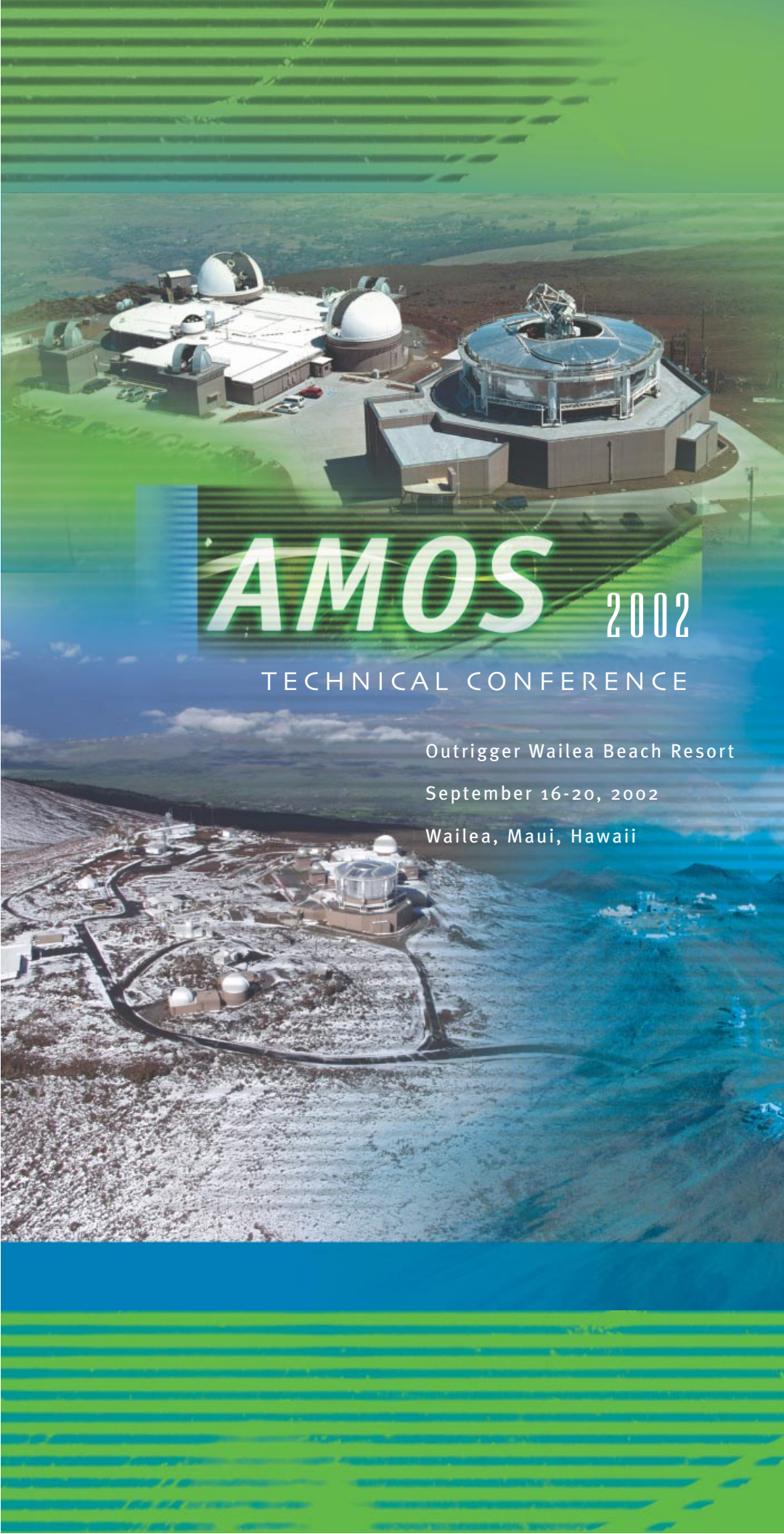

AMOS 2002

TECHNICAL CONFERENCE

Outrigger Wailea Beach Resort

September 16-20, 2002

Wailea, Maui, Hawaii

TUESDAY *september* 17

6:00 AM — **BREAKFAST** | LUAU GARDENS *at leisure from 6:00 am to 7:30 am*

7:30 — **CONFERENCE OPENING** | AULANI BALLROOM

INVOCATION
Reverend Kealahou Alika, *Keawalai Congregational Church*

OPENING REMARKS
Paul Kervin, *Air Force Research Laboratory*
Jeffery McCann, *Air Force Research Laboratory*

WELCOME REMARKS
James "Kimo" Apana, *Mayor, County of Maui*
Daniel K. Inouye, *United States Senator (via video)*

KEYNOTE ADDRESS
Gene H. McCall, *Chief Scientist, Air Force Space Command*

8:30 — **MSSS OVERVIEW**
Tom Glesne, *The Boeing Company*

SPACE CONTROL: MISSION AREA STATUS
Brian K. Anderson, *USSPACECOM/J5X*

CENTER FOR ADAPTIVE OPTICS
Lisa Hunter and Scot Olivier, *Center for Adaptive Optics*

9:45-10:00 — **BREAK** | PAVILION LANAI

10:00 — **SATELLITE METRICS**
Session Chairs: Chris Sabol and Dan Thiel

AN ARRAY OF REMOTELY CONTROLLED, AUTONOMOUS SMALL TELESCOPES FOR SURVEILLANCE OF SPACE
Brad Wallace, *Defence R&D Canada*

SATEX: SATELLITE TRACKING EXPERIMENT FOR HIGH ACCURACY ORBIT UPDATES
Chris Sabol, *Air Force Research Laboratory*

RAVEN OPERATIONS AS A CONTRIBUTING SENSOR IN THE ITW/AA NETWORK
Robin Orth, *Air Force Research Laboratory*

PROCESSING IMPROVEMENTS FOR THE RAVEN SYSTEM
Paul Sydney, *The Boeing Company*

HIGH ACCURACY NETWORKED ORBIT DETERMINATION SYSTEM (HANDS) FOR SPACE CONTROL
Daron Nishimoto, *The Boeing Company*

ACCURACY ASSESSMENT OF MSSS METRIC DATA
Aaron Granger, *Air Force Academy*

12:00 PM — **LUNCHEON** | SOUTH PACIFIC BALLROOM

1:00 — **ORBITAL DEBRIS**
Session Chairs: Gene Stansberry and Paul Kervin

A GEOSYNCHRONOUS ORBIT (GEO) SEARCH STRATEGY
John Africano, *The Boeing Company*

PROBING THE SMALL-SIZE DEBRIS ENVIRONMENT IN THE GEOSTATIONARY RING
Thomas Schildknecht, *University of Bern*

OPTICAL OBSERVATIONS OF SPACE DEBRIS AT GEOSYNCHRONOUS ORBIT WITH THE MICHIGAN SCHMIDT
Patrick Seitzer, *University of Michigan*

USING GEO OPTICAL OBSERVATIONS TO INFER ORBIT POPULATIONS
Mark Matney, *Lockheed Martin Space Operations*

SIZE REALLY DOES MATTER IN ORBITAL DEBRIS MEASUREMENTS
Gene Stansbery, *NASA /Johnson Space Center*

2:45-3:00 — **BREAK** | PAVILION LANAI

3:00 — **KEYNOTE ADDRESS** | PIKAKE BALLROOM

THE VIRTUAL UNIVERSE PROJECT: FIRST STOP MARS
Eric DeJong, *Jet Propulsion Laboratory, California Institute of Technology*

There will be four seatings of the 3D film presentation which will accommodate 50 participants each. The presentations will begin at: 3:00pm, 3:30pm 4:00pm, 4:30pm

3:00 — **POSTER PRESENTATIONS** | JADE/PLUMERIA

Presenters will be available to discuss their papers. A listing of presentations may be found at the back of this program

5:00 — **ADJOURN**

WEDNESDAY

WEDNESDAY *september* 18

6:00 AM **BREAKFAST** | LUAU GARDENS *at leisure from 6:00 am to 7:30 am*

7:30 **ASTRONOMY** | AULANI BALLROOM

Session Chairs: Lewis Roberts and Nancy Chanover

AN UPDATE OF THE NEAR-EARTH ASTEROID TRACKING / MAUI SPACE SURVEILLANCE SYSTEM (NEAT/MSSS) COLLABORATION
Raymond Bambery, *Jet Propulsion Laboratory*

RELATIVE 2-COLOR PHOTOMETRY OF NEOs
Peter Shelus, *University of Texas at Austin*

SYNERGISTIC AEOS AND MGS OBSERVATIONS OF MARS
Jim Murphy, *New Mexico State University*

SPECTRO-PHOTOMETRY OF SATURN WITH PASSBAND-TUNABLE IMAGING SYSTEM
Takafumi Temma, *New Mexico State University*

OCCULTATION OBSERVATIONS WITH ADAPTIVE OPTICS
Eliot Young, *Southwest Research Institute*

FAINT COMPANION DETECTION USING CONSTRAINED SPECKLE INTERFEROMETRY AND THE AEOS ADAPTIVE OPTICS SYSTEM
Dave Tyler, *Albuquerque High Performance Computing Center*

GROUND-BASED RAPID OBSERVATIONS OF GAMMA-RAY BURSTS
Edison Liang, *Rice University*

9:45-10:00 **BREAK** | PAVILION LANAI

10:00 **ATMOSPHERICS**

Session Chairs: Russ Taft and Josh Snodgrass

MAUI/MALT: NA WIND/TEMPERATURE LIDAR STUDIES OF GRAVITY WAVES AND INSTABILITIES IN THE UPPER ATMOSPHERE
Chet Gardner, *University of Illinois*

MAUI/MALT: INITIAL MEASUREMENTS OF MESOSPHERIC TEMPERATURE AND WAVE-INDUCED VARIABILITY OVER THE CENTRAL PACIFIC OCEAN
Mike Taylor, *Utah State University*

LIDAR PROFILING OF AEROSOLS, CLOUDS, AND WINDS BY DOPPLER AND NON-DOPPLER METHODS
Tom Wilkerson, *Utah State University*

THE ATMOSPHERIC NEUTRAL DENSITY EXPERIMENT
Andrew Nicholas, *Naval Research Laboratory*

ATMOSPHERIC DENSITY DYNAMICS AND THE MOTION OF SATELLITES
Chris Sabol, *Air Force Research Laboratory*

12:00 PM **LUNCHEON** | SOUTH PACIFIC BALLROOM

1:00 **TECHNOLOGY OF HIGH PERFORMANCE COMPUTING**

Session Chair: Bob Borchers

DOD HIGH PERFORMANCE COMPUTING MODERNIZATION PROGRAM (HPCMP)
Cray Henry, *Department of Defense High Performance Computing Modernization Program*

OVERVIEW OF MAUI HIGH PERFORMANCE COMPUTING CENTER
Dave Morton, *Maui High Performance Computing Center*

HIGH PERFORMANCE COMPUTING AT IBM
David Klepacki, *IBM T.J. Watson Research Center*

THE CRAY SV2: EXTREME PERFORMANCE IN HPC
Steve Johnson, *Cray, Inc.*

APPLICATION PERFORMANCE ON ENHANCED TOPOLOGY ORIGIN 3000 SYSTEMS
Ilene Carpenter, *Silicon Graphics, Inc.*

2:45-3:00 **BREAK** | PAVILION LANAI

3:00 **APPLICATIONS OF HIGH PERFORMANCE COMPUTING**

Session Chair: Bobby Hunt

NUMERICAL WEATHER FORECASTING FOR AMOS
Kevin Roe, *Maui High Performance Computing Center*

STANDARDIZED TOOLS FOR MODELING AND SIMULATION OF DIRECTED ENERGY WEAPONS
Douglas Rigdon, *Air Force Research Laboratory*

A COMPARISON OF PARALLELIZATION TECHNIQUES FOR BISPECTRUM AND BLIND DECONVOLUTION
Kathy Schulze, *KJS Consulting Inc.*

PROGRESS ON DETACHED-EDDY SIMULATION OF MASSIVELY SEPARATED FLOWS
Russ Cummings, *United States Air Force Academy*

4:30 **ADJOURN**

THURSDAY *september* 19

6:00 AM — **BREAKFAST** | Luau Gardens *at leisure from 6:00 am to 7:30 am*

7:30 — **IMAGING** | Aulani Ballroom

Session Chairs: Chuck Matson and Maile Giffin

A comparison of Bispectrum and MFBD Imaging Algorithms
Chuck Matson, *Air Force Research Laboratory*

Multiframe Blind Deconvolution with A Bispectrum Phase Constraint
Stuart Jefferies, *Maui Scientific Research Center*

Improved Blind Deconvolution Methods for Objects Imaged Through Turbid Media
Maile Giffin, *Oceanit Laboratories*

Prediction and Optimization of Computational Accuracy in Astronomical Image Enhancement Algorithms
Mark S. Schmalz, *Center for Computer Vision and Visualization*

Steerable, Millimeter Wave, Sparse Array for Satellite Observations Under Cloudy Conditions on Haleakala
Robin Snider, *General Atomics*

9:15-9:30 — **BREAK** | Pavilion Lanai

9:30 — **BEYOND IMAGING**

Session Chairs: Kim Luu and Mara Payne

Snapshot Hyper-spectral Imaging for Space Situational Awareness
Dan O'Connell, *Oceanit Laboratories*

Photometric Calibration of Short Exposure Imagery
Bruce Stribling, *The Boeing Company*

Systematic Effects in Color Photometry Data
Kim Luu, *Air Force Research Laboratory*

Applications of Space-based Infrared Sensor Data Collections to Spacecraft Health, Monitoring, Space Object Identification, and Sensor Calibration
Anil Chaudhary, *Applied Optimization*

Space Object Identification (SOI) with the Spica Spectrometer at the AFRL Maui Optical and Supercomputing (AMOS) Site
Kris Hamada, *The Boeing Company*

Most Recent Findings from the NASA AMOS Spectral Study (NASS): Squiggly Lines lead to Physical Properties of Orbiting Objects
Kira Jorgensen, *NASA/Johnson Space Center*

Classification of Geo Satellites Using Color Photometric Techniques
Mara Payne, *The Boeing Company*

12:00 PM — **LUNCHEON** | South Pacific Ballroom

1:00 — **Thinking Small:The Future of Micro Spacecraft Design and Capability**

Session Chair: Steven Huybrechts

Likely Exponential Growth in Microsats
Jim Benson, *SpaceDev, Inc.*

Exploring Power Generation Capabilities in Sub-Microsatellites: A Basic Systems Approach for LEO Missions
Brian Engberg, *Air Force Research Laboratory*

Membrane Optical Systems for Space-Based Surveillance
Keith K. Denoyer, CSA *Engineering Inc.*

Microsatellite Demonstration of Autonomous Proximity Operations
Russ Partch, *Air Force Research Laboratory*

2:20-2:35 — **BREAK** | Pavillion Lanai

2:35 — **PANEL DISCUSSION**

Thinking Small: The Challenge of Micro Spacecraft Tracking and Discrimination
Antonio Pensa, Assitant Director, *MIT Lincoln Laboratory*
Glenn A. Tyler, *Optical Sciences Co.*
Victor L. Gamiz, *Air Force Research Laboratory*
Robert Iwai, *Oceanit*

4:15 — **ADJOURN**

4:30 — **LUAU AND ENTERTAINMENT** | Luau Gardens

FRIDAY *september* 20

6:00 AM — **BREAKFAST** | Luau Gardens *at leisure from 6:00 am to 7:30 am*

7:30 — **LASER APPLICATIONS** | Aulani Ballroom
Session Chairs: Thomas Glesne and Mary Hartman

3D Imaging Laser Radar for AEOS
Richard M. Marino, *MIT Lincoln Laboratory*

Non-Imaging Space Situational Awareness for the MSSS
Michael C. Roggemann, *Michigan Technological University*

Laser-Photo-Voltaic Wireless Power Transmission
Mark Henley, *The Boeing Company*

On the Determination of the Solar Panel Orientation of the DMSP-F8 Satellite Using Simulated Laser Radar Returns and HI-CLASS Field Data
David Dayton, *Applied Technology Associates*

Efficient Electrostatic-Accelerator Free Electron Laser for Directed Energy Applications
Luis R. Elias, *University of Hawaii, Manoa*

9:15-9:30 — **BREAK** | Pavilion Lanai

9:30 — **TOOLS FOR SPACE SURVEILLANCE**
Session Chairs: Jeff Houchard and Brian Beveridge

The USNO-B Catalog
David Monet, *U.S. Naval Observatory*

AMOS Optical Surveillance Exploitation Tools (OSET)
Brian Beveridge, *Air Force Research Laboratory*

Satellite Assessment Center's Satellite Information Database
Bill Mitchell, *Metatech Corporation*

SIM: The Satellite and Missile Mission Simulator
Flo Cid, *The Boeing Company*

Space Surveillance Network Analysis Model (SSNAM) Infrared Satellite Model
John Lambert, *The Boeing Company*

Automated Minor Planet Light Curve Generation
Matthew Bisque, *Software Bisque*

Simulation of Polarimetric Observing from AMOS:
Mark Pesses, *Science Applications International Corporation*

12:00 PM — **LUNCHEON** | South Pacific Ballroom

1:00 — **INSTRUMENTATION**
Session Chairs: Riki Maeda and Ty Martinez

The AEOS Burst Camera: Project Description and Program Status
Mark Skinner, *The Boeing Company*

Lockheed Arizona Infrared Spectrometer (LAIRS)
Scott Horner, *Lockheed Martin Advanced Technology Center*

Adaptive Optics System for 3.6m AEOS Telescope: Uncompensated MWIR Data Collection on a Terrier-Lynx-2 Missile at 800 km
Dan Leslie, *Trex Enterprises*

Foveated Imaging Using a Liquid Crystal Adaptive Optic
David V. Wick, *Air Force Research Laboratory*

The UH - AEOS Hi-resolution Visible and Infra-red Spectrograph System (Hi-VISS)
Mark Waterson, *Institute for Astronomy, University of Hawaii*

The Phoenix Project
Bryan Law, *The Boeing Company*

Near Infrared Coronagraph Optimized for the AEOS Telescope
Ben R. Oppenheimer, *Department Astrophysics - American Museum of Natural History*

Optimal Operation of a Wavefront-Sensor-Driven Variable-Geometry Pupil
Dave Tyler, *Albuquerque High Performance Computing Center*

3:45 — **ADJOURN**

POSTER PAPERS

Horizontal and Slant-Path Surveillance With Speckle Imaging
Carmen J. Carrano, *Lawrence Livermore National Laboratory*

A Tycho-2 Based Infrared Astrometric Catalog
Michael Egan, *Air Force Research Laboratory/XPS*

The UH-AEOS Program: Physical Properties of Near-Earth Objects
Yanga Fernandez, *Institute for Astronomy, University of Hawaii*

MEMS the Word for Deformable Mirrors
Michael Helmbrecht, *University of California, Berkeley*

Educational Partnerships between the Center for Adaptive Optics and Hawaiian Community
Lisa Hunter, *Center for Adaptive Optics*

Find Your Own Planet
Denise Kaisler, *University of California, Los Angeles*

Observed Optical Brightness Distributions of Deep Space Satellites
John Lambert, *The Boeing Company*

Infrared Heterodyne Spectroscopy of Astrophysical Systems
Timothy A. Livengood, *Challenger Center for Space Science Education*

Estimation of the Adaptive Optics Long Exposure Point Spread Function Using Wavefront Sensor Data
Jose Marino, *National Solar Observatory*

The MATPHOT Algorithm for Digital Point Spread Function CCD Stellar Photometry
Kenneth J. Mighell, *National Optical Astronomy Observatory*

The Satellite Predictive Avoidance Tool: Safe Lasers Interacting with Space
Bill Mitchell, *Metatech Corporation*

Satellite Assessments and Analysis in Space Object Folders
Bill Mitchell, *Metatech Corporation*

A High Resolution Imaging Survey of A Stars With AEOS
Jenny Patience, *Lawrence Livermore National Laboratory*

Integrated Optics Systems for Image Quality Control
Bob Plemmons, *Wake University*

Novel Laser Actuated Super Adaptive Optics
Joe Ritter, *Science Applications International Corporation*

Waffle Mode Error in the AEOS Adaptive Optics Point-Spread Function
Lewis Roberts, *The Boeing Company*

Thermal Conditioning of the AEOS Telescope
Lewis Roberts, *The Boeing Company*

Faint Companion Search to O-stars Using the AEOS Adaptive Optics System
Lewis Roberts, *The Boeing Company*

Adaptive Optics Instrumentation Can Play a Role in Diabetes Prevention and Control
Fernando Romero-Borja, *University of Houston*

Lunar and Artificial Satellite Laser Ranging: The Use of Queue Scheduling and Worth Functions to Maximize Scientific Results
Peter J. Shelus, *University of Texas at Austin*

Spectral Analysis of Jupiter Image Cubes Obtained at the AEOS Telescope Facility
Amy A. Simon-Miller, *NASA/Goddard Space Flight Center*

The Rice University CCD Imager for Gamma-Ray Burst Studies
Ian Smith, *Rice University*

POSTER PAPERS