Rocket plane trajectory simulation in emergency flight conditions

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Abstract. This paper shows the results of flight simulations of a rocket plane designed for suborbital tourist flights. The vehicle uses two types of control surfaces: elevons and all-moving tail. (AMT). The study considers different scenarios in terms of possible control surface failure. Each case is simulated by a model created in MATLAB Simulink environment. The PID controller is implemented to provide control inputs and mitigate the issue when failure occurs. Results showed that in the case of failure without operating stability augmentation system, the g-loads can be bigger than FAA recommendation for commercial suborbital tourist flights.