


# MODERN TECHNOLOGY OF TRAINING SYSTEMS FOR SATELLITE NAVIGATION

## NEW TECHNOLOGIES INTRODUCTION

- KNOWLEDGE INTEGRATION;
- INTERACTIVE ACCESS TO INFORMATION RESOURCES;
- EFFECTIVE COMMUNICATION;

PROFESSIONAL DEVELOPMENT AND TRAINING

● **MODERN EDUCATION**

- ✓ TRAINING
  - ✓ UNDERSTANDING
  - ✓ NEW EXPERIENCES
- 

## ● TRAINING SYSTEMS FOR AVATORS AND MARINERS



## ● HIGHER EDUCATION FOR SATELLITE NAVIGATION IN RUSSIA


- 1. ITMO University, Saint-Petersburg**
- 2. Moscow State University of Railway Engineering (MIIT)**
- 3. Siberian State University of Geosystems and Technologies (SSUGT), Novosibirsk**
- 4. Bauman Moscow State Technical University**
- 5. Russian Federal Space Agency - Moscow Agricultural Academy named after K.A. Timiryazev**
- 6. Russian State Agrarian University**
- 7. International School on Satellite Navigation**
- 8. Saint-Petersburg State University of Aerospace Instrumentation**
- 9. Admiral Makarov State University of Maritime and Inland Shipping**
- 10. Young cosmonauts club n.a. G.S.Titov**
- 11. Baltic State Technical University "Voenmeh" D.F.Ustinov**

● MODERN EDUCATION




● **MODERN TECHNOLOGY TRAINING SYSTEMS :**

systems, devices, equipment, software for effective data processing and presentation during the learning process.



## ● TRAINING SYSTEMS

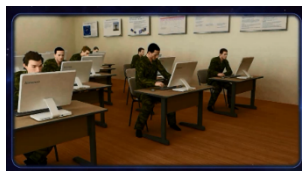
- ✓ Electronic interactive learning system
  - ✓ Automated learning systems
  - ✓ Interactive electronic technical manuals
  - ✓ Training Systems
- 



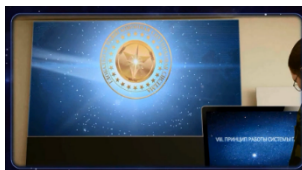
## ELECTRONIC INTERACTIVE LEARNING SYSTEM «CLASS»



INSTRUCTOR WORKSPACE



TRAINEES WORKSPACES



PANORAMIC SCREEN



DATABASES

## **ELECTRONIC INTERACTIVE LEARNING SYSTEM «CLASS»**

INTERACTIVE TOOL FOR LEARNING MATERIALS CREATION, KNOWLEDGE LEVEL CONTROL  
AND ACADEMIC PROCESS MANAGEMENT



- **INDIVIDUAL TRAINING**
- **COOPERATIVE LEARNING**
- **MULTILEVEL LEARNING PROCESS**
- **MODULAR LEARNING PROCESS**
- **CREATING AND EDITING OF LEARNING MATERIAL**
- **E- LEARNING**
- **INTEGRATION WITH OTHER TRAINING SYSTEMS**
- **PROCESS MODELING**
- **ELECTRONIC TEST SYSTEM**
- **LECTURE BROADCAST STREAM TO THE PANORAMIC SCREEN  
AND INDIVIDUAL MONITORS**

## ELECTRONIC INTERACTIVE LEARNING SYSTEM «CLASS»



### FUNCTIONALITY

- Support and skills development;
- Technical support of HI- tech systems.

### UNIQUE INTERACTIVE MEDIA

- Realistic simulation of 3D space;
- Text and graphics INFORMATION output.

### Advantages of LEARNING SYSTEM

- Innovative interactive technologies;
- Time and costs saving ;
- Access to remote information resources;
- Permanent training systems;
- High quality of education.

## ELECTRONIC INTERACTIVE LEARNING SYSTEM «CLASS»

[Учебный план](#)
[Лекции](#)
[Тесты](#)
[Результат теста](#)
[Статистика](#)
[Администрирование](#)

[Описание](#)
[Предпросмотр](#)

НАЗВАНИЕ	ДАТА ИЗМЕНЕНИЯ
Тест по теме ГЛОНАСС	16.09.2014 11:32

Название теста:

### Список вопросов


Сколько спутников необходимо для однозначного определения местонахождения объекта?

К какому из сегментов ГЛОНАСС относится ЦУКК?

### Описание

Текст вопроса: К какому из сегментов ГЛОНАСС относится ЦУКК?

Изображение для вопроса:



### Варианты ответа

ОТВЕТ	ПРАВИЛЬНЫЙ ОТВЕТ
эфемеридное и частотно-временное обеспечение	<input type="checkbox"/>
мониторинг радионавигационного поля	<input type="checkbox"/>
радиотелеметрический мониторинг	<input type="checkbox"/>
излучение высокостабильных радионавигационных сигналов	<input checked="" type="checkbox"/>
	<input type="checkbox"/>

## AUTOMATED LEARNING SYSTEMS

Generating of INFORMATION AND COMMUNICATION MODELS



- **Creating and editing of educational materials;**
- **Study task assigning;**
- **Students personal data storing;**
- **Academic performance rating;**
- **Monitoring of teaching and learning activities.**

## AUTOMATED LEARNING SYSTEMS

The screenshot shows a software interface for an automated learning system. At the top, there is a navigation bar with tabs: "Главный экран", "Помощь", "Тренировки", "Обучающие", "Справочники", and "Программы". On the right side of the header, there is a button labeled "3D система визуализации".

The main content area is titled "2. ОБЩАЯ ЧАСТЬ КУРСА". Below the title, there is a descriptive paragraph: "Блок «Наземный сегмент космического комплекса» описывает наземный комплекс управления системы ГЛОНАСС и состоит из следующих разделов: Составие наземного сегмента космического комплекса, Функциональная схема работы НС КК, Системы и комплексы НС КК, Состав НС КК." To the right of this text are navigation buttons: "<<<" and "ИЭТР".

Below the text, there are four numbered items (a, b, c, d) describing the components of the ground segment. A mouse cursor is visible over item (a).

Item (a) describes the interactive image of the segment, listing components like the GNSS system management center (ЦУС), central synchronizer (ЦС), command station network (КСС), quantum-optical stations (КОС), phase control system (СМФ), and GNSS field control equipment (АНП).

Item (b) describes the functional scheme of the ground segment work.

Item (c) describes the interactive scheme of the ground segment systems and complexes.

Item (d) describes the interactive table of the ground segment composition.

On the right side of the interface, there is a diagram titled "НС КК" (Ground Segment). It shows two main components: "НАЗЕМНЫЙ КОМПЛЕКС УПРАВЛЕНИЯ" (Ground Segment Management Complex) and "КОМПЛЕКС НАЗЕМНЫХ СРЕДСТВ ФОРМИРОВАНИЯ СИГНАЛА" (Ground Signal Formation Complex). Each component has a corresponding icon and a small image below it. At the bottom of the diagram area, there are two small thumbnail images.

At the bottom of the interface, there is a navigation bar with arrows and the numbers "1 2 3 4", and a timer showing "13:45:31".

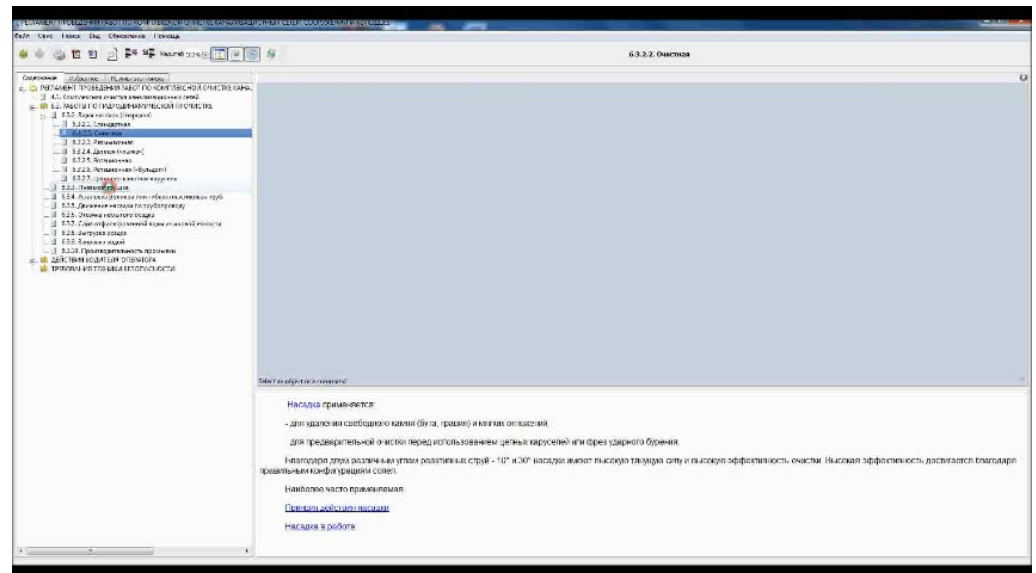
## INTERACTIVE ELECTRONIC TECHNICAL MANUALS

PORTAL FOR MANAGING TECHNICAL DOCUMENTATION



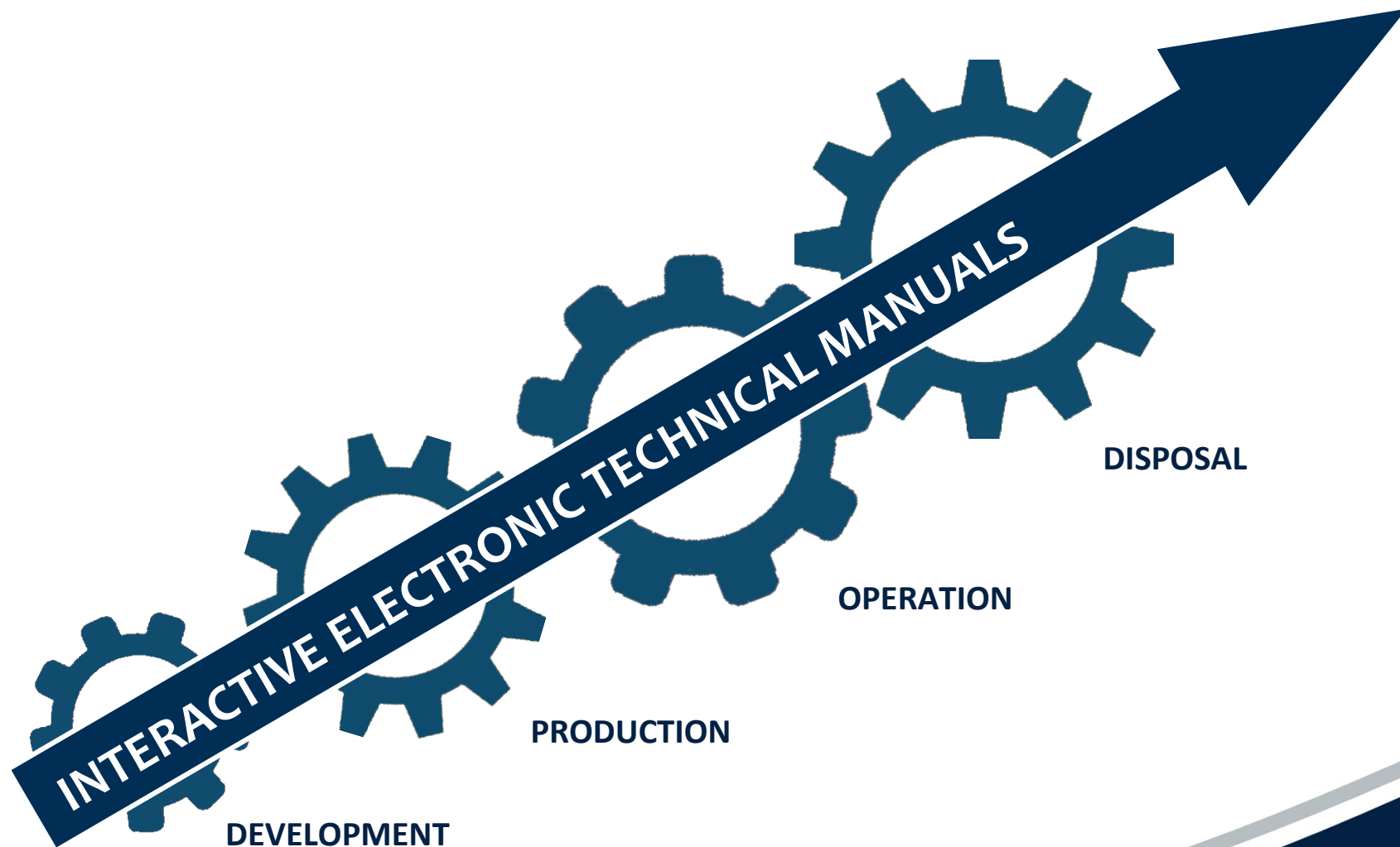
- OPERATION AND REPAIR RULES LEARNING;
- RENDERING OF BACKGROUND INFORMATION;
- EQUIPMENT DIAGNOSTICS AND TROUBLESHOOTING;
- AUTOMATED ORDERING OF MATERIALS AND SPARE PARTS;
- ROUTINE MAINTENANCE PLANNING AND ACCOUNTING.

# INTERACTIVE ELECTRONIC TECHNICAL MANUALS





● INTERACTIVE ELECTRONIC TECHNICAL MANUALS



## TRAINING SYSTEMS

mandates the use of specific teaching methods for coursework; the choice of the teaching methods to be used depends largely on the information or skill being taught and the aptitude and skills of the trainee.

- SOFTWARE




SOFTWARE SIMULATING THE HARDWARE  
INTERFACE EQUIPMENT

- HARDWARE AND SOFTWARE



EQUIPPED WITH THE REAL CONTROL GEAR

## EDUCATIONAL COMPLEX


- CREATION OF TRAINING SYSTEM FOR PROFESSIONAL STAFF MEMBERS IN SATELLITE NAVIGATION FIELD;
  - NEEDS AND SKILLS DEVELOPMENT MONITORING;
  - INTRODUCTION OF EDUCATIONAL PROGRAMS AND TEACHING MATERIALS;
  - DEVELOPMENT AND IMPLEMENTATION OF KNOWLEDGE EVALUATION METHODOLOGY;
  - INTRODUCTION OF E- LEARNING;
  - CAREER GUIDANCE.
- 

## EDUCATIONAL COMPLEX

### EDUCATIONAL PROCESS SUPPORT



## EDUCATIONAL COMPLEX

- **CREATING AND EDITING OF LEARNING MATERIAL;**
  - **ELECTRONIC TEST SYSTEM;**
  - **STUDENTS PERSONAL DATA STORING;**
  - **ACADEMIC PERFORMANCE RATING;**
  - **MONITORING OF TEACHING AND LEARNING ACTIVITIES;**
  - **INTEGRATION WITH OTHER TRAINING SYSTEMS;**
  - **PROCESS MODELING;**
  - **INNOVATIVE INTERACTIVE TECHNOLOGIES;**
  - **TIME AND COSTS SAVING ;**
  - **ACCESS TO REMOTE INFORMATION RESOURCES;**
  - **PERMANENT TRAINING SYSTEMS;**
  - **HIGH QUALITY OF EDUCATION.**
- 

● EDUCATIONAL COMPLEX



UNIVERSITIES



SCIENCE



PRODUCTION

CREATION OF SCIENTIFIC AND METHODOLOGICAL BASE

INDUSTRY COMPANIES

RESEARCH INSTITUTE

EDUCATIONAL SOFTWARE AND HARDWARE SYSTEMS



GENERAL KNOWLEDGE DATABASE



INTEGRATION OF EXISTING AUTOMATED INFORMATION AND TECHNOLOGICAL SYSTEMS



VIRTUAL MODELS AND MONITORING SYSTEMS

EDUCATIONAL COMPLEX

EDUCATIONAL COMPLEX

EDUCATIONAL COMPLEX

EDUCATIONAL COMPLEX

UNIVERSITIES

GENERAL INFORMATION FIELD