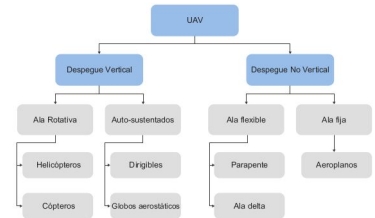


Figura 1. Clasificación de los UAV [1].

A la hora de establecer una clasificación de los UAV es posible atender a diferentes criterios. Siguiendo la clasificación propuesta por *Berrios et al. [1]* se distinguen aeronaves en función del tipo de despegue, que puede ser vertical o no. A su vez, podemos subdividir las aeronaves en función del origen de su sustentación o del tipo de ala que poseen. Esta clasificación se representa en la Figura 1, mientras que en la Figura 2 se