

Modern equipment for molecular genetic research designed and produced in the Russian Federation



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Major parts of equipment for molecular genetic research currently imported in Russia

DNA extraction

→ DNA detection/quantification →

DNA sequencing

«Tecan, Freedom Evo»



CFX-96
RotorGene-Q



Thermo Fisher Scientific,
ABI 3500



Import replacement for the major parts of equipment for molecular genetic research

DNA extraction

→ DNA detection/quantification →

DNA sequencing



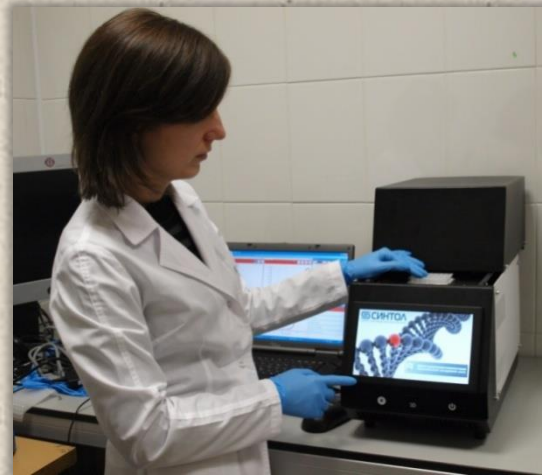
Robotic stations



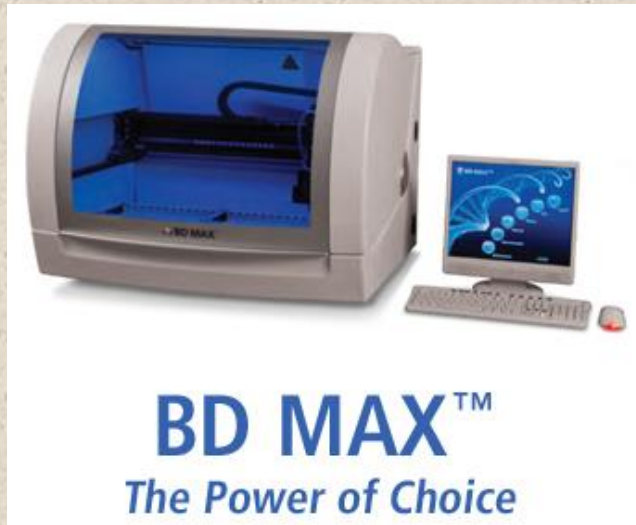
ANK series



NANOPHOR 05



Current technical level of world leaders



Beckton Dikenson, USA



Freedom Evo, Tecan, Switzerland



BioMark HD System and C1 Single Cell Auto Prep System, Fluidigm, USA



GeneXpert, Cepheid, USA

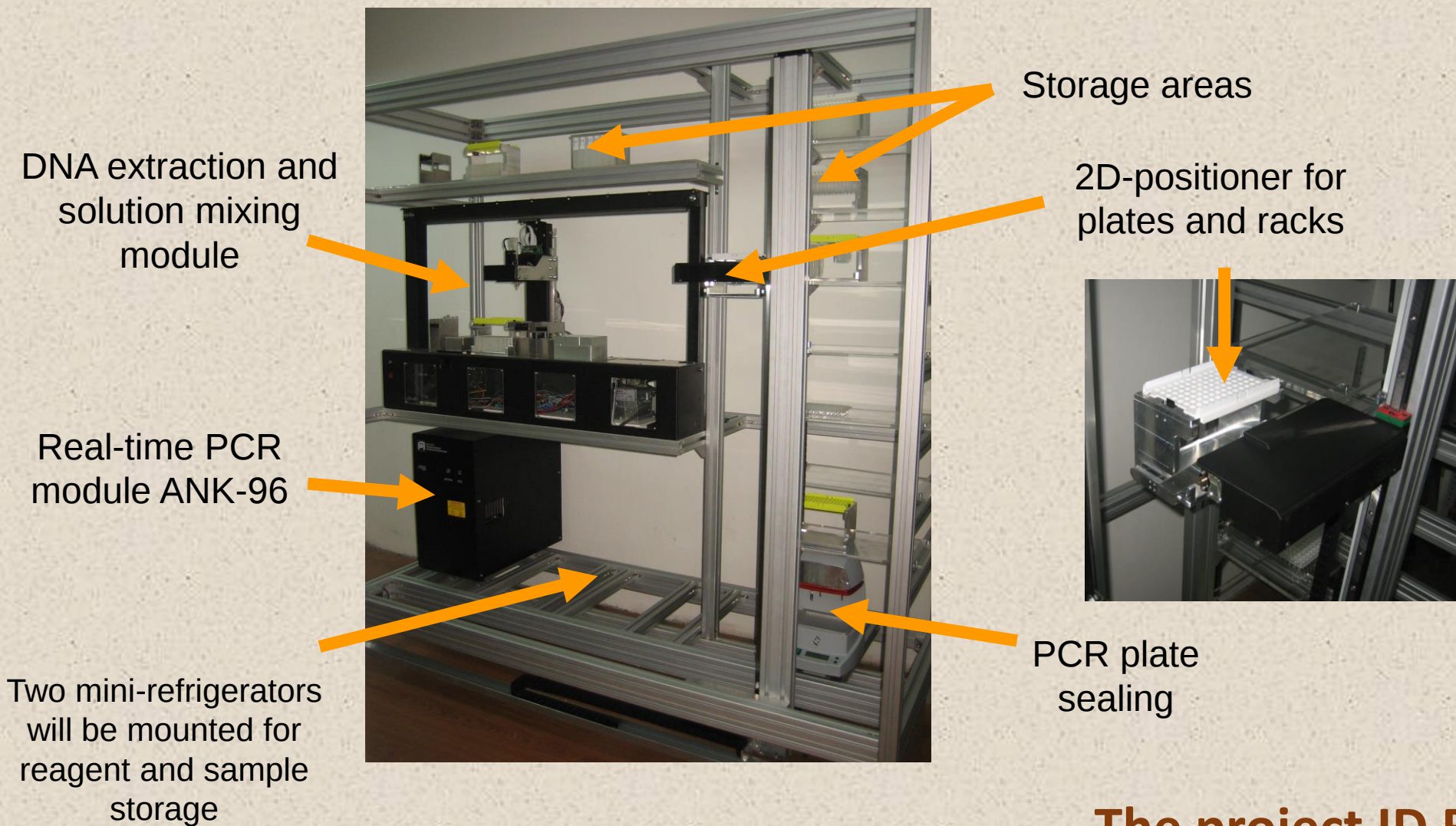
2011

The first russian robotic station for DNA extraction and liquid handling “Savraska”



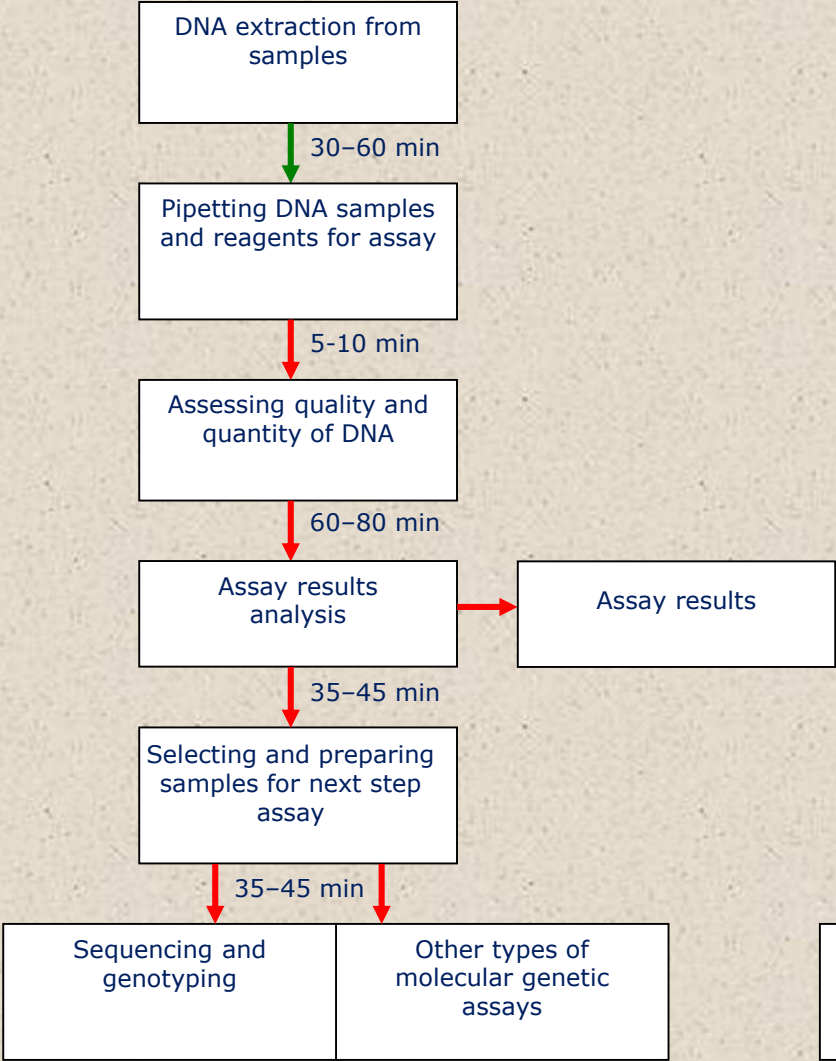
2016

The next-generation russian robotic station for complex molecular genetic research

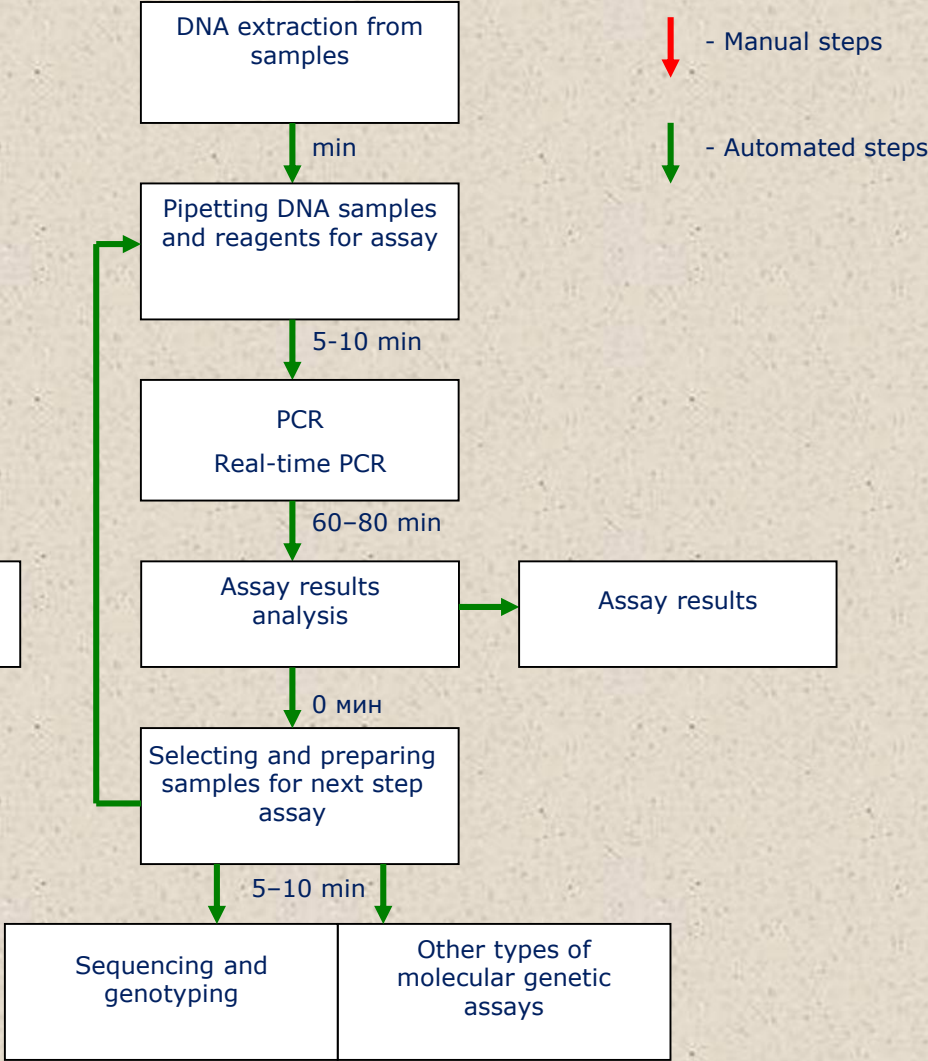


**The project ID RFMEFI57914X0012
financed by Ministry of education and science**

Standard workflow with automated station



New robotic station workflow



2013

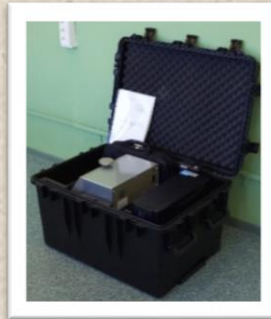
The first russian cartridge-based system
for rapid automated DNA extraction



Time for extraction, min	< 60
Number of samples	1 to 4
Maximum sample volume, ml	2
Maximum extracted DNA volume, ml	0,25
Maximum lysis temperature, °C	90
AC voltage, V	220
DC voltage, V	24
Size, mm	300 * 300 * 400

2003

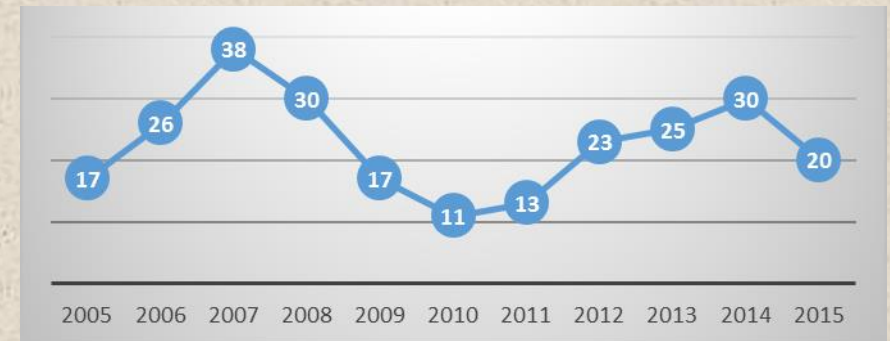
The first russian real-time PCR amplificator: ANK series launched



More than 250 devices sold since 2005



- 75 – research institutes
- 33 – universities
- 38 – tuberculosis dispensaries
- 46 – supervising authorities
- 15 – military
- 12 – state security
- 35 – exported



2016

The new russian real-time PCR amplicator: ANK-96

PCR wells	96
Tube type	0,2 ml – single, stripes, plates
Detection channels number	5-8
Temperature range, °C	4-99
Temperature variation, well to well, °C	±0,15
Temperature error in the range 40 to 95°C, °C	±0,1
Heating rate, °C per sec	6
Cooling rate, °C per sec	3
Optical unit	
Light detection	PMT
Excitation range, nm	300-700
Detection range, nm	350-800
Sensitivity, minimal for each channel, M	1×10^{-10}
Physical parameters	
Power, W	450
Size, mm	435x250x400
Weight, kg	18



The project ID RFMEFI60714X0095
financed by Ministry of education and science

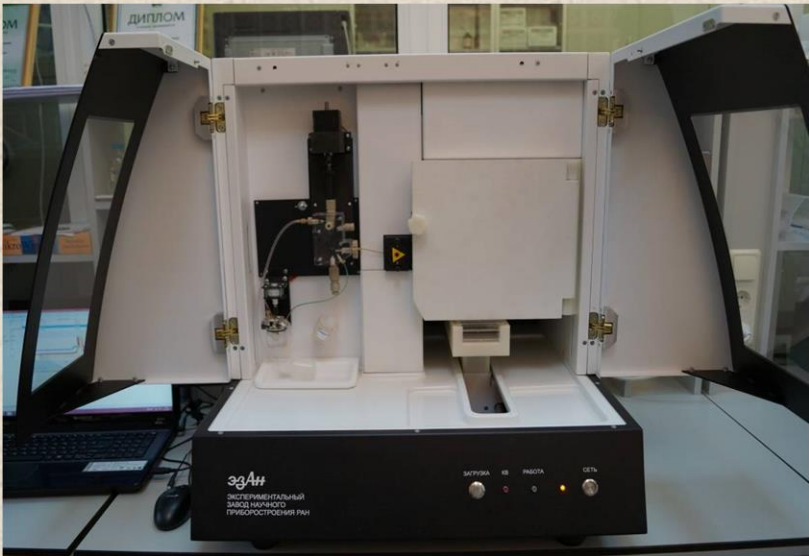
2011

The first russian genetic analyzer NANOPHOR-05

2011 - ABI 3500, USA

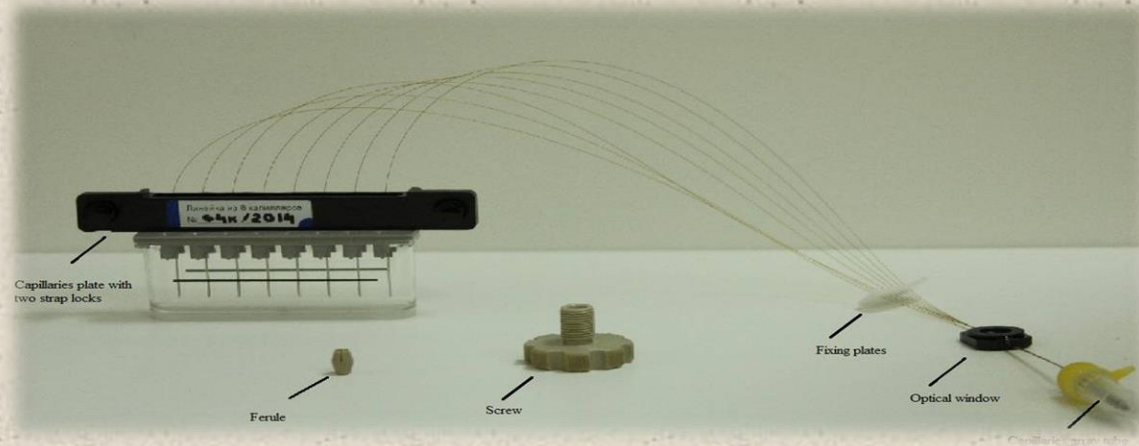


2013 - NANOPHOR 05, Russia

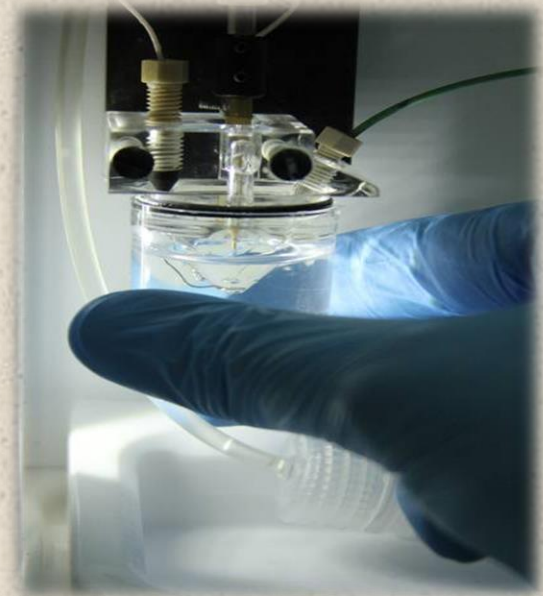


Device	ABI 3500, USA	NANOPHOR 05, Russia
Price, US\$	200 000 – 250 000	110 000
Yearly running costs, US\$	50 000 – 90 000	8 000 – 15 000

Reagents and materials for sequencing



Capillary array



Buffer solution



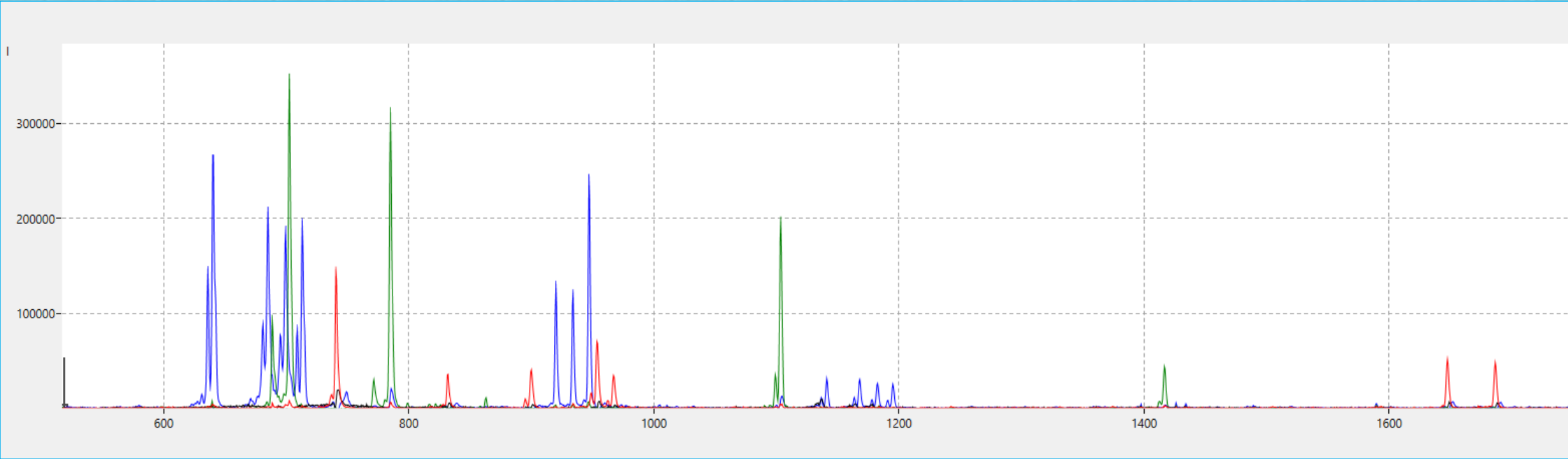
Sequencing polymer

Comparison of characteristics

Parameter, units	NANOPHOR 05	ABI3500
Number of capillaries	8	8
Number of detection channels	<u>7</u>	6
Laser wavelength, nm	<u>488</u>	505
Fluorescence detection range, nm	<u>510 - 710</u>	525 - 650
Laser power, mW	<u>100</u>	25
Voltage range, kV	0.1 – <u>20</u>	0.1 – 19
Temperature range and precision, °C	<u>15</u> to 70 ($\pm$ <u>0.03</u>)	18 to 70 ($\pm$ 1)
<u>Open system</u>	<u>YES</u>	NO, RFID
Starting time, min	<u>5</u>	30
Weight, kg	<u>47</u>	82
Power, W	<u>300</u>	1000
Dimensions, mm	630 x 600 x <u>630</u>	610 x 610 x 720
Russian software interface	<u>YES</u>	NO

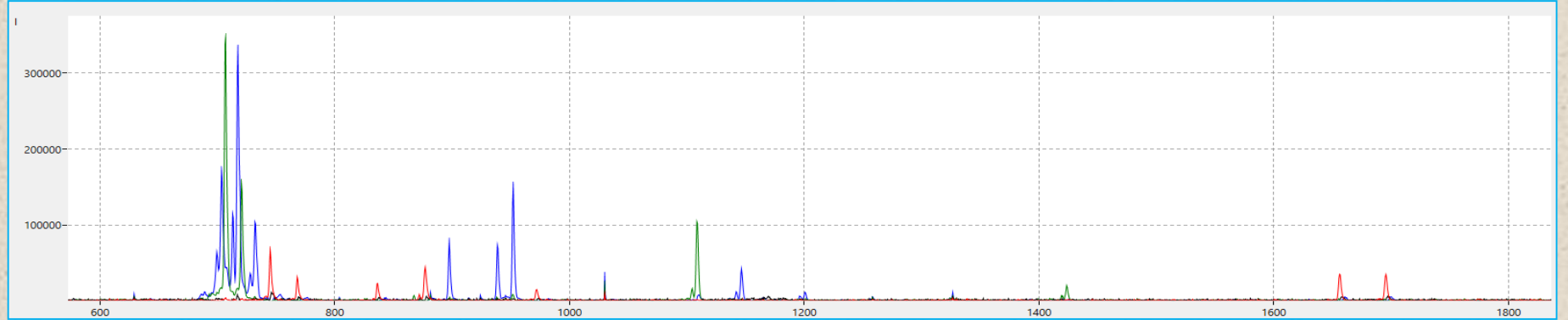
Genetic certificate of “METEOR” potato sort – plant breeders’ right

STI0032 FAM	STG0016 FAM	STI 001 FAM	STI 0030 ROX	STI0033 ROX	STM5114 ROX	STM1104 R6G	STI004 R6G	STM5127 R6G	STI0014 TAMRA
65-77-80-83 (1-1-1-1)	128-131-134 (1-1-2)	178-184-187-190 (1-1-1-1)	90-108 (3-1)	124-136-139 (1-2-1)	293-302 (2-2)	81-99 (2-2)	169 (4)	240 (4)	175-181-184 (2-1-1)



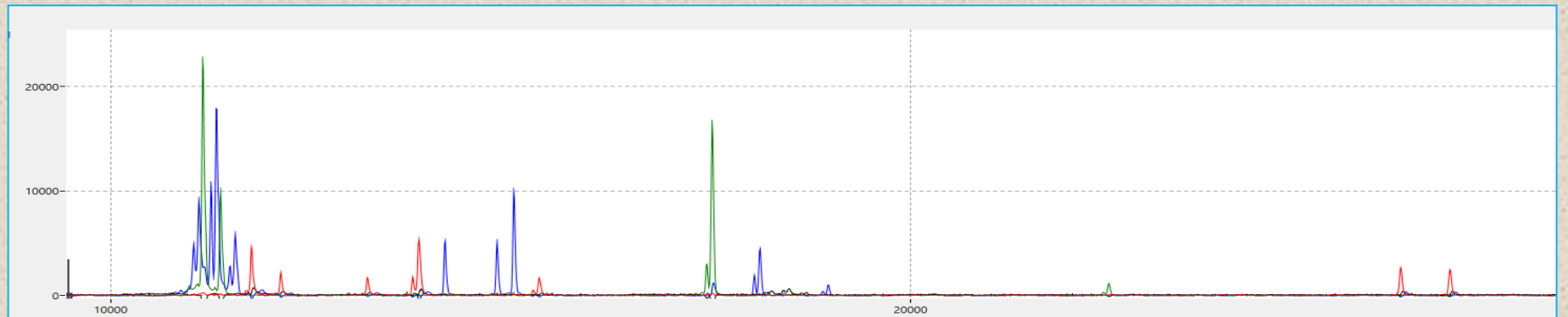
Genetic certificate of “NEVSKY” potato sort

Lorch's Potato Institute
Korenevo, Moscow Region



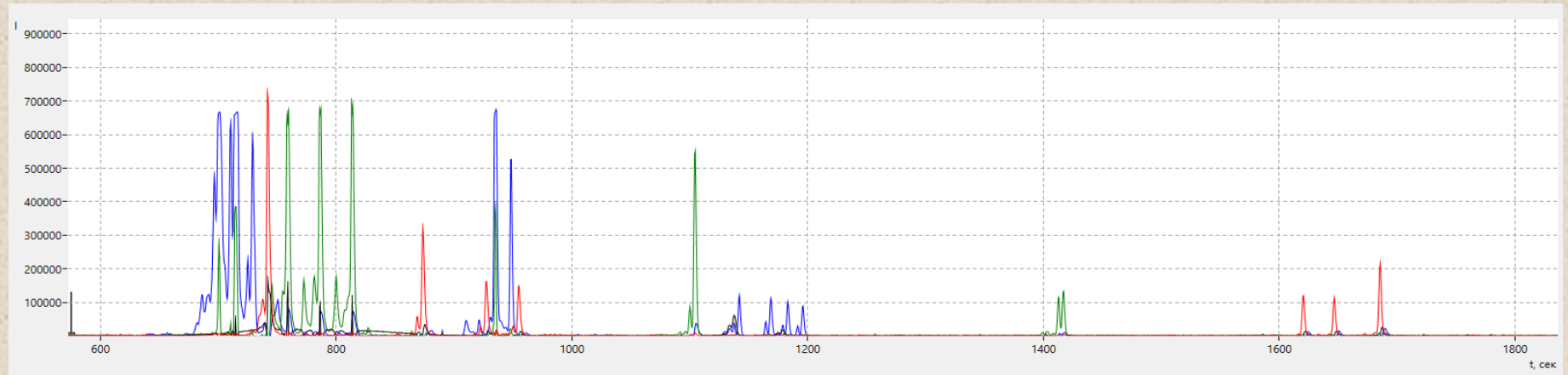
STI0032 FAM	STG0016 FAM	STI 001 FAM	STI 0030 ROX	STI0033 ROX	STM5114 ROX	STM1104 R6G	STI004 R6G	STM5127 R6G	STI0014 TAMRA
80-83-86 (1-2-1)	122-131-134 (1-1-2)	169-178-190 (1-2-1)	90-93-108 (2-1-1)	118-139 (3-1)	293-302 (2-2)	81-84 (3-1)	169 (4)	240 (4)	179-181-184 (1-2-1)

Tatar Agriculture Institute
Kazan, Tatarstan

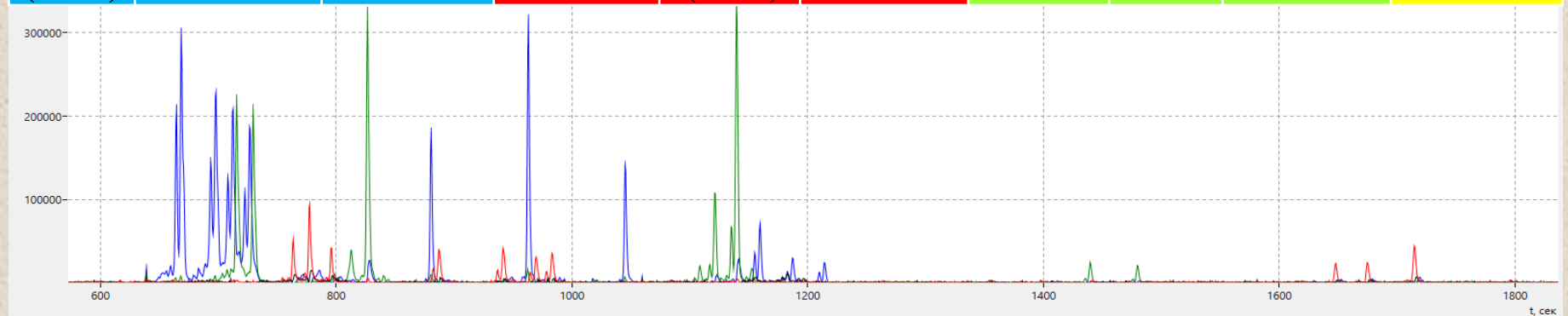


Genetic certificate of “UDACHA” potato sort – counterfeit product

Lorch's Potato Institute
Korenevo, Moscow Region

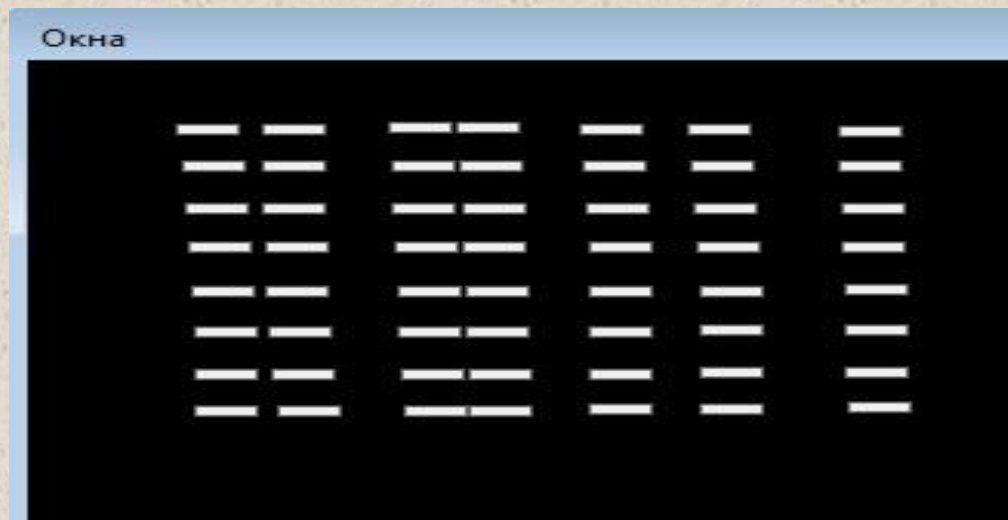
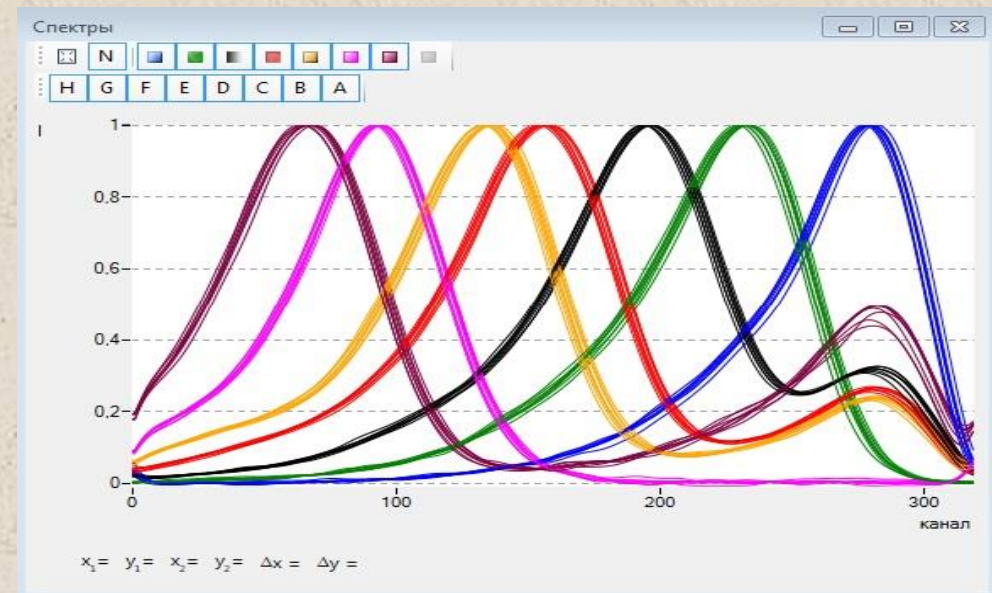
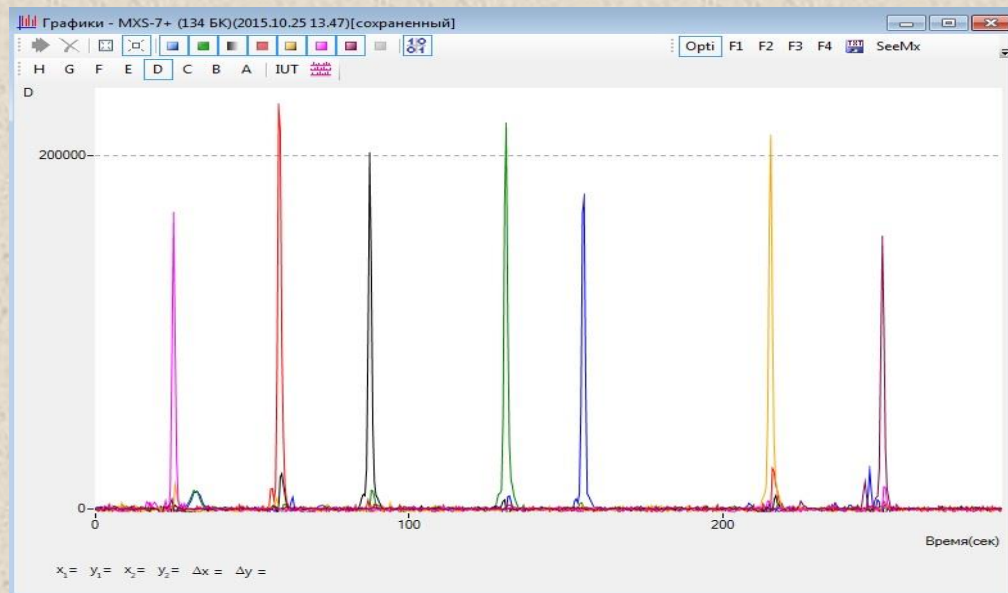


STI0032 FAM	STG0016 FAM	STI 001 FAM	STI 0030 ROX	STI0033 ROX	STM5114 ROX	STM1104 R6G	STI004 R6G	STM5127 R6G	STI0014 TAMRA
80-83-86 (1-2-1)	131-134 (2-2)	178-184-187-190 (1-1-1-1)	90 (4)	118-130-136 (2-1-1)	287-293-302 (1-1-2)	93-99-105 (1-1-2)	131-169 (1-3)	240 (4)	175-187 (3-1)
STI0032 FAM	STG0016 FAM	STI 001 FAM	STI 0030 ROX	STI0033 ROX	STM5114 ROX	STM1104 R6G	STI004 R6G	STM5127 R6G	STI0014 TAMRA
69-77-80-83 (1-1-1-1)	118-134-152 (1-2-1)	178-184-190 2-1-1)	93-96-99 (1-2-1)	118-130-136-139 (1-1-1-1)	287-293-302 (1-1-2)	81-84-105 (1-1-2)	169-172 (1-3)	240-249 (2-2)	181-184 (3-1)



Microplant «UDACHA»
from vial

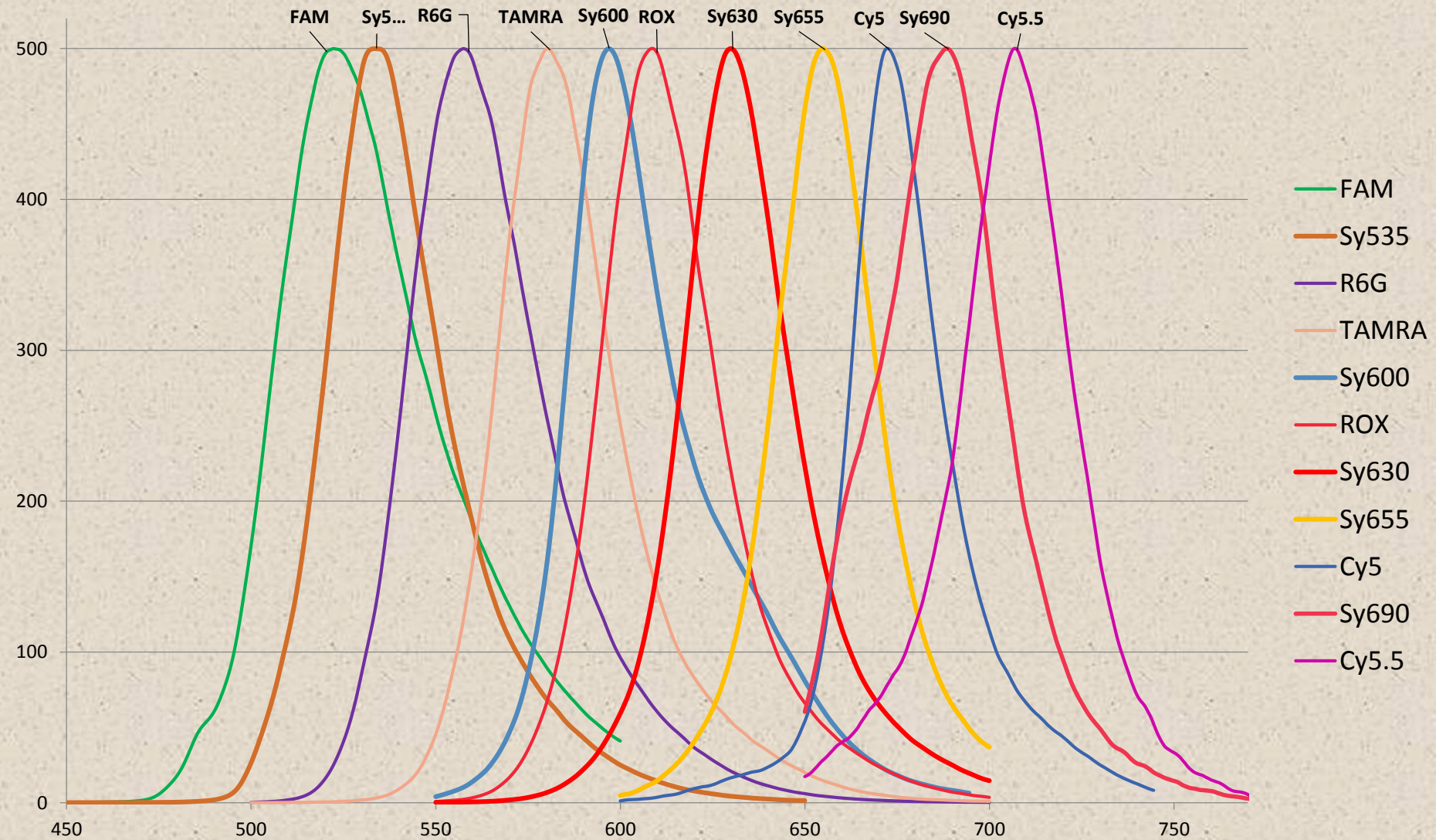
Number of detection channels = 7



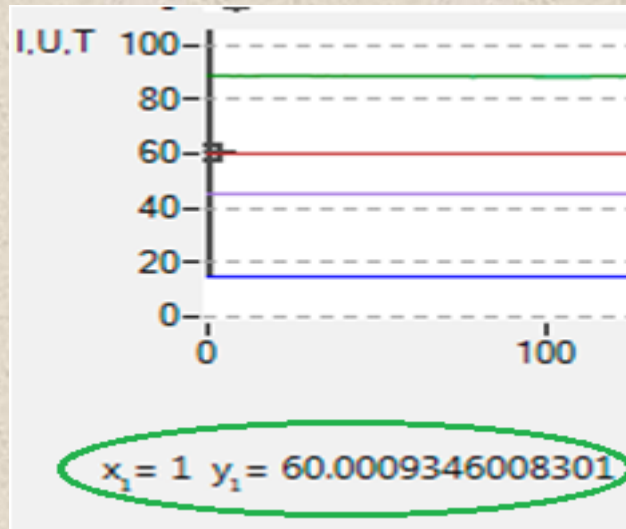
MXS 7 – First in the world!



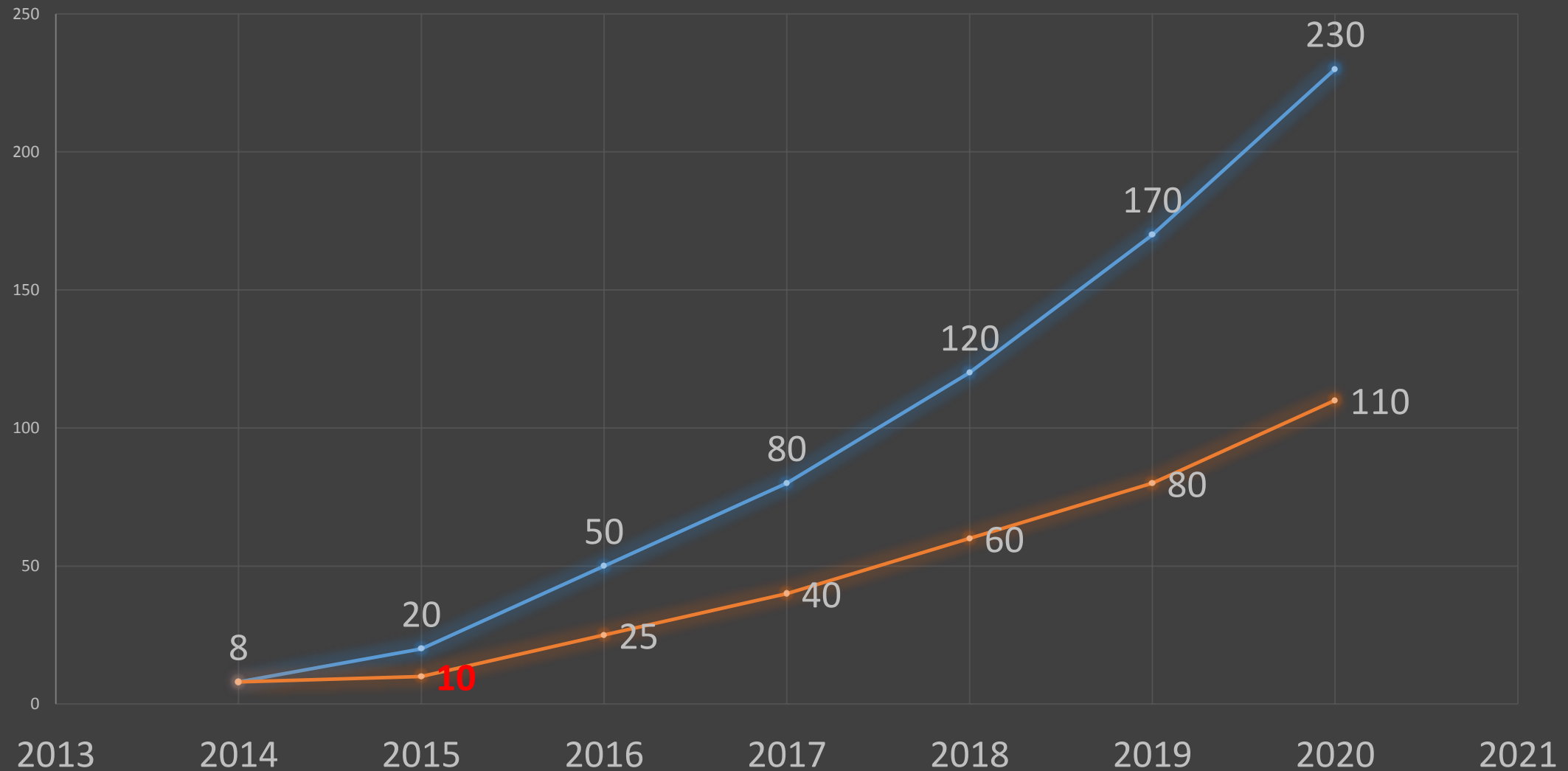
Number of detection channels = 11



Temperature regulation precision



NANOPHORE 05 production schedule



OUR CONSORTIUM

- Institute for analytical instrumentation, RAS
Sankt-Petersburg
Director Vladimir Kurochkin



ИНСТИТУТ АНАЛИТИЧЕСКОГО ПРИБОРОСТРОЕНИЯ
РОССИЙСКОЙ АКАДЕМИИ НАУК

- Experimental Factory of Scientific Engineering (EZAN), RAS
Chernogolovka
Director Vladimir Borodin



- All-Russian Research Institute of Agricultural Biotechnology
Moscow
Acting director Yakov Alekseev
Scientific supervisor Peter Kharchenko, RAS academician



- “Syntol” JSC
Director Alexey Kuzubov

СИНТОЛ

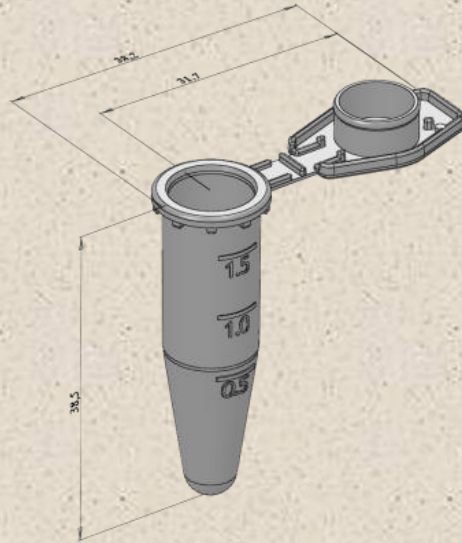
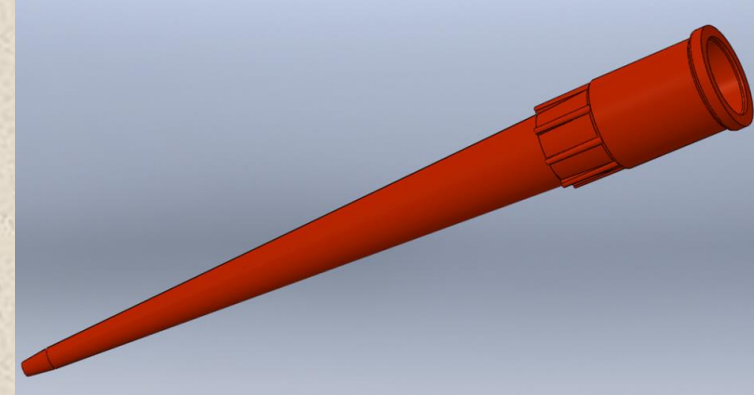
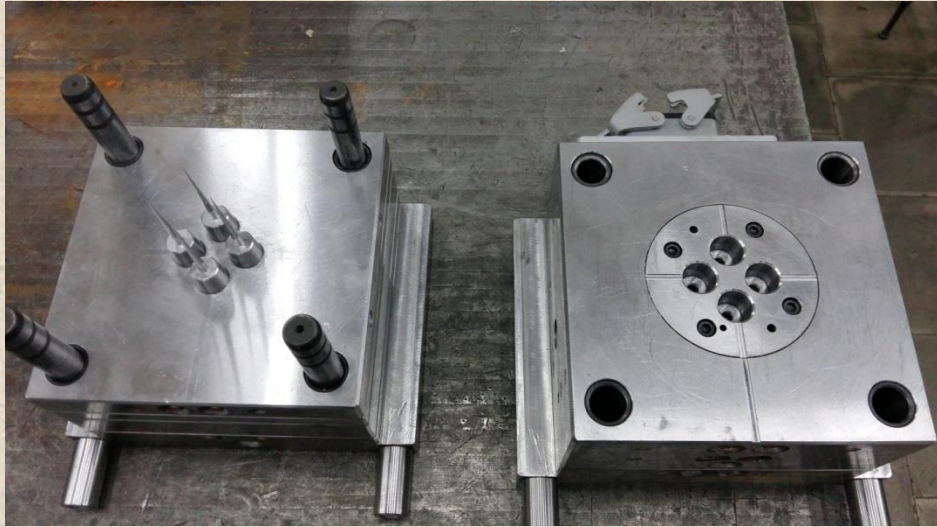
2016

Samples of newly developed russian laboratory plastics



**The project ID RFMEFI57414X0063
financed by Ministry of education and science**

Injection molding from polypropylene



Thank you for your attention!