Научные и технологические эксперименты на автоматических космических аппаратах и малых спутниках

Scientific and technological experiments on automatic space vehicles and small satellites

9-11 сентября 2014 г., Самара, Россия
September 9-11, 2014, Samara, Russia
08.30-10.00  Registration of Conference participants

10.00-10.30  Opening Ceremony
  Greetings

**Plenary session #1 (main hall of university, build. 3)**

**THE ROLE OF THE SCIENTIFIC COMMUNITY IN THE DEVELOPMENT OF THE SPACE SCIENCE AND TECHNOLOGY**

*Chair: E.V. Shakhmatov*
  *(Rector of the Samara State Aerospace University, Samara, Russia)*
  *(Representative of the Samara Region Administration (TBD))*

10.30-11.00  IAA activity to intensify research in aeronautics
  *R. Sandau*
  *(Technical director of the satellites and space applications in the IAA, Paris, France)*

11.00-11.30  Participating of the Russian academy of cosmonautics in realization of the Federal space program of Russia
  *I.V. Barmin (RACTs president, Moscow, Russia)*

11.30-12.00  Break

**Plenary session #2 (main hall of university, build. 3)**

**SAMARA SPACE**

*Chairs: I.V. Barmin (President of the Russian Academy of Cosmonautics, Moscow, Russia)*
  *R. Sandau*
  *(Technical director of the satellites and space applications in the IAA, Paris, France)*

12.00-12.30  Aerospace cluster of the Samara region as a center of Russian cosmonautics
  *(Representative of the Samara Region Administration (TBD))*

12.30-13.00  Rocket Space Center “Progress”: past, present and future.
  *A.N. Kirilin (General Director of JSC “RSC -Progress”, Samara, Russia)*

13.00-13.30  Development program of Samara State Aerospace University named after academician S.P. Korolev (National Research University)
  *E.V. Shakhmatov (SSAU rector, Samara, Russia)*

13.30-15.00  Lunch
Plenary session #3 (main hall of university, build. 3)

PROJECTS AND MISSIONS OF SMALL SPACECRAFT

Chairs: V.A. Saechnikov (Head of the department of the BSU, Minsk, Belarus)
       K. Shilling (Head of the department of the University of Würzburg, Germany)

15.00-15.30 Scientifical and technological experiments on university "AIST" type small satellites constellation

15.30-16.00 Program of space experiments of Lomonosov Moscow State University: 2005 – 2015
P.A. Klimov (Scobetsyn Institute of Nuclear Physics, Moscow, Russia; on behalf of LOMONOSOV collaboration).

16.00-16.30 Union State Program "Soyuz-Sat System"
S.V. Ablameyko, M.I. Panasiuc, V.V. Ponaryadov, G.V. Korovin, A.N. Korolev, I.V. Belokonov, V.V. Radchenko, V.A. Saechnikov, I.V. Yashin (Belarus State University, Minsk, Belarus; Space Systems Research and Development Institute in Khruinchev State Research and Production Space Center, Moscow region, Korolev, Russia; Scobetsyn Institute of Nuclear Physics of Moscow State University, Moscow, Russia; Samara State Aeronautical University, Samara, Russia)

16.30-17.00 Technology development for pico-satellite formations and their application potential
K. Shilling (University of Würzburg, Germany)

17.00-17.30 Academic microsatellite «Chibis-M». Realization in the frame of the infrastructure of the Russian segment of the international space station
V.N. Angarov, O.V. Batanov, L. M. Zeleniy, A.V. Kalyuzhnyi, S.I. Klimov, I.V. Koçlov, V.N. Nazarov, D.I. Novikov, V.N. Rodin, N.A. Eismont (Space Research Institute of the RAS, Moscow, Russia)

18.00-20.00 Welcome party
Wednesday, September 10

Session 1. Scientific and technological experiments on small spacecraft
(conference-hall, room 209, build. 3a)

Chairs: O.V. Goryachkin
(Head of Department of the Povolzhskiy State University of Telecommunications and Informatics, Samara, Russia)
V.V. Radchenko (Deputy of Director of the Scobetsyn Institute of Nuclear Physics of Moscow State University, Moscow, Russia)

9.00-9.15 Shape memory epoxy foams and composites: RIBES_FOAM 2 experiment on spacecraft “Bion-M1” and future perspective
L. Santo (Industrial Engineering Dep., University of Rome “Tor Vergata”, Rome, Italy), F. Quadrini (Industrial Engineering Dep., University of Rome Rome, Italy), W. Villadei (Italian Air Force, Head Quarter, Rome, Italy), G. Mascetti (Italian Space Agency, Rome, Italy), V. Zolesi (Kayser Italia s.r.l., Livorno)

9.15-9.30 Space systems design for research on the interaction of osteoblast-like cells and biomaterials (hydroxyapatite particles and titanium) in microgravity environment
Martina Carnio (GAUSS S.r.l., Italy), Chiara Massimiani (GAUSS S.r.l., Italy), Sara Gemini Piperni (Italy), Willian Zambuzzi (Universidade Estadual Paulista-UNESP, Brazil), Chantal Cappelletti (G.A.U.S.S. Srl, Italy), Filippo Graziani (University of Rome "La Sapienza", Italy)

9.30-9.45 Scientific-methodical aspects of implementing the Academic "Chibis-M" microsatellite
V.M. Gotlib, L.M. Zeleniy, V.N. Karedin, S.I. Klimov, D.I. Vavilov, M.S. Dolgonosov (Space Research Institute of the RAS, Moscow, Russia), V.E. Korpanov (Lviv Center of Institute Space Researches, Lviv, Ukraine), P. Segedi, C. Feren (ELTE, Budapest, Hungary)

9.45-10.00 Orbital Observatory for Planetary Science on Low Cost Autonomous Platform
A. Tavrov, A. Kiselev, O. Korablyev (Space Research Institute of the RAS, Moscow, Russia), D. Bisikalo (Institute of Astronomy of the RAS, Moscow, Russia), A. Markov (URSC “Energiya”, Korolev, Russia), M. Kokorich, N. Vedenkin (Dauria Aerospace, Technopark "Skolkovo", Moscow region, Russia)

10.00-10.15 Bistatic P-band SAR for spacecraft AIST-2
A.V. Borisenkov, O.V. Goriachkin, V.I. Dmitrenok, V.N. Dolgopolov, B.G. Gengurov, A.A. Juravlev, I.G Kurkov, S.M. Khohlov (Povolzhskiy State University of Telecommunications and Informatics, JSC “RSC -Progress”, Samara, Russia)

10.15-10.30 Carrying of flight experiment with a combined experimental equipment on spacecraft «AIST-2»
A.F. Krutov (Samara State University, Samara, Russia), G.I. Leonovich (Section of Special Problems of the RAS), S.V. Ivkov, N.A. Livochkina (JSC “RSC Progress”, Samara, Russia)

10.30-10.45 Scientific and technical aspects of navigation systems for autonomous and manned Mars rover vehicle
V.A. Akulov, P.K. Kuznetsov (State Technical University, Samara, Russia)

10.45-11.00 Break
Wednesday, September 10

Session 2. Mathematical support of space experiments  
(conference-hall, room 209, build. 3a)

Chairs: V.V. Sazonov (Senior scientist of the Keldysh Institute of Applied Mathematics, Russian Academy of Sciences, Moscow, Russia)  
V.M. Zhuravlev (Professor of the Ulyanovsk State University, Ulyanovsk, Russia)

11.00-11.15 Reconstruction of uncontrolled attitude motion of small satellite AIST  
V.I. Abrashkin (JSC “RSC -Progress”, Samara, Russia), K.E. Voronov, A.V. Piyakov (SSAU, Samara, Russia), Yu.Ya. Puzin (JSC “RSC -Progress”, Samara, Russia), V.V. Sazonov (Keldysh Institute of Applied Mathematics (RAS)), N.D. Semkin (SSAU, Samara, Russia), A.S. Filippov (JSC “RSC -Progress”, Samara, Russia), S.Yu. Chebukov (Keldysh Institute of Applied Mathematics (RAS))

11.15-11.30 Determining the spacecraft BION M-1 attitude motion by means of the workstation Graviton  
V.I. Abrashkin (JSC “RSC -Progress”, Samara, Russia), V.V. Sazonov (Keldysh Institute of Applied Mathematics (RAS)), K.E. Voronov, N.D. Semkin, A.V. Piyakov (SSAU, Samara, Russia), A.S. Filippov, Yu.Ya. Puzin (SSAU, Samara, Russia), S.Yu. Chebukov (Keldysh Institute of Applied Mathematics (RAS))

11.30-11.45 Estimation of the spectral composition of the signal by the antenna composed of multiple satellites  
V.M. Zhuravlyov, S.V. Vinogradov (USU, Ulyanovsk, Russia)

11.45-12.00 Mathematical modelling of radio tomographic ionospheric monitoring via satellite constellation  
O.V. Phylonin, I.V Belokonov, P.N. Nikolayev (SSAU, Samara, Russia)

12.00-12.15 Using technology of the differential correction to improve navigation support micro/nanosatellite  
D.A. Lopukhov (SSAU, Samara, Russia)

12.15-12.30 On-board algorithm for nanosatellite orientation and stabilization system  
M. E. Melnik (SSAU, Samara, Russia)

12.45-13.00 Break
Wednesday, September 10

Session 3. Space education
(conference-hall, room 209, build. 3a)

Chairs: I.V. Belokonov
(Head of department of Samara State Aerospace University, Samara, Russia)
K. Borre (professor, Denmark)

13.00-13.15 Development of innovative models of the higher education third level for the aerospace industry within the international project TEMPUS
K. Briss, D. Ostroverkhov (TU Berlin, Berlin, Germany), B. Pranas (VGTU, Vilnius, Lithuania), V.A. Saechnikov, E.A. Chernjavskaja (BSU, Minsk, Belarus), A. Shterengarts (ECM, Berlin, Germany)

13.15-13.30 Integrated educational MS/PhD programs of the space research department
I.V. Belokonov, I.A. Timbai, A.V. Kramlikh, I.A. Kudryavtsev
(SSAU, Samara, Russia)

13.30-13.45 Two New GNSS Master Programs at SSAU
K. Borre, I.A. Kudryavtsev (SSAU, Samara, Russia)

13.45-14.00 CANSAT in Russia. Three years of project
V. Radchenko (Scobetsyn Institute of Nuclear Physics, Moscow, Russia), N. Vedenkin (Dauria Aerospace, Technopark "Skolkovo", Moscow region, Russia)

14.00-15.00 Lunch

16.00-20.00 Volga boat trip
Thursday, September 11

Session 4. Projects and missions of small spacecraft
(conference-hall, room 209, build. 3a)

Chairs: R. Sandau (Technical director of the satellites and space applications in the IAA, Paris, France)
K. Shilling (Head of the department of the University of Würzburg, Würzburg, Germany)

9.00-9.15 Distributed Satellite Systems. An Approach to Classification
R. Sandau (IAA, Paris, France)

9.15-9.30 Small space platform for scientific and technological experiments
N. Vedenkin, V. Verkhovykh (Dauria Aerospace, Technopark “Skolkovo”, Moscow region, Russia), V. Krukovsky (JSC “Glavkosmos”, Moscow, Russia), A. Pozanenko, P. Minaev (SRI of the RAS, Moscow, Russia), S. Khandorin, A. Markov, I. Hamits (URSC “Energiya”, Korolev, Russia)

9.30-9.45 Small space platform developed by JSC «MAKEYEV State Rocket Center»
V.G. Degtiar, N.V. Tarashchik (JSC “Academician V.P.Makeyev State Rocket Centre”, Tchelyabinsk region, Miass, Russia)

9.45-10.00 Commercialization of Low Earth Orbit: Developing a Microsatellite Constellation
Michael T. McGrath (Laboratory for Atmospheric and Space Physics, The University of Colorado at Boulder, USA)

10.00-10.15 Characterization of «way cargo» of small spacecraft with a “Bion-M” or “Foton-M” satellite type

10.15-10.30 Synthesis of multiple small space vehicle launch system for different configuration of main stage separation unit
G.E. Kruglov, V.V. Yudintsev (JSC “RSC -Progress”, Samara, Russia)

10.30-10.45 Break

10.45-11.00 Small-size micro processing system for nanosatellite separation
O.V. Filonin, Z.I. Gimranov (SSAU, Samara, Russia)

11.00-11.15 Scientific-Educational nanosatellite «BelSat Mark3»
N.V. Mishchenko, V.V. Pavlovich, D.S. Romanovets, V.A. Saechnikov, I.V. Saechnikov, V.E. Cherniy (BSU, Minsk, Belarus)

11.15-11.30 SSAU project of the nanosatellite SamSat QB50 for monitoring the Earth’s thermosphere parameters
E.V. Shakhmatov, I.V. Belokonov, I.A. Timbai, E.V. Ustiugov, A.A. Nikitin,
S.V. Shafran (SSAU, Samara, Russia)

11.30-11.45 Scientific-Educational nanosatellite
S.V. Ablameyko, V.V. Ponaryadov, V.A. Saechnikov (BSU, Minsk, Belarus),
O.I. Atakischev, V.A. Pikiev (SWSU, Kursk, Russia)

11.45-12.00 SSAU nanosatellite project for the navigation and control technologies demonstration
A.N. Kirillin (JSC “RSC -Progress”, Samara, Russia), I.V. Belokonov, I.A.
Timbai, A.V. Kramlikh, M.E. Melnik, E.V. Ustiugov (SSAU, Samara, Russia)

12.00-12.15 Utilization of satellite communication systems for the rapid exchange of data by the low-altitude communication systems: experiment "Kontakt-MKA" on small spacecraft "AIST-2"
I.V. Belokonov, D.P. Avaryaskin, D.D. Davydov (SSAU, Samara, Russia)

12.15-13.45 Lunch
Wednesday, September 11

Session 5. Design and construction of small satellites and its systems
(conference-hall, room 209, build. 3a)

Chairs: I.A. Timbai (Professor of Samara State Aerospace University, Samara, Russia)
M.M. Moldabekov (Deputy of the Head of Kazakhstan National Space Agency,
Almaty, Kazakhstan)

13.45-14.00 Method of computer conceptual design of land remote sensing spacecraft
with regard to target efficiency parameters
A.N. Kirilin, R.N. Akhmetov (JSC “RSC -Progress”, Samara, Russia), V.I.
Kurenkov (SSAU, Samara, Russia), N.R. Stratilatov, V.I. Abrashkin (JSC
“RSC -Progress”, Samara, Russia), A.S. Kucherov (SSAU, Samara, Russia),
S.L. Safronov (JSC “RSC -Progress”, Samara, Russia), A.A. Yakischik
(SSAU, Samara, Russia)

14.00-14.15 Automated system for multiversion setting and solution of design problems
A.N. Kirilin, R.N. Akhmetov (JSC “RSC -Progress”, Samara, Russia), V.I.
Kurenkov (SSAU, Samara, Russia), N.R. Stratilatov, V.I. Abrashkin (JSC
“RSC -Progress”, Samara, Russia), A.S. Kucherov (SSAU, Samara, Russia),
S.L. Safronov (JSC “RSC -Progress”, Samara, Russia), A.A. Yakischik
(SSAU, Samara, Russia)

14.15-14.30 Selection of design parameters of aerodynamically stabilized nanosatellite
standard CubeSat
I.V. Belokonov, I.A. Timbai (SSAU, Samara, Russia)

14.30-14.45 Development of star tracker for satellite
M.M. Moldabekov (Kazakhstan National Space Agency, Almaty, Kazakhstan),
D.Sh. Akhmedov, S.A. Yelubayev, K.A. Alipbayev, T.M. Bopeyev, A.S.
Sukhenko, M.N. Baiiserkenov (AALR «Institute of space technique and technology»,
Almaty, Kazakhstan)

14.45-15.00 Thermal control opto-electronic telescope complex new generation
S.V. Tsaplin, S.A. Bolychev (SSAU, Samara, Russia)

15.00-15.15 Development of attitude determination and control system and its compo-
nents for scientific and technological nanosatellite
D.Sh. Akhmedov, S.A. Yelubayev S.A., K.A. Alipbayev, T.M. Bopeyev,
A.S. Sukhenko, A.E. Komekbayev (AALR «Institute of space technique and
technology», Almaty, Kazakhstan )

15.15-15.30 Break

15.30-15.45 SDR GNSS Receiver
K. Borre, I. Kudryavtsev (SSAU, Samara, Russia)

15.45-16.00 Acquisition of Galileo signals in MathLab
E. Stepanova, I. Kudryavtsev (SSAU, Samara, Russia)

16.00-16.15 System of visual monitoring of payload separation parameters
D.V. Kornilin, I.A. Kudryavtsev, M.V. Medvedev (SSAU, Samara, Russia)

16.15-16.30 Nanosatellite control device based on Android OS
A.S. Davydov (SSAU, Samara, Russia)

16.30-16.45 Design of rocket engine for spacecraft using CFD-modeling
V.M. Zubanov, V.S. Egorychev, L.S. Shabliy (SSAU, Samara, Russia)

16.45-17.00 Efficient silicon solar cells for space and ground-based aircraft
N.V Latukhina, A.S. Rogozin, G.V Puzyrnaya (SSU, Samara, Russia)
A.S. Gurtov, S.V. Ivkov, S.I. Minenko (JSC “RSC -Progress”, Samara, Russia)
N. V Afanasiev, J.V. Morozov (JSC “POZIT”)

17.00-17.15 METEOR sensor
A.M. Telegin (SSAU, Samara, Russia)

17.15-17.30 Design and Prototype Implementation of Circular-Rail Robot System for Extra-Vehicular Activities
Yongquan Chen, Chengjiang Wang (Department of Mechanical and Automation Engineering, The Chinese University of Hong Kong), Wenfu Xu (School of Mechanical Engineering and Automation, Harbin Institute of Technology Shenzhen Graduate School), Meng Chen (National Key Laboratory of Space Structure and Mechanism Technology, Institute of Aerospace System Engineering), Yangsheng Xu (Department of Mechanical and Automation Engineering, The Chinese University of Hong Kong)

17.30-18.00 Closing Ceremony

19.00-22.00 Gala Dinner