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Concept of the simulation platform architecture for the Operational Data Aggregation Platform

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INTRODUCTION

Project in the Simulation Platform [1] field is the development of a prototype of the system to enable training in the recognition and analysis of images from various observation systems and devices used in the Border Guard, BG, with the use of the Operational Data Aggregating Platform, PADO.

It is assumed that the Simulation Training Platform, STP, will include the following functionalities:

- autonomous operation both indoors and outdoors,
- possibility of mapping all PADO operating modes,
- possibility of cooperation (data exchange) with other, real training platforms,
- possibility of conducting various simulation exercises with the use of observation systems,
- possibility of conducting training in an individual and group system and supervising the course of training.

The simulation STP platform in the above-mentioned functional scope will allow the introduction of the skills of recognizing and analyzing images delivered from ground-based systems and UAVs to the training process of BG officers, which will significantly increase the effectiveness of their use in border protection, internal security, and crisis management. The creation of a simulation platform for image analysis training will strengthen the formation's competencies in the implementation of statutory tasks.

HYBRID SYSTEM OF SIMULATIONS

Our research group proposes to adopt a mixed approach to the implementation of the STP. The proposed IT solution will be focused on the integration of simulation systems and associated applications. The service integration platform offered will put it in the class of solutions providing such properties. The conducted research, especially in developing the concept of integration with the PADO real system, which will provide the STP imaging database with actual registrations from individual devices, indicates the need to provide an integrated environment that provides cross-platform mechanisms. The project's primary goal is to build a simulation environment and a methodology for conducting exercises for the BG. According to our analytical work carried out, it can be concluded that the project is a kind of precursor to the provision of a simulation system based on the designed system integrating video data with the primary tool of management actions - Inspection Steering System. A vital aspect articulated during the conceptual work (collecting requirements) was mapping the real user interface in the simulation system under construction, which will be used realistically as standard equipment of the stand at the BG post, BGP. Analytical work carried out with the BG as a future user of the designed project allowed for verification and, consequently, modification of the perception of the business needs of the built simulation environment.

It applies to both the scopes of the tools used for staff work and the detailed mapping of events recorded during the service. It is assumed that the main simulation component of the environment will support the implementation of situational scenarios based on the conduct and coordination of activities in the BGP. The simulation environment will offer an imitation of a real PADO station, equipped with images identical to those in the real system. The system configuration will correspond to the Table Top Trainer [2], TTT, series simulator, with a large-format central display based on the Video Wall.

STP ARCHITECTURE AND CLIENT STATION INTERFACE CONCEPT

The planned STP system will consist of a database, the central server, file server, and client stations. The path to the files will be taken from the master server, and the data will be stored on the file server [3]. The entire process of uploading the video to the user will be based on the streaming method.

The training stations and the instructor's computer will be connected to the router in a star topology. Devices should be equipped with the necessary components to support connections with a speed of 1000 Mbps. Internet connection should provide the ability to update the database and access to other updates

According to the assumptions adopted in the project, the STP ICT system will be designed in the client-server architecture, where users' access to the system will be provided via a web browser. It has been assumed that the server-side computer software will be serviced at the client's request by sending defined messages. In response, the received HTML page (file) will present
a GUI modeled on the real UI of the PADO system.

As a result, the user will have the impression that he performs system operations in real-time, just like in the operating system in STP. It will be necessary to ensure high bandwidth and quality of the Internet connection.

Following the capabilities of modern web browsers, the user interface is displayed correctly in most popular versions. The user may use, among others the following browser features: session manager, mouse gestures and keyboard shortcuts, pop-up blocker, private data management (cookies, visit history, form data, passwords, Etc.), spell checking (forms, e-mails, Etc.), text magnification, graphics or the entire content of the page, caching files, support for plug-ins and extensions, the ability to customize the interface to user preferences and needs, tabbed browsing, remembering passwords. This kind of interface will be sufficient for STP needs.

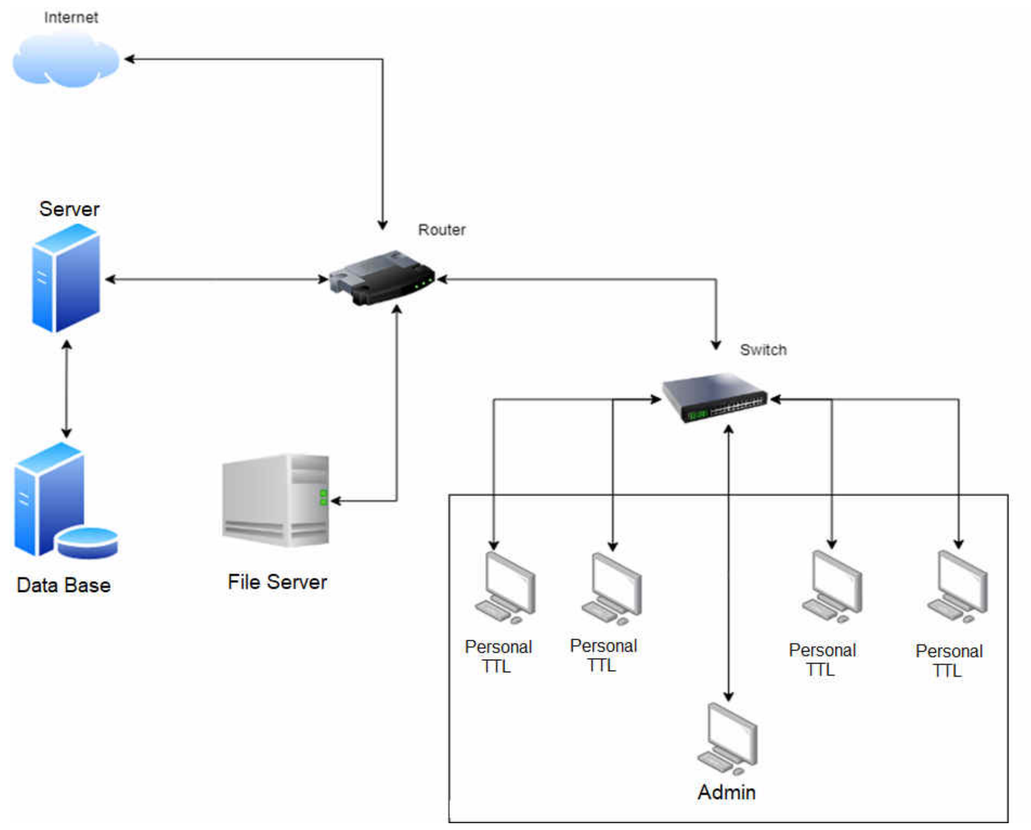

Fig.1. STP network architecture.

CONCLUSIONS

It is assumed that the key factor in building a simulation system will be the right approach to planning and creating training scenarios that will allow for the implementation of training. Such an important will be its design, allowing further creation of other scenarios as the growing training needs. As indicated, the STP training simulator may enable the implementation of training related to the use and application of optoelectronics in all service conditions. The selection of video sequences for the implementation of training scenarios, allowing the implementation of the desired scope of training, will be carried out based on real optoelectronic systems. Additionally, capturing a wide range of different events observed by cameras under different weather and lighting conditions should be made when preparing footage. It is planned that the predefined images will be able to be modified on an ongoing basis during the simulation by the system operator, e.g., to introduce unexpected complications (e.g., loss of connection with a selected data source, additional disturbances, changes in events in the further course of the scenario).

The BG officers' training system's analysis indicates the possibility of adopting a wide range of the training process for the needs of the simulator at each stage currently implemented. Both experienced officers performing tasks related to observation and those without experience in this field will find the opportunity to use a training simulator of a platform that integrates data obtained from various systems and devices used in the BG to gain experience or familiarize themselves with optoelectronic technology in the form of visualization of real images from activities border.

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