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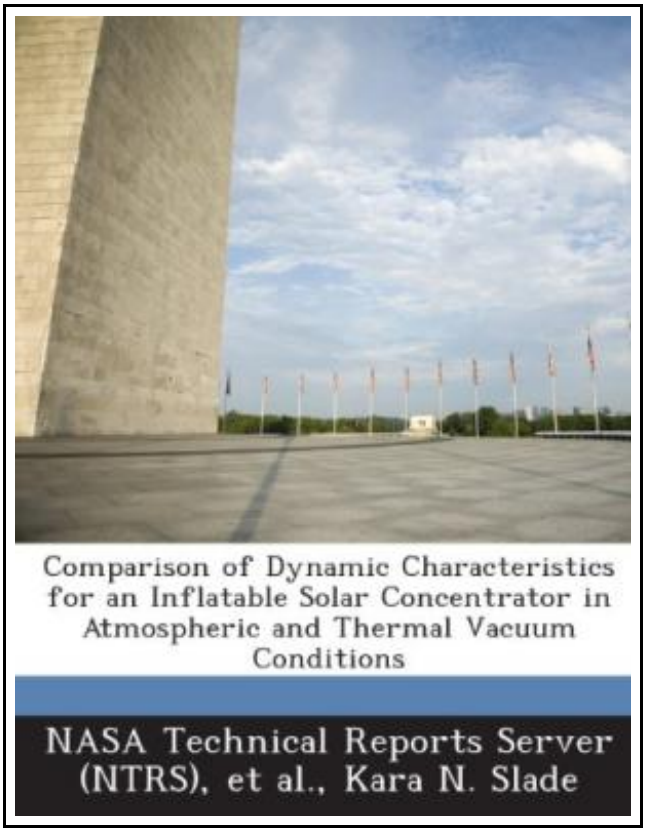

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COMPARISON OF DYNAMIC CHARACTERISTICS FOR AN INFLATABLE SOLAR CONCENTRATOR IN ATMOSPHERIC AND THERMAL VACUUM CONDITIONS

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BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 30 pages. Dimensions: 9.7in. x 7.4in. x 0.1in.Dynamic testing of an inflatable solar concentrator structure in a thermal vacuum chamber as well as in ambient laboratory conditions is described in detail. Unique aspects of modal testing for the extremely lightweight inflatable are identified, including the use of a noncontacting laser vibrometer measurement system. For the thermal vacuum environment, mode shapes and frequency response functions are compared for three different test article inflation pressures at room temperature. Modes that persist through all the inflation pressure regimes are identified, as well as modes that are unique for each pressure. In atmospheric pressure and room temperature conditions, dynamic measurements were obtained for the expected operational inflation pressure of 0. 5 psig. Experimental mode shapes and frequency response functions for ambient conditions are described and compared to the 0. 5 psig results from the thermal vacuum tests. Only a few mode shapes were identified that occurred in both vacuum and atmospheric environments. This somewhat surprising result is discussed in detail, and attributed at least partly to 1.) large differences in modal damping, and 2.) significant differences in the mass of air contained by the structure, in the two environments. Results of this investigation point out the necessity of testing inflatable space structures in vacuum conditions before they can be launched. Ground testing in atmospheric pressure is not sufficient for predicting on-orbit dynamics of non-rigidized inflatable systems. This item ships from La Vergne,TN. Paperback.

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