Review of: "Modelling of Quadcopter for Precision Agriculture and Surveillance Purposes"

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Potential competing interests: No potential competing interests to declare.

This work is about the modelling of a quadcopter intended for agricultural tasks. In the first part, an overview of the uses of flying drones in agriculture is done. It is fine but not very significant because many references are now old, and there is no critical discussion of the state of the art to highlight what has been done and what the current limitations are. The second part is about the dynamic modelling of a quadcopter and an extremely brief design of it. This part does not introduce a significant contribution or any originality to the topic. This work needs to be revised to extensively improve the authors' contribution.

COMMENTS:

1. Introduction could be shorter. More importantly, it should focus on highlighting the current state of the art and its limitations. Authors' contributions should address at least one of these limitations or propose something new and original.
2. There are contradicting statements about the applicability of drones in African agriculture. First, it is said to be ineffective for the small-scale African fields; later, it is said that the Japanese case demonstrates the effectiveness of using drones for small fields.
3. Some acronyms are not defined. VRT (in fig.1), UAS, …
4. “This research work focuses on the development of a quadcopter with an integrated fertilizer application unit and an integrated camera system for precision agricultural operations.” There is nothing on that in this work.
5. Sections 2.1 and 2.2 provide almost no details about the actual design, nor what guided the design itself, and why that particular drone frame was designed as it is.
6. I highly suggest revising the whole modelling parts. It is poorly written, there are several typos (both in text and in the symbols), and there are superfluous parts. Many so-called equations are instead just definitions, many times you use “altitude” instead of “attitude,” the symbols you are using to define some quantities change (ex: ξ and Σ) or the same symbols are used for different quantities (ex: q as generalized coordinates and as roll rate), or there is improper symbol formatting, or they are never defined (ex: w_i as the i-th propeller angular velocity). Sections 2.2.1.a (DOF) is superfluous and completely unclear; a rigid body moving in space has 6 DOF, that's it. Sections 2.2.2 (Euler angles definition) is superfluous and uses very odd notation; just state what angle combination you are using. Also, what is the point of showing that the rotation matrix becomes an identity matrix when there is no rotation? Some steps in section 2.2.4 are not clear at all (ex: in eq14, how is it possible that an orientation vector is equal to a rotation matrix times

angular velocities?).

7. The simulation and its results should be extensively revised too. It is not clear at all what you are simulating and what simplifications you are assuming, and thus the results have little to no meaning. Also, it seems that you have (or you will have) a prototype; how does it behave compared to the simulations? (Changed "compare to" to "compared to")
8. You state that you encountered a challenge in getting a stable drone due to manufacturing/assembly imprecision. Considering that you plan to fix a tank filled with (moving) liquid to the drone, this does not seem very promising. How is the actual attitude control implemented? Which sensors are you using? Or are your controls based only on the dynamic model you made?
9. Not clear what you mean by “calibration.”