Navigation: That is, the drone obtains its current (under a certain reference frame) position, speed, and other information. If necessary, it also needs to obtain the current (relative to a certain reference frame) attitude, attitude, angular velocity, and other information. For example, pure inertial navigation can be used to obtain the position, velocity, and acceleration of the drone in an inertial system, as well as the attitude angle and angular velocity relative to the inertial system; the GPS navigation system can provide the drone in the WGS84 coordinate system. Information such as speed, position, and heading angle; and with indoor positioning systems such as Vicon, UWB, you can get information about the speed and position of the drone relative to an indoor coordinate system. Therefore, a brief summary of the main task of navigation is to "know where you are and know your posture."

Guidance: That is, the drone finds (or externally inputs) the target's position, speed, and other information, and obtains the position or speed instructions required to reach the target based on its own position, speed, and constraints on internal performance and the external environment. For example, when flying according to a planned waypoint, calculate the instructions for the drone to go straight or reach a waypoint along a route; when using optical guidance based on computer vision target tracking, based on the target's position in the field of view (and the camera may Off-axis angle (existing off-axis angle) to calculate the overload or attitude angular velocity command required to track the target; and when there are obstacles or no-fly zones in the pre-installed (or SLAM) map, calculation based on the drone's flight performance is feasible Circumvention route or speed command. Therefore, a brief summary of the main task of guidance is to "know where the goal is and how to reach it."

Control: That is, according to the current speed and attitude information, the drone changes the attitude and speed parameters through the action of the actuator, so as to achieve stable flight or tracking guidance instructions. For example, when a fixed-wing drone needs to climb at an altitude, calculate the required pitch and pitch speed commands, and the throttle command required to keep airspeed from decreasing significantly; when flying along the route, but there is a crosswind, Calculate the required yaw angle command to use side slip to offset crosswind effects; or when a rotor of a multi-rotor drone fails, calculate how to assign instructions to the remaining rotors to achieve as stable a flight as possible. Therefore, the main task of briefly summarizing control is to "change the flying attitude and follow the guidance instructions".

