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[1]V. M. Sineglazov,
[2]V. M. Belii

STRUCTURE OF A PROGRAM AND TECHNICAL COMPLEX OF THE AUTOMATED CONTROL OF SYSTEM OF NAVIGATION AND MOTION CONTROL

[1,2] Aviation Computer-Integrated Complexes Department, National Aviation University, Kyiv, Ukraine
E-mails: [1]svm@nau.edu.ua, [2]iesy@nau.edu.ua

Abstract. *There are shown the main problems which were solved during the system check. Program-technical complex of structural scheme is given. The opportunities of automated system during checking navigation and motion control systems are presented.*

Keywords: automated system; program and technical complex.

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Introduction

In the navigation and control systems' production of equipment movement the main part plays quality of produced products. A big amount of types of automatized control system and design recourses and systems allows high quality of product on stage of development. On the stage of development the quality depends basically on human factor from regulator.

The interest of functional possibilities of system navigations and motion control, the increasing of micro scheme integration, decreasing of conductor size, of frame step of electrical plate, increasing of the amount of electronic elements and within stringent requirements to the quality of produced product made the adjustment of electrical circuit rather complete task.

The costs of producer firm on the control and diagnostic equipment reached 40–50 % during the production of electronic components of modules and electronic plate. A big volume of produced products compensate costs on creation specialized stands and diagnostic devices which provide total control of electronic technique. The number of firms produces the control-diagnostic equipment, which dedicated for searching and diagnostic defected electrical technique. The given equipment as usually requires the presence of high professionalism of staff and consequently long training and practice.

So, there are exist actual science-technical problem of creation automated system of quality control and diagnostic fault of system navigation and control motion.

The technical base for creation automated system control are programming-technical complex (PTC) on the base of PC.

The automated system (AS) – it's a complex of technical resources, which includes the row of processors of different complexity, the devices of operational and external memory, the set of connection devices, the devices of display units, the operational systems, the applied program packages and etc., providing the opportunity of creation of multilevel AS control system of navigation and motion control.

The creation of PTC for solving concrete problem of automatization are hard and ambiguous process which has a lot of alternatives. A lot of requirements which ask for PTC, require scientifically – grounded methodology estimation and range characteristic of technical and programmed components of complex: of interface, construction, range of modules and devices, their characteristic, structure of the system software, tests and software requirements of man-machine interface. The specificity consist on, that the developer in many cases have to take into account fuzzy, quality source information coming from an expert.

This situation creates difficulties in finding effective technical solutions, leads to additional time and financial costs. The choice of most acceptable AS navigation system of control and control motion represented as complex multicriterion problem, the solution of which is compromise between reliability, value, technical level, full software, comfort, costs on service and etc.

In most AS control presented well known basic properties but the technology and means of their realization are quite different. It is a measure of the realization of each property in the system determines the need for additional software (new input–output drivers, graphic objects, functions that extend the list of basic functions, built-in library).

When choosing AS control it is necessary to move from task, because in most cases it will be determine the further solution. The building PTC on the base of any AS control drastically reduces a set of necessary knowledge in area of classical programming which allows to concentrate efforts by the development knowledge in the engineering area.

The idea of using fuzzy sets during designing structures of PTC is based on the fact that almost

always in engineering practice you can not strictly describe the preferred choice some of variants, because this choice depends on a large number of difficult accounted and badly formalized factors. But in opposite to this we can describe not strict preferences, the mathematical model of which are fuzzy sets.

Programming-technical complex block scheme

On the fig. 1 considered the PTC block scheme for automated control system of navigations and motion control during their manufacturing.

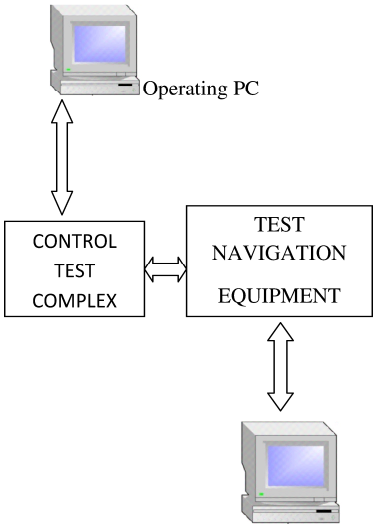

Fig. 1. Block diagram of program-technical complex

System consist of two levels control. On the lower level is controlled navigation equipment, specialized test complex (STC) and personal computer (PC).

In the PC databases are using which generate the initial configuration of the product. STC is used for checking equipment in automatically regime by the given program of tests with the help of top-level operating PC.

The PC of top-level with the help of operating program in automatic regime makes the testing of navigation systems and control motion , forms databases of checking results and gives summery by the results of inspections. As an example consider program-technical by the quality control during producing system modules of navigation equipment. The choice of main components (controllers, interfaces, and so on) of given complex done by the method of expert marks.

Block scheme of complex is shown on fig. 2.

The digital control system has a two-level hierarchical structure. The upper level is based on a personal computer which works by the control of special program, which can solve the next problems:

– management of low-level devices;

– installation parameters of specific module ;

– forming ciphergramm checks;

– mapping the test results with the following their analysis;

– creation an archive of test results.

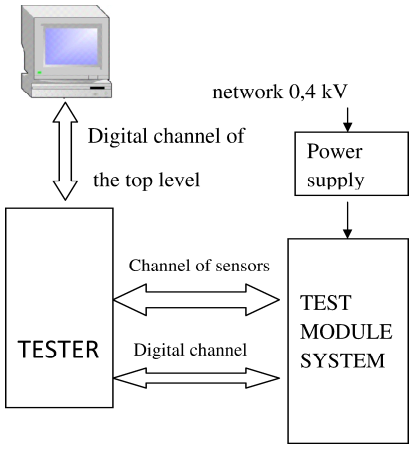

Fig. 2. Block scheme of program-technical complex of automated system quality control of module system navigation

The lower level forms a tester with the connected modules. On the lower level are realized the following functions:

– primary treatment of ciphergramm checks;

– generation of necessary analog signals for organization checking circles;

– makes the control of state discrete input checking object;

– registration of hour intervals.

Conclusion

Thanks to the presence composed of the computer system and convenient software under Windows appears possibility completely replace manual work on automated.

The automated system has the following advantages:

– excluded typical human mistakes;

– accelerates the testing process;

– appears the possibility to have quickly reliable statistic information, which can receive by measurements “manually” practically impossible due to time-consuming;

– the results of the work can be presented in visual form in graphs and automatically completed reports with the results of tests on each product.

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Sineglazov Viktor Mikhaylovich. Doctor of Engineering. Professor.
Aviation Computer-Integrated Complexes Department, National Aviation University, Kiev, Ukraine
Education: Kiev Polytechnic Institute, Kyiv, Ukraine (1973).
Research area: Air Navigation, Air Traffic Control, Identification of Complex Systems, Wind/Solar power plant.
Publications: 450.
E-mail: svm@nau.edu.ua

Belii Volodymyr Mykolayovych.
Aviation Computer Integrated Complexes Department, National Aviation University, Kyiv, Ukraine.
Education: Kyiv Polytechnic Institute, Kyiv, Ukraine (1975).
Research interests: automated monitoring system.
Publications: 15.
E-mail: iesy@nau.edu.ua

В. М. Синєглазов, В. М. Білий. Структура програмно-апаратного комплексу контролю системи навігації і керування рухом

Показано основні проблеми, які були вирішені під час перевірки системи. Розглянуто програмно-технічний комплекс структурної схеми. Представлено можливості автоматизованої системи при перевірці системи навігації і керування рухом.

Ключові слова: автоматизована система; програмно-апаратний комплекс.

Синєглазов Віктор Михайлович. Доктор технічних наук. Професор.
Кафедра авіаційних комп'ютерно-інтегрованих комплексів, Національний авіаційний університет, Київ, Україна.
Освіта: Київський політехнічний інститут, Київ, Україна (1973).
Напрям наукової діяльності: аеронавігація, управління повітряним рухом, ідентифікація складних систем, вітроенергетичні установки.
Кількість публікацій: 450.
E-mail: svm@nau.edu.ua

Білий Володимир Миколайович.
Кафедра авіаційних комп'ютерно-інтегрованих комплексів, Національний авіаційний університет, Київ, Україна.
Освіта: Київський політехнічний інститут, Київ, Україна (1975).
Напрямок наукової діяльності: системи автоматизованого контролю.
Кількість публікацій: 15.
E-mail: iesy@nau.edu.ua

В. М. Синеглазов, В. М. Белый. Структура программно-аппаратного комплекса контроля системы навигации и управления движением

Показаны основные проблемы, которые были решены в ходе проверки системы. Рассмотрена структурная схема программно-аппаратного комплекса. Представлены возможности автоматизированной системы при проверке системы навигации и управления движением.

Ключевые слова: автоматизированная система; программно-аппаратный комплекс.

Синеглазов Виктор Михайлович. Доктор технических наук. Профессор.
Кафедра авиационных компьютерно-интегрированных комплексов, Национальный авиационный университет, Киев, Украина.
Образование: Киевский политехнический институт, Киев, Украина (1973).
Направление научной деятельности: аэронавигация, управления воздушным движением, идентификация сложных систем, ветроэнергетические установки.
Количество публикаций: 450.
E-mail: svm@nau.edu.ua

Белый Владимир Николаевич. Кандидат технических наук.
Кафедра авиационных компьютерно-интегрированных комплексов, Национальный авиационный университет, Киев, Украина.
Образование: Киевский политехнический институт, Киев, Украина (1975).
Направление научной деятельности: системы автоматизированного контроля.
Количество публикаций: 15.
E-mail: iesy@nau.edu.ua