

CURRICULUM VITA

James E. Harvey

Associate Professor of Optics and Electrical Engineering
College of Optics and Photonics; CREOL and FPCE
University of Central Florida (UCF)
Orlando, FL 32816

September 2007

Telephone: (407) 330-3927 (Home)
(407) 823-6818 (Work)
FAX: (407) 823-6880 (Work)
e-mail: harvey@creol.ucf.edu

Educational Background

- 1976 Ph.D. in Optical Sciences, University of Arizona
Dissertation: *Light-scattering Characteristics of Optical Surfaces*. Advisor: R. V. Shack
- 1975 M.S. in Optical Sciences, University of Arizona
- 1966 M.S. in Physics, Wayne State University
Thesis: Radiation Induced Bubble Nucleation near the Critical Point. Advisor: L. O. Roellig
- 1964 A.B. in Physics, Kansas Wesleyan University

Areas of Technical Expertise and Research Interests: Optical systems design and image analysis, surface scatter phenomena, scalar diffraction theory, X-ray/EUV imaging, sparse array imaging, adaptive optics, optical properties of infrared materials, remote sensing.

Employment History

- 1990-present CREOL/UCF, 4000 Central Florida Blvd., P. O. Box 162700, Orlando, FL 32816
Title: Associate Professor of Optics and Electrical Engineering.
- 1983-1990 Perkin-Elmer Corp./Hughes Danbury Optical Systems, Inc. (E-O Systems Division acquired by Hughes in 1989), 100 Wooster Heights Road, Danbury, CT 06896
Title: Manager, Optical Design & Analysis (1989-1990); Senior Scientist (1986-1989).
- 1978-1983 Adv. Radiation Directorate, The Air Force Weapons Laboratory, Kirtland AFB, NM
Title: Member of Technical Staff, Rockwell International (1982-1983).
Title: Research Engineer, United Technologies Research Center (1981-1982).
Title: Research Physicist, University of Dayton Research Institute (1978-1981).
- 1976-1978 Optical Systems Development Dept., Pratt & Whitney Aircraft, West Palm Beach, FL
Title: Assistant Project Engineer.
- 1972-1976 Optical Sciences Center, University of Arizona, Tucson, Arizona.
Title: Research Associate.
- 1966-1972 Scientific Research Staff, Ford Motor Company, Dearborn, Michigan.
Title: Research Scientist (on educational leave from 1968-1972).

Teaching Experience

- 1990-present Associate Professor of Optics and Electrical Engineering, University of Central Florida. Taught Fourier Optics, each spring semester (1991-99); developed a graduate level Geometrical Optics course which I taught each fall semester (1991-97). Both of these courses were core courses in the Optical Science and Engineering Degree Program offered by the Dept. of Electrical and Computer Engineering. Also taught an Optical Testing and Metrology course (Fall 1998). Have developed a Fundamentals of Applied Optics Course (Fall 2002-06) and established an Applied Optics Lab course (Summer 1999-02, Spring 2004-06) as core courses in the College of Optics and Photonics curriculum. I have also occasionally directed 2-4 students in an Independent Study course in Advanced Optical Design and Image Analysis. However, much of my teaching is done on a one-to-one basis while mentoring the 3-5 graduate students whose thesis or dissertation research I am directing at any given time.
- 1985-1990 Instructor for the Perkin-Elmer Corp. Technology Transfer Program.
Taught Physical Optics and Fourier Optics courses; two hrs/wk for ten weeks.
- 1985-1989 Adjunct Professor of Physics (Optics), University of Connecticut.
Taught graduate level Physical Optics course in the Spring of 1985, 1987, and 1989.
- 1981-1983 Adjunct Professor of Physics (Optics), University of New Mexico.
Taught Geometrical Optics in Fall Semester and Optical Testing in the Spring Semester.

Teaching Experience (cont.)

1985-present Short Course Instructor for SPIE-The International Society for Optical Engineering. Taught approximately thirty-five short courses at various symposia and conferences: Understanding X-ray Imaging Systems, Astronomical Optics, Basic Diffraction Phenomena, Understanding Imaging Systems, Application of Scalar Diffraction Theory, Applications of Fourier Techniques to Optical Engineering Problems.

Theses Supervised

Costin Curatu	(Ph.D. in progress)	<i>Improved Optical Design of a Shack-Hartmann Wavefront Sensor for Eye Aberration Measurements.</i> Anticipated Completion Date: December 2007.
Joshua Lentz	(M.S. in Progress)	<i>Development of a Telescope Interferometric Maintenance and Evaluation (TIME) Tool.</i> Anticipated Completion Date: August 2007.
George Curatu	(Ph.D. in progress)	<i>Foviated Imaging using Liquid Crystal Spatial Light Modulators.</i> Anticipated Completion Date: May 2007.
Andrey Krywonos	Ph.D. 2006	<i>Predicting Surface Scatter using a Linear Systems Formulation of Non-paraxial Scalar Diffraction.</i>
Martina Atanassova	Ph.D. 2005	<i>Optimizing the Performance of As-Manufactured Grazing Incidence X-ray Telescopes Using Mosaic Detector Arrays.</i>
Dijana Bogunovic	M.S. 2002	<i>Non-paraxial Scalar Treatment of Diffraction Grating Behavior.</i>
Patrick Thompson	Ph.D. 2000	<i>Optical Performance of Grazing Incidence X-ray/EUV Telescopes for Space Science Applications.</i>
Cynthia L. Vernold	Ph.D. 1998	<i>A Non-paraxial Scattering Theory for Specifying and Analyzing Fabrication Errors in Optical Surfaces</i> (University of Arizona).
Anita Kotha	Ph.D. 1998	<i>Scattering Effects from Machined Optical Surfaces.</i>
Stephen P. Reddy	M.S. 1996	<i>Precision Pointing and Tracking through Atmospheric Turbulence utilizing the Reciprocal Path Scattering Phenomenon.</i>
Kenneth A. Menard	M.S. 1995	<i>Gaussian Beam Resonator Formalism using the y, ybar Method.</i>
Terri L. Alexander	M.S. 1994	<i>Target Induced Speckle Effects in Laser Radar Applications.</i>
William J. Gressler	M.S. 1993	<i>Conical Foil X-ray Telescope Performance Predictions for Space Astronomy Applications.</i>
J. Brooks Sweet	M.S. 1992	<i>Limitations of Wide Field Imaging Phased Telescope Arrays</i> (Changed to non-thesis option to expedite degree after winning SPIE's William H. Price Scholarship for thesis proposal).
Kristin L. Lewotsky	M.S. 1992	<i>Performance Limitations of Imaging Microscopes for Soft X-ray Applications.</i>
Anita Kotha	M.S. 1992	<i>EUV Performance of Wolter Type II Telescopes for Space Astronomy Applications.</i>
Elizabeth Ann Nevis	M.S. 1983	<i>Angular Grating Anomalies: An Apparent Violation of the Grating Equation</i> (Univ. of New Mexico; changed to non-thesis option to expedite degree and accept job offer).
Donald R. Erbschloe	M.S. 1983	<i>The Spot of Arago and its Role in Aberration Analysis</i> (Univ. of New Mexico).

Summary of Journal Papers, Books, Conference Presentations, and Seminars & Colloquia

- **Published Forty-four refereed papers** in international journals.
- **Published a book chapter** entitled, "X-ray Optics" in *OSA Handbook of Optics*, M. Bass, ed., (1994).
- **Edited the Book:** *Robert Shannon and Roland Shack: Legends in Applied Optics*, SPIE Press, 597 pages (2005).
- **Textbook:** *Diffraction for Engineers*, in Preparation for publication by SPIE Press (~ 380 pages).
- **Presented One Hundred Twenty-one papers** in technical conferences or symposia. **Sixty-nine** included full-length manuscripts and **fifty-two** were limited to extended summaries and abstracts published in conference proceedings or digests.
- **Presented Seventy-three Seminars or Colloquia** at Universities (29), Government Labs (26), or Industrial Organizations (18).
- **Thirty-one major technical reports** have been written & submitted to academic, government or industrial organizations.
- The above papers have been cited **over 460 times** in the technical literature.

Summary of Research Funding (Since Joining UCF in Sept. 1990)

Principal investigator (16) or Co-investigator (16) of 32 contracts or grants to UCF totaling \$5,517,394. Tasks for which I had sole technical responsibility total approximately \$1,792,820 (detailed breakdown in Addendum).

Service Activities

University:

CREOL Visiting Scholars Committee (2005-08).
CREOL Sabbatical Committee (2005-08).
CREOL Curriculum Committee MS Program (2005-07).
CREOL Bachelor of Science (BS) Committee (2005-07).
CREOL Curriculum Committee (2000-2003).
Faculty Advisor to the UCF Student Chapter of SPIE (1997-2006).
CREOL Ph.D. Qualifying Exam Committee for Optics Degree (2002-06)
CREOL Strategic Planning Committee (1995-1998).
CREOL Screening and Recruiting Committee (1990-98).
CREOL Industrial Affiliates Committee (1994-97).
ECE Electro-optics Sub-discipline Committee (1990-1999).
ECE Ph.D. Qualifying Exam Committee for Optical Sci. and Eng. Degree (1993-95).
COE Research Committee (1991-92).
Served on numerous M.S. Thesis and Ph.D. Dissertation Committees.

Professional Societies:

Board of Directors of SPIE (2001-2003)
SPIE Membership Committee (1994-99, Chair 2000-01). SPIE Awards Committee (1991-93).
Served on numerous SPIE Conference Program Committees (1985-2006).
Chairman of SPIE Tribute Conference for Robert Shannon and Roland Shack (2004).
SPIE Editorial Advisory Board for *oemagazine* (2001-03).
SPIE Strategic Planning Committee (2000-01).
Chairman of SPIE Symposium on Current Developments in Optical Engineering (1986).
Chairman of SPIE Symposium on Diffraction Phenomena (1985).
Developed and taught short courses at SPIE conferences on X-ray Optics, Astronomical Optics, Understanding Imaging Systems, Fourier Optics, and Scalar Diffraction Phenomena (1985-2006).
Member: Optical society of America (OSA). Served as an officer of several local chapters of OSA (was founding officer of Albuquerque Section). President of the Florida Section of the OSA (1998-00).
Routinely referee several papers for professional journals each year.

Community:

Participated in High School Career Day (1994).
Helped evaluate damage to St. Augustine Lighthouse Optics (1993).
Consultation to Astronauts Memorial Foundation (1990). Judged Science Fair (1980).

Professional Affiliations

Fellow of the International Society of Optical Engineering (SPIE).
Member of the Optical Society of America (OSA).

Honors, Awards and Distinctions

Fellow of SPIE, for contributions in areas of surface scatter phenomena and phased telescope arrays (1989).

Harvey-Thompson grazing incidence X-ray telescope design adopted by NOAA for Solar X-ray Imager (SXI) instrument on GOES weather satellite (Dec 1998). Four flight models and a spare manufactured by Raytheon Optical systems, Inc. on Lockheed Martin SXI program (1999-2004). **Received outstanding achievement award from Lockheed Martin Solar and Astrophysics Laboratory (LMSAL) in March 2005**. First SXI telescope successfully launched on GOES-13 by a Delta IV rocket in May 2006. First light image recorded on July 6, 2006. Image described as "exquisite" by one solar physicist on July 8, 2006.

Chosen as an outside, independent imaging expert to review NASA's Implementation Plan for the Return-to-Flight of the Space Shuttle after the 2003 Columbia disaster upon re-entering the earth's atmosphere in February of 2003.

Papers reprinted in three different Volumes of SPIE's Milestone Series of *Selected Papers on . . .*, Edited by Brian J. Thompson (P6 on Scalar Diffraction Theory, C12 on Adaptive Optics, and C48 on Surface Scatter Phenomena).

The **Harvey-Shack Surface Scatter Model** has been incorporated into four different (ASAP, TracePro, ZEMAX and FRED) commercially-available optical design and analysis codes.

One of ten Senior Scientists who were mentioned by name on the company prospectus, along with ten top managers, when the Government Systems Sector (approx. 1000 employees) of the Perkin-Elmer Corporation was sold in 1989.

Best Technical Paper Award by an Employee of the Perkin-Elmer Corp. in 1988. Paper P14, entitled "Transfer Function Characterization of Grazing Incidence Optical Systems".

Best Technical Paper Award by an Employee of the Perkin-Elmer Corp. in 1986. Paper C30, entitled "Optical Performance of Synthetic Aperture Telescope Configurations".

Two papers elaborated upon in at least three different popular text books. Papers P6 and P12 in the area of scalar diffraction theory.

Designed and engineered the top test equipment product of the year (as voted by the readers of *Electro-Optics* in their seventh annual product spotlight contest in 1983): a field-averaging spectrograph camera accessory (described in Paper P1).

Consulting/Industrial Collaborations

Consultant to Lockheed Martin (Palo Alto) in the area of surface scatter effects in UV imaging systems (2006).

Consultant to Tropol Corning in the area of surface scatter from optical fabrication errors (2005).

Consultant to SI Wave in the design of micro-zoom lenses (2005).

Consultant to the TRW in the area of phased telescope arrays (2000).

Consultant to the Invivo in the area of infrared systems design (1998).

Consultant to the Lockheed-Martin (Palo Alto) in the area of surface scatter effects in X-ray imaging (1997).

Consultant to the Center for Astrophysical Sciences, Johns Hopkins University, in the area of surface scatter phenomena (1996).

Consultant to the Abbott Laboratories in the area of diffraction analysis (1994).

Consultant to Hughes Danbury Optical Systems Inc. in the areas of Grazing Incidence EUV Imaging Systems (1991) and Phased Telescope Arrays (1990).

Consultant to Trax Instrument Corporation in the areas of design, analysis, and development of optical instrumentation (1981-1983).

ADDENDUM

Refereed Journal Articles

- P49. **J. E. Harvey** and A. Krywonos, “An Improved Inverse Scattering Solution for Smooth Surfaces”, in preparation for submission to *Opt. Eng.* (anticipated submission date April 2007).
- P48. **J. E. Harvey** and A. Krywonos, “Diffraction Theory for Physics Teachers”, in preparation for submission to *Am. J. Phys.* (anticipated submission date April 2007).
- P47. **J. E. Harvey**, A. Krywonos and Dijana Bogunovic, “Non-paraxial Scalar Treatment of Conventional Blazed Gratings”, in preparation for submission to *JOSA A* (anticipated submission date March 2007).
- P46. A. Krywonos and **J. E. Harvey**, “Predicting Surface Scatter using a Linear Systems Formulation of Non-paraxial Scalar Diffraction”, in preparation for publication in *Appl. Opt.* (anticipated submission date March 2007).
- P45. **J. E. Harvey**, Andrey Krywonos, Martina Atanassova, and P. L. Thompson, “The Solar X-ray Imager (SXI) on GOES-13: Design, Analysis, and Performance”, in preparation for publication in *Optical Engineering* (anticipated submission date Oct 2006).
- P44. **J. E. Harvey**, A. Krywonos and C. L. Vernold, “A Modified Beckmann-Kirchhoff Surface Scatter Theory for Large Incident and Scattering Angles”, *Opt. Eng.* (July 2007).
- P43. A. Krywonos, **J. E. Harvey**, R. E. Daniell, R. Eastes, and G. L. Peterson, “Scannless Ultraviolet Remote Sensor for Limb Profile Measurements from Low Earth Orbit”, *Opt. Eng.* **45** (10), Art. No. 106201, 1-9 (Oct 2006).
- P42. **J. E. Harvey**, Martina Atanassova, and A. Krywonos, “Balancing Detector Effects with Aberrations in the Design of Wide-field Grazing Incidence X-ray Telescopes”, *Opt. Eng.* **45** (6), Art. No. 063003, 1-10 (June 2006).
- P41. **J. E. Harvey**, A. Krywonos and Dijana Bogunovic, “Non-paraxial Scalar Treatment of Sinusoidal Phase Gratings”, *JOSA A* **23**, 858-865 (April, 2006).
- P40. **J. E. Harvey** and A. Krywonos, “Axial Irradiance Distribution Throughout the Whole Space Behind an Annular Aperture: Reply to Comments”, *Appl. Opt.* **42**, 3792-3794 (1 July 2003).
- P39. **J. E. Harvey**, D. Bogunovic, and A. Krywonos, “Aberrations of Diffracted Wave Fields: Distortion”, *Appl. Opt.* **42**, 1167-1174 (1 March 2003).
- P38. **J. E. Harvey** and A. Krywonos, “Axial Irradiance Distribution Throughout the Whole Space Behind an Annular Aperture”, *Appl. Opt.* **41**, 3790-3795 (July 2002).
- P37. **J. E. Harvey**, A. Krywonos, and D. Bogunovic, “A Tolerance on Defocus Precisely Locates the Far Field (Exactly where is that Far Field Anyway?)”, *Appl. Opt.* **41**, 2586-2588 (May 2002).
- P36. **J. E. Harvey**, “Perspectives on Diffraction”, *oemagazine* Vol. 1, No. 10, 22-25 (October 2001).
- P35. **J. E. Harvey**, A. Krywonos, and P. L. Thompson, “Grazing Incidence Hyperboloid-Hyperboloid Designs for Wide-field X-ray Imaging Applications”, *Appl. Opt.* **40**, 136-144 (1 Jan 2001).
- P34. **J. E. Harvey**, C. L. Vernold, A. Krywonos, and P. L. Thompson, “Diffracted Radiance: A Fundamental Quantity in Non-Paraxial Scalar Diffraction Theory: Errata”, *Appl. Opt.* **39**, 6374-6375 (Dec. 1, 2000).
- P33. P. L. Thompson and **J. E. Harvey**, “A Systems Engineering Analysis of Aplanatic Wolter Type I X-ray Telescopes”, scheduled for publication in *Opt. Eng.* **39**, 1677-1691 (June 2000).
- P32. **J. E. Harvey**, C. L. Vernold, A. Krywonos, and P. L. Thompson, “Diffracted Radiance: A Fundamental Quantity in Non-Paraxial Scalar Diffraction Theory”, *Appl. Opt.* **38**, 6469-6481 (November 1999).
- P31. **J. E. Harvey** and C. L. Vernold, “Description of Diffraction Grating Behavior in Direction Cosine Space”, *Appl. Opt.* **37**, 8158-8160 (Dec. 1, 1998).
- P30. A.R. Weeks, J. Xu, R.R. Phillips, L.C. Andrews, C. M. Stickley, G. Sellar, J. S. Stryjewski, and **J.E. Harvey**, “Experimental Verification and Theory for an Eight-element Multiple-aperture Equal-gain Coherent Laser Receiver for Laser Communications”, *Appl. Opt.* **37**, 4782-4788 (20 July 1998).
- P29. **J. E. Harvey** and W. J. Gressler, “Image Degradation due to Assembly and Alignment Errors in Conical Foil X-ray Telescopes”, *Opt Eng.* **35**, 3037-3047 (1996).
- P28. **J. E. Harvey**, K. L. Lewotsky, and A. Kotha, “Performance Predictions of a Schwarzschild Imaging Microscope for Soft X-ray Applications”, *Opt. Eng.* **35**, 2423-2436 (August 1996).
- P27. **J. E. Harvey**, S. P. Reddy, and R. L. Phillips, “Precision Pointing and Tracking through Random Media by Exploiting the Enhanced Backscatter Phenomenon”, *Appl. Opt.* **35**, 4220-4228 (1996).

- P26. **J. E. Harvey** and C. Ftaclas, "Diffraction Effects of Telescope Secondary Mirror Spiders upon Various Image Quality Criteria", *Appl. Opt.* **34**, 6337-6349 (1995).
- P25. **J. E. Harvey** and C. Ftaclas, "Field-of-view Limitations of Phased Telescope Arrays", *Appl. Opt.* **34**, 5787-5798 (1995).
- P24. **J. E. Harvey**, "Modeling the Image Quality of Enhanced Reflectance X-ray Multilayers as a Surface Power Spectral Density (PSD) Filter Function", *Appl. Opt.* **34**, 3715-3726 (1 July 1995).
- P23. **J. E. Harvey**, K. L. Lewotsky, and A. Kotha, "Optical Fabrication Tolerances for X-ray/EUV Synchrotron Beamline Optics", *Appl. Opt.* **34**, 3024-3032 (1995).
- P22. **J. E. Harvey**, A. Kotha and R. L. Phillips, "Image Characteristics in Applications Utilizing Dilute Subaperture Arrays", *Appl. Opt.* **34**, 2983-2992 (1995).
- P21. T. L. Alexander, **J. E. Harvey** and A. R. Weeks, "Average Speckle Size as a Function of Threshold Level: Comparison of Experimental Measurements with Theory", *Appl. Opt.* **33**, 8240-8250 (1994).
- P20. **J. E. Harvey** and A. Kotha, "Sparse Array Configurations Yielding Uniform MTF's in Reciprocal Path Imaging Applications", *Optics Comm.* **106**, 178-182 (15 March 1994).
- P19. **J. E. Harvey** and E. A. Nevis, "Angular Grating Anomalies: Effects of Finite Beam Size upon Wide-angle Diffraction Phenomena", *Appl. Opt.* **31**, 6783-6788 (1992).
- P18. **J. E. Harvey**, "Diffraction Effects in Grazing Incidence X-ray Telescopes", *Journal of X-ray Science and Technology* **3**, 68-76 (1991).
- P17. **J. E. Harvey**, W. P. Zmek, and C. Ftaclas, "Imaging Capabilities of Normal-incidence X-ray Telescopes", *Opt. Eng.* **29**, 603-608 (1990).
- P16. **J. E. Harvey** and R. A. Rockwell, "Performance Characteristics of Phased Array and Thinned Aperture Optical Telescopes", *Opt. Eng.* **27**, 762-768 (1988).
- P15. E. C. Moran and **J. E. Harvey**, "Ghost Image Behavior in Wolter Type I X-ray Telescopes", *Appl. Opt.* **27**, 1486-1491 (15 April 1988).
- P14. **J. E. Harvey**, E. C. Moran, and W. P. Zmek, "Transfer Function Characterization of Grazing Incidence Optical Systems", *Appl. Opt.* **27**, 1527-1533 (15 April 1988).
- P13. **J. E. Harvey**, M. J. MacFarlane, and J. L. Forgham, "Design and Performance of Ranging Telescopes: Monolithic versus Synthetic Aperture", *Opt. Eng.* **24**, 183-188 (1985).
- P12. **J. E. Harvey** and J. L. Forgham, "The Spot of Arago: New Relevance for an Old Phenomenon", *Am. J. Phys.* **52**, 243-247 (1984).
- P11. **J. E. Harvey**, "Reply to Leavitt's Comments on 'A Fourier Integral Treatment Yielding Insight into the Control of Gibbs' Phenomenon'", *Am. J. Phys.* **51**, 80 (1983).
- P10. J. S. Fender and **J. E. Harvey**, "Specifying Surface Finish and Scattering Tolerances of Conical Optical Elements", *Opt. Eng.* **21**, 983-986 (1982).
- P9. **J. E. Harvey**, "A Fourier Integral Treatment Yielding Insight into the Control of Gibbs' Phenomenon", *Am. J. Phys.* **49**, 747-750 (1981).
- P8. **J. E. Harvey** and M. L. Scott, "The Hole Grating Beam Sampler--A Versatile HEL Diagnostic Tool", *Opt. Eng.* **20**, 881-886 (1981).
- P7. B. Pierce, **J. E. Harvey**, A. Piekutowski, and W. McLinnis, "Design of a Thermal Blooming Cell for use in Evaluating Adaptive Optics", *Opt. Eng.* **19**, 381-386 (1980).
- P6. **J. E. Harvey**, "A Fourier Treatment of Near-field Scalar Diffraction Theory", *Am. J. Phys.* **47**, 974-980 (1979).
- P5. A. G. DeBell, E. L. Dereniak, **J. E. Harvey**, J. Nissley, J. Palmer, A. Selvarajan, and W. L. Wolfe, "Cryogenic Refractive Indices and Temperature Coefficients of CdTe from 6 μm to 22 μm ", *Appl. Opt.* **18**, 3114-3115 (1979).
- P4. **J. E. Harvey** and R. V. Shack, "Aberrations of Diffracted Wave Fields", *Appl. Opt.* **17**, 3003-3009 (1978).
- P3. B. C. Platt, H. W. Iconogle, **J. E. Harvey**, R. Korniski, and W. L. Wolfe, "Techniques for Measuring the Refractive Index and its Change with Temperature in the Infrared", *J. Opt. Soc. Am.* **65**, 1264-1266 (1975).
- P2. **J. E. Harvey** and W. L. Wolfe, "Refractive Index of Irtran 6 (hot-pressed Cadmium Telluride) as a Function of Wavelength and Temperature", *J. Opt. Soc. Am.* **65**, 1267-1268 (1975).
- P1. **J. E. Harvey**, W. L. Wolfe, and L. K. Lepley, "A Field-averaging Spectrograph Camera Accessory", *Remote Sensing of the Environment* **3**, 205-213 (1974).

Books or Book Chapters

- B3. **J. E. Harvey**, *Diffraction for Engineers: A Linear Systems Formulation* in Preparation for publication by SPIE Press.
- B2. **J. E. Harvey** and R. Brian Hooker, Editors; *Robert Shannon and Roland Shack: Legends in Applied Optics*, SPIE Press, 597 pages (2005).
- B1. **J. E. Harvey**, Chapter entitled “X-ray Optics”, in *OSA Handbook of Optics*, M. Bass, ed., McGraw-Hill (1994).

Conference Proceedings and Abstracts

- C121. **J. E. Harvey**, A. Krywonos, and J. C. Stover “Unified Scatter Model for Rough Surfaces at Large Incident and Scattered Angles”, **Invited Paper** presented at SPIE’s International Symposium on Optics and Photonics, San Diego, CA, August 2007; published in Proc. SPIE **6672-11** (August 2007).
- C120. J. C. Stover and **J. E. Harvey**, “Limitations of Rayleigh-Rice Perturbation Theory for Describing Surface Scatter”, **Invited Paper** presented at SPIE’s International Symposium on Optics and Photonics, San Diego, CA, August 2007; published in Proc. SPIE **6672-11** (August 2007).
- C119. **J. E. Harvey**, A. Krywonos, M. Atanassova, and P.L. Thompson, “The Solar X-ray Imager (SXI) on GOES-13: Design, Analysis, and On-orbit Performance”, presented at SPIE’s International Symposium on Optics and Photonics, San Diego, CA, August 2007; published in Proc. SPIE **6689-11** (August 2007).
- C118. **J. E. Harvey** and A. Krywonos, “Characterizing Optical Surfaces from Scattered Light Measurements”, presented at OSA Topical Meeting on Optical Interference Coatings, Tucson, AZ, June 4-7, 2007; Summary published in Conference Proceedings.
- C117. **J. E. Harvey** and A. Krywonos, “Closing the Loop between Optical Fabrication and Performance: Recent Advances in Modeling Surface Scatter Effects”, presented at SPIE’s Optifab 2007, Rochester, NY, May 14-17, 2007; Summary published in Conference Proceedings.
- C116. R. Eastes, W. McClintock, A. Aksnes, D. Anderson, L. Andersson, S. Budzien, A. Burns, M. Codrescu, R. Daniell, K. Dymond, F. Eparvier **J. Harvey**, T. Immel, A. Krywonos, M. Lankton, J. Lumpe, G. Prölss, A. Richmond, D. Rusch, S. Solomon, D. Strickland and T. Woods, “Global-scale Observations of the Limb and Disk (GOLD)”, Paper presented at the Chapman Conference on Mid-latitude Ionospheric Dynamics and Disturbances, Yosemite National Park, CA (Jan 3, 2007).
- C115. W. McClintock, M. Lankton, R. Eastes, A. Aksnes, D. Anderson, L. Andersson, A. Burns, M. Codrescu, R. Daniell, F. Eparvier **J. Harvey**, T. Immel, A. Krywonos, J. Lumpe, G. Prölss, A. Richmond, D. Rusch, S. Solomon, D. Strickland and T. Woods, “Global-scale Observations of the Limb and Disk (GOLD): Mission Implementation”, Poster Paper presented 2006 Fall AGU Meeting, San Francisco, CA (Dec 2006).
- C114. R. Eastes, W. McClintock, A. Aksnes, D. Anderson, L. Andersson, D. Baker, A. Burns, M. Codrescu, R. Daniell, F. Eparvier **J. Harvey**, T. Immel, A. Krywonos, J. Lumpe, G. Prölss, A. Richmond, D. Rusch, S. Solomon, D. Strickland and T. Woods, “Global-scale Observations of the Limb and Disk (GOLD): Continuous, Global-scale Ultraviolet Observations of Earth”, Poster Paper presented 2006 Fall AGU Meeting, San Francisco, CA (Dec 2006).
- C113. R. Eastes, W. McClintock, A. Aksnes, D. Anderson, L. Andersson, A. Burns, M. Codrescu, R. Daniell, F. Eparvier **J. Harvey**, T. Immel, A. Krywonos, M. Lankton, J. Lumpe, G. Prölss, A. Richmond, D. Rusch, S. Solomon, D. Strickland and T. Woods, “Global-scale Observations of the Limb and Disk (GOLD): Science Objectives”, Poster Paper presented 2006 Fall AGU Meeting, San Francisco, CA (Dec 2006).
- C112. A. Krywonos and **J. E. Harvey**, “Recent Developments in the Analysis of Surface Scatter Phenomena”, presented at SPIE’s International Symposium on Optics and Photonics, San Diego, CA, August 2006; published in Proc. SPIE **6291B-27**, (August 2006).
- C111. **J. E. Harvey** and A. Krywonos, “Understanding Diffraction Effects in Novel Systems Containing Nanostructures”, **Invited paper** presented at SPIE’s International Symposium on Optics and Photonics, San Diego, CA, August 2006; published in Proc. SPIE **6286-23**, (August 2006).
- C110. **J. E. Harvey** and A. Krywonos, “Radiance: The Natural Quantity for Describing Diffraction and Propagation”, presented at SPIE’s International Symposium on Optics and Photonics, San Diego, CA, August 2006; published in Proc. SPIE **6285-4**, 12 pages (August 2006).
- C109. R. Eastes, W. McClintock, D. Anderson, L. Andersson, D. Baker, A. Burns, M. Codrescu, R. Daniell, F. Eparvier **J. Harvey**, A. Krywonos, J. Lumpe, G. Prölss, A. Richmond, D. Rusch, S. Solomon and T. Woods, “Continuous, Global-scale Ultraviolet Observations of Earth: The Future for Space Weather Observations”, Poster Paper presented at Eos Trans. AGU, 86(52), 2005 Fall Meet. Suppl., Abstract SA51B-1143, non-refereed, international.

- C108. G. C. Curatu, D. V. Wick, D. M. Payne, T. Martinez, J. L. Harriman, and **J. E. Harvey**, “Wide Field-of-View Imaging System using a Liquid Crystal Spatial Light Modulator”, Proc. SPIE **5874-08** (August 2005).
- C107. **J. E. Harvey**, A. Krywonos, and J. B. Houston, Jr., “Performance Modeling of Launch Vehicle Imaging Telescopes”, Proc. SPIE **5867-16**, 12 pages (August 2005).
- C106. **J. E. Harvey**, M. Atanassova, and A. Krywonos, “Systems Engineering Analysis of Five “As-manufactured” SXI Telescopes”, Proc. SPIE **5867-15**, 11 pages (August 2005).
- C105. **J. E. Harvey**, A. Krywonos, and J. B. Houston, Jr., “Performance Modeling of Launch Vehicle Imaging Telescopes”, 114th Meeting of the Optical Systems Group of the Range Commander’s Council, Yuma, AZ (April 2005).
- C104. Andrey Krywonos, **James E. Harvey**, Robert E. Daniell, Nicolas Parent, and Richard Eastes, “Scannless Ultraviolet Remote Sensor for Limb Profile Measurements from Low Earth Orbit”, Proc. SPIE **5660**, 56-65 (Nov 2004).
- C103. **J. E. Harvey**, Martina Atanassova, and A. Krywonos, “Including Detector Effects in the Design of Wide-field Imaging Systems”, **Invited paper** presented at SPIE’s International Symposium on Optical Science and Technology, Denver, CO, August 2004; published in Proc. SPIE **5523**, 90-99 (August 2004).
- C102. **J. E. Harvey** and A. Krywonos, “A Global View of Diffraction - Revisited”, **Invited paper** presented at SPIE’s International Symposium on Optical Science and Technology, Denver, CO, August 2004; published in Proc. SPIE **AM100-26**, 191-210 (August 2004).
- C101. **J. E. Harvey**, Martina Atanassova, and A. Krywonos, “Including Detector Effects in the Design of Grazing Incidence X-ray Telescopes”, presented at SPIE’s International Symposium on Astronomical Telescopes and Instrumentation, Glasgow, Scotland, June 2004; published in Proc. SPIE **5497**, 636-645 (June 2004).
- C100. Martina Atanassova and **J. E. Harvey**, “A New X-ray Telescope Design”, presented as a poster paper at 12th Int’l School on Quantum Electronics: Physics and Applications, Varna, Bulgaria (23-28 September 2002); published in Proc. SPIE **5266**, 275-279 (2003).
- C99. **J. E. Harvey** and A. Krywonos, “Axial Irradiance Distribution Throughout the Whole Space Behind an Annular Aperture”, (**Reviewed**) poster paper **PDP9**, presented at the OSA Annual Meeting, Long Beach, CA (Oct. 2001).
- C98. D. Bogunovic, and **J. E. Harvey**, “Aberrations of Diffracted Wave Fields: Re-visited”, (**Reviewed**) poster paper **PDP8**, presented at the OSA Annual Meeting, Long Beach, CA (Oct. 2001).
- C97. **J. E. Harvey** and A. Krywonos, “A Systems Engineering Analysis of Image Quality”, presented at SPIE’s International Symposium on Optical Science and Technology, San Diego, CA, August 2000; published in Proc. SPIE **4093**, 379-388 (August 2000).
- C96. R. C. Catura, M. E. Bruner, P. R. Catura, B. K. Jurcevich, C. Kam, J. R. Lemen, S. B. Meyer, M. D. Morrison, M. B. Magida, P. B. Reid, **J. E. Harvey**, and P. L. Thompson, “Performance of the Engineering Model X-ray Mirror of the Soft X-ray Imager for Future GOES Missions”, presented at SPIE’s International Symposium on Optical Science and Technology, San Diego, CA, August 2000; published in Proc. SPIE **4138**, 33-42 (August 2000).
- C95. **J. E. Harvey**, P. L. Thompson and A. Krywonos, “Hyperboloid-Hyperboloid Grazing Incidence X-ray Telescope Designs for Wide-field Imaging Applications”, presented at SPIE’s Astronomical Telescope and Instrumentation Symposium, Munich, Germany. Proc. SPIE **4012**, 328-341 (March 2000).
- C94. **J. E. Harvey** and A. Krywonos, “Common Misconceptions of Diffraction Grating Behavior”, (**Reviewed**) poster paper presented at the OSA Annual Meeting, Santa Clara, CA (Sept. 1999).
- C93. **J. E. Harvey**, C. L. Vernold, and A. Krywonos, “A Fourier Treatment of Non-paraxial Scalar Diffraction Theory”, (**Reviewed**) poster paper presented at the OSA Annual Meeting, Santa Clara, CA (Sept. 1999).
- C92. **J. E. Harvey** and P. L. Thompson, “New Developments in Grazing Incidence X-ray Telescope Design”, **Invited Paper** presented at the OSA Annual Meeting, Santa Clara, CA (Sept. 1999).
- C91. **J. E. Harvey** and P. L. Thompson, “A Generalized Wolter Type I Design for Wide-field X-ray Imaging Applications”, presented at SPIE’s International Symposium on Optical Science, Engineering, and Instrumentation, Denver, CO, July 1999; published in Proc. SPIE **3779**, 371-381 (July 1999).
- C90. P. L. Thompson and **J. E. Harvey**, “Image Quality Criteria for Wide-field X-ray Imaging Applications”, presented at SPIE’s International Symposium on Optical Science, Engineering, and Instrumentation, Denver, CO, July 1999; published in Proc. SPIE **3779**, 390-400 (July 1999).

- C89. **J. E. Harvey** and P. L. Thompson, "A Generalized Wolter Type I Design for the Solar X-ray Imager (SXI)", presented at SPIE's International Symposium on Optical Science, Engineering, and Instrumentation, Denver, CO, July 1999; published in Proc. SPIE **3766** 173-183 (July 1999).
- C88. P. L. Thompson and **J. E. Harvey**, "Development of an Imaging Performance Criterion for Wide-field Grazing Incidence X-ray Telescopes", **Invited Paper** presented at SPIE's International Symposium on Optical Science, Engineering, and Instrumentation, Denver, CO, July 1999; published in Proc. SPIE **3766** 162-172 (July 1999).
- C87. **J. E. Harvey** and C. L. Vernold, "Modifying the Harvey-Shack Surface Scatter Theory", presented at SPIE's International Symposium on Optical Science, Engineering, and Instrumentation, San Diego, CA, 19-24 July 1998; published in Proc. SPIE **3426-39**, 326-332 (July 1998).
- C86. C. L. Vernold and **J. E. Harvey**, "A Modified Beckmann-Kirchoff Scattering Theory for Non-paraxial Angles", presented at SPIE's International Symposium on Optical Science, Engineering, and Instrumentation, San Diego, CA, 19-24 July 1998; published in Proc. SPIE **3426-05**, 51-56 (July 1998).
- C85. **J. E. Harvey**, P. L. Thompson and C. L. Vernold, "Understanding Surface Scatter Effects in Grazing Incidence X-ray Synchrotron Applications", presented at SPIE's International Symposium on Optical Science, Engineering, and Instrumentation, San Diego, CA, 19-24 July 1998; published in Proc. SPIE **3447-14**, 94-100 (July 1998).
- C84. M. E. Bruner, R. C. Catura, and **J. E. Harvey**, "Design and Performance Predictions for the GOES SXI Telescope", presented at SPIE's International Symposium on Optical Science, Engineering, and Instrumentation, San Diego, CA, 19-24 July 1998; published in Proc. SPIE **3442-23**, 192-202 (July 1998).
- C83. **J. E. Harvey**, P. L. Thompson and C. L. Vernold, "Understanding Surface Scatter Effects in Grazing Incidence X-ray Telescopes", **Invited paper** presented at SPIE's International Symposium on Optical Science, Engineering, and Instrumentation, San Diego, CA, 19-24 July 1998; published in Proc. SPIE **3444-50**, 518-525 (July 1998).
- C82. P. L. Thompson and **J. E. Harvey**, "The 'Aplanatic' Wolter Type I Telescope design: Is There a Practical Advantage?", presented at SPIE's International Symposium on Optical Science, Engineering, and Instrumentation, San Diego, CA, 19-24 July 1998; published in Proc. SPIE **3444-51**, 526-542 (July 1998).
- C81. L. C. Andrews, D. E. Kelly, R. L. Phillips, A. R. Weeks, **J. E. Harvey**, J. Xu, C. Gagge, A. Notash, G. Luvera, and G. Sellar, "Carrier-to-noise Ratio for an Equal Gain Coherent Laser Radar Receiver Array System: Theory and Experiment", Europto Symposium on Optics in Atmospheric Propagation and Adaptive Systems II, London, UK (September 23-24, 1997); published in Proc. SPIE **3219**, 84-92 (1997).
- C80. C. L. Vernold and **J. E. Harvey**, "Comparison of Harvey-Shack Scatter Theory with Experimental Measurements", SPIE's International Symposium on Optical Science, Engineering, and Instrumentation, San Diego, CA, 31 July 1997; published in Proc. SPIE **3141-14**, 128-138 (1997).
- C79. **J. E. Harvey** and C. L. Vernold, "Transfer Function Characterization of Scattering Surfaces: Revisited", SPIE's International Symposium on Optical Science, Engineering, and Instrumentation, San Diego, CA, 31 July 1997; published in Proc. SPIE **3141-13**, 113-127 (1997).
- C78. A. R. Weeks, J. Xu, R. L. Phillips, L. C. Andrews, **J. E. Harvey**, G. Sellar, K. J. Gamble, D. Kelly, P. Thompson, C. Gagge, K. Lewis, G. Luvera, A. Notash, C. M. Stickley, and J. S. Stryjewski, "Field Test and Theory of CNR-Gain for an Eight-Aperture Coherent Laser Receiver Array", presented at 9th International Conference on Coherent Laser Radar in Linkoping, Sweden (June 1997).
- C77. A. R. Weeks, R. L. Phillips, J. Xu, K. J. Gamble, C. Gagge, K. Lewis, G. Luvera, A. Notash, P. Thompson, **J. E. Harvey**, G. Sellar, C. M. Stickley, L. C. Andrews, D. Kelly, and J. S. Stryjewski, "Experimental Verification and Theory of CNR Gain for an Eight Element Multiple Aperture Coherent Laser Receiver", presented at SPIE's International Symposium on Optical Engineering in Aerospace Sensing in Orlando, FL (April 1997); published in Proc. SPIE **3065-10**, 62-70 (1997).
- C76. A. Kotha, **J. E. Harvey**, D. Golini, "Estimation of the Surface Power Spectral Density (PSD) Function for Deterministic Microground Surfaces", OSA Annual Meeting, Rochester, NY (1996).
- C75. **J. E. Harvey**, C. L. Vernold, and K. A. Richardson, "A Diffraction Grating Model of Surface Scatter Phenomena", OSA Annual Meeting, Rochester, NY (Oct. 20-25, 1996).
- C74. R. E. Phillips and **J. E. Harvey**, "Reciprocal Path Tracking in Satellite Laser Communications Applications", European symposium on Satellite Remote Sensing III, Taormina, Italy (September 23-27, 1996); published in Proc. SPIE **2956**, 179-187 (1997).

- C73. **J. E. Harvey**, “Bridging the Gap between ‘Figure’ and ‘Finish’”, OSA Optical Fabrication & Testing Meeting, Boston, MA (May 3, 1996).
- C72. A. Kotha and **J. E. Harvey**, “Modeling Image Degradation due the *Opticam* Manufacturing Process”, OSA Optical Fabrication & Testing Meeting, Boston, MA (April 29-May 3, 1996).
- C71. S. P. Reddy, **J. E. Harvey**, and R. L. Phillips, “Pointing, Tracking, and Acquisition through Atmospheric Turbulence utilizing Reciprocal Path Techniques”, presented at SPIE's International Symposium on Optical Engineering in Aerospace Sensing in Orlando, FL (1996); published in Proc. SPIE **2739-04**, 40-51 (1996).
- C70. **J. E. Harvey**, S. P. Reddy, and R. L. Phillips, “Precision Pointing and Tracking through Atmospheric Turbulence for Hard Target Imaging Applications”, presented at the OSA sponsored Topical Meeting on *Coherent Laser Radar* at Keystone, Colorado, July 23-27, 1995.
- C69. **J. E. Harvey**, “Scattering Effects in X-ray Imaging Systems”, **Invited paper** presented in the *X-ray and Extreme Ultraviolet Optics* Conference at SPIE's International Symposium on Optical Science, Engineering, and Instrumentation, San Diego, CA, 9-14 July 1995; published in Proc. SPIE **2515-32** (1995).
- C68. A. Kotha and **J. E. Harvey**, “Scattering Effects of Machined Optical Surfaces”, presented at SPIE's International Symposium on Optical Science, Engineering, and Instrumentation, San Diego, CA, 9-14 July 1995; published in *Optical Scattering in the Optics, Semiconductor, and Computer Disc Industries*, J. C. Stover ed., Proc. SPIE **2541-07**, 54-65 (1995).
- C67. **J. E. Harvey** and A. Kotha, “Scattering Effects from Residual Optical Fabrication Errors”, presented at the International Conference on Optical Fabrication and Testing, Tokyo, Japan, 5-7 June 1995; published in Proc. SPIE **2576-25**, 155-174 (1995).
- C66. P. Gatt, **J. E. Harvey**, A. R. Weeks, H. Mylar, C. M. Stickley, and R. Mongeon, “CREOL Laser Radar Activities at BMDO's ISTEf”, presented at the 17th International Laser Radar Conference, Sendai, Japan, 25-29 July 1994.
- C65. **J. E. Harvey** and A. Kotha, “Specifying Optical Fabrication Tolerances to Satisfy Specific Image Quality Requirements”, presented at the OSA sponsored *Optical Fabrication and Testing Workshop* in Rochester, New York (June 1994).
- C64. A. Kotha, **J. E. Harvey**, and R. L. Phillips, “Reciprocal Path Imaging: A Technique for the Mitigation of Image Degradation due to Atmospheric Turbulence”, presented at SPIE's International Symposium on Optical Engineering in Aerospace Sensing in Orlando, FL (4-8 April 1994); published in Proc. SPIE **2222-61**, 462-469 (1994).
- C63. **J. E. Harvey**, A. Kotha, and R. L. Phillips, “Fundamental Limitations of Reciprocal Path Imaging through the Atmosphere with Dilute Subaperture Arrays”, presented at SPIE's International Symposium on Optical Engineering in Aerospace Sensing in Orlando, FL (4-8 April 1994); published in Proc. SPIE **2222-62**, 470-484 (1994).
- C62. T. L. Alexander, **J. E. Harvey**, and D. Hefele, “Experimental Verification of a Theoretical Model for Speckle Intensity Excursion Areas”, presented at SPIE's International Symposium on Optical Engineering in Aerospace Sensing in Orlando, FL (4-8 April 1994); published in Proc. SPIE **2222-63**, 485-498 (1994).
- C61. **J. E. Harvey**, R. L. Phillips, C. M. Stickley, and A. Kotha, “Reciprocal Path Imaging through the Atmosphere with Sparse Array Receivers”, presented at the 7th Conference on Coherent Laser Radar, Paris, France (1993).
- C60. A. Kotha and **J. E. Harvey**, “Enhanced EUV Performance of Wolter Type II Telescopes”, presented in the conference on *Multilayer and Grazing Incidence X-ray/EUV Optics II* at SPIE's 1993 International Symposium on Optics, Imaging, and Instrumentation (11-16 July 1993); published in Proc. SPIE **2011**, 34-46 (1993).
- C59. W. J. Gressler and **J. E. Harvey**, “Conical Foil Telescope Performance Predictions for Space Astronomy Applications”, presented in the conference on *Multilayer and Grazing Incidence X-ray/EUV Optics II* at SPIE's 1993 International Symposium on Optics, Imaging, and Instrumentation (11-16 July 1993); published in Proc. SPIE **2011**, 182-192 (1993).
- C58. **J. E. Harvey**, K. L. Lewotsky and A. Kotha, “Specifying Optical Fabrication Tolerances for Soft X-ray Imaging Applications”, **Invited Paper** presented at Conference on Soft X-rays in the 21st Century, Provo, Utah (Feb 1993).
- C57. K. L. Lewotsky and **J. E. Harvey**, “Optical Fabrication Tolerances for Synchrotron Beamline Optics”, presented at the OSA Annual Meeting in Albuquerque, NM (Sept 1992).
- C56. K. L. Lewotsky, A. Kotha, and **J. E. Harvey**, “Performance Limitations of Imaging Microscopes for Soft X-ray Applications”, presented at the conference on *Soft X-ray Microscopy* at SPIE's 1992 International Symposium on Optical Applied Science and Engineering in San Diego, CA (19-24 July 1992); published in Proc. SPIE **1741**, 32-39 (1992).

- C55. **J. E. Harvey**, “Potential Pitfalls in the Design of X-ray/EUV Optics”, presented in the conference on *Lens Design: Critical Reviews of Optical Science and Technology* at SPIE's OE LASE '92 in Los Angeles, CA (19-25 January 1992), published in Proc. SPIE **CR41-18**, W. J. Smith, ed., (1992).
- C54. **J. E. Harvey**, “Scattering from Multilayer Coatings: a Linear Systems Model”, presented in the conference on *Optical Scatter: Applications, Measurement* at SPIE's 1991 International Symposium on Optical Applied Science and Engineering in San Diego, CA (21-26 July 1991); published in Proc. SPIE **1530**, 35-41 (1991).
- C53. C. L. Vernold and **J. E. Harvey**, “Effective Surface PSD for Bare Hot-isostatic-pressed Beryllium Mirrors”, presented in the conference on *Optical Scatter: Applications, Measurement* at SPIE's 1991 International Symposium on Optical Applied Science and Engineering in San Diego, CA (21-26 July 1991); published in Proc. SPIE **1530-15**, 144-149 (1991).
- C52. **J. E. Harvey**, “Specifying Optical Fabrication Tolerances for Soft X-ray Projection Lithography Systems”, presented at the OSA Topical Meeting on Soft X-ray Projection Lithography in Monterey, CA (April 1991).
- C51. **J. E. Harvey**, “Recent Progress in X-ray Imaging”, presented at the AIAA Space Programs and Technologies Conference in Huntsville, AL (Sept. 1990).
- C50. **J. E. Harvey** and C. Ftaclas, “Fundamental Limitations on Off-axis Performance of Phased Telescope Arrays”, in *Advanced Technology Optical Telescopes IV*, L. D. Barr, ed., Proc. SPIE **1236-34**, 390-405 (1990).
- C49. **J. E. Harvey** and C. Ftaclas, “Image Quality Predictions in the Presence of Secondary Mirror Spiders and Other Obscurations”, presented at the Engineering Problems and Solutions Workshop at SPIE's OE/FIBERS Symposium, Boston, MA (1989)
- C48. **J. E. Harvey**, “Surface Scatter Phenomena: A Linear, Shift-invariant Process”, in *Scatter from Optical Components*, J. C. Stover, ed., Proc. SPIE **1165-42**, 87-99 (1989)
- C47. **J. E. Harvey**, W. P. Zmek, and E. C. Moran, “X-ray/EUV Multilayers: Promise and Pitfalls”, in *X-ray /EUV optics for Astronomy and Microscopy*, R. B. Hoover, ed., Proc. SPIE **1160-22**, 209-216 (1989).
- C46. W. P. Zmek, **J. E. Harvey**, and E. C. Moran, “Prediction of Image Quality for Normal-incidence X-ray/EUV Multilayers in the Presence of Substrate and Interface Fabrication Errors”, in *X-ray /EUV optics for Astronomy and Microscopy*, R. B. Hoover, ed., Proc. SPIE **1160-27**, 217-228 (1989).
- C45. **J. E. Harvey** and C. Ftaclas, “Effects of Telescope Aberrations upon Phased Array Performance”, presented at the Lunar Optical/IR Synthesis Array (LOISA) Workshop, Albuquerque, NM (Feb. 1989).
- C44. E. C. Moran, **J. E. Harvey**, F. E. Christensen, N. J. Westergaard, H. W. Schnopper, B. P. Byrnak, and H. U. Noergaard-Nielson, “Ghost Image Analysis for the XSPEC High-throughput X-ray Telescope Mission”, presented at the 173rd Meeting of the American Astronomical Society in Boston, MA (Jan. 1989).
- C43. **J. E. Harvey**, “Field-of-view Limitations of Phased Telescope Arrays”, **Invited Paper** at OSA Topical Meeting on Space Optics for Astrophysics, Cape Cod, MA (Sept. 1988).
- C42. **J. E. Harvey** and C. Ftaclas, “Diffraction Effects of Secondary Mirror Spiders upon Telescope Image Quality”, in *Current Developments in Optical Engineering III*, R. E. Fischer and W. J. Smith, eds., Proc. SPIE **965-02**, 7-17 (1988).
- C41. W. P. Zmek, E. C. Moran, and **J. E. Harvey**, “Effects of Surface Quality upon the Performance of Normal Incidence X-ray/XUV Imaging Systems”, in *X-ray Multilayers for Diffractometers, Monochrometers, and Spectrometers*, F. E. Christensen, ed., Proc. SPIE **984-26**, 202-212 (1988).
- C40. **J. E. Harvey** and E. C. Moran, “Degradation of Optical Performance due to Scattering in Grazing Incidence (X-ray & EUV) Applications”, 18th Winter Colloquium on Quantum Electronics, Snowbird, Utah (Jan. 1988).
- C39. **J. E. Harvey**, E. C. Moran and W. P. Zmek, “Transfer Function Characterization of Grazing Incidence Optical Systems”, in *Grazing Incidence Optics for Astronomical and Laboratory Applications*, S. Bowyer and J. Green, eds., Proc. SPIE **830-05**, 37-43 (1987).
- C38. E. C. Moran and **J. E. Harvey**, “Ghost Image Control of Grazing Incidence Optical Systems”, in *Grazing Incidence Optics for Astronomical and Laboratory Applications*, S. Bowyer and J. Green, eds., Proc. SPIE **830**, 254-259 (1987).
- C37. **J. E. Harvey** and R. A. Rockwell, “Performance Characteristics of Phased Array and Thinned Aperture Optical Telescopes”, in *Reflective Optics*, D. Korsch, ed., Proc. SPIE **751**, 62-71 (1987).
- C36. **J. E. Harvey** and A. B. Wissinger, “Specifying Optical Performance of Imaging Phased Telescope Arrays”, presented at the 1986 Annual Meeting of the Optical Society of America. Abstract published in J. Opt. Soc. Am. A, **3** (13), P5 (1986).

- C35. A. B. Wissinger, K. N. Bolin, and **J. E. Harvey**, "Transfer Function Characterization of Phased Telescope Arrays", presented at 1986 Annual Meeting of the Optical Society of America. Abstract published in *J. Opt. Soc. Am. A*, **3** (13), P5 (1986).
- C34. **J. E. Harvey**, "Diffraction-limited Performance of Grazing Incidence Optical Systems", in *Grazing Incidence Optics*, J. F. Osantowski and L. VanSpeybroeck, eds., Proc. SPIE **640-03**, 2-9 (1986).
- C33. **J. E. Harvey**, "The Effects of Finite Beam Size upon Wide-angle Diffraction Phenomena", in *Diffraction Phenomena in Optical Engineering Applications*, J. E. Harvey and D. M. Byrne, eds., Proc. SPIE **560-03**, 21-28 (1985).
- C32. D. R. Erbschloe and **J. E. Harvey**, "Aberration Analysis from Diffraction Patterns Produced by Annular Apertures", in *Diffraction Phenomena in Optical Engineering Applications*, **J. E. Harvey** and D. M. Byrne, eds., Proc. SPIE **560**, 114-125 (1985)
- C31. **J. E. Harvey**, A. B. Wissinger, and A. N. Bunner, "A Parametric Study of Various Synthetic Aperture Telescope Configurations for Coherent Imaging Applications", in *Infrared, Adaptive, and Synthetic Aperture Optical Systems*, R. B. Johnson, W. L. Wolfe and J. S. Fender, eds., Proc. SPIE **643-30**, 194-207 (1985).
- C30. **J. E. Harvey**, P. R. Silverglate, and A. B. Wissinger, "Optical Performance of Synthetic Aperture Telescope Configurations", Southwest Conference on Optics, Albuquerque, NM, March 1985, Proc. SPIE **540**, 110-118 (1985).
- C29. E. A. Nevis and **J. E. Harvey**, "Angular Grating Anomalies: An Apparent Violation of the grating Equation", Proc. SPIE **503-10**, 46-52 (1984).
- C28. F. D. Tart and **J. E. Harvey**, "Alignment Theory and Practice for Diffraction Grating Rhombs", Proc. SPIE **483**, 2-9 (1984).
- C27. **J. E. Harvey**, M. J. MacFarlane, and J. L. Forgham, "Design and Performance of Ranging Telescopes: Monolithic vs. Synthetic Aperture", in *Synthetic Aperture Systems*, J. S. Fender, ed., Proc. SPIE **440-11**, 56-67 (1983).
- C26. **J. E. Harvey**, J. L. Forgham, and V. L. Gamiz, "The Spot of Arago: HEL Diagnostics without Beam Sampling Components", High Power Laser Optical Components Conference, Boulder, Colorado (1982).
- C25. **J. E. Harvey**, J. L. Forgham, and K. von Bieren, "The Spot of Arago and its Role in Wavefront Analysis", Proc. SPIE **351-02**, 2-9 (1982).
- C24. **J. E. Harvey** and J. S. Fender, "A Systems Approach to Specifying Optical Surface Finish", Showcase for Technology, Albuquerque, New Mexico (October 1981).
- C23. **J. E. Harvey** and J. S. Fender, "Specifying Surface Finish and Scattering Tolerances of Conical Optical Elements", Conference of Conical Optical Element Metrology, Albuquerque, New Mexico (June 1981).
- C22. **J. E. Harvey**, "Simplified BRDF Data Presentation--A Linear Systems Approach", ASTM Minisymposium on Standards for Specifying the Surface Finish of Optical Components, NBS Gaithersburg, Maryland (June 1981).
- C21. B. J. Pierce, **J. E. Harvey**, and J. S. Nichols, "Experimental Verification of a Return Wave Concept for Thermal Blooming Compensation", CLEO/ICF '80, San Diego, CA (Feb. 1980).
- C20. **J. E. Harvey** and M. L. Scott, "The Hole Grating Beam Sampler -- A Versatile HEL Diagnostic Tool", Proc. SPIE **240-37** (1980).
- C19. **J. E. Harvey**, M. L. Scott, J. P. Mills, and D. Vunck, "Experimental Evaluation of the ALL Hole Grating", High Power Laser Optical Components Conference, Boulder, Colorado (1980).
- C18. **J. E. Harvey**, B. J. Pierce, and M. A. Coyne, "Thermal Boundary Layer Effects from Uncooled HEL Mirrors", High Power Laser Optical Components Conference, Boulder, Colorado (1979).
- C17. B. J. Pierce, **J. E. Harvey**, R. Dymale, and J. S. Nichols, "Experimental Verification of the Slow Dither Concept for Thermal Blooming Compensation", Proc. SPIE **195-31**, 222-231 (1979).
- C16. J. K. Bowker, J. Feinleib, L.E. Schmutz, S. J. Tubbs, J. A. Gordon **J. E. Harvey**, and J. E. Pearson, "Closed-loop Experimental Performance of the I³ Sensor", IEEE/OSA Conference on Laser Engineering and Applications, Washington, D.C. (1979).
- C15. B. J. Pierce, **J. E. Harvey**, A. Piekutowski, and W. McLinnis, "Design of a Thermal Blooming Cell for use in Evaluating Adaptive Optics", Proc. SPIE **179-12**, 81-90 (1979).
- C14. **J. E. Harvey**, "The Surface Transfer Function as a Means of Specifying Optical Surface Finish and Scattering Tolerances", Conference on Standards for Scattering from Optical Surfaces, NBS Boulder, Colorado (Feb. 1979).
- C13. A. G. DeBell, E. L. Dereniak, **J. E. Harvey**, J. Nissley, J. Palmer, and A. Selvarajan, "Cryogenic Refractive Indices and Temperature Coefficients of Cadmium Telluride from 20 to 300 K", 1978 Annual Meeting of the Optical Society of America, San Francisco, CA. Abstract published in *J. Opt. Soc. Am.*, **68**, 1397 (1978).

- C12. **J. E. Harvey** and G. M. Callahan, "Wavefront Error Compensation Capabilities of Multi-actuator Deformable Mirrors", in *Adaptive Optical Components I*, S. Holly and L. James eds., Proc. SPIE **141-08**, 50-57 (1978).
- C11. J. E. Breneman, **J. E. Harvey**, and G. M. Callahan, "Modeling the Wavefront Error Compensation Capabilities of a Laser Deformable Mirror", presented at a Mathematical Modeling Symposium sponsored by the Society of Industrial and Applied Mathematics, Carnegie-Mellon University (July 1978).
- C10. **J. E. Harvey** and G. M. Callahan, "Transfer Function Characterization of Deformable Mirrors", 1977 Annual Meeting of the Optical Society of America, Toronto, Canada. Abstract published in J. Opt. Soc. Am., **67**, 1367 (1977).
- C9. **J. E. Harvey**, "Light Scattering Characteristics of Optical Surfaces", in *Stray Light Problems in Optical Systems*, J. Lytle and H. Morrow, eds., Proc. SPIE **107-05**, 41-47 (1977).
- C8. F. O. Bartell, A. G. DeBell, D. S. Goodman, **J. E. Harvey**, and W. L. Wolfe, "A BRDF Measuring Instrument", OSA Topical Meeting on Optical Phenomena in Infrared Materials, Annapolis, MD (Dec. 1976).
- C7. **J. E. Harvey**, J. A. Gunderson, R. V. Shack, and W. L. Wolfe, "Scattering Properties of Optical Surfaces and Baffle Materials for Infrared Systems", OSA Topical Meeting on Optical Phenomena in Infrared Materials, Annapolis, MD (Dec. 1976).
- C6. **J. E. Harvey**, "Transfer Function Characterization of Scattering Surfaces", 1976 Annual Meeting of the Optical Society of America, Tucson, AZ. Abstract published in J. Opt. Soc. Am., **66** (10), 1136 (1976).
- C5. J. K. Lepley and **J. E. Harvey**, "Measurement of In Situ Reflectance and Film Characteristics with Spectrograph Camera Accessory", 1975 ASP-ACSM Fall Convention, Phoenix, AZ (Oct. 1975).
- C4. **J. E. Harvey**, "Aberrations of Diffracted Wave Fields", 1975 Annual Meeting of the Optical Society of America, Boston, MA. Abstract published in J. Opt. Soc. Am., **65** (10), 1167 (1975).
- C3. M. A. DeBell and **J. E. Harvey**, "Recent Developments in Surface Scatter Studies", 1974 Annual Meeting of the Optical Society of America, Houston, TX. Abstract published in J. Opt. Soc. Am., **64** (10), 1404 (1974).
- C2. **J. E. Harvey**, W. L. Wolfe, and L. K. Lepley, "A Portable Field-averaging Spectrograph", Fourth Annual Conference on the Application of Remote Sensing of Arid Land Resources and Environment, Tucson, Arizona (Nov. 1973).
- C1. **J. E. Harvey** and W. L. Wolfe, "Refractive Index of Irtran 6 as a Function of Wavelength and Temperature", 1973 Spring Meeting of the Optical Society of America, Denver, CO. Abstract published in J. Opt. Soc. Am., **63** (4), 494 (1973).

Colloquia, Seminars, and Workshop Presentations

- S73. **J. E. Harvey** and A. Krywonos, "Recent Advances in the Understanding of Surface Scatter Behavior", Photon Engineering, LLC, Tucson, AZ (June 8, 2007).
- S72. **J. E. Harvey** and A. Krywonos, "Recent Advances in the Understanding of Surface Scatter Behavior", National Institute for Standards and Testing, Gaithersburg, MD (April 19, 2007).
- S71. **J. E. Harvey** and A. Krywonos, "Recent Advances in the Understanding of Surface Scatter Behavior", NASA/GSFC, Greenbelt, MD (April 18, 2007).
- S70. **J. E. Harvey** and A. Krywonos, "Recent Advances in the Understanding of Surface Scatter Behavior", National Capital OSA Section Meeting, OSA Headquarters, Washington DC (April 17, 2007).
- S69. J. Lentz, **J. E. Harvey** and J. Salg, "Status Report on the TIME Tool", Modern Optical Imaging Systems Design, Test and Evaluation Workshop, sponsored by CREOL/UCF in conjunction with the PAFB SLRSC Damewood Optical Maintenance Laboratory, Patrick AFB, Florida (Oct. 23, 2006).
- S68. J. B. Houston, Jr. and **J. E. Harvey**, "Fundamental Factors Affecting Image Quality", Modern Optical Imaging Systems Design, Test and Evaluation Workshop, sponsored by CREOL/UCF in conjunction with the PAFB SLRSC Damewood Optical Maintenance Laboratory, Patrick AFB, Florida (Oct. 23, 2006).
- S67. **J. E. Harvey**, "Generalized Harvey-Shack Surface Scatter Theory", Breault Research Organization, Tucson, AZ (Aug 2006).
- S66. **J. E. Harvey**, "Optical Design and Image Analysis", Imaging Sciences Research Forum, University of Central Florida, (July 2006)
- S65. **J. E. Harvey**, "Solar Physics, Space Weather, and Wide-field X-ray Telescopes", CREOL Industrial Affiliates Day (April 21, 2006).

- S64. **J. E. Harvey**, “Baselining and Performance Predictions of Range Telescopes with the TIME Tool”, ITT/SLRS Launch Vehicle Imaging Telescope Workshop, in conjunction with the RCC/OSG Meeting, Patrick AFB, FL (March 27, 2006).
- S63. **J. E. Harvey**, “Solar Physics, Space Weather, and Wide-field X-ray Telescopes”, Physics Colloquium presented at Kansas Wesleyan University (September 30, 2005).
- S62. **J. E. Harvey**, “Solar Physics, Space Weather, and Wide-field X-ray Telescopes”, CREOL REU Program, (June 28, 2005).
- S61. **J. E. Harvey**, “Solar Physics. Space Weather, and Wide-field X-ray Telescopes”, Colloquium presented at Tropel Corning in Fairport, NY (May 25, 2005).
- S60. **J. E. Harvey** and A. Krywonos, “The BRDF and Surface Scatter Phenomena”, BRDF Workshop: From Physics to Rendering, SPIE Defense & Security Symposium, Orlando, FL (April 12, 2004). *Invited.*
- S59. **J. E. Harvey**, “Diffracted Radiance and a Modified Beckmann-Kirchhoff Scattering Theory”, Colloquium presented at Breault Research Organization in Tucson, AZ (October 13, 2003).
- S58. **J. E. Harvey**, “Modified Beckmann-Kirchhoff Scattering Theory”, Colloquium presented at The Royal Institute of Technology, Stockholm, Sweden (June 26, 2003).
- S57. **J. E. Harvey**, “Diffracted Radiance: Recent developments in Scalar Diffraction Theory”, Colloquium presented at The Royal Institute of Technology, Stockholm, Sweden (June 12, 2003).
- S56. **J. E. Harvey**, “Edge diffraction and the Spot of Arago (New Relevance for an Old Phenomenon)”, Colloquium presented at The Royal Institute of Technology, Stockholm, Sweden (May 29, 2003).
- S55. **J. E. Harvey**, “Aberrations of Diffracted Wave Fields”, Colloquium presented at The Royal Institute of Technology, Stockholm, Sweden (May 15, 2003).
- S54. **J. E. Harvey**, “The Impact of Optics as an Enabling Technology”, Colloquium presented at The Open Polytechnic of New Zealand, Wellington, New Zealand (March 31, 2003).
- S53. **J. E. Harvey**, “Diffracted Radiance and a Modified Beckmann-Kirchhoff Scattering Theory”, Colloquium presented at FOI Swedish Defense Research Agency in Linkoping, Sweden (October 23, 2002).
- S52. **J. E. Harvey**, “Recent Developments in Scalar Diffraction Theory”, Colloquium presented at the Photonics Research Center, The University of Connecticut, Storrs, CT (September 27, 2002).
- S51. **J. E. Harvey**, “Systems Engineering Analysis of Image Quality for Lithography Applications”, Colloquium presented at AMSL, Inc, Wilton, CT (August 9, 2002).
- S50. **J. E. Harvey**, “Grazing Incidence X-ray Telescopes for High energy Solar Physics Applications”, Faculty Seminar Series at CREOL, The University of Central Florida, Orlando, FL (March 30, 2001).
- S49. **J. E. Harvey**, “A Systems Engineering Analysis of Image Quality for Grazing Incidence X-ray Imaging Systems”, Colloquium presented at the MIT Space Nanotechnology Laboratory, Cambridge, MA (March 13, 2001).
- S48. **J. E. Harvey**, “Thinned Aperture Imaging Systems”, Colloquium presented at TRW Corp., Redondo Beach, CA (December 11, 2000).
- S47. **J. E. Harvey**, “Recent Developments in Non-paraxial Scalar Diffraction Theory”, Colloquium presented for CREOL REU Program, Orlando, FL (June 12, 2000).
- S46. **J. E. Harvey**, “Diffracted Radiance: A Fundamental Quantity in Scalar Diffraction Theory”, Colloquium presented at Zeiss Optics Works, Oberkochen, Germany (April 4, 2000).
- S45. **J. E. Harvey** and C. L. Vernold, “Diffracted Radiance: A Fundamental Quantity in Scalar Diffraction Theory”, Colloquium presented at the Department of Physics and Astronomy, The University of New Mexico, Albuquerque, NM (September 10, 1999).
- S44. **J. E. Harvey** and C. L. Vernold, “Diffracted Radiance: A Fundamental Quantity in Scalar Diffraction Theory”, Colloquium presented at Raytheon Optical Systems, Inc., Danbury, CT (August 18, 1999).
- S43. **J. E. Harvey** and C. L. Vernold, “Diffracted Radiance: A Fundamental Quantity in Scalar Diffraction Theory”, Colloquium presented at Center for Applied Optics, The University of Alabama in Huntsville, Huntsville, AL (March 11, 1999).
- S42. **J. E. Harvey**, “Generalized Wolter Type I Designs for Wide-angle X-ray Imaging Applications”, Huntsville Electro-Optical Society, Huntsville, AL (March 11, 1999).
- S41. **J. E. Harvey**, “Phased Telescope Array Design Constraints”, JPL Sparse Aperture Workshop, Pasadena, CA (January 14, 1999).

- S40. **J. E. Harvey** and P. L. Thompson, "Suggested Alternative Optical Design for Improved Performance of SXI", presented at the National Oceanic and Atmospheric Administration (NOAA) Headquarters, Boulder, CO (November 6, 1998).
- S39. **J. E. Harvey**, "Scattering Effects in EUV Imaging Systems", Workshop on Novel Concepts for Sub-130 nm Optical Lithography, Sponsored by Semiconductor Research Corp., San Jose, CA (September 30, 1997).
- S38. **J. E. Harvey**, "Specifying Optical Fabrication Tolerances to Satisfy Specific Image Quality Criteria", Short Course presented at the Center for Optics Manufacturing (COM) Summer School to serve the needs of the American Precision Optics Manufacturers Association (APOMA), The University of Rochester, Rochester, NY (June 20, 1997).
- S37. **J. E. Harvey**, "Fundamentals for Imaging with Wavefront Combination", JPL Workshop on Sensor System Architectures for High Resolution Imaging, Pasadena, CA (July 29, 1996).
- S36. **J. E. Harvey** and Cynthia L. Vernold, "Image Degradation due to Surface Scatter Effects", Colloquium presented at the Air Force Phillips Laboratory, Kirtland Air Force Base, NM (July 18, 1996).
- S35. **J. E. Harvey**, "Surface Scatter Phenomena in Optical Systems", CREOL REU Program, (July 2, 1996).
- S34. **J. E. Harvey**, "Specifying Optical Fabrication Tolerances to Satisfy Specific Image Quality Criteria", Short Course presented at the Center for Optics Manufacturing (COM) Summer School to serve the needs of the American Precision Optics Manufacturers Association (APOMA), The University of Rochester, Rochester, NY (June 13, 1996).
- S33. **J. E. Harvey**, "Precision Pointing and Tracking thru Atmospheric Turbulence by Exploiting the Enhanced Backscatter Phenomenon", Eglin A. F. B. (May 15, 1996).
- S32. **J. E. Harvey**, "Image Quality Degradation due to Residual Optical Fabrication Errors", Lockheed-Martin Orlando, FL (March 7, 1996).
- S31. **J. E. Harvey**, "Fourier Treatment of Near-field Scalar Diffraction Theory", Joint Seminar presented to the Optoelectronic Materials, Devices and Systems Group and the Optoelectronic Computing Systems Center at the University of Colorado (February 14, 1996).
- S30. **J. E. Harvey**, "Enhanced Backscatter through Random Media: Applications to Pointing Tracking and Imaging", Colloquium presented at the Center for Research and Education in Optics and Lasers (CREOL), University of Central Florida, (September 27 1995).
- S29. **J. E. Harvey**, "Angular Grating Anomalies: An Apparent Violation of the Grating Equation", Colloquium presented at Abbott Laboratories in Abbott Park, IL (July 25, 1994).
- S28. **J. E. Harvey**, "Scattered Light in Optical Systems", Colloquium presented at Martin Marietta Electronic Systems, Orlando, FL (May 6 1993).
- S27. **J. E. Harvey**, "Potential Pitfalls in the Design of X-ray/EUV Imaging Systems", Colloquium presented at the Danish Space Research Institute, Copenhagen, Denmark (June 9, 1992).
- S26. **J. E. Harvey**, "The Surface Transfer Function as a Means of Characterizing Optical surface Finish and scattering Behavior", presented to the Working Group on Propagation and Scattering at the Center for Research and Education in Optics and Lasers (CREOL), University of Central Florida, (April 9 1992).
- S25. **J. E. Harvey**, "Specifying Optical Fabrication Tolerances for Grazing Incidence X-ray/EUV Applications", Colloquium presented at Lawrence Berkeley Laboratory, Berkeley, CA (February 12, 1992).
- S24. **J. E. Harvey**, "Recent Advances in X-ray and EUV Imaging", Colloquium presented at Eastman Kodak Co., Rochester, NY (July 19, 1991).
- S23. **J. E. Harvey**, "Understanding X-ray Imaging", Colloquium presented at AT&T Bell Labs, Holmdel, NJ (February 25, 1991).
- S22. **J. E. Harvey**, "Effect of Surface Fabrication Errors upon the Performance of Grazing Incidence Mirrors for Precision X-ray applications", IBM Advanced Technology Center, East Fishkill, NY (August 14, 1990)
- S21. **J. E. Harvey**, "Field-of-view Limitations of Phased Telescope Arrays", Advanced Imaging Concepts for Remote Sensing Workshop, Hughes Danbury Optical Systems, Inc., Danbury, CT (January 25, 1990).
- S20. **J. E. Harvey**, "The Application of Linear Systems Theory to Optical Phenomena", Colloquium presented at the Center for Electro-Optics and Lasers, the University of Central Florida, Orlando, FL (November 20, 1989).
- S19. **J. E. Harvey**, "Recent Progress in X-ray Optics", Colloquium presented at the Optical Sciences Center, the University of Arizona, Tucson, AZ (October 9, 1989).
- S18. **J. E. Harvey**, "Effects of Aperture Obscurations and Dust upon the Hubble Space Telescope Image Quality", Colloquium presented at the NASA/GSFC, Greenbelt, MD (Aug'89).

- S17. B. Miller, **J. E. Harvey** and C. Ftacilas, “The Effects of Diffraction and Wavefront Error on Modulation Transfer Function”, NASA/GSFC (May 23, 1989).
- S16. **J. E. Harvey**, “Optical Fabrication Tolerances Required for Normal Incidence X-ray Multilayers”, Colloquium presented at the NASA/GSFC, Greenbelt, MD (December 14, 1988).
- S15. **J. E. Harvey**, “AFWL Phased Telescope Array Study”, Final Review presented to AFWL, Kirtland AFB, NM (November 30, 1988).
- S14. **J. E. Harvey**, “Transfer Function Characterization of Grazing Incidence Optical Systems”, Physics Department Colloquium, Brigham Young University (January 5, 1988).
- S13. **J. E. Harvey**, “Optical Performance Characteristics of Phased Array and Thinned Aperture Imaging Systems”, presented at the Air force Weapons Laboratory (AFWL), Kirtland AFB, New Mexico (June 26, 1987).
- S12. **J. E. Harvey**, “The Spot of Arago: New Relevance for an Old Phenomenon”, Southwestern Connecticut Section of the Optical Society of America (March 18, 1987).
- S11. **J. E. Harvey**, “The Surface Transfer Function as a Means of Characterizing Optical Surface Finish and Scattering Behavior”, Guest Lecture at the Center for Applied Optics, the University of Alabama in Huntsville, Huntsville, AL (April 9, 1986).
- S10. **J. E. Harvey**, “Angular Grating Anomalies: An Apparent Violation of the Grating Equation”, Physics Department Colloquium presented at the University of Alabama in Huntsville, Huntsville, AL (April 9, 1986).
- S9. **J. E. Harvey**, “Field of View Limitations of Phased Array Telescopes”, Colloquium presented at the Air Force Weapons Laboratory (AFWL), Kirtland AFB, New Mexico (July 25 1985).
- S8. **J. E. Harvey**, “Angular Grating Anomalies: An Apparent Violation of the Grating Equation”, Physical Optics Seminar, University of Connecticut (December 13, 1984).
- S7. **J. E. Harvey**, “The Spot of Arago: New Relevance for an Old Phenomenon”, Wednesday Colloquium, The Perkin-Elmer Corporation (April 18, 1984).
- S6. **J. E. Harvey**, “Simplified BRDF Data Presentation: A Linear Systems Approach”, Minisymposium on Standards for Specifying the Surface Finish of Optical Components at the NBS Laboratory in Gaithersburg, MD (June 9, 1981).
- S5. **J. E. Harvey**, “Linear Systems in Stray Light Analysis”, Lawrence Livermore National Labs, Livermore, CA (August 5, 1980).
- S4. **J. E. Harvey**, “Adaptive Optics for Infrared Applications”, Colloquium at the Optical Sciences Center, University of Arizona (April 3, 1978).
- S3. **J. E. Harvey**, “Surface Scattering Phenomena including the Inverse Scattering Problem”, Colloquium presented at the Naval Weapons Center, China Lake, California (February 11, 1976).
- S2. **J. E. Harvey**, “The Behavior of Light Scattered from Optical Surfaces”, Colloquium presented at the Air Force Weapons Laboratory (AFWL), Kirtland AFB, New Mexico (November 14, 1975).
- S1. **J. E. Harvey**, “Recent Progress in Surface Scatter Phenomena”, Colloquium at the Physical Sciences Directorate, U.S. Army Missile Research, Development, and Engineering Laboratory, Redstone Arsenal, Alabama (Aug. 28, 1975).

Short Courses (Taught at Technical Conferences or Industrial Organizations)

- E35. **J. E. Harvey**, *Astronomical Optics for Astronomers*, seven (7) hour short course taught at SPIE’s International Symposium on Astronomical Telescopes and Instrumentation, Orlando, FL, May 27, 2006.
- E34. **J. E. Harvey**, *Understanding X-ray Imaging Systems*, seven (7) hour short course taught at SPIE’s International Symposium on Optics and Photonics in San Diego, CA, August 3, 2005.
- E33. **J. E. Harvey**, *Understanding X-ray Imaging Systems*, seven (7) hour short course taught at SPIE’s International Symposium on Optical Science and Technology in Denver, CO, August 3, 2004.
- E32. **J. E. Harvey**, *Astronomical Optics for Astronomers* (SC136), seven (7) hour short course taught at SPIE’s International Symposium on Astronomical Telescopes and Instrumentation in Glasgow, Scotland, June 21, 2004.
- E31. **J. E. Harvey**, *UV, EUV, and X-ray Optics*, seven (7) hour short course taught at SPIE’s International Symposium on Optical Science and Technology in San Diego, CA, Aug 3, 2003.
- E30. **J. E. Harvey**, *Astronomical Optics for Astronomers*, seven (7) hour short course taught at SPIE’s International Symposium on Astronomical Telescopes and Instrumentation in Waikoloa, Hawaii, August 22, 2002.
- E29. **J. E. Harvey**, *Understanding X-ray Imaging Systems*, seven (7) hour short course taught at SPIE’s International Symposium on Optical Science and Technology in Seattle, WA, July 7, 2002.

- E28. **J. E. Harvey**, *Non-paraxial Scalar Diffraction Theory: Application to Gratings and Surface Scatter Phenomena*, four (4) hour short course taught at SPIE's International Symposium on Optical Science and Technology in San Diego, CA, July 31, 2001.
- E27. **J. E. Harvey**, *Understanding X-ray Imaging Systems*, four (4) hour short course taught at SPIE's International Symposium on Optics and Photonics in San Diego, CA, July 30, 2001.
- E26. **J. E. Harvey**, *Astronomical Optics for Astronomers*, seven (7) hour short course taught at SPIE's International Symposium on Astronomical Telescopes and Instrumentation in Munich, Germany, March 31, 2000.
- E25. **J. E. Harvey**, *X-ray Optical Performance Engineering*, four (4) hour short course taught at SPIE's International Symposium on Optical Science, Engineering and Instrumentation in Denver, CO, July 22, 1999.
- E24. **J. E. Harvey**, *Scattering Effects and Image Quality Engineering*, seven (7) hour short course taught at SPIE's International Symposium on Optical Science, Engineering and Instrumentation in Denver, CO, July 21, 1999.
- E23. **J. E. Harvey**, *Astronomical Optics for Astronomers*, seven (7) hour short course taught at SPIE's International Symposium on Astronomical Telescopes and Instrumentation in Kona, Hawaii, March 23, 1998.
- E22. **J. E. Harvey**, *Fundamental Factors Affecting Image Quality*, four (4) hour short course taught at SPIE's AeroSense '95 in Orlando, FL, April 17, 1995.
- E21. **J. E. Harvey**, *Astronomical Optics*, four (4) hour short course taught at SPIE's AeroSense '95 in Orlando, FL, April 17, 1995.
- E20. **J. E. Harvey**, *X-ray Imaging Systems*, four (4) hour short course taught at SPIE's International Symposium on Optics, Imaging, and Instrumentation in San Diego, CA, July 26, 1994.
- E19. **J. E. Harvey**, *Astronomical Optics for Astronomers*, seven (7) hour short course taught at SPIE's International Symposium on Astronomical Telescopes and Instrumentation in Kona, Hawaii, February 13, 1994.
- E18. **J. E. Harvey**, *Diffraction in Optical Engineering Applications*, four (4) hour short course taught at Optical Engineering Midwest '93 in Chicago, IL, September 18, 1993.
- E17. **J. E. Harvey**, *X-ray Imaging Systems*, four (4) hour short course taught at SPIE's International Symposium on Optics, Imaging, and Instrumentation in San Diego, CA, July 13, 1993.
- E16. **J. E. Harvey**, *Understanding Imaging Systems*, seven (7) hour short course taught at SPIE's International Symposium on Optical Applied Science and Engineering in San Diego, CA, July 24, 1992.
- E15. **J. E. Harvey**, *Basic Diffraction Phenomena*, seven (7) hour short course taught at SPIE's International Symposium on Optical Applied Science and Engineering in San Diego, CA, July 20, 1992.
- E14. **J. E. Harvey**, *Understanding Imaging Systems*, seven (7) hour short course taught at SPIE's International Symposium on Optical Engineering and Photonics in Aerospace Sensing in Orlando, FL, April 24, 1992.
- E13. **J. E. Harvey**, *Understanding Imaging Systems*, seven (7) hour short course taught at IS&T's International Symposium on Electronic Imaging Science and Technology in San Jose, CA, February 9, 1992.
- E12. **J. E. Harvey**, *Basic Diffraction Phenomena*, four (4) hour short course taught at SPIE's International Symposium on Lasers, Sensors, and Spectroscopy in Los Angeles, CA, January 22, 1992.
- E11. **J. E. Harvey**, *Physical Optics*, ten (10) hour short course taught in Technology Transfer Program (T²P) at the Perkin-Elmer Corporation in Danbury, CT, Fall 1990.
- E10. **J. E. Harvey**, *Advanced Fourier Techniques for Analyzing Optical System Performance*, seven (7) hour short course taught at SPIE's International Symposium on Optical Engineering and Photonics in Aerospace Sensing in Orlando, FL, April 18, 1990.
- E9. **J. E. Harvey**, *Astronomical Telescopes: Optical Design Considerations*, three (3) hour short course taught in Technology Transfer Program (T²P) at the Perkin-Elmer Corporation in Danbury, CT, February 28, 1990.
- E8. **J. E. Harvey**, *Astronomical Optics for Astronomers*, seven (7) hour short course taught at SPIE's International Symposium on Astronomical Telescopes and Instrumentation in Tucson, AZ, February 11, 1990.
- E7. **J. E. Harvey**, *Application of Fourier Techniques to Optical Engineering Problems*, seven (7) hour short course taught at SPIE's International Symposium on Optical and Optoelectronic Applied Science & Engineering in San Diego, CA, August 7, 1989.
- E6. **J. E. Harvey**, *Introduction to Fourier Optics*, ten (10) hour short course taught in Technology Transfer Program (T²P) at the Perkin-Elmer Corporation in Danbury, CT, Spring 1988.
- E5. **J. E. Harvey**, *Physical Optics*, ten (10) hour short course taught in Technology Transfer Program (T²P) at the Perkin-Elmer Corporation in Danbury, CT, Fall 1987.

- E4. **J. E. Harvey**, *Introduction to Fourier Optics*, ten (10) hour short course taught in Technology Transfer Program (T²P) at the Perkin-Elmer Corporation in Danbury, CT, Fall 1986.
- E3. **J. E. Harvey**, *Application of Scalar Diffraction Theory to Practical Problems*, seven (7) hour short course taught at SPIE's International Symposium on Optical and Optoelectronic Applied Sciences and Engineering in San Diego, CA, August 18, 1986.
- E2. **J. E. Harvey**, *Application of Scalar Diffraction Theory to Practical Problems*, seven (7) hour short course taught in the Optical/Optoelectronic Engineering Update Series sponsored by SPIE and OSSC in Los Angeles, CA, January 14-25, 1986.
- E1. **J. E. Harvey**, *Application of Scalar Diffraction Theory to Practical Problems*, seven (7) hour short course taught at SPIE's International Symposium on Optical and Electro-Optical Engineering in San Diego, CA, August 19, 1985.

Major Reports (Limited Distribution)

- R31. **J. E. Harvey**, "University Assistance to the Ground Camera Ascent Imagery (GCAI) Project", Final Report submitted to ASRC Aerospace corporation, Kennedy Space Center, FL (June 2005).
- R30. **J. E. Harvey** and M. Atanassova, "Effects of Optical Fabrication Errors upon SXI Telescope Image Quality", a Final Report prepared for Lockheed Martin Solar and Astrophysics Laboratory (LMSAL), Palo Alto, CA (November 2004).
- R29. **J. E. Harvey**, "Surface Topography Analysis Code (STAC)", a Final Report prepared for SPAWAR Systems Center, San Diego, CA (December 14, 2001).
- R28. **J. E. Harvey**, "An Extremely Large yet Ultralightweight Space Telescope and Array", a Final Report prepared for Bekey Designs, Inc., Annandale, VA (January 27, 2001).
- R27. **J. E. Harvey** and R. A. Buchroeder, "Feasibility of the Anamorphic Optical Unit", Final Report to Cinema Six Film Group, December 28, 1994).
- R26. **J. E. Harvey**, "FUSE Telescope Performance Predictions", Final Report submitted to Johns Hopkins University (June '96)
- R25. **J. E. Harvey**, "A New Mission for the Air Force Phillips Laboratory Malabar Test Facility", Final Report for Summer Faculty Research Program: submitted to AFOSR and the Air Force Phillips Laboratory (October 1994).
- R24. **J. E. Harvey** and W. L. Gressler, "Optical Surface Texture Requirements", A, Task Report submitted to Martin Marietta Electronic Systems, Orlando, FL (August 1993).
- R23. Anita Kotha and **J. E. Harvey**, "Performance Predictions of Wolter Type II Telescopes in Support of the HDOS FUSE Phase B Study", Final Report to Hughes Danbury Optical Systems, Inc. (July 28, 1992).
- R22. **J. E. Harvey**, "Optical Issues Relating to the Astronauts Memorial at the Kennedy space Center", submitted to the Astronauts Memorial Foundation Committee (1 November 1990).
- R21. **J. E. Harvey**, "Effects of Aperture Obscurations and Dust upon the Predicted Image Quality of the Hubble space Telescope", Perkin-Elmer Electro-Optic Technology division Technical Memorandum ST-SE-6117 (8 Sept 1989).
- R20. **J. E. Harvey**, "Imaging Phased Telescope Array Study", Perkin-Elmer Project Report PR B11-0064, prepared for NASA/MSFC, 53 pages (1989).
- R19. **J. E. Harvey**, "Far Ultraviolet Spectroscopic Explorer (FUSE) Telescope Feasibility Study", Perkin-Elmer Engineering Report ER-1898, prepared for NASA/GSFC, 58 pages (1988).
- R18. C. Ftaclas and **J. E. Harvey**, "GOES Telescope Performance Model", Perkin-Elmer Technical Memorandum 88-AD-SSD-2468 (1988).
- R17. **J. E. Harvey**, Numerous Reports concerning Optical Performance Predictions of NASA's Advanced X-ray Astrophysical Facility (AXAF), Perkin-Elmer Project Reports (1984-86).
- R16. **J. E. Harvey**, et. al., "Chemically Etched Grating Analysis and Circular Grating Analysis", Rockwell International Final Report RI/RD82-325, prepared for the Air Force Weapons Laboratory, 93 pages (April 1982).
- R15. **J. E. Harvey**, et. al., "Diffraction Losses Associated with High Spatial Frequency Content in the Output Intensity of the AVCO Humdinger Laser", Air Force Weapons Laboratory Final Report AFWL-TR-80-129, 40 pages (May 1981).
- R14. **J. E. Harvey**, "Interferogram Analysis at the Air Force Weapons Laboratory", University of Dayton Research Institute Technical Report UDRI-A-XXX, 24 pages (1980).
- R13. **J. E. Harvey** and M. L. Scott, "Engineering Principles for the Design and Analysis of Hole Grating Beam Samplers", University of Dayton Research Institute Technical Report UDRI-A-209 (1980).

- R12. **J. E. Harvey**, Roger D, Petty, Donald L. Mullen and B. J. Pierce, “Diffraction losses Associated with High Spatial Frequency Content in the Output Intensity of the AVCO Humdinger Laser”, University of Dayton Research Institute Technical Report UDRI-A-193 (1980).
- R11. **J. E. Harvey**, B. J. Pierce, and M. A. Coyne, “Thermal Boundary Layer Effects from Uncooled HEL Mirrors”, University of Dayton Research Institute Technical Report UDRI-A-183 (1979).
- R10. **J. E. Harvey** and G. M. Callahan, “Laser Beam Expander Technology (LBET) Study”, Pratt & Whitney Final Report prepared for Eastman Kodak Company, Subcontract No. 60-2877-81482 (1977).
- R9. F. O. Bartell, R. P. Breault, A. G. DeBell, B. Fannin, D. S. Goodman, A. Greynolds, J. Gunderson, **J. E. Harvey**, S. Lange, R. V. Shack, A. F. Turner, W. L. Wolfe, . D. Wooden, A Study Leading to Improvements in Radiation Focusing and Control in Infrared Sensors”, Final Report AMMRC CTR 76-42 submitted to the Army Materials and Mechanics Research Center, Watertown, Massachusetts (Dec. 1976).
- R8. **J. E. Harvey**, *Light-scattering Characteristics of Optical Surfaces*, Ph.D. Dissertation, The University of Arizona (1976).
- R7. **J. E. Harvey** and R. V. Shack, “An Investigation of the Relationship Between Surface Microroughness and Radiant Energy Scattering”, University of Arizona Optical Sciences Center Final Report, SAMSO Contract No. 404701-75-C-0106 (1976).
- R6. **J. E. Harvey** and R. V. Shack, “Surface Scatter Measurements”, University of Arizona Optical Sciences Center Interim Report, SAMSO Contract No. F04701-74-C-0083 (1974).
- R5. W. L. Wolfe, **J. E. Harvey** and B. C. Platt, “Large-aperture, Wide-angle Infrared Scanning Systems”, University of Arizona Optical Sciences Center Final Report, SAMSO TR72-78 (1972).
- R4. M. J. Irland, V. L. Lindberg, and **J. E. Harvey**, “Windshield Distortion Analysis by Laser Scanner”, Ford Motor Company Technical Report No. SR 70-61 (May 1970).
- R3. **J. E. Harvey** and M. J. Irland, “Spatial Relationships between Objects in a Hologram Image”, Ford Motor Company Technical Report No. AR 68-12 (Sept. 1968).
- R2. M. J. Irland, V. L. Lindberg, and **J. E. Harvey**, “High-speed Automatic Inspection of Float Glass using a Laser”, Ford Motor Company Technical Report No. ARM 6-11 (July 1967).
- R1. **J. E. Harvey**, *Radiation Induced Bubble Nucleation near the Critical Point*, M. S. Thesis, Wayne State University Physics Dept (1966).

Detailed Statement of Research Funding (Since Joining UCF in Sept. 1990)

Principal investigator (16) or Co-investigator (16) of 32 contracts or grants to UCF totaling \$5,517,394. Tasks for which I had sole technical responsibility total approximately \$1,792,820.

Title: *Technical Support on the Maintenance of Launch Vehicle Imaging Telescopes*
 PI(s)/Duration of Effort: J. E. Harvey /May. 2007 - Jan. 2008
 Agency/Dollar Amount: UCF/I4 / **\$47,500**

Title: *Technical Support on the Maintenance of Launch Vehicle Imaging Telescopes*
 PI(s)/Duration of Effort: J. E. Harvey /Jan. 2007 - Jan. 2008
 Agency/Dollar Amount: ITT/SLRS / **\$95,000**

Title: *Global-scale Observations of the Limb and Disk (GOLD)*
 PI(s)/Duration of Effort: R. Eastes (FSI), PI; J. E. Harvey, Co-I /Sept. 2006 - Aug. 2007
 Agency/Dollar Amount: NASA / \$979,683 (**Harvey, \$97,968**): Phase A of a \$46.9M Program (UCF Prime)

Title: *Technical Support on the Maintenance of Launch Vehicle Imaging Telescopes*
 PI(s)/Duration of Effort: J. E. Harvey /May. 2006 - Jan. 2007
 Agency/Dollar Amount: UCF/I4 / **\$46,052**

Title: *Technical Support on the Maintenance of Launch Vehicle Imaging Telescopes*
 PI(s)/Duration of Effort: J. E. Harvey /Jan. 2006 - Jan. 2007
 Agency/Dollar Amount: ITT/SLRS / **\$91,495**

Title: *University Assistance to GCAI Project*
 PI(s)/Duration of Effort: J. E. Harvey /Jul. 2004 - Apr. 2005
 Agency/Dollar Amount: NASA/KSC / **\$25,000**

Title: *Extension for Support to HIDEN Remote Sensor Project*

PI(s)/Duration of Effort: J. E. Harvey /Apr. 2004 - Dec. 2005
 Agency/Dollar Amount: R. Eastes/FSI (**Harvey, \$57,480**).

Title: *Solar X-ray Imager (SXI) Instrument*
 PI(s)/Duration of Effort: J. E. Harvey /Jan. 2004 - July. 2004
 Agency/Dollar Amount: Lockheed Martin Missiles & Space / **\$34,716**

Title: *Ultraviolet Remote Sensor for HIDDEN from low earth orbit*
 PI(s)/Duration of Effort: R. Eastes (FSI) and J. E. Harvey /Mar. 2003 - Mar. 2004
 Agency/Dollar Amount: NASA / \$130,107 (**Harvey, \$24,605**).

Title: *Solar X-ray Imager (SXI) Instrument*
 PI(s)/Duration of Effort: J. E. Harvey /Jan. 2003 - Dec. 2003
 Agency/Dollar Amount: Lockheed Martin Missiles & Space / **\$40,291**

Title: *Bio-optic Synthetic Systems (Liquid Crystal Adaptive Optics)*
 PI(s)/Duration of Effort: S. T. Wu and J. E. Harvey /Jun. 2002 - Feb. 2004
 Agency/Dollar Amount: DARPA / \$632,034 (**Harvey \$107,446**).

Title: *Solar X-ray Imager (SXI) Instrument*
 PI(s)/Duration of Effort: J. E. Harvey /Jan. 2002 - Dec. 2002
 Agency/Dollar Amount: Lockheed Martin Missiles & Space / **\$82,858**

Title: *Solar X-ray Imager (SXI) Instrument*
 PI(s)/Duration of Effort: J. E. Harvey /Jan. 2001 - Dec. 2001
 Agency/Dollar Amount: Lockheed Martin Missiles & Space / **\$87,600**

Title: *Optical Systems Engineering and Performance Analysis*
 PI(s)/Duration of Effort: J. E. Harvey /March. 2000 - Jan. 2001
 Agency/Dollar Amount: Bekey Designs, Inc. / **\$40,000**

Title: *Surface Topography Analysis Code (STAC)*
 PI(s)/Duration of Effort: J. E. Harvey /Feb. 2000 - Jan. 2001
 Agency/Dollar Amount: NASA/GSFC / **\$95,000+\$7000 Match**

Title: *Thermal Region Camera System (T-ReCS)*
 PI(s)/Duration of Effort: G. Boreman, G. Sellar, and J. E. Harvey /Jan. 1999 – July 1999
 Agency/Dollar Amount: Univ. of Florida / \$50,000 (**Harvey; \$9,349**).

Title: *Solar X-ray Imager (SXI) Instrument*
 PI(s)/Duration of Effort: J. E. Harvey /Sept. 1997 - July. 2000
 Agency/Dollar Amount: Lockheed Martin Missiles & Space / **\$244,600**

Title: *Laser-Assisted Glass Cutting*
 PI(s)/Duration of Effort: A. Kar, L. Glebov, and J. Harvey /Dec. 1997- Feb. 2000
 Agency/Dollar Amount: Accudyne Corporation / \$119,000 (**Harvey; \$6,480**)

Title: *ISTEF V: Multiple Aperture Coherent Array Technology*
 Principal Investigator(s): C. M. Stickley, R. L. Phillips, L. Andrews, J. E. Harvey, and A. Weeks
 Agency/Dollar Amount: DOD/NAVY/NRAD Grant for \$340,000
 Duration of Effort: May 1997-April 1998 (**Harvey; \$24,146**)

Title: *Manufacturing Science of Infrared Materials*
 PI(s)/Duration of Effort: K. C. Richardson, J. E. Harvey, and K. Beck/Oct. 1995 - Dec. 1996
 Agency/Dollar Amount: Center for Opt. Man./U. of Rochester (8 Tasks for total of \$150,000)
 Task 8: *Image Degradation due to Scattering Effects* (**Harvey; \$54,947**)

Title: *ISTEF V: Multiple Aperture Coherent Array Technology*
 Principal Investigator(s): C. M. Stickley, J. E. Harvey, R. L. Phillips, L. Andrews, and A. Weeks
 Agency/Dollar Amount: DOD/NAVY/NRAD Grant for \$500,000 (**Harvey \$93,912**)
 Duration of Effort: July 1995-July 1996

Title: *Manufacturing Science of Infrared Materials*
 PI(s)/Duration of Effort: K. C. Richardson, J. E. Harvey, and K. Beck/May 1995-Oct. 1995
 Agency/Dollar Amount: Center for Opt. Man./U. of Rochester (8 Tasks for total of \$100,000)
 Task 8: *Image Degradation due to Scattering Effects* (**Harvey; \$31,569**)

Title/Duration of Effort: *ISTEF IV* /July 1994-July 1995

Principal Investigator(s): C. M. Stickley, J. E. Harvey, H. Myler, A. Weeks, and P. Gatt
Agency/Dollar Amount: DOD/NAVY/ONR (Five Tasks for total of \$475,000)
Task 2 (Grant #30191): *LIDAR Experiments (Harvey; \$57,594)*,
Task 4 (Grant #30202): *Reciprocal Path Imaging (Harvey; \$16,406)*

Title: *Manufacturing Science of Infrared Materials*
PI(s)/Duration of Effort: K. C. Richardson, J. E. Harvey, and K. Beck/May 1994 - May 1995
Agency/Dollar Amount: Center for Opt. Man./U. of Rochester for total of \$100,000
Task 8: *Image Degradation due to Scattering Effects (Harvey; \$18,000)*

Title: *Feasibility Verification of the Torus Anamorphic Optical Unit*
PI(s)/Duration of Effort: J. E. Harvey/April 1994 - November 1994
Agency/Dollar Amount: Cinema Six Film Group for **\$50,000 + \$8,311 Match**

Title: *Evaluation of Binary Optic Replication Process*
PI(s)/Duration of Effort: M. Moharam and J. E. Harvey/December 1993 - December 1993
Agency/Dollar Amount: Gel Tech Grant for \$2,000 (**Harvey; \$1,000**)

Title/Duration of Effort: *ISTEF IV /July 1993-July 1994*
Principal Investigator(s): C. M. Stickley, J. E. Harvey, H. Myler, A. Weeks, and P. Gatt
Agency/Dollar Amount: DOD/NAVY/ONR Grant #30191 for \$500,000
Task Description: *Speckle Characterization of CLAR Targets (Harvey; \$45,531)*
Task Description: *Reciprocal Path Imaging (Harvey; \$49,555)*

Title: *Optical Texture Requirement*
PI(s)/Duration of Effort: J. E. Harvey/May 1993 - August 1993
Agency/Dollar Amount: Martin Marietta Grant#80775 for **\$10,409**

Title/Task Duration: *ISTEF IV /July 1992-July 1993*
Principal Investigator(s): C. M. Stickley, J. E. Harvey, H. Myler, A. Weeks, and P. Gatt
Agency/Dollar Amount: DOD/NAVY/ONR Grant #30191 for \$350,000
Task Description: *Speckle Characterization of CLAR Targets (Harvey; \$25,369)*
Task Description: *Reciprocal Path Imaging (Harvey; \$46,631)*

Title: *Simplified Ultra-high Resolution Optic for Soft X-ray Imaging*
PI(s)/Duration of Effort: W. T. Silfvast and J. E. Harvey/February 1992 - December 1992
Agency/Dollar Amount: AFOSR Grant #50146 for \$19,569 (**Harvey; \$7,000**)

Title: *Novel Appl. of Diffractive Optics;*
PI(s)/Duration of Effort: M. Moharam, G. Boreman, and J. E. Harvey/Jan1991-Jan 1992
Agency/Dollar Amount: FL High Tech. Council; Grant #70571 for \$15,000 (**Harvey; \$5,000**)

Title: *Consultation on Illumination System;*
PI(s)/Duration of Effort: James E. Harvey/October 1990-May 1991
Agency/Dollar Amount: Astronauts Memorial Foundation; **\$7,000**

Patents

J. E. Harvey and J. H. Bluge, "Improved optical Beam Monitor", patent application on United Technologies Invention Disclosure F-3989, December 14, 1978.

J. E. Harvey, M. J. Irland, and V. L. Lindberg, "Glass Window Structures Eliminating Jamin Interference Fringes", U.S. Patent 3,647,285, March 7, 1972.

J. E. Harvey, M. J. Irland, and V. L. Lindberg, "Methods of Making a Glass Window Structure", U.S. Patent 3,554,772, January 12, 1971.