SAMARA STATE AEROSPACE UNIVERSITY as

RESEARCH-EDUCATIONAL COMPLEX



Victor A. Soyfer

Rector of Samara State Aerospace University,

19% rural population. There are 11 cities and 27 districts in Samara region.





EDUCATIONAL CAPABILITY SSAU







Since 1942 till now more 50 000 people graduated from SSAU

There are at SSAU:

- > 10 faculties, 12000 students.
- > 28 specialties.
- Training for bachelor, master, Ph.D. academic degree obtaining.
- > 51 chairs, more 800 lecturers.
- 6 Members of Russian Academy of Science, 124 Doctors of Science, Full Professors.
- 440 Candidate of Science (Ph.D.), Associate Professors.
- **59** computer classrooms.
- 14 buildings with more 92000 sq. meters.
- Aviation and cosmonautics museum.
- Aviation engines history centre.
- Training airdrome
- 7 hostels and hotel.
- International aerospace Lyceum.





Annually SSAU graduates more 1000 specialists

Faculty of flying vehicles

(established in 1942)



Dean: Acc. Prof. Victor K. Moisseyev

 Specialties – 8; Students – 1600; Among 187 lecturers are 3 Corresponding Members of Russian Academy of Science, 34 Full Professors, 105 Acc. Professors.

• Set of specialties comply with the steps of creation a flying vehicle: research, designing, manufacturing, quality control, certification.

Faculty has

10 chairs; 3 research institutions; 9 research laboratories; wind tunnel; 16 training laboratories,
 9 computer classrooms: hangars with aviation and space-rocket real samples.

• The modern CAD/CAM/CAE systems and CALS technology are used in training.

Faculty of flying vehicle engines

(established in 1942)



Dean: Prof. Alexander I. Ermakov

- Specialties 5; Students 1400; Among 140 lecturers are 1 Academician of Russian Academy of Science, 33 Full Professors, 71 Acc. Professors.
- Training in areas: aircraft engines and power plant units; rocket engines; laser systems; hydraulic machines, hydraulic drives and hydro-pneumo-automation.



Faculty has

• 7 chairs; 1 research institution; 9 research laboratories; 30 training laboratories, 15 computer classrooms; Centre of aviation engines history.

• The modern ADEM, AutoCad, ANSYS, NASTRAN, SolidEdge, Unigraphics and other systems are used in training.

Faculty of air transport engineers

(established in 1949)



Dean: Acc. Prof. Aleksey N. Tikhonov

o Specialties – 3; Students – 800; Among 117 lecturers are 4 Full Professors, 42 Acc. Professors.

o Training in areas: Airplanes and engines technical maintenance; Maintenance of aircraft power system and piloting-navigational complexes.

Faculty has



o 5 chairs; 4 research laboratories; 8 training laboratories, 4 computer classrooms; training airdrome with aviation real samples and real airplanes.

Faculty of plastic working of metals

(established in 1958)



Dean: Prof. Vladimir R. Kargin

o Specialties – 2; Students – 750; Among 58 lecturers are 12 Full Professors, 38 Acc. Professors.

o Training in areas: pressure treatment of metals; machines ant technology of metal plastic working.



Faculty has

o 4 chairs; 1 research institution (Volga branch of the Metallurgical institute Russian academy of science); 4 research laboratories; 6 training laboratories, 2 computer classrooms.

o The modern CAD/CAM/CAE systems and CALS technology are used in training.

Faculty of radio engineering



Dean: Acc. Prof. Yuri F. Shirokov

Specialties – 4; Students – 1200; Among 89 lecturers are 14 Full Professors, 65 Acc.
 Professors.

 Training in areas: radio engineering; design and technology of radio-electronic devices; consumer radio-electronic equipment; biotechnical and medical devices and systems.

Faculty has

• 7 chairs; 1 research institution; 4 research laboratories; 24 training laboratories, 3 computer classrooms.

Faculty of information science

(established in 1975)



Dean: Prof. Sergey A. Prokhorov

Specialties – 4; Students – 1100; Among 104 lecturers are 1 Corresponding member of Russian Academy of Science; 15 Full Professors, 64 Acc. Professors.
Training in areas: physics; applied mathematics; applied physics; automated systems for information processing and control.



Faculty has

5 chairs; 1 research institution; 2 research laboratories; 7 training laboratories, 10 computer classrooms.

Faculty of economics and management

(established in 1993)



Dean: Prof. Victor G. Zaskanov

- Specialties 1; Students 1400; Among 112 lecturers are 10 Full Professors, 56 Acc.
 Professors.
- Training in areas: management; . management psychology; banking; audit.



Faculty has

6 chairs; 3 computer classrooms



Evening Faculties on the plants of aerospace industry

(established in 1956)



- Faculty of aircraft engines at Corporation "Samara research-technical complex named after N.D. Kuznetzov".
- Faculty of aviation technology and management at Corporation "Samara metallurgical plant".





S&T library with intercollegiate media center

Information-consulting center which services students, teachers, engineers, scientists, administrative personnel of educational organizations by way of consolidation of information resources and technologies from higher education institutions of Samara region

Specifications

- Area 4000 sq.m
- Computer number 300
- Channel capacity 1 Gigabit per second (inside), 10 Megabit per second (external)
- Visitors 2000 persons per day
- Possible users 140,000 persons

Now available resources

- Regional net for science and education
- Corporative net in SSAU
- E-resources catalog, databases
- > Samara virtual University
- E-teaching technologies, system "Complex of automated didactic means (KADIS)"





Partners

- Information centers and libraries of Russia: SSC RAS library, GPNTB, VINITI, INION, BEN RAS, RFFI, GPNTB SO RAS, RNB, RGB, MCNTI
 - Associations, consortiums: EBNIT, ARBIKON, MARS, RKP and others.
 - Foreign information systems: EBSO, JSTOR and others.

Student scientific creative work

is the basis of successful career

Research job of students makes for Samara region industrial enterprises.

Student scientific and technical conference takes place annually at SSAU, where inside 42 sections more 1000 reports are represented. Since 1991 SSAU organize Conference of young scientists "Korolev's seminar" in that participate more 20 University of Russia.



Number of reports at "Korolev's seminar"

Student participation in Conference in another cities of Russia

- Moscow
- Sankt-Petersburg
- Penza
- Ekaterinburg
- Sudak
- Taganrog
- Krasnoyarsk
- Tomsk
- Kazan
- Ufa







Student research society (SRS) is creative laboratory in which the bold ideas and projects are realized

University SRS join the students who carry out the researches and include student design bureaus, creative laboratories and research groups at chairs and faculties.

Under the direction of University scientists students create the project of airplanes and spacecrafts, test benchs and devices for space exploration, develop the software for multimedia and CAD systems.

NAME SCHOLARS

- 91 students are the name scholars:
- 7 from Council of University
- 4 named after P.Alabin
- 2 from President of Russia
- **3** from Russian Government
- 20 from Potanin fund
- 2 from Boeing company
- 53 from industrial enterprises







Post-graduate study (Ph.D. degree obtaining)

Areas of training

- Theoretical mechanics
- Solids mechanics
- Fluid, gas and plasma mechanics
- Dynamics and strength of machines, devices and equipment
- Radio-physics
- Condensed state physics
- Thermal physics and theoretical heating engineering
- Electro-chemistry
- Engineering science, driving gear systems and machinery
- Mechanism and machine theory
- Standardization and quality control
- Technology and enginery for mechanical and technical treatment
- Aerodynamics and heat exchange of flying vehicles
- Designing, structures and manufacturing of flying vehicles
- Strength and thermal conditions of flying vehicles
- Thermal, electric propulsion and power plant units of flying vehicles
- Checkup and testing of flying vehicles and its systems
- Dynamics, ballistics and movement control of flying vehicles
- Information-measuring and control systems
- Systems, networks and devices for telecommunication
- Elements and devices of computer engineering and control systems
- CAD systems
- Mathematical modeling, numerical methods and software
- Physical metallurgy and thermal processing of metals
- Metal plastic working
- History of Russia
- Mathematical methods in economics

Number of post-graduate study graduates





Russia-USA Program "Basic Researches and Higher Education"

Research Educational Center (REC) for Mathematical basis of diffraction optics and image processing



Scientific publication of REC during 2002-2005

- > Total number 373
- > All-Russia conferences 201
- > International conferences 33
- Russian journals 12
- Foreign journals 13



Research Educational Center (REC) Personnel



The main research areas at SSAU











 Aerodynamics, Flight dynamics, Designing and manufacturing technology of aviation and space flying vehicles.

- Structure, airborne system and equipment of flying vehicles.
- Theoretical and experimental researches of flying vehicle engines.
- Modeling and designing in propulsion engineering.
- Internal-combustion engines.
- Special materials for propulsion engineering.
- Manufacturing technology, systems, units and aggregates of engine.
- Manufacturing technology of machine parts and units.
- Laser technology. Electronic-ionic-plasma technology.
- Pressing, agglomeration and stamping parts from powdered material.
- Surface treatment by plastic deforming.
- Mathematical and cybernetic methods in mechanical engineering.
- Protection from noise, vibration, electrical and magnetic field and radiation.
- Complex and special areas of mechanics.
- Units, parts and elements of radio-electronic equipment.
- Inorganic catalysts.
- Medical devices and measuring systems.
- Bio-electronic and mechanical system for stimulation of human organs and tissue.
- Image processing and computer optics.
- CAD systems.
- Computer network, telecommunication systems, information systems.











Lower RAS organizations, created on the SSAU base

Image Processing Systems Institute of RAS





Volga Branch of Metallurgy Institute of RAS







S&R Institute for Machine Acoustics





S&R Institute for Technology and Quality

Problems







Director, Corr. Member RAS Soyfer V.A.



Director, Professor Grechnikov F.V.



Scientific Supervisor, Academician Shorin V.P.





Director, Corr, Member RAS Barvinok V.A.







Innovation activity

S&T Park "AVIATEKCHNOKON"



Regional S&T Park



SSAU objectives in area of intellectual property

control and technology transfer

- Stimulation of researches in science and technology development
- Definition of high priority directions in specific kinds of industry
- Defense of intellectual property of SSAU and STC
- Stimulation of small business enterprise creation
- Embedding science development into industry
- Organization of student's practice in area of technology transfer
- Help in certification procedure
- Teaching center creation for preparing specialists in area of technology transfer



Participation in regional and inter-institutional Programs for Samara region

1991 – 1996 Samara conversion





Cooperation between Russian Ministry of Education and OAO "AVTOVAZ" in Program "Research-Innovation Cooperation"

The main areas of activity

- Engineering personnel training on the basis of University-"AVTOVAZ" system
- > Development of perspective cars, units, systems
- Creation of new materials and technologies for motor-car construction
- Increasing of production efficiency
- Development and implementation of energy-efficient technologies and increasing of ecological production safety
- Quality system and production certification
- Management improvement and CALS technology embedding

Some results 2002-2004

- > Number of project-winners 97
- Number of Universities-participators (in Program) 43
- > Number of Federal Districts-participators (in Program) 7
- Amount of financing 38 100 000 rubles







Cooperation SSAU with RAS organizations within Program "Federating of science and higher education in Russia"

Some totals 1997-2005





- Personnel: 1 academician RAS, 3 corresponding members RAS, 27 Doctors of Science
- Amount of financing: 8.5 millions rubles for S&R plus 35 millions for building
- Graduated: 700 students, 36 post-graduates, 11 persons working for doctor's degree
- Dissertations defended: 14 for doctoral degree; 34 for Ph.D. degree
- Published: 13 monographs and 29 school-books
- Developed: 9 scientific-teaching test-benches
- 10 international and 8 All-Russian conferences were organized
- Corporative computer's net with Internet access and the Center of High-Speed Calculations was created
- 8 divisions were provided with equipment for video-conference
- The new part of building #14 was put in commission
- The new building for library and intercollegiate media center

Scientific-teaching complexes

- Computer optics and image processing
- Dynamics of Hydro-gas systems
- Aerodynamics
- Bio-technical systems











International Cooperation





The main partners

- Harbin University of Technology (China)
- Beijing University of Technology (China)
- Beijing Aerospace University (China)
- Taiyuan Institute of Technology (China)
- North-West Institute of Technology (China)
- Bradley University (USA)
 - Purdue University (USA)
 - High School of Aeronautics ENSICA (France)
 - High Polytechnic School (France)
 - European Society of Jet Propulsion (France)
 - Aerospatiale (France)
 - Technical University Stuttgart (Germany)
- Technical University Munich (Germany)
- Oxford Broocs University (GB)
 - Cranfield University (GB)



SSAU participated in International Programs

- > INTAS: Conversion in CIS and Great Britain
- > TEMPUS-TASIS: Period of transition in regional economics
- TASIS-ACE: Joint enterprises in aviation industry conversion
- NATO-grant: Network infrastructure
- Columbus-500 Project
- CRDF-grant: Research-educational centre "Mathematical basis of diffraction optics and image processing"
- CRDF-grant: Samara innovation-research centre for development and research of magnet-pulse technology



International Contracts



International Contracts

International Contracts have been completed with firms from Italy, Finland, USA, France, China, Lithuania, Latvia, Ukraine.



Automated system and devices for liquid pollution control Are used in aviation, motor-car, ship-building industry.

Plastic deforming technology



New complex of magnet-pulse technologies for sharing, forming, calibration, assembly, welding.

The contracts with FIAT (Italy), VTT Technology Manufacturing (Finland), China Chang Feng Mechano-Electronic Engineering Academy, China National Precision Machinery Import and Export Corp. (China) are completed.

Elastic metal-plastic bearings

Are embedded:

In 41 power stations in China In 3 power stations in Czechia In 3 power stations in Vietnam In 1 power stations in Sweden



"Capitan" – four-seating twin-engine general-duty amphibian

"Capitan" is very successful realization of the "Flying Jeep" concept. It has low maintenance charges and high reliability, simple maintenance and absence of parking problem.

"Capitan" can be both the comfortable yacht and dutiful "air worker".

"Capitan" is made from modern composite material and has high strength, corrosion resistance and durability.





Specification

PASSENGERS, PERSONS	4
CREW, PERSONS	12
ENGINE	2 * Rotax-912ULS
CAPACITY, H.P.	2 * 100
TAKE-OFF MASS, KG	1100
PAYLOAD, KG	300
LANDING SPEED, KM/H	75
CRUISING SPEED, KM/H	180
MAXIMUM SPEED, KM/H	200
RANGE ABILITY, KM	ДО 1000
TAKE-OFF RUN, M	50150
RATE OF CLIMB (VERTICAL SPEED), M/SEC	ДО 5
MAXIMUM WAVE HIGH, M	0,6

"Skeef" – two-seater ultra light all-purpose airplane



Airplane destination

- Training
- Patrol of power line, gas- and oil-pipe line
- Tourism, sport, recreation and entertainment
- Chemical treatment of agricultural land





Specification

LENGTH, M	6,38
нідн, м	2,675
WING AREA, M ²	13,52
EMPTY MASS, KG	400
OPERATING OVERLOADING	+4 / -2
ENGINE	SUBARU EA-82
CAPACITY, H.P.	100
FUEL: TYPE/CONSUMPTION, LITER/H	A95 / 10
MINIMUM SPEED, KM/H	70
CRUISING SPEED, KM/H	150
MAXIMUM SPEED, KM/H	200
RATE OF CLIMB (VERTICAL SPEED), M/SEC	5
VOLUME OF CHEMICAL TANK, LITER	200
WIDTH OF CHEMICAL TREATMENT STRIP, M	25

"Crechet" – two-seater ultra light all-purpose airplane



Airplane destination

- Training
- Patrol of power line, gas- and oil-pipe line
- Tourism, sport, recreation and entertainment
- Chemical treatment of agricultural land





Specification

LENGTH, M	6,38
нідн, м	2,675
WING AREA, M ²	13,52
EMPTY MASS, KG	360
OPERATING OVERLOADING	+4 / -2
ENGINE	Rotax-912ULS
CAPACITY, H.P.	100
FUEL: TYPE/CONSUMPTION, LITER/H	A95 / 15
MINIMUM SPEED, KM/H	70
CRUISING SPEED, KM/H	150
MAXIMUM SPEED, KM/H	200
RATE OF CLIMB (VERTICAL SPEED), M/SEC	5
RANGE ABILITY, KM	450
MAXIMUM ALTITUDE, M	4500
VOLUME OF CHEMICAL TANK, LITER	190
WIDTH OF CHEMICAL TREATMENT STRIP, M	22