

## AUTOMATED SYSTEM FOR AIR TRAFFIC MANAGEMENT "TOPAZ"



**Automated System for Air Traffic Management "TOPAZ"** is intended for ensuring support of air traffic in airspace of consolidated, terminal-areal and areal centers of Air Traffic Management Consolidated System

### TOPAZ AUTOMATED SYSTEM COMPRISES:

- » **"TOPAZ ATM CAF"** – Complex of Automated Facilities of air situation processing and displaying to ensure fulfilment of air traffic planning and control procedures;
- » **"AVIATOR"** – complex for voice data and air situation data recording and replaying;
- » **"TOPAZ-TSC"** – Time Synchronization Complex;
- » **"STC"** – Simulation and Training Complex for target flow simulation and for training of controllers;
- » **"VCC"** – Voice Communication Complex;
- » **"TOPAZ-CC"** – Topaz Control Consoles.

**"TOPAZ ASUP CAF"** – complex of facilities for automation of planning and usage of airspace of a regional/consolidated center is intended for automation of daily and current planning procedures of airspace usage including arrangement of air traffic flow, as well as for data support of ATC automated facilities complex, for bringing daily flight plans to the notice of airdrome controllers' post, local control post and independent areal center. In addition, it is used for automated interaction based on air-navigational and reference data with AAD units within a zone of ATM Consolidated System.

**"TOPAZ ATM CAF"** is intended for automation of flight planning functions on the stage of current planning and for multi-radar processing and displaying of radar data. This complex ensures automated functions of reception, processing and combined displaying of radar data, bearing, planning, meteorological, NOTAM, coordinate, map-graphic, reference data, and system of state-belonging identification data.

### **"TOPAZ ATM CAF" comprises the following:**

- » central computative complex, i.e. the set of duplicated servers for processing of various types of data, and for ensuring communication and information security;
- » Automated Workstations for Controllers (AWS-C):
  - functional purpose of controller's workstation is variable depending on tasks to be resolved (areal center, airdrome control center, circle/approach, take off / taxing);
  - automated workstation of AFTN operator;
  - flight director's automated workstation;
- » group cross-communication equipment;
- » data transmission equipment;
- » remote automated workstations for installation on sites located remotely from area control centers.

**"TOPAZ TSC" – Time Synchronization Complex** is intended for defining, storage and output of values of current time synchronized with the scale of UTC (Universal Coordinated Time). **"TOPAZ TSC"** provides users with values of current world time with the accuracy of  $1 \times 10^{-12}$ , measuring and output of geographic coordinates.

**Simulation and Training Complex – "STC"** is intended for target flow simulation and for training of controllers personnel as well as for testing **"TOPAZ ATM CAF"** on a test bench.

### **"STC" – Simulation and Training Complex comprises:**

- » server;
- » target flow simulator;
- » controller's workstation;
- » instructor's (systems operator pilot) workstation.

**“AVIATOR” is a complex for recording and replaying of voice data and air situation data** that ensures solution of the following tasks:

- » recording of voice conversations, as well as digital and analogue radar data regarding air situation, and storage of data recorded;
- » association of data recorded to signals of unified time;
- » listening of point-to-point channels in real time without interruption of data recording procedure;
- » synchronous replaying of voice data and digital radar data from online archive and long-storage archive.

**“AVIATOR” Complex comprises the following**

- » recording rack;
- » automated workstation for remote monitoring and automated workstation for replaying voice data and air situation data.

Number of recording channels: from 8 up to 64 with 8-channels set or from 16 up to 128 with 16-channels set.

**“VCC” – Voice Communication Complex** is intended for establishing voice data interchange among ATC processes servicing personnel via channels of radio communication, internal and external telephone communication and loudspeaker communication.

**Voice Communication Equipment Complex** comprises the following:

- » central equipment with control modules;
- » communication terminal with access to radio-communication, internal and external telephone communication;
- » remote communication terminal;
- » technical monitoring and control terminal.

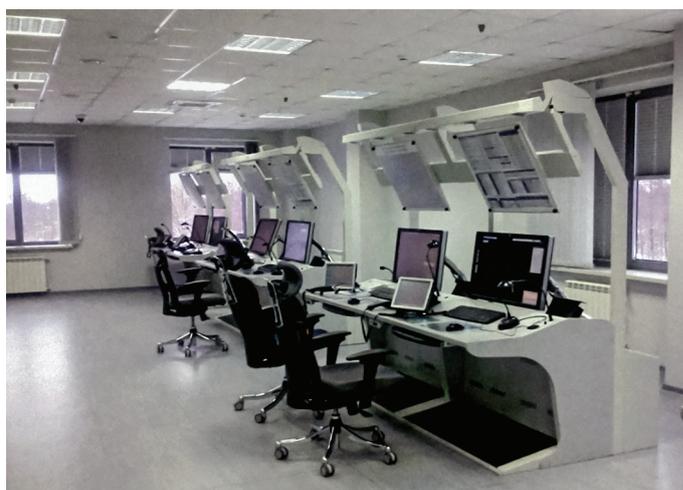
Voice communication equipment complex can be interfaced with on-duty communication means of ATC centers and controllers’ posts.

**“TOPAZ CC” – TOPAZ Control Consoles** have modern design and ergonomic composition. The following three types of consoles are proposed:

- » Areal Center consoles for equipping of ATC controllers’ (navigators’) workstations;
- » Aerodrome Control Command Post consoles for equipping workstations of aerodromes control-command posts;
- » Flight Director’s console for equipping workstations of flight directors (shift supervisors), controllers of aerodrome controllers’ post (air traffic flow management group), technical and administrative personnel.



*ACCP Controller's Console*



*Areal Center Console*



*Flight Director's Console*