Aerodynamic performance of supersonic parachutes behind slender bodies

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Abstract:

NASA's ASPIRE (Advanced Supersonic Parachute Inflation Research Experiments) project was launched to investigate the supersonic deployment, inflation and aerodynamics of full-scale disk-gap-band (DGB) parachutes. Three flight tests (October 2017, March 2018 and July 2018) deployed and examined parachutes meant for the upcoming "Mars 2020" mission. Mars-relevant conditions were achieved by performing the tests at high altitudes over Earth on a sounding rocket platform, with the parachute deploying behind a slender body (roughly 1/6-th the diameter of the capsule that will use this parachute for descent at Mars). All three tests were successful and delivered valuable data and imagery on parachute deployment and performance. CFD simulations were used in designing the flight test, interpreting the flight data, and extrapolating the results obtained during the flight test to predict parachute behavior at Mars behind a blunt capsule. This presentation will provide a brief overview of the test program and flight test data, with emphasis on differences in parachute performance due to the leading body geometry.