Abstract

This project (Project Code: 2001-HT-SHDX) belongs to the spaceflight technic fund projects, is also jointly supported by the national project of "863" program, the grand project of Shanghai Science and Technology Committee, and the discipline aids of Shanghai University.

In this paper, a new type of helicopter, Four-Rotor Flying Robot (FR2), has been designed and introduced. The Flying Robot has four Rotors, the flying motion in line with the rolling speed of these rotors. On the base of the helicopter technology, the paper has do some research of this Four-Rotor Flying Robot, and a sample has been designed and realized. The design includes three parts: the body design, the control method design and the control system design, the control system design has been emphasized in this paper.

Four-Rotor Flying Robot (FR2) is useful for scout, communication relay, outer space exploration, and so on. Some developed country, such as America and Japan, have do some research on the FR2. There aren't any relative research reports of FR2 in china up to the present.

The whole system of this FR2 is controlled by SCM. The software of this control system is programmed by C language, the hardware include many modules such as power module, sensor module, motor driver module, remoter and receiver module, and MCU.

This FR2 can finish the fundamental flying mission. The steady system, which composed of a two-Axis tilt sensor and three one-Axis angular velocity sensors, can read the current motion and modify the control values to keep the Flying Robot steady. In the end, the design has finished flying test.

Keywords: Four-Rotor Flying Robot, FR2, flight control system, steady system, rotor