

# Technical characteristics of LVP UPC 9 MNIS 1.0

The name of the proposed software product is: **Lite version of the program "Universal Processing Center of nine multilingual network instrumental systems, version 1.0"** (LVP UPC 9 MNIS 1.0).

## 1. General characteristics of the product

### 1.1. Business benefits

Provision of an opportunity to any interested network users to solve operatively in any convenient for them language either via the Internet (*network mode* of LVP UPC operation), or in a local network or on a separate computer (*local mode* of its operation), their tasks on optimizing control of discrete technological and information processes for various purposes with the help of the following nine lite versions of *multilingual network instrumentation systems* (LV MNISs):

- 1) LV MNIS MBO 1.0/upc - Ministry's budget optimization;
- 2) ... GAO 2.2/upc - goal achievement optimization (network planning);
- 3) ... IO 2.2/upc - investments optimization;
- 4) ... EO 1.3/upc - expenses optimization;
- 5) ... HIO 1.2/upc - housing investment optimization;
- 6) ... RIO 1.0/upc - real estate investment optimization;
- 7) ... NPO 1.0/upc - network purchases optimization;
- 8) ... TO 1.6/upc - transportation optimization;
- 9) ... PTPDO 1.2/upc - public transport passenger delivery optimization.

The user interface of the LVP UPC 9 MNIS 1.0 itself can be presented in two languages: English and Russian.

### 1.2. Product positioning

Market of network optimizing software tools.

### 1.3. Information about users

Users of LVP UPC 9 MNIS 1.0 are those persons who have access to the above LV MNISs through their automated work places (AWPs) intended to input the initial data of tasks and to output the results of their solutions.

## 2. Product overview

**LVP UPC 9 MNIS 1.0** is a set of multilingual programs to be run by a batch file **UPC9\_lite.bat**. The full composition of this set includes the following 10 software modules (any of them in case of uselessness may be excuded):

- **MBOml.exe** - module of optimization (MO) of MNIS MBO 1.0/upc, that performs the following functions on solving tasks of Ministry's budget optimization:
  - forming an array of parameters of step transitions for a specified controlled discrete process of service (DPS);
  - finding numerically or otherwise of an optimal strategy of controlling this DPS;
  - administration of jobs sent from the user to solve the specified tasks, namely: checking the admissibility of their processing, calculation of execution cost, registration of operations to be fulfilled, etc.;
- **GAOml.exe** - MO of LV MNIS GAO 2.2/upc, that performs similar functions for solving tasks of goal achievement optimization;
- **IOml.exe** - MO of LV MNIS IO 2.2/upc, that performs similar functions for solving tasks of investments optimization;
- **EOml.exe** - MO of LV MNIS EO 1.3/upc, that performs similar functions for solving tasks of expenses optimization;
- **HIOml.exe** - MO of LV MNIS HIO 1.2/upc, that performs similar functions for solving tasks of housing investment optimization;
- **RIOml.exe** - MO of LV MNIS RIO 1.0/upc, that performs similar functions for solving tasks of real estate investment optimization;

- **NPOml.exe** - MO of LV MNIS NPO 1.0/upc, that performs similar functions for solving tasks of network purchases optimization;
- **TOml.exe** - MO of LV MNIS TO 1.6/upc, that performs similar functions for solving tasks of transportation optimization;
- **PTPDOMl.exe** - MO of LV MNIS PTPDO 1.2/upc, that performs similar functions for solving tasks of public transport passenger delivery optimization;
- **REQ.exe** - module of processing requests from LV MNISs users to receive by them from LVP UPC 9 MNIS 1.0 the following information:
  - 1) Excel-file of the user tasks protocol, i.e. his fragment of the tasks log of users, having the following format: **\_<five-digit numerical user code>\_<date of forming this file in UPC>\_tasks.xls** (format of the file of this type request - **\_<user code>\_tasks.req**);
  - 2) text file of registration events in solving tasks of the user on a specified date, having the following format: **\_<user code>\_<date of registration events in UPC>\_log.txt** (format of the file of this type request - **\_<user code>\_<date of registration events>.req**).

In the optimization modules of MNISs, which are included in LVP UPC 9 MNIS 1.0, is realized the scheme of recurrent optimization by Schweitzer-Burlakov, which allows to use instant controls [Бурлаков М.В. Ситуационное управление в системах массового обслуживания. - Киев: Наук. думка, 1991. - 160 с.; стр. 61 (Burlakov M.V. Situational control in queuing systems. - Kiev: "Наук. думка", 1991. - 160 p.; page 61)].

Periodic start of the batch file **UPC9\_lite.bat** is usually done automatically by the Windows operating system in the mode of assigned job. There's also a manual mode to run this file.

Year of release LVP UPC 9 MNIS 1.0 - 2018. Place of development - Kiev (Ukraine).

### 3. Computer requirements

- operating system - Windows;
- volume of operative memory - at least 1 GByte;
- for the *local* operating mode of the LVP UPC - multi-core processor.

### 4. Product restrictions

- restrictions for the optimization modules of LVP UPC 9 MNIS 1.0 on the allowable number of phase states of optimizable process:
  - for LV MNIS MBO 1.0/upc - **20000**;
  - for ... GAO 2.2/upc - same;
  - for ... IO 2.2/upc - same;
  - for ... EO 1.3/upc - **10000**;
  - for ... HIO 1.2/upc - **2000**;
  - for ... RIO 1.0/upc - **20000**;
  - for ... NPO 1.0/upc - same;
  - for ... TO 1.6/upc - **30000**;
  - for ... PTPDO 1.2/upc - **10000**.

### 5. Practical application

This product was put into operation in August 2018. It is designed for *free* solution in test mode by local and network users of the tasks of optimizing control of discrete processes for different purposes with relatively small numbers of phase states. The archive file of the two installation sets (local and network) of LVP UPC 9 MNIS 1.0 you can download from the website "Promotion center of IT AC DTIP" (<http://dtip-burlakov.com/en>).

Burlakov Michael Viktorovich,  
creator of LVP UPC 9 MNIS 1.0  
Doctor of Engineering