

### II. CREATION OF A SELF-ORGANIZING AND SELF-SUSTAINING MICROCIRCUIT BY MEANS OF THE NANOTECHNOLOGY. [1]

It is known [1] that Research Institute ME&NT «Delta» successfully created a «Nanotechnology Complex – 500» (NC-500), which is designed for conducting the nanotechnological processes and measuring characteristics of surfaces. The task execution is achieved by using piezo manipulators of a new type, combining a wide range of transposition and high mechanical strength of the construction. Special analog-digital system with integrated signal processor is carrying for the management of the processes, include lithography, spectroscopy and the very management of the complex, which is accomplished by scanning with a tunneling microscope. In particular, owing to NC-500 the elements of microcircuits electronics have been created – given out conductor and FET (**Figure 1. and 2.**).

***Figure 1. A fragment of a nano-conductor.***

***Figure 2. A fragment of a Field-Effect Transistor.***

In [2] it is proposed the complex to be used for creation a neurochips, in particular (a component basis of neurocomputers).

**We offer, within the concept of Open Systems, to close the control scheme of the NC-500 with recursive feedback from the output side.** *This means to make changes in the*

*structure of the output microcircuit over discrete time intervals («change» – «inclusion in the framework of management» – «change back») by means of NC-500. Or, if it is technically possible, to modify the microcircuit constantly in the process of its work. In this case, if the production of NC-500 is neuro-cyber microcircuit or even a cellular automat, that would be entirely feasible.*

The algorithm, described in the Cambridge mathematician John D. Conway's game «Live», can be used as a cell self-replicating automat [3, 4, 5]. In [5, page 315] we can read the following task: «Shape a Turing machine, using the Conway's game». The idea consists in to make use of «gliders» (moving structures in a predetermined area of the cell structure – *author's note.*) as a single pulse for storage and transmission of information and to implement the necessary logic operations allowed by the circuit components on real computers. If it's possible to make the molecular «Turing machine» with a Conway's game, one question immediately arised – is it possible to create a «universal constructor» or so-called «nanoassembler», which allow to produce such machines that could fully copied or reproduced themselves. Ibid [5, page 338 – 339] mentioned that research conducted in the University of Massachusetts and also in Cambridge by Conway itself (see [6]) showed that the algorithm of the game «Live» is necessary and sufficient for shaping the Turing machine and self-replicating machines. Then, the complex NC-500 could only be used to set the initial configuration of the cellular automat and for amendment during its operation. (

**Figure 3.**

illustrated the capabilities of the NC-500 to create a «cellular space»).

**Figure 3. A fragment of informative array.**

The current scientific problems associated with cellular automats and self-organizing systems can be discussed at [7]. The computer program for modeling the game «Live» ® Windows Life, can be kindly provided by © Jean MICHEL (22, rue de Wattignies 75012 PARIS FRANCE), [8].

We would like to emphasize that to obtain a self-organizing system it is sufficient to take into

account the principles set out in [9, 10]. In turn, we offer one option for their technical realization.

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**[1] Корчмарюк Я. И. О создании самоорганизующейся и самовоспроизводящейся микросхемы средствами нанотехнологии.** (Тезисы докладов,)

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