Specialized Drone for Tropospheric Ozone Research With Precise Positioning and Wireless Data Transmission

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Photochemical smog is a global problem. The concentration of tropospheric ozone continues to increase worldwide. Ozone is air pollutant threatening the health, harmful to all types of cells and greenhouse gas contributing to climate change. Tropospheric ozone concentrations are difficult to predict, they depend on the content of ozone precursors in the air. Measuring stations with a stationary location are not always located in places where the most ozone accumulates. Therefore, the main purpose of this work was to develop a drone capable quick and efficient monitoring of ozone concentration, especially in hard-to-reach places. Specialized drone for tropospheric ozone research with precise positioning and wireless data transmission was built as planned. The drone has an RTH system for automatic return to the place of take-off at a set altitude. It is possible to fly autonomously along a pre-programmed route. A telemetry system has been used, which enables data reception during the flight and its presentation on the display screen. The ozone sensor allows you to work in the measuring range of 10-1000 ppb. The data collection and transmission were successful and the prototype's locomotion system worked as expected. With the obtained results, it was concluded that the developed drone is a useful and functional mobile tool for monitoring ozone levels that fulfils information, control and warning tasks. It can be used for research on tropospheric ozone, contributing to a better understanding of the mechanisms of ozone formation in a specific area and under certain conditions.

Awards Won:
Third Award of $1,000
American Meteorological Society: Honorable Mention of $125