

**The Workshop  
on «Appropriative Effective» Material Control and  
Accounting, and Physical Protection  
(Nashville, Tennessee, July, 18, 2008)**

**«APPROPRIATIVE EFFECTIVE»  
PHYSICAL PROTECTION.  
CONCEPT & IMPLEMENTATION  
(Russian Experience)**

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# **ENHANCEMENT OF ROSATOM NUCLEAR SITES PHYSICAL PROTECTION (PP)**

- **Goal-Program Planning**
- **Legislation and Regulatory Support**
- **Systematic Analysis of PP Upgrading**
- **PP Effectiveness Assessment**
- **Development and Implementation of New Technical Security Equipment**
- **Integration (Interaction) of PP and MC&A Systems**

# **GOAL-PROGRAM PLANNING**

## **Documents**

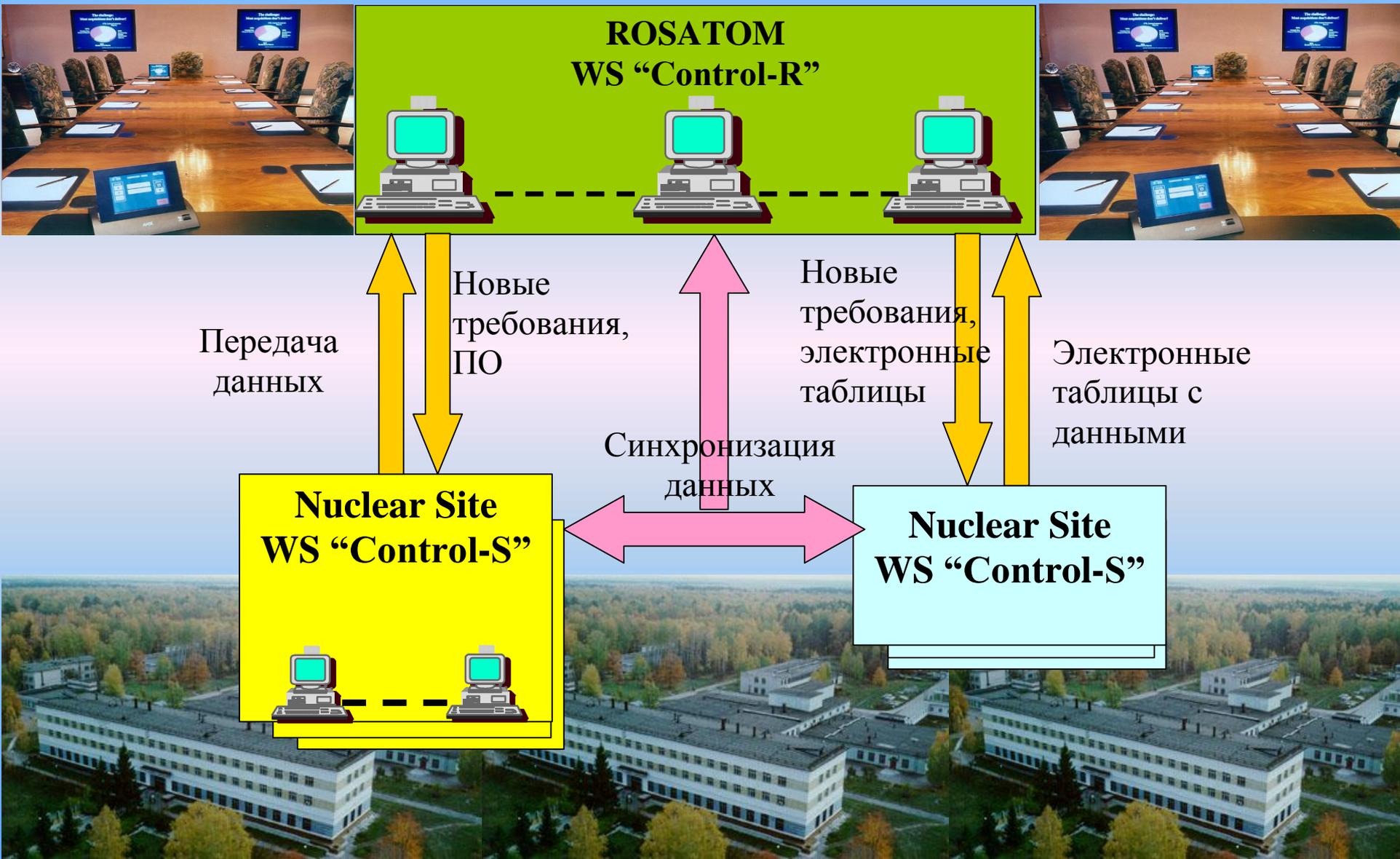
- **The Program of Physical Protection Upgrading for ROSATOM Nuclear Sites (NS) for Period of 2001-2007**
- **New Program of ROSATOM NS Physical Protection Upgrading for Period of 2009-2011 (under development)**

## **Tools**

### **PPS Status Monitoring System:**

- **Rosatom Level (Workstation “Control-R”)**
- **Site Level (Workstation “Control-S”)**

# MONITORING SYSTEM STRUCTURE



# **REGULATORY AND LEGAL BASE (1)**

## **International**

- Resolution 1540 (2004), adopted by the U.N. Security Council on 28.04.2004
- “The International Convention on Nuclear Counterterrorism”, No 59/290, UNO 13.04.2005
- “The Convention on Physical Protection of Nuclear Materials” , IAEA, INFCIRC/274
- “Physical protection of nuclear materials and facilities”, IAEA, INFCIRC/225/rev.4, 1999
- IAEA Guidelines on Nuclear Security

# **REGULATORY AND LEGAL BASE (2)**

## **National (State Level)**

- The RF Law “On the usage of nuclear energy”, dated 21.11.1995
- The RF Law “On the counteraction to terrorism”, dated 6.03.2006
- “Rules for physical protection of nuclear materials, nuclear installations, and storage facilities” №456, approved by the RF Government on 19.07.2007
- Federal Regulation “Requirements for physical protection of nuclear materials, installations, and storage facilities” NP-083-07, approved on 27.12.2007
- Other RF Laws and Regulations, related to Physical Protection

# **REGULATORY AND LEGAL BASE (3)**

## **National (ROSATOM Level):**

- “Provision on general requirements for physical protection systems of Minatom nuclear-hazardous sites”, approved by Decree №550 dated 10.10.2001
- Regulations on interaction of all organizations involved in PP activity
- Regulations on management of PPS monitoring
- Regulations on management of PPS design, commissioning, and operation
- Methodological recommendations on vulnerability analysis and PPS effectiveness assessment

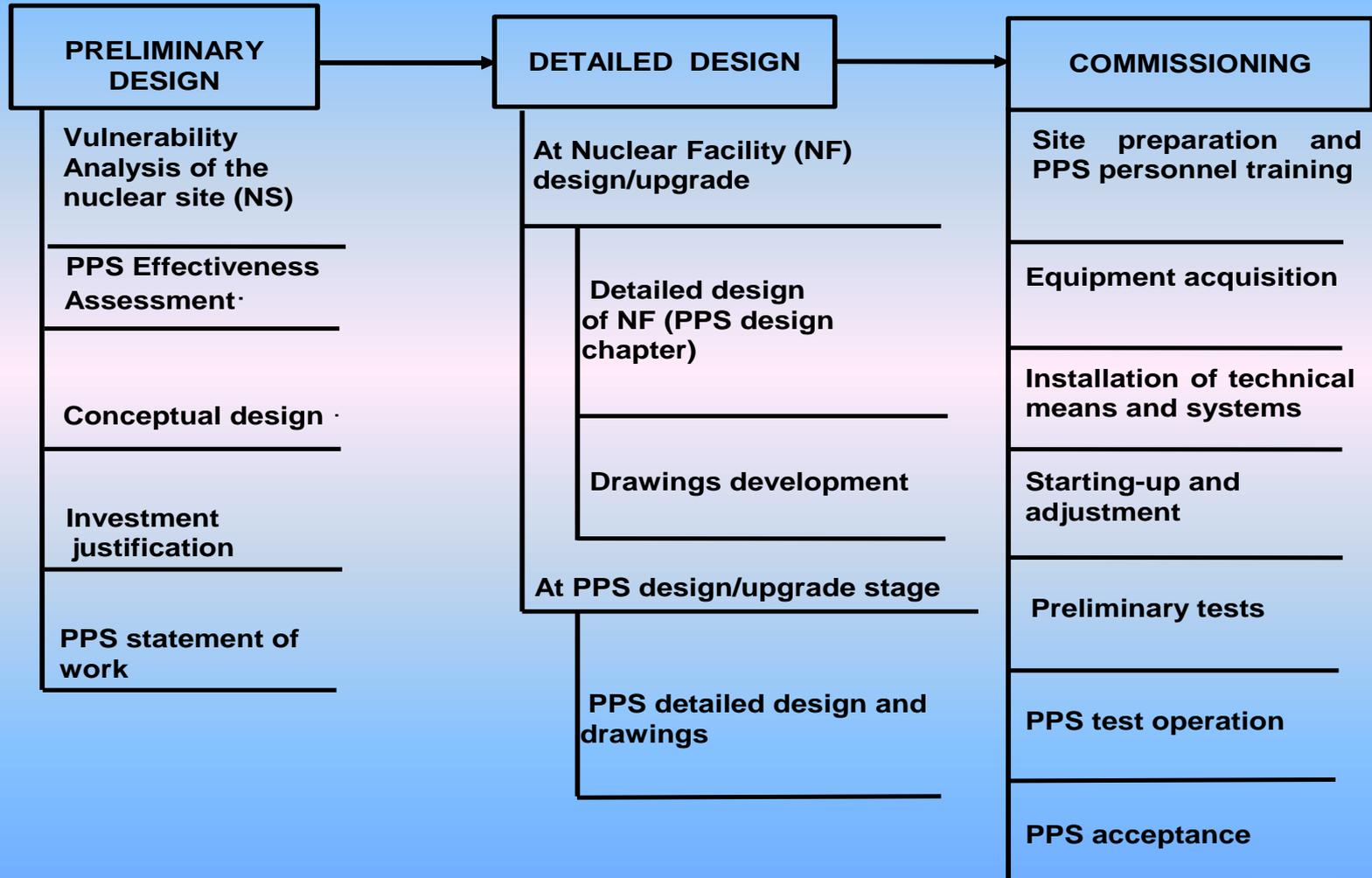
## **National (Site Level)**

# BASIC PRINCIPLES OF PHYSICAL PROTECTION

- Physical Protection Adequacy to Design Basis Threats
- Zonal Principle, Protection-in-depth
- Timely Counteraction
- Equal Degree of Protection
- Scheduled Monitoring of Operation
- General Technical Principles (Reliability, Survivability, Compatibility of Elements, etc.)

# PP DEVELOPMENT/UPGRADE

## STAGES & MILESTONES



# **PP EFFECTIVENESS ASSESSMENT (1)**

## **Regulatory Base**

ROSATOM document “Physical protection systems for nuclear sites. The guidelines for the effectiveness assessment”, approved on 22.01.2004

## **Tools**

Computer programs “Vega-2”, “Polygon”  
(Rosatom, “Eleron”)

## **Practice**

The PPS effectiveness assessment has been performed for the most important ROSATOM sites

# ASSESSMENT OF PP EFFECTIVENESS (2)

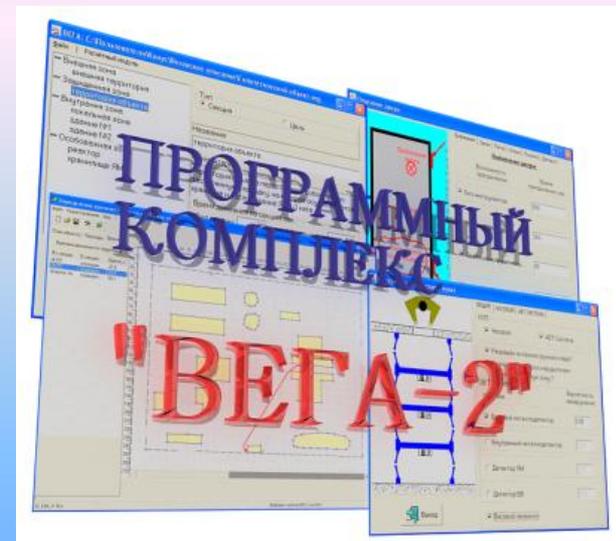
## Computer program “Vega-2”

### Intent use

Evaluation of the effectiveness of PPS (probability of site physical protection) under given PPS structure and chosen threats and adversary profiles

### Main features

- Effectiveness assessment automation
- Accounting of a random character of the processes in system “guard-adversary”
- Possibility of consideration of actions of insiders and outsiders
- Low-level user qualification requirements



# PP EFFECTIVENESS ASSESSMENT (3)

## Certificates



## Practice

Preparation for “Vega-2” computer program transmission to Rosatom sites.

# ASSESSMENT OF PP EFFECTIVENESS (4)

## Computer Program “Polygon” (transport version)

### Intent use

Simulation of local combats in system “guard-adversary” on transport vehicles

### Main features

- Application of a probability model of firing from different types of weapons considering shooters skills and target characteristics
- Automation of definition of intervisibility and a possibility of people and vehicles movement
- Record-keeping to provide a battle retrospective view
- Terrain editor (3D)
- Open software architecture



# PP EFFECTIVENESS ASSESSMENT (5)

## Certificates



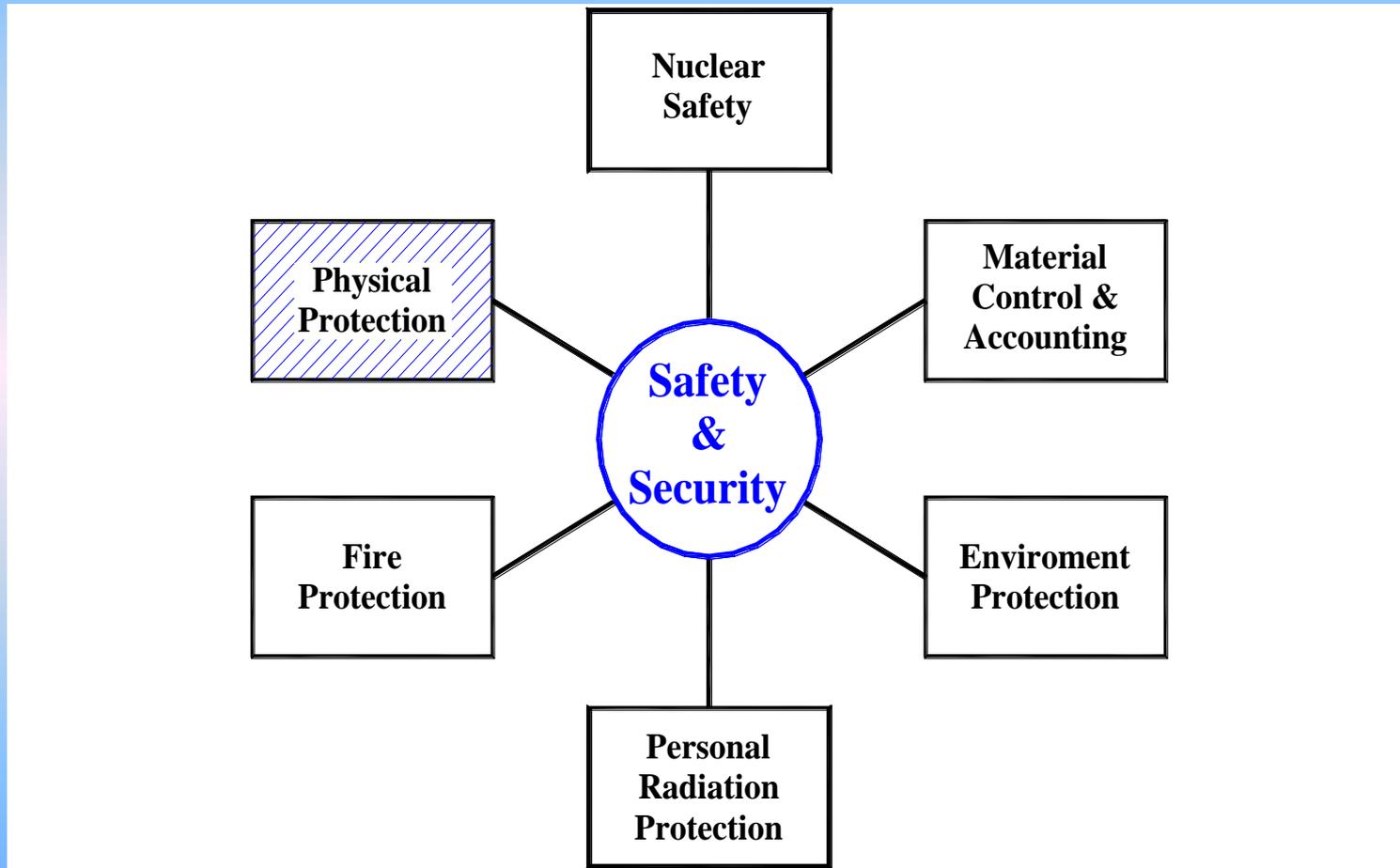
## Practice

Program implementation in the training center “Lunevo” and MVD units is in process (Record of JCC-1 Meeting)

# DEVELOPMENT AND IMPLEMENTATION OF NEW TECHNICAL SECURITY EQUIPMENT

- Upgrading of Traditional Technical Security Equipment
- Development of New Technical Security Equipment (detectors of underwater intruders, low-flying targets, non-lethal weapons etc.)
- Automated Security Transportation System

# ASPECTS OF NUCLEAR MATERIAL AND NUCLEAR FACILITIES SAFETY & SECURITY



# **INTEGRATION/INTERACTION OF PP SYSTEM AND MC&A SYSTEM**

Upgrade of Nuclear Material Protection by  
Joint Monitoring of NM Handling Procedures  
by Two Independent Services (PP and MC&A)

Methods of Supporting for Interaction between  
Both Systems:

- Technical
- Organizational
- Informational

# SUMMARY

- Assurance of Effective PP of Nuclear Materials and Installations is a Challenging Task and it Must be Solved on a State, Agency, and Site Level
- The State Corporation for Atomic Energy ROSATOM Places Significant Emphasis on Planning of PP System Upgrade
- A Regulatory and Legal Base, Procedures, and Computer Programs for Assessment and Monitoring of the PP Status have been developed and are being Constantly Updated
- The American-Russian Cooperation makes a Contribution to this Process