

Soft Landing of a Hybrid Rocket Thruster Powered Platform: Hardware-in-the-Loop Simulation

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Objective To study the feasibility of using a hybrid rocket motor for vertical soft landing application

◆ Compressed air was used as the oxidiser for a wax-aluminium-based fuel in the hybrid rocket motor

Highlights ◆ A 3-segmented velocity profile was developed to implement a velocity tracking descent algorithm

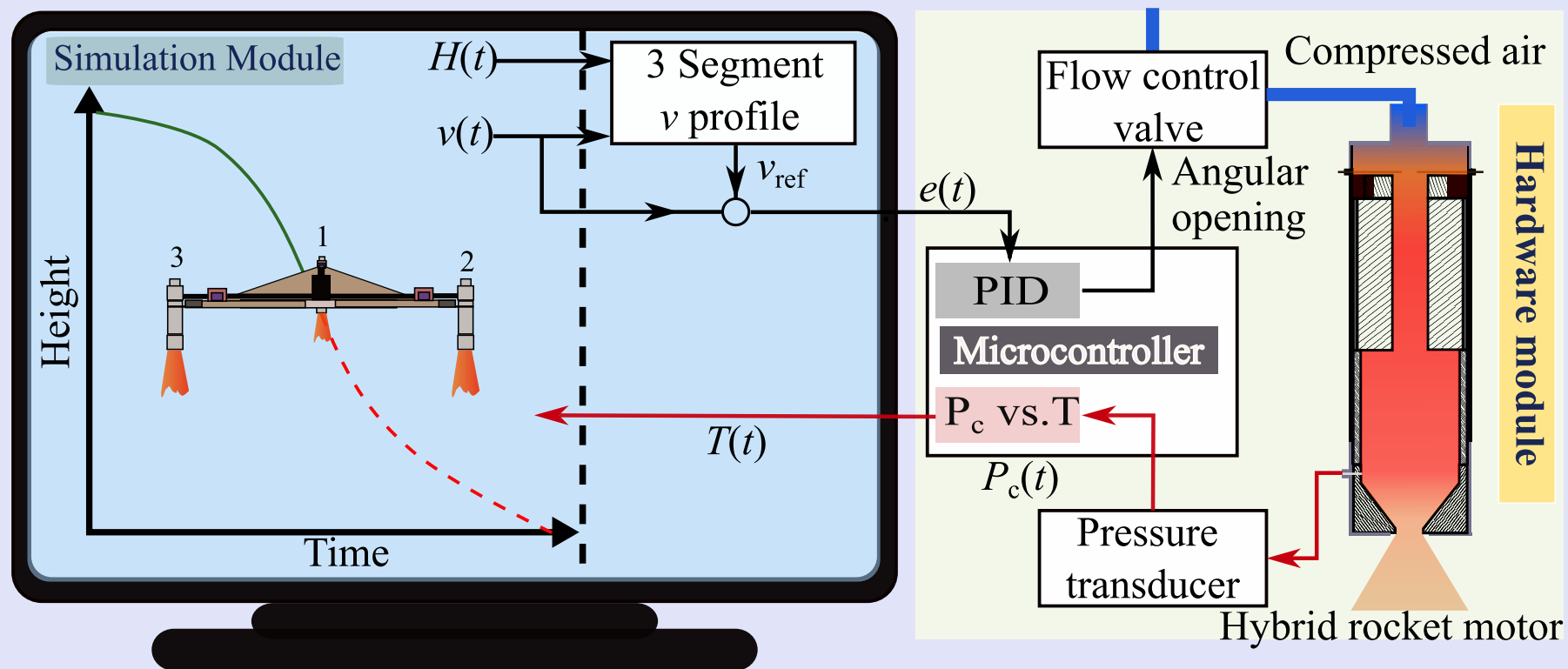
◆ A closed-loop PID controller was implemented to demonstrate a soft landing

Assumptions

- ◆ No drag
- ◆ Pitch = 0
- ◆ Roll = 0

Simplification

- ◆ All thruster have same thrust = $T(t)$



Results : A soft landing with a touchdown speed of less than 1 m/s was demonstrated in spite of the realistic burning uncertainties of the hybrid rocket motor in the hardware module,