4th IAA SYMPOSIUM

ON SMALL SATELLITES

FOR EARTH OBSERVATION

Final Program

APRIL 7 - 11, 2003

Composition photo: DLR

DLR

GERMAN AEROSPACE CENTER

INSTITUTE OF SPACE SENSOR TECHNOLOGY AND PLANETARY EXPLORATION

BERLIN, GERMANY

SPONSORED BY

International Academy of Astronautics (IAA)

International Academy of Astronautics

COSPONSORS

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR)
European Space Agency (ESA)
National Aeronautics and Space Administration (NASA)
Argentine Commission on Space Activities (CONAE)

HONORARY CHAIRMAN

Gerhard Haerendel
(International University Bremen, Germany)

CHAIRMEN

Arnoldo Valenzuela
Chairman
IAA Committee on Small Satellite Missions
(Italy)

Hans-Peter Röser
Director Institute of Space Systems
University of Stuttgart (Germany)

Rainer Sandau
Chairman
IAA Subcommittee on Low Cost Earth
Observation Missions (Germany)

LOCAL ARRANGEMENTS

B. Kirchner, Symposium and Program Co-ordinator
DLR/WP
D. Hennig, Symposium Organizer
CMT ConTour GmbH

SCIENTIFIC PROGRAM COMMITTEE

M. Angulo (INTA, Spain)
G. A. Avanesov (IKI, Russia)
A. Bachem (DLR, Germany)
M. N. Barbosa (INPE, Brazil)
J.-M. Contant (IAA, France)
M. Rougeron (CNES, France)
C. Elachi (NASA/JPL, USA)
F.-B. Hsiao (NCKU, Taiwan, China)
V. Kelhä (VTT, Finland)
R. Hornstein (NASA/HQ, USA)
S. Neeck (NASA/GSFC, USA)
T. Uesugi (ISAS, Japan)
U. Renner (TU Berlin, Germany)
A. Ginati (ESA)
K. Staenz (CCRS, Canada)
K. Thyagarajan (ISRO, India)
C. F. Varotto (CONAE, Argentina)
Y. L. Zhu (CAST, Beijing, China)

PROGRAM COMMITTEE

L. Alkalai (NASA/JPL, USA)
K. Brieß (DLR, Germany)
G. Fountain (JHU/APL, USA)
H. Jahn (DLR, Germany)
E. Herland (ESA/ESTEC)
J. Esper (NASA/GSFC, USA)

This Symposium was made possible by the support and cooperation of our co-sponsors and our host organization

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR)
German Aerospace Center
Institute of Space Sensor Technology and Planetary Exploration (WP)

Sincere appreciation is extended to the following corporate contributors for their generous support:

Jena-Optronik GmbH
EUROSPACE Technische Entwicklungen GmbH
Astro- und Feinwerktechnik Adlershof GmbH
Druckhaus Schöneweide GmbH

Message of Greeting

from the Governing Mayor of Berlin, Klaus Wowereit, for the

4th Symposium on Small Satellites for Earth Observation of the

International Academy of Astronautics (IAA)

in Berlin, April 7 – 11, 2003

Klaus Wowereit

Berlin would like to extend a very warm welcome to the delegates attending this 4th Symposium. Having outstanding scientists and engineers from all over the world meet here for this forum on aerospace issues underscores our reputation as a city of knowledge. I would like to thank the International Academy of Astronautics for choosing Berlin as the venue for this conference for the fourth time.

Berlin can point to a wide variety of experience in the area of aeronautics and earth observation. This includes not only the previous conferences, which were attended by 800 delegates from more than 30 countries, but also the superb results achieved by scientists from Berlin working in the area of small satellites, which are also to be presented at this symposium. The German Aerospace Center (DLR) will be presenting the small satellite BIRD, among other things, which has been observing large fires and volcano eruptions all over the world since October 2001.

I hope that the delegates will also take the opportunity to explore Berlin, which, in addition to being a city of knowledge, has much more to offer. Here you will find not only some of the most famous museums in the world, great theaters, and opera houses, but a multitude of other attractions as well. Right now Berlin is one of the world's most exciting cities, a capital city in the heart of Europe, and a metropolis on the move.

I wish you a very pleasant stay in Berlin and a productive and stimulating symposium.

AGENDA

Sunday, April 6, 2003

16.00-20.00 Registration, Hilton Hotel
19.00-20.00 Get-Together

Monday, April 7, 2003

08.00-09.30 Registration, Hilton Hotel

09.30-09.50 **Welcome:** R. Sandau, Symposium Chairman
P. Pasternack, Senate of Berlin
J.-M. Contant, IAA Secretary General
A. Bachem, DLR

09.50-10.45 **Keynote Address:** G. Haerendel, Intern. Univ. Bremen, Germany

10.45-11.15 BREAK, PRESS CONFERENCE

11.15-12.30 **Session 01:**
PROGRAMMATICS
Chair: J.-M. Contant, IAA
Rapporteur: H.-P. Röser, Univ. of Stuttgart, Germany

12.30-13.30 LUNCH

13.30-15.00 **Session 02:**
EARTH OBSERVATION MISSIONS
Chair: A. Ginati, ESA
Rapporteur: K. Thyagarajan, ISRO, India

15.00-15.20 BREAK

15.20-16.40 **Session 03:**
RESULTS AND LESSONS LEARNED
Chair: R. Sandau, IAA
Rapporteur: L. Paxton JHU/APL, USA

16.40-17.40 **Panel 1:**
LAUNCH OPPORTUNITIES FOR SMALL SATELLITES
Chair: J.-M. Contant, IAA

Tuesday, April 8, 2003

09.00-10.30 **Session 04:**
EARTH EXPLORER MISSIONS
Chair: E.-A. Herland, ESA/ESTEC
Rapporteur: L. Alkalai, NASA/JPL, USA

Tuesday, April 8, 2003 (cont'd.)

10.30-10.50 BREAK

10.50-12.10 **Session 05:**
EDUCATIONAL PROGRAMS
Chair: T. Hayashi, CHIBA, Japan
Rapporteur: J. Esper, NASA/GSFC, USA

12.10-13.30 LUNCH

13.30-15.00 **Session 06: (Special)**
STUDENT CONFERENCE
Chair: L. Paxton, JHU/APL, USA
Rapporteur: H. Jahn, DLR, Germany

15.00-15.20 BREAK

15.20-16.40 **Session: 07**
TECHNOLOGIES AND INSTRUMENTS
Chair: L. Alkalai, NASA/JPL, USA
Rapporteur: E.-A. Herland, ESA/ESTEC

16.40-17.40 **Panel 2:**
FUTURE NASA SPACE TECHNOLOGIES FOR SMALL SATELLITE MISSIONS
Chair: L. Alkalai, NASA/JPL, USA

Wednesday, April 9, 2003

09.00-10.30 **Session 08:**
TECHNOLOGY DEMONSTRATION
Chair: H. Jahn, DLR, Germany
Rapporteur: St. Neeck, NASA/GSFC, USA

10.30-10.50 BREAK

10.50-12.10 **Session 09:**
SPACECRAFT SUBSYSTEMS
Chair: U. Renner, TU Berlin, Germany
Rapporteur: M. Ovchinnikov, RAS, Russia

12.10-13.30 LUNCH

AGENDA (cont'd.)

Wednesday, April 9, 2003 (cont'd.)

13.30-15.00 **Session 10: (Special)**
NASA EARTH SCIENCE SMALL SATELLITE MISSIONS AND TECHNOLOGIES
Chair: St. Neeck, NASA/GSFC, USA
Rapporteur: R. Sandau, IAA

15.00-15.20 BREAK

15.20-16.40 **Session 11:**
CONSTELLATIONS AND PLATFORMS
Chair: K. Thyagarajan, ISRO India
Rapporteur: K. Briess, DLR, Germany

16.40-17.40 **Session:**
POSTER

Thursday, April 10, 2003

09.00-10.30 **Session 12:**
ATTITUDE CONTROL SYSTEMS
Chair: M. Ovchinnikov, RAS, Russia
Rapporteur: K. Lundal, SSC, Sweden

10.30-10.50 BREAK

10.50-12.10 **Session 13:**
SPECIAL ASPECTS OF SMALL SATELLITE MISSIONS
Chair: H.-P. Röser, Univ. of Stuttgart, Germany
Rapporteur: J. L. Joergensen, DTU, Denmark

12.10-13.30 LUNCH

13.30-15.00 **Session 14: (Special)**
COST EFFECTIVE EARTH OBSERVATION MISSIONS
Chairs: J. Esper, NASA/GSFC, USA
R. Sandau, IAA
Rapporteur: U. Renner, TU Berlin, Germany

15.00-15.20 BREAK

Thursday, April 10, 2003 (cont'd.)

15.20-16.40 **Session 15:**
LAUNCH SYSTEMS AND GROUND SEGMENT
Chair: K. Briess, DLR, Germany
Rapporteur: M. Ovchinnikov, RAS, Russia

16.40-17.40 **SYMPOSIUM SUMMARY**
Chair: H.-P. Röser, Univ. of Stuttgart, Germany
Chief Rapporteur: G. Fountain, JHU/APL, USA

AWARDS

Friday, April 11, 2003

09.00-12.00 **Visit to:**

WISTA, Science and Technology Center

Berlin-Adlershof

Bus Shuttle Departure from the Berlin Hilton Hotel at 09.00,
Approximate Return at 13.00

Monday, April 7, 2003, 11.15-12.30

SESSION 01 - **PROGRAMMATICS**

Chair: J.-M. Contant – IAA
Rapporteur: H.-P. Röser – Univ. of Stuttgart, Germany

The ESA Living Planet, Future Programme
Ginati, A.; Tobias, A. – ESA/ESTEC IAA-B4-0101

From Observations to Decision Support: The New Paradigm for Satellite Data
McCuistion, J.D.; Birk, R. – NASA/HQ, USA IAA-B4-0102

Possible Scenario for Future Mission in Earth Observation
Hernandez, D. – CNES, France IAA-B4-0103

Monday, April 7, 2003, 13.30-15.00

SESSION 02 - **EARTH OBSERVATION MISSIONS**

Chair: A. Ginati – ESA
Rapporteur: K. Thyagarajan – ISRO, India

The Earth Observation Program at OHB-System
Penne, B.; Tobehn, C.; Kassebohm, M.; Lübberstedt, H. – OHB, Germany IAA-B4-0201

Low/Medium Density Biomass, Coastal and Ocean Carbon: A Carbon Cycle Mission
Esper, J.; Gervin, J.; Kirchmann, F.; Middleton, B.; Knox, R.; Gregg, W.; Mannino, A.; McClain, Ch.; Herman, J.; Hall, F. – NASA/GSFC, USA IAA-B4-0202

MAPSAR: A Small L-band SAR Mission for Land Observation
Schröder, R,; Puls, J.; Hajnsek, I.; Jochim, F.; Neff, Th. – DLR, Germany, Kono, J.; Paradella, W. R.; Quintino da Silva, M. M.; de Morisson Valeriano, D.; Farias Costa, M. P. – INPE, Brazil IAA-B4-0203

New Small Satellite Mission for Carlo Gavazzi Space
Morea, G.D.; Sabatini, P. – CARLO GAVAZZI SPACE, Italy IAA-B4-0204

Monday, April 7, 2003, 15.20-16.40

SESSION 03 - **RESULTS AND LESSONS LEARNED**

Chair: R. Sandau – IAA
Rapporteur: L. Paxton – JHU/APJ, USA

JASON 1: Lessons Learned from the Development and 1 Year in Orbit
Lafon, Th. – CNES, France IAA-B4-0301

Noncoherent Doppler Tracking: First Flight Test Results
DeBoy, C.C.; Jensen, J.R.; Asher, M.S. – JHU/APL, USA IAA-B4-0302

PROBA: An ESA Technology Demonstration Mission with Earth Imaging Payload. First Year of In Orbit Results
Teston, F. – ESA-ESTEC; Barnsley, M. – UNIV. of WALES SWANSEA , UK; Settle, J. – ESSC, UK; Vuilleumier, P.; Santandrea, S. – ESA-ESTEC IAA-B4-0303

Technology Demonstration by the BIRD Mission
Brieß, K.; Bärwald, W.; Gill, E.; Halle, W.; Kayal, H.; Montenbruck, O. – DLR, Germany; Montenegro, S. – FhG FIRST, Germany; Skrbek, W.; Studemund, H.; Terzibaschian, T.; Venus, H. – DLR, Germany IAA-B4-0304

Monday, April 7, 2003, 16.40-17.40

PANEL 1 - LAUNCH OPPORTUNITIES FOR SMALL SATELLITES

Chairman: J. M. Contant – IAA

Members: S.S. Balakrishnan – Antrix, India

Cl. Berna – Arianespace, France

P. Freeborn – Eurockot, Germany

Tuesday, April 8, 2003, 09.00-10.30

SESSION 04 - **EARTH EXPLORER MISSIONS**

Chair: E.-A. Herland – ESA/ESTEC
Rapporteur: L. Alkalai – NASA/JPL, USA

SPECTRA – ESA Candidate Earth Explorer Core Mission – Feasibility Results and Outlook
Tobehn, C.; Kassebohm, M.; Schmälter, E. – OHB, Germany IAA-B4-0401

Detection and Analysis of High Temperature Events in the BIRD Mission
Zhukov, B.; Brieß, K.; Lorenz, E.; Oertel, D.; Skrbek, W. – DLR, Germany IAA-B4-0402

Atmosphere Climate Experiment Plus ACE+
Veldman, S.; Lundahl, K. – SSC, Sweden IAA-B4-0403

EKOSAT-IR – Ecology Related Earth Observation and Hot Spot Detection
Lübberstedt, H.; Penné, B. – OHB, Germany;
Sandau, R.; Oertel, D. – DLR, Germany IAA-B4-0404

Tuesday, April 8, 2003, 10.50-12.10

SESSION 05 - **EDUCATIONAL PROGRAMS**

Chair: T. Hayashi – CHIBA, Japan
Rapporteur: J. Esper – NASA/GSFC, USA

University Small Satellite Program - ANUSAT
Thyagarajan, K.; Gupta, J.P.; Goel, P.S.; Jayaraman, K. – ISRO, India IAA-B4-0501

Results of In Flight Operation of Scientific Payload on Micro-Satellite "Kolibri-2000"
Klimov, S.I.; Afanasyev, Yu.V.; Eismont, N.A.; Grachev, E.A.; Grigoryan, O.R; Grushin; V.A.; Lysakov, D.S.; Nozdrachev, M.N. – Interregional public organization "Microsputnik", Russia IAA-B4-0502

Need of High Resolution Low Cost Small Satellite Mission Based Educational Programme and its Application to State Level Planning in India
Rajendran, S. – Annamalai University, India IAA-B4-0503

Program of Educational and Research Center of Ecological Monitoring Based on the Usage of a New Small Satellite Imaging System
Boyarchuk, K.A. – RAS, Russia; Khutorskoy, M.D. – RPFU, Russia;
Zaitzev, A.N. – RAS, Russia IAA-B4-0504

Tuesday, April 8, 2003, 13.30-15.00

SESSION 06 (Special) – **STUDENT CONFERENCE**

Chair: L. Paxton – JHU/APL, USA
Rapporteur: H. Jahn – DLR, Germany

The Icarus Student Satellite Project
Goldberg, H.R.; Gilchrist, B.E. – University of Michigan, USA IAA-B4-0601

Attitude Estimation from Magnetometer and Earth-Albedo-Corrected Coarse Sun Sensor Measurements
Appel, P. – University of Bremen, Germany IAA-B4-0602

Exploration of Influence of a Solar Flares on Operation of the Star Trackers
Voronkov, S.– RAS, Russia IAA-B4-0603

Citizen Explorer-I: An Earth Observer with New Small Satellite Technology
Allen, D.Z.; Dunn, C.E – University of Colorado, USA IAA-B4-0604

The DOBSON SPACE TELESCOPE – A Time Shared Telescope for NEO and Earth Observation
Segert, T.; Danziger, B.; Geitner, M. – TU Berlin, Germany IAA-B4-0605

Large Angle Manoeuvre of an Underactuated Small Satellite Using Two Wheels
Horri, N.M. **–** University of Surrey, UK IAA-B4-0606

Tuesday, April 8, 2003, 15.20-16.40

SESSION 07 - **TECHNOLOGIES AND INSTRUMENTS**

Chair: L. Alkalai – NASA/JPL, USA
Rapporteur: E.-A. Herland – ESA/ESTEC

Development of Engineering Model of Medium-sized Aperture Camera System
Kim, E.-E.; Choi, Y.-W.; Yang, H.S.; Kang, M.-S.; Jeong, S.-K.; Yang, S.-U.;
Kim, J.-U. – SaTReC, Korea;
Rasheed, Ad. A. Ad.; Nasir, H. Md. Md.; Rosdi, R. Md.;
Hai, A. H. Ad.; Ismail, I.; Arshad, A. S. – ATSB, Malaysia IAA-B4-0701

Mono-Photon Technology Based Hyperspectral Systems for Remote Sensing in Russia
Makridenko, L.A. – ROSAVIAKOSMOS, Russia; Salikhov, R.S. – NIIEM, Russia; Ovchinnikov, M.Y.; Khrenov, N.N. – RAS, Russia; Montenegro, S.; Behr, P.; Pletner, S. – FhG FIRST, Germany; Rodionov, I.D. – REAGENT, Russia IAA-B4-0702

ASP-based Miniature Sun Sensor for Earth Observation Nanosatellites
Buonocore, M.; Grassi, M.; Rufino, G. – University of Naples, Italy IAA-B4-0703

Tethered System for Sensitive Scientific Experiments Onboard the Microsatellite
Korepanov, V.; Dudkin, F. – ISR, Ukraine IAA-B3-0704

Tuesday, April 8, 2003, 16.40-17.40

PANEL 2 - FUTURE NASA SPACE TECHNOLOGIES FOR SMALL SATELLITE MISSIONS

Chair: L. Alkalai – NASA/JPL, USA

Members: N.N.

Wednesday, April 9, 2003, 09.00-10.30

SESSION 08 - **TECHNOLOGY DEMONSTRATION**

Chair: H. Jahn – DLR, Germany
Rapporteur: St. Neeck – NASA/GSFC,USA

TopSat: Low Cost High Resolution Imagery from Space
Cawley, St. – QinetiQ Ltd, England IAA-B4-0801

On Orbit Technology Validation for a University Microsatellite
Bernelli-Zazzera, F.; Ercoli-Finci, A.; Molina, M.; Cattaneo, M.; Dioli, M.; Bertolini, I.; Bianchi, R. – Politecnico di Milano, Italy; Sabatini, P.; Crocco, L.; Schiavi, F.; Zucconi, A. – Carlo Gavazzi Space, Italy IAA-B4-0802

The PROBA Satellite Star Tracker Performance
Jørgensen; J.L.; Denver, T.; Betto, M. – Technical University of Denmark, Denmark; Van den Braembussche, P. – VERHAERT, Belgium IAA-B4-0803

SAC-C Orbit Acquisition Maneuver Sequence
Filici, C.; Suarez, M. – CONAE, Argentina IAA-B4-0804

Wednesday, April 9, 2003, 10.50-12.10

SESSION 09 - **SPACECRAFT SUBSYSTEMS**

Chair: U. Renner – TU BERLIN, Germany
Rapporteur: M. Ovchinnikov – RAS, Russia

Micro-Satellites Thermal Control-Concept and Components
Baturkin, V. – National Technical University of Ukraine, Ukraine IAA-B4-0901

Implementing an Image Processing System for the Next Generation Earth Observation Sensors for the Sunsat 2 Micro-Satellite Program
Mostert, S.; Kriegler, E. – University of Stellenbosch, South Africa IAA-B4-0902

IRECIN Nanosatellite Communication System and Ground Segment
Ferrante, M.; Povia, M.; Di Ciolo, L. – VITROCISET, Italy IAA-B4-0903

In-Flight Quality and Accuracy of Attitude Measurements from the CHAMP Advanced Stellar Compass
Jørgensen, P.S.; Jørgensen, J.L.; Denver, T.; Betto, M. – Technical University of Denmark IAA-B4-0904

Wednesday, April 9, 2003, 13.30-15.00

SESSION 10 (Special) - **NASA EARTH SCIENCE SMALL SATELLITE MISSIONS AND TECHNOLOGIES**

Chair: St. Neeck – NASA/GSFC, USA
Rapporteur: R. Sandau – IAA

NASA's Small Satellite Missions for Earth Observation
Neeck, S.; Magner, T.; Paules, G.– NASA/HQ, USA IAA-B4-1001

NN IAA-B4-1002

The Orbiting Carbon Observatory (OCO) Mission
Johnson, C.; Crisp, D. – NASA/HQ, USA IAA-B4-1003

Advanced Platform Technologies Enabling Efficient Distributed Sensing System for Earth Science
Lemmerman, L.; Raymond, C.; Shotwell, R.; Chase, J. – NASA/JPL, USA; Bhasin, K. – NASA/GRC, USA; Connerton, R. – NASA/GSFC, USA IAA-B4-1004

Wednesday, April 9, 2003, 15.20-16.40

SESSION 11 - **CONSTELLATIONS AND PLATFORMS**

Chair: K. Thyagarajan – ISRO, India
Rapporteur: K. Briess – DLR, Germany

MAGNAS - Magnetic Nanoprobe Swarm
Lübberstedt, H.; Koebel, D. – OHB, Germany; Hansen, F. – DSRI, Denmark; Brauer, P. – Ørsted DTU MI, Denmark IAA-B4-1101

The RapidEye Mission Design
Tyc, G. ; Tulip, J.; Schulten, D. – MDA, Canada; Krischke, M.; Oxfort, M. – RapidEye AG, Germany IAA-B4-1102

Small Satellite Constellation for Disaster Prevention and Rescue
Oraevsky, V.N.; Boyarchuk, K.A.; Dokukin, V.S. – IZMIRAN, Russia; Salikhov, R.S.; Vladimirov, A.V.; Sennik, N.A. – NIIEM, Russia IAA-B4-1103

A Microsatellite Payload Platform for Hot Spot Detection
Walter, I.; Briess, K.; Baerwald, W.; Lorenz, E.; Skrbek, W.;
Schrandt, F. – DLR, Germany IAA-B4-1104

Wednesday, April 9, 2003, 16.40-17.40

SESSION - **POSTERS**

METSAT – A Dedicated Meteorological Mission of ISRO
Kaila, V.K.; Katti, V.R. – ISRO, India IAA-B4-0205P

Thermal Plasma Measurement Unit for Micro-Satellites
Hruska, F.; Chum, J.; Kolmasova, I.; Smilauer, J.;
Truhlik, V. – CAS, Czech Republic IAA-B4-0405P

MUNIN – A Swedish Nanosatellite
Johnson, K. – SISP, Sweden IAA-B4-0406P

Space Monitoring for the Future
Burdyuzha, V. – RAS, Russia IAA-B4-0407P

Singapore's Satellite Mission X-SAT
Bretschneider, T. – Nanyang Technological University, Singapore IAA-B4-0506P

Software Error Protection Technique for High Density Memory
Saturno, M.E. – INPE, Brazil IAA-B4-0705P

Micro ASC, a Miniature Star Tracker
Jørgensen; J.L.; Denver, T.; Betto, M.; Jørgensen, P.S. – Ørsted DTU,
Denmark IAA-B4-0706P

Magnetometer Measure Subsystem of the Nanosatellite IRECIN
Ferrante, M.; Di Ciolo, L.; Povia, M. – VITROCISET, Italy IAA-B4-0707P

LAGRANGE RO: A GNSS Receiver for Radio Occultation
De Cosmo, V.; Vespe, F. – ASI, Italy; Banfi, E. – LABEN, Italy IAA-B4-0708P

Application of APS Detector to GNC Sensors
Boldrini, F.; Monnini, E., Procopio, D. – OFFICINE-GALILEO, Italy IAA-B4-0709P

Tracking Algorithm for Star Sensors Using CMOS Devices
Accardo, D. – University of Naples; Italy IAA-B4-0710P

Hyperspectral Monitoring Data Processing
Montenegro, S.; Behr. P. – FhG FIRST, Germany;
Rodionov, I.; Rodionov, A.; Fedounin, E. – REAGENT, Russia IAA-B4-0711P

Compact High Resolution Imaging Spectrometer (Chris)
Cutter, M.A.; Lobb, D. R. – SIRA, England IAA-B4-0712P

Earth Observation from Elliptical Orbits with Very Low Altitude Perigee
Ceccanti, F.; Marcuccio, S. – ALTA-SPACE, Italy IAA-B4-0805P

Earth Reference Sensor of IRECIN Nanosatellite
Ferrante, M.; Di Ciolo, L.; Povia, M. – VITROCISET, Italy IAA-B4-0905P

Specialized Small Satellites with Wireless Power Transmission as New Way in Micro-Gravity Technology
Chuyan, R.; Grechnev, A.; Kvasnikov, L.; Smakhtin, A. – MAI, Russia; Savvin, V. – MSU, Russia; Shalimov, V.; Zemskov, V. – BAIKOV IMMS, Russia; Resh, G. – NPO Mashinostroenie, Russia IAA-B4-0906P

Antenna Deployment Mechanism for Spacecraft SPARTNIK
Prabhakar, S.; Sing Sidhu, R. – San Jose State University, USA IAA-B4-0907P

The RapidEye Spacecraft
Tyc, G.; Buttner, G. – MDA, Canada; Krischke, M.; Oxfort, M. – RAPIDEYE AG, Germany IAA-B4-1105P

The New Approach towards Commercial Earth Observation –Rapid Eye
Krischke, M.; Jung-Rothenhäusler, F. – RAPIDEYE AG, Germany; Schulten, D.; Tyc, G. – MDA, Canada IAA-B4-1106P

Microsatellite Configuration Design for an Earth Observation Mission based on the Distributed Sensor Concept
Tancredi, U.; D'Errico, M. – Second University of Naples, Italy IAA-B4-1107P

Small Satellite Platform "Vulkan"
Salikhov, R.S.; Vladimirov, A.V.; Sennik, N.A. – NIIEM, Russia; Oraevsky, V.N.; Dokukin, V.S.; Boyarchuk, K.A. – IZMIRAN, Russia IAA-B4-1108P

Scientific Instrumentation for the Small Satellite Platform "Vulkan"
Oraevsky, V.N.; Boyarchuk, K.A.; Dokukin, V.S. – IZMIRAN, Russia IAA-B4-1109P

Small Satellite "KOMPAS-2"
Oraevsky, V.N. – IZMIRAN, Russia; Danilkin, V.A. – State Rocket Centre "V.P. Makeyev", Russia; Boyarchuk, K.A.; Dokukin, V.S. – IZMIRAN, Russia IAA-B4-1110P

A Simple Low Cost Digital Sun Sensor for Micro-Satellites
Chum, J.; Vojta, J.; Base, J.; Hruska, F. – Academy of Sciences, Czech Republic IAA-B4-1205P

Onboard Autonomous Corrections for Accurate IRF Pointing
Jørgensen, J. L.; Betto, M.; Jørgensen, P. S.; Denver, T. – Ørsted.DTU, Denmark IAA-B4-1206P

Autonomous Attitude Determination by Starry Sky Image Processing
Kiryushkin, I.Y. – Keldysh Institute, Russia IAA-B4-1207P

The Combined Energy and Attitude Control System for Small Satellites – Earth Observation Missions
Varatharajoo, R.; Fasoulas, S. – TU Dresden, Germany IAA-B4-1208P

Determination of Attitude Motion of the Nanosatellite Reflector Using Orbital Tracking Data Obtained by the Laser Telescope
Nemuchinsky, R.; Ovchinnikov, M. – RAS, Russia; Parkhomenko, N. – Institute of Precise Equipment Building, Russia; Tretjakova, N. – Institute of Physics and Technology, Russia IAA-B4-1209P

Application Specific Radiation Tests for Cots EEE Components
Thuesen, G. G.; Guldager, P. B.; Jørgensen, J. L. – Technical University of Denmark, Denmark IAA-B4-1305P

Determination of Small Satellite Orbits for Earth Observation Missions
Mirshams, M. – Toosi University of Technology, Iran IAA-B4-1306P

An Accurate Satellite Localization Technique Based on GPS for the Sake of WEOS System
Okamoto, Y.; Hayashi, T.; Hosokawa, S.; Yokoyama, K. – CHIBA, Japan IAA-B4-1307P

A Study of Perturbation Effect on Satellite Orbit Using Cowell's Method
Adnan, M. S. K.; Razali, R.; Said, Md. A. Md. – University Science Malaysia, Malaysia IAA-B4-1308P

Space Laser Power System on Basis of Small Satellite Group as Global Ground Rescue System
Smakhtin, A. P.; Chuyan, R. K. – MAI, Russia IAA-B4-1309P

The Two-Degree-of-Freedom System – Base for the Estimation of Test Specification and Test Limits
Jahn, H. – ASTRO GmbH, Germany; Ritzmann, S. - STAR Technologies, Germany IAA-B4-1310P

Applications of Remote Sensing to Environmental Monitoring and Detection the Pollution - Case Study : Detection of Oil Spills Along a Part of the Eastern Coast of the Mediterranean Sea Using Small and Other Satellite Data
Dalati, M. – GORS, Syria IAA-B4-1311P

New Generation of Multipurpose Earth Ground Stations for Mini- and Microsatellites
Chatain, Ch. – ELTA, France; Corcoral, N. – CNES, France IAA-B4-1503P

Comparing INPE and Argos Geolocation Accuracies Using Argos System Real Data
Tobler de Sousa, C.; Koiti Kuga, H. – INPE, Brazil IAA-B4-1505P

DLR Ground Station Neustrelitz - Operational for Remote Sensing and for Small Satellite Missions
Schwarz, J.; Maass, H.; Skottke, H.-J. – DLR, Germany IAA-B4-1506P

The A-Train: NASA's Earth Observing System (EOS) Satellites and other Earth Observation Satellites
Kelly, A.C.; Macie, E.J. – NASA/GSFC, USA IAA-B4-1507P

Low Cost Ground Systems for the Small LEO Satellites
Dupas, B. - Integral Systems Europe, France IAA-B3-1508P

Thursday, April 10, 2030, 09.00-10.30

SESSION 12 - **ATTITUDE CONTROL SYSTEMS**

Chair: M. Ovchinnikov – RAS, Russia
Rapporteur: K. Lundal – SSC, Sweden

The TUBSAT Attitude Control System: Flight Experience with DLR-TUBSAT and MAROC-TUBSAT
Renner, U.; Bleif, J.; Roemer, S. – TU Berlin, Germany IAA-B4-1201

Design and Testing of Magnetic Controllers for Satellite Stabilization
Guelman, M.; Waller, R.; Shiryaev, A. – ASRI, Israel;
Psiaki, M. – Cornell University, USA IAA-B4-1202

Gyrostat Attitude Control Using Nonlinear SDDRE Method
Nayeri, M.R.D. - Sharif University, Iran; Mirshams, M. - Toosi University, Iran IAA-B4-1203

Space Vehicle Stabilization Using Angular Velocity Sensors Sign and Gas Jets Actuators
da Silva, W.C.C. – UBC, Brazil; Milani, P.G.; Gadelha de Souza, L.C. – INPE, Brazil IAA-B3-1204

Thursday, April 10, 2003, 10.50-12.10

SESSION 13 – **SPECIAL ASPECTS OF SMALL SATELLITE MISSIONS**

Chair: H.-P. Röser – University of Stuttgart, Germany
Rapporteur: J. L. Joergensen – DTU, Denmark

Cost Reducing Challenge and In-Orbit Results of Whale Ecology Observation Satellite (WEOS)
Hayashi, T.; Yokoyama, K.; Hosokawa, S.; Tomita, H. – CHIBA, Japan;
Masumoto, Y. – Japan IAA-B4-1301

First Steps in the Disaster Monitoring Constellation
da Silva Curiel, A.; Boland, L.; Cooksley, J.; Stephens, P.;Sun, W.;
Sweeting, Sir M. – SSTL, UK IAA-B4-1302

New Possible Roles of Small Satellites in Maritime Surveillance
Wahl, T.; Høye, G. K. – NDRE (FFI), Norway IAA-B4-1303

Quality Assurance for Space Instruments Built with COTS
Guldager, P. B.; Thuesen, G. G.; Jørgensen, J. L. – Ørsted DTU, Denmark IAA-B4-1304

Thursday, April 10, 2003, 13.30-15.00

SESSION 14 (Special) - **COST EFFECTIVE EARTH OBSERVATION MISSIONS**

Chair: J. Esper – NASA/GSFC, USA
R. Sandau – IAA
Rapporteur: U. Renner – TU Berlin, Germany

NN IAA-B4-1401

Cost Effective Earth Observation Missions
- Fundamental Limits and Future Potentials -
Roeser, H.-P. – University of Stuttgart, Germany IAA-B4-1402

Aerospace Education Program Realization by Means of the Microsatellite
Klimov, S.I.; Tamkovich, G.M.; Angarov, V.N.; Grigoriev, Yu.I.; Grigoryan, O.R.; Dobriyan, M.B.; Nozdrachev, M.N.; Papkov, A.P.; Pharnakeev, I.V.; Radchenko; V.V.; Vasiliev, S.I.; Zelenyi, L.M. – Russia IAA-B4-1403

Cost Effective Earth Observation Missions: Taiwan's Perspective
Hsiao, F.-B. – National Cheng Kung University, Taiwan, China; Wu, A.-M.; Chern, J.-S. – NSPO, Taiwan, China IAA-B4-1404

Thursday, April 10, 2003, 15.20-16.40

SESSION 15 - **LAUNCH SYSTEMS AND GROUND SEGMENT**

Chair: K. Briess – DLR, Germany
Rapporteur: M. Ovchinnikov – RAS, Russia

The Rockot Launch Vehicle - The Competitive Launch Solution for Small Earth Observation Satellites into Low Earth Orbits
Freeborn, P.; Viertel, Y. – EUROCKOT, Germany IAA-B4-1501

OFEK 5 Launch
Oiknine, C.; Bergman, D. – IAI MLM, Israel IAA-B4-1502

Low-cost Management Aspects for Developing, Producing, and Operating Future Space Transportation Systems
Goehlich, R. A. – TU Berlin, Germany; Rücker, U. – Astrium GmbH IAA-B4-1509

Multimission Raw Data Center for GRACE
Missling, K.-D.; Daedelow, H.; Maass, H.; Richter, J.; Schlage, J. **–** DLR, Germany IAA-B4-1504

Thursday, April 5, 2001, 16.40-17.40

SYMPOSIUM SUMMARY

Chair: H.-P. Röser – University of Stuttgart, Germany
Chief Rapporteur: G. Fountain – JHU/APL, USA

AWARDS

Best Paper Presentation Award

Best Poster Presentation Award

STUDENT PRIZE PAPER COMPETITION

Final see **Session 06 (Special)**

The awards for the winner of the *Student Prize Paper Competition* will be presented during the IAA Dinner, Tuesday, April 8, 2003 19.00 at Berlin Hilton Hotel

A Special Thanks to the Students Paper Evaluation Committee:

Dr. Rainer Sandau, DLR, Germany
Dr. Leon Alkalai, NASA/JPL, USA
Dr. Klaus Brieß, DLR, Germany
Jaime Esper, NASA/GSFC, USA
Prof. Tomonao Hayashi, Chiba Institute of Technology, Japan
Dr. Einar-Arne Herland, ESA/ESTEC
Prof. Michael Ovchinnikov, Keldysh Institute of Applied Mathematics, Russia
Dr. Craig Underwood, SSTL, UK
Dr. K. Thyagarajan, ISRO, India

Student Prize Contributors:

ESA
EADS Launch Vehicles
DLR
ASTRIUM GmbH
OHB System GmbH
JHU/APL

INDEX OF AUTHORS AND CO-AUTHORS

Name	Paper/ Poster Reference	Session
Connerton, R.	IAA-B4-1004	NASA Earth Science Small Satellite Missions
Cooksley, J.	IAA-B4-1302	Special Aspects of Small Satellite Missions
Corcoral, N.	IAA-B4-1503P	Launch System and Ground Segment
Crisp, D.	IAA-B4-1003	NASA Earth Science Small Satellite Missions
Crocco, L.	IAA-B4-0802	Technology Demonstration
Cutter, M. A.	IAA-B4-0712P	Technologies and Instruments
da Silva, M. M. Q.	IAA-B4-0203	Earth Observation Missions
da Silva, W. C. C.	IAA-B4-1204	Attitude Control Systems
da Silva Curiel, A.	IAA-B4-1302	Special Aspects of Small Satellite Missions
Daedelow, H.	IAA-B4-1504	Launch System and Ground Segment
Dalati, Moutaz	IAA-B4-1311P	Special Aspects of Small Satellite Missions
Danilkin, V. A.	IAA-B4-1110P	Constellations and Platforms
de Cosmo, V.	IAA-B4-0708P	Technologies and Instruments
de Morisson Valeriano, D.	IAA-B4-0203	Earth Observation Missions
DeBoy, C. C.	IAA-B4-0302	Results and Lessons Learned
Denver, T.	IAA-B4-0706P	Technologies and Instruments
Denver, T.	IAA-B4-0803	Technology Demonstration
Denver, T.	IAA-B4-0904	Spacecraft Subsystems
Denver, T.	IAA-B4-1206P	Attitude Control Systems
D'Errico, M.	IAA-B4-1107P	Constellations and Platforms
Di Ciolo, L.	IAA-B4-0707P	Technologies and Instruments
Di Ciolo, L.	IAA-B4-0903	Spacecraft Subsystems
Di Ciolo, L.	IAA-B4-0905P	Spacecraft Subsystems
Dioli, M.	IAA-B4-0802	Technology Demonstration
Dobriyan, M. B.	IAA-B4-1403	Cost Effective Earth Observation Missions
Dokukin, V. S.	IAA-B4-1103	Constellations and Platforms
Dokukin, V. S.	IAA-B4-1108P	Constellations and Platforms
Dokukin, V. S.	IAA-B4-1109P	Constellations and Platforms
Dokukin, V. S.	IAA-B4-1110P	Constellations and Platforms
Dudkin, F.	IAA-B4-0704	Technologies and Instruments
Dupas, B.	IAA-B4-1508P	Launch System and Ground Segment
Eismont, N. A.	IAA-B4-0502	Educational Programs
Ercoli Finzi, A.	IAA-B4-0802	Technology Demonstration
Esper, J.	IAA-B4-0202	Earth Observation Missions
Fasoulas, S.	IAA-B4-1208P	Attitude Control Systems
Fedounin, E.	IAA-B4-0711P	Technologies and Instruments
Ferrante, M.	IAA-B4-0707P	Technologies and Instruments
Ferrante, M.	IAA-B4-0903	Spacecraft Subsystems
Ferrante, M.	IAA-B4-0905P	Spacecraft Subsystems
Filici, C.	IAA-B4-0804	Technology Demonstration
Freeborn, P.	IAA-B4-1501	Launch System and Ground Segment
Gadelha de Souza, L. C.	IAA-B4-1204	Attitude Control Systems
Gervin, J.	IAA-B4-0202	Earth Observation Missions
Gill, E.	IAA-B4-0304	Results and Lessons Learned
Ginati, A.	IAA-B4-0101	Programmatics
Goehlich, R. A.	IAA-B4-1509	Launch System and Ground Segment
Goel, P. S.	IAA-B4-0501	Educational Programs
Grachev, E. A.	IAA-B4-0502	Educational Programs
Grassi, M.	IAA-B4-0703	Technologies and Instruments
Grechnev, A.	IAA-B4-0906P	Spacecraft Subsystems
Gregg, W.	IAA-B4-0202	Earth Observation Missions
Grigoriev, Yu. I.	IAA-B4-1403	Cost Effective Earth Observation Missions

Name	Paper/ Poster Reference	Session
Grigoryan, O. R.	IAA-B4-0502	Educational Programs
Grigoryan, O. R.	IAA-B4-1403	Cost Effective Earth Observation Missions
Grushin, V. A.	IAA-B4-0502	Educational Programs
Guelman, M.	IAA-B4-1202	Attitude Control Systems
Guldager, P. B.	IAA-B4-1304	Special Aspects of Small Satellite Missions
Guldager, P. B.	IAA-B4-1305P	Special Aspects of Small Satellite Missions
Gupta, J. P.	IAA-B4-0501	Educational Programs
Hai, A. H. Ad.	IAA-B4-0701	Technologies and Instruments
Hajnsek, I.	IAA-B4-0203	Earth Observation Missions
Hall, F.	IAA-B4-0202	Earth Observation Missions
Halle, W.	IAA-B4-0304	Results and Lessons Learned
Hansen, F.	IAA-B4-1101	Constellations and Platforms
Hayashi, T.	IAA-B4-1301	Special Aspects of Small Satellite Missions
Hayashi, T.	IAA-B4-1307P	Special Aspects of Small Satellite Missions
Herman, J.	IAA-B4-0202	Earth Observation Missions
Hernandez, D.	IAA-B4-0103	Programmatics
Hosokawa, S.	IAA-B4-1301	Special Aspects of Small Satellite Missions
Hosokawa, S.	IAA-B4-1307P	Special Aspects of Small Satellite Missions
Høye, G. K.	IAA-B4-1303	Special Aspects of Small Satellite Missions
Hruska, F.	IAA-B4-0405P	Earth Explorer Missions
Hruska, F.	IAA-B4-1205P	Attitude Control Systems
Hsiao, F.-B.	IAA-B4-1404	Cost Effective Earth Observation Missions
Ismail, I.	IAA-B4-0701	Technologies and Instruments
Jahn, H.	IAA-B4-1310P	Special Aspects of Small Satellite Missions
Jayaraman, K.	IAA-B4-0501	Educational Programs
Jensen, J. R.	IAA-B4-0302	Results and Lessons Learned
Jeong, S.-K.	IAA-B4-0701	Technologies and Instruments
Jochim, F.	IAA-B4-0203	Earth Observation Missions
Johnson, C. C.	IAA-B4-1003	NASA Earth Science Small Satellite Missions
Johnsson, K.	IAA-B4-0406P	Earth Explorer Missions
Jørgensen, J. L.	IAA-B4-0706P	Technologies and Instruments
Jørgensen, J. L.	IAA-B4-0803	Technology Demonstration
Jørgensen, J. L.	IAA-B4-0904	Spacecraft Subsystems
Jørgensen, J. L.	IAA-B4-1206P	Attitude Control Systems
Jørgensen, J. L.	IAA-B4-1304	Special Aspects of Small Satellite Missions
Jørgensen, J. L.	IAA-B4-1305P	Special Aspects of Small Satellite Missions
Jørgensen, P. S.	IAA-B4-0706P	Technologies and Instruments
Jørgensen, P. S.	IAA-B4-0904	Spacecraft Subsystems
Jørgensen, P. S.	IAA-B4-1206P	Attitude Control Systems
Jung-Rothenhäusler, F.	IAA-B4-1106P	Constellations and Platforms
Kaila, V. K.	IAA-B4-0205P	Earth Observation Missions
Kang, M.-S.	IAA-B4-0701	Technologies and Instruments
Kassebom, M.	IAA-B4-0401	Earth Explorer Missions
Kassebom, M.	IAA-B4-0201	Earth Observation Missions
Katti, V. R.	IAA-B4-0205P	Earth Observation Missions
Kayal, H.	IAA-B4-0304	Results and Lessons Learned
Kelly, A. C.	IAA-B4-1507P	Launch System and Ground Segment
Khrenov, N. N.	IAA-B4-0702	Technologies and Instruments
Khutorskoy, M. D.	IAA-B4-0504	Educational Programs
Kim, J.-U.	IAA-B4-0701	Technologies and Instruments
Kim, E.-E.	IAA-B4-0701	Technologies and Instruments
Kirchman, F.	IAA-B4-0202	Earth Observation Missions

Name	Paper/ Poster Reference	Session
Kiryushkin, I.	IAA-B4-1207P	Attitude Control Systems
Klimov, S. I.	IAA-B4-0502	Educational Programs
Klimov, S. I.	IAA-B4-1403	Cost Effective Earth Observation Missions
Knox, R.	IAA-B4-0202	Earth Observation Missions
Koebel, D.	IAA-B4-1101	Constellations and Platforms
Koiti Kuga, H.	IAA-B4-1505P	Launch System and Ground Segment
Kolmasova, I.	IAA-B4-0405P	Earth Explorer Missions
Kono, J.	IAA-B4-0203	Earth Observation Missions
Korepanov, V.	IAA-B4-0704	Technologies and Instruments
Kriegler, E.	IAA-B4-0902	Spacecraft Subsystems
Krischke, M.	IAA-B4-1102	Constellations and Platforms
Krischke, M.	IAA-B4-1105P	Constellations and Platforms
Krischke, M.	IAA-B4-1106P	Constellations and Platforms
Kvasnikov, L.	IAA-B4-0906P	Spacecraft Subsystems
Lafon, T.	IAA-B4-0301	Results and Lessons Learned
Lemmerman, L. A.	IAA-B4-1004	NASA Earth Science Small Satellite Missions
Lobb, D. R.	IAA-B4-0712P	Technologies and Instruments
Lorenz, E.	IAA-B4-0402	Earth Explorer Missions
Lorenz, E.	IAA-B4-1104	Constellations and Platforms
Lübberstedt, H.	IAA-B4-0201	Earth Observation Missions
Lübberstedt, H.	IAA-B4-0404	Earth Explorer Missions
Lübberstedt, H.	IAA-B4-1101	Constellations and Platforms
Lundahl, K.	IAA-B4-0403	Earth Explorer Missions
Lysakov, D. S.	IAA-B4-0502	Educational Programs
Maass, H.	IAA-B4-1504	Launch System and Ground Segment
Maass, H.	IAA-B4-1506P	Launch System and Ground Segment
Macie, E. J.	IAA-B4-1507P	Launch System and Ground Segment
Magner, T. J.	IAA-B4-1001	NASA Earth Science Small Satellite Missions
Makridenko, L. A.	IAA-B4-0702	Technologies and Instruments
Mannino, A.	IAA-B4-0202	Earth Observation Missions
Marcuccio, S.	IAA-B4-0805P	Technology Demonstration
Masumoto, Y.	IAA-B4-1301	Special Aspects of Small Satellite Missions
McClain, C.	IAA-B4-0202	Earth Observation Missions
McCuistion, J. D.	IAA-B4-0102	Programmatics
Middleton, E.	IAA-B4-0202	Earth Observation Missions
Milani, P. G.	IAA-B4-1204	Attitude Control Systems
Mirshams, M.	IAA-B4-1203	Attitude Control Systems
Mirshams, M.	IAA-B4-1306P	Special Aspects of Small Satellite Missions
Missling, K.-D.	IAA-B4-1504	Launch System and Ground Segment
Molina, M.	IAA-B4-0802	Technology Demonstration
Monnini, E.	IAA-B4-0709P	Technologies and Instruments
Montenbruck, O.	IAA-B4-0304	Results and Lessons Learned
Montenegro, S.	IAA-B4-0304	Results and Lessons Learned
Montenegro, S.	IAA-B4-0702	Technologies and Instruments
Montenegro, S.	IAA-B4-0711P	Technologies and Instruments
Morea, G. D.	IAA-B4-0204	Earth Observation Missions
Mostert, S.	IAA-B4-0902	Spacecraft Subsystems
Nasi, H. Md.	IAA-B4-0701	Technologies and Instruments
Nayeri, R. D.	IAA-B4-1203	Attitude Control Systems
Neeck, S. P.	IAA-B4-1001	NASA Earth Science Small Satellite Missions
Neff, T.	IAA-B4-0203	Earth Observation Missions
Nemuchinsky, R.	IAA-B4-1209P	Attitude Control Systems

Name	Paper/ Poster Reference	Session
Nozdrachev, M. N.	IAA-B4-0502	Educational Programs
Nozdrachev, M. N.	IAA-B4-1403	Cost Effective Earth Observation Missions
Oertel, D.	IAA-B4-0402	Earth Explorer Missions
Oertel, D.	IAA-B4-0404	Earth Explorer Missions
Oiknine, C.	IAA-B4-1502	Launch System and Ground Segment
Okamoto, Y.	IAA-B4-1307P	Special Aspects of Small Satellite Missions
Oraevsky, V. N.	IAA-B4-1103	Constellations and Platforms
Oraevsky, V. N.	IAA-B4-1108P	Constellations and Platforms
Oraevsky, V. N.	IAA-B4-1109P	Constellations and Platforms
Oraevsky, V. N.	IAA-B4-1110P	Constellations and Platforms
Ovchinnikov, M.	IAA-B4-0702	Technologies and Instruments
Ovchinnikov, M.	IAA-B4-1209P	Attitude Control Systems
Oxfort, M.	IAA-B4-1102	Constellations and Platforms
Oxfort, M.	IAA-B4-1105P	Constellations and Platforms
Papkov, A. P.	IAA-B4-1403	Cost Effective Earth Observation Missions
Paradella, W. R.	IAA-B4-0203	Earth Observation Missions
Parkhomenko, N.	IAA-B4-1209P	Attitude Control Systems
Paules, G. E.	IAA-B4-1001	NASA Earth Science Small Satellite Missions
Penné, B.	IAA-B4-0201	Earth Observation Missions
Penné, B.	IAA-B4-0404	Earth Explorer Missions
Pereira Farias Costa, M.	IAA-B4-0203	Earth Observation Missions
Pharnakeev, I. V.	IAA-B4-1403	Cost Effective Earth Observation Missions
Pletner, S.	IAA-B4-0702	Technologies and Instruments
Povia, M.	IAA-B4-0707P	Technologies and Instruments
Povia, M.	IAA-B4-0903	Spacecraft Subsystems
Povia, M.	IAA-B4-0905P	Spacecraft Subsystems
Prabhakar, S.	IAA-B4-0907P	Spacecraft Subsystems
Procopio, D.	IAA-B4-0709P	Technologies and Instruments
Psiaki, M.	IAA-B4-1202	Attitude Control Systems
Puls, J	IAA-B4-0203	Earth Observation Missions
Radchenko, V. V.	IAA-B4-1403	Cost Effective Earth Observation Missions
Rajendran, S.	IAA-B4-0503	Educational Programs
Rasheed, Ad. A. Ad	IAA-B4-0701	Technologies and Instruments
Raymond, C.	IAA-B4-1004	NASA Earth Science Small Satellite Missions
Razali, R.	IAA-B4-1308P	Special Aspects of Small Satellite Missions
Renner, U.	IAA-B4-1201	Attitude Control Systems
Resh, G.	IAA-B4-0906P	Spacecraft Subsystems
Richter, J.	IAA-B4-1504	Launch System and Ground Segment
Ritzmann, S.	IAA-B4-1310P	Special Aspects of Small Satellite Missions
Rodionov, I. D.	IAA-B4-0702	Technologies and Instruments
Rodionov, I.	IAA-B4-0711P	Technologies and Instruments
Rodionov, A.	IAA-B4-0711P	Technologies and Instruments
Roemer, S.	IAA-B4-1201	Attitude Control Systems
Rosdi, Md. R. Md.	IAA-B4-0701	Technologies and Instruments
Röser, H.-P.	IAA-B4-1402	Cost Effective Earth Observation Missions
Rücker, U.	IAA-B4-1509	Launch System and Ground Segment
Rufino, G.	IAA-B4-0703	Technologies and Instruments
Sabatini, P.	IAA-B4-0204	Earth Observation Missions
Sabatini, P.	IAA-B4-0802	Technology Demonstration
Said, Md. A. Md.	IAA-B4-1308P	Special Aspects of Small Satellite Missions
Salikhov, R. S.	IAA-B4-0702	Technologies and Instruments
Salikhov, R. S.	IAA-B4-1103	Constellations and Platforms

Name	Paper/ Poster Reference	Session
Salikhov, R. S.	IAA-B4-1108P	Constellations and Platforms
Sandau, R.	IAA-B4-0404	Earth Explorer Missions
Santandrea, S.	IAA-B4-0303	Results and Lessons Learned
Saturno, M. E.	IAA-B4-0705P	Technologies and Instruments
Savvin, V.	IAA-B4-0906P	Spacecraft Subsystems
Schiavi, F.	IAA-B4-0802	Technology Demonstration
Schlage, J.	IAA-B4-1504	Launch System and Ground Segment
Schmälter, E.	IAA-B4-0401	Earth Explorer Missions
Schrandt, F.	IAA-B4-1104	Constellations and Platforms
Schroeder, R.	IAA-B4-0203	Earth Observation Missions
Schulten, D.	IAA-B4-1102	Constellations and Platforms
Schulten, D.	IAA-B4-1106P	Constellations and Platforms
Schwarz, J.	IAA-B4-1506P	Launch System and Ground Segment
Sennik, N. A.	IAA-B4-1103	Constellations and Platforms
Sennik, N. A.	IAA-B4-1108P	Constellations and Platforms
Settle, J.	IAA-B4-0303	Results and Lessons Learned
Shalimov, V.	IAA-B4-0906P	Spacecraft Subsystems
Shiryaev, A.	IAA-B4-1202	Attitude Control Systems
Shotwell, R.	IAA-B4-1004	NASA Earth Science Small Satellite Missions
Singh Sidhu, R.	IAA-B4-0907P	Spacecraft Subsystems
Skottke, H.-J.	IAA-B4-1506P	Launch System and Ground Segment
Skrbek, W.	IAA-B4-0304	Results and Lessons Learned
Skrbek, W.	IAA-B4-0402	Earth Explorer Missions
Skrbek, W.	IAA-B4-1104	Constellations and Platforms
Smakhtin, A.	IAA-B4-0906P	Spacecraft Subsystems
Smakhtin, A. P.	IAA-B4-1309P	Special Aspects of Small Satellite Missions
Smilauer, J.	IAA-B4-0405P	Earth Explorer Missions
Stephens, P.	IAA-B4-1302	Special Aspects of Small Satellite Missions
Studemund, H.	IAA-B4-0304	Results and Lessons Learned
Suarez, M.	IAA-B4-0804	Technology Demonstration
Sun, W.	IAA-B4-1302	Special Aspects of Small Satellite Missions
Sweeting, M.	IAA-B4-1302	Special Aspects of Small Satellite Missions
Tamkovich, G. M.	IAA-B4-1403	Cost Effective Earth Observation Missions
Tancredi, U.	IAA-B4-1107P	Constellations and Platforms
Terzibaschian, T.	IAA-B4-0304	Results and Lessons Learned
Teston, F.	IAA-B4-0303	Results and Lessons Learned
Thuesen, G. G.	IAA-B4-1304	Special Aspects of Small Satellite Missions
Thuesen, G. G.	IAA-B4-1305P	Special Aspects of Small Satellite Missions
Thyagarajan, K.	IAA-B4-0501	Educational Programs
Tobehn, C.	IAA-B4-0201	Earth Observation Missions
Tobehn, C.	IAA-B4-0401	Earth Explorer Missions
Tobias, A.	IAA-B4-0101	Programmatics
Tobler de Sousa, C.	IAA-B4-1505P	Launch System and Ground Segment
Tomita, H.	IAA-B4-1301	Special Aspects of Small Satellite Missions
Tretjakova, N.	IAA-B4-1209P	Attitude Control Systems
Truhlik, V.	IAA-B4-0405P	Earth Explorer Missions
Tulip, J.	IAA-B4-1102	Constellations and Platforms
Tyc, G.	IAA-B4-1102	Constellations and Platforms
Tyc, G.	IAA-B4-1105P	Constellations and Platforms
Tyc, G.	IAA-B4-1106P	Constellations and Platforms
Van den Braembussche, P.	IAA-B4-0803	Technology Demonstration
Varatharajoo, R.	IAA-B4-1208P	Attitude Control Systems

Name	*Paper/ Poster Reference*	*Session*
Vasiliev, S. I.	IAA-B4-1403	Cost Effective Earth Observation Missions
Veldman, S.	IAA-B4-0403	Earth Explorer Missions
Venus, H.	IAA-B4-0304	Results and Lessons Learned
Vespe, F.	IAA-B4-0708P	Technologies and Instruments
Viertel, Y.	IAA-B4-1501	Launch System and Ground Segment
Vladimirov, A. V.	IAA-B4-1103	Constellations and Platforms
Vladimirov, A. V.	IAA-B4-1108P	Constellations and Platforms
Vojta, J.	IAA-B4-1205P	Attitude Control Systems
Vuilleumier, P.	IAA-B4-0303	Results and Lessons Learned
Wahl, T.	IAA-B4-1303	Special Aspects of Small Satellite Missions
Waller, R.	IAA-B4-1202	Attitude Control Systems
Walter, I.	IAA-B4-1104	Constellations and Platforms
Wu, A.-M.	IAA-B4-1404	Cost Effective Earth Observation Missions
Yang, H.-S.	IAA-B4-0701	Technologies and Instruments
Yang, S.-U.	IAA-B4-0701	Technologies and Instruments
Yokoyama, K.	IAA-B4-1301	Special Aspects of Small Satellite Missions
Yokoyama, K.	IAA-B4-1307P	Special Aspects of Small Satellite Missions
Zeitzev, A. N.	IAA-B4-0504	Educational Programs
Zelenyi, L. M.	IAA-B4-1403	Cost Effective Earth Observation Missions
Zemskov, V.	IAA-B4-0906P	Spacecraft Subsystems
Zhukov, B.	IAA-B4-0402	Earth Explorer Missions
Zucconi, A.	IAA-B4-0802	Technology Demonstration

GENERAL INFORMATION

Symposium Venue

The symposium will take place in the BERLIN HILTON HOTEL, Conference Center
Mohrenstrasse 30, D-10117 Berlin**,**
Tel. +49-30-20 23-0, Fax. +49-30-20 23-4269.
Underground Station: Stadtmitte (U2, U6).

On-site Registration

The Registration Desk will be set up in the Symposium Room Foyer of the Berlin Hilton Hotel.
It will be open::

April 6, Sunday	16.00 - 20.00
April 7, Monday - April 10, Thursday	08.00 - 19.00

Name Badges

Name Badges must be worn at all times in order to be admitted to the sessions and the social events.
The following colors have been assigned:

Participants	White
Students	White
Press	Yellow
Accompanying Persons	Blue
Organization	Green

Language

The official language of the symposium is English.

Offices

- The Symposium Office will be co-located with the Registration Office in the Symposium Room Foyer of the Berlin Hilton Hotel
  Tel. +49-30-20 23-1338 Fax. +49-30-20 23-4938

  Pay Fax, Telephone

- Chairpersons' and Rapporteurs' meeting room: “Ratsherrenzimmer”
  Meeting of Session Chairpersons and Rapporteurs at 08.30 each day for introduction to their duties.
- Authors are requested to arrive at the session room assigned 10 minutes before the start of the session in order to meet the session chairperson for final preparations. Please bring your short biographies.

Slide Testing Center

Berlin Hilton Hotel, Conference Center, Ratsherrenzimmer
In this center you may test your slides and borrow magazines.
The session room will be equipped with a video projector with PC interface, video recorder, 24 x 36 mm slide and overhead projectors. Other audio-visual equipment may be rented, please apply to the office.

Publication of Papers

A selection of contributed papers will appear in a Special Issue of ACTA ASTRONAUTICA, the journal of the International Academy of Astronautics to be published after the symposium.

Messages

A message center will be located in the registration area at the Conference Center of the Berlin Hilton Hotel. There will be an internet terminal available for you to access your web-based e-mail accounts.

Lunch, Coffee Breaks

The registration fee of the participants will cover the coffee breaks and the lunch buffet. Accompanying persons who want to take part in the lunch buffet may purchase a voucher at the Registration Desk (€ 15,00/day).

Social Events

Date/Time	**Event**	**Venue**
April 6 Sunday 19.00 - 20.00	Get-Together	Berlin Hilton Hotel
April 7 Monday 18.30 -22.00	Reception (included in the registration fee)	City Hall "Rotes Rathaus" Heraldic Room 20 minute walk from Hilton Hotel
April 8 Tuesday 19.00	IAA Dinner Tickets can be purchased at the Information Desk at the cost of € 40,00 per person, no later than Tuesday, April 8, 2003 at 11.00	Hilton Restaurant
April 9 Wednesday	Elzbieta Sternlicht piano "Works from romantic period"	Berlin Philharmonie
April 10 Thursday 21.00	Film Presentation (included in the registration fee) "Space Station 3D"	Discovery Channel IMAX Berlin Marlene-Dietrich-Platz 4 10785 Berlin Station: Potsdamer Platz

Excursions

April 11 Friday

09.00-12.00 Visit to **WISTA, Science and Technology Center Berlin-Adlershof**
Rudower Chaussee 5, 12489 Berlin

Bus Shuttle Departure from the Berlin Hilton Hotel at 09.00,
Approximate Return at 13.00

Sightseeing and Tours

During the symposium, local sightseeing and tours with an English-speaking guide will be arranged on demand by the Hilton Hotel for accompanying persons. Please fill in the Supporting Program Form and send it together with your Registration Form and Hotel Reservation Form to CMT ConTour GmbH.

Daily

Sightseeing Tour in Berlin (by bus)
Duration: 3 hours
A sightseeing trip through the most famous historical parts of Berlin as well as the new sites of the growing German capital, including Potsdamer Platz and "Deutscher Bundestag".
Meeting place: Main Entrance of Hilton Hotel Departure: 9.20 and 13.20
Price: € 21,50 / person

Full day tour to Potsdam (by bus) -not on Mondays-
Sightseeing in Potsdam, the capital of Brandenburg, including a visit to the world-famous palace of Frederic the Great "Sanssouci" and its park, visit to the palace "Neues Palais".
Meeting place: Main Entrance of Hilton Hotel Departure: 09.20
Price: € 35,00 / person Arrival: 17.00

The Discover Berlin Walk
You walk through Berlin´s complex, sometimes tragic past and its exciting dynamic present. You are introduced to the famous (and infamous) personalities, who left their mark on the city and you are shown the main sights in the historic heart - the Brandenburg Gate, the Reichstag, Checkpoint Charly, remains of the Berlin wall and lots more.
Meeting place: taxi stand at Zoo station Departure: 10.00
Price: € 10,00 / person Arrival: 14.30

On demand

Full day Tour to Dresden (by bus) -only on Tuesdays-
Bus transfer to Dresden, sightseeing in the historic center, lunch, visit to the museum Grünes Gewölbe, Dresdner Zwinger, Taschenbergpalais etc., transfer back to Berlin.
Meeting place: Kurfürstendamm/U-Bahn station Uhlandstraße Departure: 08.00
Price: € 51,00 / person Arrival: 19.00
(dependent on the number of participants)

On demand

A sightseeing tour by ship
A guided sightseeing tour on Berlin´s waterways. You can experience the variety of architectural styles from another point of view and discover that Berlin has more bridges than Venice.
Meeting place: Jannowitzbrücke Departure: 11.30
Price: € 15,00 / person Arrival: 15.30

4th IAA Symposium on Small Satellites for Earth Observation	MONDAY April 7, 2003	TUESDAY April 8, 2003	WEDNESDAY April 9, 2003	THURSDAY April 10, 2003	FRIDAY April 11, 2003
09.00 - 09.30 *Paper*	09.30 - 09.50 **Welcome**	**Session 04**	**Session 08**	**Session 12**	**Visit of:**
09.30 - 09.50 *Paper*	**and Greetings**	Earth Explorer	Technology	Attitude	09.00 - 12.00
09.50 - 10.10 *Paper*	09.50 - 10.45	Missions	Demonstration	Control	WISTA, Science
10.10 - 10.30 *Paper*	**Keynote**			Systems	and Technology
10.30 - 10.50 Coffee Break	10.45 - 11.15 Break and				Center,
10.50 - 11.10 *Paper*	Press Conference	**Session 05**	**Session 09**	**Session 13**	Berlin-Adlershof
11.10 - 11.30 *Paper*	11.15 - 12.30 **Session 01**	Educational	Spacecraft	Special Aspects	
11.30 - 11.50 *Paper*	Programmatics	Programs	Subsystems	of Small Satellite	
11.50 - 12.10 *Paper*				Missions	
12.10 - 13.30 Lunch Break	12.30 - 13.30 Lunch				
13.30 - 14.00 *Paper*	**Session 02**	**Session 06**	**Session 10**	**Session 14**	
14.00 - 14.20 *Paper*	Earth Observation	Student	NASA Earth Science	Cost Effective	
14.20 - 14.40 *Paper*	Missions	Conference	Small Satellite Miss.	Earth Observation	
14.40 - 15.00 *Paper*		(Special Session)	and Technologies	Missions	
15.00 - 15.20 Coffee Break			(Special Session)	(Special Session)	
15.20 - 15.40 *Paper*	**Session 03**	**Session 07**	**Session 11**	**Session 15**	
15.40 - 16.00 *Paper*	Results and	Technologies	Constellations	Launch Systems and	
16.00 - 16.20 *Paper*	Lessons Learned	and Instruments	and Platforms	Ground Segment	
16.20 – 16.40 *Paper*					
16.40 - 17.40 Panel	*Launch Opportunities*	*Future NASA Space*	**Session Poster**	**Symposium**	
	for Small Satellites	*Technologies*		**Summary**	
	(J.-M. Contant)	*for Small Satellite*			
		Missions		**Awards**	
		(L. Alkalai)			
18.30 Social Event (19.00/21.00)	**Reception** (18.30-22.00) Rotes Rathaus	**IAA-Dinner** (19.00) Hilton Hotel *Student Awards*	**Concerts**	**Film Presentation** (21.00) IMAX Berlin	

Status: 26.03.03

Timetable