

Peer Review

Review of: "The Ingenuity Mars Helicopter Specified and Analyzed with the Real-time Mode-aware Dataflow Model"

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As someone with a rotorcraft background but not a computer science background, my review focuses on the aeromechanical and practical implications of the computational modeling.

Strengths of the Paper:

1. The application of RMDF provides a structured and reproducible framework for analyzing Ingenuity's operations, which may be beneficial for future autonomous rotorcraft designs.
2. The study effectively verifies feasibility by ensuring that all tasks meet their real-time execution constraints.

Areas for Improvement:

- The paper does not explicitly compare the RMDF-derived results with actual telemetry data from Ingenuity. It is suggested to incorporate real flight logs to verify the correctness of RMDF predictions and strengthen confidence in the model. If flight logs can't be found, it is recommended to find simulation data of Ingenuity.
- The paper acknowledges that frame classification in the vision system has been simplified, which may lead to discrepancies between the RMDF simulation and the actual system.
- The paper assumes fixed execution times for RMDF components, but real-world performance can be affected by Martian atmospheric turbulence, sensor noise, or computational delays. It is

recommended to introduce uncertainty modeling to account for variability in execution times and sensor inputs, improving robustness.

Declarations

Potential competing interests: No potential competing interests to declare.