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## **Dmitry Grigorovich**

### **Portfolio**

**C, C++, C++11/14/17, Qt, QML, STL, HTML/CSS/JavaScript, DevOps,  
XML, OpenCV, Shell script, Windows, Linux, SQL, C#**

**11 March 2021**

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## 1. Porting QML UI to Qt

**Period:** January 2021

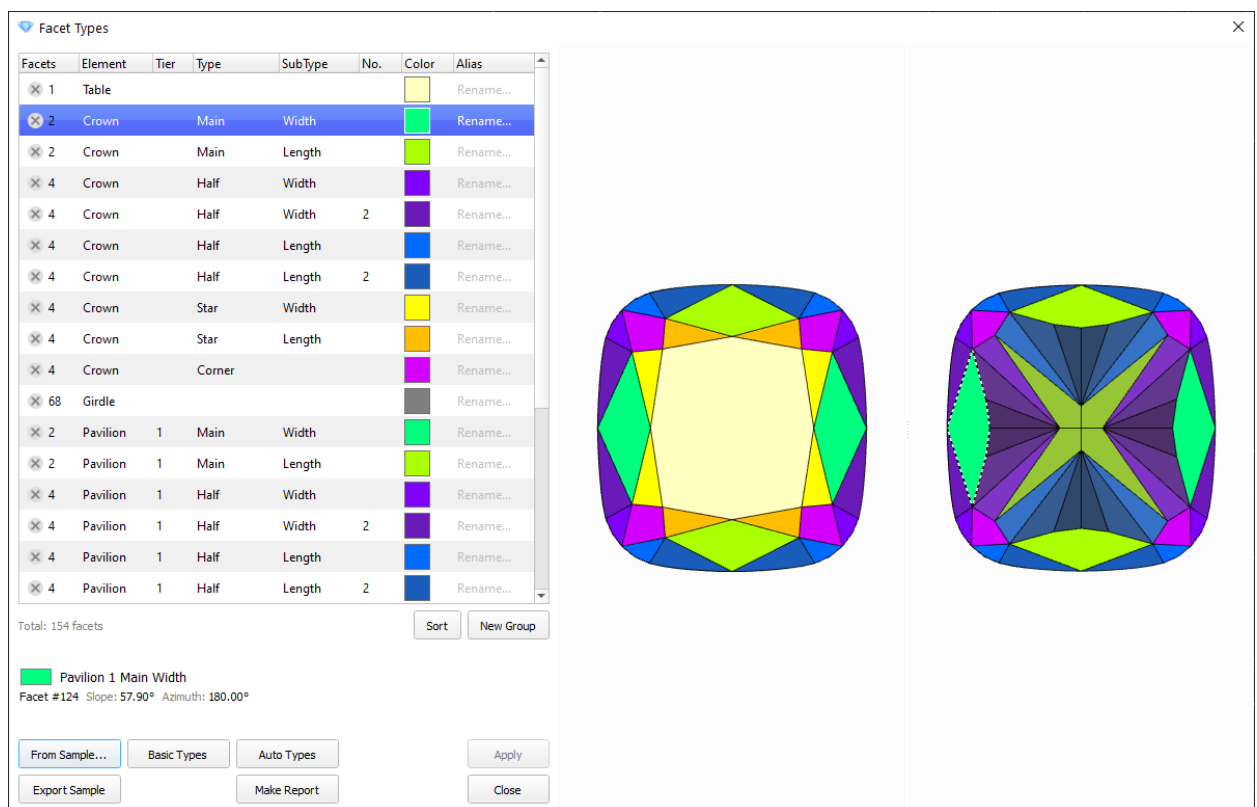
**Category:** Application Programming,

**Company:** OctoNus Software, Moscow, Russia

**Technology:** QML, Qt, C++, Visual Studio

### Description:

Ported part UI of the module for 3D visualization and editing of facet types of diamond model (QML, Qt, C++) from QML to Qt. Facet Types module is used to display and modify types of facet and their properties. These facet types are using in other parts of a company's desktop software solution for diamond scanning and processing: in reports, in polishing process by cutters. It's very useful and flexible for user to create custom facet types for a wide variety diamond cuttings.



## 2. Semipolish Report

**Period:** October – December 2020

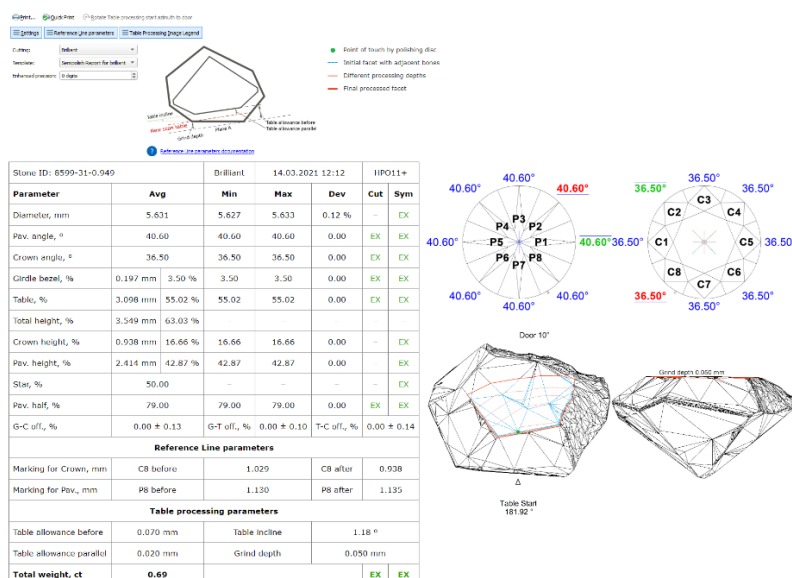
**Category:** Application Programming, Web Development

**Company:** OctoNus Software, Moscow, Russia

**Technology:** C++, GDI+, 2D, 3D-geometry, algorithms, Qt, Qt Web Engine, HTML, CSS, JavaScript, Visual Studio, Qt Visual Studio Add-in

### Description:

Designed and developed Semipolish Report (HTML/CSS/ JavaScript). It allows controlling (both visually and via parameter values) a Table facet polishing process to obtain a Table plain of a target diamond from a rough Stone. Table facet is the large, horizontal facet on the top, the table facet acts as a window into the interior of the gem. The report includes the Rotate table processing start azimuth to door control (presented if the hardware is connected) to simplify Table processing for cutters. Developed and implemented a GUI panel for browsing the report using Qt WebEngine, is displayed in the Scene. Reports are generated based on the template and filled by calculated data and images that are created using Windows GDI+, the range of 2D and 3D algorithms.



### 3. Distances between Models in Comparative I3D Report

**Period:** September 2020

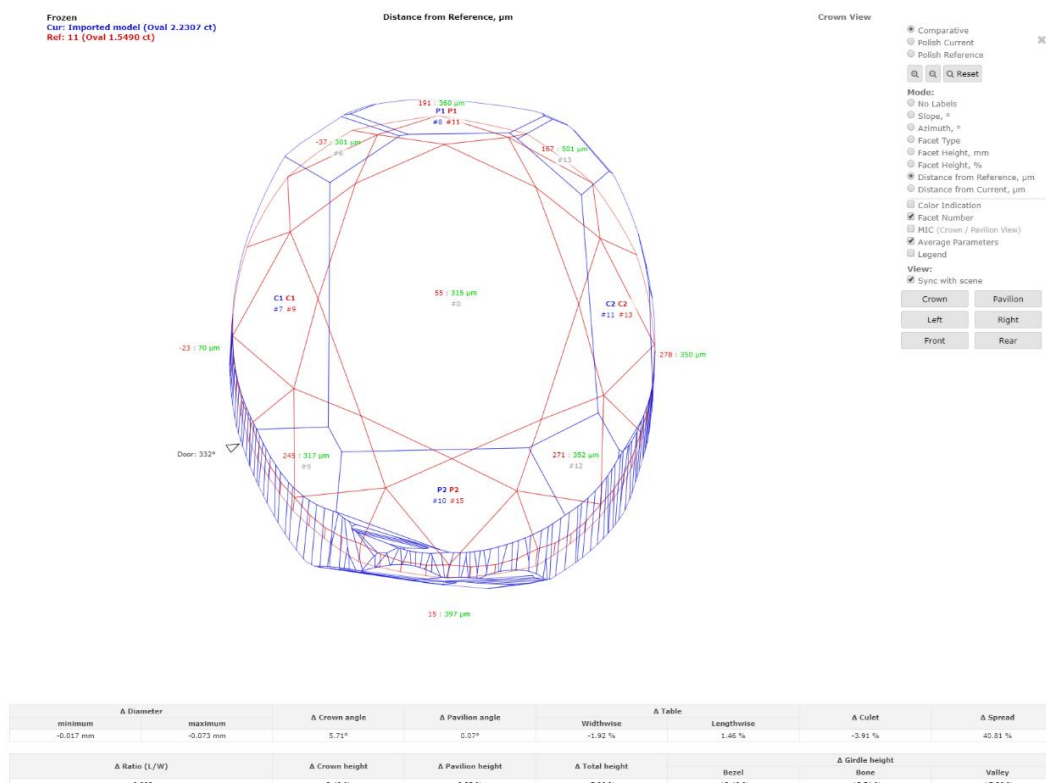
**Category:** Web Development, 2D, 3D-geometry, algorithms, 3D-Graphics, Application Programming

**Company:** OctoNus Software, Moscow, Russia

**Technology:** JavaScript, HTML, CSS, C++

#### Description:

Comparative Interactive 3D Report (HTML/CSS/JavaScript) is used for viewing of diamond models and its different parameters in 3D scene – inside a GUI panel based on Qt WebEngine. Implemented 2 new modes for displaying distances between models at comparison of 2 models (Current and Reference) in Comparative I3D Report. It shows how each pair of corresponding models' facets are close to each other. It's used, for example, to find the best diamond model to process or to control the current stone process state.



## 4. Integration of Desktop Application with Cloud

**Period:** May – August 2020

**Category:** Application Programming, Web Development

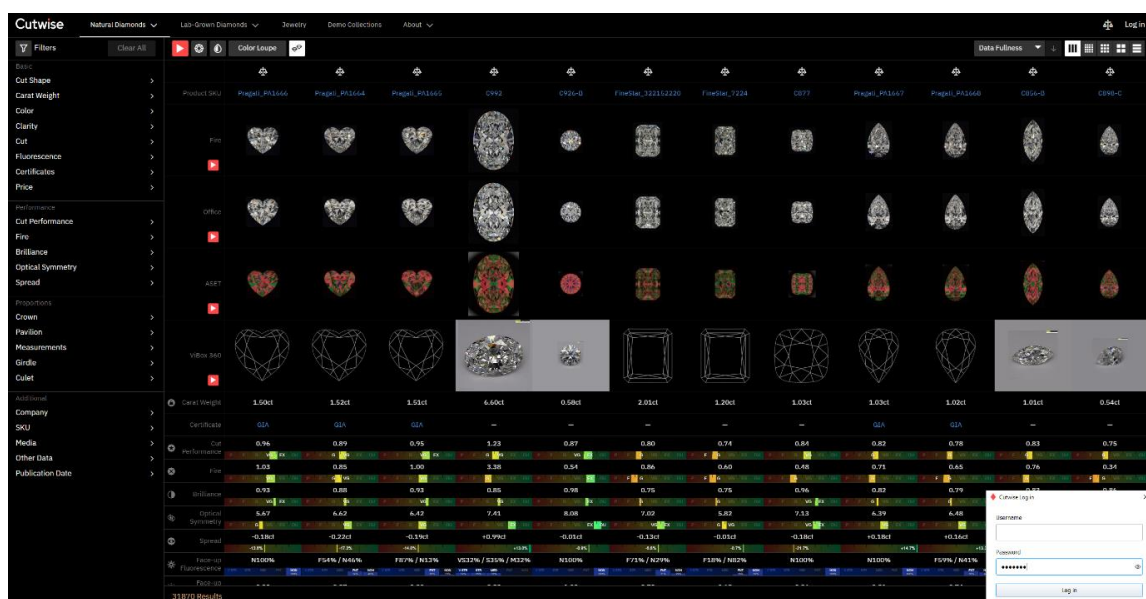
**Company:** OctoNus Software, Moscow, Russia

**Technology:** C++, Visual Studio, Asynchronous Programming, HTML, CSS, JavaScript,

Qt, Qt Visual Studio Add-in

### Description:

Developed and implemented an architecture (C++) and a GUI (Qt) for integration of a company's desktop software solution for diamond scanning and processing that operating on Windows OS with a company's cloud <https://cutwise.com/>. Data generated in the application (scan and diamond 3D models, different type of reports [HTML/CSS/JS], spectrums, metadata) is send to the cloud, then it becomes available for different diamond processing companies, distributors and customers. The application interacts with a C++ client of a permanent Windows service to login users, upload files and obtain statuses. The service sends data to the cloud in his turn. I developed parts associated with data generation and preparation, interaction the desktop application with the client of the Windows service.

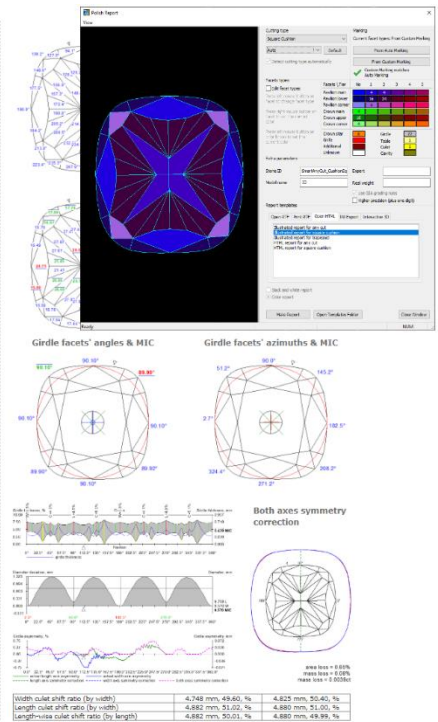
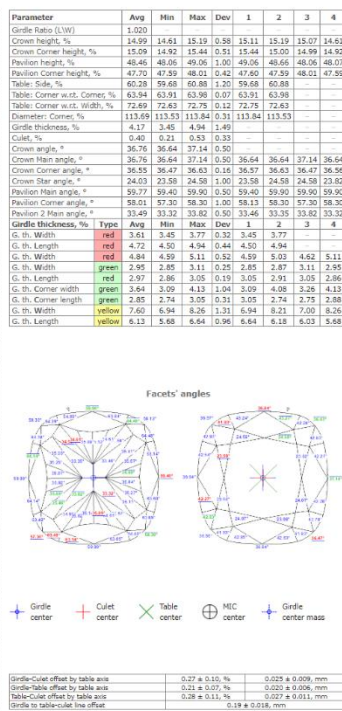
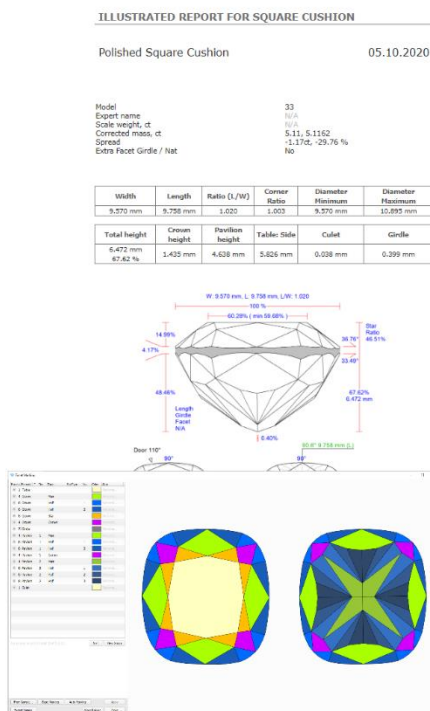


**Period:** January – April 2020

**Company:** OctoNus Software, Moscow, Russia

**Description:**

Developed new features and fixed bugs in different types of reports (HTML and Word based) including implementation of logic (C++), GUI (MFC and QML) and HTML/CSS/JS report templates. Adapted HTML reports for mobile devices. Enhanced module for 3D visualization and editing of facet marking of diamond model (QML, Qt, C++) and widely integrated it with different parts of the application.





## 6. Refactoring of Models Comparison Engine

**Period:** November – December 2019

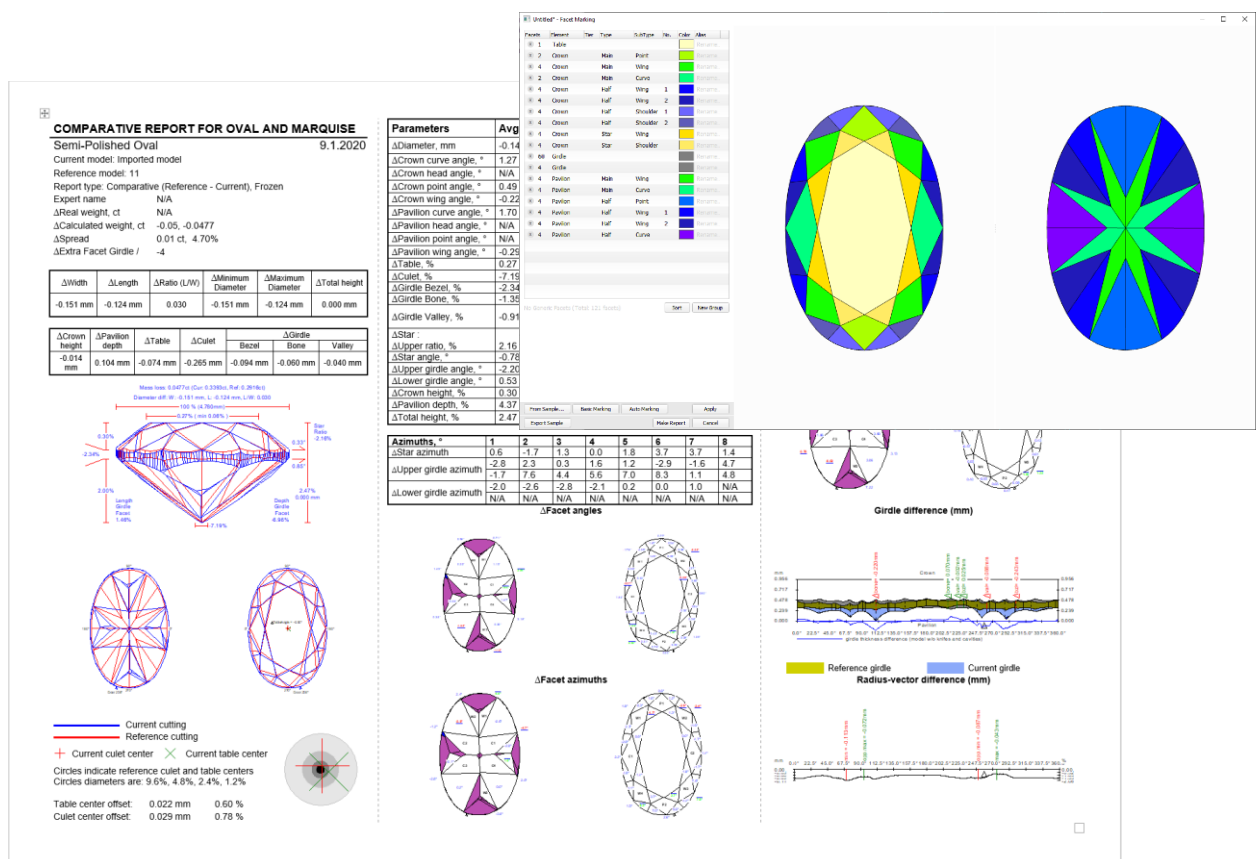
**Category:** Application Programming

**Company:** OctoNus Software, Moscow, Russia

**Technology:** C++, Visual Studio

### Description:

Refactored of a diamond models comparison engine (C++) in a company's software solution for diamond scanning to scale the engine using in different dynamic libraries. Added support of multithreading in the engine. It has already been used by several existing software features.





## 7. Solutions Report

**Period:** July – August 2019


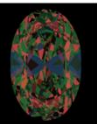
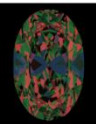
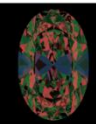
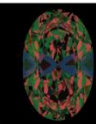
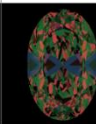
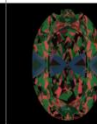






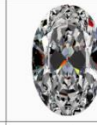
**Category:** Application Programming, Web Development

**Company:** OctoNus Software, Moscow, Russia

**Technology:** C++, Qt, Qt Web Engine, Qt WebChannel, multithreading, ReactJS, HTML, CSS, JavaScript, Visual Studio, Qt Visual Studio Add-in

### Description:

Designed and developed Solutions Report (ReactJS/JavaScript/ HTML/CSS) for viewing of photorealistic diamond images and its different parameters in a scene. Developed and implemented a GUI panel for browsing the report using Qt WebEngine. The report exchanges data with the Qt GUI panel and a core C++ program via Qt WebChannel. User can add and remove diamond solutions in/from the report. Photorealistic diamond images are added into the report dynamically when they have been calculated. Integrated the panel in a company's software solution for diamond scanning. The panel was developed within the Visual Studio IDE for Windows platform.

	✕	✕	✕	✕	✕	✕	✕
Solution number	5	10	4	8	6	9	7
Weight, ct	0.2914	0.2914	0.2908	0.2902	0.2894	0.2890	0.2884
Price, \$	270	270	270	270	270	270	261
ASET							
Office							
Cutting	Oval	Oval	Oval	Oval	Oval	Oval	Oval
Yield, %	85.48	85.48	85.48	85.48	85.48	85.48	82.53
Clarity	VS1	VS1	VS1	VS1	VS1	VS1	VS1
Color	H	H	H	H	H	H	H
Optical symmetry	7.21	7.25	7.13	7.26	7.40	7.56	7.66
Final grade	EX	EX	EX	EX	EX	EX	EX
Cut grade	EX	EX	EX	EX	EX	EX	EX
Symmetry grade	EX	EX	EX	EX	EX	EX	EX
Brightness	—	—	—	—	—	—	—

Sort by Price ↓

Page 1 of 2 Columns per page 7

## 8. Visualization of Diamond Girdle Thickness in Interactive 3D Report

**Period:** May 2019

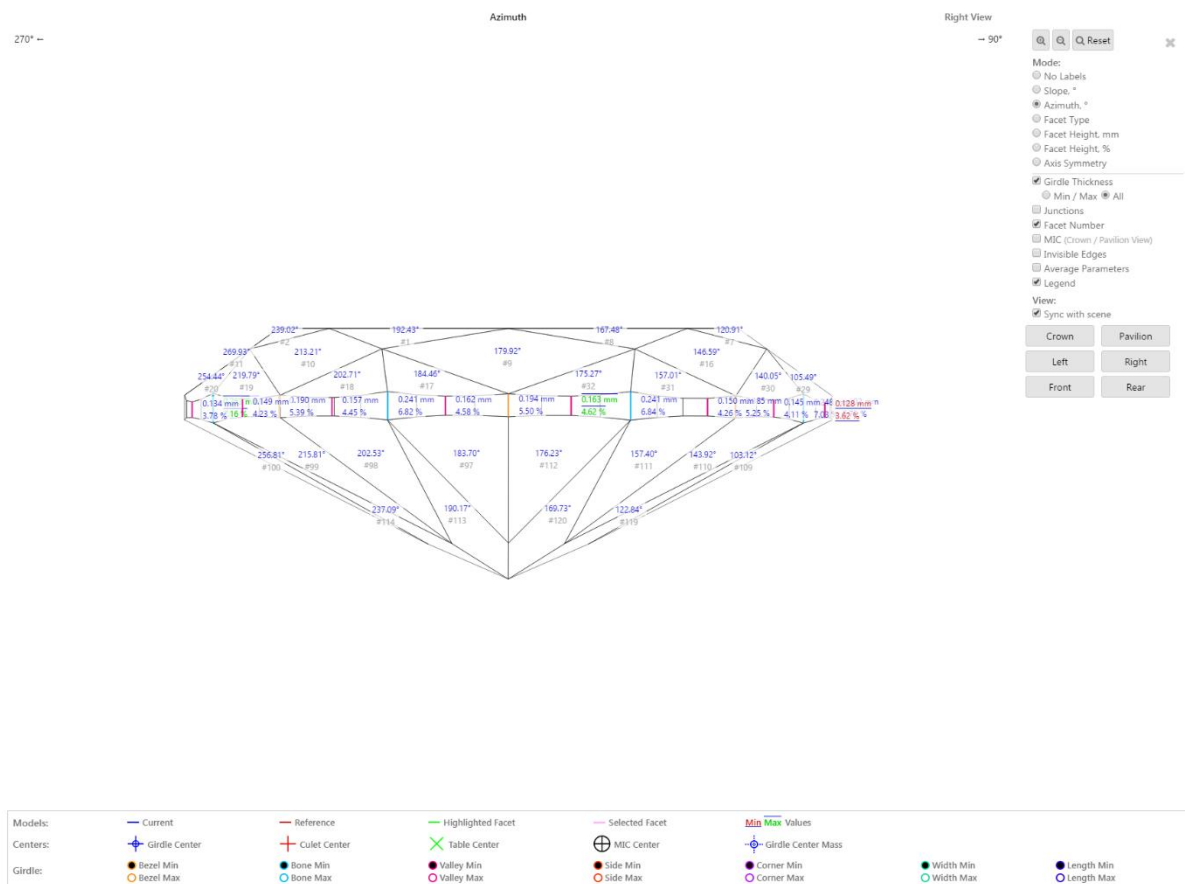
**Category:** Web Development, 3D-Graphics, Application Programming

**Company:** OctoNus Software, Moscow, Russia

**Technology:** JavaScript, HTML, CSS

### Description:

Interactive 3D Report (HTML/CSS/JavaScript) is used for viewing of diamond models and its different parameters in 3D scene – inside a GUI panel based on Qt WebEngine. Fixed visualization of diamond girdle thickness in Interactive 3D Report for different diamond shapes. Developed final calculations of girdle thicknesses for Interactive 3D Report based on a precalculated report data. Implemented a legend for the report.



## 9. Report for Comparison Scanned Diamond Models

**Period:** April 2019

**Category:** Application Programming

**Company:** OctoNus Software, Moscow, Russia

**Technology:** C++, Qt, Visual Studio, Qt Visual Studio Add-in

### Description:

Developed a report for comparison scanned diamond models using C++. The report is used to check repeatability of model building by our scanning equipment. The report is generated to a text file based on INI templates with different diamond parameters.

Created detailed and brief (with main diamond parameters) report templates.

Implemented calculation of parameters' statistics. Cumulated reports could be exported to Microsoft Excel. Integrated the report generation feature in company's software solution for diamond scanning.

	A	B	C	D	E
1	Parameter	3Sigma	Permissible	Avg Value	
2	Mass, ct	0.00012	0.001	0.549	OK
3	Diameter, mm	0.0009	0.002	5.289	OK
4	Diameter Minimum, mm	0.0012	0.003	5.28	OK
5	Diameter Maximum, mm	0.0015	0.003	5.3	OK
6	Total height, mm	0.0009	0.005	3.23	OK
7	Crown Angle, °	0	0.04	33.98	OK
8	Crown Angle Minimum, °	0.0262	0.1	33.44	OK
9	Crown Angle Maximum, °	0.0134	0.1	34.16	OK
10	Crown Height, mm	0.0009	0.01	0.818	OK
11	Crown Height Minimum, mm	0.0009	0.01	0.804	OK
12	Crown Height Maximum, mm	0.00147	0.01	0.833	OK
13	Pavilion Angle, °	0	0.02	40.59	OK
14	Pavilion Angle Minimum, °	0.0134	0.1	40.51	OK
15	Pavilion Angle Maximum, °	0	0.1	40.71	OK
16	Pavilion Depth, mm	0	0.01	2.244	OK
17	Pavilion Depth Minimum, mm	0.0009	0.01	2.218	OK
18	Pavilion Depth Maximum, mm	0	0.01	2.262	OK
19	Table, mm	0.0024	0.008	2.942	OK
20	Girdle Height Bezel, mm	0.00137	0.01	0.167	OK
21	Girdle Height Bone, mm	0	0.01	0.179	OK
22	Girdle Height Valley, mm	0.0009	0.01	0.09	OK

	A	B	C	D	K	L	M	N	O	P	Q	R	S
1	Parameter	1	2	3	10	Avg	Min	Max	Dev	St. Dev	3Sigma	Parameter	Final Status
2	Date/Time	2019-05-13, 15:01:28	2019-05-13, 15:02:01	2019-05-13, 15:06:12	2019-05-13, 15:48:59	-	-	-	-	-	-	Date/Time	
3	Model name	Shadow scan	Shadow scan	Shadow scan	Shadow scan	-	-	-	-	-	-	Model name	
4	Mass, ct	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.0001	0.00004	0.00012	Mass, ct	OK
5	Corrected mass, ct	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0	0	0	Corrected mass, ct	
6	Corrected mass, ct	0.5479	0.5479	0.5479	0.5479	0.5479	0.5479	0.5479	0	0	0	Corrected mass, ct	
7	Spread, ct	0	0	0	0	0	0	0	0	0	0	Spread, ct	
8	Spread, %	-0.39	-0.39	-0.39	-0.38	-0.39	-0.39	-0.38	0.01	0.0046	0.0137	Spread, %	
9	Extra Facet Girdle / Nat	No	1 (1/8)	No	No	-	-	-	-	-	-	Extra Facet Girdle / Nat	
10	Appraiser title	GIA Facetware.Mfg	GIA Facetware.Mfg	GIA Facetware.Mfg	GIA Facetware.Mfg	-	-	-	-	-	-	Appraiser title	
11	Overall symmetry grade	GD	GD	GD	GD	-	-	-	-	-	-	Overall symmetry grade	
12	Diameter average, mm	5.289	5.288	5.289	5.289	5.289	5.288	5.289	0.001	0.0003	0.0009	Diameter average, mm	OK
13	Diameter minimum, mm	5.28	5.28	5.28	5.28	5.28	5.28	5.281	0.001	0.0004	0.0012	Diameter minimum, mm	OK
14	Diameter maximum, mm	5.3	5.299	5.299	5.3	5.3	5.299	5.3	0.001	0.0005	0.0015	Diameter maximum, mm	OK
15	Diameter deviation, mm	0.02	0.019	0.019	0.019	0.019	0.018	0.02	0.002	0.00054	0.00162	Diameter deviation, mm	
16	Diameter deviation, %	0.38	0.37	0.35	0.37	0.36	0.35	0.38	0.03	0.009	0.027	Diameter deviation, %	
17	Diameter 1, mm	5.283	5.283	5.282	5.283	5.283	5.282	5.283	0.001	0.00046	0.00137	Diameter 1, mm	
18	Diameter 2, mm	5.298	5.297	5.297	5.297	5.297	5.298	5.298	0.001	0.0004	0.0012	Diameter 2, mm	
19	Diameter 3, mm	5.29	5.29	5.29	5.289	5.29	5.289	5.29	0.001	0.0003	0.0009	Diameter 3, mm	
20	Diameter 4, mm	5.295	5.294	5.295	5.295	5.295	5.294	5.295	0.001	0.0005	0.0015	Diameter 4, mm	
21	Total height, mm	3.23	3.23	3.23	3.229	3.23	3.229	3.23	0.001	0.0003	0.0009	Total height, mm	OK
22	Total height, %	61.08	61.08	61.08	61.06	61.07	61.06	61.08	0.02	0.0066	0.0199	Total height, %	
23	Crown angle average, °	33.98	33.98	33.98	33.98	33.98	33.98	33.98	0	0	0	Crown angle average, °	OK
24	Crown angle minimum, °	33.44	33.45	33.43	33.46	33.44	33.43	33.46	0.03	0.0087	0.0262	Crown angle minimum, °	OK
25	Crown angle maximum, °	34.16	34.16	34.16	34.16	34.16	34.15	34.17	0.02	0.0045	0.0134	Crown angle maximum, °	OK
26	Crown angle deviation, °	0.72	0.7	0.73	0.69	0.71	0.69	0.73	0.04	0.0112	0.0335	Crown angle deviation, °	
27	Crown angle 1, °	33.94	33.94	33.94	33.93	33.93	33.95	33.95	0.02	0.0045	0.0134	Crown angle 1, °	
28	Crown angle 2, °	34.03	34.04	34.05	34.05	34.04	34.03	34.05	0.02	0.0054	0.0162	Crown angle 2, °	
29	Crown angle 3, °	34.11	34.12	34.14	34.12	34.13	34.11	34.14	0.03	0.01	0.0381	Crown angle 3, °	
30	Crown angle 4, °	33.44	33.45	33.43	33.46	33.44	33.43	33.46	0.03	0.0087	0.0262	Crown angle 4, °	

## 10. Facets Multi-Selection Tool

**Period:** November 2018 – January 2019

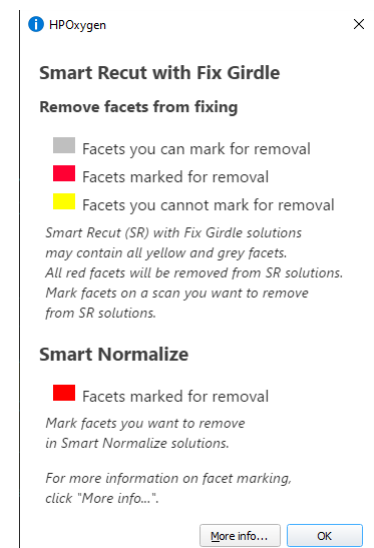
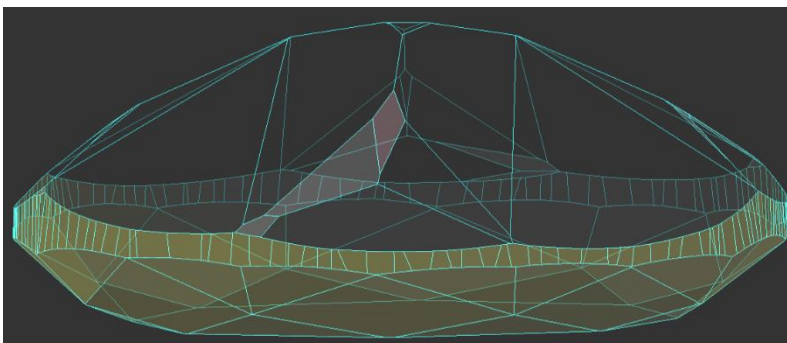
**Category:** Application Programming, 3D- Graphics, Web Development

**Company:** OctoNus Software, Moscow, Russia

**Technology:** C++, OpenGL, Qt, Qt Web Engine, Visual Studio, Qt Visual Studio Add-in, HTML, CSS, JavaScript

### Description:

Designed and developed a tool for facets multi-selection in 3D scene using C++ (containers, algorithms), OpenGL. User could rotate a diamond model and select "undesirable" facets. Selected facets are used for several algorithms of diamond models creation, special processing methods are applied for these facets inside the algorithms. Also developed a hint dialog for this functionality using Qt WebEngine and HTML/CSS/JavaScript.



## 11. Polish Report for Cylinder

**Period:** October 2018

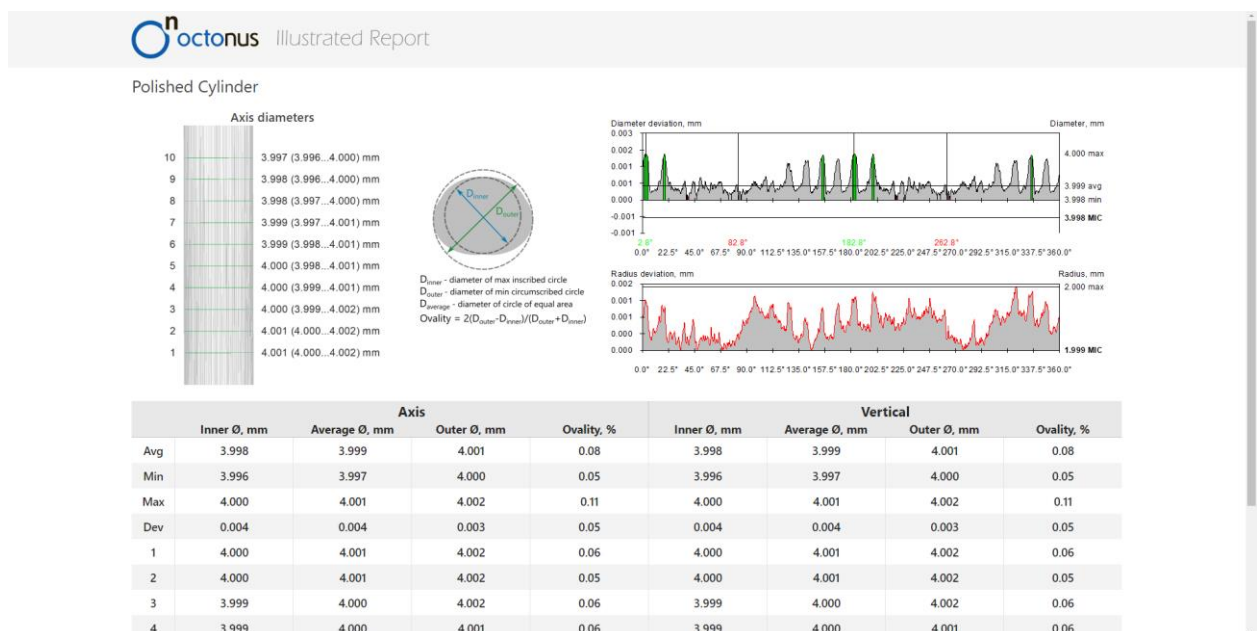
**Category:** Application Programming, 2D- Graphics, Web Development

**Company:** OctoNus Software, Moscow, Russia

**Technology:** C++, GDI+, HTML, CSS, JavaScript, Visual Studio

### Description:

Designed and developed a HTML/CSS/JavaScript report template for viewing of a polished cylinder's parameters (diameters). Reports are generated based on the template and filled by calculated data and images that are created using Windows GDI+. Implemented drawing of a cylinder overview picture with sections perpendicular to cylinder axis and by vertical using C++ and GDI+. The created report is automatically opened in the default system browser.



## 12. Interactive 3D Report

**Period:** October 2017 – July 2018

**Category:** Web Development, 3D-Graphics, Application Programming

**Company:** OctoNus Software, Moscow, Russia

**Technology:** HTML, CSS, JavaScript, C++, Qt, Qt Web Engine, Qt WebChannel, Visual Studio, Qt Visual Studio Add-in

### Description:

Integrated Interactive 3D Reports (HTML/CSS/JavaScript) for viewing of diamond models and its different parameters in a scene. Developed and implemented a GUI panel for browsing HTML-based reports using Qt WebEngine. Fixed some Axis Symmetry issues. Reports Implemented GUI for comparing two models in Interactive 3D mode. Reports exchange data with the Qt GUI panel, a core program C++ and between each other via Qt WebChannel. Integrated the panel in a company's software solution for diamond scanning. The panel was developed within the Visual Studio IDE for Windows platform.



## 13. HTML-based Faceting Report

**Period:** July 2017 – September 2017

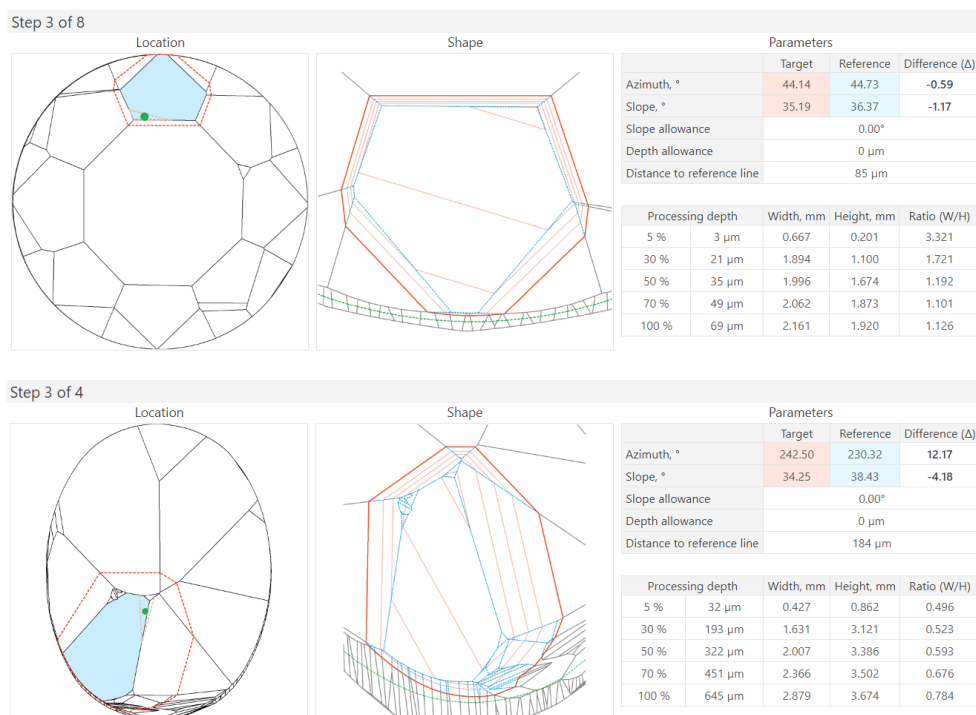
**Category:** Application Programming, 2D- Graphics, Web Development

**Company:** OctoNus Software, Moscow, Russia

**Technology:** C++, GDI+, HTML, CSS, JavaScript, JSON, Qt, Visual Studio

### Description:

Designed and developed a HTML/CSS/JavaScript/JSON report template for viewing of faceting plans for stones (processing sequence of facets and cutting results), a report manager for reports generation and a Qt GUI panel to configure them. Reports are generated based on the template and filled by JSON data and images that are created using Windows GDI+. The created report is automatically opened in the default system browser. Integrated the workflow in company's software solution for diamond scanning.





## 14. Centralized Settings of Diamond Scanning Software

**Period:** August 2016 – July 2017

**Category:** Architecture Design, Application Programming

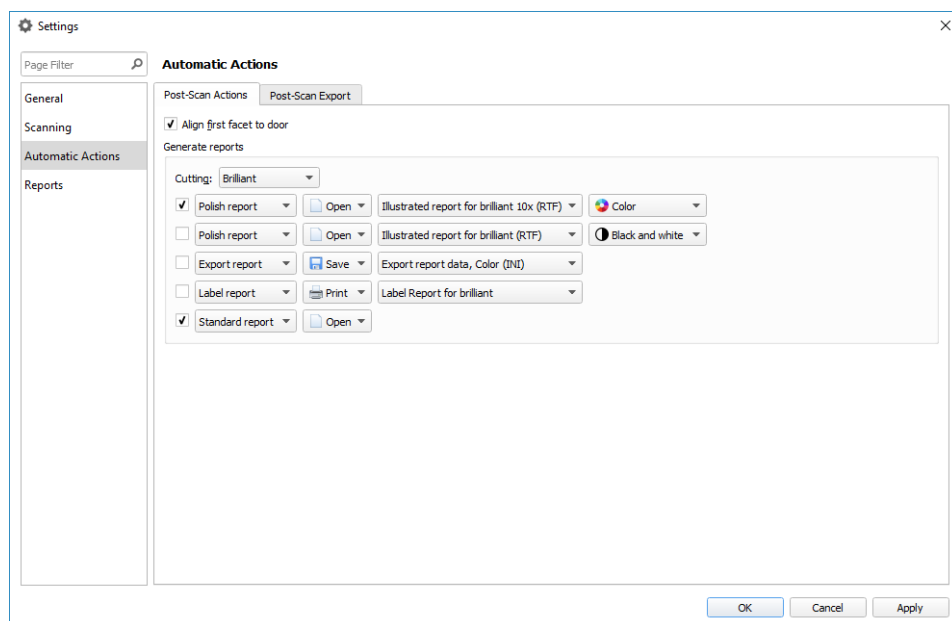
**Company:** OctoNus Software, Moscow, Russia

**Technology:** C++11, STL, Qt, Qt Creator, Visual Studio, QtWinMigrate,

Qt Visual Studio Add-in

### Description:

Designed, developed and implemented an architecture and a GUI for centralized settings of a company's software solution for diamond scanning. The settings dialog has a structure with categories and pages. Categories and pages are sorted by their weight coefficient. The settings GUI supports filtering pages by key phrases. Pages could be exported from different plugins (libraries) of the program and embedded in the settings dialog. The GUI was realized within Qt Creator IDE and moved into a separate library using the Visual Studio IDE.



## 15. HTML-based Diamond Reports

**Period:** February 2016 – June 2016

**Category:** Application Programming, Web Development

**Company:** OctoNus Software, Moscow, Russia

**Technology:** C++, Qt, Qt WebEngine, Visual Studio, QtWinMigrate, Qt Visual Studio

Add-in, HTML, CSS, JavaScript

### Description:

Designed and developed HTML/CSS/JavaScript report templates for viewing of diamond parameters and grades. Report templates were created for different types of diamond cuttings. Developed and implemented a GUI panel for browsing HTML-based reports using Qt WebEngine. Integrated the panel in a company's software solution for diamond scanning. The report panel is automatically opened after scanning. The panel was developed within the Visual Studio IDE for Windows platform.

Settings   Print...   Quick Print							
Cutting type	Brilliant			Model	Imported model		
Spread	-0.09 ct -5.84 %			Scale weight, ct			
Extra Facet Girdle / Nat	1 (0/1)			Corrected mass, ct	1.56, 1.5664		
Cut appraiser	GIA Facetware Lab			Cut grade	GD		
Symmetry appraiser	GIA Facetware Lab			Sym grade	VG		
Model building info				Final grade	GD		

Parameter	Avg	GIA Rounded	Min	Max	Dev	Cut	Sym
Diameter, mm	7.371		7.346	7.391	0.02 %		EX
Table, %	4.576 mm 62.07 %	62	61.93	62.31	0.37	VG	EX
Crown angle, °	34.89	35.0	34.22	35.43	1.22	VG	EX
Pavilion angle, °	40.87	40.8	40.30	41.48	1.18	VG	VG
Star length, %	51.56	50	49.60	53.63	4.03	VG	EX
Lower girdle length, %	78.78	80	77.14	79.77	2.63	VG	EX
Girdle bezel, %	0.372 mm 5.05 %	5.0	4.69	5.83	1.14	VG	EX
Girdle bone, %	0.378 mm 5.13 %	—	4.81	5.65	0.84	—	—
Girdle valley, %	0.251 mm 3.40 %	—	3.04	4.16	1.11	—	—
Girdle valley minimum, %	3.04	THK	—	—	—	VG	—
Girdle valley maximum, %	4.16	VTK	—	—	—	GD	—
Culet, %	0.135 mm 1.83 %	SML	1.73	1.90	0.17	EX	—
Crown painting, °	0.08	0.1	—	1.68	2.74	EX	—
Pavilion painting, °	0.04	0.0	—	0.27	0.53	EX	—
Sum painting, °	0.12	0.1	—	—	—	EX	—
Crown height, %	0.979 mm 13.28 %	13.5	12.77	13.72	0.95	—	EX
Pavilion height, %	3.137 mm 42.56 %	42.5	41.75	43.16	1.41	—	VG
Total height, %	4.488 mm 60.88 %	60.9	—	—	—	—	—
Table offset, %	0.006 mm 0.08 %	—	—	—	—	—	EX
Culet offset, %	0.042 mm 0.56 %	—	—	—	—	—	EX
Table-culet offset, %	0.037 mm 0.50 %	—	—	—	—	—	EX
Star angle, °	19.80	19.8	17.88	20.70	2.82	—	EX
Upper girdle angle, °	42.61	42.6	41.63	43.19	1.56	—	EX
Lower girdle angle, °	41.97	42.0	41.39	42.63	1.24	—	EX
Facet twist, °	1.66	—	0.00	2.76	2.76	—	—
Junction bezel twist, °	0.34	—	-1.39	1.75	3.13	—	—
Junction bone twist, °	0.56	—	-0.46	2.19	2.65	—	—
Misalignment (ALN), °	2.19	2.2	—	—	—	—	VG
2*radius roundness, %	—	—	—	—	—	—	VG
15°	0.39	—	—	—	—	—	EX
22.5°	0.47	—	—	—	—	—	VG
30°	0.51	—	—	—	—	—	VG
45°	0.62	—	—	—	—	—	EX
90°	0.74	—	—	—	—	—	EX
Model table edge, %	23.40	—	22.98	24.38	1.40	—	—
Table edge (TEV), %	23.82	23.8	23.32	24.84	1.53	—	EX
Table edge junction, %	0.39	—	0.16	0.69	0.54	—	—
Table angle, °	135.0	—	133.7	135.8	2.2	—	—
Bezel width, %	30.35	—	29.51	31.21	1.70	—	—

## 16. Asynchronous Logger and GUI Panel for Log Messages

**Period:** November 2015 – February 2016

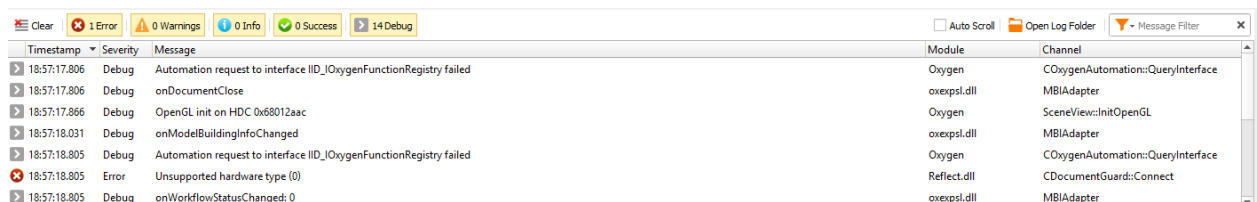
**Category:** Architecture Design, Application Programming

**Company:** OctoNus Software, Moscow, Russia

**Technology:** C++11, g3log, STL, Qt, Qt Creator, Visual Studio, QtWinMigrate, Qt Visual Studio Add-in

### Description:

Integrated an asynchronous C++11 logger (g3log) in a company's software solution for diamond scanning. Designed, developed and implemented a submodule in a separate library that logs messages to files and in a GUI panel. The logger captures messages from all libraries of the program, it helps to determine a current state of scanning workflow. Implemented a rotation policy of log files. Designed, developed and implemented a GUI panel in a separate library for viewing log messages in real time. The panel supports filtering messages by log levels, searching messages by keywords and sorting messages by log parameters. The GUI was realized within Qt Creator IDE and integrated in a MFC panel using the QtWinMigrate framework. The logger and the GUI panel were developed within the Visual Studio IDE for Windows platform.



## 17. Interactive 3D Reports Client

**Period:** August 2015 – October 2015

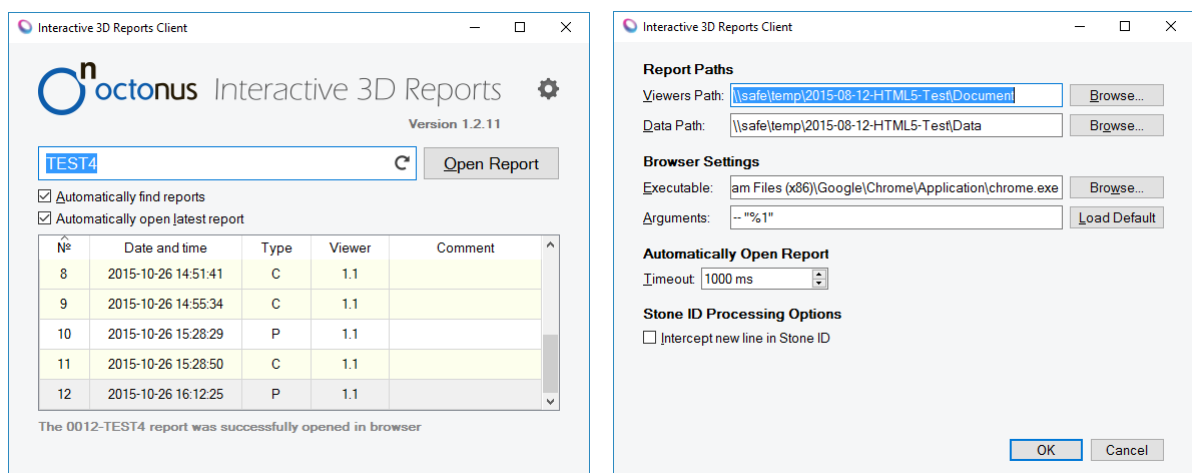
**Category:** Application Programming, Installer Development

**Company:** OctoNus Software, Moscow, Russia

**Technology:** C++11, Qt, Qt Creator, XML, Inno Setup, Web browsers

### Description:

Developed, developed and implemented a Windows app that allows scanner operators and cutters find, open and operate with HTML5-based Interactive 3D Reports from their workstations. The software is used to find and view previously generated reports stored on a network location or a local disk for a stone with a specific identifier. Metadata of reports are represented in XML format. Most of the modern web browsers are supported by the reports client. The application was realized within the Qt Creator IDE using C++11. An installer for the software was developed using Inno Setup.



## 18. Set-Top Boxes Software

**Period:** August 2010 – August 2015

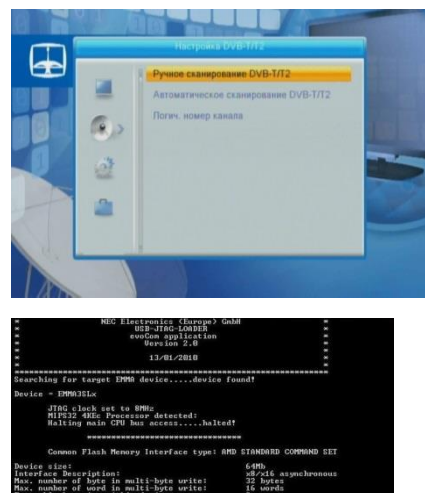
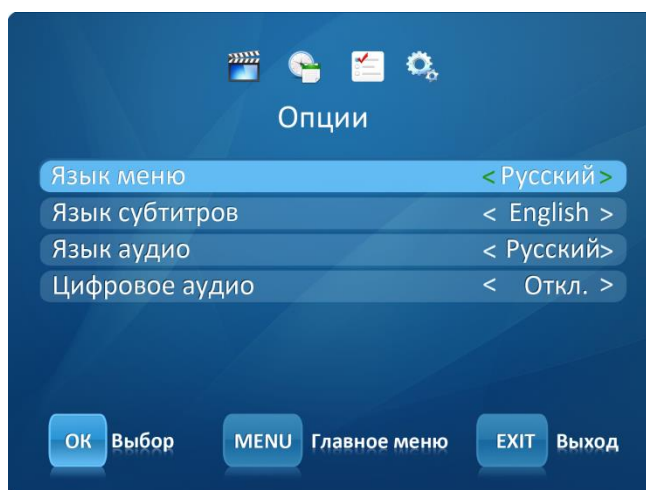
**Category:** Embedded Software Development and Testing

**Company:** Moscow Scientific Research Television Institute, Moscow, Russia

**Technology:** C, C++, Shell script, Makefiles, DirectFB, Cross Compilers, Embedded Linux, DVB-T/T2, IPTV, VirtualBox, Minicom, JTAG

### Description:

I was responsible for developing, refactoring and testing applications for DVB-T/T2 set-top boxes based on Renesas Electronics, ST Electronics, NXP Semiconductors, ALi Corporation and HiSilicon Technologies platforms. Worked in a development team that has been designing set-top boxes using a variety of the latest digital TV technologies. Had been developing and testing set-top boxes software utilizing C, C++, Shell script, Makefiles and Cross Compilers. The set-top boxes are based on Embedded Linux. Configured and started a HiSilicon 4K platform with support of an Android Operating System. Started a NXP Semiconductors IPTV set-top box and tested it using VLC media player. Tested Set-Top-Boxes according the Nordig specifications. Had been configuring development environment and installing SUSE Linux, Fedora Linux, Ubuntu. Had been finding and fixing faults in set-top boxes via Minicom, JTAG.



## 19. Aerodynamic Measurements Software

**Period:** January 2015 – April 2015

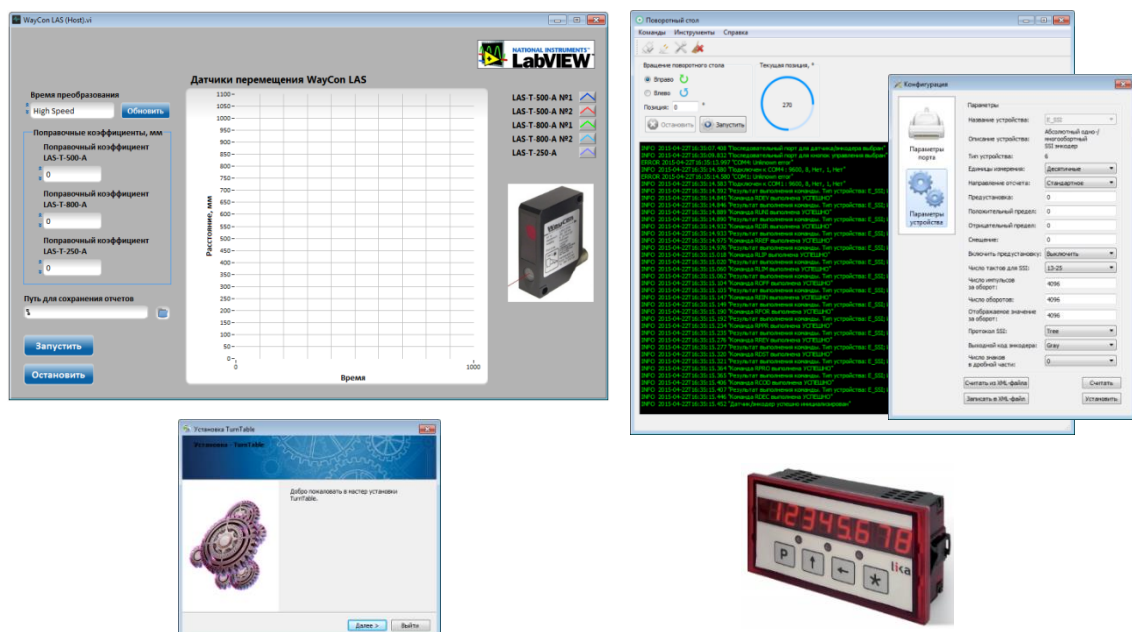
**Category:** Application Programming

**Company:** Moscow Scientific Research Television Institute, Moscow, Russia

**Technology:** NI LabVIEW, C++, Qt, Qt Installer Framework

### Description:

Aerodynamic measurements control software was developed and tested for Windows platform. The software is used to implement a physical modeling of wind impact on buildings. A model is positioned at the center of a turntable that can be rotated to simulate wind approaching from any azimuth. The model is geometrically scaled to a building. An application software for laser sensors that detect a distance to the model was implemented in the NI LabVIEW IDE. The laser sensors are connected to a NI chassis with FPGA that interacts with PC by Ethernet. Results are saved in Excel files. A turntable management application was realized within the Qt Creator IDE using C++. Commands between PC and the turntable are transmitted via a serial port and a universal position display.



## 20. Algorithm of Character Recognition

**Period:** March 2013 – June 2014

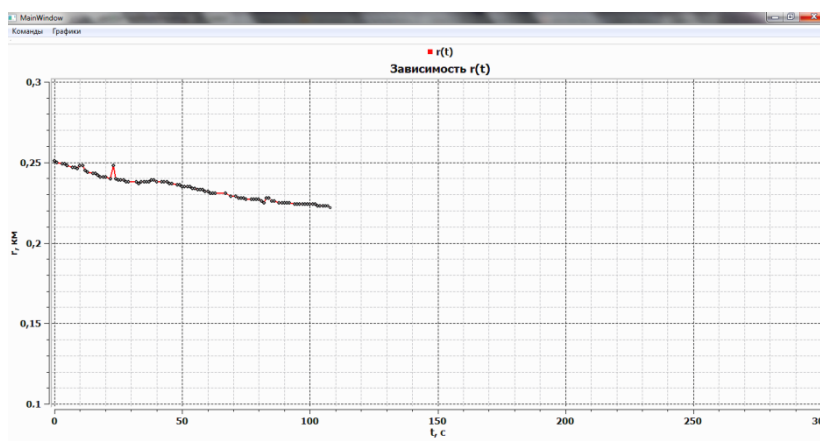
**Category:** Algorithm Design and Implementation, Research and Development Project

**Company:** Moscow Scientific Research Television Institute, Moscow, Russia

**Technology:** C++, OpenCV, Qt, Qwt, XML, SQL

### Description:

Utilized algorithm design principles and theories to implement a correlation algorithm of character recognition in TV images from satellites. It is used for extraction of telemetry data using binary patterns of characters. Segmentation of characters is performed via contours. To determine the degree of closeness of input image and template is used the cross-correlation with FFT. The algorithm was written in C++. Some steps of this algorithm have been implemented using the OpenCV computer vision library. Recognition results are stored in SQL database. The app processes a real-time video stream. The program utilizes a multi-threaded processing of all parameters. Its complexity and performance were evaluated against other image recognition solutions. The project was developed in the Qt Creator IDE for Windows platform.





## 21. Widget for Samsung Smart TV

**Period:** June 2012 – November 2012

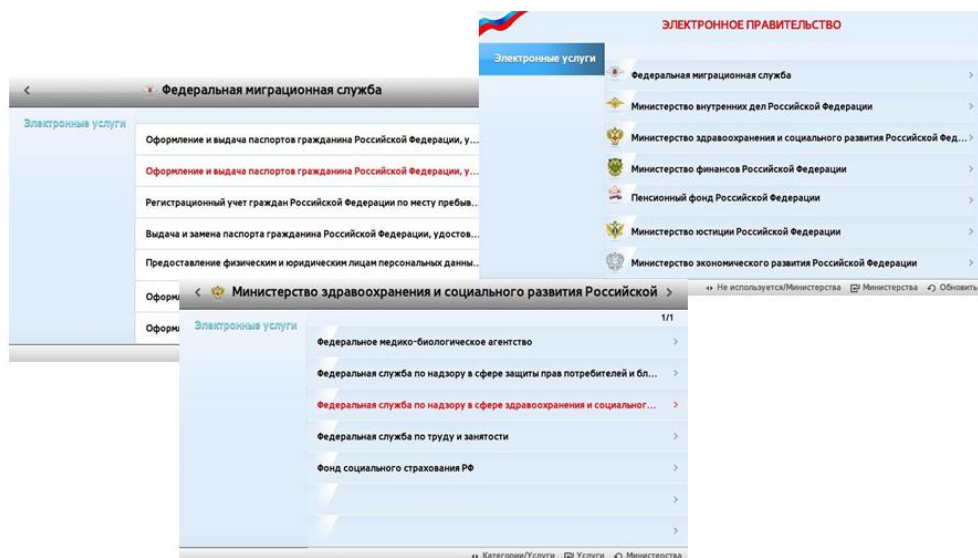
**Category:** Web Development

**Company:** Moscow Scientific Research Television Institute, Moscow, Russia

**Technology:** HTML, JavaScript, XML, AJAX, CSS, Eclipse, Samsung Smart TV SDK

### Description:

Designed, developed and tested a widget for Samsung Smart TV scripted in JavaScript. The widget was designed to provide a simple and easy-to-use way of giving information about the public services in Russia. The app displays the structure of ministries and departments, the list of services and information about them. Other web technologies: resources are extracted from XML files via AJAX requests. The widget is managed by remote control. The project was developed within the Eclipse IDE included Samsung Smart TV SDK.



## 22. Porting Device Drivers

**Period:** January 2012 – May 2012

**Category:** Device Driver Development

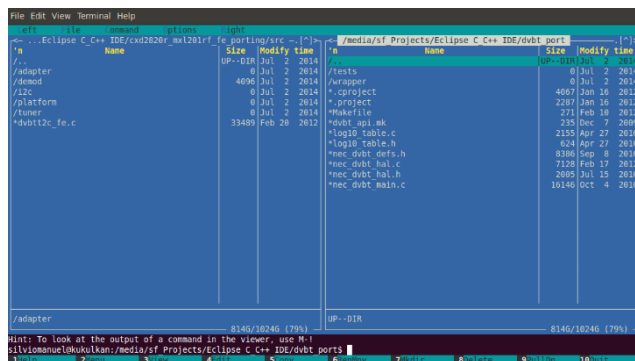
**Company:** Moscow Scientific Research Television Institute, Moscow, Russia

**Technology:** C, C++, Shell script, Linux I2C Core, Embedded Linux, SVN

### Description:

Frontend (tuner and demodulator) drivers were integrated in DVB-T and DVB-T2 set-top boxes based on Renesas platform with Embedded Linux. Used two frontends:

1) MaxLinear tuner and Sony demodulator; 2) DiBcom tuner and demodulator. Each frontend has two channels (two tuners and two demodulators). The demodulators are connected to a set-top box CPU by I2C bus. The set-top box CPU is a master, the demodulators are slaves. Each tuner is joined with demodulator by I2C bus. Each demodulator is a gateway for appropriate tuner. Software was written in C and C++. Used Linux I2C Core. A kernel module wrapper calls open demodulator functions and interacts with user space.



name	Size	Modify time	name	Size	Modify time
UP--DIR	0 Jul 2 2014		UP--DIR	0 Jul 2 2014	
/adapter	0 Jul 2 2014		/tests	0 Jul 2 2014	
/demod	4096 Jul 2 2014		/wrapper	0 Jul 2 2014	
/i2c	0 Jul 2 2014		*.project	4067 Jan 15 2012	
/platform	0 Jul 2 2014		*.project	2287 Jan 16 2012	
/tuner	0 Jul 2 2014		*Makefile	271 Feb 18 2012	
*dvbI2C_fe.c	33489 Feb 26 2012		*dvbI2C_api.mk	235 Dec 7 2009	
			*log10_table.c	2155 Apr 27 2010	
			*log10_table.h	624 Apr 27 2010	
			*rec_dvbt_defs.h	8186 Sep 8 2010	
			*rec_dvbt_hal.c	7128 Feb 17 2012	
			*rec_dvbt_hal.h	2005 Jul 15 2010	
			*rec_dvbt_main.c	10146 Oct 4 2010	



## 23. Software Engineering for Microcontrollers

**Period:** August 2009 – July 2010

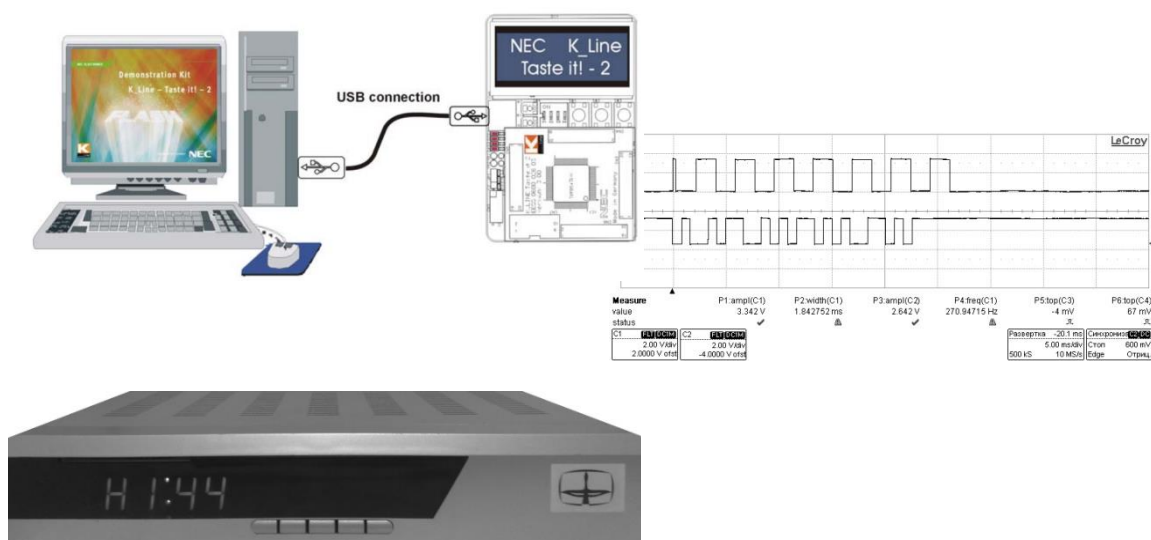
**Category:** Microcontroller Programming, Embedded Software Development, Low-Level Debugging

**Company:** Moscow Scientific Research Television Institute, Moscow, Russia

**Technology:** C, I2C, IAR Embedded Workbench EW78K, Green Hills Multi, SVN

### Description:

Developed and tested software for a front panel of digital set-top box in IAR Embedded Workbench EW78K IDE using C language. A model is based on Renesas Electronics components. A microcontroller of front panel interacts with an LED indicator driver and a set-top box CPU by I2C bus. The app controls and synchronizes the current time, processes key presses, decodes a remote control signal by Philips RC-5 protocol, supports standby. Developed a communication protocol between the set-top box CPU and the micro of front panel. Software for the set-top box CPU was developed in Green Hills Multi IDE. Oscilloscope was applied to low-level debugging. The developed software is used in two set-top boxes (DVB-T and DVB-T2) based on different Renesas Electronics chipsets.



## 24. Software for Researching of Solar Panels

**Period:** February 2009 – May 2009

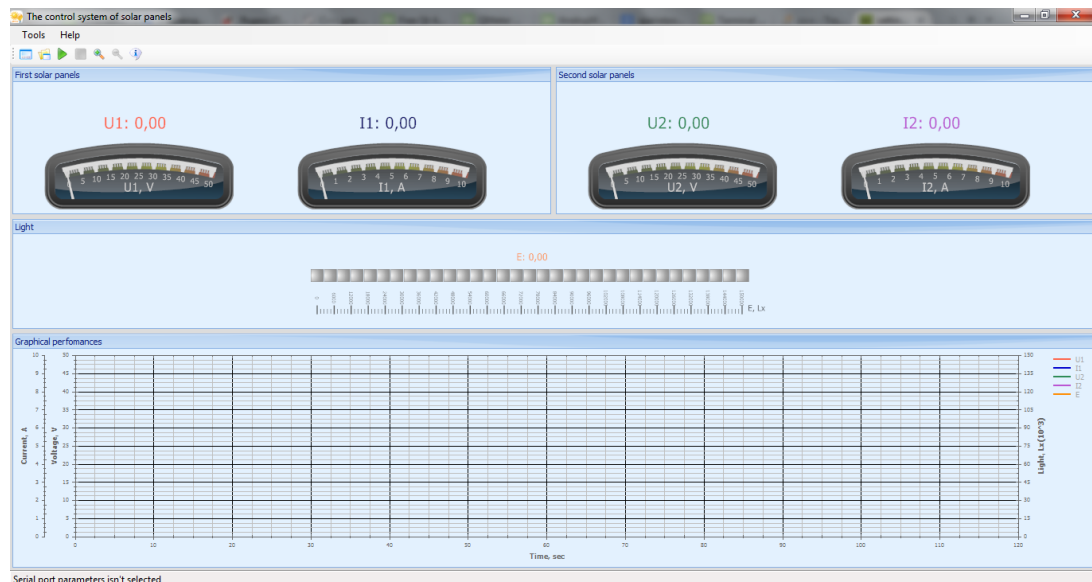
**Category:** Research and Development Project

**Company:** Bauman Moscow State Technical University

**Technology:** C#, Windows Forms, InteropServices (Excel), Visual Studio, InstallShield

### Description:

An application for researching the level of insolation and efficiency solar panels was developed and tested. The app was written in C#. It controls an output current of solar panels and a voltage of panels from sensors through a serial port. The data is saved in an Excel file, where is calculated the hourly capacity and are built some graphs. The project was developed within the Visual Studio IDE. The necessary calculations for the real efficiency estimation of solar panels were implemented.



## 25. System of Confidentiality Protection and Data Integrity

**Period:** January 2008 – November 2008

**Category:** Application Programming, Architecture Design, Database Development, Installer Development, Testing

**Company:** Perimetrix, Moscow, Russia

**Technology:** C++, C#, STL, WinAPI, MFC, UML, SQLite, Visual Studio, WinDbg, SVN, InstallShield, Active Directory, Scrum

### Description:

Participated in Perimetrix SafeSpace Data Loss Prevention System developer team. I took an active part in a Perimetrix SafeEdge subsystem development. It is a real-time monitoring system for all documents leaving the corporate network perimeter which automatically filters and classifies outgoing documents. This product ensures a protection of data in motion. I developed a client driver, a test utility, static and dynamic class diagrams, GUI, an installer, unit tests and database structure. I also performed testing product modules. I implemented software in C++ and C#. The project was developed within the Visual Studio IDE. Our team used the Scrum software development methodology.



## 26. Test-System for a Computing Complex

**Period:** March 2007 – January 2008

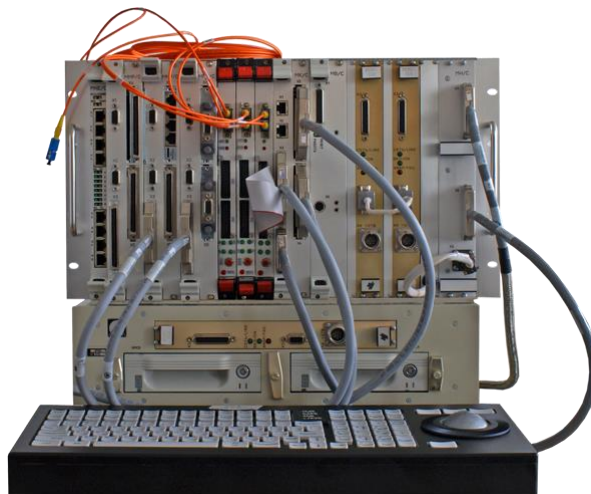
**Category:** Test-System Development

**Company:** MCST, Moscow, Russia

**Technology:** C, Shell script, Linux, CVS

**Description:**

Worked within a team responsible for software development and testing of a computing complex. Developed and modified tests for main devices this system using C language and Shell script. Installed and configured Linux operating system. I also developed a system for an automation of assemblage and installation Linux kernels using Shell script.



## 27. Publications

1. Hardware and software development of unified module of management and indication panel for digital set-top-box, 2010.
2. The practical aspects of hardware and software development of unified front panel module for digital set-top-boxes, 2012.
3. Smart TV applications development experience, 2012.
4. Operational selection of telemetry data in TV images, 2013.
5. Recognition of character information in TV images using binary templates, 2014.
6. A recognition system of character information in TV images, 2014.
7. Correlation algorithm of character information recognition in TV images, 2014.



## **28. Accomplishments**

1<sup>st</sup> prize in Temryuk City Junior Physics Olympiad, Krasnodar Region, Russia, 2000

2<sup>st</sup> prize in Temryuk District Junior Physics Olympiad, Krasnodar Region, Russia, 2000

3<sup>st</sup> prize in Slavyansk-na-Kubani Area Junior Physics Olympiad, Krasnodar Region, Russia, 2000

1<sup>st</sup> prize in Temryuk District Junior Physics Olympiad, Krasnodar Region, Russia, 2002

3<sup>st</sup> prize in Programming & Research Contest of Young Specialists, Moscow Scientific Research Television Institute, Moscow, Russia, 2014