

# Chapter 19

## The Educational and Academic Innovation of the Avionics Engineering Center

**Andrey V. Proletarsky**

*Bauman Moscow State Technical University, Russia*

**Konstantin A. Neusypin**

*Bauman Moscow State Technical University, Russia*

**Kai Shen**

*Beijing Institute of Technology, China*

### **ABSTRACT**

*Research directions for carrying out scientific works are presented within the Avionics Engineering Center at Bauman Moscow State Technical University. The structure of Avionics Engineering Center is illustrated and prospective areas of working are highlighted. Methods on implementation of perspective scientific research and educational programs are developed for innovative development of the Avionics Engineering Center. Symbiosis of new developed programs allows training and getting a set of better quality specialists and innovative technologies in the defense and aerospace industry.*

### **INTRODUCTION**

For the education of high-level professionals, the “Russian method of engineering training” was originally developed and successfully implemented at Bauman Moscow State Technical University (BMSTU). Nowadays, for implementation modern innovative technologies (Knyagin, Meshkov, & Utolin, 2016), the Avionics Engineering Center was built as a joint project of Bauman Moscow State Technical University and Ramenskoye Design Company. In this sense, the project “Avionics Engineering Center” is a practical implementation of the method “Russian method of engineering training” in modern information society.

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Avionics Engineering Center has been working on the following main research and educational directions:

- Preparation of bachelors, engineers, masters and highly qualified specialists in the priority areas;
- Improvement of training methods, creating a highly effective system for training technical professions;
- Carrying out joint research projects;
- Participation in scientific competitions, grants, awards, including Grants of Ministry of Education and Science of Russian Federation;
- Joint organization of international conferences and symposia;
- International cooperation, for example, international laboratory;
- Organization of joint scientific journal, scientific and methodical bases;
- Joint intellectual property rights (patents);
- Joint participation in competitions, grants, awards and research funds.

## **THE EQUIPMENT AND RESEARCH WORKS OF THE CENTER**

The equipment of the Avionics Engineering Center located in three main areas:

- The multipurpose multifunctional exerciser based on four-generation aircraft cabin with spread spectrum of functionality: simultaneous work for several students, practicing coalition cooperation, advanced training of flight crews under conditions that are close to combat, practicing dueling and group interaction of several aircrafts, and further complication for training purposes;
- The Laboratory of Intelligent Systems at Bauman Moscow State Technical University includes several operational working stations for pilots which are adapted to current and future requirements, such as formation of flight mission during multi-conflict flight situation, coalition, interaction and formation of models of external environment;
- The research is in progress with real navigation and piloting systems and platforms of modeling aerodynamic characteristics.

The research works are carried out in the following directions:

- The research in the field of aerodynamic characteristics, application of nanotechnology and research of aerodynamic properties, creation of models and working out on modeling complex engineering center;
- The work on dynamic formation of flight mission on the basis of predictive models with Genetic Algorithms to meet changing operational conditions of aircraft and conditions of our aircrafts against coalition enemies;
- The development of measurement systems and complex of modern aircraft from the concept of measuring complex synthesis with variable structures which can provide information as accurately as possible under conditions of intensive maneuvering.
- Perspective areas of research works are:

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