FINAL REPORT

Basic Research in Orbital Debris Detection and Estimation

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Publications reporting on research supported by this grant, or otherwise supported in whole or in part by this grant and authored or co-authored by Robert D. Culp, include:

"An Optical Analysis of the 6470 Hypervelocity Debris Fragments," co-author: Ian Gravseth; Astrodynamics 1995, Vol.90, Part 1, Advances in the Astronautical Sciences; Univelt, Inc., 1996, pp. 771-779

"The Investigation of Space Debris Generation and Associated Long-term Effects in the Geosynchronous Region," co-author: R.P. McNamara; Astrodynamics 1995, Vol.90, Part 1, Advances in the Astronautical Sciences; Univelt, Inc., 1996, pp. 791-807.

"Determination of the Sizes and Masses of Debris Objects," co-author: Ian Gravseth; Spaceflight Mechanics 1996; Advances in the Astronautical Sciences, Vol. 93, Part 1; Univelt, Inc., 1996, pp. 221-229.

"Initiatives in Guidance, Navigation, and Control Education at the University of Colorado," Guidance and Control 1996 Vol. 92, Advances in the Astronautical Sciences, 1996, pp. 299-310

"Mass-Diameter and Characteristic-Length Ratio Functions for Orbital Debris," co-authors: Ian J. Gravseth; Journal of Spacecraft and Rockets, Vol. 33, No.3 May-June, 1996, pp. 262-266.

"Space-Debris Identification Using Optical Calibration of Common Spacecraft Materials," co-author: Ian J. Gravseth; Journal of Spacecraft and Rockets, Vol. 33, No. 2, March-April, 1996, pp. 262-266.

"Determination of Debris Sizes and Masses Using Radar and Optical Data," co-author: Ian Gravseth; Proceedings, SPIE International Symposium on Optical Science, Engineering, and Instrumentation, Vol. 2813, Characteristics and Consequences of Orbital Debris and Natural Space Impactors, 1996, 15pp.

"Estimating the Area of Artificial Space Debris," R.A. Madler, K. Jorgensen, D.B. Spencer and R.D. Culp, *Proceedings of the Second Conference of Space Debris*, European Space Agency Publications Division, **SP-393**, 1997, pp. 297-302.

"Implications of Collisions in Supersynchronous Orbits," K.Kim Luu and Robert D. Culp, *Proceedings of the Second Conference on Space Debris*, European Space Agency Publications Division, **SP-393,** 1997, pp.637-642.