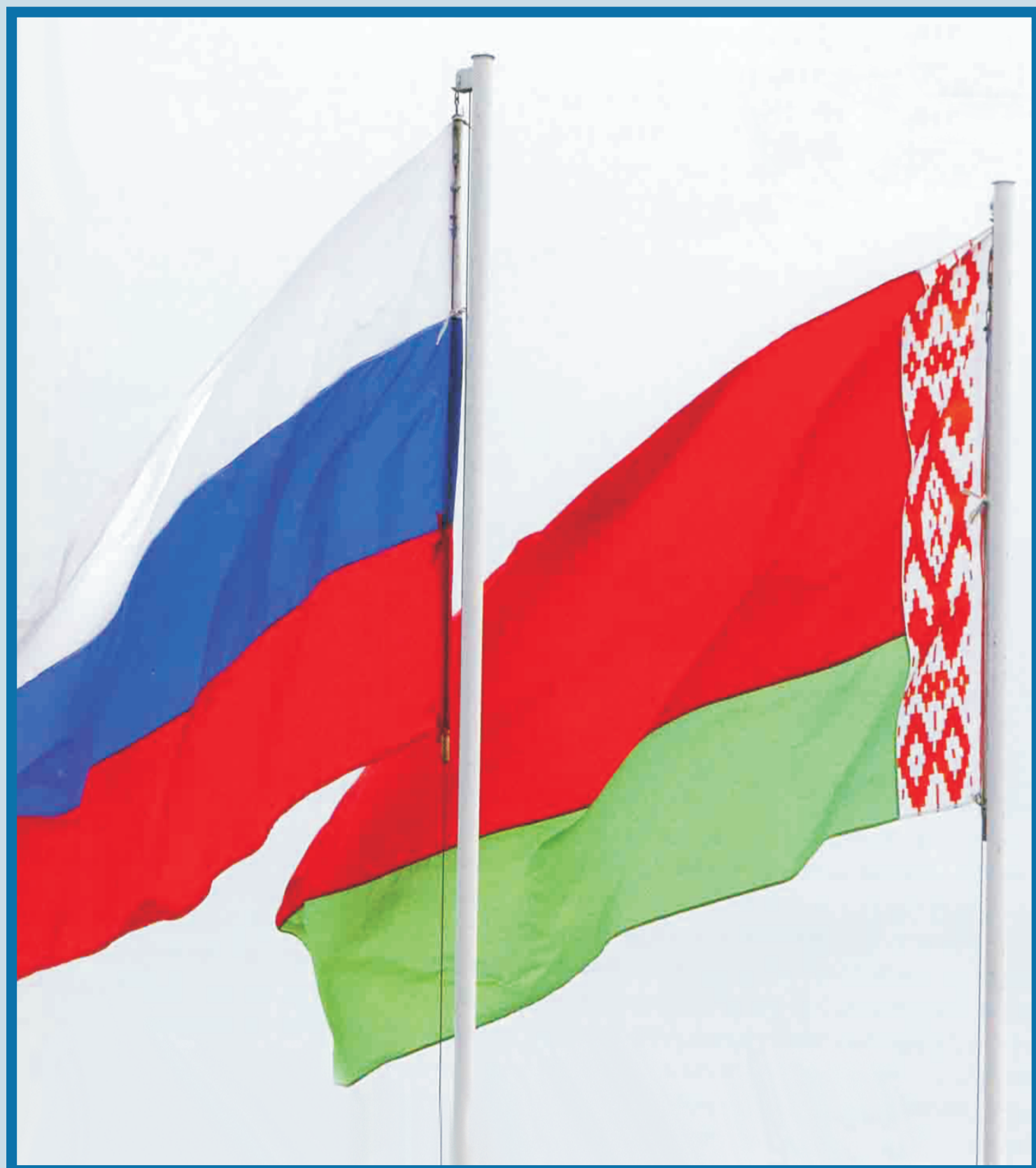


# SUPERCOMPUTER “SKIF-GRID” PROJECT OF THE UNION OF RUSSIA AND BELORUSSIA



## BASICS FACTS



Science and engineering effort of the Union of Russia and Belorussia. Lead organizations are Ailamazian Program Systems Institute of the Russian Academy of Sciences (PSI RAS, Russia), and United Insitite of Informatics Problems of National Academy of Sciences of Belorussia (UIIP NASB, Belorussia). More information is available on web sites <http://skif-grid.botik.ru/> and <http://skif.bas-net.by>. Consortium includes more than 30 organizations in the both countries.

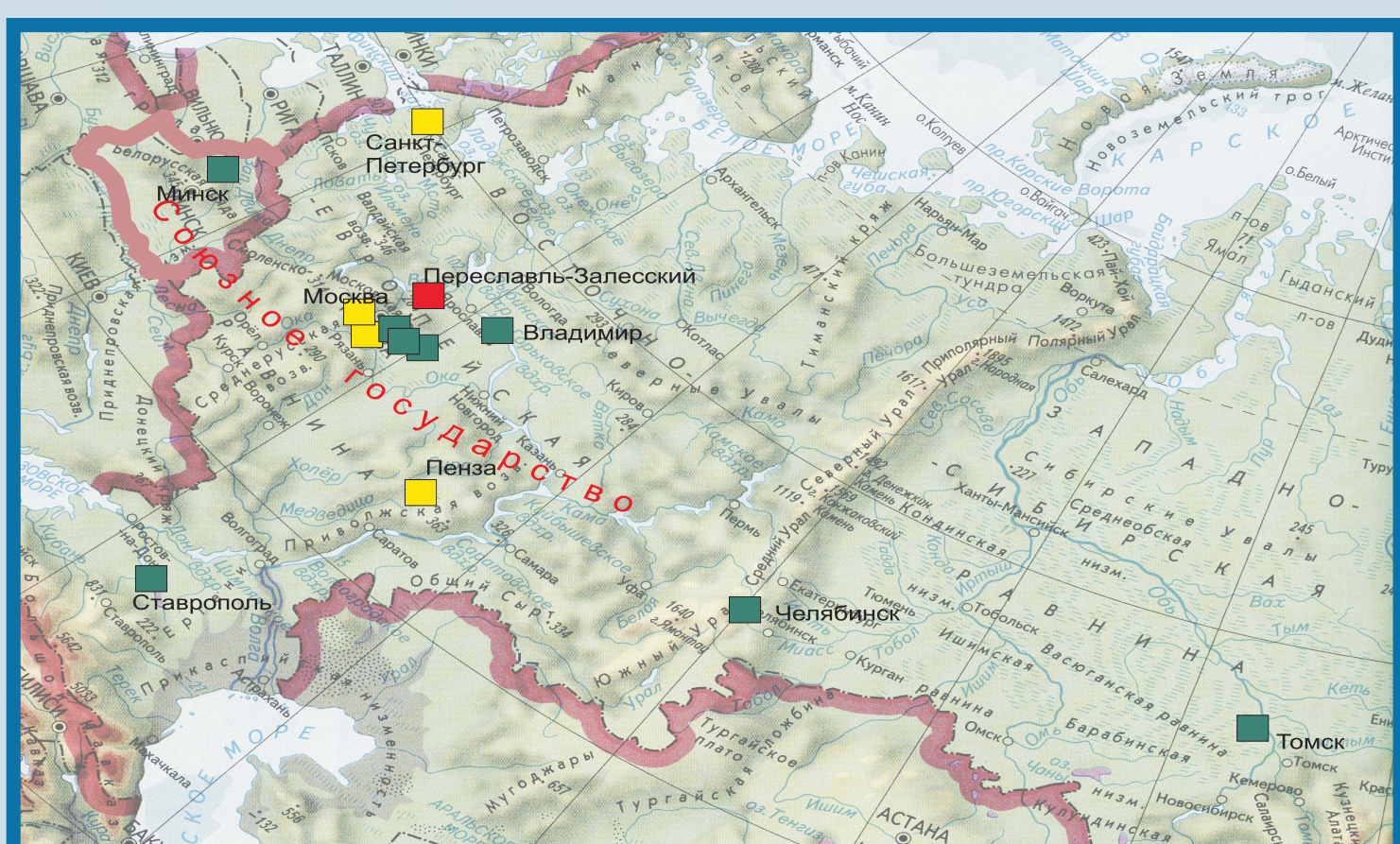
### TIMELINE

- March 2007** – approved by the Government
- March 2008** – “SKIF MSU” supercomputer deployed (#36 in June 2008 Top 500)
- May 2008** – “SKIF-Polygon” testbed grid-system created
- March 2009** – alliance agreement signed for SKIF series 4 development

### PROJECT DIRECTIONS

- ✓ Grid technology
- ✓ Supercomputers
  - Hardware – interconnect, monitoring etc.
  - Software – OS, development tools
- ✓ Information Security
- ✓ Pilot projects – applications of HPC and grid technology

## GRID-TECHNOLOGY



- ✓ Middleware based on UNICORE platform
- ✓ Unified access to all sites
- ✓ Workflow services and resource brokerage
- ✓ Distributed storage
- ✓ 4 computers in the June 2008 list
  - MSU, “SKIF MSU”, #36
  - South Urals State University, “SKIF Ural”, #282
  - Tomsk State University, “SKIF Cyberia”, #484
  - Ufa State Technical University, #169



## SUPERCOMPUTERS “SKIF”



Series 1



Series 2

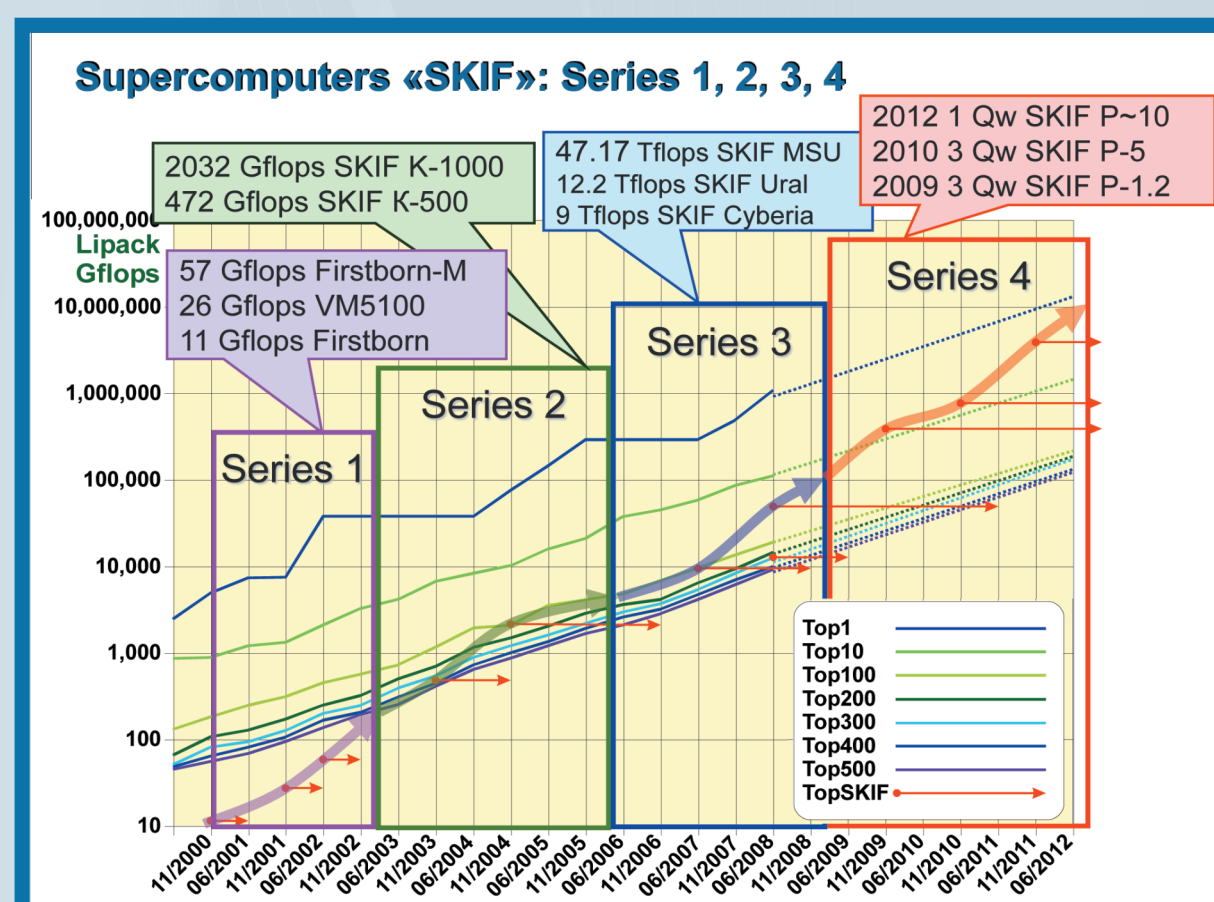


Series 3

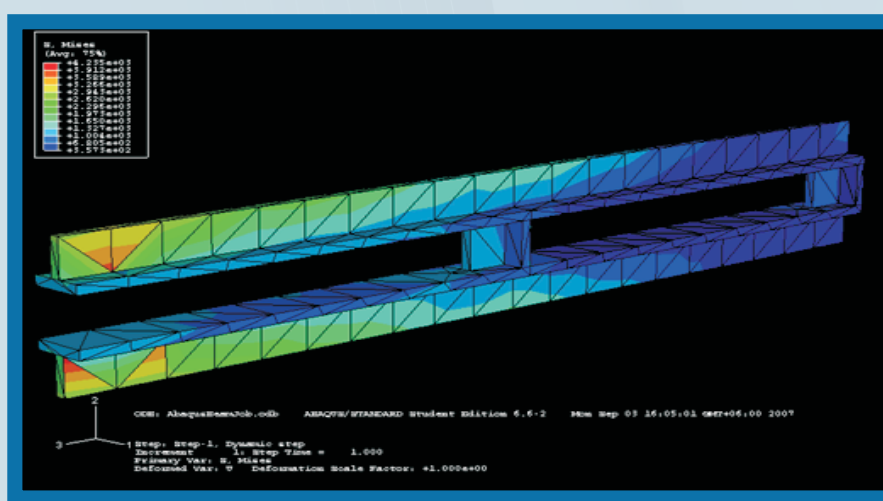
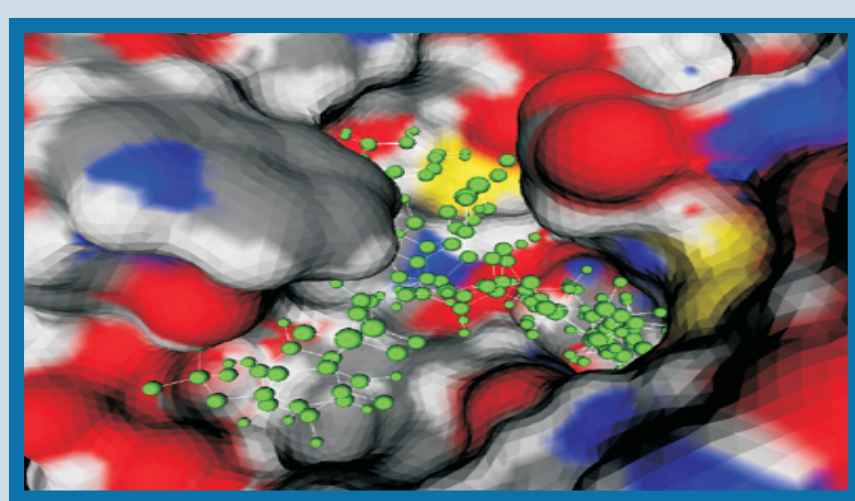
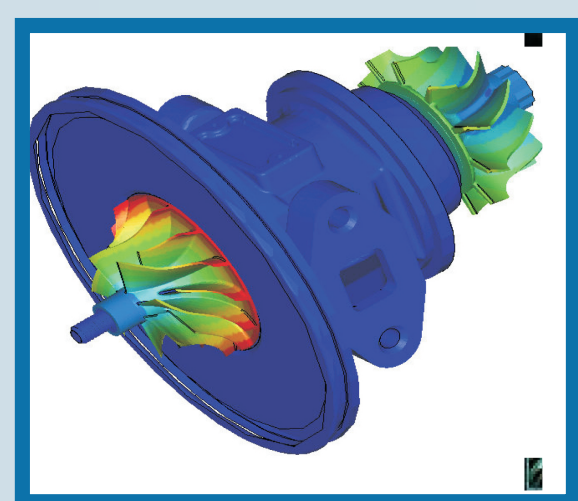


Series 4

- “SKIF-Aurora” (SKIF series 4)
- CPU type: Intel Xeon X5500 series (Nehalem) or Intel Xeon 5600 (Westmere, six-core)
  - Dual-CPU nodes
  - RAM: 12 or 24 GB per node
  - Interconnect: 3-D torus topology (60 Gbit/s per node max., latency 1  $\mu$ s)
  - Auxillary network: InfiniBand QDR (40 Gbit/s, latency 2  $\mu$ s)
  - SKIF-ServNet sensor and management network
  - Global synchronization network
  - Installation in South Ural State University, Chelyabinsk, Russia (2010)



## PILOT APPLICATIONS



### Engineering applications

- ✓ Computational Fluid Dynamics
- ✓ Finite Element Analysis
- ✓ Optimization

### Computational chemistry

- ✓ Quantum chemistry
- ✓ Hybrid (QM/MM)
- ✓ Drug design

### Computational Physics

- ✓ Electron emission
- ✓ Ionosphere simulations

### Medicine

- ✓ Mammography archive prototype

