

# SAMARA STATE AEROSPACE UNIVERSITY

NATIONAL  
RESEARCH  
UNIVERSITY



# ROADMAP

2013-2020

# SSAU WEB-PORTAL

Samara State Aerospace University



3D tour  

News & events

Education

Research

About us

Information & services

Students' life



Yastreb: light  
multipurpose  
aircraft

### Events

[all events](#)

dec  
04  
wed

[International scientific conference "Perspective information technologies \(PIT-2013\)"](#)  
Conference: Samara, SSAU

nov  
05  
tue

[VI International Scientific and Practical Conference "Science and Education in Transport"](#)  
Conference: Samara, Samara State University of Railway Transport

nov  
12  
tue

[IX International forum "Optical systems and technologies"](#)  
Forum: Moscow, 57 Hall, All-Russian Exhibition Centre

nov  
12

[The XII International Conference "Aviation and Space 2013"](#)

### Samara timelapse



### Campus



### News

[all news](#)

21.10.2013

[Pre-university courses](#)  
Courses include Mathematics, Physics, Russian, Computer science

18.10.2013

[Web of Science database available for the University users](#)  
Dear lecturers, postgraduates and young scientists

18.10.2013

[An open dialog: ask the SSAU rector](#)  
Meetings become regular



18.10.2013

[Access to full-text archives of leading scientific journals](#)  
National Electronic Information Consortium implemented the



# SSAU PARTNERS

## LOCAL PARTNERS

### COMPANIES OF RUSSIAN FEDERAL SPACE CENTER:

- Progress State Research and Production Space Centre
- Federal space center Baikonur
- Research Institute Chimmash
- Design bureau Chimmash named after A.M. Isaev
- Central Research Institute of mechanical engineering
- NPO Energomash named after academician V.P. Glushko
- OJSC State rocket center named after V.P. Makeev
- S.P. Korolev RSC Energia
- Khrunichev state research and production space center
- Research and Production Association S.A. Lavochkin
- JSC «Information satellite systems» named after M.F. Reshetnev
- Research and manufacturing association Technomasch

### COMPANIES OF UNITED AIRCRAFT CORPORATION AND UNITED ENGINE CORPORATION:

- JSC «Kuznetsov»
- JSC «Saturn»
- JSC «Metallist-Samara»
- JSC «Sukhoi»
- CJSC «AVIASTAR-SP»
- CJSC «Aerocomposite»

### MECHANICAL ENGINEERING JOINT-STOCK COMPANIES:

- JSC «Salut»
- JSC «Aviaagrat»
- JSC «Agregat»
- JSC «AvtoVaz»
- JSC «Volgaburmash»
- JSC « Samara Metallurgical Plant»
- Research institute «Ecran»
- JSC Aviakor
- JSC Concern AVRORA Scientific and Production Association
- JSC «Samara Bearing Plant
- LLC «EPK»

### OPERATION AND MAINTENANCE COMPANIES::

- international airport Kurumoch
- Aircompany «Volga-Dnepr»
- JSC Gazprom
- JSC Russian Railways

### INSTITUTIONS AND ORGANIZATIONS OF RUSSIAN ACADEMY OF SCIENCE:

- IPSI RAS
- Samara division of Lebedev Physical Institute
- Institute of complex systems control
- Samara research center
- Research Institute for Machine Science named after A.A. Blagonravov

### RUSSIAN STATE RESEARCH CENTERS:

- Central Aerohydrodynamic Institute
- All-Russian Scientific Research Institute of Aviation Materials
- Central Institutes of Aircraft Engines
- National Research Centre «Kurchatov Institute»
- Russian Federal Nuclear Center - The All-Russian Research Institute of Experimental Physics
- Krylov State Research center

## INTERNATIONAL PARTNERS

### USA

- Purdue University
- Ohio State University
- Alcoa Technical Center
- Worcester Polytechnic Institute

### GREAT BRITAIN

- Glyndwr University
- Bath University

### GERMANY

- Berlin Technical University
- University Stuttgart
- Laser Zentrum Hannover e.V. (LZH)

### FRANCE

- L'institut superieur de l'aeronautique et de l'espace (ISAE)

### CHINA

- Beijing Institute of Technology
- Harbin Institute of Technology

### ITALY

- Politecnico di Torino
- ### SWEDEN
- Lulee university of technology

### SWISS

- Progress Industrial Systems SA

### SPAIN

- Universida de Vigo

### KAZAKHSTAN

- Baiterek

### DENMARK

- A/S Haldor topsoe

### BELGIUM

- Lessius -Mechelen University College

### IRELAND

- Carlow University

### HUNGARY

- Budapest University of Technology and Economics





# SSAU TARGET MODEL BY 2020

## RESEARCH

ADVANCED AND APPLIED  
RESEARCH AREAS

**7** RESEARCH  
INSTITUTES  
WITHIN SSAU  
**10**

ADVANCED RESEARCH  
AREAS



**5**

SSAU SCIENTIFIC  
JOURNALS INDEXED  
BY WOS И SCOPUS

**5,5**

PUBLICATIONS CITED  
IN SCOPUS AND WOS  
PER 1 FACULTY

**34,2**

CITATIONS PER  
1 FACULTY MEMBER

## APPLICANTS MARKET

GRADUATES - SPECIALISTS  
WITH INTERDISCIPLINARY  
CORE COMPETENCIES

SSAU  
provides  
elite level  
training

**>5000**

ON-CAMPUS STUDENTS

**1500**  
MASTERS

**3000**

ADDITIONAL  
PROFESSIONAL  
EDUCATION COURSES  
STUDENTS

**23**

EDUCATIONAL COURSES  
IN ENGLISH

**13,5%**

ARE INTERNATIONAL  
STUDENTS

## IT STRUCTURE

GRID COMPUTING  
ENVIRONMENT



Constant  
expanding  
“Sergey  
Korolyov”  
supercomputer  
center’s capacity

**>1000+**  
TFlops

COMMON INFORMATION  
SPACE DEVELOPMENT

**25**

WORLD’S LEADING  
SCIENTIFIC AND  
EDUCATIONAL DATABASES

ELECTRONIC DISTANCE  
EDUCATION,  
MULTILINGUAL CONTENT

**15**

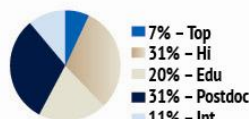
MOOC DEVELOPED  
AND DELIVERED BY SSAU

## PERSONNEL RESOURCE

TALENTED YOUTH  
RECRUITMENT

**11%**

SHARE OF INTERNATIONAL  
FACULTY AND RUSSIAN  
FACULTY HAVING  
INTERNATIONAL PhD



**90%**  
FACULTY LANGUAGE  
COMPETENCE

TRAINING HIGHLY  
QUALIFIED PERSONNEL  
ACCORDING  
TO RUSSIAN STANDARDS  
FOR POSTGRADUATE  
AND DOCTORAL DEGREE  
AND INTERNATIONAL  
STANDARDS FOR PhD  
DEGREE

**85%**  
ACADEMIC  
MOBILITY

**86%**  
OF THE FACULTY HAVING  
POSTGRADUATE DEGREES

**45 years**

IS AN AVERAGE STAFF AGE

## FACILITIES

TWO STAGE DEVELOPMENT



BUILDING OF A NEW  
DORMITORY ON THE  
TERRITORY OF CURRENT  
CAMPUS:

**510** VACANCIES  
FOR STUDENTS  
**180** FLATS FOR  
FACULTY



NEW CAMPUS  
IN TECHNOPOLIS

- Labs of international standards – total area – S 11 000 m2.
- Dormitories for students and postgraduate students. Housing for academic teaching staff – total area – S 18 000 m2.
- Hotel providing 250 rooms.
- Sociocultural and sport facilities – total area – S 32 500 m2.
- Congress-exposition hall – total area – S 70 000 m2.
- Technopark with an innovative technological center and innovative village.

## ECONOMIC AND FINANCE MODEL

INCREASING REVENUE  
UNDER EFFECTIVE  
MANAGEMENT

Project-  
oriented  
management  
system

**40%**

OFF-BUDGET REVENUE  
SHARE

**5**

BILLION RUB –  
TOTAL REVENUE

**250%**

AVERAGE FACULTY  
TEACHER INCOME  
AS REGARDS TO  
THE AVERAGE ONE  
IN THE REGION

**2**

RUB 2 MLN. R&D  
INCOME  
PER 1 FACULTY

COST OPTIMIZATION FOR  
INCREASING THE SHARE  
OF UNIVERSITY  
DEVELOPMENT FUNDING

## INFORMATION SUPPORT OF THE ACTIVITIES

SSAU IN THE INTERNATIONAL  
ACADEMIC AND  
PROFESSIONAL FIELD

Positioning  
of SSAU as the  
leading higher  
education institute  
in the Russian  
Federation

MULTILANGUAGE  
WEB-PORTAL  
RUSSIAN  
ENGLISH  
ESPAÑOL  
FRANÇAIS  
中文

**7000**  
VISITORS A DAY

**60 000**  
USERS IN SSAU'S SOCIAL  
MEDIA ACCOUNTS

**25**

INTERNATIONALLY  
RELEVANT EVENTS  
A YEAR, IN WHICH SSAU  
TAKES PART



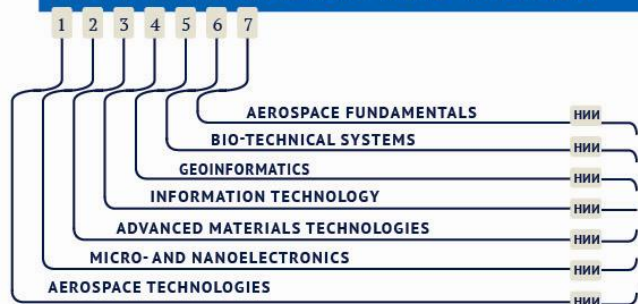
ANNUAL  
HOLDING  
OF ALUMNI  
CONGRESS



# RESEARCH MARKET

**5** BREAKTHROUGH  
RESEARCH  
AREAS

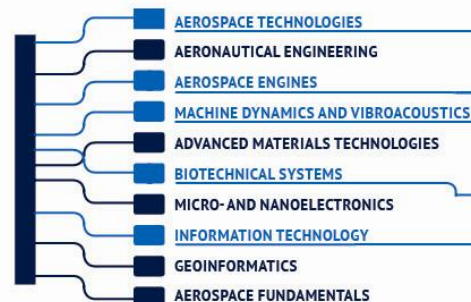
## 7 MAJOR RESEARCH INSTITUTES AT SSAU



WORLD-CLASS  
LABORATORY  
FACILITIES

10 ADVANCED  
RESEARCH  
AREAS

INTERNATIONAL  
EDUCATIONAL  
PROGRAMS



IMPLEMENTATION STAGES

2020

IMPLEMENTATION STAGES

STAGE I STAGE II

2013 2014 2015 2016 2017 2018 2019

KEY INDUSTRY SECTORS

ENGINE BUILDING

AUTOMOTIVE



AEROSPACE

AERONAUTICS

PETROLEUM INDUSTRY

RESEARCH  
RESULTS/  
PUBLICATIONS

**5,5**  
PUBLICATIONS  
PER 1 FACULTY

**34,2**  
CITATIONS  
PER 1 FACULTY

**5** SSAU'S OWN  
ACADEMIC  
JOURNALS,  
INDEXED  
BY WOS AND  
SCOPUS





# APPLICANTS MARKET



# 77

SSAU APPLICANT'S  
AVERAGE SCORE  
AT THE UNIFIED  
STATE EXAM

SSAU IMPLEMENTS ELITE  
TRAINING THROUGH RESEARCH

MORE THAN  
**5000**  
FULL-TIME  
STUDENTS

**1500**  
Increase of Master's  
students amount by **3 times**

BACHELOR'S	2400	STUDENTS
MASTER'S	1500	STUDENTS
SPECIALISTS (DIPL.ENG.)	1250	STUDENTS
POST-GRADUATE	700	STUDENTS

**+ 30000**   
CPE PROGRAMS STUDENTS

EDUCATION IS FOCUSED ON RESEARCH.  
OUTPUT - HIGHLY SKILLED PROFESSIONALS  
WITH INTERDISCIPLINARY CORE  
COMPETENCIES

**2020**

IMPLEMENTATION STAGES

2013 2014 2015 2016 2017 2018 2019

INTERNATIONAL  
APPLICANTS  
MARKET

**13,5%**

SHARE OF INTERNATIONAL STUDENTS

**23**  
EDUCATIONAL  
PROGRAMS DELIVERED  
IN ENGLISH

**15**  
MOOC DEVELOPED BY  
SSAU

**105**  
COURSES DELIVERED  
IN ENGLISH

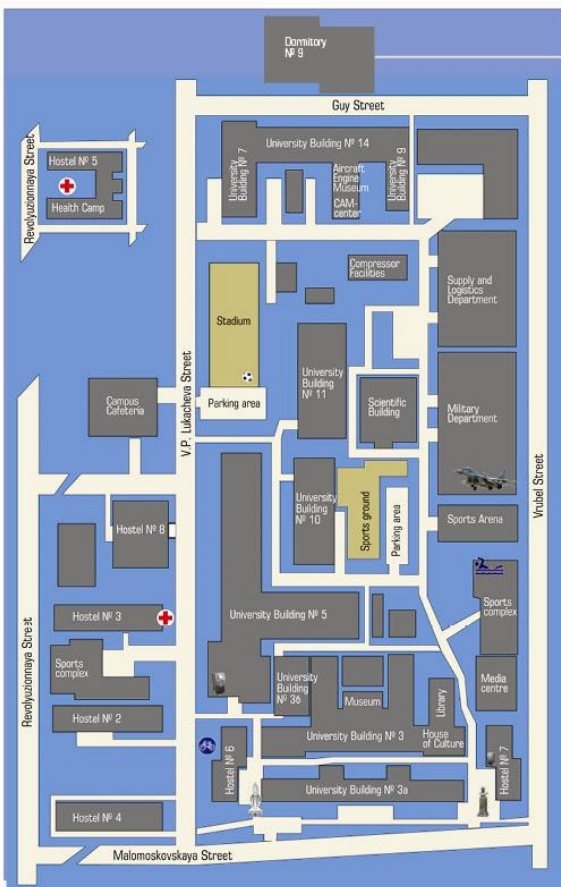




# FACILITIES

2013

SSAU CAMPUS,  
MOSKOVSKOE SHOSSE



## NEW LABORATORIES

- advanced materials technologies
- composite materials
- radio research laboratory, micro- and nano-electronics,
- geoinformatics, information security and telecommunication,
- IT-rechnology
- laser and bio-medical systems

## DORMITORY

Construction area – 4710,4 m<sup>2</sup>  
510 student capacity, including international students  
180 apartments for young researchers

AEROSPACE  
MUSEUM  
NAMED AFTER  
SERGEY P.  
KOROLEV



TRAINING  
AIRFIELD



THE HISTORY  
CENTER OF  
AIRCRAFT ENGINES  
NAMED AFTER  
NIKOLAY D.  
KUZNETSOV

2020

NEW SSAU CAMPUS  
IN TECHNOLIS

Technopolis next to stadium for World Cup

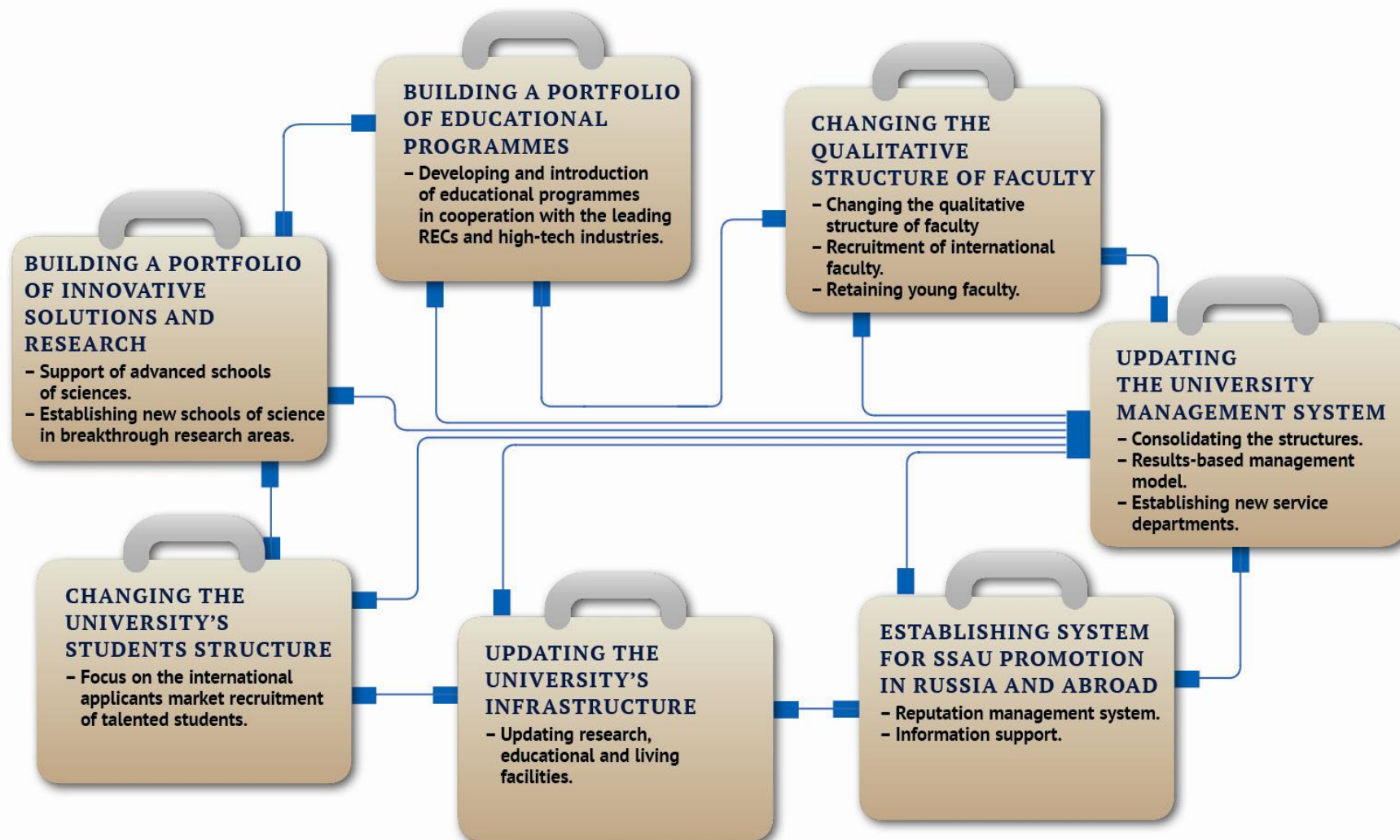






# ROADMAP 2013-2020

## ACHIEVING A SYNERGISTIC EFFECT THROUGH THE ARRAY OF INITIATIVES



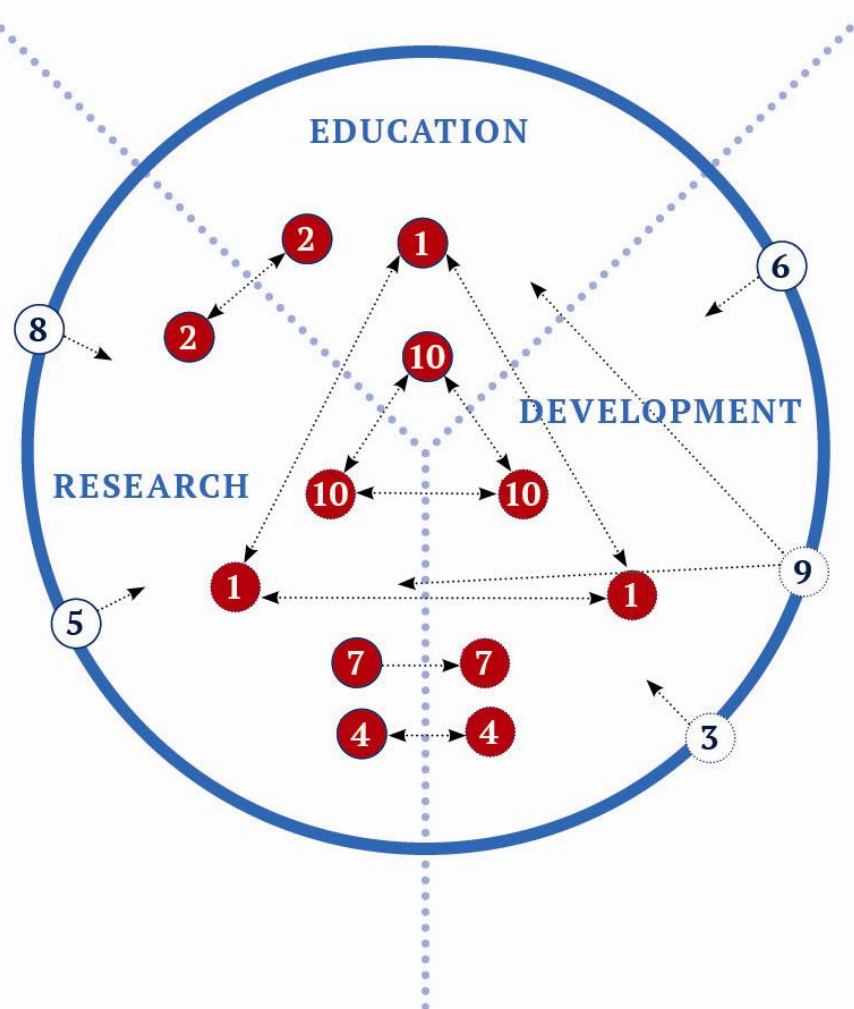




# AMBITION RADAR

## EDUCATION AND RESEARCH AREAS OF SSAU DEVELOPMENT

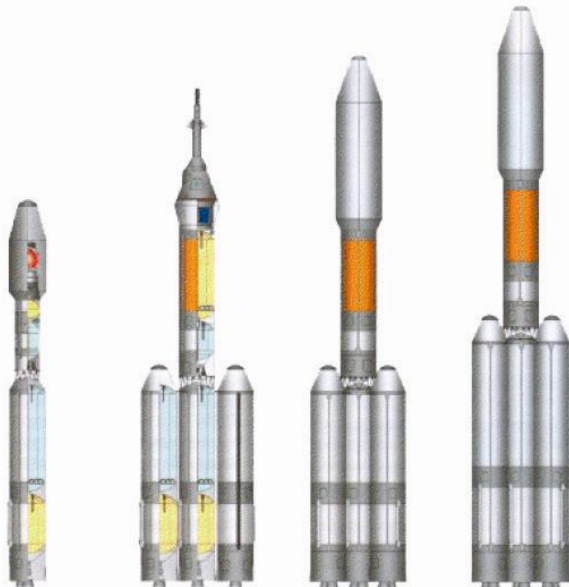
- 1 AEROSPACE TECHNOLOGIES
- 2 BIO-TECHNICAL SYSTEMS
- 3 ADVANCED MATERIALS TECHNOLOGIES
- 4 DYNAMICS AND VIBRO-ACOUSTICS OF MACHINES
- 5 AEROSPACE FUNDAMENTALS
- 6 GEOINFORMATICS
- 7 INFORMATION TECHNOLOGY
- 8 MICRO- AND NANO-ELECTRONICS
- 9 AERONAUTICAL ENGINEERING
- 10 AEROSPACE ENGINES





# AEROSPACE TECHNOLOGIES

## ADVANCED RESEARCH PROJECTS



**NEW GENERATION ROCKET CARRIERS DEVELOPMENT FOR SPACEPORTS: VOSTOCHNY, PLESECK – RUSSIA, BAIKONUR – KAZAKHSTAN, GUIANA SPACE CENTRE – FRANCE**



**SPACE TUGS WITH ELECTRIC JET ENGINES**



**HI-TECH ENGINEERING AND MANUFACTURING OF SMALL SPACECRAFT WITH RADIO AND HYPERSPECTRAL EQUIPMENT**



**ORBITAL SATELLITE CONSTELLATION BASED ON AIST PLATFORM FOR RESEARCH AND GENERAL APPLICATIONS  
DEVELOPMENT OF NANO- AND PICO-SATELLITES**



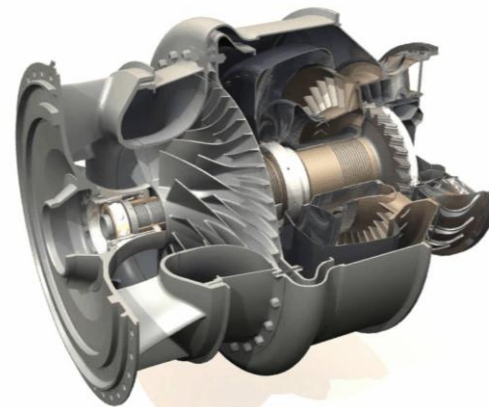
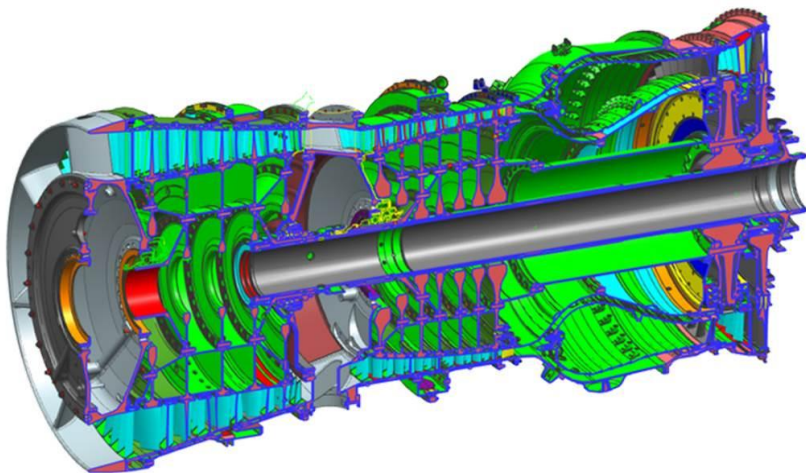
**EDUCATION  
PRACTICAL TRAINING,  
INTERNATIONAL AEROSPACE  
SUMMER SCHOOL**







# AEROSPACE ENGINES



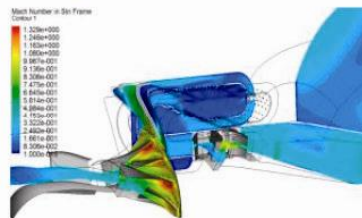
**COMPUTER MODEL  
FOR COMPLETE LIFE-CYCLE  
OF AIRCRAFT ENGINE**

## EDUCATION

**PROJECT-BASED APPROACH,  
INTEGRATED INTERDISCIPLINARY  
TRAINING AND EDUCATION THROUGH  
RESEARCH**

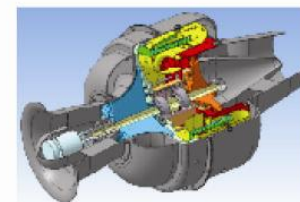


## ADVANCED RESEARCH PROJECTS



**COMPLEX DUAL PARAMETRIC  
SIMULATION OF ENGINE DESIGN  
AND MANUFACTURING PROCESS,  
GLOBAL OPTIMIZATION**

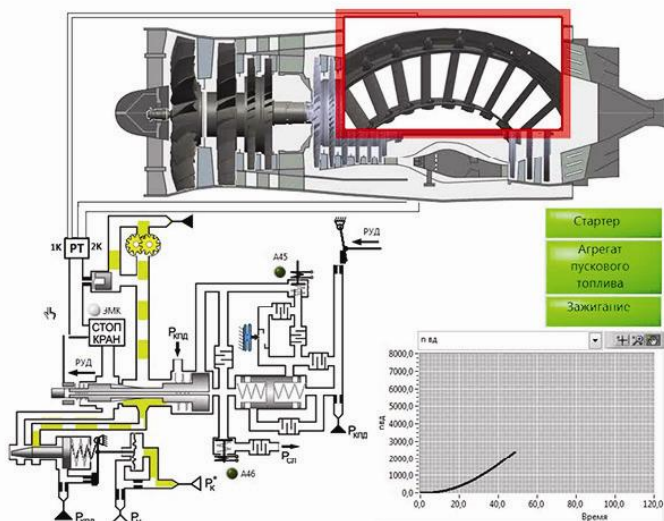
## DEVELOPMENT



**DEVELOPMENT OF EFFICIENT  
TECHNOLOGIES FOR AIRCRAFT  
ENGINES ENGINEERING AND HI-TECH  
MANUFACTURING**



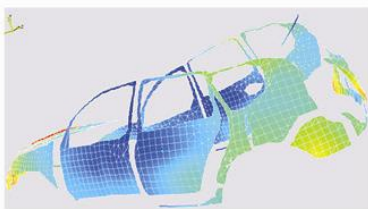
# MACHINE DYNAMICS AND VIBROACOUSTICS



COMPLEX SOLUTION OF MACHINE DYNAMICS AND VIBRO-ACOUSTICS ISSUES TAKING INTO ACCOUNT THE INTERACTION OF FLUID PULSATIONS, VIBRATION AND NOISE

## ADVANCED RESEARCH

NEW THEORY OF VIBRO-ACOUSTICAL PROCESSES CONTROL



## INNOVATIVE EDUCATION

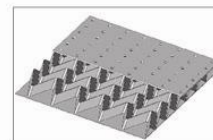
- EDUCATIONAL PROGRAMS BASED ON MULTILEVEL MODELING
- INTERNATIONAL ROBOTICS FESTIVAL



## DEVELOPMENT



- MODIFIED MATERIAL METAL-RUBBER MP



- VIBRO-ACOUSTIC PROTECTION EQUIPMENT

## POSITIONING

- INTERNATIONAL SCIENCE CONFERENCE "MACHINE DYNAMICS AND VIBRO-ACOUSTICS" (SCOPUS)
- FLUID POWER CENTER







# INFORMATION TECHNOLOGY



Samara. Kuybyshev square. Photo from space in honor of 50th anniversary of the first manned spaceflight with cosmonaut Yuri Gagarin aboard.

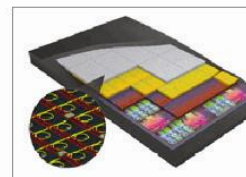


## RESEARCH

INFORMATION  
TECHNOLOGY,  
GEOINFORMATICS  
COMPUTER OPTICS  
AND NANOPHOTONICS



Spacecraft «Resource-P»,  
Samara, JSC Progress  
Launched on June 25, 2013



## DEVELOPMENT

### NANOPHOTONICS

Integrated electronic and nanophotonic  
components

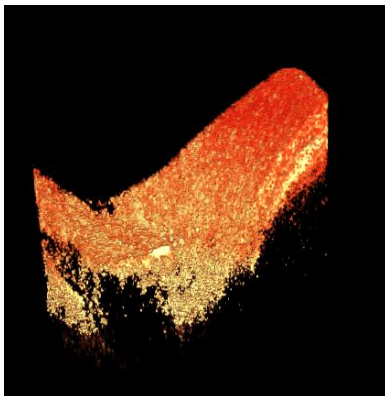
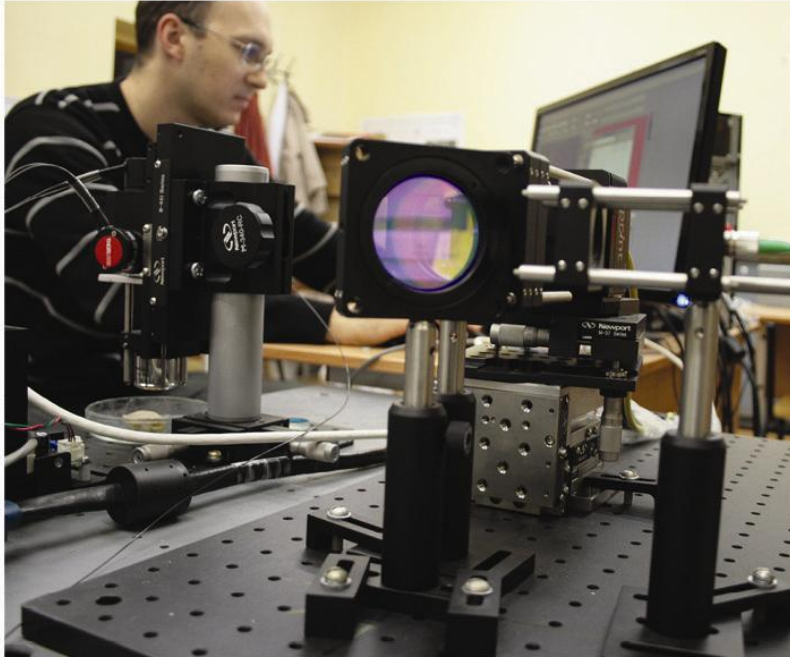


## ADVANCED RESEARCH

METHODS FOR BIG DATA MINING



# BIOTECHNICAL SYSTEMS



## EDUCATION

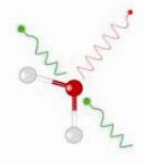
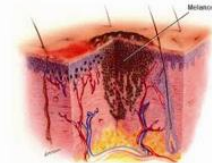
- INTERNATIONAL PhD PROGRAMME IN BIOPHOTONICS ON THE BASIS OF RESEARCH AND EDUCATION CENTERS OF SAMARA STATE AEROSPACE UNIVERSITY (RUSSIA), UNIVERSITY OF HOUSTON (USA), TECHNICAL UNIVERSITY OF DENMARK (DENMARK), UNIVERSITY OF OULU (FINLAND), UNIVERSITY OF OTAGO (NEW ZEALAND).

## RESEARCH

- RESONANCE RAMAN SPECTROSCOPY TECHNOLOGY FOR NON-INVASIVE TRANSCUTANEOUS ANALYSIS

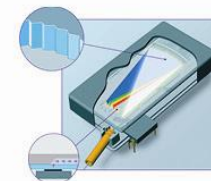
## ADVANCED RESEARCH

- CONTROLLED REGENERATION
- MULTI-FACTOR SCREENING AND REMOTE MONITORING OF HUMAN CANCERS



## DEVELOPMENT

- THE SYSTEM OF THREE-DIMENSIONAL VIRTUAL BIOPSY.
- NON-INVASIVE BLOOD ANALYSIS DEVICES.







# QUICK WINS

## LAUNCH OF SOYUZ ROCKET MODEL BY SSAU'S STUDENT AT BISCARROSSE (FRANCE)



## RECRUITMENT OF TALENTED POSTGRADUATE STUDENTS

- CONTRACTS WITH INTERNATIONAL RECRUITMENT AGENCIES (SPAIN)
- PROMOTIONAL TOURS IN LATIN AMERICAN COUNTRIES
- EDUCATIONAL EXHIBITIONS IN CHINA

- DATA SUBMISSION TO QS RANKING DATABASE
- ESTABLISHMENT OF UNIVERSITY'S ENGLISH WEB-PORTAL
- ESTABLISHMENT OF PRESS SERVICE, SOCIAL MEDIA PROMOTION
- STUDENTS TEAMS WIN INTERNATIONAL COMPETITIONS (THEORY OF MACHINES AND MECHANISMS, PROGRAMMING) INTERNATIONAL AÉROBIC CHAMPIONSHIP (SERBIA)



- AUTONOMOUS INSTITUTION
- SUPERVISORY BOARD
- INTERNATIONAL ADVISORY COUNCIL
- ESTABLISHMENT OF ENDOWMENT FUND

# 20%

- SSAU IS GUARANTEED ANNUAL FUNDING BY GOVERNMENT OF SAMARA REGION IN THE AMOUNT 20% OF THE OF THE FEDERAL SUBSIDY

UNIVERSITIES OF SAMARA REGION ARE PROVIDING SUPPORT FOR SSAU'S DEVELOPMENT PROGRAM

- ESTABLISHMENT OF ORBITAL AIST SATELLITE CONSTELLATION (APRIL, SEPTEMBER 2013) UNDER CONTROL OF SSAU MISSION CONTROL CENTER



INCLUSION OF RUSSIAN ACADEMY OF SCIENCES INSTITUTES IN SSAU STRUCTURE



THANK YOU FOR YOUR ATTENTION