The Modern Application Development with Ada

What is a good language? It's a language which has a small set of words, but it's enough to accurately explicate all important minds and actions. This is ADA-2005, isn't it?

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We will be set a simple question, why ADA did not become the same popular programming language as C, C ++ or JAVA? It seems to me, that the basic reason is an insufficient environment and rather small numbers of IDE and packages, that expands language possibilities.

What is necessary today for developing software for scientific, engineering and business oriented systems?

1. Presence powerful IDE which would allow parallel work of a great number of developers (ADA packages is the best way to support parallel works).

2. Developed software, that functioning on various platforms and operating systems. (ADA standard provides 100% compatibility of source code).

3. A various and high-quality sets of widgets, providing multipurpose GUI.(This part is not included into language standard, and require to write corresponding ADA packages).

4. Possibility of direct interaction with databases at ODBC level or interfaces to ORACLE, MYSQL, MS SQL SERVER, SQLITE and other Databases.

5. Processing multimedia objects: video, sound and various graphics formats.

6. Display and processing of various documents in XML, HTML, DOC, DOCX, PDF and others popular formats.

7. Maintenance of a network communication facility and data transmission. Protocols support for TCP/IP, FTP, HTTP, HTTPS, and others, and also URL navigation.

8. 2D and 3D rendering and imaging.

9. Make a call of system functions and get of various system information.

Probably the best solution of the described above problems - is to develop corresponding packages and interfaces, and their additions to the language environment or, at least, as addition components of the IDE (GNAT compiler).

However, a long time and big financial investments are needed to realize such projects. Therefore it is necessary to consider others ways of the decision tasks, in view of which can be reached with smaller efforts and time expenses, at maintenance shipping and stability requirements.

One of the decisions, of the considered above requirements, was realized in **VAD** (Visual Ada Developer)
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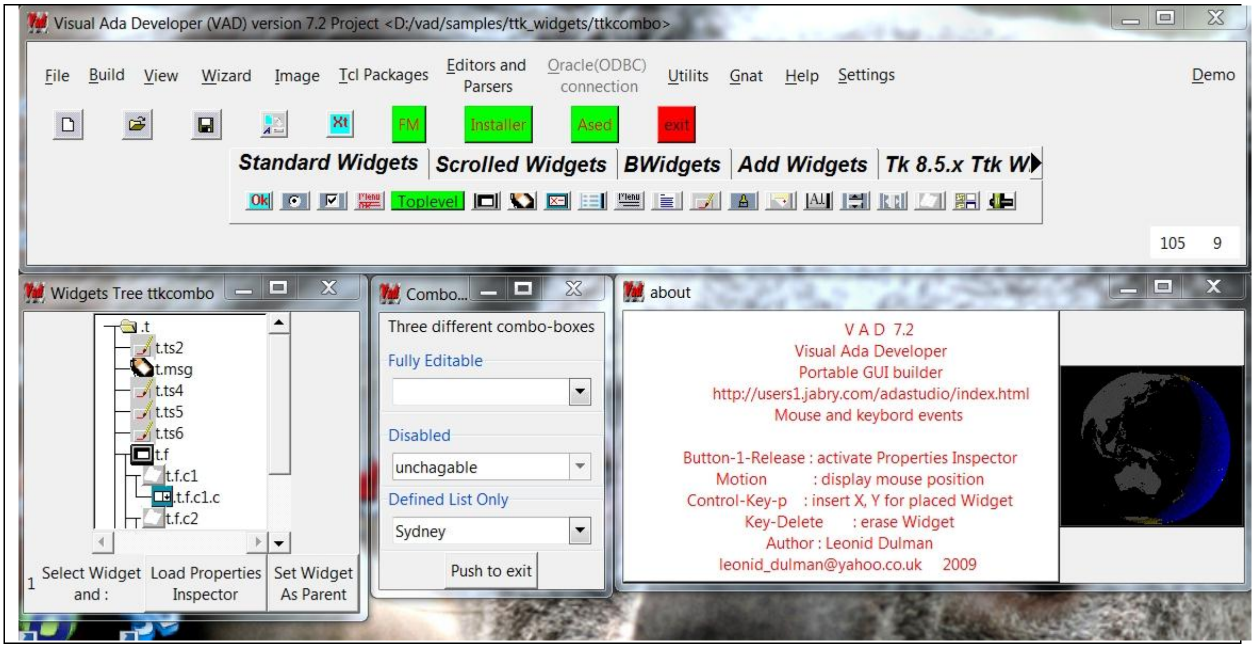

Visual Ada Developer (VAD) version 7.2 Project <D:/vad/samples/ttk_widgets/ttkcombo>

Widgets Tree ttkcombo

.t
t.ts2
t.msg
t.ts4
t.ts5
t.ts6
t.f
t.f.c1
t.f.c1.c
t.f.c2

Combo...

Three different combo-boxes

Fully Editable

Disabled

unchagable

Defined List Only

Sydney

about

V A D 7.2
Visual Ada Developer
Portable GUI builder
http://users1.jabry.com/adastudio/index.html
Mouse and keybord events

Button-1-Release : activate Properties Inspector
Motion : display mouse position
Control-Key-p : insert X, Y for placed Widget
Key-Delete : erase Widget
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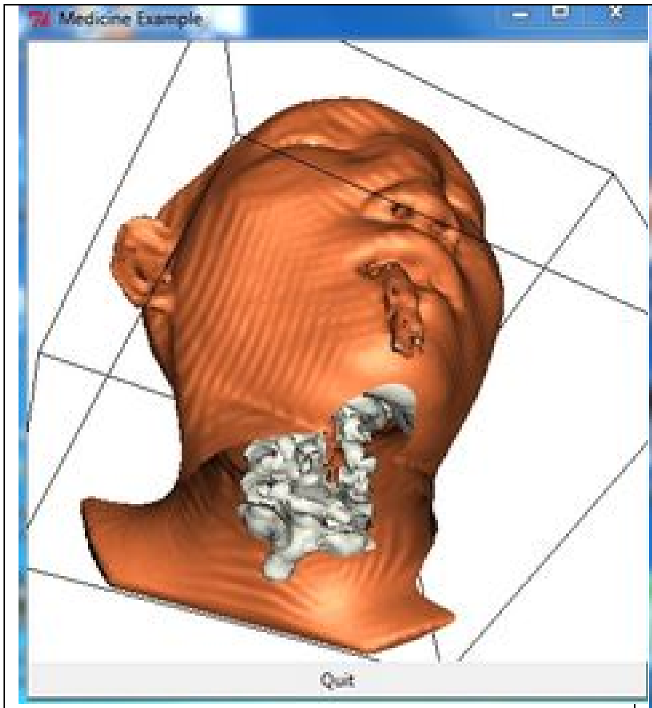
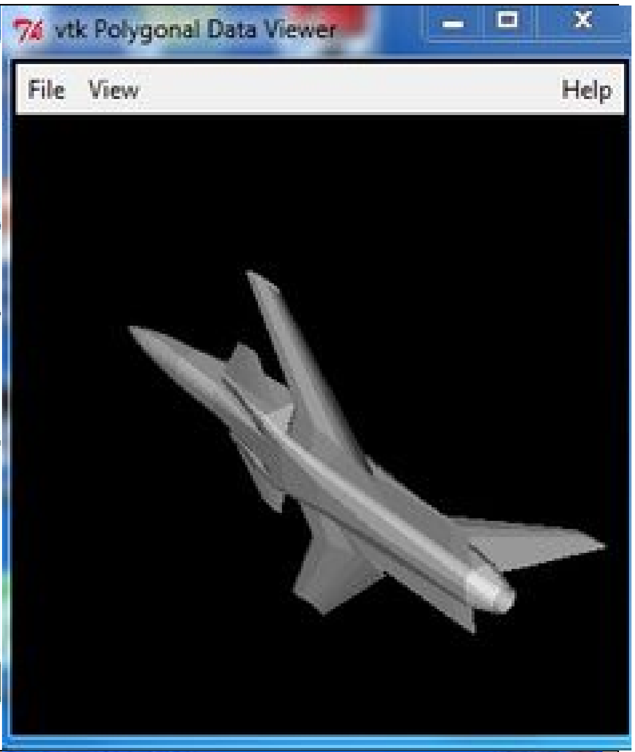
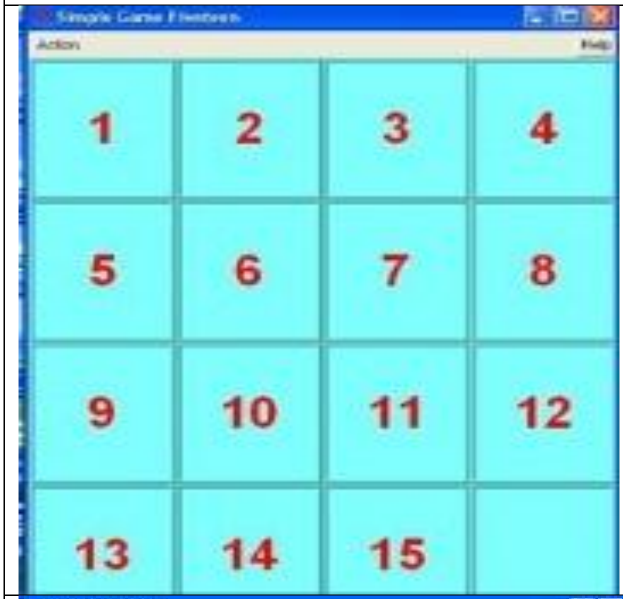
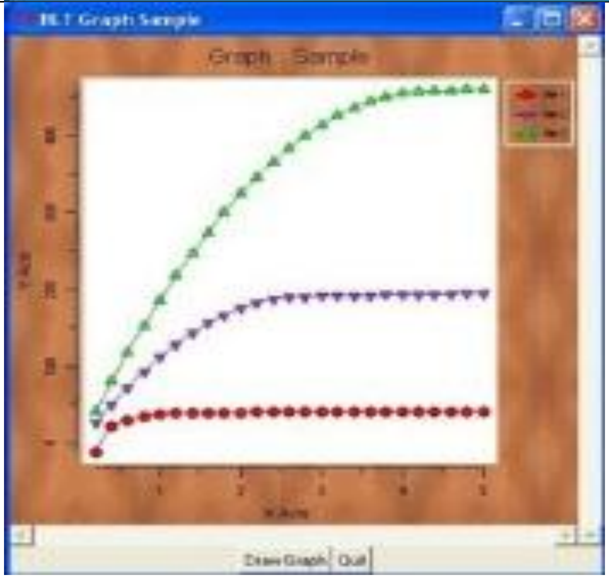
In VAD application, we can use any of tcl/tk packages compatible with version 8.5 and above, and it allows simple and quick way to develop ADA application.
This IDE can be effective enough for education and training. For example, problem's solutions of "Hanoi tower", 8 queens, dinner philosophers, simple games, etc.

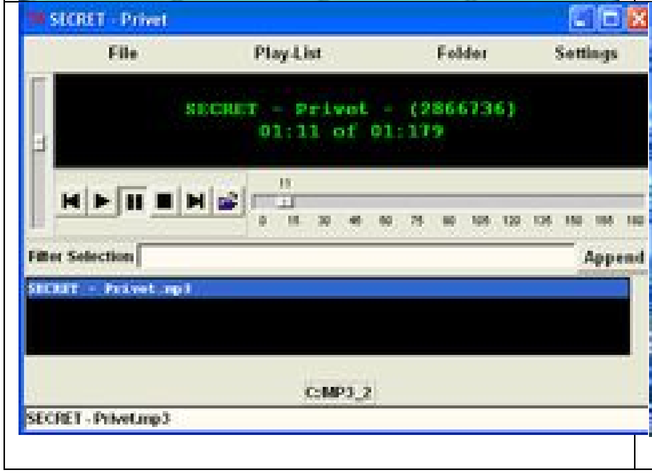
In the examples showing to VAD, you can see realizations of the discussed above applications.











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01:11 of 01:179
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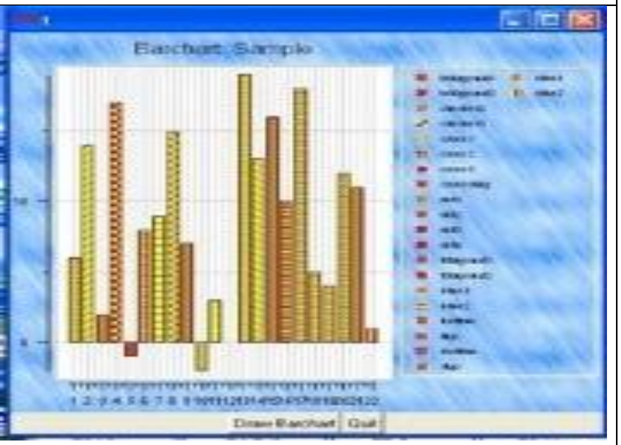
SECRET - Privet.mp3

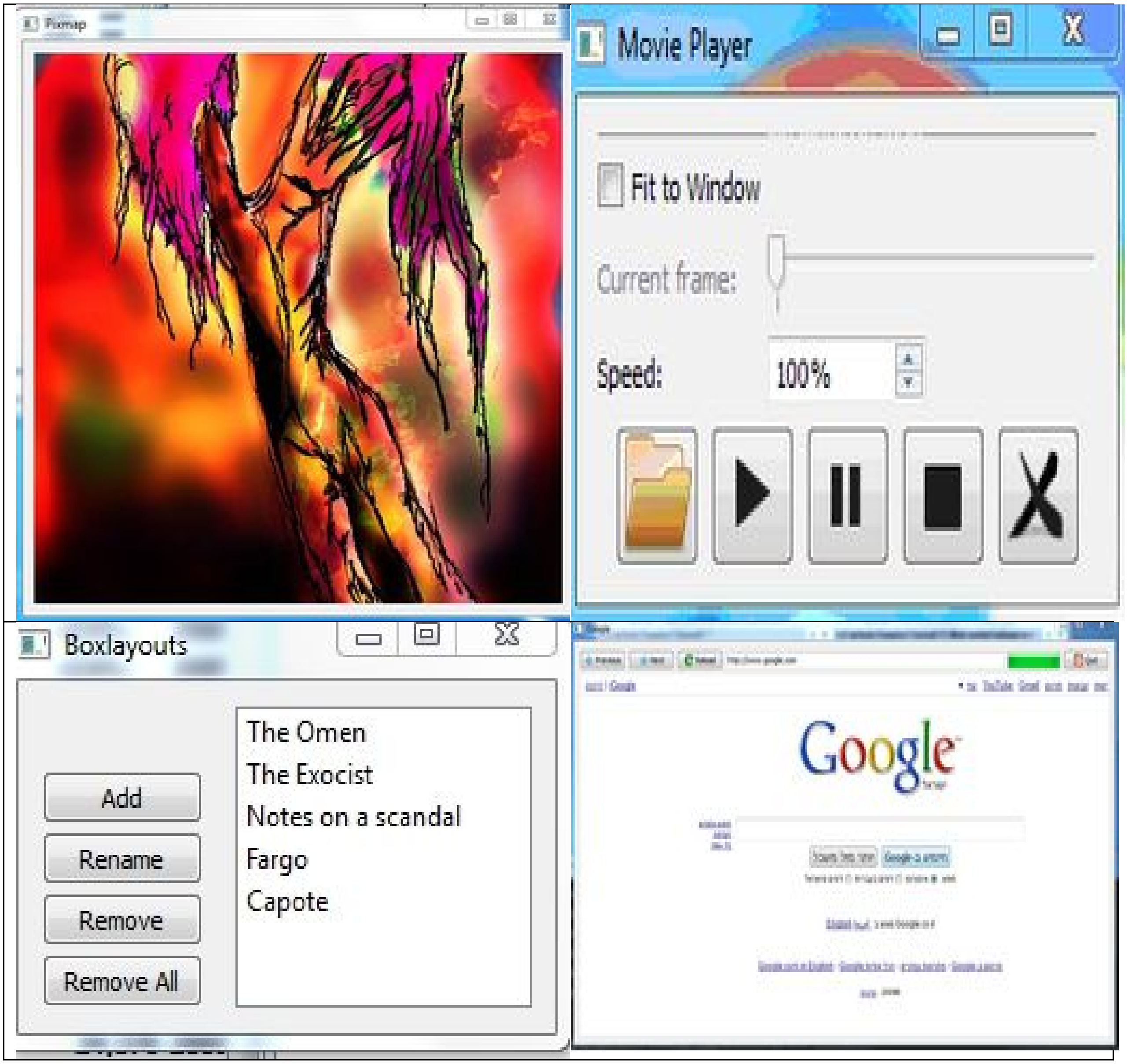
SECRET - Privet.mp3



Other approach is to use systems which are written on C, as it is possible to use C to ADA interface (pragma IMPORT). The problem is that today program software development on C almost nonexistent because of C programming low reliability. And practically everybody moved to C++.

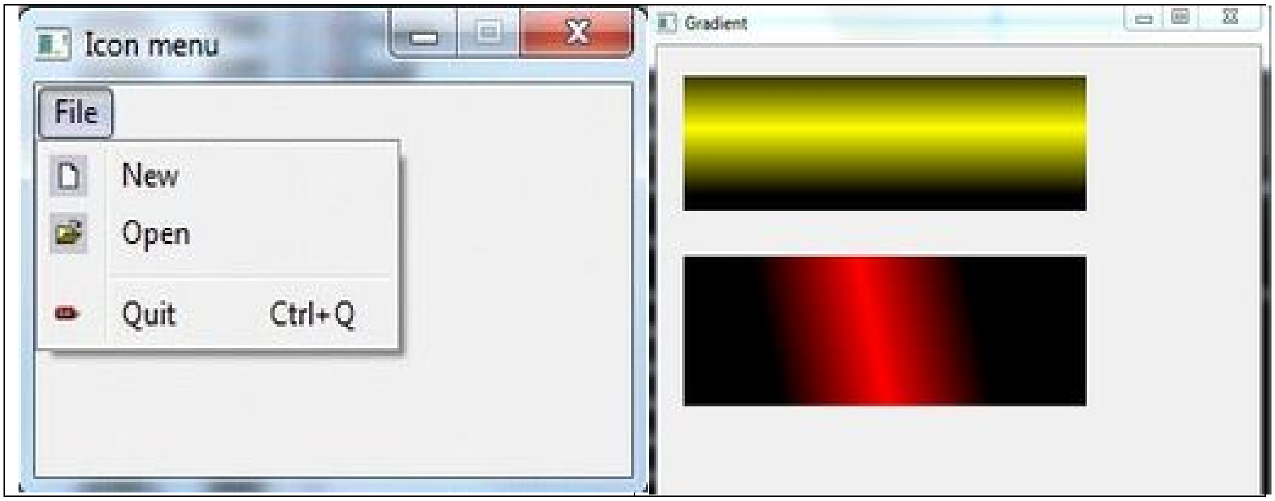
One of the last and most perspective (as it seems to me) FRAMEWORK is QT of TrollTech Inc. and Nokia. It is constantly developed, well documented reliable system with a considerable quantity of examples (including such complex as WEB BROWSER, MEDIA PLEYER, DATABASE BROWSER and others).

Qt is the basis for KDE and others base applications in LINUX oriented Operating systems, and, thanks to portability, these applications can be easily transferred to the WINDOWS and APPLE environments.



Speed: 100%

The Omen
The Exocist
Notes on a scandal
Fargo
Capote



All of above open the huge possibilities for the ADA-95 (2005,2012) software developers.

1. In the course of the base programming training. On one hand, thanks to ADA standardization, perhaps the best programming language. It has a simple and strong construction to support the object oriented and structural programming, and also supports of the parallel multitasking programming. So, with the graphics interface, we have got a powerful presentation model (a problem about 8 queens or dinner philosophers), which allows making the training process an interesting and effective task.

2. Trainers design development, modeled systems and emulators in ADA cannot be realized without using powerful GUI tools.

3. Design of the large control systems (for example monitoring systems and airport managements), also cannot be realized without database access, 2D, 3D rendering and UI.

4. Numerous successful attacks on various systems has found out vulnerability in the software, which shows serious problems in systems safety which are a consequence of used programming technologies and programming languages (For example stack overflow, buffer overflow), also force to pass to more strict programming systems, and ADA is on the first place.

All it shows, is that use ADA and QT is a rather perspective development technology, reliable and has effective program maintenance.

However to work with QT from ADA It is necessary:

1 to write C interface to QT C++ FRAMEWORK - QTC
2 ADA’s packages to call QTC functions.

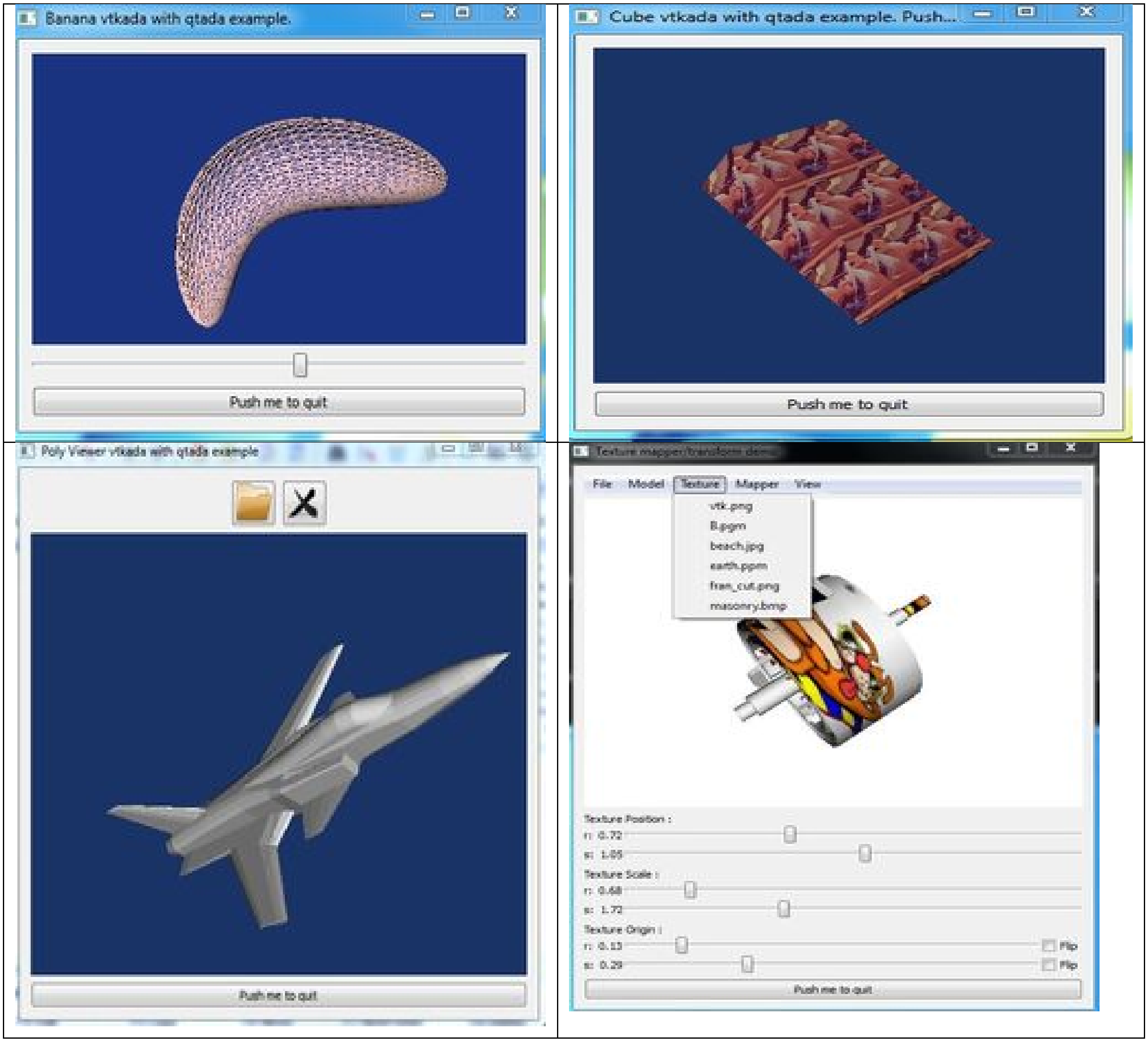
The model, described above, has realized in ADA-95 (ADA-2005) expansion QTADA (http://users1.jabry.com/adastudio/index.html). This is a group of the packages, which provide a call of relevant QTC functions in ADA modules.

QTADA consists of a root package Qt in which specified the basic types of the data are specified both the most important constants, and the child packages, where have realized corresponding QT classes (Their properties, methods, events).

Current version QTADA 5.15.0 supports interaction with QT 5.15.0 and above and was tested in Windows 10 (64 versions MS Visual Studio 2019) and Linux x86-64 (Debian 9,10).

The next step is to add high level 2D and 3D imaging and rendering to QtAda framework. It was realized in **VTKADA** package - Ada interface to

VTK (**Visualization ToolKit** by **Kitware Inc.**).



Texture Position :
r: 0.72
s: 1.05
Texture Scale :
r: 0.68
s: 1.72
Texture Origin :
r: 0.13 □ Flip
s: 0.29 □ Flip

There four problems were solved in **VTKADA**

1. VTK rendered window inside of QtAda application
2. Qt signal slot mechanism to control Qt and VTK objects
3. Event handlers (mouse, keyboard and others) to control Qt and VTK objects.
4. AddObserver event handle mechanism in VTK.

These examples demonstrate, how to use **VTKADA** rendering inside of **QTADA** window. Now we have "All in one", powerful framework with powerful imaging and rendering.

These applications may be used in wide class projects, which need high level 2D and 3D imaging and rendering and GUI, to build critical systems such as airport control and navigation, medical, nuclear reactor and others. It may be used in various training and emulation systems as well. In ADA-2005 it is possible dynamically to create task for any new object (for example new airplane in the zone of airport's responsibility),and in real time to display the object's graphics representation with modeling of its further behavior through given time interval.

I hope my work may be used in software developing for education, medicine, military, engineering and others spheres.