Welcome to the First Responsive Space Conference

Redondo Beach, CA    April 1–3, 2003

Email: ResponsiveSpace@smad.com    web: www.ResponsiveSpace.com

Sponsored by
AIAA LA Section and Space Systems Technical Committee
Organizing Committee

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Dr. Keith Comeaux, Boeing
Chair, LA Section

If you need anything during the conference, find one of us and we’ll find it for you!
We would like to thank the following people for making this conference happen:

The **Responsive Space Conference Organizing Committee** for doing the day-to-day planning and setting up the conference

**Regina Jenkins** for handling an infinite number (more-or-less) of administrative details

**Marge Risinger** of Rosenberg and Risinger for planning coordination

**Joy Sakaguchi** and **Jeanine Newcomb** for all of the conference artwork

**Donna Klungle** and **Joy** for creating all of the publications and documents and doing the CD-ROM Proceedings volume between now and Thursday noon

The volunteers who are helping with all aspects of the conference over the next 3 days: **Jennifer Christopher, Dee Kilmer, Jose Mancera, Gary Moir** and **Alice Wertz**

And, of course, the **AIAA LA Section** and **AIAA Space Systems Technical Committee**, who have made this conference possible along with the corporate sponsors on the next page.
Sponsors make the conference possible. We greatly appreciate their support.
• **Parking**
  – Self parking garage is just south of the Hotel and has an entrance to the lobby from the garage
  – Sticker from Regina lets non hotel guests park all day for $6 — however, there are no “in and out” privileges with this price

• **Notes for Presenters**
  – You should already have turned in everything for the Proceedings CD-ROM
    • *If you haven’t, leave now and turn the material in at the registration desk*
  – Electronic projection is preferred
    • Viewgraph projector is available as a back-up
  – You will **NOT** be allowed to connect your computer to the projection equipment
  – All material to be projected electronically must be turned in now at the registration desk
    • We want to test it and be sure everything works
  – *Please meet with your session chairman at 8:00 am on the day of your presentation in the main meeting room (Peninsula Pacific) for any final instructions*

• **Tour of Microcosm**
  – A tour of both the Scorpius launch vehicle and the AIAA Wright Flyer project is tentatively scheduled for 9:00 am on Friday morning
  – If you’re interested, please sign up at the Microcosm booth
More Administrative Details

• **Proceedings**
  – Complete conference proceedings will be available to all participants on a CD-ROM at no additional cost
    • Abstracts
    • Papers
    • Viewgraphs
    • Conference information
    • Attendee list
    • Information from Sponsors
  – CD-ROM will be available at the wrap-up session, Thursday, April 3
    • Will include all material handed in as of today
    • Use the ticket in your registration pack to pick up your CD on Thursday

• **Win a $100 gift certificate for AIAA books**
  – We want to find out how well the conference works for you and how to make it better
  – On Thursday we'll have a drawing for a gift certificate worth $100 toward any AIAA book purchase
    • To enter, just fill out a questionnaire, available Thursday, on how well the conference has done what was needed
    • We'll have the drawing at the Wrap-Up session
MONDAY, MARCH 31, 2003
1:00 pm – 5:00 pm REGISTRATION, CORAL FOYER
4:00 pm – 6:00 pm EXHIBITS OPEN, CORAL FOYER
5:00 pm – 7:00 pm NO HOST BAR AND RECEPTION, SEASCAPE BALLROOM

TUESDAY, April 1, 2003
7:00 am – 5:00 pm REGISTRATION, CORAL FOYER
7:00 am – 8:30 am CONTINENTAL BREAKFAST AND NETWORKING SESSION, CORAL FOYER
8:00 am – 6:00 pm EXHIBITS OPEN, CORAL FOYER
8:30 am – 9:15 am WELCOME AND INTRODUCTIONS—James R. Wertz, General Chairman, Peninsula/Pacific Ballroom
9:15 am – 10:00 am OPENING SPEAKER—ROBERT SACKHEIM, ASSISTANT DIRECTOR AND CHIEF ENGINEER, MSFC
10:30 am – 12:10 pm NEEDS AND REQUIREMENTS (Co-Chairs—Steven Cook, Col. Pamela Stewart, AFSPC), Peninsula/Pacific Ballroom
10:30 am A) DoD Access to Space for Small Satellites: Current Options & Direction Maj. Mark Mocio, DoD Space Test Program
10:50 am B) Operationally Responsive Spacelift for the U.S. Air Force Maj. Paul Kolodziejski, AFSPC
11:10 am C) The Strategy of Responsive Space: Assured Access to Space Revisited Lawrence A. Cooper, Kepler Research
11:30 am D) Heritage Schmeritage Chris McCormick, Broad Reach Engineering
12:10 pm LUNCH. Speaker: LTG (RET) EUGENE L. TATTINI–DEPUTY DIRECTOR, JET PROPULSION LABORATORY, SEASCAPE BALLROOM
1:40 pm – 3:20 pm ORBITS AND MISSION DESIGN (Chair—Pat Patterson, SDL), Peninsula/Pacific Ballroom
1:40 pm A) A Docking Solution for On-Orbit Satellite Servicing—Part of the Responsive Space Equation Pete Tchoryk, Michigan Aerospace Corporation
2:00 pm B) Improving Space-Asset Responsiveness using the SHERPA 2nd Lt. Randall Carlson, AFRL/V5
2:20 pm C) Developments in Commercial Near-Space Systems Jerry Knoblach, Space Data Corporation
2:40 pm D) Operational Concepts and Payoffs for Responsive Space Systems Mike Borky, Tamarac Technologies
**Agenda**

**3:20 pm**

BREAK, CORAL FOYER

**3:50 pm – 5:30 pm**

SPACE SYSTEMS-I (Chair—John Bystroff, Boeing), Peninsula/Pacific Ballroom

3:50 pm  
A) Microsatellite Deployment on Demand  
**Michael Hurley, NRL**

4:10 pm  
B) Advanced Lightweight Electronically Steered Antennas for Responsive Space Payloads  
**Wyman L. Williams, EMS**

4:30 pm  
C) “Launch-On-Demand” A Revolutionary Paradigm for Space Utilization  
**Jeff Summers, MicroSat Systems, Inc**

4:50 pm  
D) Survivability and Resource Management of Ground System Assets  
**Fred Wynkoop, L-3 Communications Systems—West**

**5:30 pm – 7:00 pm**

RECEPTION, CORAL FOYER

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**WEDNESDAY, April 2, 2003**

7:00 am – 1:00 pm  
REGISTRATION, CORAL FOYER

7:00 am – 8:30 am  
CONTINENTAL BREAKFAST AND NETWORKING SESSION, CORAL FOYER

8:00 am – 6:00 pm  
EXHIBITS OPEN, CORAL FOYER

8:30 am – 10:10 am  
SPACE SYSTEMS-II (Chair—Terry Jaggers, SMC/XR), Peninsula/Pacific Ballroom

8:30 am  
A) Modular Micro-Satellite Bus  
**John Hodak, Starhunter Corporation**

8:50 am  
B) The Trailblazer Class of Low Cost Space Vehicle  
**Dennis Laurie, Transorbital, Inc.**

9:10 am  
C) Implementing Standard Microsatellites for Responsive Space Responsiveness to Space  
**Ray M. Haynes, Northrop Grumman Space Technology**

9:30 am  
D) University Collaborations: Jumpstarting Industry Dynamic Delivery Express (EDDE)  
**Joseph Carroll, Tether Applications, Inc.**

9:50 am  
E) Affordable, Responsive Space Asset Delivery by Electro Dynamic Delivery Express (EDDE)  
**Joseph Carroll, Tether Applications, Inc.**

10:10 am  
BREAK—CORAL BALLROOM

10:40 am – 12:00 pm  
BREAKING THE BARRIERS (Chair—Lawerence Cooper, Kepler Research), Peninsula/Pacific Ballroom

10:40 am  
A) Technology for Responsive Space Capability  
**Bob Pugh, AFRL/VS**

11:00 am  
B) Lessons Learned from Past Reusable Launch System Designs  
**Greg Peralta, Lockheed Martin Technical Operations**

11:20 am  
C) Responsive Launch with the Scorpius® Family of Low-Cost, Expendable Launch Vehicles  
**James R. Wertz, Microcosm, Inc.**

11:40 am  
D) NAI Study Outbrief  
**Babu Singaraju, AFRL/VS**
12:00 pm  LUNCH. Speaker: MGEN (RET) ROBERT S. DICKMAN, SAF/US—MILITARY SPACE
         Plus Presentation of AIAA Space Systems Award, SEASCAPE BALLROOM

1:30 pm – 3:10 pm  TECHNOLOGY FOR IMPROVED RESPONSIVENESS (Chair—Todd Mosher, USU), Peninsula/Pacific Ballroom
1:30 pm  A) Fast Responsive Experiment Flight Opportunities using SSPC
         Gerald Murphy, Design-Net Engineering
1:50 pm  B) On-Demand Wavelength Tuning of Detector Responsivity for Multi-Mission Scenarios
         Dave Cardimona, AFRL/VS
2:10 pm  C) Pistonless Dual Chamber Rocket Fuel Pump
         Steve Harrington, Flometrics
2:30 pm  D) A Low-Cost Flight Computer using GPS
         Michael Castle, SiRF Technology, Inc.
2:50 pm  E) Near Space Maneuvering Vehicle
         Lt. Col. Thomas Shields, Schriever AFB
3:10 pm  BREAK, CORAL FOYER

3:40 pm – 5:20 pm  BUSINESS ISSUES (Chair—Russ Joyner, Pratt-Whitney), Peninsula/Pacific Ballroom
3:40 pm  A) Achieving Responsive Access to Space—Market, Money, Mechanics and Management Lessons from X-33
         Carl J. Meade, Lockheed Martin Aeronautics, Palmdale
4:00 pm  B) Rapid Financing: The Ultimate Oxymoron
         Mark R. Oderman, CSP Associates Inc.
4:20 pm  C) Decision Support Tools to Enable Affordability For Responsive Space
         Sam Boykin, Frontier Technology Inc.
4:40 pm  D) Benefits of Commercial Spaceports
5:00 pm  E) Responsive Space Systems and Consumer Markets: The Celestis Case
         Charlie Chafer, Celestis
5:20 pm  BREAK, CORAL FOYER

6:30 pm – 7:00 pm  RECEPTION, CORAL FOYER
7:00 pm – 9:00 pm  CONFERENCE BANQUET. Speaker: BGEN SIMON P. (PETE) WORDEN—DIRECTOR, OFFICE OF TRANSFORMATION, AF SPACE AND MISSILE COMMAND, SEASCAPE BALLROOM

THURSDAY, April 3, 2003

7:00 am – 8:00 am  CONTINENTAL BREAKFAST AND NETWORKING SESSION, CORAL BALLROOM
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<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tr>
<td>8:00 am – 9:00 am</td>
<td>PANEL—THE NEED FOR RESPONSIVE SPACE, Peninsula/Pacific Ballroom</td>
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<tr>
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<td>BG STEPHEN FERRELL, OSD-ATL</td>
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<td>PETER G. WILHELM, DIRECTOR, NAVAL CENTER FOR SPACE TECHNOLOGY</td>
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<td>GARY MARTIN, NASA SPACE ARCHITECT</td>
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<td>PAUL PISCOPO, DDR&amp;E</td>
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<td>9:00 am – 4:30 pm</td>
<td>EXHIBITS OPEN, CORAL FOYER</td>
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<td>9:00 am – 10:40 am</td>
<td>LAUNCH VEHICLES &amp; OPERATIONS-I (Chair—Tony Williams, Booz Allen Hamilton)</td>
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<tr>
<td>9:00 am</td>
<td>A) Responsive Space: Near-Term Options for the Military</td>
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<td>Matt Bille, Booz Allen Hamilton</td>
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<td>9:20 am</td>
<td>B) I-Cone for Rapid Response and Low Cost Access to Space</td>
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<td>Mike Cully, Swales Aerospace</td>
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<td>9:40 am</td>
<td>C) DNEPR Program: Prospects and Advantages for Responsive Space</td>
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<td>Reese Nielsen, ATK Thiokol Propulsion</td>
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<td>10:00 am</td>
<td>D) Rapid Access Small Cargo Affordable Launch (RASCAL)</td>
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<td>Preston Carter, Program Mgr., DARPA</td>
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<td>10:20 am</td>
<td>E) Low-Cost, Flexible Spacelift for Research and Development Satellites using Peacekeeper ICBM Derived Space Launch Vehicle</td>
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<td>Tim D. Luddeke, Product Development</td>
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<td>10:40 am</td>
<td>BREAK, CORAL FOYER</td>
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<td>11:00 am – 12:40 pm</td>
<td>LAUNCH VEHICLES &amp; OPERATIONS-II (Chair—Larry Davidoff, Boeing)</td>
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<tr>
<td>11:00 am</td>
<td>A) Air Force Space Operations Vehicle: Operability Driven</td>
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<td>Keith McIver, The Boeing Company</td>
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<td>11:20 am</td>
<td>B) Responsive Space Launch the F-15 Microsatellite Launch</td>
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<td>Lt. Julia Rothman, AFRL/VS, Space</td>
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<td>11:40 am</td>
<td>C) Atlas V Evolved Expendable Launch Vehicle: Spiral Development of Responsive Space</td>
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<td>Timothy Gillespie, Lockheed Martin Spacecraft Astronautics</td>
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<td>12:00 pm</td>
<td>D) Demonstrating Low Cost Access to Space for Small Satellites</td>
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<td>Maj. Timothy Sumrall, Space and Missile Systems, Kirtland AFB</td>
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<td>12:20 pm</td>
<td>E) The Scorpius® Expendable Launch Vehicle Family and Status of the Sprite Small Launch Vehicle</td>
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<td>Shyama Chakroborty, Microcosm, Inc.</td>
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<td>12:40 pm</td>
<td>LUNCH. Speaker: DR. ANTONIO L. ELIAS—VP/GM ADVANCED PROGRAMS, ORBITAL SCIENCES CORP., SEASCAPE BALLROOM</td>
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<td>2:20 pm – 3:30 pm</td>
<td>WRAP-UP PANEL WITH SUMMARIES BY SESSION CHAIRS, PENINSULA/PACIFIC BALLROOM</td>
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<td>2:20 pm</td>
<td>CD-ROM OF ALL PAPERS AVAILABLE TO PARTICIPANTS</td>
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<td>3:30 pm – 6:30 pm</td>
<td>TOWN MEETING REGISTRATION (Separate Registration Fee Required)</td>
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<td>4:30 pm – 6:30 pm</td>
<td>TOWN MEETING NETWORKING SESSION</td>
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<td>6:30 pm – 9:00 pm</td>
<td>NASA TOWN MEETING DINNER AND PANEL</td>
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• Responsiveness has become critical to many modern systems
  – War in Iraq
  – Shorter time frame for most information-based technologies
    • “Instant answers” to many issues available on the Internet or web

• Space assets are a major contributor in many areas
  – Military, commercial, science, engineering, education, exploration

• **But, however important space assets may be in today’s world, they aren’t responsive**
  – Apollo went from a dream to landing people on the Moon (including developing the largest rocket ever built) in 8 years
  – Today, major unmanned programs take well more than a decade, and even small satellite missions can take 5 to 7 years

• Many would regard Iridium as a technical success, but a business failure
  – Why? — Largely because it took too long to build and deploy and was made irrelevant by the rapid growth of ground-based systems
  – The lack of multiple LEO communications constellations is, in part, a direct result of the lack of responsiveness in our industry

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The fundamental questions for this conference are:
How do we make space responsive?
If we’re successful, how do we take advantage of this new capability?
What Missions Need To Be Responsive?

- Military missions — rapid and continuous battlefield intelligence that’s “responsive and flexible” (the quote is from Gen. Tommy Franks assessment of the new strategy for the Iraq war — March 22, 2003)
  - Without responsiveness, space will be less relevant to future military users
- Commercial missions — ground-based, rather than space-based sparing, 0-g manufacturing based on needs defined today
  - For space to remain relevant, the next major set of commercial systems must succeed
  - We all share responsibility for the death of the LEO communications revolution
- Science — observations of transient phenomena; responsive science with tomorrow’s experiment based on today’s results
- Education — experiments launched while the student is still a student, or at least still in astronautics
- Crewed missions — can we make them safer by having responsive launch available?
  - Consumables brought up as needed to extend on-orbit life
  - Inspection missions launched when needed to evaluate potential problems
  - “Spare parts” brought up to mitigate any launch or on-orbit failures

Answer: All of ’em.
“I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to Earth.”

– John Kennedy, before a joint session of Congress, May 25, 1961

“The U.S. Air Force has kick-started a major study on quick-to-launch boosters capable of enhancing the nation’s warfighting abilities,... Given a Pentagon go-ahead and funding, the Air Force could first fly a multi-stage system by 2014.”


“If it takes us 11 years to create a Responsive Space capability, we all oughta find a different line of work.”

– Jim Wertz, Challenge to the First Responsive Space Conference, April 1, 2003

We can do better. We must do better. Let’s get started and find out how.