

Erwin Mooij received his MSc and PhD degree in Aerospace Engineering in 1991 and 1998, respectively, from Delft University of Technology, The Netherlands. From 1995 until mid 2007, he worked for Airbus Defence and Space, The Netherlands, on re-entry systems and (real-time) simulator development. Currently, he is an Associate Professor in the Faculty of Aerospace Engineering, Delft University of Technology. His research interests include launch and re-entry systems, trajectory optimisation, space-situational awareness, and guidance and control system design. He is an Associate Fellow of AIAA, and a member of the AIAA GNC Technical Committee.

Examples of control problems occurring during flight tests of fighter aircraft are well documented. In many cases, the cause of the problem could be characterised as inadequate modelling or other inappropriate treatment of the aeroelastic effects on the vehicle dynamics and/or the flight-control design. Also long and slender bodies, such as (small) conventional launch systems, may suffer from an unwanted coupling between the rigid body and its flexible modes. In addition, due to propellant consumption during the flight, the change in atmospheric environment, and aerodynamic effects, the entire flight profile should be examined to identify the stability and controllability performance of the launch vehicle. Sloshing, i.e., the motion of liquids in the propellant tanks, amplifies the perturbing dynamics. This colloquium addresses several modelling aspects of such conventional launchers and their relation with stability and control.