New ways for ground-based air defence personnel training using simulation technologies

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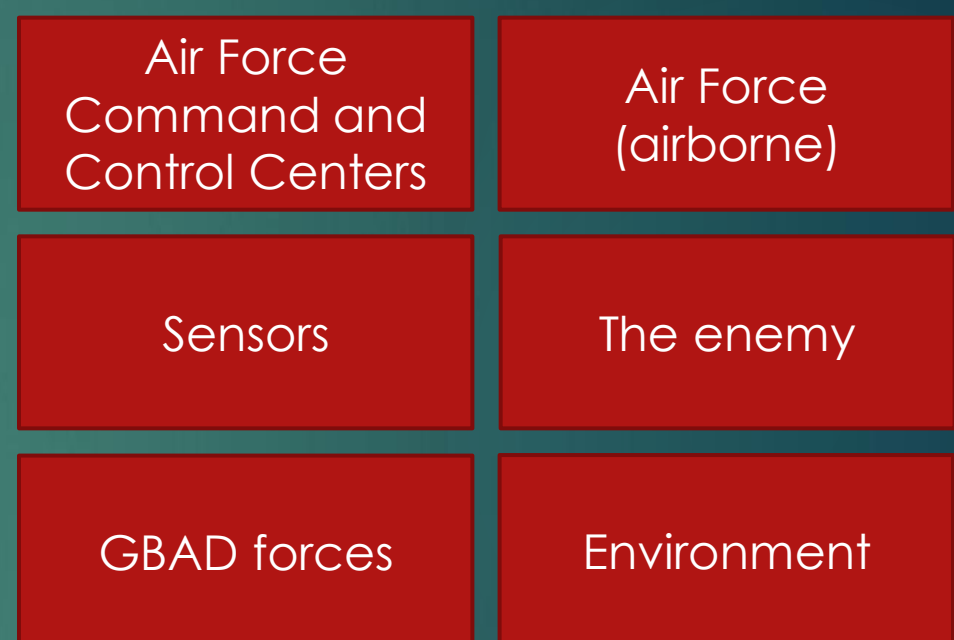vlastimil.hujer@unob.cz

Aspects of Advanced Air Defence Simulators

- **„Single role"** simulators
  - Current simulators are not very robust
  - For a narrow range of users
- Current trends [1], [2]
  - Train different types of troops
- **Complex** simulators for groud forces
  - Presagis, OneSAF, VBS3, etc.
- **Complex** simulators for GBAD
  - Simulations for GBAD are **solved separetely**
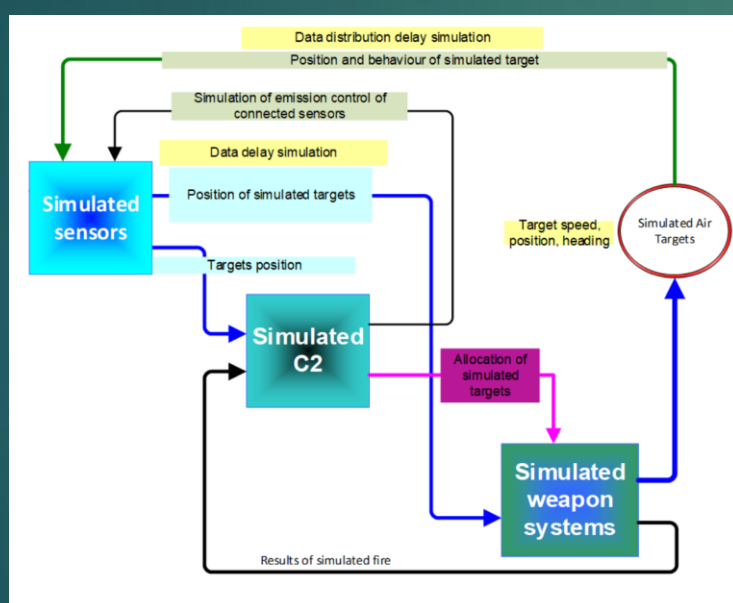
Conclusion

The above described concept of extending existing simulation technologies with advanced elements that will allow not only realistic, but especially comprehensive training of ground-based air defense personnel was tested in the research activities of the Department of Air Defense, University of Defense (PROKVES 2016-2020 project). To support these extensions, several experimental software was created, which confirmed the correctness of the arguments defining the requirements for advanced simulation technologies of ground-based air defense. The list of attributes and properties of the simulator in the article contains the most important characteristics that a ground-based air defense simulator should have in order to be used for modeling and simulation of combat operations involving multiple air force entities. Thus, not only more than one ground air defense unit (two or more - the so-called clusters), but also coordination with air elements of the air force, such as aircraft, helicopters, etc.

Entities for GBAD training simulators

Air Force Command and Control Centers	Air Force (airborne)
Sensors	The enemy
GBAD forces	Environment

1. Air Force Command and Control Centers, in which at least the following could be simulated:
   a. Positive and procedural management of subordinate forces and resources.
   b. Allocation of simulated weapons (air and ground).
   c. Sensor models and their fusion.
2. Air Force (airborne):
   a. Basic models of Wing Operation Centers (WOC) in terms of procedural management.
   b. Models of aircraft (airplanes, UAVs, helicopters, etc.)
   c. Tactical procedures and techniques used in the preparation phase and then for combat operations
3. Ground-based air defense forces
   a. Basic models of ground-based air defense operations centers (SAMOC - Surface to Air Missiles Operation Center) in terms of procedural management,
   b. Models of ground-based air defense weapon systems (models of ground-based air defense batteries, or just stand-alone vehicles),
   c. Tactical procedures and techniques used in the preparation phase and then for combat operations.
4. Sensors
   a. Modeling of detection capabilities of radars and other sensors (e.g., air observer equipment, etc.).
5. The enemy
   a. Modeling the capabilities and actions of enemy forces and resources.
6. Environment
   a. Modeling of the battlefield from the environment point of view, weather, terrain, etc..