

EXCERPT FROM MR. BEDRICH CHALOUPKA PRESENTATION  
ON XONICS MT SYSTEM

The system known as the Xonics MT System was developed in the last six years from private sources. Those responsible for its development are Dr. Giuliano Gnugnoli, Dr. Allen Tucker, and Mr. Bedrich Chaloupka.

It is coded entirely in the PL1 programming language. It runs in a 100K memory region and may be executed on any IBM 360/370 computer in either a DOS or a OS environment.

The program may be executed in three different modes.

1. The Batch mode for translation of large volumes of text.
2. The sentence-by-sentence mode for translation of articles, abstracts, and titles.
3. The interactive mode, which allows translations and dictionary maintenance to be performed at a terminal. In this mode the dictionary update and the translation program may be executed simultaneously.

The system consist out of two programs.

1. The dictionary maintenance program.
2. The translation program.

The dictionary maintenance program allows the user to enter new items into the dictionary, to delete items from the dictionary, to change any field of items in the dictionary, and to enter semantic units.

### The Dictionaries

The dictionaries are residing on direct access storage devices. The organization of the dictionary is indexed. This gives the possibility to open the dictionary files in either sequential or indexed sequential mode, depending on the mode of translation.

There are separate source and target dictionaries. Presently the source dictionary is 160 characters long. The target dictionary is 80 characters long. This organization is undergoing changes, so that a given dictionary may be used interchangeably as a source or a target dictionary.

The grammatical information in the dictionary is very rudimentary. There is no special skill or linguistic training required to work with the dictionaries.

The system is using both stem and full form dictionaries. The dictionary contains approximately 25,000 items in physics and chemistry.

### The Translation Program

The translation program is small, consisting of approximately 650 PL1 statements. The translation algorithm simulates the mental processes of a human translator, and is not styled on any specific linguistic theories. The translation program is modularly designed.

In addition to proper recognition of grammatical properties the system eliminates case prepositions after conjunctions and punctuation marks, properly translates prepositions and semantic units, and rearranges participle and nested structures.

The system was designed for translation from Russian to English, but other languages with similar structures as Russian, such as Czech, may be translated. Even German sentences can be handled.

The system was demonstrated on a terminal. The demonstration consisted of translation of sentences in Russian, Czech and Serbian into English.

The dictionary update, as well as semantic unit insertion and deletion, was demonstrated. The attached illustration shows some sample translations that were done by the system.

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Mr. Chaloupka has worked on machine translation projects since 1956. He first became involved with machine translation at Georgetown University in 1956 where he worked on the GAT, SLC and Code Matching Techniques. He has done studies on major efforts in machine translation both in the United States and abroad. Mr. Chaloupka is the principle researcher in the development of the machine translation project at Xonics, Inc.

Mr. Chaloupka taught courses in computers and systems analysis. He is an accomplished systems analyst and computer programmer.

Mr. Chaloupka received his B.S. in Business Administration and M.S. in Political Science from the Charles University, Prague, Czechoslovakia. He received a B.S. in Languages and an M.S. in Linguistics from Georgetown University.

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Dr. Gnugnoli is currently Professor of Computer Science at Georgetown University and Systems Consultant to Xonics, Inc. He has over ten years experience in the development of computer translation systems. He is responsible for the design and implementation of the Xonics computer systems for machine translation.

Dr. Gnugnoli has developed and taught courses on the undergraduate and graduate level in data structures, PL/1, operating systems, file management and information processing. He is an expert in systems programming and computer communications.

Dr. Gnugnoli received his A.B. in Mathematics from Harvard University and Ph.D. in Mathematics from Georgetown University. He is author of the book "Simulation of Discrete Stochastic Systems", published by Science Research Associates, 1972.