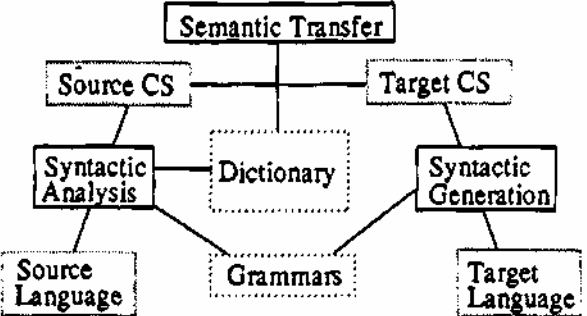


2) Name of Organization	Information Processing & Control System Group, Toshiba Corporation, 1-1, Shibaura 1-chome, Minato-ku, Tokyo 105, Japan						
3) Current status	commercial / experimental						
4) Features of the system	Lexical transition network grammar						
5) Languages translated	English to Japanese      Japanese to English						
6) Strategies of translation (a) Analysis grammar (b) Translation Process	<p>ATN + Lexical Grammars</p>  <pre> graph TD     ST[Semantic Transfer] --- SC[Source CS]     ST --- TC[Target CS]     SC --- SA[Syntactic Analysis]     SC --- D[Dictionary]     TC --- SG[Syntactic Generation]     TC --- D     SA --- SL[Source Language]     SA --- G[Grammars]     SG --- TL[Target Language]     SG --- G     D --- SA     D --- SG     D --- G     </pre>						
7) Dictionaries (a) Structure  (b) Size	<p>for each entry: syntactic category, syntactic properties, semantic properties, lexical rules</p> <table border="0"> <tr> <td>general word</td> <td>50,000 words</td> </tr> <tr> <td>technical term</td> <td>up to 200,000 words</td> </tr> <tr> <td>user-defined word</td> <td>up to 200,000 words</td> </tr> </table>	general word	50,000 words	technical term	up to 200,000 words	user-defined word	up to 200,000 words
general word	50,000 words						
technical term	up to 200,000 words						
user-defined word	up to 200,000 words						
8) Equipment (a) Implementation language (b) Operating system (c) Type of CPU	<p>C OS/AS V3 MC 68020</p>						
9) Performance Translation speed	7,000 words/hour						
10) Facilities	Pre- and Post-editor, Bi-lingual editor, Dictionary maintenance system, OCR, DTP, etc.						

## Exhibiting organizations

FUJITSU LIMITED and ARIS Software - Entwicklung GmbH.

## Contact addressee

FUJITSU LIMITED,  
Chiyoda-ku, Tokyo 100, Japan  
Tel.: (Intl Prefix)-(81)-(3)-216-3211

or

ARIS Software-Entwicklung GmbH  
Robert-Bosch-Str. 79, 7000 Stuttgart 1, FRG  
Tel.: (49)-(711)-25 30 31  
Fax,: (49)-(711)-2 57 87 90

## System description

ATLAS II, marketed by Fujitsu, is a multilingual, semantic - based machine translation system which adopts the interlingua approach. Conceptual structure is used as a language - independent, intermediate meaning representation. The Japanese - German translation system exhibited at the MT Summit is based on ATLAS II. The prototype development is completed and the system is on the way to commercialization. The German word dictionary consists of more than 30 000 entries.

The German generation system uses high-level translation rules, which map patterns of conceptual structures onto patterns of the German language. Translation rules are declarative and permit a modular design of the generation grammar.

Software tools so far developed are, among others, a translation rule Compiler, graphical interactive lexicon and translation rule editors, constituting an integrated environment for linguistic works.

The compiler is designed to translate the high-level representation of rules into ATLAS II generation code, so that linguists can easily maintain and improve their linguistic data in a high level representation.

## Equipment and performance

The system will be demonstrated on a Sun 4/110 workstation with 7 MIPS and 8 MB main memory, on which it translates 6000 words per hour.

## An Experimental MT-System in the EUROTRA sideline family

The following is a brief description of the CAT2 system that will be exhibited by the EUROTRA-D project at IAI Saarbrücken.

- The system is called CAT2 and it has been developed within the EUROTRA project. The name recalls the three kinds of formal objects the formalism contains: C(onstructors), A(toms) and T(ranslator) rules.
- The system has been developed and will further be developed by

EUROTRA-D  
Institut für Angewandte Informationsforschung  
Martin-Luther-Str. 14  
D-6600 Saarbrücken  
Federal Republic of Germany  
e-mail: joerg@iaisun.uucp

- The system is at the present stage a research system on the threshold to development.
- Translated languages: German- English  
English - German  
Spanish- German  
German- Spanish  
Spanish- English  
French - German (experimental)
- The underlying MT theory is of multilingual design, it is transfer-based and the formal language is declarative and unification-based.
- Dictionaries have different size. They have between 200 and 300 lexical units (equivalent: up to 2000 full form entries).
- The system is implemented in C-Prolog, YAP and SICSTUS-Prolog.  
The YAP version is available for SUN (680xx-family), HP, and DEC VAXes.
- The performance depends on the Linguistic phenomena that have to be treated. A sentence consisting of 16 words will be translated from German to English in around 60 secs.

2) Name of the organization	Sharp Corp, Information Systems Laboratories 492, Minosho-cho, Yamatokoriyama-shi Nara 639-11, JAPAN Phone: 07435-3-5521 Fax: 07435-3-0792
3) Current Status	Commercial
4) Feature of the system	High speed translation on workstation
5) Translated languages	English to Japanese
6) Strategies	
Type of grammar	
Syntactic analysis	Augmented Context-Free Grammar
Semantic analysis	Case Grammar
Generation	built by the combination of rules and procedures
Rule size for analysis	Around 1,2000 rules
7) Dictionaries	Basic dictionary: appr. 60,000 words Technical term dictionary: up to 40,000 words per field (Economics, Information Processing, Electronics, Mechanical Engineering, Chemical, Science in geneal) User dictionary: 40,000 words per dictionary
8) Equipment	
Implemented language	C
Operating system	UNIX System V
Type of CPU and hardware	OA-110WS (MC68010) OA-210, OA-310, IX-7 (MC68020)
9) Performance	5,000 words/hour (MC68010) 10,000 words/hour (MC68020)
10) Facilities	
Pre-editing	Users can specify 1) the correct part-of-speech of syntactically ambiguous words; and 2) the phrase boundaries.
Post-editing	Interactive syntactical and lexical disambiguation, and learning.

EUROTRA Commission of the Stand no 10 Cocktail Lounge  
European Communities

Organization: Commission of the European Communities

Head of the project: Sergei Perschke (DG XIII)  
Batiment Jean Monnet  
Plateau du Kirchberg  
BP 1907  
L-2920 LUXEMBOURG

Current status:

EUROTRA has entered the third and last phase of the programme and is due to be completed by the end of 1980. Currently the emphasis is on:

- assessment and consolidation of the linguistic models;
- revision and extension of the lexical bases;
- improvement of the existing software.

Features of the System:

EUROTRA is a multi-lingual machine translation system of advanced design covering all the official languages of the Community, i.e. 72 language pairs. On completion of the programme a prototype system will be available for a limited subject field and for a limited category of texts.

Strategies in translation:

The translation process in EUROTRA is split up into three stages: analysis, transfer and synthesis. The analysis and synthesis components are purely monolingual and must be as complete as possible to simplify the process of transfer.

The vast bulk of R&D is carried out by national research teams (1-2 teams in each Community member state): each language group is responsible for both the analysis and synthesis of its own language and for the transfer from other languages into its own language.

Structure and Size of dictionaries:

Structure :

Stratified dictionaries with full-form entries at surface constituent level and baseform entries at relational and interface levels.

Size:

Monolingual dictionaries contain approximately 4000-6000 entries at interface structure level; bilingual dictionaries for most language pairs are somewhat smaller. For testing purposes, subsets of the above dictionaries are used.

Equipment:

The EUROTRA environment consist of SUN-3s, SUN-4s, HP-900s, DEC stations, VAXes and McVAXes with a variety of UNIX systems (both BSD and S.V.). The software is written in Prolog and C. The rules and terms employed during the translation processes are stored and maintained by the UNIFY RDBMS. The YAP Prolog compiler speeds up

the performance of the system.

**Performance:**

EUROTRA is first and foremost a research-oriented project and priority is assigned to functionality, extensibility and portability; run-time performance is comparable with that of other unification-grammar based systems.

**Facilities:**

Aids to developers include the UNIFY (TM) relational database management system and MARKIT (TM), an SGML parser developed by Sobemap SA/NV.

Name of Organization (Contact address)	Hitachi, Ltd. Computer Group, Hitachi, Ltd. Hitachi Omori 2nd Bldg., 6-27-18, Minami-Oi, Shinagawa-ku, Tokyo 140, JAPAN	
Current status	Commercial (Program product)	
Feature of the system	Semantic transfer	
Translated language	Japanese to English	
Strategies in translation · Analysis grammar · Generation grammar · Translation processes	Dependency grammar Phrase structure grammar  i) Morphological analysis ii) Syntactic/semantic analysis iii) Transformation of semantic representation iv) Syntactic generation v) Morphological synthesis	
Number of rules	approx. 5,000	
Dictionaries	<ul style="list-style-type: none"> <li>- Basic term: 50,000 words</li> <li>- Terminology (Science &amp; technology: 250,000 words, Business: 100,000 words)</li> <li>- User dictionary</li> </ul>	
Equipment · Type of CPU · Operating system	HI-UX/W	2050/32 workstation
Performance · Translation speed	3,000 words/hour	
Facilities · Pre-editing aid	Japanese sentence diagnosis tool	
· Translator's workbench	<b>HICATS/WS:</b> <ul style="list-style-type: none"> <li>- Bilingual text editor</li> <li>- English spelling checker</li> <li>- Electronic dictionary for human use (J to E: 36,000 words, E to J: 75,000 words)</li> <li>- Dictionary editor</li> </ul>	

Name of the organization and contact address:

NEC Corporation  
EDP SYSTEM ENGINEERING DIVISION  
14-22, SHIBAURA 4-CHOME, MINATO-KU, TOKYO 108 JAPAN

Current status of the system:

Pre-product release

Features of the system:

- Personal translation support on engineering workstation
- Powerful support function for dictionary generation
- Japanese & English text editor
- High-quality translation by interlingual approach

Translated languages:

Japanese to English  
English to Japanese

Strategies in translation:

Interlingual approach

Dictionaries (structure and size):

3layered dictionary  
Morphological Block...morphological information (Japanese & English)  
Syntactic Block ...syntactic information (Japanese & English)  
Conceptual Block ...conceptual information (universal)  
Japanese-English ...50.000 entries  
English-Japanese ...50.000 entries

Equipment:

EWS4800/20 (NEC's Engineering Workstation)

Performance:

3.500 words per an hour

Facilities :

- Japanese & English text editor
- Dictionary editor
- Dictionary generation support editor



At the MT Summit, we will be showing our German-English translation system, Release 5.4 on a Wang VS system.

The LOGOS system not only incorporates translation modules, but also allows a text to be compared with the existing dictionaries thus creating a list of unknown words which can then be processed and entered into the dictionary.

There are two further modules, ALEX and SEMANTHA, which enable the user to enter terms into the dictionary and to write company specific semantic rules.

Although we will be showing the German-English system, Logos also translates from German-French, English-German, English-French and English-Spanish. Both German-Italian and English-Italian are presently being developed and should be available by the end of the year.

The basic dictionaries range from approximately 80,000 to 120,000 entries, depending on the language pair.

Logos runs on Wang VS systems, IBM mainframes under both MVS and VM/CMS operating systems and on Unisys computers under Unix V.2.

The performance depends on the system used. A small Wang system can translate one or two pages (Din A4) per hour, whereby an IBM mainframe can translate up to 200 pages per hour.

Machine Translation System CICC Stand no 15 Cocktail Lounge  
for Asian Languages

<p>(2) Name of the organization and contact address</p>	<p>Center of the International Cooperation for Computerization (CICC) Machine Translation System Laboratory FUJI BUILDING 30-9, SHIBA 5-CHOME, MINATO-KU, TOKYO, 108 JAPAN TEL:(03)798-5085 FAX:(03)798-7294</p>
<p>(3) Current status of the system</p>	<p>under development</p>
<p>(4) Features of the system</p>	<p>Interlingua approach using the conceptual dictionary and the cooccurrence dictionary</p>
<p>(5) Translated language</p>	<p>Japanese, Chinese, Malay, Thai</p>
<p>(6) Strategies in translation</p>	<p>Analysis grammar: Dependency grammar + Phrase structure grammar Generation grammar: Phrase structure grammar Translation process: (1) Morphological analysis (2) Syntactic and semantic analysis (3) Syntactic and morphological synthesis</p>
<p>(7) Dictionaries</p>	<p>Japanese dictionary 200,000 words Chinese dictionary 10,000 words Malay dictionary 10,000 words Thai dictionary 5,000 words</p>
<p>(8) Equipment</p>	<p>Three stand alone workstations: FUJITSU E230 2 sets NEC EWS 4800/20 1 set</p>
<p>(9) Performance Translation speed</p>	<p>5,000 words/hour</p>
<p>(10) Facilities</p>	<p></p>

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1. Name of system METAL
  2. Name of organization, contact address Siemens AG  
KAP 323  
Otto-Hahn-Ring 6  
D-8000 München 83
  3. Current status commercially available (German-English);  
pilot operation (French, Dutch, Spanish)
  4. Features of the system full integration into office environ-  
ment; automatic deformatting and  
reformatting; intelligent tool for  
lexicon update by user
  5. Translated languages German-English (product); English-  
German, German-Spanish, French-Dutch,  
Dutch-French, German-French, German-  
Danish (in development)
  6. Strategies in translation Augmented phrase structure grammar  
with case frame component;  
prioritized chart-parser; levelling  
of rules; recursive rule application;  
linguistic parallel processing
  7. Dictionaries Both monolingual dictionaries and one  
transfer dictionary per language pair;  
hierarchy of subject-specific modules,  
defined by user. Basic set (function  
words, general vocabulary and common  
technical vocabulary) supplied
  8. Equipment Siemens MX300 workstations with  
Symbolics 36xx as server, written in  
CommonLisp
  9. Performance ca. 1 sec/word = 200 pages per working  
day
  10. Facilities menu-driven work-station; automatic  
deformatting, reformatting; diagnostic  
tools; specialized editor; intelligent  
coding support for lexicon maintenance

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Name of the Organization and contact address:

Office System R & D Department  
Systems Laboratory  
Research & Development Group

OKI Electric Industry Co., Ltd.  
11-22, Shibaura 4-Chome, Minato-ku  
Tokyo 108, Japan  
Phone: Tokyo (03)454-2111 Telex: J22627  
Cable: "OKIDENKI TOKYO"

Current status of the System: on sale

Feature of the System:

Bidirectional Translation system on the small computer such as the PC and EWS.

Translated language:

Japanese to English and  
English to Japanese.

Strategies in translation:

Transfer through semantic process based on the case grammar.

Dictionary:

- a) structure: Japanese morphological dictionary (JM)  
Japanese to English words dictionary (JEW)  
Japanese to English parsing dictionary (JEP)  
English to Japanese words dictionary (EJW)  
English to Japanese parsing dictionary (EJP)  
English morphological dictionary (EM)  
Japanese to English user dictionary (JEU)  
English to Japanese user dictionary (EJU)
- b) size: JM and JEW dictionaries: 90.000 lexical units  
EM and EJW dictionaries: 60.000 lexical units  
JEP dictionary: 8.000 rewriting rules  
EJP dictionary: 6.000 rewriting Rules  
JEU and EJU dictionaries: 40.000 lexical units  
capacity each

Equipment: OKI IF 1000 UNITOPIA MODEL 20  
(MC68020 UNIX Personal Computer)  
IBM PS/55  
(180386 OS/2 PS/2 Modified by IBM Japan)

SUN Workstation (under development)

Performance: 4.000 words per hour on OKI IF1000

Facilities: Bilingual text editor  
Sentence-by-sentence mode or bulk mode translation

User dictionary editor

Conventional dictionary

MS-DOS format FD handler (on IF 1000)

The Saarbrücker Translation Service STS is offered at the "Information Science" department (Prof. Dr. Harald H. Zimmermann) of the University of the Saarland in cooperation with the Society for the Promotion of Applied Information Research (GFAI). Apart from the translations for the database ICONDA, translations are realized for:

German Information Centre for Technical Rules (DITR),  
Information Centre for Social Sciences,  
German Patent Office (DPA),  
Information Centre for Technology and the Federal Office for  
Environmental Protection (UBA),  
German Information Centre for Energy, Physics and Mathematics,  
Karlsruhe,  
Hoppenstedt publisher.

An expansion of the translation service to other specialized fields is being planned.

The STS makes full use of the possibilities and advantages of computer-assisted translation aids and of machine translation by the Saarbrücker translation system "SUSY". The advantages of the STS-Service are, among others, the easier organization of translations and greater consistency in terminology.

As for the respective client, the organization of the translations is reduced to an organization of data exchange. The translations are sent back as machine-readable data prepared e.g. for an easy database update.

The translation output is available in three different quality degrees:

informative machine translation,  
rapid post-edited translation,  
high quality translation.

For the time being the data are exchanged tape-to-tape. Data exchange, however, can be made more efficient by using data networks (e.g. DATEX-P).

The consistency in terminology is achieved by building-up and checking the specialized vocabulary for each client. The respective terminology is then incorporated in the machine-readable dictionaries and therefore available for all further texts to be translated. This procedure substantially reduces the inconsistencies which usually occur in conventional translations realized by different translators using different dictionaries.

SYSTRAN is a fully automatic translation software system, translating texts from one source language to a target language without human intervention. The software is owned by SYSTRAN S.A. company which bought in 1986 all the rights of the system (except for Japanese).

The international translation network of SYSTRAN (based on two IBM mainframes - one in France, the other in the USA) allows PC users to carry out any translation they might need in more than 12 language pairs through the normal telephone network in the world and through the INFONET/TRANSPAC data transmission network in Europe, or through the domestic MINITEL network (with currently almost 5 million users connected in France).

The operator can use his own personal computer with the word processor of his choice to type the text to be translated. He may also use an OCR to read printed texts, (On demand SYSTRAN supplies software for comfortable text handling e.g. spelling and grammar checker etc..) After sending the text, SYSTRAN translates it within a very short amount of time, e.g. the user of the high-speed translation system (TGV - traduction grande vitesse) in France receives the translation of a one-page text within one minute.

Machine translation allows to deal with cases where manual translation is not cost or time effective. In addition to the traditional translation sectors, SYSTRAN will offer in the near future the possibility of Data Base Interrogation in foreign languages, Technology Survey, Multilingual Message Handling with Instantaneous Translation, Automatic Text Indexing with complex syntactic and semantic parameters and complete economic activities restructuration thanks to Integral Office Document Production Systems covering drafting, translating, post-editing, publishing and mailing.

The SYSTRAN system of Artificial Intelligence is composed of analysis programs for the source language with generally 100 000 lines each (written in a programming language especially created for linguistic purposes), transfer and synthesis programs for the target language (generally having 25 000 lines), basic word and contextual dictionaries (the size depends on the language-pair), pre and post processing programs interfacing between the external word processor systems and internal SYSTRAN formats as well as software for user dictionary input (coding). The SYSTRAN group is currently continuing to create automatic code generation programs to make dictionary coding more efficient.

The SYSTRAN group employs worldwide more than 70 persons working full-time on SYSTRAN developing and marketing tasks with teams in PARIS/SOISY (France), LA JOLLA (California/USA), Luxembourg and RENCHEN (Germany).

The SYSTRAN system is currently used by major national and international organizations as the EEC, FTD (USA), Atomic Agency of Vienna, GENERAL MOTORS, RANK XEROX, Karlsruhe Nuclear Center, DORNIER, in France: EDF, Aerospatiale, Bull, etc. .

- Name of organization and contact address:  
Tovna Machine Translations Ltd,  
127 Yigal Alon St.  
Tel Aviv  
Israel  
Tel. 972-3-256252
  
- Current status of the system:  
Commercial with English into French. Already installed  
in Europe and North America. English-Russian will  
be commercial in few months (both directions) and  
with more languages coming next year.
  
- Features of the system:
  1. TOVNA MTS is a learning system which learns from examples  
the user gives and from corrections made by the user,  
thus improves itself with use.
  2. TOVNA MTS has a universal software which enables to develop  
new languages in a relatively short time and with a  
relatively small investment.
  3. TOVNA MTS can be installed on different types of hardware.
  4. TOVNA MTS uses very sophisticated and user friendly Post-  
Editing tools
  
- Dictionaries:  
TOVNA MTS uses a general dictionary with sub-dictionaries  
for different subject matters and different companies.
  
- Equipment:  
TOVNA MTS runs now on a Sun 3/60 workstation with 16 MB RAM  
and 300 MB disk space and can easily be modified to other  
types of 32 bits platforms.