Foresight for aviation industry in Russia

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Prerequisites for using Foresight in Russia

• “Russian economy is stagnating now” (The Central Bank of the Russian Federation)
• Technological gap between Russia and leading economies
• Restrictions for import in variety of sectors
• Relatively low innovation activity of Russian companies
• Lack of long-term planning at the sectoral level
• Shortcomings of action plans in the industry

Necessity of new forms of innovation activity stimulation – Foresight for “locomotive” sectors

Source: HSE, OECD
Main fields for Foresight in Russia

- Energy
- Transport
- Advanced technologies

Source: Vishnevskiy K., Karasev O., Meissner D. Integrated roadmaps and corporate Foresight as tools of innovation management: The case of Russian companies // Technological Forecasting and Social Change. 2014
Aviation sector among top priorities

Priority S&T directions & Critical technologies

“Transport and space systems” and “Technologies of creating new generation rocket, space and transport system”

State program “Development of aviation industry till 2025”

Russian long-term S&T Foresight 2030

Special chapter “Transport and space systems”

Long-term Foresight for nanotechnologies

273 prospective aerospace products
Aviation sector among top priorities: Roadmaps public domain selected by Phaal

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<th>Area</th>
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More than 50 public domain Foresight studies for aviation industry
Example of Foresight: Flightpath 2050. Europe’s Vision for Aviation

Goal: creation of future vision for aviation industry development in the European Union

Task: setting priority system for R&D for aviation

Analysis: current situation, challenges and opportunities

Strategic fields of interest:
- maintenance and expansion of industrial leadership
- satisfaction of social and market needs
- environmental protection
- use of safe energy
- providing security
Example of roadmap for certain goal: Sustainable Aviation CO₂ Roadmap

**Goal:** Providing sustainable development of aviation industry in Great Britain, identification of ways of reducing CO₂ emission in aviation

**Problem:** existing forecasts concerning CO₂ emission reduction don’t take into account future technologies and S&T breakthroughs

8 key tasks and 34 necessary actions were identified

**Scenarios of CO₂ emission reduction:**

- Integration of new technologies, improvement of operational efficiency and new fuels
- Emissions trading
- Better flight planning, more direct flights and less delays
- Improvements of airplanes features
Russian long-term S&T Foresight 2030: Results for “Transport and space systems”

Challenges

Threats

Windows of opportunities

Prospective markets

Innovation products and services

Prospective directions of R&D

Estimation of level of Russian R&D

Higher School of Economics, Moscow, 2014
Russian long-term S&T Foresight 2030: Main challenges for aviation industry

- Management of hydro- and aerodynamics flows
- Shift to new construction materials
- Shift to new generation of aircraft engines
- Wide using of polymer materials
- Strengthening of safety legislation
- Development of unmanned aircrafts

Period of time

Impact for Russia

Higher School of Economics, Moscow, 2014
Foresight & roadmapping for nanotechnologies: Key prospective directions

Most promising areas of nanotechnology concern the development of polymer composites, thermoplastics, composite materials and metallic nanoalloys.

- Airframe: Reduced structural weight, fuel economy, lower emissions
- Engine: Increased wearing qualities, reliability and durability
- Avionics: Increased passenger comfort
Example of corporate roadmap for air transportation industry

Grand challenges

Priority directions of innovation development

R&D

Technologies

Projects

Business processes improvements

Action plan

Innovation program financing

Prospective routes

Target indicators

Key performance indicators

Time of technologies commercialization

Competitors and their level

Roadmapping as a post-Foresight activity

Foresight
- Methodological principles of Foresight for aviation industry
- Aviation S&T Foresight 2030

Roadmapping
- Composition & configuration
- Materials
- Avionics
- Engine

Prospective S&T directions
- Key technological tasks
- Market forecasts

Detailed chains
- R&D – technology – product – market
- Wild cards & weak signals
- Key points for decision-making
Thank you for your attention!

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