

Abstract Submitted
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Recovery methods of the dragonfly from irregular initial conditions. JAMES MELFI, Cornell University, ANTHONY LEONARDO, HHMI Janelia Farms, JANE WANG, Cornell University — We release dragonflies from a magnetic tether in a wide range of initial orientations, which results in them utilizing multiple methods to regain their typical flight orientation. Special focus is placed on dropping them while upside down, as the recovery method used is a purely rolling motion. Filming this stereotypical motion with a trio of high speed cameras at 4000 fps, we capture detailed body and wing kinematics data to determine how the dragonfly generates this motion. By replaying the flights within a computer simulation, we can isolate the significant changes to wing kinematics, and find that it is an asymmetry in the wing pitch which generates the roll. Further investigation demonstrates that this choice is highly dependent upon the state of the dragonfly, and as such our results indicate the dragonfly both tracks its current state, and changes its mid-flight control mechanisms accordingly.

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