Approved by the Regents May 15, 2014

PROMOTION RECOMMENDATION
University of Michigan
College of Engineering
Department of Aerospace Engineering
Department of Atmospheric, Oceanic and Space Sciences

James W. Cutler, assistant professor of aerospace engineering, Department of Aerospace Engineering, and assistant professor of atmospheric, oceanic and space sciences, Department of Atmospheric, Oceanic and Space Sciences, College of Engineering, is recommended for promotion to associate professor of aerospace engineering, with tenure, Department of Aerospace Engineering, and associate professor of atmospheric, oceanic and space sciences, without tenure, Department of Atmospheric, Oceanic and Space Sciences, College of Engineering.

Academic Degrees:

Ph.D.	2005	Stanford University, Electrical Engineering, Palo Alto, CA
M.A.	1998	Stanford University, Electrical Engineering, Palo Alto, CA
M.S.	1996	Purdue University, Electrical Engineering, West Lafayette, IN

Professional Record:

2010-present	Assistant Professor, Department of Atmospheric, Oceanic and Space Sciences, University of Michigan
2008-present	Assistant Professor, Department of Aerospace Engineering, University of Michigan
2008-present	Founder and Consultant, Skybox Imaging Corporation, Mountain View, CA
2007-present	Founder and Director of Research, Astronautical Development, LLC, Ann Arbor, MI
2005-2008	Consulting Professor, Stanford University, Stanford, CA
2002-2008	Research Scientist, Quakefinder, LLC, Palo Alto, CA
2001-2002	Research Engineer, Lockheed Martin Corporation, Sunnyvale, CA

Summary of Evaluation:
Teaching: Professor Cutler has taught two different undergraduate courses (five times and two times, respectively) and one graduate level course (two times). One of these two courses has been a senior design course with a large student enrollment that he has significantly improved and upgraded. His Q1/Q2 teaching scores have consistently improved and are very solid. He has graduated two Ph.D. students and has been advising two more. One of his Ph.D. students comments that Professor Cutler has "been a great research advisor." He has established and has been leading the Michigan Space Exploration laboratory (MXL), which engages many undergraduate and graduate students every year. MXL is exceptionally well-managed and represents a unique and significant asset to the university. The external faculty evaluators offer uniformly high appraisal of his educational role.

Research: Professor Cutler has established a reputation as one of the leading innovators in small spacecraft technology. His work in signal transmission, communications networks, and design optimization is widely seen as crucial to demonstrating the value of small spacecraft for scientific research. This technology is expected to play an important and long-term role in the future of aerospace engineering, in particular, for basic science, communications, and defense. His scholarly publication record is strong in terms of quantity, impact, and venue. He has published 18 archival papers and more than 40 conference papers. All of the archival papers appear in the highest quality venue appropriate to the subject matter. These papers are the result of nanospacecraft design, construction, launching, and operation. The papers include engineering aspects of operation, such as novel on-orbit calibration techniques, as well as scientific implications of the data obtained during flight. Professor Cutler has

established a laboratory that enables this research. To do this he has secured funding from the Jet Propulsion Laboratory (JPL), the National Science Foundation (NSF), and the Air Force Office of Scientific Research (AFOSR), placing him in the prestigious position of having built and operated the first satellite funded by NSF. This highly visible and competitive project has established his reputation as one of the leaders in the field of nanospacecraft, even among more senior academic researchers.

Recent and Significant Publications:

J. W. Cutler and H. Bahcivan, "The Radio Aurora Explorer – A Mission Overview," *Journal of Spacecraft and Rockets*, Published online June 25, 2013, 10.2514/1.A32436.

S.C. Spangelo and J.W. Cutler, "Analytical Modeling Framework and Applications for Space Communication Networks," *Journal of Aerospace Computing, Information, and Communication*, Accepted 2012.

S. C. Spangelo, M. W. Bennett, D. C. Meinzer, A. T. Klesh, J. A. Arlas and J. W. Cutler, "Design and Implementation of the GPS Subsystem for the Radio Aurora Explorer," *Acta Astronautica*, 87, pp. 127-138, 2013, ISSN 0094-5765, 10.1016/j.actaastro.2012.12.009.

J.C. Springmann, A.J. Sloboda, A.T. Klesh, M.W. Bennett and J.W. Cutler, "The attitude determination system of the RAX satellite," *Acta Astronautica*, 75, pp. 120-135, 2012.

J.C. Springmann and J.W. Cutler, "Attitude-Independent Magnetometer Calibration with Time-Varying Bias," *Journal of Guidance, Control, and Dynamics*, 35 (4), 2012, pp. 1080-1088, 10.2514/1.56726.

H. Bahcivan and J.W. Cutler, "Radio Aurora Explorer: Mission Science and Radar System," *Radio Science*, 47 (2), RS2012, 10.1029/2011RS004817.

S. Spangelo, J.W. Cutler, A. Klesh and D. Boone, "Models and Tools to Evaluate Space Communication Network Capacity", *IEEE Transactions on Aerospace and Electronic Systems*, 48 (3), pp. 2387 – 2404, 2012, 10.1109/TAES.2012.6237598.

Service: Within the Department of Aerospace Engineering, Professor Cutler has taken an active role in the hiring of staff and he has advised a large number of undergraduate extracurricular projects involving students from underrepresented groups. Across the college, he has established and has been leading MXL, which engages many undergraduate and graduate students every year. In addition, he is the director of the Peach Mountain Radio Astronomy Site. Through his initiative, this 26-m dish facility was rescued from demolition, transferred to the college, and is now undergoing significant upgrading to support current and future space missions. The extremely visible nature of this facility generates excitement for space-related research and serves to attract interest in his program, especially from students entering the field. At the national level, he has served as a reviewer for journals and conferences, contributed to studies on space issues, participated in panel discussions at major conferences, and advised the U.S. State Department.

External Reviewers:

Reviewer A: "Professor Cutler's work on small satellite flight programs is quite impressive. This is an important but challenging 'space' to work in because the reality of developing flight projects makes it difficult to incorporate traditional scholarly approaches that can be counted on to lead to a series of archival publications and support from conventional funding agencies…Professor Cutler is widely recognized in the small satellite community as a leader and key contributor. The alignment between Professor Cutler's work and this entrepreneurial company could have a tremendous impact on growing commercial space opportunities."

Reviewer B: "Rather, the flight missions he and his students conceive, design and operate have provided fundamental advancement in the science of space weather and space technology attitude determination and control…I cannot think of a more prolific university-based small spacecraft program in the world…Each of Professor Cutler's papers is innovative and mathematically rigorous. The writing is excellent and the presentation is clear and lucid…Students exiting his program earn more than a degree;

they also gain foundational experience across the full project lifecycle that is likely to serve them well over their careers. Professor Cutler has clearly made substantial creative contributions his chosen areas of research. His program is well known throughout the aerospace industry and is viewed as a model across academia."

Reviewer C: "The mission received critical acclaim in the small satellite community for demonstrating that CubeSats could perform meaningful space science experiments. I also note that Dr. Cutler, with his students and colleagues, has more than 30 conference papers presented in this same time period. I consider the successful conclusion of the RAX mission and the establishment of Dr. Cutler's satellite lab at Michigan to be the most significant research accomplishments so far in his career…I place Dr. Cutler's program…as one of the top 5 such university programs in the country and world."

Reviewer D: "Professor Cutler is one of only a handful of academic researchers on space systems who are engaged in a transformation of space exploration through the development of nanosatellites that are uniquely tailored to the specific requirements of specific experiments or set of measurements. I hold his work in the highest esteem and my study of his promotion package has confirmed what I had already expected to be a clear-cut case for promotion…Professor Cutler's outstanding research is contributing to a transformation in the way JPL missions are being conceived. Through his personal efforts and those of former students that are working at JPL, Professor Cutler is among the leaders of this field."

Reviewer E: "Jamie's work is of the highest quality, he has been very productive, and his scholarly work has had a very high impact in the enabling of small satellites, including the ultra-small cubesats. His highest impact accomplishments have been his RAX mission, his creative and clever accomplishments in small-satellite technologies (communications, sensors,…), his passion for educating students, and his involvement in commercial space…For an Assistant Professor and from his resume, he appears to have performed an amazing amount of meaningful service to the profession, the small-satellite community, and to his institution. He appears to be very much a valuable and valued team player…I think Jamie is a gem – he is a dedicated scholar and educator. I would do everything possible to support him and keep him."

Summary of Recommendation: At an early stage in his career, Professor Cutler has established himself as a leader in nanosatellite technology. He established a laboratory, won major competitions to secure substantial funding, and designed, built, and operated multiple satellites, students with a unique and unprecedented educational activity. This work was reported in high-quality archival publications, which presented innovative engineering techniques and valuable scientific data. It is with the support of the College of Engineering Executive Committee that I recommend James W. Cutler for promotion to associate professor of aerospace engineering, with tenure, Department of Aerospace Engineering, and associate professor of atmospheric, oceanic and space sciences, without tenure, Department of Atmospheric, Oceanic and Space Sciences, College of Engineering.

David C. Munson Jr.

David C. Munson, Jr.
Robert J. Vlasic Dean of Engineering
College of Engineering

May 2014