DRONE TEAM

Making and Designing a Toy Drone through Multidisciplinary Collaborative Work
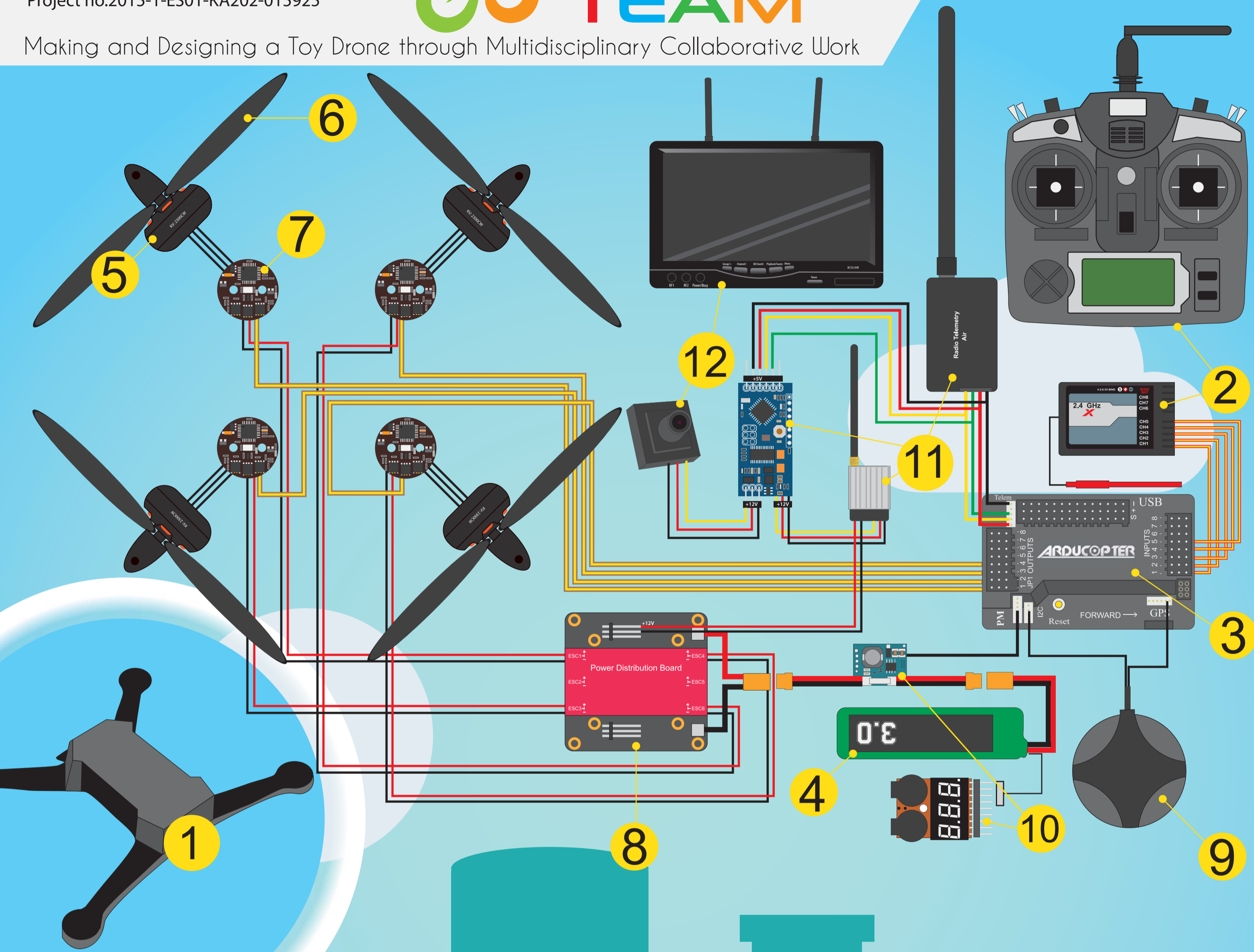
1 **Frame** is the base on which the other components are assembled. The most common are 4 motors (quadcopter). For heavy drones is advisable 6 (hexacopter) or 8 motors (Octacopter).

2 **Radio Transmitter** is used to control the motors of the drone. We need to bind the transmitter with the receiver of drone. In advanced drone we can use other system to control.

3 **Flight Controller (FC)** Is the brain of drone. It receives sensor inputs provides orders to stabilise the drone. Advanced controls permit autopilot: take-off, waypoints and landing.

4 **Battery** capacity is related to the flying time. Voltage should be according to the other components. Discharge rate (C rating) should be optimal, usually LIPO (lithium polymer).

5 **Motor**, brushless type which is more efficient. Motors and propellers should theoretically push 2.5 times the weight of drone to fly. Key parameter to know is KV (Kilo volt).

6 **Propellers**. Pitch parameter: distance in one turn. Bigger pith implies increase motor KV. The "R" propellers are fitted with the CW (Clock Wise) rotation and the "L" with CCW.

7 **Electronic Speed Controller (ESC)** defines the speed of rotation of a brushless motor by the generation of pulses. It receives the power through the PDB and the orders from Flight Controller.

8 **Power Distribution Board (PDB)** distribute the power from battery to all ESC. It has positive pads for red wires and negative pads for black wires. It can include two voltage circuits (5V & 12V).

9 **GPS** provides latitude, longitude. Combined with a **Magnetometer** (direction), **Barometer** (elevation) **Accelerometer** (inertia), **Gyroscope** (position). It is needed for waypoint flying mode.

10 **Power module** permit measure current consumption and provides a stable voltage. It allows triggering a warning when battery is near of its capacity or there is a power problem.

11 **Telemetry**, is used to collect data from mounted sensors. The data flow is bidirectional: it can send data about the flight to a Ground Station and send commands to the FC.

12 **First Person View (FPV)**, allows viewing on a screen (e.g. smartphone) the view of the camera mounted. The camera may be mounted on a gimbal system to move and stabilise it.