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An Operation-time Simulation Framework for UAV Swarm Configuration and Mission Planning Y. Wei, M.B. Blake, G.R. Madey	1949
An Offline/Online DDDAS Capability for Self-aware Aerospace Vehicles D. Allaire, J. Chambers, R. Cowlagi, D. Kordonowy, M. Lecerf, L. Mainini, F. Ulker, K. Willcox	1959
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Adjoint-based Control of Fluid-structure Interaction for Computational Steering Applications Y. Bazilevs, M.-C. Hsu, M.T. Bement	1989
Dynamic Data Driven Applications System Concept for Information Fusion E. Blasch, G. Seetharaman, K. Reinhardt	1999

An Energy-aware Airborne Dynamic Data-driven Application System for Persistent Sampling and Surveillance E.W. Frew, B. Argrow, A. Houston, C. Weiss, J. Elston	2008
A Testbed for Investigating the UAV Swarm Command and Control Problem Using DDDAS R. Purta, M. Dobski, A. Jaworski, G. Madey	2018
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