

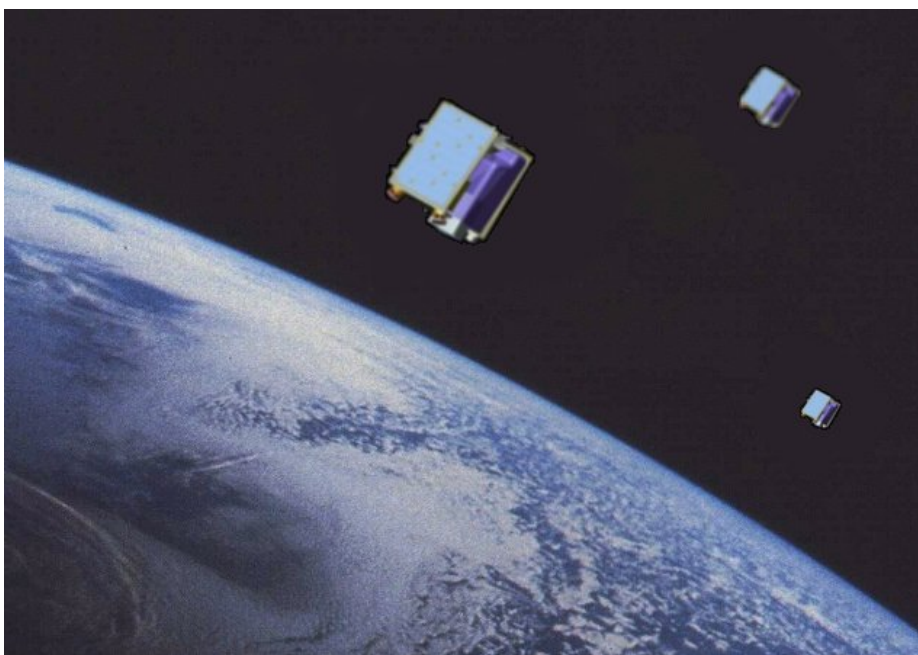
**Final Program**

**5<sup>th</sup> IAA SYMPOSIUM**

**ON SMALL SATELLITES**

**FOR EARTH OBSERVATION**

**APRIL 4 - 8, 2005**



Composition photo: DLR



**DLR**

**GERMAN  
AEROSPACE  
CENTER**

**BERLIN, GERMANY**



*International  
Academy of  
Astronautics*

Sponsored by

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## Message of Greeting

from the Governing Mayor of Berlin, Klaus Wowereit, for the  
5<sup>th</sup> Symposium on Small Satellites for Earth Observation of the  
International Academy of Astronautics (IAA)  
in Berlin, April 4 – 8, 2005



*Klaus Wowereit*

It is a great pleasure for Berlin to be able to welcome for the fifth time the participants in the international IAA Symposium on Small Satellites for Earth Observation.

I would like to extend my greetings to all those who have come to Berlin, a city which is proud of its scientific potential. My special thanks go to the International Academy of Astronautics (IAA) for choosing Berlin as the conference location again in 2005.

Berlin is continuing a long tradition in the field of aeronautics and space flight, the results of which are visible in the industry as well as in institutions of higher education and research institutions. One example illustrating this is the small satellite BIRD, which was designed to detect forest fires and other high temperature events from space and is still operating successfully. With this small satellite, DLR and its site in Berlin-Adlershof, in cooperation with a large number of partners, have contributed to the growing acceptance - nationally and internationally - of small satellites.

The participation of a high number of experienced scientists, successful engineers, and promising students coming from about 25 countries not only reflects this growing interest in small satellites, but also expresses high regard for Berlin as an internationally recognized conference location.

In addition to your main tasks of exchanging scientific results, technical solutions, and programmatic visions, I hope you will find the time to discover Berlin as a metropolis of culture, history, architecture, and museums.

I wish all of you a successful symposium with new and interesting contacts, fruitful discussions, and a very pleasant stay here in Berlin.

A handwritten signature in black ink, which appears to read 'Klaus Wowereit'. The signature is written in a cursive style with some stylized flourishes.

We wish to thank the following for their contribution to the success of this conference:



European Office of Aerospace Research and Development  
of the USAF

**EUROSPACE**



**TELDIX GmbH**



## AGENDA

### *Sunday, April 3, 2005*

16:00-20:00 Registration, Hilton Hotel  
19:00-20:00 Get-Together

### *Monday, April 4, 2005*

08:00-09:30 Registration, Hilton Hotel  
09:30-09:50 **Welcome:** H.-G. Husung,  
Senate of Berlin  
J.-M. Contant, IAA  
S. Wittig,  
Honorary Chairman  
09:50-10:45 **Keynote Address:** K. Beneke, DLR

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

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:**  
**CONSTELLATIONS & PLATFORMS**  
*Chair:* C. I. Underwood,  
SSTL, UK  
*Rapporteur:* M. Ovchinnikov,  
RAS, Russia

16:40-17:40 **Panel 1:**  
**SMALL SATELLITE  
CONTRIBUTIONS TO DISASTER  
WARNING AND MITIGATION**  
*Chair:* H. Stoewer, SAC, Germany

### *Tuesday, April 5, 2005*

09:00-10:30 **Session 04:**  
**RESULTS & LESSONS LEARNED**  
*Chair:* J. Wertz, SMAD, USA  
*Rapporteur:* S. Mostert,  
University of Stellen-  
bosch, South Africa

### *Tuesday, April 5, 2005 (cont'd.)*

10:30-10:50 BREAK

10:50-12:10 **Session 05:**  
**EDUCATIONAL PROGRAMS**  
*Chair:* U. Renner, TU Berlin  
*Rapporteur:* C. I. Underwood,  
SSTL, UK

12:10-13:30 LUNCH

13:30-15:00 **Session 06: (Special)**  
**STUDENT CONFERENCE**  
*Chair:* L. Paxton,  
JHU/APL, USA  
*Rapporteur:* H. Jahn, DLR

15:00-15:20 BREAK

15:20-16:40 **Session 07:**  
**INSTRUMENTS**  
*Chair:* L. Alkalai,  
NASA/JPL, USA  
*Rapporteur:* R. A. da Silva Curiel,  
SSTL, UK

16:40-17:40 **Panel 2:**  
**THE IAA VIEW ON  
COST-EFFECTIVE EARTH  
OBSERVATION MISSIONS**  
*Chair:* J. Wertz, SMAD, USA

### *Wednesday, April 6, 2005*

09:00-10:30 **Session 08:**  
**SPECIAL ASPECTS**  
*Chair:* S. Neeck, NASA,  
USA  
*Rapporteur:* K. Brieß, TU Berlin

10:30-10:50 BREAK

10:50-12:10 **Session 09:**  
**EARTH EXPLORER**  
*Chair:* H. Jahn, DLR  
*Rapporteur:* L. Paxton,  
JHU/APL, USA

12:10-13:30 LUNCH

**AGENDA** (cont'd.)

**Wednesday, April 6, 2005** (cont'd.)

- 13:30-15:00 **Session 10:**  
**ORBIT & ATTITUDE  
DETERMINATION**  
*Chair:* K. Brieß, TU Berlin  
*Rapporteur:* S. Neeck,  
NASA, USA
- 15:00-15:20 BREAK
- 15:20-16:40 **Session 11:**  
**SUBSYSTEMS**  
*Chair:* R. A. da Silva Curiel,  
SSTL, UK  
*Rapporteur:* U. Renner, TU Berlin
- 16:40-17:40 **POSTER SESSION**

**Thursday, April 7, 2005**

- 09:00-10:30 **Session 12:**  
**ATTITUDE CONTROL**  
*Chair:* M. Ovchinnikov,  
RAS, Russia  
*Rapporteur:* T. Terzibaschian,  
DLR
- 10:30-10:50 BREAK
- 10:50-12:10 **Session 13:**  
**DATA TRANSMISSION &  
GROUND STATIONS**  
*Chair:* K. Thyagarajan, ISRO,  
India  
*Rapporteur:* K. Lundahl, Swedish  
Space Corp., Sweden
- 12:10-13:30 LUNCH
- 13:30-15:00 **Session 14:**  
**TECHNOLOGY DEMONSTRATION**  
*Chair:* H.-P. Röser,  
Univ. of Stuttgart  
*Rapporteur:* L. Alkalai,  
NASA/JPL, USA
- 15:00-15:20 BREAK

**Thursday, April 7, 2005** (cont'd.)

- 15:20-16:40 **Session 15:**  
**DESASTER MONITORING**  
*Chair:* J.-S. Chern,  
NSPO, Taiwan  
*Rapporteur:* D. Oertel,  
DLR
- 16:40-17:40 **SYMPOSIUM SUMMARY**  
*Chair:* A. Valenzuela, IAA  
*Chief*  
*Rapporteur:* L. Paxton,  
JHU/APL, USA
- AWARDS**

**Friday, April 8, 2005**

- 09:00-12:00 **Visit to:**  
**WISTA, Science and Technology Center**  
Berlin-Adlershof
- or to:**  
**Astrophysical Institute Potsdam (AIP)**  
Potsdam

**Monday, April 4, 2005, 11:15-12:30**

**SESSION 01 - PROGRAMMATICS**

*Chair:* J.-M. Contant – IAA

*Rapporteur:* H.-P. Röser – Univ. of Stuttgart, Germany

- The New Horizons of ESA Earth Observation Future Programme** IAA-B5-0101  
Liebig, V., Ginati, A.
- Small Satellites Changing the Approach to Earth Observation** IAA-B5-0102  
Sweeting, M.
- Small Satellites in the CNES Earth Observation Programme** IAA-B5-0103  
Marsal, O., Boissin, B., Clair, M.-A., Tarrieu, C.
- NASA's Plans for Earth Science** IAA-B5-0104  
Evans, D. L.

**Monday, April 4, 2005, 13:30-15:00**

**SESSION 02 - EARTH OBSERVATION MISSIONS**

*Chair:* A. Ginati, ESA

*Rapporteur:* K. Thyagarajan, ISRO, India

- Remote Sensing Satellite Mission for Third World Nations** IAA-B5-0201  
Thyagarajan, K., Gupta, J. P., Dasgupta, S.
- SMOS: An L-Band Interferometric Radiometer Mission** IAA-B5-0202  
Bermudo, F., Venet, M., Ledu, M., Kerr, Y., Barre, H.
- Earth Observation - a New Paradigm** IAA-B5-0203  
Mostert, S., du Plessis, J.
- BIRD Fire Recognition and Comparison with Terra/MODIS** IAA-B5-0204  
Oertel, D., Lorenz, E., Zhukov, B., Csiszar, I.

**Monday, April 4, 2005, 15:20-16:40**

**SESSION 03 - CONSTELLATIONS & PLATFORMS**

*Chair:* C. I. Underwood, SSTL, UK

*Rapporteur:* M. Ovchinnikov, RAS, Russia

- Progress in Small Satellite Technology for Earth Observation Missions** IAA-B5-0301  
da Silva Curiel, A., Cawthorne, A., Sweeting, Sir Martin
- Technical Aspects and Attitude Control Strategy of LAPAN-TUBSAT Satellite** IAA-B5-0302  
Hardhienata, S., Nuryanto, A., Triharjanto, R. H., Renner, U.
- NASA and CNES Get on the Aqua Train through the CALIPSO Mission** IAA-B5-0303  
Castillan, P., Belon, B., Blouvac, J., Crébassol, P., Schaffhauser, F., Salcedo, C., Wells, J., Wusk, B.
- OHB Platforms for Constellation Satellites** IAA-B5-0304  
Koebel, D., Tobehn, C., Penné, B.

**Monday, April 4, 2005, 16:40-17:40**

**PANEL 1 - SMALL SATELLITE CONTRIBUTIONS TO DISASTER WARNING AND MITIGATION**

*Chair:* H. Stoewer, SAC, Germany

**Tuesday, April 5, 2005, 09:00-10:30**

**SESSION 04 - RESULTS & LESSONS LEARNED**

*Chair:* J. Wertz, SMAD, USA

*Rapporteur:* S. Mostert, University of Stellenbosch, South Africa

**Star-Tracking in High Radiation Regime: In-Flight Results from the SMART-1 Mission** IAA-B5-0401

Troelz, D., Jørgensen, J. L., Jørgensen, P. S., Rathsmann, P.

**In Orbit Performance Verification of FORMOSAT-2** IAA-B5-0402

Chern, J.-S.

**Initial High-Tech Demonstration Results of TS-1 Micro-Satellite** IAA-B5-0403

Cao, X., Zhang, S.

**BIRD: More than 3 Years Experience in Orbit** IAA-B5-0404

Lorenz, E., Jahn, H.

**Tuesday, April 5, 2005, 10:50-12:10**

**SESSION 05 - EDUCATIONAL PROGRAMS**

*Chair:* U. Renner, TU Berlin

*Rapporteur:* C. I. Underwood, SSTL, UK

**Results of Space Weather Research on Scientific-Educational Micro-Satellite  
"KOLIBRI-2000"** IAA-B5-0501

Klimov, S. I., Grigoryan, O. R., Grushin, V. A., Novikov, D. I., Petrov, V. L., Savin, S. P.

**BEOSAT (Brunswick-Earth-Observation-Satellite)** IAA-B5-0502

Kluge, R., Pfingstgräff, J.

**Proposal for a New Hyper Spectral Imaging Micro Satellite: SVALBIRD** IAA-B5-0503

Sigernes, F., Renner, U., Roemer, S., Bleif, J.-H., Lorentzen, D. A., Claes, S.,  
Nordheim, R., Johannessen, F., Ekstrand, V., Pedersen, S.-C.

**X-SAT Mission Progress** IAA-B5-0504

Bretschneider, T., Tan, S. H., Goh, C. H., Arichandran, K., Koh, W. E., Gill, E.

**Tuesday, April 5, 2005, 13:30-15:00**

**SESSION 06 - STUDENT CONFERENCE**

*Chair:* L. Paxton, JHU/APL, USA

*Rapporteur:* H. Jahn, DLR

**Command and Data Handling System Design for the COMPASS-1 Picosatellite** IAA-B5-0601

Scholz, A.

**APS-Based Miniature Sun Sensor for Earth Observation Nanosatellites** IAA-B5-0602

Perrotta, A., Degtyarev, A.



<b>Payload and Scientific Investigation of the Flying Laptop</b> Walz, S., Lengowski, M., von Schoenermark, M.	IAA-B5-0603
<b>Remote Satellite Position &amp; Pose Estimation Using Monocular Vision</b> Malan, D. F., Steyn, W. H., Herbst, B. M.	IAA-B5-0604
<b>Remote Sensing by University of Tokyo's Pico-Satellite Project "PRISM"</b> Enokuchi, A., Nagai, M., Funase, R., Nakamura, Y., Nakasuka, S.	IAA-B5-0605
<b>Dobson Space Telescope - The Future of Microsat Based Observation</b> Segert, T., Danziger, B., Lieder, M.	IAA-B5-0606

## Tuesday, April 5, 2005, 15:20-16:40

### SESSION 07 - INSTRUMENTS

*Chair:* L. Alkalai, NASA/JPL, USA

*Rapporteur:* R. A. da Silva Curiel, SSTL, UK

<b>Micro Electro Optical Systems (MEOS) for a New Generation of Ultra Small Satellites: a Fully Integrated Scanning Mach-Zehnder Microinterferometer on LINBO<sub>3</sub></b> Chiarini, M., Apollonio, P., Cerabolini, P., Pennestrì, G., Dinicolantonio, W., Bentini, G. G., Bianconi, M., Cerutti, A., Kostadinov, I., De Cosmo, V., Guzzi, R.	IAA-B5-0701
<b>Advanced Instruments and Their Impact on Earth Science Missions (I)</b> Hartley, J., Komar, G., Lemmerman, L., Gerber, A.	IAA-B5-0702
<b>Advanced Instruments and Their Impact on Earth Science Missions (II)</b> Gerber, A., Lemmerman, L., Komar, G.	IAA-B5-0703
<b>JSS Multispectral Imagers for Earth Observation Missions</b> Döngi, F., Engel, W., Pillukat, A., Kirschstein, O.	IAA-B5-0704

## Tuesday, April 5, 2005, 16:40-17:40

### Panel 2: THE IAA VIEW ON COST-EFFECTIVE EARTH OBSERVATION MISSIONS

*Chair:* J. Wertz, SMAD, USA

## Wednesday, April 6, 2005, 09:00-10:30

### SESSION 08 - SPECIAL ASPECTS

*Chair:* S. Neeck, NASA, USA

*Rapporteur:* K. Brieß, TU Berlin

<b>Gun Launch System for Small Satellites: a Fresh Look</b> Degtyarev, A., Kanevsky, V., Ventskovsky, O.	IAA-B5-0801
<b>Development of System Engineering Design Tool (SEDTool) for Small Satellite Conceptual Design</b> Chang, Y.-K., Hwang, K.-L., Kang, S.-J., Moon, B.-Y., Kim, S.-J., Chang, J.-S.	IAA-B5-0802
<b>The ROCKOT Launch Vehicle - Future Missions and Plans for Enhancing Cost-Effective Access to Orbit for the Small Satellite Community</b> Kinnersley, M., Freeborn, P., Schumacher, I., Zorina, A.	IAA-B5-0803

**Market Analysis and Demand Forecasting Methodology in Project Management of Small Satellites in South East Asia (SEA)**

IAA-B5-0804

Saeedipour, H. R., Said, Md. A. Md., Allaudin, M. F.

**Wednesday, April 6, 2005, 10:50-12:10**

**SESSION 09 - EARTH EXPLORER**

*Chair:* H. Jahn, DLR

*Rapporteur:* L. Paxton, JHU/APL, USA

**Swarm - Three Explorers of the Earth Magnetic Field and Environment**

IAA-B5-0901

Schönenberg, A., Haagmans, R., Regan, A., Ginati, A., Menard, Y.

**Coal Fire Quantification and Detection Using the DLR Experimental Bi-Spectral Infrared Detection (BIRD) Small Satellite**

IAA-B5-0902

Tetzlaff, A., Hirner, A., Zhukov, B., Kuenzer, C., Voigt, S.

**The STEAM Project**

IAA-B5-0903

van Scheeële, F., Frisk, U., Veldman, S.

**NASA Small Satellites for Exploration of the Earth-Sun System**

IAA-B5-0904

Neeck, S. P., Gay, C. J.

**Wednesday, April 6, 2005, 13:30-15:00**

**SESSION 10 - ORBIT & ATTITUDE DETERMINATION**

*Chair:* K. Brieß, TU Berlin

*Rapporteur:* S. Neeck, NASA, USA

**Orbit Analysis for the Brazilian-German Space Project MAPSAR Based on User Requirements**

IAA-B5-1001

Jochim, F., Quintino da Silva, M. M., Schröder, R., Hajnsek, I., Puls, J.

**Analysis of Orbit Propagation and Relative Position Accuracy of Small Satellites for SAR Interferometry**

IAA-B5-1002

De Florio, S., Neff, T., Zehetbauer, T.

**Orbit Analysis of a Remote Sensing Satellite for Local Observation of the Earth Surface**

IAA-B5-1003

Ebrahimi, A., Mirshams, M., Moosavian, S. A. A.

**The Micro Advanced Stellar Compass for ESA's PROBA 2 Mission**

IAA-B5-1004

Jørgensen, P. S., Jørgensen, J. L., Denver, T., van den Braembuche, P.

**Wednesday, April 6, 2005, 15:20-16:40**

**SESSION 11 – SUBSYSTEMS**

*Chair:* R. A. da Silva Curiel, SSTL, UK

*Rapporteur:* U. Renner, TU Berlin

**Dependable and Flexible Board Computer for Pico Satellites**

IAA-B5-1101

Montenegro, S., Brieß, K., Kayal, H.

<b>Elaboration of Low-Temperature Heat Pipes for Thermal Control of Micro Satellites for Near-Earth Space Missions</b>	IAA-B5-1102
Baturkin, V., Vojta, J., Lura, F.	
<b>Power Storage for Small Satellites: Comparison of NiH2 and LiIon Batteries</b>	IAA-B5-1103
Wenige, R., Schilbach, M., Weidner, P. F.	
<b>Smallsat Propulsion</b>	IAA-B5-1104
Smith, P., McLellan, R., Gibbon, D.	
<b>Wednesday, April 6, 2005, 16:40-17:40</b>	
<b>SESSION – POSTERS</b>	
<b>Earth Observation Results of FORMOSAT-2 from June 2004 to February 2005</b>	IAA-B5-0205P
Chern, J.-S.	
<b>Small, Low Cost Earth Surveillance Satellites for Enhanced Environmental Policies in Profit of Rural Communities</b>	IAA-B5-0206P
Rugescu, R. D.	
<b>Results of Radio Holographic Analysis of GPS Occultation Signals Registered during CHAMP and GPS/MET Small Satellites Missions</b>	IAA-B5-0207P
Pavelyev, A. G., Wickert, J., Liou, Y. A., Pavelyev, A. A., Schmidt, T., Matyugov, S. S.	
<b>Two Earth Observation Missions Based on CNES MYRIADE Small Satellites</b>	IAA-B5-0208P
Tatry, B., Beghin, B.	
<b>Real Time Weather Forecasting: The EGPM Mission Concept by Carlo Gavazzi Space Team</b>	IAA-B5-0209P
Lo Rizzo, V., Ortix, F., Jarrett, M., Erickson, P. D., Warne, D. H.	
<b>PARASOL a Micro Satellite in the A-Train for Earth Atmospheric Observations</b>	IAA-B5-0305P
Bastien-Thiry, C., Bach, M., Lifermann, A.	
<b>SWARM Constellation Deployment &amp; Maintenance</b>	IAA-B5-0306P
Lübberstedt, H., Kassebom, M., Tobehn, C.	
<b>Magnetic-Free Microsatellite Platform for Technological and Scientific Experiments</b>	IAA-B5-0308P
Protsan, Yu. V., Tarasov, G. V., Ostapchuk, S. V., Moroka, O. A., Sytnikov, A. V.	
<b>Formation Flying: A subject Being Fast Unfolding in Space</b>	IAA-B5-0309P
Wang Xiang, Jørgensen, J. L.	
<b>Active Microsatellite Platform with Electric Propulsion Thruster</b>	IAA-B5-0310P
Tolmachev, V. V., Tarasov, G. G., Protsan, Yu. V., Moskalev, S. I., Zhuravlev, E. P., Loyan, A. V.	
<b>Gathering SAR Data under Different Bistatic Angle: a New Potential of COSMO/SkyMed Constellation</b>	IAA-B5-0313P
Fasano, G., D'Errico, M.	
<b>A multiple satellite concept for severe weather monitoring</b>	IAA-B5-0314P
Drescher, A., Sandau, R.	

<b>How many Interfaces does the micro satellite BIRD have? - Lessons Learned</b>	IAA-B5-0405P
Lorenz, E., Halle, W., Bärwald, W., Venus, H., Skrbek, W.	
<b>Demonstration of a Semi-operational Fire Recognition Service Using BIRD Microsatellite - DEMOBIRD</b>	IAA-B5-0406P
Gonzalo, J., Martín de Mercado, G., Lorenz, E., Oertel, D., Casanova, J. L., Aguirre, M., Leibrandt, W., Billing, G.	
<b>The Research and Development of the USM Nanosatellite for Remote Sensing Mission</b>	IAA-B5-0505P
Said, Md. A. Md., Allaudin, M. F., Kamal Adnan, M. S., Othman, M. H., Kassim, N. M., Fai, O. K., Chai Hwee Minn, J., Kang Wah, C.	
<b>Innovation features of building of magnetic-gravitational subsystem of system of determination and orientation control for microsatellite platform</b>	IAA-B5-0506P
Ostapchuk, S. V., Ivanova, G. A., Khoroshilov, V. S.	
<b>Satellite Orbit Determination and Analysis (S. O. D. A.) - a visual tool of satellite orbit for space engineering education and research</b>	IAA-B5-0507P
Kamal Adnan, M. S., Said, Md. A. Md., Othman, M. H., Johari, S. M.	
<b>An Academic Small Satellite Mission beyond Low Earth Orbit - The Lunar Mission BW1 of the University of Stuttgart</b>	IAA-B5-0508P
Laufer, R., Röser, H.-P.	
<b>Some problems of engineering of gravitational stabilizator for microsatellite magnetic-gravitational sub-system of orientation and stabilization</b>	IAA-B5-0509P
Moroka, O. A., Denisov, V. P.	
<b>A University Pico-Satellite Program: PACEsat</b>	IAA-B5-0510P
Miau, J.-J., Juang, J.-C., Chiu, H.-L., Tu, J.-K., Wang, C.-T., Wu, S.-H., Tsai, C.-T., Chu, C.-C., Liu, H.-P., Tseng, Y.	
<b>Development of Earth Observation Sensors for Small Satellites in Satrec Initiative</b>	IAA-B5-0705P
Kim, E.-E., Choi, Y.-W., Kang, M.-S., Jeong, S.-K.	
<b>The Evaluation of Un-Cooled Detectors for Low-Cost Thermal-IR Earth Observation at the Surrey Space Centre</b>	IAA-B5-0706P
Oelrich, B., Underwood, C., Mackin, S.	
<b>Meteor Observations from Space with the Smart Panoramic Optical Sensor Head (SPOSH)</b>	IAA-B5-0707P
Oberst, J., Michaelis, H., Schroedter, R., Buhl, M., Ehrich, J., Röbler, M.	
<b>Research results of low-power SPT</b>	IAA-B5-0805P
Aliyeva, M. T., Maksymenko, T. A., Koshelev, N. N., Loyan, A. V.	
<b>An estimation of the components radiation tolerance at low dose rates</b>	IAA-B5-0806P
Voronkov, S. V.	
<b>Comparing methods for remote sensing satellite project validation</b>	IAA-B5-0808P
Mirshams, M., Amani, S.	
<b>Cost and mass estimation model of small satellites at system design level</b>	IAA-B5-0809P
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**Thursday, April 7, 2005, 09:00-10:30**

**SESSION 12 - ATTITUDE CONTROL**

*Chair:* M. Ovchinnikov, RAS, Russia

*Rapporteur:* T. Terzibaschian, DLR

- Magnetic Attitude Control Systems of the Nanosatellite TNS-Series** IAA-B5-1201  
Ovchinnikov, M., Penkov, V. I., Yu.Ilyin, A. A., Selivanov, S. A.
- Analysis of the HAUSAT-2 Attitude Control with a Pitch Bias Momentum System** IAA-B5-1202  
Chang, Y.-K., Lee, B.-H., Kim, S.-J.
- Development and Validation of a Modern CMOS Digital Sun Sensor at UNINA** IAA-B5-1203  
Rufino, G., Grassi, M., Pulcino, V. , Degtyarev, A.
- Experiences with the BIRD Magnetic Coil System for Wheel Desaturation, Satellite Rate Damping and Attitude Control - the Concept of Virtual Wheel Systems** IAA-B5-1204  
Terzibaschian, T.

**Thursday, April 7, 2005, 10:50-12:10**

**SESSION 13 - DATA TRANSMISSION & GROUND STATIONS**

*Chair:* K. Thyagarajan, ISRO, India

*Rapporteur:* K. Lundahl, Swedish Space Corp., Sweden

- Secured Communication Links for Earth Observation Satellites** IAA-B5-1301  
Michalik, H., Hinsenkamp, L., von der Wall, M., Burr, T., Schöenberg, A.
- BAYERNSAT - a Real-Time Communication-Architecture for Interactive Earth Observation via Geostationary Inter Satellite Link for Small Satellite Systems** IAA-B5-1302  
Letschnik, J., Raif, M., Pauly, K., Walter, U.
- A Web-Based Modular and Flexible Data Acquisition and Telemetry Monitoring System for Micro Satellites** IAA-B5-1303  
Sarkarati, M., Brieß, K., Kayal, H.
- Space-Based AIS for Global Maritime Traffic Monitoring** IAA-B5-1304  
Høye, G. K., Eriksen, T., Meland, B. J., Narheim, B. T.

**Thursday, April 7, 2005, 13:30-15:00**

**SESSION 14 - TECHNOLOGY DEMONSTRATION**

*Chair:* H.-P. Röser, Univ. of Stuttgart

*Rapporteur:* L. Alkalai, NASA/JPL, USA

- Pico Satellite Concept of TU-Berlin** IAA-B5-1401  
Kayal, H., Brieß, K.
- Technology Demonstration with the Micro-Satellite Flying Laptop** IAA-B5-1402  
Grillmayer, G., Falke, A., Röser, H.-P.
- Two Nano Satellites for Space Experiments** IAA-B5-1403  
Urlichich, Yu. M., Selivanov, A. S., Stepanov, A. A.

**Thursday, April 7, 2005, 15:20-16:40**

**SESSION 15 - DISASTER MONITORING**

*Chair:* J.-S. Chern, NSPO, Taiwan

*Rapporteur:* D. Oertel, DLR

**Evaluation of the Utility of the Disaster Monitoring Constellation  
in Support of Earth Observation Applications**

IAA-B5-1501

Underwood, C. I., Machin, S., Stephens, P., Hodgson, D.,  
da Silva Curiel, A., Sir Martin Sweeting

**The Micro-Satellite "Chibis" - Universal Platform for Development of Methods  
of Space Monitoring of Potentially Dangerous and Catastrophic Phenomena**

IAA-B5-1502

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Korablev, O. I., Linkin, V. M., Loupian, E. A., Korepanov, V. E.

**Small Satellite Utilization for Disaster Management Information Systems**

IAA-B5-1503

Albayrak, O.

**FOCUS-M Missile Early Warning Satellite System**

IAA-B5-1504

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**Thursday, April 7, 2005, 16.40-17.40**

**SYMPOSIUM SUMMARY**

*Chair:* A. Valenzuela – IAA

*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 5, 2005, 19:00 at Berlin Hilton Hotel.

### **A Special Thanks to the Students Paper Evaluation Committee:**

Rainer Sandau, DLR, Germany

Leon Alkalai, NASA/JPL, USA

Klaus Brieß, DLR, Germany

Jaime Esper, NASA/GSFC, USA

Tomonao Hayashi, Chiba Institute of Technology, Japan

Einar-Arne Herland, ESA/ESTEC

Sias Mostert, SunSpace, University of Stellenbosch, South Africa

Michael Ovchinnikov, Keldysh Institute of Applied Mathematics, Russia

Craig Underwood, SSTL, UK

K. Thyagarajan, ISRO, India

### **Student Prize Contributors**

DLR

ESA

Eurospace Technische Entwicklungen GmbH

Eurokot Launch Services GmbH

Keldysh Institute of Applied Mathematics

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Montenegro, S.	IAA-B5-1101	Ranjbar, A.	IAA-B5-1310P
Moon, B.-Y.	IAA-B5-0802	Rathsman, P.	IAA-B5-0401
Moosavian, S. A. A.	IAA-B5-1003	Razali, R.	IAA-B5-1005P
Moradi, S.	IAA-B5-1107P	Regan, A.	IAA-B5-0901
Moroka, O. A.	IAA-B5-0308P	Renner, U.	IAA-B5-0302
Moroka, O. A.	IAA-B5-0509P	Renner, U.	IAA-B5-0503
Moskalev, S. I.	IAA-B5-0310P	Rodin, V. G.	IAA-B5-1502
Mostert, S.	IAA-B5-0203	Roemer, S.	IAA-B5-0503
Mueller, A.	IAA-B5-0905P	Rohi, H.	IAA-B5-1309P
Nagai, M.	IAA-B5-0605	Rohi, H.	IAA-B5-1310P
Nakamura, Y.	IAA-B5-0605	Rohi, H.	IAA-B5-1311P
Nakasuka, S.	IAA-B5-0605	Röser, H.-P.	IAA-B5-0508P
Narheim, B. T.	IAA-B5-1304	Röser, H.-P.	IAA-B5-1402
Nasirean, M.	IAA-B5-1209P	Rößler, M.	IAA-B5-0707P
Nazirov, R.	IAA-B5-1006P	Rufino, G.	IAA-B5-1203
Neeck, S. P.	IAA-B5-0904	Rugescu, R. D.	IAA-B5-0206P
Neff, T.	IAA-B5-1002	Saeedipour, H. R.	IAA-B5-0804
Neff, T.	IAA-B5-1010P	Saeedipour, H. R.	IAA-B5-1305P
Nordheim, R.	IAA-B5-0503	Said, Md. A. Md.	IAA-B5-0505P
Novikov, D. I.	IAA-B5-0501	Said, Md. A. Md.	IAA-B5-0804
Novikov, D. I.	IAA-B5-1006P	Said, Md. A. Md.	IAA-B5-0810P
Novinzadeh, A. B.	IAA-B5-1207P	Said, Md. A. Md.	IAA-B5-1305P
Nuryanto, A.	IAA-B5-0302	Salcedo, C.	IAA-B5-0303
Oberst, J.	IAA-B5-0707P	Samani, M.	IAA-B5-0809P
Oelrich, B.	IAA-B5-0706P	Sandau, R.	IAA-B5-0314P
Oertel, D.	IAA-B5-0204	Sarkarati, M.	IAA-B5-1303
Oertel, D.	IAA-B5-0406P	Sathyanarayana, P.	IAA-B5-1305P
Okamoto, Y.	IAA-B5-1406P	Savin, S. P.	IAA-B5-0501
Ortiz, F.	IAA-B5-0209P	Schaffhauser, F.	IAA-B5-0303
Ostapchuk, S. V.	IAA-B5-0308P	Schilbach, M.	IAA-B5-1103
Ostapchuk, S. V.	IAA-B5-0506P	Schmidt, T.	IAA-B5-0207P
Othman, M. H.	IAA-B5-0505P	Scholz, A.	IAA-B5-0601
Othman, M. H.	IAA-B5-0507P	Schönenberg, A.	IAA-B5-0901
Ovchinnikov, M. Yu.	IAA-B5-1201	Schönenberg, A.	IAA-B5-1301
Pantsyrnyi, O. A.	IAA-B5-1404	Schreier, G.	IAA-B5-0905P
Pauly, K.	IAA-B5-1302	Schröder, R.	IAA-B5-1001
Pauly, K.	IAA-B5-1306P	Schroedter, R.	IAA-B5-0707P
Pavelyev, A. A.	IAA-B5-0207P	Schumacher, I.	IAA-B5-0803
Pavelyev, A. G.	IAA-B5-0207P	Sedigh, S. A. K.	IAA-B5-1209P
Payamifard, M.	IAA-B5-1307P	Segert, T.	IAA-B5-0606
Payamifard, M.	IAA-B5-1311P	Selivanov, S. A.	IAA-B5-1201
Pedersen, S.-C.	IAA-B5-0503	Selivanov, A. S.	IAA-B5-1403
Penkov, V. I.	IAA-B5-1201	Sigernes, F.	IAA-B5-0503
Penné, B.	IAA-B5-0304	Skrbek, W.	IAA-B5-0405P
Pennestrì, G.	IAA-B5-0701	Smith, P.	IAA-B5-1104
Perrotta, A.	IAA-B5-0602	Stepanov, A. A.	IAA-B5-1403
Petrov, V. L.	IAA-B5-0501	Stephens, P.	IAA-B5-1501
Pfingstgräff, J.	IAA-B5-0502	Steyn, W. H.	IAA-B5-0604
Pillukat, A.	IAA-B5-0704	Stuffer, T.	IAA-B5-0905P
Pourtakdost, S. H.	IAA-B5-1207P	Sweeting, Sir Martin	IAA-B5-1501

<u>Name</u>	<u>Paper/Poster Reference*</u>	<u>Name</u>	<u>Paper/Poster Reference*</u>
Sweeting, Sir Martin	IAA-B5-0102	Venus, H.	IAA-B5-0405P
Sweeting, Sir Martin	IAA-B5-0301	Voigt, S.	IAA-B5-0902
Sytnikov, A. V.	IAA-B5-0308P	Vojta, J.	IAA-B5-1102
Tan, S. H.	IAA-B5-0504	von der Wall, M.	IAA-B5-1301
Tarasov, G. V.	IAA-B5-0308P	von Schoenermark, M.	IAA-B5-0603
Tarasov, G. G.	IAA-B5-0310P	Voronkov, S. V.	IAA-B5-0806P
Tarhani, F.	IAA-B5-1309P	Voronkov, S. V.	IAA-B5-1008P
Tarrieu, C.	IAA-B5-0103	Walter, U.	IAA-B5-1302
Tatry, B.	IAA-B5-0208P	Walter, U.	IAA-B5-1306P
Taylor, E. A.	IAA-B5-0813P	Walz, S.	IAA-B5-0603
Terzibaschian, T.	IAA-B5-1204	Wang, C.-T.	IAA-B5-0510P
Terzibaschian, T.	IAA-B5-1208P	Wang Xiang	IAA-B5-0309P
Tetzlaff, A.	IAA-B5-0902	Warne, D. H.	IAA-B5-0209P
Thyagarajan, K.	IAA-B5-0201	Weidner, P. F.	IAA-B5-1103
Tobehn, C.	IAA-B5-0304	Wells, Jim	IAA-B5-0303
Tobehn, C.	IAA-B5-0306P	Wenige, R.	IAA-B5-1103
Tobehn, C.	IAA-B5-1504	Wickert, J.	IAA-B5-0207P
Tolmachev, V. V.	IAA-B5-0310P	Wu, S.-H.	IAA-B5-0510P
Triharjanto, R. H.	IAA-B5-0302	Wusk, B.	IAA-B5-0303
Troelz, D.	IAA-B5-0401	Yadegari, H.	IAA-B5-1206P
Tsai, C.-T.	IAA-B5-0510P	Yokoyama, K.	IAA-B5-1406P
Tseng, Y.	IAA-B5-0510P	Zehetbauer, T.	IAA-B5-1002
Tu, J.-K.	IAA-B5-0510P	Zehetbauer, T.	IAA-B5-1010P
Underwood, C. I.	IAA-B5-0706P	Zelenyi, L. M.	IAA-B5-1502
Underwood, C. I.	IAA-B5-1501	Zhang, S.	IAA-B5-0403
Urlichich, Yu. M.	IAA-B5-1403	Zhukov, B.	IAA-B5-0204
van den Braembuche, P.	IAA-B5-1004	Zhukov, B.	IAA-B5-0902
van Scheéle, F.	IAA-B5-0903	Zhuravlev, E. P.	IAA-B5-0310P
Varatharajoo, R.	IAA-B5-1205P	Zorina, A.	IAA-B5-0803
Veldman, S.	IAA-B5-0903		
Venet, M.	IAA-B5-0202		
Ventskovsky, O.	IAA-B5-0801		

\* I A A - B 5 - 0 0 0 0 P

┌───┐ ─── Session No.

01 to 04 - Sequence of oral presentation  
 from 05P - Poster presentation during Poster session

## **GENERAL INFORMATION**

### ***Symposium Venue***

The symposium will take place in the BERLIN HILTON HOTEL, Conference Center, Mohrenstraße 30, 10117 Berlin,  
Phone +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 3, Sunday	16:00-20:00
April 4, Monday - April 7, 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  
Phone +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, room: "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 the book of selected proceedings.

### *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*

<b>Date/Time</b>	<b>Event</b>	<b>Venue</b>
<b>April 3, Sunday</b> 19:00-20:00	Get-Together	Berlin Hilton Hotel
<b>April 4, Monday</b> 19:00-22:00	Reception (included in the registration fee)	Television Tower Alexanderplatz
<b>April 5, Tuesday</b> 19:00-23:00	IAA Dinner €40.00/person	Berlin Hilton Hotel
<b>April 6, Wednesday</b> 20:00	<b>Concert:</b> Klassische Philharmonie Bonn Cherubini, Mozart, Mendelssohn-Bartholdy	Konzerthaus Berlin
<b>April 7, Thursday</b>	Film Presentation (included in the registration fee)	IMAX Cinema Potsdamer Platz

### *Excursions*

#### **April 8 Friday**

09:00-12:00 Visit to:

**WISTA, Science and Technology Center,**  
Rudower Chaussee 5, 12489 Berlin-Adlershof

**or to:**

**Astrophysical Institute Potsdam (AIP),**  
An der Sternwarte 16, 14482 Potsdam

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

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

#### City Circle Tour (by bus)

Every 30 minutes - starting from 10:45 up to 15:45 - a sightseeing tour bus will pick you up at the entrance of the Hilton Hotel. There are 14 bus stops at the most beautiful places in the town, where you can leave the bus and discover the town by your own as long as you want. The next bus will take you off and bring you to the next stop and at last home. At the sightseeing busses there is information available in any language by headsets.

Meeting place: Main Entrance of Hilton Hotel Departure: 10:45-15:45

Price: €18.00/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: 9:20

Price: €35.00/person

### **On demand**

#### Full day Tour to Dresden (by train)

Transfer to Dresden by taxi and train, English speaking guided tour through the historic center of Dresden, lunch, visit to the museum Grünes Gewölbe, Dresdner Zwinger, Taschenbergpalais etc., transfer by train back to Berlin.

### **On demand**

#### A sightseeing tour by ship

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.



<b>5<sup>th</sup> IAA Symposium on Small Satellites for Earth Observation</b>	<b>MONDAY April 4, 2005</b>	<b>TUESDAY April 5, 2005</b>	<b>WEDNESDAY April 6, 2005</b>	<b>THURSDAY April 7, 2005</b>	<b>FRIDAY April 8, 2005</b>
<b>09:00 - 09:30</b> <i>Paper</i>	<b>09.30 - 09.50</b> Welcome & Greetings	<b>Session 04</b> Results & Lessons Learned	<b>Session 08</b> Special Aspects	<b>Session 12</b> Attitude Control	<b>09.00 - 12.00 Visit of:</b>  WISTA, Science and Technology Center, Berlin-Adlershof  Astrophysical Institute Potsdam (AIP)
<b>09:30 - 09:50</b> <i>Paper</i>	<b>09.50 - 10.45</b> Keynote				
<b>09:50 - 10:10</b> <i>Paper</i>					
<b>10:10 - 10:30</b> <i>Paper</i>					
<b>10:30 - 10:50</b> Coffee Break	<b>10.45 - 11.15</b> Break and Press Conference	<b>Session 05</b> Educational Programs	<b>Session 09</b> Earth Explorer	<b>Session 13</b> Data Transmission & Ground Stations	
<b>10:50 - 11:10</b> <i>Paper</i>	<b>11.15 - 12.30</b> <b>Session 01</b> Programmatics				
<b>11:10 - 11:30</b> <i>Paper</i>					
<b>11:30 - 11:50</b> <i>Paper</i>					
<b>11:50 - 12:10</b> <i>Paper</i>					
<b>12:10 - 13:30</b> Lunch Break	<b>12.30 - 13.30</b> Lunch				
<b>13:30 - 14:00</b> <i>Paper</i>	<b>Session 02</b> Earth Observation Missions	<b>Session 06</b> Student Conference (Special Session)	<b>Session 10</b> Orbit & Attitude Determination	<b>Session 14</b> Technology Demonstration	
<b>14:00 - 14:20</b> <i>Paper</i>					
<b>14:20 - 14:40</b> <i>Paper</i>					
<b>14:40 - 15:00</b> <i>Paper</i>					
<b>15:00 - 15:20</b> Coffee Break					
<b>15:20 - 15:40</b> <i>Paper</i>	<b>Session 03</b> Constellations & Platforms	<b>Session 07</b> Instruments	<b>Session 11</b> Subsystems	<b>Session 15</b> Disaster Monitoring	
<b>15:40 - 16:00</b> <i>Paper</i>					
<b>16:00 - 16:20</b> <i>Paper</i>					
<b>16:20 - 16:40</b> <i>Paper</i>					
<b>16:40 - 17:40</b> Panel	<b>Panel 1</b> Small Satellite Contributions for Disaster Warning and Mitigation	<b>Panel 2</b> The IAA View on Cost-Effective Earth Observation Missions	<b>Session Poster</b>	<b>Symp. Summary Awards</b>	
<b>19:00 Social Event</b>	<b>Reception (19:00-22:00)</b> Television Tower	<b>IAA-Dinner (19:00)</b> Hilton Hotel	<b>Concerts</b> Konzerthaus Berlin	<b>Film Presentation</b> IMAX Cinema	