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CA SYSTEMS INTEGRATION AND APPLICATION INTERFACE

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ABSTRACT
In the paper is a described VBA (Visual Basic for Application) and API (Application programming interface) in CAD/CAM system ALPHACAM. VBA is a full fledge programming language that allows a developer to create applications, the MACROS are now PROCEDURES. In second part of article is described the Communication Manager. It allows the connection between CAD/CAM system ALPHACAM and CAPP system SYSKLASS. The Communication Manager was made by VBA and his utilization brings the effective tool for a rapid communication between both systems.
Keywords: API, VBA, object, procedure, integration

1. MACRO LANGUAGE
Macro languages are used for writing macros. Macros languages gone by development so the others programming languages. In this time they are hybrid, procedural and object oriented languages. Macro language used in products of firm MS is based on programming language Visual Basic. His name is Visual Basic for Application (VBA).
Actual languages for making of macros offer:

- Language based on function and subroutines with orientation to objects
- Using of standard programming structures (If…Then…Else, Do…Loop. For…Next, Select Case, etc.)
- Possibility of fixation and handling exceptions (ON Error …)
- Handling event (OnClick, OnOpen …)
- Full access to commands and function of host application
- Integral editors for writing and making codes
- Possibility of debug
- Making of own user interface - GUI (guest user interface)(dialog box, menu, panels of tools, help, etc.)
- Possibility to use GUI host application, eventually to change and to complete them
- Make use of programming interface of application (API – Application Programming Interface) Windows, of own DLL library

From the present list result, those macro languages offer sufficient tools. Whit him help is possible make application labour of everyday using programs. If we add to possibility of connection all

products Office and access to data in databases, we have in hand very strong tool for making of complex office applications.
Even if applications based on Office can't in area of programming supply of programming languages (C++, SmallTalk, Delphi, Java, …), are this applications advantageous from this reasons:

- They make possible create application "tailor-made" by simple accommodation ready host application
- They working quickly, because can using standard functions of host application
- They make possible users stay in known work-bench
- They make possible own application also experienced users with minimal knowledge of programming

2. MACRO LANGUAGE IN SYSTEM ALPHACAM

In actual machine firm are necessary integration, flexibility and intelligence of production processes and systems. For all that, integration of CA systems represents eminent trend. Is it higher and more effective degree of using computer systems. Integration affects whole effects of computer aided and effects of engineering work in firm. Insufficient integration between computers aided systems, make big problems in technical preparation of production and in whole business system of planning and control production. This have negative result in area of production costs, continues times and etc..
Using of API interface can markedly make easier solve of this problem. System ALPHACAM have very good API interface. API interface is available by VBA, which is component of installation system ALPHACAM.
The ALPHACAM API is an OLE Automation programming interface to ALPHACAM. The API contains many functions that can be called from Visual Basic for Applications (VBA) in ALPHACAM. The functions can also be called by VBA (in Excel, Access, Word etc) or by programs or DLLs created with Visual Basic, Delphi, C++ or any other language that supports OLE Automation.
The API functions provide the programmer with direct access to ALPHACAM functionality such as creating geometries, machining them, controlling the input and saving of files etc. The API interface uses an **Object Oriented approach**. All of the functions are including **Methods** and **Properties** which apply to an **Object**. The **Object Browser** in the **View** menu of the VBA Editor contains a complete searchable list of all the objects, methods and properties available in the program.
All Advanced modules include the ability to run externally created Parametric Macros. The API does not replace Parametric Macros, but is an additional, more powerful, way of controlling the functions in an ALPHACAM module.

3. INTEGRATION OF CAPP AND CAD/CAM SYSTEMS

In this time is large ambition to integrate used CA systems. Idealistic imagery about full-integrated factory with full-integrated CA systems changed "more sober" looks outgoing from realistic condition and available devices. Is better step by step automating production facilities and integrate existing computer systems, then built complex Computer Integration Manufactory - factory of future.
A lot of CAD/CAM and CAPP systems are on a market. By separate using of systems makes "island of automation". In the middle of them is very high quality of work and effects but communication be stagnating. And so effect all CA systems is below. At the connection between systems is problem with incompatibility of operating files. System CAD interlocks to CAPP system. Connection between systems is very important assumption more extensive integration computer systems. Structure of data using in CAPP systems has different characters them data using in CAD/CAM systems. Geometric interpretation is for both systems the most important part of basic information. One from most difficult tasks is transformation CAD data to form, which is possible process in CAPP system.
The program, which mange and transform data both systems, could be solution in today's conditions. System SYSKLASS is working with databases files. These files are without problems available. System ALPHACAM is working with data, especially geometric, in own format. This data are, without more extensive intervention to main system, difficult available. Important entries are in format, which make possible processing. These entries are final information about single technologic operation. This data is possible read and transform to form of necessary to input to system

SYSKLASS. Communication between systems is in two levels, designing and technologic. Designing information are in format DWG and DXF. Technologic information is in format DBF. ALPHACAM generate description operation and NC programs and save in format ANC. From save file is generating simple verbal process plan and export to databases of SYSKLASS.
The work in the Communication Manager has following rules (fig. 1):

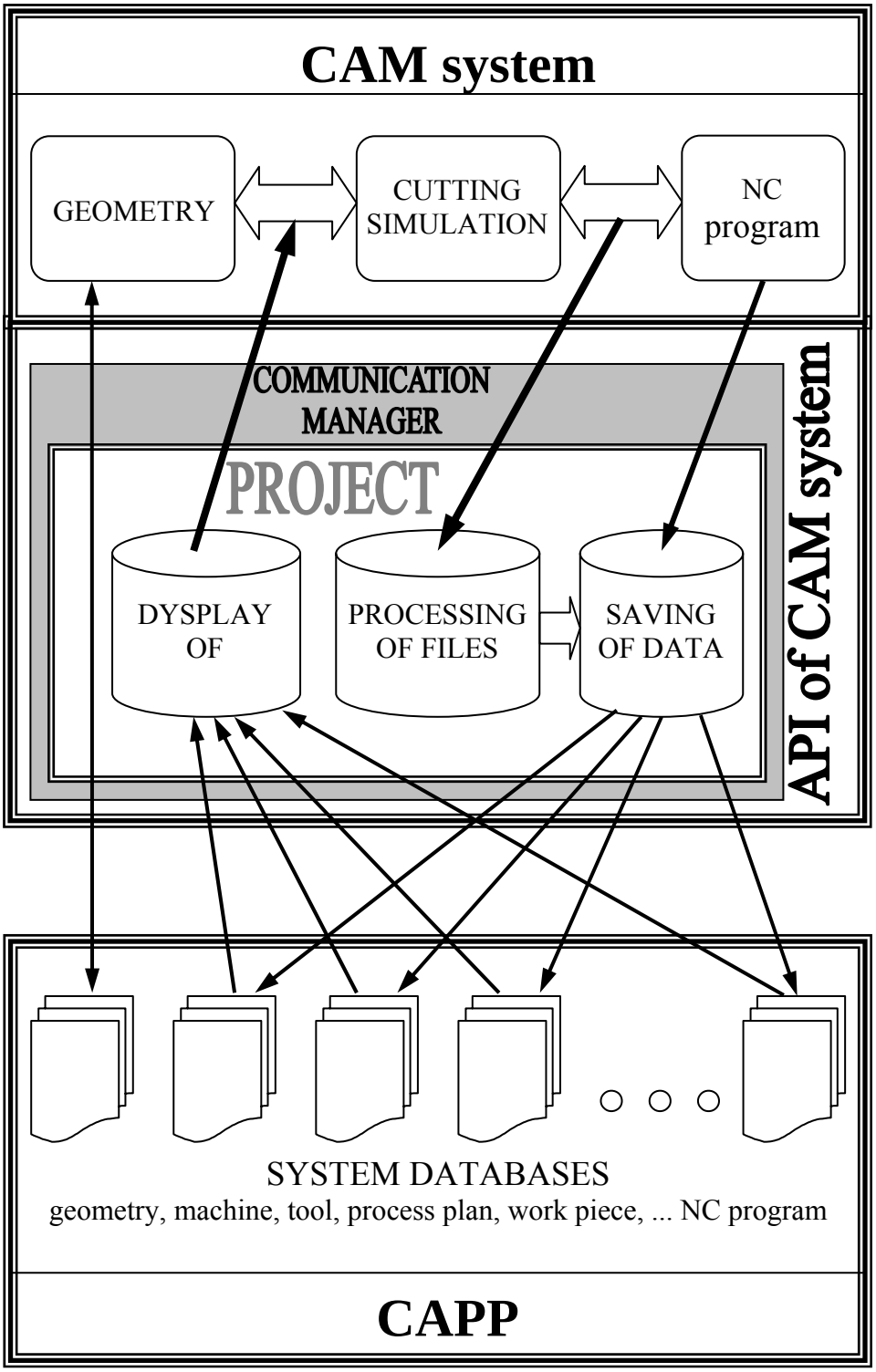

Figure 1.Principle of CA systems cooperation.

1. Choosing of the project by the project name or part name from system SYSKLASS.
- the possibility to load the choosing project and than to search of the part design or work piece, technological process, tools or NC program.

2. The work in system ALPHACAM, modification of existing part design or creation of new part design.
- the generating of operation and NC program list,
- the finish work with system ALPHACAM.

3. The generating of simple verbal technological process in Communication Manager.
- the possibility to classification new part design, technological process or NC program to the database of system SYSSKLAS with help of Communication Manager,
- the possibility to continue in work with new part after the classification of this part.

Is creating effective instrument to quickly communication between both systems. Using CAD/CAM properties of system ALPHACAM, under production new product, are at the same time obtained input information for databases of system SYSKLASS. This connection markedly to hurry filling of databases. System SYSKLASS may be using in the short time after application to firm.
Next possibilities of solve connection CAD/CAM and a CAPP system is using of so-called neutral files. These files have incorporate structure comprehensible for both systems. This way could be create common internal databases of factory. Databases would contained all entries needs for production of part in all production process, from construction through technologic to marketing. Single CA system could be obtains all entries, which needs for their activity. If the integrated system will be parametric, then is ideal situation. It is mean, that change in arbitrary level is manifesting in others levels of production process, too.

4. CONCLUSION

From the practical viewpoint the producing of the Communication Manager brings the effective tool for a rapid communication between both systems. The utilization of CAD and CAM characteristics of system ALPHACAM by the creation of new part allows at the same time to acquire the output information for enter to the database of system SYSKLASS.
This connection considerable speed up the database completing of system SYSKLASS and it can allow his quickly and effective utilization the short time after the installation.

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5. REFERENCES

[1] KONČÍR M.: Programové zabezpečenie komunikácie CAD/CAM systému AlphaCAM so systémom SYSKLASS, Diplomová práca, KMA, ŽU, SjF, Žilina, jún 2000
[2] KUBA, J. - JANČUŠOVÁ, M.: Brief View of Technical Production Preparation Automation in Chipless Technologies Area. In: 4th International Conference Process and Manufacturing Equipment Design Systems, Cracow, Poland, 5-6th October 2004,str. 155-161
[3] FIGURA J.: SYSKLASS - reference manual, GTS Detva, 1995
[4] KOČIŠKO, M.: Creation Of Construct Documentation For The Area Of Joints Disassembling. In: Proceedings of 5th International Meeting Of The Carpathian Region Specialist In The Field Of Gears, North University of Baia Mare, Romania, 2004, str. 35 – 38,
[5] LICOM SYSTEMS Ltd.: ALPHACAM 05, manual, LICOM SYSTEMS Ltd., 2005