

SKOLKOVO

Innovation support and
opportunities for cooperation

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Advanced industrial technology cluster



VISION, MISSION AND TARGET RESULT OF THE SKOLKOVO FOUNDATION

The mission, vision and target result of the Foundation by 2020 determine the key direction of development

VISION

Russia is a technological power, a leader in the field of scientific research and education

MISSION

Create an innovation ecosystem favorable to entrepreneurial and research activities in the following areas:

- energy efficiency and energy saving;
- nuclear technologies;
- space technologies;
- biomedical technologies;
- computer technologies and software development.

TARGET RESULT

Self-developing innovation ecosystem, facilitating the creation of jobs at new companies and attracting talented people

The project is now focused on self-development and unlocking of the ecosystem's commercialization potential

Creation and development of a critical mass of the key elements of the innovation ecosystem

Further development of the innovation ecosystem's key elements, including development and implementation of turnover mechanisms within elements as well as ensuring their integration and interaction

Transition to self-development; unlocking the ecosystem's commercialization potential

2010

2011

2012

2013

2014

2015

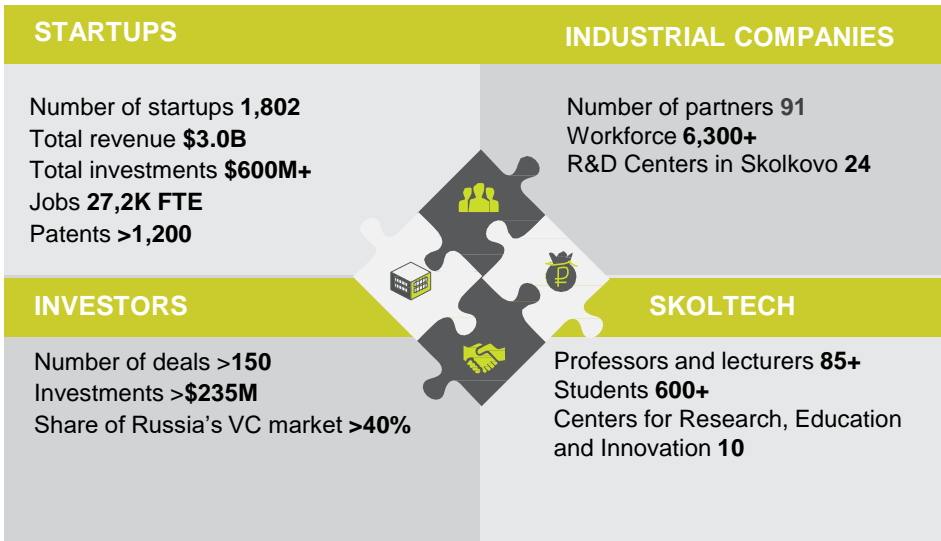
2016

2017

2018

2019

2020



Innovation city and physical infrastructure

- Technopark Skolkovo – the largest technology park in Europe has opened
- The residential areas have been put into operation, the first residents have received keys
- **2.6M** sq. m. of total space, currently over **700,000** sq. m. are complete

Technopark service infrastructure

- **40** service providers in Skolkovo Technopark
- By January 1st, 2018 more than **300** startups have already reallocated or planning to move to Skolkovo Innovation center.
- Over **20** th. sq. m. of office and laboratory facilities in the Technopark Skolkovo complex of buildings

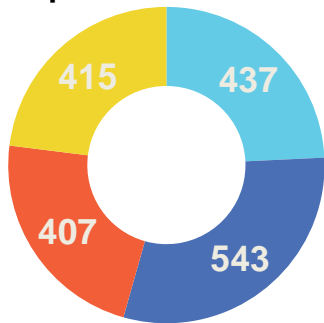
Skolkovo Intellectual Property Center

- Over **1,670** applications, including more than **300** international applications submitted through Skolkovo IP Center
- More than **120** transactions of Skolkovo startups with an estimated value of over **\$60M** supported in 2014-2016
- The Skolkovo Foundation has the status of an Official Observer at the UN WIPO

Skolkovo Ventures Venture Investments

- Three venture funds launched in partnership with RVC:
 - High-tech
 - IT
 - Biotech
- More than **\$200M** of assets under management

Total number of Skolkovo startups
1 802



Over **40%** of Skolkovo startups reported revenue in 2016
Every **22nd** of them reported revenue of over **\$1.5M**

Over **160** Skolkovo startups reported international sales

Every **5th** startup submitted an application for IP registration, every **11th** obtained a patent or license

Acceleration programs, including foreign accelerators

Skolkovo mentorship panel development

Cooperation with industrial partners, including development of demand for innovative technologies

Improving quality of Skolkovo startups

Research activity is monitored regularly, and **417** startups have lost their Skolkovo status for failure to comply with the requirements for resident startups

Regular monitoring of procedures of startups receiving grants

The technical and business expertise of the expert panel is updated and enhanced

Instruments to ensure quality and transparency of the process

- **random sampling** of independent experts
- **formalization of procedures**
- **publication of results** on the foundation website

Average period of application review	33 days
Total number of applications reviewed	Over 10,000
Total number of startups that obtained status	Over 2,000

The process of becoming a Skolkovo startup



Skolkovo board of experts

1. Collegial character

Over **700** experts are included on the expert board, **30%** of them are foreign specialists

2. Competence

- 1 Nobel laureate
- About **15** members of the Russian Academy of Science
- Over **250** professors of leading Russian universities
- Over **100** DScs and PhDs of foreign universities
- Over **150** top managers and founders of companies

3. Independence

Experts are not employed by the foundation, and their identity is not disclosed to applicants or to foundation employees working with applicants.

FINANCIAL SUPPORT

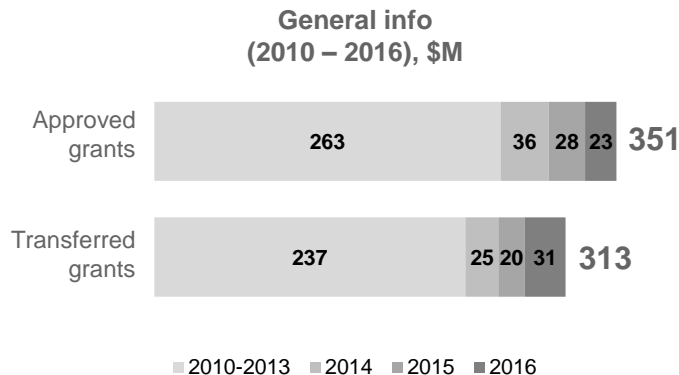
- 1 Support of attraction of venture financing:**
 - Venture Funds and Business Angels community development
 - Development of materials for professional investors
 - Facilitation of investments from professional investors
- 2 Grant financing:**
 - Non-repayable financing
 - The foundation provides micro-grants (up to \$20,000) for local tasks, mini-grants (up to \$70,000) for the base-phase of the project and grants (up to \$4M) for R&D, provided that the startup attracts co-financing of 25% to 75%, depending on the project stage and grant amount
- 3 Tax and customs benefits:**
 - Insurance premiums - **14%**
 - Profit tax – **0%**
 - Exemption from VAT
 - Property tax – **0%**
 - Reimbursement of customs payments



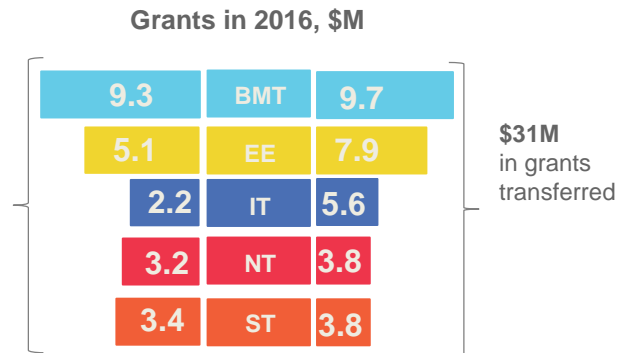
NON-FINANCIAL SUPPORT

- 4 Acceleration services:**
 - Mentorship program
 - Support of commercialization
 - Marketing support
 - Acceleration programs in Russia and abroad
- 5 Intellectual property protection:**
 - Patenting in Russia and abroad
 - Patent search and development of patent landscapes
 - Legal support in complex deals related to the registration, protection, use and transfer of IP rights
- 6 Access to office and laboratory infrastructure:**
 - R&D infrastructure of Skoltech and shared resource centers
 - Lease of offices and co-working spaces
- 7 City services:**
 - Lease of residential facilities
 - Medical services
 - Pre-school and school education

Over 1000 grants worth a total amount of more than \$350M were approved, \$320M was transferred to the startups



\$23.1M
in grants
approved



Total number of approved grants is over **1000**:
200+ grants
250+ minigrants
600+ microgrants

The share of private financing for the entire period is **65%**:
 2015 – **84%**
 2014 – **80%**
 2013 – **62%**

The total number of grants approved in 2016 was **453** (**37** grants and **416** mini- and microgrants)
 In 2015 Skolkovo launched a new system of financing for the startups, **microgrants**, to finance the following activities:

1. IP Protection
2. Prototyping
3. Testing
4. Participation in exhibitions and conferences



There are 40 shared resource centers accredited across Russia

In 2016-2017, **220+** research orders were carried out in the following areas:

- prototyping;
- metrological services;
- biomedical services;
- testing.

Examples of orders fulfilled by Technopark shared resource centers for Skolkovo startups



The InCata laboratory developed an industrial design and manufactured prototypes of lidars for 3 different types of use (vehicles, service robots and UAVs).



The Karfidov Lab engineering center created an industrial design for a 3D graphite printing device called CarboPrint. Visualization and renders were used by the startup to attract investors and potential customers.

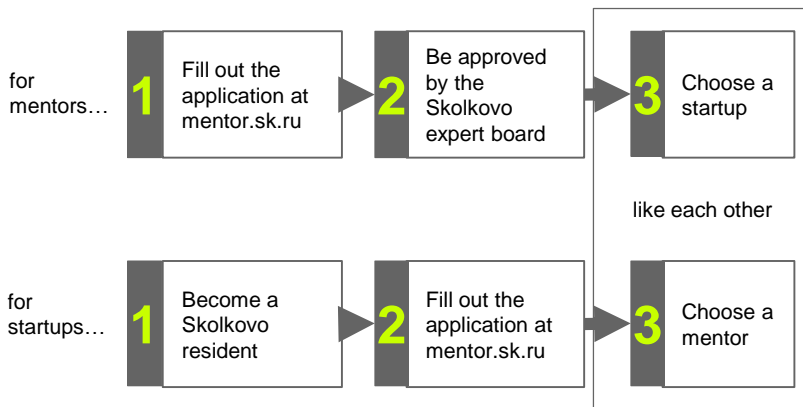


Development of design and manufacturing of a prototype of a machine with numerical program control based on ultrasound positioning technology.

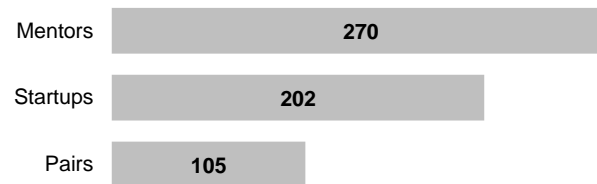


- The program was launched in July 2014
- Over **270** mentors and over **200** startups are taking part in the program, there are **100+** mentor and protégé pairs
- First success stories achieved

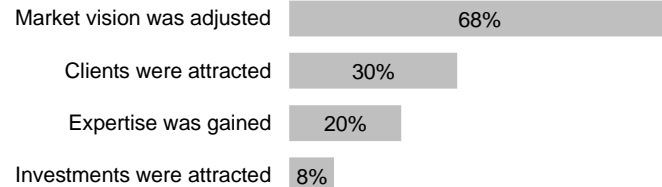
Skolkovo mentorship program: 3.5 steps to success



Critical mass of mentors and startups formed:

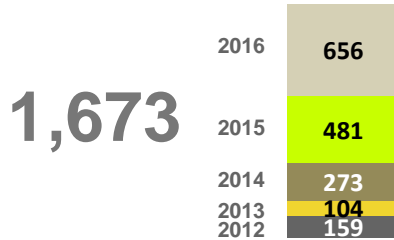


Key results of a survey of startups:

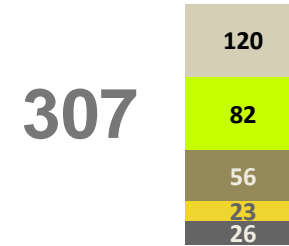


The Skolkovo Foundation has observer status with the World Intellectual Property Organization (WIPO).
A WIPO representative office operates at the Skolkovo Innovation Center

Number of IP applications submitted through the Skolkovo IP Center



Number of international IP applications submitted through the Skolkovo IP Center



The patent school is the first face-to-face course in Russia on patenting and IP protection. Over **600** students participated in the first event.

In 2014–2016, over 100 transactions of Skolkovo startups with a total value of \$60M were supported by Skolkovo IP Center lawyers



ATTRACTION OF INVESTMENT: SKOLKOVO INVESTMENT COMMUNITY

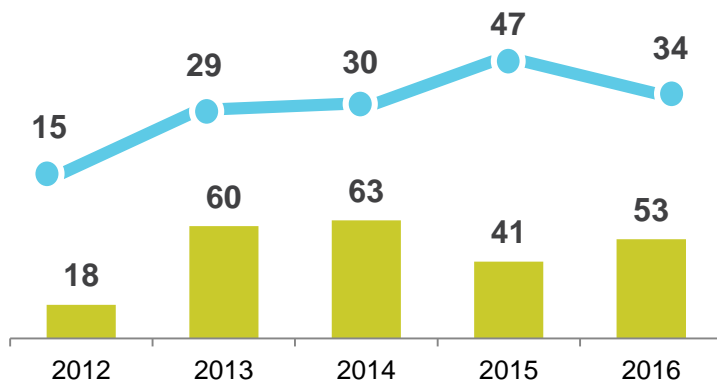
41% of Russia's VC market is related to Skolkovo startups

>150 venture deals were closed in 2012-2016

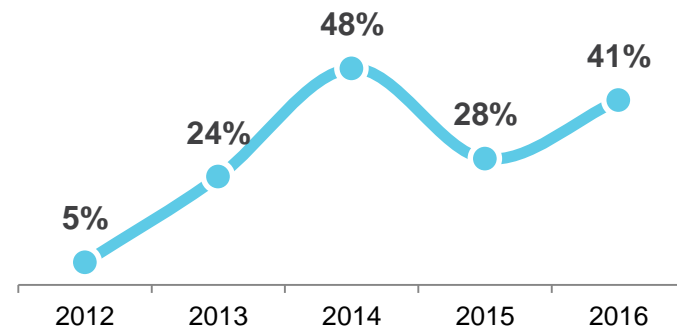
>\$230M in investment from venture funds was attracted in 2012-2016

Investments in Skolkovo startups, \$M

Volume of investment
 Number of deals



Skolkovo startups' share of the Russian VC market, %



Skolkovo Ventures is a full-scale investment management platform for raising capital, managing VC funds, founding and marketing new financial products for rapidly growing high-tech companies.

KEY AREAS OF DEVELOPMENT

Venture Funds Management (Buy-side)

- Three venture capital funds have been formed in the following areas: High-tech, IT, and Biotech for investments in Skolkovo and NTI projects
- The funds are co-managed by leading venture teams
- Over **\$100M** under management
- Target stages of development: Round A and B, average size of investment – \$15-30M

Attraction of investments to start-up companies (Sell-side)

- Providing services on a turn-key basis: from creation of an investment strategy and materials to marketing, support of negotiations and closing of the transaction.
- As of the end of 2016, the volume of investments attracted by Skolkovo companies accounted for **1/3 of the entire venture market of the Russian Federation**. The investment service's direct share accounts for **8%** of the market.

Ecosystem support

- Mentoring of projects and development of investment materials
- Participation in the development of a legal and regulatory framework, promotion of new financial instruments

Over 6,300 researchers will work in the R&D centers of Skolkovo's industrial partners in 3 years

Role of industrial partners in the Skolkovo ecosystem – examples:

- 11 TOP-20 Russian corporations (Gazprom, Lukoil, Rosneft, RZD, Sberbank, AFK Systema, Rosseti, Tatneft, InterRAO, Transneft, Severstal, Rostech) have implemented innovations developed by Skolkovo companies.
- 5 TOP-10 global pharma companies (Pfizer, J&J, Sanofi, Medtronic, Roche) have invested in Skolkovo startup projects
- 3 Skoltech CREIs were created with the support of large industrial companies, including Rosatom, RSC Energiya, Gazpromneft, Rushydro, Rosseti, Tatneft, Russian Helicopters.
- Over 20 competitions for innovative projects were supported financially by industrial partners



INTERNATIONAL EXPOSURE OF SKOLKOVO



>25 international industrial partners
>200 startups participated in international events

More than 20 international conferences and exhibitions

More than 1000 international applications filed by startups in 2014-2017
Over 150 patents obtained abroad

- **85+** full-time professors, lecturers, guest and associate professors (200 professors by 2020)
- **600+** masters and post-docs (1,200 by 2020)
- **67%** of students are involved in the development of innovation projects and startups
- **17%** of students are international;
- **60%** of professors and lecturers are from foreign countries



- **Research:** 10 Centers of research, innovation and education (CREIs) have started their operations
- **4.4** publications indexed in Scopus / Web of Science per 1 profession, which is comparable to benchmarks of leading institutions
- **Education:** 15 education programs; 4 innovation programs
- **Industry:** 15% of all Skoltech expenses are covered by external non-governmental sources.

Russian partners of CREIs



- Biomedicine and biotechnology
- Infectious diseases and functional genomics
- Electrochemical energy storage
- Energy Systems
- Designing, manufacturing technologies and materials
- Hydrocarbon recovery
- Photonics and Quantum materials
- Big data
- Space
- Advanced Studies

International partners of CREIs



KEY BUILDINGS



- Apartments
- R&D facilities
- R&D Centers
- Social infrastructure
- Retail
- Transport infrastructure


1



MATRYOSHKA COMPLETED

Area:
30,000 sq. m.

2



TECHNOPARK COMPLETED

Area:
95,000 sq. m.

3



APARTMENTS COMPLETED

9 - 11

Area:
51,000 sq. m.



YEAR OF COMPLETION

2016

2017

4



FAMILY CAMPUS

YEAR OF COMPLETION:
2017

Area:
22,000 sq. m.



5



PROFESSORS' QUARTER

YEAR OF COMPLETION:
2017

Area:
10,000 sq. m.



6



SKOLTECH

YEAR OF COMPLETION:
2017

Area:
140,000 sq. m.



7



GALLERY

YEAR OF COMPLETION:
2017

Area:
78,000 sq. m.



8



KEY PARTNERS' ZONE

YEAR OF COMPLETION:
2017

Area:
126,000 sq. m.



OFFICES AND R&D CENTERS OF INDUSTRIAL PARTNERS



1 **TECHNOPARK OFFICE CENTER**

43,000 sq. M. **2014-2015**

2 **RENOVA**

27,000 sq. M. **2016**

3 **MATRYOSHKA**

30,000 sq. M. **2016**

- 7** **SBERBANK DATA CENTER**
37,000 sq. M. **2018-2019**
- 8** **TMK**
15,000 sq. M. **2018**
- 9** **TATNEFT**
10,000 sq. M. **2017**

4 **BOEING**

5,000 sq. M. **2016**

5 **KEY PARTNERS (CISCO, IT-CLUSTER)**

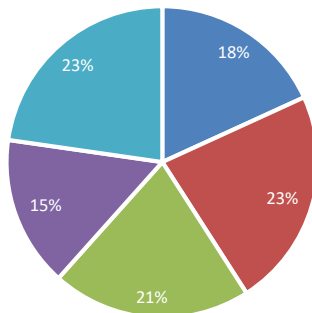
83,000 sq. M. **2017**

6 **GALLERY**

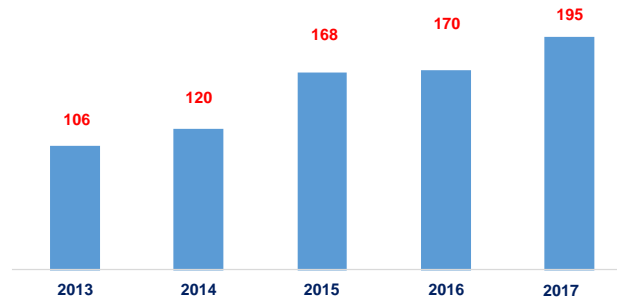
78,000 sq. M. **2017**

- Space Technology - 36
- Space Applications - 45
- Aviation - 41
- New Materials and components for aerospace - 31
- Telecom - 45

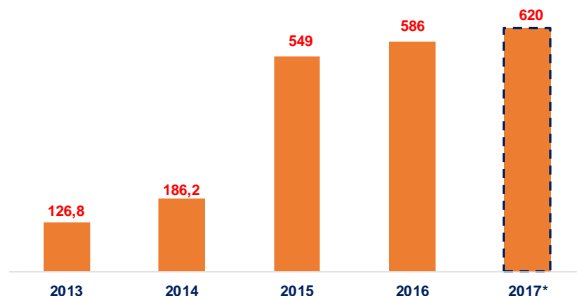
Startups breakdown by foresight



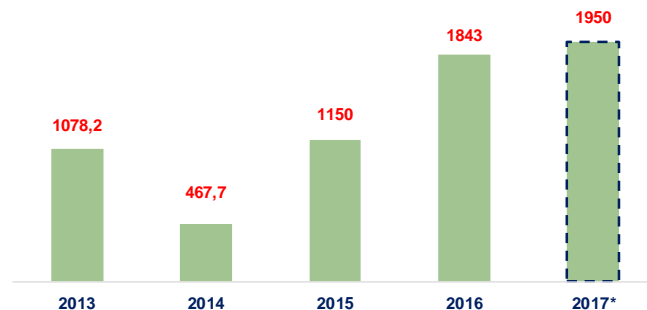
Number of startups within the Space Technology & Telecom Foresight



Private Investments in portfolio companies, mln. Rub



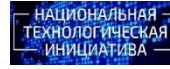
Revenue of portfolio companies, mln. Rub.



* Expected indicators as of the end of 2017

1

Active role of the Cluster's experts in working groups of national Technology Initiative (AeroNet, AutoNet, MariNet Road Maps)



AutoNet
Разработка дорожной карты развития автомобильной отрасли

ОПИСАНИЕ
ЦЕЛИ
КЛЮЧЕВЫЕ СЕГМЕНТЫ
ПИЛОТНЫЕ ПРОЕКТЫ
КРУПНЫЕ КОМПАНИИ
РАБОЧЕЙ ГРУППЫ
СОСТАВ РАБОЧЕЙ ГРУППЫ
КУРАТОРЫ РАБОЧЕЙ ГРУППЫ
АВТОНЕТ

AeroNet
Разработка дорожной карты развития авиационной отрасли

ОПИСАНИЕ
ЦЕЛИ
КЛЮЧЕВЫЕ СЕГМЕНТЫ
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РАБОЧЕЙ ГРУППЫ
СОСТАВ РАБОЧЕЙ ГРУППЫ
КУРАТОРЫ РАБОЧЕЙ ГРУППЫ
АЭРОНЕТ

MariNet
Разработка дорожной карты развития отрасли судостроения и смежных отраслей транспортного машиностроения

ОПИСАНИЕ
ЦЕЛИ
КЛЮЧЕВЫЕ СЕГМЕНТЫ РЫНКА
ПИЛОТНЫЕ ПРОЕКТЫ
КРУПНЫЕ КОМПАНИИ — УЧАСТНИКИ РАБОЧЕЙ ГРУППЫ
СОСТАВ РАБОЧЕЙ ГРУППЫ
ГРАФИК ЗАСЕДАНИЙ
КУРАТОРЫ РАБОЧЕЙ ГРУППЫ РЫНКА МАРИНЕТ

2

Participation in leading international industrial forums, conferences, and exhibitions



3

Organization of startup contests, pitch sessions, etc. with partners



Smart City Lab



AIRBUS





- In 2011 Airbus (EADS) spun-off Airbus Russian Technology Office in Skolkovo employing both European and Russian engineers.
- 12 employees., est. budget until 2015 — 400 mln rub.
- Designing the detonation combustion chamber for aircraft engines since 2012
- The project partners are:
 - MBDA (Matra BAE Dynamics Alenia)
 - Baranov Central Institute for Aviation Motor Building
 - Lavrentiev Hydrodynamics Institute of RAN Siberian Branch
- Two more Airbus spinoffs operate in Skolkovo:
 - Telum – development and commercialization of a self-organization technology for small LTE (Long Term Evolution) cells – investment 10 mln rub.
 - Datadvance - development of design process automation, predictive modeling and multidisciplinary design optimization software – investment 22 mln rub.



- In 2013 the agreements are signed between Skolkovo and Boeing Corp. regarding Boeing Research Center deployment and International Aviation Academy construction in Skolkovo
- Boeing research center: 30 employees, estimated budget until 2015 — more than 500m rub.;
- Joint project with Russian private investor on creation of Private flight academy – 1st education center in Russia for Boeing plane pilots with the use of newly developed flight simulator equipment.



- In 2011 the agreements are signed between Skolkovo and Siemens AG regarding Siemens Research Center placement in Skolkovo
- Overall investment of Skolkovo and Siemens into the project (high frequency solid state generator) up to the moment accounted 130 mln. RUR.
- 15 research engineers engaged



- In 2015 the agreements are signed between Skolkovo and FANUC regarding Engineering Center construction in Skolkovo
- Overall investment into the center presumed 850 mln. RUR. in construction, deployment and operations until 2020
- 55 engineers, 5000 sq.m. with expansion option up to 10 000 sq.m. until 2030
- Construction in progress.

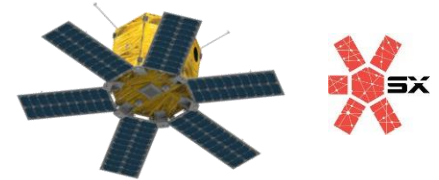
DAURIA AEROSPACE: DEVELOPMENT OF NEXT-GEN SMALL SATELLITES

- Product: Satellites, small satellite platforms and subsystems
- Three satellites built and launched
 - DX-1 AIS satellite
 - Two Perseus AIS satellites were sold on-orbit (contract value between \$4,35 and 6 Million.)
- Investment attracted – over \$20M
- Spacecraft under construction
 - Two MKA-N medium resolution EO-satellites for Roscosmos – to be launched in July 2017
 - One Auriga high-resolution satellite – testbed for future EO constellation.
 - Contract on GEO-based satellite with Indian telecom operator



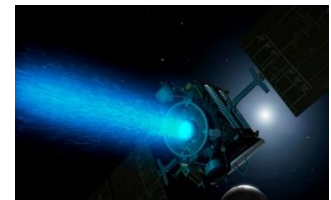
SPUTNIX: INTEGRATED SOLUTIONS FOR SMALL SPACECRAFT

- Product: Full stack of small satellite technologies and products, Education kits, Test equipment
- First private Russian satellite built and launched
- Profit vehicle: equipment for education and small satellite testing for schools and universities
- Doubled its revenue in 2017 in comparison with 2016 - 150 mln. Rub. (and started international sales in Myanmar, Kazakhstan, and active negotiations in Iran, France, and Belorussia).



AVANT-SPACE: NEXT GENERATION ELECTRIC PROPULSION FOR SMALL SPACECRAFT

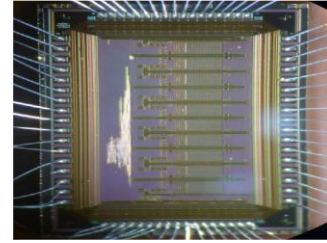
- Product: Low power consumption propulsion system for small satellites.
- The thruster can be used for phasing, orbit raising, station-keeping and deorbiting.
- Experimental development of thruster is carried out – first results obtained



MEGARAD: POWER MANAGEMENT INTEGRATED CIRCUITS FOR SMALL SATELLITES

- Product: A family of radiation hardened power management integrated circuits for small satellite electrical power system, from solar cells to payload electronics
- Radiation hardening by design realized on cheap commercial technologies leads to the best combination of performance, radiation hardness, and cost.
- First serial pieces of hardware developed and manufactured

MEGARAD



THERCON-LHP: HIGHLY EFFICIENT LOOP HEAT PIPES (LHP) FOR AEROSPACE APPLICATIONS

- Product: LHP - highly efficient passive heat-transfer devices, operating on a closed evaporation-condensation cycle and using capillary pressure for pumping the working fluid
- Applicable in:
 - Avionics
 - Aircraft sensors
 - Aircraft servers
- Joint project with Thales Avionics

ТЕРКОН-КТТ



DIGITAL SOLUTIONS: ASIC AND ELECTRONIC ENGINEERING DESIGN CENTER

- Product: various ECB for aerospace industry
- Main focus - the development and creation of algorithms for digital radio, image processing, radar, as well as designing of various devices based on the FPGA and digital signal processors
- Contracts with leading aerospace companies of Russia



IMAGEAIRY: PLATFORM FOR GEOSPATIAL DATA TREATMENT

AN ASTRO DIGITAL COMPANY
imageairy.com

- Web-based platform for geospatial data access and API for building analytic products on top of the EO data
- Markets: precision agriculture, urban planning
- Innovation: to robotize selection, processing, and access to Earth Remoting Sensing data based on AI / Big Data algorithms
- 01/2017. Investment Fund Larnabel Enterprises, VP Capital, Vast Ventures, and GVA Capital invested \$16,65 mln in Astro Digital Co. - Imageary Co. is Russian branch of the company



WAYRAY: AUGMENTED REALITY FOR CARS

- Product: the first True Augmented Reality car navigation system that applies aeronautical principles to land navigation
- 02/2017. WayRay raised \$18 mln investments from a group of investors led by Alibaba Group
- Showcase at CES 2018

 W A Y R A Y



AEROSTATE: AIR QUALITY FORECASTS

- Product: Worldwide verifiable air quality forecasts at city-block resolution. Distributed through API.
- Company provides rigorous accuracy assessment of our forecasts 24/7
- High prediction accuracy
- Global coverage of the system with high resolution (1 km² per pixel).
- Currently forecasts supplied in several cities around the globe – US, UK, Russia, Spain, more is coming

 AERO
STATE



AEROB: UNMANNED AIRCRAFT SYSTEMS / PLATFORMS

- Product: Automated control systems for UAVs, UAV platform
 - Aerob 4D, 4 DFL platforms
 - Wide variety of payloads for surveillance: optical, radar, laser scanning
- Partnered with Russian Helicopters (one of the major helicopter manufacturers) on the innovative convertiplane UAVs development and won several significant R&D contracts.
- Multiple units sold to Emercom, Government services
- Joint venture with Indian UAV manufacturer: foreign market entrance

**SCAN: DEVELOPMENT OF UAV PLATFORMS, UAV-BASED PRODUCTS AND SERVICES**

- Product:
 - Professional aerial imaging systems,
 - Agisoft PhotoScan - stand-alone photogrammetric software solution
 - GIS Sputnik — multidimensional spatial data visualization system. Orthophotos and digital elevation models created with Agisoft PhotoScan Professional can be imported into Sputnik GIS for further analysis using wide range of tools: length, height and volume measurements, cross sections generation and kriging interpolation.
- > \$10M revenue
- Global sales and operations

GEOSCAN

**KURSIR: UNIFIED GROUND-BASED EQUIPMENT OF LANDING SYSTEMS, NAVIGATION AND AIR TRAFFIC CONTROL FOR AIRFIELDS**

- Product: modern high tech equipment that guarantees safe navigation and landing
- Product has been developed, tested and implemented. Current R&D: use the UAV for inspections
- All necessary licenses obtained
- Manifested interest from Chinese airports and Finnish contractors

CURSIR



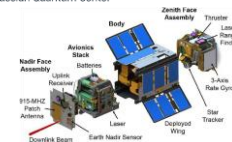
ANISOPRINT: ADDITIVE MANUFACTURING USING CARBON FIBER FOR DURABLE AND LIGHTWEIGHT STRUCTURES

- Anisoprint™ is 3D additive technology providing insertion of the continuous reinforcing yarn into the plastic in the course of printing. It allows 3D printing of the components of the material which:
 - is 20 times stronger than the conventional plastic,
 - 1.5 times stronger than aluminium,
 - is comparable by strength with titanium alloys,
 - and with all this, weighs 4 times less!



QSPACE TECHNOLOGIES: OPTICAL SATELLITE COMMUNICATIONS AND QUANTUM CRYPTOGRAPHY

- Optical data transmission – significant increase in bandwidth
- Absolute confidentiality by design
- Won Airbus BizLab corporate accelerator contest
- Satellite segment in development



3D BIOPRINTING SOLUTIONS: MAGNETIC SPACE BIOPRINTING

- Main goal of the project – use of space environment for 3D-printing of human tissues and organs
- Scaffold-free 3D printing technique using tissue spheroids, which are capable of fusing on their own
- Functional thyroid gland for mouse was printed
- Preparation for bioprinting experiment on ISS is underway. Joint work with IMBP, RSC “Energia”, Roscosmos



Skolkovo Foundation is the unique and most efficient knowledge based ecosystem in Russia.

To be a partner of Skolkovo Foundation is a great opportunity for getting access to breaking through technologies, dialog with governmental institutions and market access.*

- Point of entry to Russian aerospace market
- Convenient place for technology collaboration:
 - tax exemptions, venture capital, grants etc.
- Strong connections with aerospace major players
- Access to cutting edge technologies
- Industrial infrastructure access
- Softlanding program for foreign startups and partners
- Infrastructure projects to participate



* Disclaimer. Market access can not be guaranteed due to nonprofit statement of Skolkovo Foundation



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