

Stephen Horan

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New Mexico State University
Klipsch School of Electrical and Computer Engineering
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EDUCATION

Ph. D. Electrical Engineering, New Mexico State University, 1984

Dissertation: "High-Speed TTL Time to Digital Conversion"

Related Area: Astronomy

M.S.E.E., New Mexico State University, 1981

M.S. Astronomy, New Mexico State University, 1979

Thesis: "A Survey of the Hyades for Delta Scuti Variables"

A.B. Physics, Franklin and Marshall College, 1976

Awarded Pennsylvania Secondary School Teaching Certification in Physics

EXPERIENCE

Klipsch School of Electrical and Computer Engineering, New Mexico State University, 1986 - Present,

Assistant Professor 1986 - 1991,

Associate Professor 1991- 1996,

Professor 1996 - present

Responsibilities include developing a teaching and research program in the communications and telemetering area including the M.S.E.E. program in telemetry; supporting the telemetering industry, especially the International Foundation for Telemetering; sub-department head for the communications and telemetering specialty area; mentoring new faculty.

Awards: El Paso Corporation Foundation Award for Teaching Excellence, April 2003; University Research Council Award for Exceptional Achievements in Creative Scholarly Activity, August 2005; FY2007 NASA Tech Briefs Article Award, July 2007.

Department Head 2005 - present

Responsibilities include oversight of the academic and research activities of the Klipsch School of Electrical and Computer Engineering including ABET accreditation, curriculum, faculty evaluation, staff evaluation, faculty recruiting, laboratory enhancement, scholarship awarding, and related departmental operations; working with College outreach and development efforts; budgetary oversight.

Director, Manuel J. Lujan Space Tele-Engineering Program, and Frank Carden
Telemetry and Telecommunications Chair, 1996 - 2005

Responsibilities include oversight of Telemetry Center academic and research programs and program staff; conducting research in communications and telemetry systems; interacting with funding agencies for program reporting and development; developing industrial support mechanisms.

Director, New Mexico Space Grant Consortium 1990 - 1998

Responsibilities include initializing and providing direction to a state-wide consortium of educational institutions, museums, and industry participating in the NASA Space Grant College and Fellowship program; oversee the operation of the project office; interact with state-wide public and private-sector entities; interact with NASA and other consortia on a nation-wide and regional basis; program development activities.

TEACHING ACTIVITIES

Developed the following new courses to be part of the Electrical and Computer Engineering curriculum (each is a 3 semester hour class):

EE 498/499	Capstone Design: Payload Design/Satellite Design
EE 581	Digital Communication Systems I
EE 582	Digital Communication Systems II
EE 583	Satellite Communications
EE 583	Personal Communication Systems
EE 584	Payload Electronics Techniques
EE 585	Telemetry Systems
EE 590	Secure Communications
EE 590	Orbital Mechanics
EE 590	System Integration & Test

Developed HON 312 - Living and Working in Space - for the University Honors Program and general education.

Developed the Short Course "Introduction to PCM Telemetry Systems," presented at the 1990, 1991, 1992, and 1993 International Telemetry Conference and various local and remote sites since 1990

Developed the Short Course "Basics of Radio Propagation," presented at the 1999 and 2001 International Telemetry Conference.

Developed the Short Course "Basic Modulation Techniques," presented at the 2003 – 2007 International Telemetry Conferences.

Developed Personal Communication Systems, Satellite Communications Systems and Telemetry Systems classes for presentation over the NTU instructional television network.

Developed summer outreach educational programs for pre-college teachers to illustrate

space science and engineering applications.

RESEARCH ACTIVITIES

- Principal Investigator on “University Nanosatellite Program Development of the Second NMSU Satellite,” Air Force Office of Sponsored Research, 4/2005 - 3/2007, \$110,00. *Responsibilities:* grant administration, design and construction of a nanosatellite, link analysis, flight software design, frequency management.
- Investigator on “Reconfigurable Transceiver Architecture and Technology for NASA Space Communications,” subcontractor to General Dynamics, 4/2004 to 12/2004, \$15,000. *Responsibilities:* assist in development of requirements and architecture concepts for NASA software radio program.
- Principal Investigator on “Development of a Portable Ground Station for the 3 Corner Satellite Project,” Air Force Research Laboratory, 6/2004 - 12/2004, \$45,000. *Responsibilities:* grant administration, design and construction of a portable ground station, link analysis, communications system design, frequency management.
- Principal Investigator on “University Nanosat Program Development of the NMSUSat,” Air Force Office of Sponsored Research, 4/2003 – 4/2005, \$100,000. *Responsibilities:* grant administration, nanosatellite design and construction, link analysis, communications system design, frequency management.
- Principal Investigator on “Research Supporting Satellite Communications Technology,” NASA Goddard Space Flight Center, 5/2003 – 12/2006, \$600,000. *Responsibilities:* grant administration, design and testing of satellite cluster communications protocol.
- Co-Investigator on “Effective Utilization of Commercial Wireless Networking Technology in Planetary Environments,” NASA Glenn Research Center, 4/2003 – 4/2006, \$647,324. *Responsibilities:* integration of DEM data into propagation simulation software, assist in grant direction and management.
- Principal Investigator on “IP-Compliant Satellite Architecture Study,” NASA Glenn Research Center, 6/02 - 8/03, \$65,000. *Responsibilities:* grant management, conceptual design for IP-compliant satellite architecture.
- Principal Investigator on “Center for Space Telemetry and Telecommunications Systems,” NASA Goddard Space Flight Center, 5/00 - 5/03, \$1,560,000.00. *Responsibilities:* grant management, simulation and evaluation of networking protocols over lossy satellite channels, simulate concepts for small satellite access of the Space Network.
- Principal Investigator on “Formation Flying Supplemental Funding,” Universities Space Research Association/NASA Goddard Space Flight Center, 8/99 – 9/01, \$53,324.00. *Responsibilities:* grant management, conceptual design issues for a cluster of nanosatellites.
- Principal Investigator on “New Mexico Component of the Three Corner Sat Constellation,” Air Force Office of Sponsored Research, 4/1/99 - 9/30/02, \$200,000.00. *Responsibilities:* grant administration, radio system design,

frequency management.

- Principal Investigator on “Center for Telemetry and Telecommunication Systems,” NASA Goddard Space Flight Center, 7/1/98 - 4/30/00, \$1,344,000.00. *Responsibilities:* grant management, simulation and evaluation of networking protocols over lossy satellite channels, simulate concepts for small satellite access of the Space Network.
- Principal Investigator on "On-Site Research Support for the ACTS Propagation Experiments Program," subcontractor to Stanford Telecommunications, Inc. on NASA, 6/1993 - 3/1999, \$298,825.00. *Responsibilities:* acquisition and processing of Ka-band satellite propagation data, maintenance of site instrumentation.
- Principal Investigator on "Protocols and Interfaces for Remote Observatory Access via the ACTS," NASA Headquarters, 1/1/91 - 6/30/91, \$65,000. *Responsibilities:* grant administration, simulation of satellite-based control links.
- Principal Investigator on "New Mexico Space Grant Consortium," NASA Headquarters, 2/1/90 - 6/30/98, \$3,156,350.00. *Responsibilities:* grant administration, overall project direction, development of summer programs and academic classes, interface with other state consortia and NASA HQ.
- Co-Investigator and Principal Investigator on “Telemetry and Telecommunications Research,” NASA Goddard Space Flight Center, 6/89 - 4/99, \$5,410,221.00. *Responsibilities:* evaluation of networking protocols over lossy satellite channels, simulate concepts for small satellite access of the Space Network, grant administration.
- Principal Investigator on "Telemetry Downlink Interfaces and Level-Zero Processing," NASA Goddard Space Flight Center, 10/88 -9/90, \$597,380.00. *Responsibilities:* grant administration, simulation of space data flow.
- Co-Principal Investigator on "Flight Telerobotic Servicer Development Studies," subcontractor to Lockheed Contract No. NAS9-17900 NASA Johnson Space Center, 9/87 -12/87, \$15,000. *Responsibilities:* simulation of 8-PSK modem architectures.

EDUCATIONAL DEVELOPMENT ACTIVITIES

- S. Horan, “*BalloonSat* Flight Support,” International Foundation for Telemetry, 12/2007 – 12/2008, \$50,000.
- S. Castillo and S. Horan, “International Foundation for Telemetry Professorship in Telecommunications,” International Foundation for Telemetry, 10/2004 - 10/2005, \$130,000.
- S. Horan, “New Mexico State University Telemetry and Telecommunications Support,” International Foundation for Telemetry, 10/2001 – 9/2004, \$90,000.
- S. Horan and W. Ryan, “Undergraduate Instrumentation and Telemetry Laboratory,” International Foundation for Telemetry, 10/1996 – 9/1997, \$30,000.
- S. Horan and J. McShannon, “Elementary Summer Institute,” New Mexico Committee on Higher Education, 1993, \$130,538.

S. Horan and A. Ghassemi, "Powers of Ten," New Mexico Committee on Higher Education, 1993, \$64,818.

UNIVERSITY SERVICE ACTIVITIES

1. Faculty advisor, Electrical Engineer Honor Society, Eta Kappa Nu, 1986 – 1996.
2. Member, Faculty Search Committee, 1999-2001; 2005-2007
3. Department Promotion and Tenure Committee, 1999 - 2005
4. Faculty advisor, NMSU Amateur Radio Club, W5GB, 1999 – present
5. Member, Engineering Research Center Advisory Committee, 1999 - 2004.
6. College Promotion and Tenure Committee, 1999 - 2005; Chair, 2000 - 2001
7. Member, Chemical Engineering Department Promotion & Tenure Committee, 2003 – 2004.
8. External Promotion and Tenure Evaluator, Nursing Department, 2005 – 2006.
9. Member, Dean of Engineering Search Committee, 2003 - 2004.
10. University Research Council, member 2000 - 2005, Executive Committee 2001-2005, Chair 2002 - 2003; Interim Chair 2004.
11. Council of Research Center Directors, 2002-2003, 2004.
12. Chair, Overhead Committee, 2001-2002.
13. Member, Disclosure Statement Committee, 2002.
14. Member, PI Certification Committee, 2002-2003.
15. PI Certification Training, 2003 – present
16. ITAR Training, 2003 – present.
17. Member, Vice Provost for Research and Economic Development Search Committee, 2004.
18. Member, Conflict of Interest Committee, 2004 – present
19. Member, Conflict of Interest Policy Committee, 2004
20. Member, Faculty Senate IDC Special Committee, 2004
21. Member, Aerospace Engineering Director Search Committee, 2004 - 2005
22. Chair, 21st Century Aerospace Cluster, 2005.

NASA/ASEE Summer Faculty Fellow , NASA Goddard Space Flight Center, Summer 1988

Performed research on data flow simulation for Level-Zero Processing of space data systems.

NASA/ASEE Summer Faculty Fellow, NASA Johnson Space Center Summer 1987

Performed research on Space Station communication system options for 8-ary PSK modem development.

Space Communications Company, White Sands Ground Terminal, Las Cruces, New Mexico, 1984 - 1986.

Software Analyst - 1984-1985

Senior Software Analyst and TDRSS Operations Team Leader, 1985 - 1986

Principal Engineer, Systems Engineering, 1986.

Responsibilities included performing software maintenance on TDRS spacecraft command and telemetry processing software and the associated operator interface; lead team to develop new processing algorithms for RAM-hit detection and command time-out; developed systems requirements specifications for software and upgrades to the TDRS control center.

College Instructor, Department of Electrical and Computer Engineering, New Mexico State University, Las Cruces, New Mexico, 1983 - 1984.

Responsibilities included teaching courses in circuit analysis, instrumentation, computers, and communications.

PROFESSIONAL AND PUBLIC SERVICE ACTIVITIES

1. National Council of Space Grant Directors, 1990 - 1998; Networking Subcommittee, 1990 - 1992; Council Chairman, 1994 - 1996; Executive Committee, 1994 - 1998.
2. Southwest Regional Space Task Force, 1991 - 1998; Education Committee chairman, 1991 - 1994.
3. Governor's Technical Excellence Committee, subcommittee on space, 1992.
4. Director, Southwestern New Mexico Regional Science and Engineering Fair, 1992 - 1996.
5. Proposal Reviewer for NASA Headquarters, 1991, 1996, 2001.
6. Proposal Reviewer for Louisiana Space Grant Consortium, 1993 - 1999.
7. Proposal Reviewer for the National Science Foundation, 1996.
8. Proposal Reviewer for Florida Space Grant Consortium, 1997.
9. Proposal Reviewer for Alabama Space Grant Consortium, 1999.
10. Proposal Reviewer for Natural Sciences and Engineering Research Council of Canada, 2003, 2004.
11. Paper Reviewer for *IEEE Transactions on Communications*, 1992, 1994.
12. Paper Reviewer for *IEEE Transactions on Aerospace and Electronic Systems*, 1996, 2004.
13. Paper Reviewer for *IEEE Aerospace and Electronics Systems Magazine*, 2006.
14. Paper Reviewer for *IEEE Transaction on Antennas and Propagation*, 1998.
15. Paper Reviewer for *IEEE Antennas and Propagation Magazine*, 2001.
16. Paper Reviewer for *Computer Networks*, 2003 - 2004.
17. Text Book Reviewer for Prentice-Hall (Digital Communications, Probability and Statistics).
18. Text Book Reviewer for Irwin (Circuit Analysis).
19. Text Book Reviewer for Macmillian (Signal Processing).
20. Text Book Reviewer for Oxford University Press (Circuit Analysis).
21. Chapter Reviewer for the *Handbook of Computer Networks* (Wiley)
22. External Promotion and Tenure Reviewer: Cleveland State University, 2003; Pennsylvania State University, 2004; Utah State University, 2005; UTEP, 2005, 2006,

- 2008; Air Force Institute of Technology, 2007; Univ. of Idaho, 2007.
23. Vice Technical Program Chairman, International Telemetry Conference, 1996.
 24. Technical Program Chairman, International Telemetry Conference, 1997.
 25. Vice General Chairman, International Telemetry Conference, 2001.
 26. General Chairman, International Telemetry Conference, 2002.
 27. Technical Committee, Space Internet Workshop III, June 2003.
 28. Technical Committee, Space Internet Workshop IV, June 2004.
 29. Volunteer Examiner for FCC amateur radio licenses, 1997 - present
 30. Faculty representative to the Federal Demonstration Partnership, 2002 - 2008; "Minority University/Emerging Research Institution" working group co-chair, 2002 – 2007.
 31. Universities Space Research Association Science and Engineering Education Council, 2003 – 2008; member of "Access to Space" working group.
 32. Member, Electrical and Computer Engineering Department Heads Association Board of Directors, 2008 – present.

PROFESSIONAL AFFILIATIONS

American Institute for Aeronautics and Astronautics (Senior Member)
 Institute of Electrical and Electronics Engineers (Senior Member)
 American Society for Engineering Education
 American Association for the Advancement of Science

BOOKS, CHAPTERS, ARTICLES, and CONFERENCE PROCEEDINGS

1. S. Horan, "Telemetry," in *The Electrical Engineering Handbook 3rd ed. Broadcasting and Optical Communication Technology*, R. Dorf, ed. Boca Raton: CRC Press, 2006, 12-1 – 12-11.
2. R. Wang, B. Gutha, S. Horan, Y. Xiao, and B. Sun, "Which Transmission Mechanism is Best for Space Internet: Window-Based, Rate-Based, or a Hybrid of the Two?," *IEEE Wireless Communications*, Dec. 2005, p. 2 – 9.
3. S. Horan, "Telemetry Systems," in *The Engineering Handbook 2nd ed.*, R. Dorf, ed., Boca Raton: CRC Press, 2004, pp 154-1 – 154-6.
4. S. Horan, *ARRL's Extra Q&A*, Newington, CT: The American Radio Relay League, Inc., 2003.
5. C. Force and S. Horan, "Earth Orbiting Satellites, Data Receiving and Handling Facilities," in *Encyclopedia of Space Science and Technology*, Hans Mark, ed., New York: Wiley, 2003.
6. S. Horan, *Introduction to PCM Telemetry Systems*, 2nd ed., Boca Raton: CRC Press, 2002.
7. S. Horan, *Solutions Manual for Introduction to PCM Telemetry Systems*, 2nd ed., Boca Raton: CRC Press, 2002.
8. S. Horan, ed. *Proceedings of the International Telemetry Conference*, Vol. XXXIII, Research Triangle Park, N.C.: ISA, 1997.

9. S. Horan, "Telemetry Systems," in *The Engineering Handbook*, Boca Raton: CRC Press, 1996, pp 1509-1513.
10. S. Horan, *Introduction to PCM Telemetry Systems*, Boca Raton: CRC Press, 1992.
11. S. Horan, *Solutions Manual for Introduction to PCM Telemetry Systems*, Boca Raton: CRC Press, 1992.

JOURNAL PUBLICATIONS

1. R. Wang, B. Shrestha, X. Wu, T. Wang, A. Ayyagari, E. Tade, and S. Horan, "Experimental Investigation of Core File-Delivery Operation in Unreliable CCSDS File Delivery Protocol (CFDP) over Cislunar Communication Links," *IEEE Trans. on Aerospace & Electronic Systems*, in press.
2. R. Wang, S. Horan, B. Tian, and S. Bonasu, "Optimal Acknowledgement Frequency over Asymmetric Space-Internet Links," *IEEE Trans. on Aerospace & Electronic Systems*, Vol. 42, No. 4, October 2006, p. 1311 - 1322.
3. R. Wang, S. Horan, and R. Chandrasekaran, "An experimental investigation of cross-layer optimal packet size in space Internet," *International Journal of Satellite Communications and Networking*, Vol. 24, 2006, p. 561-577.
4. R. Wang and S. Horan, "Impact of Van Jacobson Header Compression on TCP/IP Throughput Performance over Lossy Space Channels," *IEEE Trans. on Aerospace & Electronic Systems*, Vol. 41, No. 2, April 2005, p. 681 - 692.
5. V. Chukkala, P. De Leon, S. Horan, and V. Velusamy, "Radio Frequency Channel Modeling for Proximity Networks on the Martian Surface," *Computer Networks*, Vol. 47, Issue 5, April 2005, p 751-763.
6. S. Horan, A. Chakraborti, S. Muddasani, and S. Narina, "Testing MDP in a Simulated Space Channel Environment," *Computer Networks*, Vol. 46, No. 3, 22 October 2004, p. 363-374.
7. S. Horan, "Non-Tracking Antenna Performance for Inertially Controlled Spacecraft Using TDRSS," *IEEE Trans. on Aerospace & Electronic Systems*, Vol. 39, No. 4, October 2003, p 1263 - 1269.
8. S. Horan, "The Potential for Using LEO Telecommunications Constellations to Support Nanosatellite Formation Flying," *International Journal of Satellite Communications*, **20**, 2002, p. 347 - 361.
9. S. Horan and R. Wang, "Design of a Space Channel Simulator Using Virtual Instrumentation Software," *IEEE Trans. Instrument and Measurements*, Vol. 51, No. 5, October 2002, p. 912-916.
10. S. Horan, T. Minnix, and J. Vigil, "Small Satellite Access of the Space Network," *IEEE Trans. Aerospace & Electronic Systems*, Vol. 35, No. 4, Oct. 1999, p. 1173-1182.
11. J. Pinder, L. Ippolito, S. Horan, J. Feil, "Four Years of Experimental Results from the New Mexico ACTS Propagation Terminal at 20.185 and 27.505 GHz," *IEEE Journ. Sel. Areas Commun.*, Vol. 17, No. 2, Feb. 1999, p. 153 - 163.
12. J. Feil, L. Ippolito, H. Helmkin, C.E. Meyer, S. Horan, and R. Henning, "Fade Slope Analysis for Alaska, Florida, and New Mexico ACTS Propagation Data at 20 and 27.5

- GHZ,” *Proc. IEEE*, Vol. 85, No. 6, June 1997, p. 926 - 935.
13. S. Horan, “Use of High-Power Model Rockets as a Laboratory for a Microcontroller Data Acquisition System,” *A.S.E.E. Computers in Education*, Vol. VI, No. 1, January-March 1996, p. 53-56.
 14. F. Carden and S. Horan, “Telemetry: An Academic Program,” *The ITEA Journal of Test and Evaluation*, Vol. XII, No. 4, p. 16-19, 1991.
 15. J. Taylor and S. Horan, “New Tools for Simulation of Digital Communication Networks,” *A.S.E.E. Computers in Education*, March-April 1991.
 16. R. L. Golden, S. Horan, et al., “Evidence for the existence of cosmic-ray antiprotons,” *Phys. Rev. Letters*, **43**, October 15, 1979, 1196-1199.
 17. S. Horan, “A Photometric Survey of the Hyades for δ Scuti Variables,” *The Astronomical Journal*, **84**, No. 11, Nov. 1979, p. 1770 – 1774.
 18. M.A. Seeds and S. Horan, “Observations of BDS 1269, A Metal-Deficient Scuti Star,” *Pub. Astronomical Society of the Pacific*, **88**, June 1976, 251 - 252.

PATENT

with T. Shay et. al, U.S. Patent Office Patent no. 6,778,779 covering the “Full-Duplex Optical Communication System” issued on August 17, 2004.

CONFERENCE PAPERS

1. S. Horan, “Using LabVIEW to Design a Payload Control System,” *Proc. International Telemetry Conf.*, Oct. 2008.
2. S. Horan, R. Aaronscooke, and D. Jaramillo, “IP-based Networking as Part of the Design of a Payload Control System,” *Proc. International Telemetry Conf.*, Oct. 2008.
3. S. Horan et al., “Analysis of IEEE 802.11a and b WLAN Standards on the Martian Surface,” CCSDS Workshop, University of Colorado, Colorado Springs, January 2007.
4. R. Wang and S. Horan, “Performance Evaluation of Space Communication Protocol Standards (SCPS) over Asymmetric ACTS Satellite Links,” *Proc. Globecom 2006*, Nov. 2006.
5. R. Wang, S. Horan, S. Kota, and B. Sun, “An Experimental Evaluation of SCPS-TP over Lossy GEO-Space Links,” *Proc. Globecom 2006*, Nov. 2006.
6. S. Horan, et al., “Utilization of Commercial Wireless Networking Technology in Simulated Martian Environments,” Space Internet Workshop V, University of Maryland, Sept. 2006.
7. R. Wang and S. Horan, “Performance of Space Communication Protocol Standards (SCPS) over ACTS Satellite Links,” *Proc. Globecom 2005*, Nov. 2005
8. R. Wang and S. Horan, “Performance Evaluation of TCP and Its Extensions over Lossy Links in a Small Satellite Environment,” *Proc. International Communications Conference*, May 2005.
9. S. Horan and G. Deivasigamani, “Design of a Fault-Tolerant Satellite Cluster Link Establishment Protocol,” *Proc. IEEE Aerospace Conference*, Big Sky, MT, March 2005.

10. S. Horan and G. Deivasigamani, "Using Labview To Design A Fault-Tolerant Link Establishment Protocol," *Proc. International Telemetry Conference*, October 2004.
11. S. Horan and G. Deivasigamani, "Design of a Fault-Tolerant Link Establishment Protocol," Space Internet Workshop IV, Goddard Space Flight Center, June 2004.
12. N. Fernandez and S. Horan, "Oh no! Export Control: What is Export Control?," National Council of University Research Administrators Region VI & VII Meeting, San Francisco, CA, April 2004.
13. V. Chukkala, P. De Leon, S. Horan, and V. Velusamy, "Modeling the Radio Frequency Environment of Mars for Future Wireless, Networked Rovers and Sensor Webs," *Proc. IEEE Aerospace Conference*, Big Sky, MT, March 2004.
14. R. J. Lyman, Q. Wang, P. DeLeon, and S. Horan, "Transmission Parameter Estimation for an Autoconfigurable Receiver," *Proc. IEEE Aerospace Conference*, Big Sky, MT, March 2004.
15. S. Horan and S. Horan, "Application of Data Compression to Frame and Packet Telemetry," *Proc. International Telemetry Conference*, 03-28-03, Las Vegas, NV, October 2003.
16. P. DeLeon, Q. Wang, S. Horan, and R. Lyman, "A Design for Satellite Ground Station Receiver Autoconfiguration," *Proc. International Telemetry Conference*, 03-31-06, Las Vegas, NV, October 2003.
17. S. Horan, et al., "The New Mexico State University Satellite (NMSUSat) Mission," *Proc. 17th Annual/USU Conference on Small Satellites*, SSC03-IX-5, Logan, UT, August 2003.
18. P. DeLeon, S. Horan, D. Borah, and R. Lyman, "Effective Utilization of Commercial Wireless Networking Technology in Planetary Environments," NASA Proximity Workshop, Rice University, June 2003.
19. S. Horan, L. Alvarez, et al., "The Three Corner Satellite Mission," *Proc. International Symposium Formation Flying: Missions & Technologies*, Toulouse, FR, October 2002.
20. S. Horan and L. Alvarez, "Preparing a COTS Radio for Flight - Lessons Learned from the 3 Corner Satellite Project," *Proc. 16th Annual/USU Conference on Small Satellites*, SSC02-X-4, Logan, UT, August 2002.
21. S. Horan, et al., "Evaluation of MDP Over Low Bandwidth-Delay Product Links," 2nd Space Internet Workshop, Greenbelt, MD, May 2002.
22. S. Horan, "Introducing Pre-college Students and Teachers to Engineering via a Summer Enrichment Program," *Proc. 2001 ASEE Annual Conference & Exposition*, Albuquerque, NM, June 2001.
23. S. Horan "Using Measurements and Sensors in a Pre-college Enrichment Program," *Proc. 18th IEEE Instrument and Measurement Technology Conference*, Budapest, May 2001.
24. S. Horan, "Design of a Space Channel Simulator Using Virtual Instrumentation Software," *Proc. 18th IEEE Instrument and Measurement Technology Conference*, Budapest, May 2001.
25. S. Horan and R. Wang, "Internet-Type Protocol Testing in a Simulated Small Satellite Environment," *Proc. IEEE Aerospace Conference*, Big Sky, MT, March 2001.
26. S. Horan, "The Potential for Using LEO Telecommunications Constellations to Support Nanosatellite Formation Flying," First Joint Space Internet Workshop, Goddard Space

- Flight Center, November 2000.
27. S. Horan and R. Wang, "Effects of Networking Configuration on Space Channel Throughput," *Proc. 14th AIAA/USU Conf. On Small Satellites*, Aug. 2000.
 28. N. Clark, P. Furth, and S. Horan, "Intelligent Star Tracker," *Proc. 14th AIAA/USU Conf. On Small Satellites*, Aug. 2000.
 29. S. Horan, "A LabVIEW-Based Channel Error Simulator," *Proc. International Telemetering Conference*, **34**, p. 78-86, October 1999.
 30. S. Horan and R. Wang, "Comparison of File Transfer Using SCPS FP and TCP/IP FTP over a Simulated Satellite Channel," *Proc. International Telemetering Conference*, **34**, p. 87-95, October 1999.
 31. S. Horan, B. Anderson, et al., "Three Corner Sat Constellation – New Mexico State University: Communications, LEO Telecommunications Services, Intersatellite Communications, and Ground Stations and Network," *Proc. 13th AIAA/USU Conf. on Small Satellites*, Aug. 1999.
 32. A. Borsholm and S. Horan, "A MATLAB Program for Predicting the Antenna Wetting Effects of the ACTS 1.2-meter Antenna," *Proc. 23rd NASA Propagation Experimenters Meeting (NAPEX XXIII) and the Advanced Communications Technology Satellite (ACTS) Propagation Studies Workshop*, JPL Pub. 99-16, June 1999, p. 207.
 33. X. Tang and S. Horan, "Development of Elevation Angle PDFs for Non-Geostationary Satellite Constellations," *Proc. 23rd NASA Propagation Experimenters Meeting (NAPEX XXIII) and the Advanced Communications Technology Satellite (ACTS) Propagation Studies Workshop*, JPL Pub. 99-16, June 1999, p. 223.
 34. J. Pinder, L. Ippolito, J. Feil, and S. Horan, "Four Years of Experimental Results from the New Mexico ACTS Propagation Terminal at 20.185 and 27.505 GHz," URSI, Sept. 1998.
 35. S. Horan, "The Use of Fixed Antennas for Data Communications with TDRS," *Proc. First ESA Workshop on Tracking, Telemetry and Command Systems*, WPP-153, 6.2, ESTEC, The Netherlands, June 1998.
 36. S. Horan, "An Operational Concept for a Demand Assignment Multiple Access System for the Space Network," *Proc. International Telemetering Conference*, **32**, p. 96-19-2, October 1996.
 37. J. Feil, L. Ippolito, M. Buehrer, G. Feldhake, and S. Horan, "The First Two Years of Experimental Results from the New Mexico ACTS Propagation Terminal at 20.185 and 27.505 GHz," *Proc. IEEE Antennas and Propagation Society International Symposium*, Baltimore, 1996.
 38. J. Feil, L. Ippolito, M. Buehrer, G. Feldhake, and S. Horan, "First Year Propagation Experiment Results from New Mexico ACTS Receiver Terminal at 20.185 and 27.505 GHz," 16th AIAA International Communications Satellite Systems Conference, Washington, D.C., February 1996.
 39. S. Horan, "Small Satellite Access of the Space Network," *Proc. Space Technology and Applications International Forum*, Albuquerque, NM, January 1996, p. 501-506.
 40. S. Horan, "Small Satellite Usage of the Space Network," AIAA/USU Conference on Small Satellites," Logan, UT, September, 1995.

41. S. Horan, M. C. Deny, K. S. Anderson, and J. R. Fowler, "Real-Time Control of Remote Sites: Using the ACTS with the Apache Point Observatory," NASA ACTS Results Conference, Cleveland, OH, September, 1995.
42. G. Feldhake, S. Horan, and L.J. Ippolito, "Ka Band Propagation Statistics at White Sands New Mexico", National Radio Science Meeting, Boulder, CO, January 1995.
43. S. Horan and T. Minnix, "Small Satellite Access of the Space Network," *Proc. International Telemetry Conference*, **30**, p. 78, October 1994.
44. T. Minnix and S. Horan, "TDRSS Link Budget Design Table," *Proc. International Telemetry Conference*, **29**, p. 665, October 1993.
45. S. Horan, "Space Grant Networking," 3rd MU-SPIN Conference, September 1993.
46. S. Horan, "A High-School Level Summer Space Education Seminar," *Proc. 30th Space Congress*, p. 8-9, April 1993.
47. S. Horan and G. Georghiou, "Remote Observatory Access via the ACTS," NASA ACTS Conference '92, November 1992.
48. S. Horan, "Making Space Part of General Education," *Proc. 29th Space Congress*, p. 3-22, April 1992.
49. S. Horan, "A Multi-Level Digital Communications Laboratory," Simulation Conference 15, Alexandria, VA, August 1990 (invited presentation).
50. S. Horan, "Designing a Structured Curriculum: Some Lessons Learned at NMSU," International Test and Evaluation Association Federal Agencies Seminar on Test and Evaluation Issues and Challenges, Fort Belvoir, VA, 13 June 1990 (invited presentation).
51. J. Taylor and S. Horan, "New Tools for Simulation of Digital Communication Networks," A.S.E.E. Annual Conference, June 1990.
52. S. Horan, "Simulations of Space Station Data Links and Ground Processing," *Proc. International Telemetry Conference*, **25**, October 1989.
53. S. Horan, "Computer Simulations of Communication Links for Use in the Space Station System," Simulation Conference 14, San Diego, September 1989. (invited presentation)
54. S. Horan, "Modem Simulations for Possible Use in Space Station," *Proc. International Telemetry Conference*, **24**, pp. 431-436, October 1988.

TECHNICAL REPORTS

1. S. Horan, "NMSU BalloonSat Mission Procedures," NMSU-ECE-08-02, May 2008.
2. K. M. Chaganti and S. Horan, "Efficient Routing Technique to Support Intra-Cluster Communications," NMSU-ECE-08-01, January 2008
3. S. Horan, "NMSUSat2 Final Report," NMSU-ECE-07-002, March 2007.
4. S. Horan and R. Lyman, "Final Report: Research Related to Satellite Communications," NMSU-ECE-07-001, January 2007.
5. P. G. Thonour and S. Horan, "Design of an Improved Link Establishment Protocol for Satellite Clusters," NMSU-ECE-06-003, December 2006.
6. S. Horan, L. Alvarez, and R. Hull, "Responsive Space Study Report," NMSU-ECE-06-002, October 2006.
7. S. Horan and R. Lyman, "Annual Report: Research Supporting Satellite Communications

- Technology,” NMSU-ECE-05-002, March 2005.
8. P. DeLeon, S. Horan, D. Borah, and R. Lyman “Effective Utilization of Commercial Wireless Networking Technology in Planetary Environments: Annual Report Year 2,” NMSU-ECE-05-001, March 2005.
 9. S. Horan, L. Alvarez, J. Delgado, and J. Rodgers, “3 Corner Satellite Portable Ground Station Final Report,” NMSU-ECE-04-009, December 2004.
 10. G. Deivasigamani and S. Horan, “Masters Thesis: Design Of A Fault Tolerant Link Establishment Protocol For Satellite Clusters,” NMSU-ECE-04-007, November 2004.
 11. S. Horan, “NMSU Satellite Annual Report”, NMSU-ECE-04-008, September 2004.
 12. S. Horan and G. Deivasigamani, “Link Establishment Algorithm Development – Test Report,” NMSU-ECE-04-005, June 2004.
 13. S. Horan and G. Deivasigamani, “Link Establishment Algorithm Development – Phase I,” NMSU-ECE-04-004, June 2004.
 14. P. DeLeon and S. Horan, “Effective Utilization of Commercial Wireless Networking Technology in Planetary Environments,” NMSU-ECE-04-003, April 2004.
 15. S. Horan and R. Lyman, “Annual Report: Research Supporting Satellite Communications Technology,” NMSU-ECE-04-002, March 2004.
 16. K. Newtonson and S. Horan, “Final Report – IP Compliant Satellite Architecture Study,” NMSU-ECE-04-001, February 2004.
 17. S. Horan, “NMSUSat 2003 Annual Report,” NMSU-ECE-03-005, September 2003.
 18. S. Horan, P. DeLeon, D. Borah, and R. Lyman, “Final Report: The Center for Space Telemetry and Telecommunications Systems,” NMSU-ECE-03-006.
 19. G. Orozco and S. Horan, “Baseline Communications System for Small Satellite,” NMSU-ECE-03-003, July 2003.
 20. S. Muddasani and S. Horan, “Assessment of the Multicast Dissemination Protocol for Constrained Satellite Channels,” NMSU-ECE-03-002, July 2003.
 21. S. Horan, “Satellite Cluster Communications,” NMSU-ECE-02-004, September 2002.
 22. S. Narina and S. Horan, “Optimal Point-to-Point Protocol (PPP) Frame Size for Transmission Control Protocol (TCP) in High Error Environments,” NMSU-ECE-02-003, August 2003.
 23. S. Horan, “3 Corner Satellite: New Mexico Final Technical Report,” NMSU-ECE-02-005.
 24. S. Horan, “Protocol Testing Procedures,” NMSU-ECE-02-002, May 2002.
 25. S. Horan, L. Alvarez, B. Anderson, R. Pachecho, and M. Jourdan, “Dual Transceiver User's Manual,” UN2-MAN-31114-404, Rev.B, Las Cruces, NM, February 2002.
 26. S. Horan, “Basic Electronic Design for Proposed NMSU Hitchhiker Payload,” NMSU-ECE-00-011, September 2000.
 27. S. Horan, “3 Corner Satellite Communications Link Estimates,” NMSU-ECE-00-010, September 2000.
 28. S. Horan and R. Wang, “Effects of Protocol Options on Data Throughput Over a Simulated Space Channel,” NMSU-ECE-00-007, August 2000.
 29. S. Horan, “Using Cell Phones from Satellites,” NMSU-ECE-00-002, April 2000.
 30. S. Horan and R. Wang, “Enhancement of the NMSU Channel Error Simulator to Provide

- User-Selectable Link Delays,” NMSU-ECE-00-001, March 2000.
31. S. Horan, “Basic Hitchhiker Payload Requirements,” NMSU-ECE-99-018.
 32. S. Horan, “Hitchhiker Payload Mission,” NMSU-ECE-99-017, December 1999.
 33. S. Horan and R. Wang, “Design of a Channel Error Simulator Using Virtual Instrument Techniques,” NMSU-ECE-99-002, April 1999.
 34. S. Horan and R. Wang, “Enhancement of The NMSU Channel Error Simulator to Provide Unbalanced Forward And Return Transmission Rates,” NMSU-ECE-99-003, April 1999.
 35. S. Horan, “Non-Gimbaled Antenna Pointing - Summary of Results and Analysis,” NMSU-ECE-98-001, March 1998.
 36. S. Horan, “Test Report: Low-Cost Access to TDRS Using TOPEX to Emulate Small Satellite Performance,” NMSU-ECE-97-013, August 1997.
 37. S. Horan and J. Vigil, “Further Results For Non-gimbaled Antenna Pointing,” NMSU-ECE-96-018, December 31, 1996.
 38. S. Horan, “Analysis of EUVE Experiment Results,” NMSU-ECE-96-016, December 17, 1996.
 39. S. Horan, “TEST REPORT: Low Cost Access and Efficient Use of TDRSS,” NMSU-ECE-96-008, July 1996.
 40. S. Horan and W.P. Osborne, “Analysis of the Ka-Band Direct Data Distribution Concept,” NMSU-ECE-95-006, July 1995.
 41. R. Caballero and S. Horan, “TDRS MA Phased-Array Antenna Simulations”, NMSU-ECE-95-013, May 1995.
 42. S. Horan, “ACTS Propagation Experiment Program: Sun and Moon Intrusion Prediction,” NMSU-ECE-002, January 1995.
 43. S. Horan, “ACTS Propagation Experiment Program: Rain Gauge Calibration Report,” NMSU-ECE-001, January 1995.
 44. S. Horan, W. P. Osborne, and T. Minnix, “Improved Small Satellite Access of the Space Network,” NMSU-ECE-94-014, December 14, 1994.
 45. S. Horan, “Space Education Seminar: Lessons & Workbook,” NMSU-ECE-92-011, July 1992.
 46. S. Horan, J. Watson, J. Taylor, K. Peterson, J. Polson, J. Pfeiffer, “Final Report: Research Relevant to Telemetry Downlink Interfaces and Level-Zero Processing,” Feb. 1992.
 47. S. Horan, “Fundamentals of Telemetry Systems Short Course Notes,” NMSU-ECE-91-010, November 1991.
 48. S. Horan “A Multi-Level Digital Communications Laboratory,” NMSU-ECE-90-007, September 1990.
 49. S. Horan, “Computer Simulations of Communication Links for Use in the Space Station System,” NMSU-ECE-89-025, September 1989.
 50. S. Horan, "Simulations of Space Station Data Links and Ground Processing," NMSU-ECE-89-019, June 1989.
 51. S. Horan, “PCM-FM Frequency Plan Study,” NMSU-ECE-89-009, May 1989.
 52. S. Horan, “CDOS Evolutionary Path Sensitivity Study,” Final Report for NASA/ASEE Summer Faculty Fellowship, July, 1988.

53. S. Horan and F. Carden, "Final Report on Flight Telerobotic Servicer Studies," Lockheed EMSCO P.O. #0200118138, May 31, 1988.
54. S. Horan, "High Data Rate Modem Simulation for the Space Station Multiple-Access Communications System," NGT-44-001-800, 1987.

DOCTORAL DISSERTATION SUPERVISION

1. Ruhai Wang, "TCP Extensions for Space," 2001.
2. Omar Hassan, "Narrowband Duobinary FM with Limiter Discriminator Detection Over Mobile Channels," 1996.
3. Georghious Georghiou, "Remote Observatory Access via the Advanced Communications Technology Satellite," 1992.
4. John C. Watson, "CCSDS Space Data Systems Analysis," 1992.

MASTERS THESIS AND TECHNICAL REPORT SUPERVISION

1. Krishna Mohan Chaganti, thesis: "Efficient Routing Technique to Support Intra-cluster Communications," 2008.
2. Praveen Gopinath Thonour, thesis: "Design of an Improved Link Establishment Protocol for Satellite Clusters," 2006.
3. Giri Prasad Deivasigamani, thesis: "Design of a Fault Tolerant Link Establishment Protocol for Satellite Clusters," 2004.
4. Kathleen Newton, thesis, "Testing Internet Protocol for Communications in Space Applications," 2004
5. Anirban Chakraborti, thesis: "Performance Analysis of MDP in Simulated Space Channel Environment," 2002.
6. Bobby Anderson, thesis: "3 Corner Satellite Communications System," 2000
7. Atle Borsholm, thesis: "Modeling and Experimental Validation of the Surface Attenuation Effects of Rain on Composite Antenna Structures at Ka-Band," 1999.
8. Glenn Feldhake, thesis: "Ka-band Satellite Propagation Characteristics Using ACTS," 1995.
9. 44 MSEE student technical reports supervised

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- Secret Clearance
- Proficient in FORTRAN, Visual BASIC, MATHCAD, LabVIEW
- Simulation Software Usage: Satellite Tool Kit, multiSimm, Commsim
- FCC Amateur Radio license AC5RI