Technical characteristics of MLIS and MNIS RIO 1.0

The names of the proposed software products are: **Multilingual local instrumental system of real estate investment optimization**, version 1.0 (MLIS RIO 1.0) and **Multilingual network instrumental system of real estate investment optimization**, version 1.0/upc (MNIS RIO 1.0/upc).

1. General characteristics of the products

1.1. Business benefits

Providing the opportunity for any interested users facing the problem of buying and selling real estate objects (in short - RIO) with commercial purposes or services on their commercial use to quickly solve their tasks for finding optimal strategies of executing such operations.

1.2. Products positioning

Markets of software and network computing services to solve tasks of real estate trade.

1.3. Information about users

Potential users of MLIS RIO 1.0 and MNIS RIO 1.0/upc are buyers and sellers of any real estate, as well as various real estate companies.

2. Products overview

Programs **MLIS/MNIS RIO 1.0** are designed to find effective strategies of purchase or sale of real estate objects (REO) with commercial purpose or of their renting. They provide for *two modes* of investment use: 1 - an investment in purchase of the alien real estate and 2 - an investment in upgrade of the own real esate. The first mode is applied in case the user is going to invest his money in the purchase of REO for their subsequent resale or renting, and the second - in the upgrade of his REO for their further sale or renting. Both these modes allow to solve tasks of the following *four types*: 1) maximizing the absolute income from sale of REO without accounting the payback factor; 2) the same taking into account this factor; 3) maximizing the relative income from exploitation of REO without accounting t the payback factor; 4) the same taking into account this factor.

For the tasks of purchasing the alien real estate or upgrading the one's own it is allowed to use not only the investor's own funds, but also credit funds attracted at a specific interest rate. As a result of the solution of the posed task, are found not only the optimal set and parameters of the acquired or upgraded REO, but in the case of absolute income from their realization - the optimal amount of loan, which at that will be spent.

The programs also provide for the statistics function, which makes it possible to evaluate the investment efficiency for the type 2 and 4 tasks taking into account the risk factor.

All information about REO is stored in their specialized databases (in short - DBREO), the creation and correction of which are provided in MLIS/MNIS. DBREO are of two types: *A* and *B*, the first of which is intended for buyers of alien real estate, and the second - for sellers of one's own. There is provided a mode of automatic correction of DBREO when solving any task.

MLIS/MNIS RIO 1.0 are multilingual programs. Alternative languages of their interfaces are stored in separate files, called *language shells*. These programs include two such shells: Russian and English, as well as a special program of version 1.0 called "**Генератор языковых оболочек (ГЯО 1.0)** (Generator of language shells (GLS 1.0))", that allows users themselves to create such shells for any languages in which they usually communicate.

MLIS RIO 1.0 is an offline program, designed for a particular user (the lite version of this program is free).

MNIS RIO 1.0/upc is designed to provide network services to many users. This system consists of two parts: one remote module of optimization (MO), which is a part of the Universal processing center (UPC) 9 MNIS 1.0 (that is why the suffix "/upc" is indicated in the name of this MNIS), and numerous automated work places (AWPs) targeted at specific MNIS users. Each such AWP is designed to prepare by a separate user the input data of the tasks to be solved and to output the calculation results, and the synthesis of optimal strategies of RIO purchase or modernization takes place in the MO. Information link between AWPs and MO can be carried out via the Internet, over the local network or even on the computer bus of a single user of AWPs. In the first and second cases MO is located on the network server, and in the third - on the computer of the indicated user. At that, there is ensured the operativeness and full auto-

mation of the AWPs interaction with this module.

Note. MLIS/MNIS RIO 1.0 are localized versions of the software products of wide purpose "Local/Network instrumental system of investments optimization (LIS/NIS IO 2.1)", which are designed for solving various tasks on finding optimal strategies of investing money in the acquisition of diverse sources of income from their specified totality.

MLIS/MNIS RIO 1.0 are created on the basis of a new science-intensive information technology of automation of control of discrete technological and information processes (IT AC DTIP), having many uses, the founder of which is the author of these multilingual programs. A set of lite version of MLIS RIO 1.0 can be downloaded from any of two websites of the author: "Promotion center of IT AC DTIP" (http://promo.dtip-optim.com/en) and "Implement, center of IT AC DTIP" (http://dtip-optim.com/en/main). There also the user can solve remotely up to 10 test tasks in MNIS RIO 1.0/upc.

Area of possible using MLIS/MNIS RIO 1.0 is **real estate trading**. Year of their issuing – 2017 (year of MNIS update to version 1.0/upc - 2018). Place of development - Kiev (Ukraine).

3. Products functions

MLIS/MNIS RIO 1.0 allow to solve tasks of four types in finding optimal strategies of investment in the purchase of alien REO for commercial purposes or in the modernization of one's own REO that are put up for sale or for leasing. At that is reached the maximum of average absolute or relative income obtained from the acquisition or modernization of REO from their specified set while ensuring the required investment risk in the case of a payback factor. In the basis of their solution lies the method of numerical optimization of discrete service processes, as well as a unique scheme of optimizing such processes, developed by the creator of these programs. The main properties of the indicated types of tasks are listed below.

Tasks of type 1

- maximixed parameter: *absolute income from sale of REO*;
- payback factor - *absent*;
- statistical modeling - *absent*.

Tasks of type 2

- maximixed parameter - *absolute income from sale of REO*;
- payback factors:
  - for the mode of investment in purchase of the alien real estate - *average payback for a given initial period of a certain part of the spent investment amount*;
  - for the mode of investment in upgrade of the own real estate - *receiving for a given initial period of the required average income*;
- statistical modeling - *provided*.

Tasks of type 3

- maximixed parameter: *relative income (per time unit) from REO exploitation*;
- payback factor - *absent*;
- statistical modeling - *absent*.

Tasks of type 4

- maximixed parameter - *relative income (per time unit) from REO exploitation*;
- payback factors:
  - for the mode of investment in purchase of the alien real estate - *average payback for a given initial period of a certain part of the spent investment amount*;;
  - for the mode of investment in upgrade of the own real estate - *receiving for a given initial period of the required average income*;;
- statistical modeling - *provided*.

4. Restrictions

- allowable amount of REO in the uses DBREO - **1000**;
- maximum number of investment options: in the absence of a payback factor - **10**, and in its presence - **5**;
- allowable number of phase states of an optimizable process (it is available for regulation by the user) -

1000000 (for lite version of the program MLIS RIO 1.0 - **20000**).

5. Practical application

MLIS/MNIS RIO 1.0 were put into operation in September 2017 (MNIS was updated to version 1.0/upc in July 2018). Now comes the stage of the search for potential dealers and users of these systems.

Burlakov Michael Viktorovich,
the creator of MLIS/MNIS RIO 1.0,
Doctor of Engineering