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Editorial

Main topic of this issue of EUROSIM - Simulation News Europe is the EUROSIM '95 Congress which took place in Vienna in September. The title page shows a few snapshots from the Congress. Reports, statistics, and more photos may be found inside - from the scientific events, and from the social events.

This issue also reports on the scientific results of the congress, for instance on the outcome of the "Special Interest Sessions": summaries of the Industry Session and of the Session on Computational Mechanics and Mechatronics are published. Reports on the other Special Interest Sessions will follow in the next issues.

The congress also offered the opportunity to get in closer contact with other and / or new simulation societies, and to get information for SNE. This issue reports about JSST, the Japanese Simulation Society, reports from other new societies will follow.

The EUROSIM Comparisons are continued with two new solutions. Results, solutions, comments and extended solutions of Comparison 1 and Comparison 2 are now available as ARGESIM Report. The series will be continued, in 1996 both a new discrete and a continuous comparison will be set up.

We would like to thank all who have contributed to this issue - we have received much more information than we could publish - we hope to be able to publish all remaining information in the next issues.

F. Breitenacker, I. Husinsky

Aims and Scope

The journal EUROSIM - Simulation News Europe (abbreviated SNE) publishes information related to simulation. It is distributed to all members of European member societies and to other simulation societies or to individuals.

SNE contains news on EUROSIM, on the EUROSIM societies, on other international simulation societies and groups (and societies from related areas), including a calendar of events. Each SNE publishes an essay dealing with new developments in a particular area.

Furthermore, there are presentations of simulation centers, book reviews, industry news, reports on software and hardware developments. A special series on simulation comparisons (EUROSIM comparisons) gives a comprehensive overview on features and developments of simulation software and hardware, including parallelisation techniques.

General information, parts of the news section and information about the EUROSIM comparisons may be found on ARGESIM's WWW server ([URL:http://eurossim.tuwien.ac.at/](http://eurossim.tuwien.ac.at/)).

All contributions are selected and may be edited by the editors of the journal.

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EUROSIM, the Federation of European Simulation Societies, was set up in 1989. The purpose of EUROSIM is to provide a European forum for regional and national simulation societies to promote the advancement of modelling and simulation in industry, research, and development.

EUROSIM members may be regional and / or national simulation societies. Two kinds of membership, full membership and observer membership, are available. At present EUROSIM has eight full members and two observer members: ASIM - Arbeitsgemeinschaft Simulation (Austria, Germany, Switzerland), CSSS - Czech & Slovak Simulation Society (Czech Republic, Slovak Republic), DBSS - Dutch Benelux Simulation Society (Belgium, The Netherlands), FRANCOSIM - Société Francophone de Simulation (Belgium, France), HSS - Hungarian Simulation Society (Hungary), ISCS - Italian Society for Computer Simulation (Italy), SIMS - Simulation Society of Scandinavia (Denmark, Finland, Norway, Sweden), UKSS - United Kingdom Simulation Society (UK). AES - Asociación Española de Simulación (Spain) and SLOSIM - Slovenian Simulation Society (Slovenia) are observer members.

EUROSIM is governed by a **Board** consisting of one representative of each member society. The Board elects officers, who are at present: K. Juslin (SIMS) - president, F. Breitenacker (ASIM) - past president, R. Zobel (UKSS) - secretary, L. Dekker (DBSS) - treasurer.

EUROSIM's journal **EUROSIM - Simulation News Europe** (SNE) publishes information on simulation news in Europe and trends and developments in simulation, including reports of EUROSIM's member societies. **Simulation Practice and Theory** (SIMPTA), EUROSIM's scientific journal, publishes high quality contributions on modelling and simulation.

EUROSIM Board Meeting, September 10, 1995

On September 10, 1995, just before the EUROSIM'95 Congress, a EUROSIM Board meeting took place. Mr. Breitenacker chaired his last meeting as EUROSIM president. After some organisational affairs a change of the bylaws, which was prepared carefully during the last meetings, was accepted unanimously: the extension of the board by the position of the Past President, and the installation of Observer Members. In the following the cooperation agreements with the Japanese Simulation Society JSST and with SCS, The Society for Computer Simulation, were discussed. Mr. Breitenacker reported on first contacts with JSST. Mr. Zobel presented a revised version of the cooperation agreement with SCS.

Mr. Breitenacker reported briefly on the preparations and coming highlights of the EUROSIM'95 Congress: The most important point is that much more than the expected 250 people will attend the conference (about 480).

Then the representatives of the member societies for the EUROSIM board had to be nominated, or confirmed, respectively (1st representative / 2nd representative):

AES: J.M. Giron Sierra / A. Guasch

ASIM: J. Halin / D.P.F. Möller

CSSS: M. Alexik / J. Stefan

DBSS: L. Dekker / J. Zuidervaart

FRANCOSIM: F. Lorenz

HSS: A. Javor / A. Vigh

ISCS: F. Maceri / G. Iazeolla

SIMS: K. Juslin / N. Houbak

SLOSIM: B. Zupancic / R. Karba

UKSS: R.N. Zobel / D.J. Murray-Smith

According to the registered laws and the bylaws, at the end of the meeting a new EUROSIM Board was elected and installed. SIMS, the Scandinavian Simulation Society, has offered to organize the next EUROSIM Congress in Finland. Furthermore, SIMS suggested Mr. K. Juslin from VTT, Finland, as new President. This offer was accepted unanimously, the board welcomed the new President (who will take over the presidency formally with the end of the fiscal year). Mr. Juslin sketched shortly his plans for the future and announced the Congress EUROSIM'98 for spring 1998 near Helsinki. Mr. Dekker and Mr. Zobel were re-elected as Treasurer and Secretary, resp., for a final period. Mr. Breitenacker remains at the board as Past President.

After the formal closing the Board Meeting "continued" with a dinner in a typical Viennese Restaurant with Czech cuisine, where the board members continued discussions in a familiar atmosphere. The three Presidents (on the photo from right to left: F. Maceri - "past" Past President, F. Breitenacker - "new" Past President, and K. Juslin, new President) exchanged their experiences.



Letter from the Past President

Dear simulationist,

At the last EUROSIM Board Meeting a new Board of Directors was elected, and I retired as President of EUROSIM. I welcome cordially the new President, Mr. K. Juslin of SIMS, and I look forward to being able to provide him with any initial help needed through my position as Past President. I would like to thank all the Board Members, the Representatives and the Officers of the Member Societies, and all other colleagues for their excellent co-operation and help.

During the three year period, when I was helmsman of EUROSIM, I was able to stimulate new developments, to continue and to establish some new projects, and also to enlarge the EUROSIM federation. There were, in my personal opinion, some highlights during this period. First, the Iron Curtain had come down - and I was happy to welcome CSSS, the Czech and Slovak Simulation Society and HSTAG (HSS), the Hungarian Simulation Society, as new members. It turned out that these members from the reform countries enriched the work of EUROSIM substantially, broadening the scope of our federation in an important way.

EUROSIM had also to react to other dramatic changes within Europe, and to be able to do this the status of "Observer Member" was created. This form of membership gives "younger" societies and groups the opportunity to cooperate within EUROSIM and to get their society established. In 1994 I welcomed AES, the Spanish Simulation Society, as the first Observer Member of EUROSIM, and my last official task in September 1995 was to hand over the confirmation of Observer Membership to Mr. B. Zupancic, the President of the Slovenian Simulation Society (SLOSIM), in Portoroz.

Another highlight involved the dissemination of information on modelling and simulation. EUROSIM can be proud of the Scientific Journal "Simulation Practice and Theory" (SIMPRA) - here we all have to thank Mr. L. Dekker, the Editor-in-Chief of SIMPRA. "EUROSIM - Simulation News Europe" (SNE), edited by Mrs. I. Husinsky and myself in Vienna, was enriched by the introduction of a new type of information (new "corners"), and the idea of the EUROSIM software comparisons has become quite successful (evaluations are now being published as ARGESIM Report). SNE also took into account the new developments in the information world: after a first attempt with a Gopher Server in 1994 we were able to announce at the beginning of 1995 "EUROSIM and SNE go Internet".

The last highlight was the Congress EUROSIM'95. The Congress became larger than ever expected - and we were put under considerable stress by the amount of work. I hope we did a good job. In particular I would like to thank cordially the people who co-organized this congress, Mrs. I. Husinsky and Mr. M. Salzmänn. As the date of the Congress approached we had to spend more and more

time on the preparations, and we have to apologize to our families and friends, because we had not enough time for them.

Summarizing, I am happy with the results and developments in the last three years. I am glad to be able to show the "New European Simulation Map", with ten member societies now, representing in total about 3000 simulationists (see the following picture). However there are also tasks which I had to leave for my successor - for instance, the map shows some "white spots", and simulation societies from Croatia (CROSSIM), Romania (ROMSIM), and from other reform countries are knocking at the door.

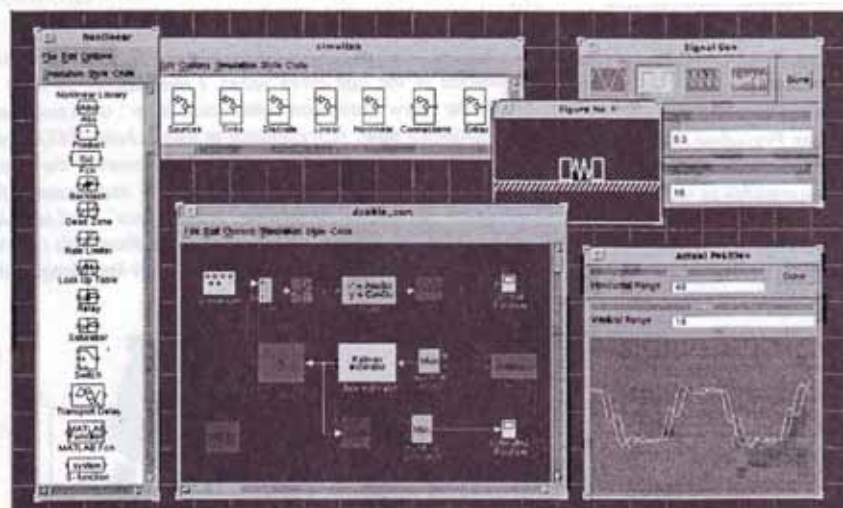


My strategy was - and is - to make EUROSIM a strong federation of Simulation Societies - a big umbrella which not only keeps out the rain, but also holds people together, with strong, individual and independent Member Societies. I handed over this umbrella (a template does really exist, see the following photo) on the occasion of the congress dinner of EUROSIM'95 to my successor Kaj Juslin, and again, I wish him best success for the future.



I look forward to being able to attend the Congress EUROSIM'98 as a simple participant!

F. Breitenacker, Past President



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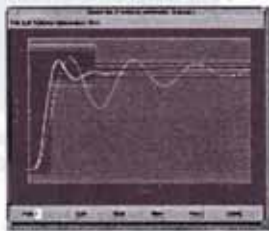
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Professor Giorgio Savastano Award

It is a honour to announce that for the second time the "Savastano Award" has been granted during the EUROSIM'95 Congress in Vienna, Austria, Sept. 1995.

The winning paper is entitled "Improvement of Electricity Consumption Forecasts Using Temperature Inputs" by Fiona T. Murray and John V. Ringwood from the Dublin City University, Ireland.

Professor Savastano was the first EUROSIM President and died suddenly in February 1990. From 1964 - 1978 he was Director of the Institute of Electrical Engineering of the "Federico II" University of Napoli, Italy, and from 1970 - 1982 he was the first director of the "Hybrid Computer Research Center" - National Research Council of Italy. In 1983 he became President of the community of researchers at C.N.R. involved in the study of Electrical and Electronic Measurements. After his death, the Board of Directors of EUROSIM decided to install the "Savastano Award", to be granted once every three years. The award was granted the first time during the EUROSIM'92 Congress in Capri, Italy.

For the second "Savastano Award" eleven papers in the field of electrical and electronic simulation were preselected, arising from the following sources: proceedings of the EUROSIM'95 congress, proceedings of the 1st Joint Conference of International Simulation Societies, papers published or accepted for publication, resp. in the journal "Simulation Practice and Theory" (SIMPRA). A commission of eight persons selected, after careful reviewing, the winning paper.

Both the Award Commission and the members of the EUROSIM Board would like to congratulate the winning authors. Special congratulations are coming from Prof. Savastano's widow, Mrs. Anna Savastano, who could not be present in Vienna.

L. Dekker, Editor-in-Chief SIMPRA

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Email: fbreiten@email.tuwien.ac.at

Letter from the President

Dear simulationist,

The EUROSIM CONGRESS '95 was a great success, due to the enthusiastic accomplishment of both participants and organisers. My most sincere thanks to everybody.

The next triennial "family meeting" of the European simulation societies will take place in Helsinki, April 14-17, 1998. The spring has just arrived in Helsinki. The venue for the congress will be Helsinki University of Technology. The first two days will be mainly devoted for invited state of the art lectures and contributed full papers. The next days will include short papers, poster sessions, plenary sessions, vendor presentations, users' group meetings, short courses, work shops, and meetings of regional or special interest based associations. Post congress trips to the old Hansa town of Tallinn, the art galleries of Saint Petersburg or to a ski resort up in Lapland will be arranged. Anybody interested in taking part of any of the arrangements of the EUROSIM CONGRESS '98, or in the exhibition of simulation hardware, software and publications, kindly contact me at earliest convenience to be included in the mailing list. This is also the call for scientific session organisers.

To enhance the efficiency of EUROSIM administration, the Executive Board was decided to be strengthened by the secretary of the president's office, and the representative for the scientific journal, in addition to the mandatory officers, namely the secretary for international affairs, the treasurer, the past president, and the president. The Executive board reports to the EUROSIM Board of representatives.

All the individual members of the joint European simulation societies have several benefits under the EUROSIM umbrella. They receive three times a year the newsletter "EUROSIM - Simulation News Europe", and have reduced participation fees to several Simulation congresses, world-wide. It has now been proposed to find out if it would be possible for interested individual members to get the scientific journal "Simulation Practice and Theory" by paying an optional and affordable addition to their annual membership fees. This would be a considerable advancement.

In any matters with regard to improve the operation of EUROSIM, don't hesitate to contact me. You may most conveniently reach me by E-mail: Kaj.Juslin@vtt.fi or by fax +358 0 4566 475.

K. Juslin, EUROSIM president

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This was EUROSIM'95

In this issue of EUROSIM - Simulation News Europe we have tried to summarize the outcome of the EUROSIM '95 Congress in Vienna (September 11 to 15, 1995) under different aspects. There are scientific results, facts and numbers, impressions, and personal views.

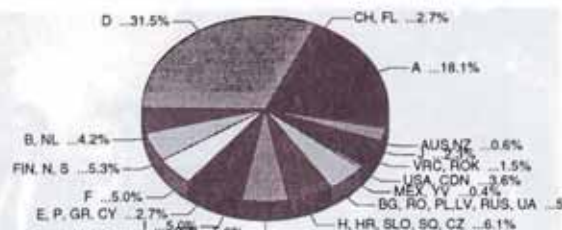
For the scientific programme we have introduced a new kind of organized sessions, the so-called "Special Interest Sessions". The idea was that the organizer (chairperson) not only suggests and collects contributions but also that at the end of each session a summarizing discussion takes place and a report is provided. This issue presents two session reports "Simulation in Mechatronics and Computational Mechanics" and "VHDL-A, A Standard Modeling Language for Simulation?". The summary by Mr. Ecker shows that in Mechatronics and Computational Mechanics there is a new view of simulation tools and methods: people "living" in the domain between 1 Hz and 1 KHz meet people simulating from 1 KHz on. The Industry Session organized by Mrs. Bausch-Gall discussed in detail the up-to-date question of model exchange and the question whether AHDL is a new common denominator in modelling and simulation. This series of reports will be continued in the next issues of SNE.

Also the Poster Session was new to European simulation congresses. Posters were on display during the entire congress, on Thursday afternoon a special Poster Session took place, with a Best Poster Award. This award became a big competition because some of the posters were of outstanding quality (see also page 13).

From the reactions from the participants which we heard during and after the Congress we gather that EUROSIM '95 was a very informative event for the simulation society. People also enjoyed the atmosphere of Vienna during the mild autumn days and the social events of the congress. But it is difficult for us to judge about the congress, being the organizers. Therefore we have to thank especially D. Murray-Smith for writing a personal report on this congress for us (see next page).

The Congress turned out to be a much larger event than we had expected. Therefore the organizers were put under considerable stress during the last seven months before the congress. We would like to thank everybody who helped with organizing this congress, especially our staff members (ARGESIM staff) and our congress helpers (see also their personal report).

Some numbers and facts: 480 participants attended the congress, they were from **41 countries**. The figure shows that most of them came from the ASIM area. Some came from very far, at least one from each continent. 55 of the participants were students. The participation of most of the people from the reform countries has been supported financially by special funds.



459 abstracts for presentations have been submitted. The **Proceedings** (1356 pages) and **Late Paper Volume** (111 pages) contain **240 contributions**, 410 copies of the Proceedings have been distributed. The Proceedings of the Session "**Software Tools and Products**" present **37 papers** (163 pages). The presentations were held on four days in seven parallel sessions. The session chairpersons suggested 50 papers for publication in SIM-PRA and MMS (extended versions). **113 Posters** were on display.

During the **preparation** we mailed about **25000 flyers**, our database contains about **1000 addresses**. We sent and received **several hundred email** messages and counted about **3500 contacts** to our WWW server from outside.

More than **30 persons** belonged to our **staff**, some of them you may find on the following photo:



Finally, photos may tell more than a thousand words, so please have a look at the cover page and at page 10 to get some impressions.

F. Breiteneker, I. Husinsky



EUROSIM CONGRESS '95 VIENNA September 11 - 15



EUROSIM CONGRESS '95 - A Personal View

The EUROSIM Simulation Congress took place at the Technical University of Vienna during the period 11-15 September 1995. The Congress programme included presentations on many aspects of computer simulation methodology and a very wide range of applications.

EUROSIM '95 was the largest conference which the EUROSIM federation has organised, with a total of 480 registered participants from all parts of Europe and from many countries much further away. The Congress on this occasion was organised on behalf of EUROSIM by ASIM (*Arbeitsgemeinschaft Simulation*), the German speaking simulation society, in cooperation with the other EUROSIM member societies and a number of co-sponsoring societies and organisations.

Vienna is a splendid conference venue and the scene was set for those attending EUROSIM '95 by the excellent Welcome Party which took place at a wine cellar close to the Technical University on the first evening. Much wine was consumed and many friendships were established or renewed that evening. The Opening Session the following morning (see next photo) provided more opportunities to learn about the Viennese way of life.



After the formalities of the opening ceremony - welcome addresses of the organizers, Prof. F. Breitenacker and Mrs. I. Husinsky, and of Prof. Stachelberger, Dean of the Faculty for Technical and Natural Sciences - the audience were given an excellent guided tour of the city and its surroundings by Professor Dr. Inge Troch using some of her own beautiful photographs and accompanied by a zither group playing themes from "The Third Man" as well as some more traditional music from Vienna.

The professionalism of the Opening Session carried over to the technical sessions which involved plenary sessions based on invited lectures, some special lectures

on topics of particular interest and a large number of parallel sessions involving up to seven lecture theatres simultaneously. Session chairpersons had been instructed to keep strictly to the schedule and they succeeded in controlling both the speakers and those involved in discussion in a very effective fashion. The precise control of the parallel sessions contributed considerably to the success of the Congress in my view. Sessions started on time and finished on time and the participants were able to move between parallel sessions with relative ease.

One interesting feature of the EUROSIM '95 programme was the inclusion of a poster session for which a period of more than two hours was allowed. Participants were served with glasses of the specially selected *Grüner Veltliner* Congress Wine and other refreshments while walking round the poster and exhibition areas. It is clear that much useful discussion took place and I suspect that the quality of the discussion improved steadily as the afternoon progressed and more and more wine was consumed. Many of the poster displays were of a very high standard.

A *Heurigen* evening held in the open air on the outskirts of the city at the end of the first full day of the Congress was a great success. It also provided an opportunity for all concerned to test their abilities to use the public transport system. Equipped with passes for the underground, trains and buses all 480 of us were let loose on the city at the Technical University and re-appeared, as if by magic, at the *Heurigen* which was quite a few kilometers away by a journey involving at least two of the three possible modes of transport. I am sure that detailed monitoring of our arrival times could have provided a basis for some fascinating simulation studies, aimed at deducing the actual routes taken! However, at the time, no-one was admitting to having had any problems at all and certainly, by the end of the week, everyone was full of praise for the excellent transport facilities in and around the city.



Another important social event took place on the Wednesday evening. This was an organ and choral concert at the Church of St. Michael. The *Wiener Sän-*

gerrunde was conducted by Karl-Hans Strassl and the organist was Thomas Preisz. The concert included works by Bach, Beethoven, Buxtehude, Mendelssohn-Bartholdy and Mozart. The concert showed, that simulationists may be also excellent in music: the organist and some members of the chorus are PhD students in simulation technique. The audience listened concentrated to the music. The photo above also shows that the church was full to the last seat.

On Thursday evening there was a reception by the Mayor followed by the Conference Dinner, both at the Rathaus. This proved to be a very appropriate and impressive location for the highlight of the social programme and provided an opportunity for the EUROSIM umbrella to be handed over from the Past President Prof. F. Breiteneker to the new EUROSIM President Dr. Kaj Juslin. This tradition was established in 1989 at the European Simulation Congress in Edinburgh when, much to my surprise, I was presented with an umbrella signed by representatives of all the European simulation societies existing at that time. This was to celebrate the successful outcome of talks concerning the creation of the EUROSIM federation. An umbrella was again used at the EUROSIM Congress in Capri in 1992 to mark the transfer of the EUROSIM presidency and it was good to see the tradition continuing this year in Vienna.

Unfortunately all good things come to an end eventually and it was with some sadness, perhaps, that those who remained in Vienna on the final afternoon of the Congress gathered together in the *Café Schrödinger* for the Closing Party. After a hard week people could relax, having a beer from the cask and a Gulyas soup (see next photo). It is said that some participants and some staff members finished the Closing Party on Saturday.



Another attraction for participants was the *Café Simulation* in the congress area where "real" coffee (Espresso, Melange), the Congress Wine and snacks could be enjoyed.



In the *Café Simulation* scientific discussions took place, vendors could get into contact with customers, and one could meet old friends.

By the way, it was a very nice idea that every participant could get a bottle of the Congress Wine to take home.

Over 280 papers had been presented at the Congress and most of these were included in the Congress Proceedings [1], a massive volume of 1356 pages, in the Late paper Volume and in the Proceedings of the Session on "Software Tools and Products", abstracts of the 113 posters are published in the Poster Book (ARGESIM reports, see page 14). Many useful discussions had taken place in the formal sessions, at the poster displays, at the exhibition stands, informally in the corridors, at the social events or at the excellent *Café Simulation*.

Although the Congress turned out to be a much larger event than expected, the local team led by Prof. Dr. Felix Breiteneker and Mrs. Irmgard Husinsky ensured that the organization was of the very highest quality. All of the Congress staff and helpers are to be congratulated for their hard work and for making their conference such an interesting and pleasant one to attend. Particular mention should also be made of Dr. Manfred Salzmann who had special responsibilities within the Local Organization Committee. Manfred is a dynamic system in every sense and managed to deal calmly and efficiently with every minor difficulty as soon as it arose while simultaneously finding time to exchange jokes with those around him and keep the whole organization one step ahead of any real problems. I am sure that local organization committees for many other conferences could learn much by studying how it was done at EUROSIM '95.

David Murray-Smith

[1] EUROSIM '95 Simulation Congress"

Edited by F. Breiteneker and I. Husinsky, Elsevier, Amsterdam, 1995 (ISBN: 044482241 0)

Poster-Award EUROSIM '95

113 Posters, on display from Monday to Friday, showed a broad spectrum of applications and methodology. During the Poster Session on Thursday, with no other sessions in parallel, participants were invited to inform themselves on the posters in walking around in the poster/exhibition area, where the authors gave explanations.



Refreshments, snacks and the Congress Wine were served in order to stimulate discussions.

The visitors of the Poster Session were invited to select the best posters. As some of the posters were of outstanding quality the award became a big competition. The congress helpers collected the ballots in time (see next photo), so that the three winners could be announced in the evening at the congress dinner.



The Winners are:

1. Simulation in the Planning of Construction Operations. Sagert P., Mansson U., Chalmers University of Technology, Göteborg, Sweden

2. Modelling and Optimization of Carbon and Nitrogen Elimination. Vogelpohl A., Sievers M., Möller D.P.F., Bracio B.R., Jungblut J., CUTEC and Technical University of Clausthal, Germany

3. Object-Oriented Approach for Modeling Discrete Event Systems. Muhlenbach L. Wendling S., Laboratoire d'Informatique de Sévenans, Belfort, France

The three winners received a one-year subscription to the journal "Simulation Practice and Theory". Also three winners of a one-year subscription of "Simulation Practice and Theory" have been drawn from the visitors who took part in the selection of the best poster, they are: Jukka Toukonen, ABB Corporate Research, Finland; Liliana Oprea, Technical University of Timisoara, Romania; Marko Gerbec, Jozef Stefan Institute, Ljubljana, Slovenia.

Report from a Congress Helper

About 20 students from the high school "BORG Wiener Neustadt" had the possibility to help at the "EUROSIM Simulation Congress" at the Technical University of Vienna from Sept. 11th to Sept. 15th. The "EUROSIM '95" was concerned with all aspects of computer simulation methodology and application.

While talking with participants from all over the world we were able to practise English and we got a better view of people from other countries. With our blue name-badges we stood recognisable along the corridors of the building to help participants find the right lecture-halls and trying to answer their questions. We often found ourselves in unexpected and funny situations but most of the time we found a solution or at least another person who could help.

Apart from copying and washing the dishes (for the *Café Simulation*, where we could rest in the breaks, see photo) we sat in lecture-halls watching the time exactly to stop the speakers and we also tried to help which meant slipping out of the last row and giving the speaker in the front a piece of chalk which lay beside him.



Although we haven't met the other members of the staff before, we were soon accepted and became part of a good working team. Participating in the evening events was always amusing for us.

When looking back I come to the decision that these were interesting days with lots of experiences you never get at school.

Alexandra Tobler

P.S.: The organizers would like to thank Mr. Wiesbauer, director of the BORG, Mrs. Lechner, English teacher, and Mr. Fischer, teacher for Computer Science, for their support.



The working group "ARGESIM" was mainly responsible for the organization of the congress EUROSIM'95. In the following this working group is introduced in more detail.

ARGE Simulation News (ARGESIM) is a non-profit working group providing the infra structure for the administration of EUROSIM activities and other activities in the area of modelling and simulation. ARGESIM organizes and provides the infra structure for

- the production of the journal *EUROSIM - Simulation News Europe*
- the comparison of simulation software (EUROSIM Comparisons)
- the organisation of seminars and courses on modelling and simulation
- COMETT Courses on Simulation
- development of simulation software, for instance mosis - continuous parallel simulation, D_SIM - discrete simulation with Petri Nets, GOMA-optimization in ACSL, genetic algorithms for optimization in simulators
- running a WWW-server on EUROSIM activities, on activities of member societies of EUROSIM and on ARGESIM activities (URL:<http://eurosim.tuwien.ac.at/>)
- running a FTP-Server with software demos of continuous simulation software, discrete simulation software, engineering software tools, tools developed within ARGESIM (URL:<ftp://simserve.tuwien.ac.at>)
- "Seminare über Modellbildung und Simulation" at TU Vienna
- Support and Maintenance of Simulation Software at TU Vienna

In 1995 ARGESIM became also a publisher and started the series ARGESIM Reports. In this series also the Late Paper Volume, the Poster Book and the Proceedings of the Session "Software Tools and Products" of the EUROSIM '95 Congress were published. In general, ARGESIM will publish evaluations of the EUROSIM comparisons and textbooks for simulation courses. Publication is also open for monographs, reports from societies, reports from simulation working groups, etc.

Up to now the following reports have been published:

ARGESIM Report No. 1: Congress EUROSIM'95 - Late Paper Volume, eds: F. Breiteneker, I. Husinsky, ISBN 3-901608-01-X

ARGESIM Report No. 2: Congress EUROSIM'95 - Session Software Products and Tools, eds: F. Breiteneker, I. Husinsky, ISBN 3-901608-02-8

ARGESIM Report No.3: EUROSIM'95 - Poster Book, eds: F. Breiteneker, I. Husinsky, ISBN 3-901608-03-6

ARGESIM Report No. 4: *Seminar Modellbildung und Simulation-Simulation in der Didaktik*, eds: F. Breiteneker, I. Husinsky, M. Salzmann, ISBN 3-901608-04-4

ARGESIM Report No. 5: *Seminar Modellbildung und Simulation - COMETT - Course "Fuzzy Logic"*, eds: D. Murray-Smith, D.P.F. Möller, F. Breiteneker, ISBN 3-901608-05-2

ARGESIM Report No. 6: *Seminar Modellbildung und Simulation - COMETT-Course "Object-Oriented Discrete Simulation"*, eds: N. Kraus, F. Breiteneker, ISBN 3-901608-06-0

ARGESIM Report No. 7: EUROSIM Comparison 1 - Solutions and Results, eds: F. Breiteneker, I. Husinsky, ISBN 3-901608-07-9

ARGESIM Report No. 8: EUROSIM Comparison 2 - Solutions and Results, eds: F. Breiteneker, I. Husinsky, ISBN 3-901608-08-7

Price: ATS 200.- each.

At the EUROSIM '95 Congress the ARGESIM booth (see photo) also represented ASIM and other EUROSIM member societies.



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High Performance Simulation

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1. Introduction and Background

The need for High Performance Computing (HPC) is still growing. Although originating from the physical sciences, engineering and the study of complex systems, an increasing variety of new applications are emerging, such as HPC in financial modelling, transaction processing, image analyses, etc. It is this strong application pull that has motivated national and international research programs to stimulate research, education, and hardware development especially in the field of parallel computing and parallel systems design. Financial support comes mainly from resources allocated by the national and international governments, for instance in the USA the HPCC bill aims at a 1.109 dollar budget for HPCC related research per year. In Europe the EC funds the 4th framework program by 300.106 ECU over 5 years in addition to many national and intergovernmental funding.

If we take a closer look at the type of applications that are addressed by these initiatives, we find that the majority deals with large scale simulation problems, ranging from weather prediction to vehicle dynamics. It is clear that only massive parallel processing (MPP) can provide the extreme processing power required by these grand engineering and simulation applications. We should not restrict ourselves to MPP but rather consider also the possibilities arising from heterogeneous parallel computing. Here we can think of large clusters of high-end workstations of different architecture or combinations of MPP systems with Vector Super computers. A nice example of this last category comes from the results presented by Paul Messina (Caltech) at the HPCN95 Europe conference where he reported on a chemical reactor simulation that took 18 hrs on a Cray C90 (vector super) or 16 hrs on the (parallel) Delta Touchstone. However, when the problem was distributed over the Cray for the eigenvalue calculation, and the Delta for the dense matrix calculation the mixed simulation only took 4 hrs! This notion of the relevance of simulation in heterogeneous parallel processing is also prominent in the new USA HPC initiative (following the 1982 Lax Report and the 1989 AI Core HPCC initiative) the so-called: Acceleration Strategy for Computational Initiatives (ASCI), a 10 year (140 M\$/year) collaboration between the Department of Energy and the Industry. In this initiative

simulation studies such as multi-physics, 3D-geometry's, nuclear plant simulation, complex systems and modelling are mentioned explicitly, together with software and hardware programmes for distributed and massive parallel computing.

If we look at it from the bright side, we find that within a very short time span the HPC initiatives have had an enormous impact on the computer society in general and the simulation society specifically, resulting in many new scientific journals, new HPC research centres (some of which are organised in the European HPCnet E.G. [1]), new educational programmes and new hardware initiatives (in Europe for instance: Parsys' Supernode, Parsytec's PowerStone, Meiko's CS2) that might eventually lead to TeraFlop performance or even PetaFlop performance [2].

There is however a dark side if we take a more realistic view at what can be obtained and what is actually being done. Although a strong emphasis in HPC programmes has been on stimulating industry to participate (for instance through the European 4th framework programme and the Europort projects) hardly any industry really uses this technology in their core products. This is a sign on the wall that HPC is still not accepted by industry and indicates the immature character of the technology. Some reasons for this relatively slow take up of technology might be:

- It takes a lot of effort to outperform a vectorized code running on a vector-super.
- Most applications that are successfully parallelised run in an embarrassingly parallel mode and can easily be outperformed by a large pool of independently (sequentially) working workstations.
- There are hardly any formal models beyond the classical PRAM and CSP models for parallel computing. The models that do exist won't support the distributed memory MIMD type of machines (PRAM) or hamper the description of the algorithm.
- There is still little to no understanding of the differences in- and consequences of- parallel versus sequential computing. Much work is to be done on the numerical aspects of parallel algorithms and the implicit differences in parallel and sequential solvers (for instance it is still an open question whether parallel Simulated Annealing algorithms probe the

same phase space as sequential SA's [3]).

Even worse are these cases where, thanks to the capacity of the parallel systems, too large a problem is studied without quantitative understanding of the numerical consequences.

- Computer Science has failed in developing a quantitative understanding of simulation in a distributed environment. New potential models that take up the notion of complex system theory are still in its infancy [4].
- Even if we assume for a moment that we do have large TeraFlop (or even PetaFlop) machines, than we still lack good computational models that fully exploit the parallelism present in applications and that take care of well load balanced parallel execution.

Perhaps it is time for the scientific -simulation- society to reconsider the various design and implementation stages for applications that require advanced parallel systems.

In this essay we have a less ambitious approach and take a helicopter view and zoom in on some of the crucial decision moments in the modelling and simulation cycle, by identifying 'hot spots' in the modelling phase and the model execution phase, each with its own possibilities and pitfalls.

The modelling phase: The first step to simulation is the development of an abstract model of the real-world system under study [5a and 5b]. Strange enough there are hardly any formal methods of modelling which supports completeness, correctness and efficiency. The lack of such methods might harm the success of this research field significantly, specifically for the kind of complex systems we want to study in High Performance Simulation. Of special interest here are new results obtained with algorithms mimicking nature's processing power. We have tossed the term 'Natural Solvers' for these type of algorithms, examples are: Genetic Algorithms, Artificial Neural Networks, Simulated Annealing, etc. Their specific relevance stems from the natural way in which they translate the real-world system into an abstract algorithm, moreover they are highly adaptive and often easily scalable. If we model for parallel execution we must understand where in our abstract model locality in space or time (or space time for that matter) is present and how to exploit this locality in the computational model. Again no quantitative methods exist although interpretation of parallel computing as the mapping of one complex system (the application) onto another complex system (the parallel machine) may prove to be a fruitful alternative to formalise parallel computing [6], this is however beyond the scope of this paper, some recent ideas will be discussed elsewhere [7].

The model execution phase: This phase essentially contains all the elements necessary for the model execu-

tion on some -parallel- platform. Here we concentrate on the mapping of the different solvers to the machine architecture. Since the type of problems we are interested in are computationally very demanding, much research effort is going on in the efficient use of modern architectures (parallel computer systems) for simulation.

From the domain specific problem (for instance turbulent flow around a dynamically changing object) we need to abstract a conceptual model (e.g., a theory of liquids) and annotate all the possible instances of locality (e.g. flow behaviour in the vicinity of the object is largely independent of the behaviour at the flow source). Next we cast this conceptual model into a computer specific model, basically this comprises the solver that allows for an algorithmic description of the conceptual model (e.g. define Navier Stokes equations and choose relaxation methods to solve the discretised PDE's). Finally we need to implement the solver for a parallel platform. Here we must consider the interconnectivity and locality of both the computer specific model and the hardware (e.g. can we map the loosely coupled program into a SPMD model to be executed on a distributed memory MIMD architecture?).

2. Natural Solvers

With the type of complex simulations we want to address in High Performance Simulation we need to rethink the (mathematical) structure of the applications. Ed Masi from Intel once formulated it in this way: 'With horse driven carts people never worried about aerodynamics...'. Basically there are two fundamental issues we should take into account, since we are not dealing with horse driven carts anymore: (1) Can we simulate real physics on a computer or are we mimicking? (2) What is the underlying structure of the application and can it be mapped efficiently to a parallel/concurrent architecture?

Aspects related to the first question were beautifully discussed in a paper by Richard Feynman [8]. We can rephrase these questions to: Does nature itself behave as a Universal Computer and can we build systems to execute this universal computer. The relation between physics and universal computing has been addressed by Fredkin [9] and Wolfram [6] but is still an open question. In a forthcoming paper we will discuss in detail some new ideas in this research area [7]. Here we are mainly concerned with the second part of the question namely: 'What kind of models can be mapped efficiently to parallel systems'.

A very promising class of solving techniques can be identified by 'natural solvers', these techniques have in common that they are inspired by processes from nature and preserve domain properties in the mapping from solver to the computational model. Important examples

of natural solvers are Genetic Algorithms (inspired by the process of natural selection), Simulated Annealing (inspired by the process of cooling heated material which converges to a state of minimal energy), the Lattice Boltzmann method (a many particle system with a macroscopic behaviour that corresponds to the hydrodynamic equations), and artificial Neural Networks (inspired by the transmission of signals in the brain). In an 'non-natural solver', as for example finite differencing, a number of approximations and abstractions are involved in the simulation of the real physical phenomena, as for example diffusion and flow. In the simulation model this process of approximation and abstraction obscures the explicit information on the physical phenomena and as a consequence violates the 'domain conservation'. Even worse, the possible implicit parallelism of the problem becomes completely indistinct in the abstraction process. Traditionally, methods as finite differencing are widely used to simulate physical phenomena. In parallel computing especially the class of natural solvers is a very promising approach, since the physical characteristics of the original physical phenomenon remain visible in the solving method and the implicit and explicit parallelism of the problem remain conserved.

There is no doubt that 'natural solvers' will become more and more recognised in the High Performance Simulation society. For instance, a recent paper by Dzwiniel et al., [10] discusses the use of Molecular Dynamics to pattern recognition on parallel systems. They concluded that 'the inherently sequential problem, i.e., the global minimum search for the multidimensional criterion, changes for particle dynamics which is-in turn-inherently parallel'.

3. Runtime Support for High Performance Simulation

Given a chosen solver and a parallelization strategy we must concentrate on the underlying hardware on which the actual model execution takes place. First we note that in academia and industry interest is renewed in using clusters of high performance workstations for HPC tasks rather than tightly coupled parallel monoliths. There are several reasons for this. Monoliths are expensive and dedicated, whereas clusters are relatively cheap and general purpose. In addition the 64-bit RISK technology boosts the performance per workstations-node to figures comparable to dedicated monolith nodes (e.g., PowerPC and the Alpha chip). Moreover, new software technologies provide better programming environments (e.g., heterogeneous PVM/MPI), resource management tools (e.g., CODINE, CONDOR). The major reason however seems to be the increasing network bandwidth supporting fast and reliable communication between nodes in a cluster environment,

installations with 100, 150 and some even with 622 Mbit/s ATM-SONET Local Area Networks were reported recently by Tolmie at the HPCN95 Europe conference in Milan [11]. One of the major questions remaining is what the consequences are for the parallel applications that are highly tuned to tightly coupled parallel systems. This is not merely a question of portability, but also one of more fundamental differences in execution behaviour, especially when issues as load balancing are considered. The major differences stem from the fact that cluster computing implies a dynamic (and often heterogeneous) computer resource as opposed to the static (homogeneous) resources available in monolith computing. We have identified this problem of load balancing in a parallel cluster environment and presented a possible way out in [12, 13].

4. Hardware consequences

In the field of parallel computation, there are hardly any analytical methods to guide decisions faced by developers for both hardware and software design. Instead, simulation must be used to study the performance of the hardware. For parallel applications additional performance metrics need to be extracted from test runs on a parallel platform (such as: throughput, latency, interconnectivity, node asymmetry, etc.). In order to obtain insight in the consequences of implementing the application on different architecture's, we need new methods and tools to guide us through the various decisions and to assist in the prediction of performance behaviour.

There are many approaches in parallel hardware simulation, most are based on some form of discrete event simulation where processor cache and memory behaviour are studied through stochastic traces [14], determined by for instance process activity graphs [15]. A major drawback of these simulators is that they are extremely complicated, often dedicated to one type of architecture and require substantial simulation time for - in the eye of the engineer - modest results. Especially when parallel computing is involved the number of experimental parameters to be studied becomes very large. Moreover the engineer would like to perform 'what-if' experiments in order to trace down communicational or computational bottlenecks on different architecture's. Therefore a light weighted highly adaptable simulation system is required.

An approach would be to abstract relevant information of the application and derive a time complexity formula that incorporates all the significant information on computation, communication and data dependency. We can do the same for the underlying hardware by building a machine database that provides a generic machine description which is able to roughly describe

the parameters which influence the performance of a computer. The execution time of an application can then be determined automatically by the machine parameters and the abstracted time complexity formula. If a time complexity formula is used in which the performance parameters of the machine are kept abstract, an interactive performance analysis becomes feasible.

This approach of simulating an abstraction of an application on an abstraction of a parallel machine is implemented in the Esprit-III project CAMAS [16-18], where old dusty deck F77 programs or new F77 with PVM/MPI can be fed into a translator which produces the time complexity and determines the dependencies between all the different parameters in the formula.

5. Summary and Conclusions

In this essay we have shortly discussed some issues in High Performance Simulation (HPS). We argued that parallelism adds a complete new dimension to the expected behaviour of model execution demanding new paradigms and new software techniques. We have taken a top down helicopter view from application modelling via runtime support systems to the machine level, and identified some pitfalls and possible solutions. Clearly we could only touch upon some of the myriad of aspects involved. For instance we have discarded aspects related to Languages.

It seems clear that the best approach to HPS is an holistic view fully incorporating all different levels in the mapping of application architecture to machine architecture. We believe that HPS has just started and will become a very important research and technology area. Due to the complexity of the systems being simulated in HPS, new tools and methods need to be developed (and used!) that abstract locality information from the application and support in the mapping to HPC systems. The concept of natural solvers in conjunction with hybrid parallel implementation supported by dynamic resource management systems seem to be a very promising way to go. Once we can fully exploit the parallel technology we might even expect in the near future real-time simulations guiding real-time complex experiments, a research technique sometimes referred to as 'living simulations'. For more details on the issues discussed here I refer to the discussion in [20].

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Simulation in Mechatronics and Computational Mechanics

Within 4 sessions a total of 13 presentations were actually given at the congress. Mechatronic systems are characterized by the interaction of subsystems with different physical nature, e.g. electrical, magnetic, mechanical or thermodynamic systems. This is the background of specific problems encountered when modeling and simulating mechatronic systems. Many of the presentations contributed to the ongoing discussions in this vital field of research.

Modeling issues of mechatronic systems were discussed in [2], [4], [5] and [7]. The successful application of network analogies were reported in [2] and [7], but heterogeneous models, each based on their fundamental physical principles, seem to be more versatile [2], [5]. Remarkable effort is put into the development of simulators and simulation environments for mechatronic applications [3], [4], [5]. Interestingly these simulators are based on completely different programming languages, e.g. ADA [3], C++ [4] and the numerical/algebraic software package MapleV [5]. A similar package, *Mathematica*, is used in an analysis and design program for mechanical structures [6].

Special problems of modeling in mechanical systems were reported in several presentations. Interesting aspects of modeling friction in a satellite application were discussed in [8] and an overview on simulation models in rotordynamics was given [10]. Two talks were devoted to modeling and Finite Element analysis of failures in laminated beams [11], [12] and one to an ongoing project on modeling lift plants [13].

Parallelization of simulation tasks was discussed in [3], where an open, parallel simulation environment was presented. It is based on the PVM (parallel virtual machine) message-passing system. PVM also has been employed on first trials to parallelize ACSL simulation runs [10].

A number of interesting applications were presented. In [1] off-line simulation is used as a tool for the development of a variable cam phasing system of a combustion engine. A piezoelectric resonant beam force sensor is investigated in [2] and an integrated capacitive pressure sensor in [4]. Time histories of pressure and flow in hydraulic systems, consisting of pipes and valves, are simulated in [5]. The mechanical behaviour and characteristic electric quantities are the simulation results of an investigation of an electromechanical contactor [7]. Due to the occurrence of friction forces several types of motion are encountered by nu-

merical analysis of the solar panels of the Hubble Space Telescope [8]. A model of a hand-held drilling tool is used in [9] to analyze the dynamic behaviour in the case of sudden load changes. [10] deals with the occurrence of failures and transient conditions in rotating machinery. Other kinds of failures, occurring in composite beams, are investigated in [11] and [12]. Finally, results from a modal analysis of piles of a lift plant were presented in [13].

The most frequently asked questions during the discussion of papers were about the pros and cons of software. This topic was raised primarily because so many different software packages were used by the authors and the contributors from the auditorium. Since nearly each mechatronic application is different it seems to be unlikely that a single program language will ever meet even most of the possible demands. However, general purpose programming systems/languages like Simulink, ACSL and, to some extent, PSpice have been applied successfully in mechatronic applications and can be regarded as a good choice in many cases. Nevertheless, there is no doubt that new programming systems, which can handle the different parts of a mechatronic system in an easy-to-use and unified way are of great interest. Promising steps in this direction have been reported in some of the presentations.

- [1] Off-line Mechatronic Simulation, H. Schmitz, H. Krohm, Atlas Fahrzeugtechnik, Germany
- [2] Two Approaches to Coupled Simulation of Complex Microsystems, A. Klein, A. Schroth, T. Blochwitz, G. Gerlach, TU Dresden
- [3] CAMEL/PVM: An Open, Distributed CAE Environment for Modelling and Simulating Mechatronic Systems, P. Klingebiel, R. Diekmann, U. Lefahrt, M. Fischer, J. Seuss, Univ. Paderborn
- [4] Mechatronic Simulation Using Alecsis, Anatomy of the Simulator, Z. Mrcarica, T. Ilic, D. Glozic, V. Litovski, H. Dettler, TU Vienna
- [5] Modeling of Mechatronic Systems by Symbolic Computation, K. Schlacher, R. Scheidl, University Linz
- [6] Computer Aided Analysis and Design of Branched Mechanisms, C. Eisinger, B.Z. Sandler, Univ. of the Negev, Israel
- [7] Mixed System Simulation of Electromagnetic Drives Containing Electrical, Magnetical and Mechanical Subsystems, Th. Roschke, TU Dresden
- [8] Some ESL Models for the Friction Forces between the Fixed Booms and Solar Panels of the Hubble Space Telescope, R.N. Zobel, J.M. Zammit, Univ. of Manchester
- [9] Transient Movement of Hand-held Drilling Tools Subjected to Severe Loading Conditions, R. Schaer, B. Favre-Bulle, Hilti Corp., Liechtenstein
- [10] Simulation of Rotordynamic Systems with ACSL, H. Ecker, TU Vienna, J.D. Knight, Duke Univ. North Carolina
- [11] 3D-Finite Elements for the Analysis of Progressive Failure in Laminated Composite Beams, R. Luciano, R. Zinno, Rome
- [12] Finite Element Analysis of Failure in Laminates, D. Bruno, G. Porco, R. Zinno, Univ. Rome
- [13] Dynamic Numerical Model of Lift Plants, F. Maceri, Rome

H. Ecker, TU Vienna

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The 1996 Winter Simulation Conference invites papers for all aspects of discrete and combined discrete-continuous simulation, including tutorials, research, applications, exhibits, and a poster session. We encourage submissions in the following tracks:

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We will consider submissions in other areas. All submissions will be reviewed and accepted papers will be published in the conference *Proceedings*. The conference language is English.

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- **June 1, 1996**—Contributors will receive notification of paper acceptance and *Author's Kit*.
- **July 15, 1996**—Authors provide camera-ready manuscript copy to the *Proceedings* Editor.
- **November 1, 1996**—Poster Session and Ph.D.-Student Colloquium Submissions.

FURTHER INFORMATION

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VHDL-A A Standard Modeling Language for Simulation?

Necessity, languages and tools for unified modeling and model exchange have been presented and discussed at the EUROSIM '95 congress in Vienna in a special session. The published papers can be found in the conference proceedings, pages 469-510. About 80 persons attended the one-day session and the closing discussion. Their major interest was the usage of VHDL-A for analog modeling and model exchange. This paper will summarize the results and tell you where to get more information on VHDL-A.

Why do we have to exchange simulation models?

A great number of simulation tools is available on the software market for many different purposes and many hardware platforms. The description of models is mostly done by equations, functional blocks or prepared model components. Hierarchical modeling and graphical input are usually supported.

Simulation experience shows: Usage of different simulation programs results in models, which can not be easily exchanged with other persons or reused in another tool. Simulation of large systems, with subsystems using simulator specific models is currently almost impossible. Simulation models tend to grow larger and larger. They include a lot of specific know-how and work effort. Many models have to be exchanged between departments of a company and also between cooperating companies, who often use different software [2].

Today, only VHDL in logic simulation, supports an almost automatic model exchange between different tools. In all other engineering fields, models have to be manually rewritten so they can be used in another software system.

As a summary, exchange of models is important due to:

- Reusability of models, if a software system is no longer available.
- Import of existing models into another simulation tool.
- Building large models, e.g. mechatronic models.
- Development of software-independent, application oriented model libraries.

In [1], we came to the conclusion that only VHDL-A seems to have a realistic chance to be accepted as international standard for the solution of these tasks.

What is VHDL-A?

VHDL-A is the analog extension of VHDL, an IEEE standard (IEEE 1076) which was originally designed for the description of digital hardware systems. VHDL

is widely used for these purposes. Almost all toolmakers of logic simulators allow VHDL models. The design of VHDL-A (IEEE 1076.1) addresses the specific requirements to support the description and simulation of analog and mixed digital-analog hardware systems. It is intended to be a superset of VHDL 1076 and is likely to support the description and the simulation of continuous time conservative systems, also non-electrical systems such as mechanical or thermal systems and control systems with signal flow semantics. The first version of the VHDL-A IEEE Language Reference Manual should appear by spring 1996.

The following examples give an impression of VHDL-A's modeling capability.

Examples with VHDL-A

Simple model of a diode from [4]:

```
entity diode is
  -- describes the interface to other components
  generic (iss,n,vt,tau,cj0,phi:real)
  port (
    terminal p, m: electrical);
end entity diode;

architecture bhv of diode is
  -- describes the behaviour of the diode
  -- different architectures are allowed for one entity
  quantity vd across id, ic through p to m;
  quantity qc:real;
begin
  qc == tau*id - 2.0*cj0*sqrt(phi**2-phi*vd);
  ic == qc'dot;
  id == iss*(exp(vd/(n*VT)) - 1);
end architecture bhv;
```

The following VHDL-A model realizes the pendulum of the EUROSIM comparison No. 7 (see SNE No. 7, March 1993, p. 29), which needs state-events. The model was written by Ernst Christen from Analogy in April 1995, according to a suggested standard form. This will not be the final VHDL-A syntax. Ernst Christen is a member of the standardization committee and especially involved in mixed-mode- simulation.

```
entity pendulum is
  generic (
    M, L, D: real;          -- mass, length and damping factor
    phi0: real;             -- angular position of pin
    LP: real;               -- distance from origin of pin
    linear: boolean;        -- use linear approximation?
    port (quantity phi:real); -- angle of pendulum
end entity pendulum;

architecture E of pendulum is
  constant G: real := 9.81;
  constant LS: real := L-LP;
  quantity Lnow, phim: real;
begin
  if linear use phim == phi; else phim == sin(phi); end use;
  if phi > phi0 use Lnow == LS; else use Lnow == L; end use;
  M*Lnow*phi'dot'dot == - M*G*phim - D*Lnow*phi'dot;
  break phi'dot => phi'dot * L/LS when phi'cross(phi0)='1';
  break phi'dot => phi'dot * LS/L when phi'cross(phi0)='0';
end architecture;
```


Alternatives for this model and many other models can be found on the VHDL-A reflector (ftp-address see below).

VHDL-A as modeling language

The need for a unified description language supporting analog behavioural modeling of plants and control units exists since a long time. For the first time it seems possible to achieve unified modeling of systems coming from different engineering areas with a sufficiently large base of users and toolmakers.

VHDL-A will support block oriented (as SIMULINK, SYSTEMBUILD), component oriented (as SPICE, ADAMS) and equation oriented modeling (as ACSL). ODEs, DAEs, algebraic linear and nonlinear equations will be allowed. Models may include time- and state-dependent discontinuities.

Hierarchical modeling, as a must, is supported by VHDL-A. VHDL-A allows to supply different realizations (architectures) for one component (entity), which helps with flexible model development. Exchange of graphical information, over-determined differential algebraic equations and partial differential equations will not be supported.

A more detailed description of VHDL-A's modeling capabilities can be found in [3], [4]. Especially the exchange of graphical information will be necessary. VHDL-A therefore will have to adapt to an exchange format of graphical information. Current VHDL simulators use the IEEE EDIF standard to exchange graphical information.

VHDL-A's origin is electronics. But: VHDL-A will support all modeling capabilities needed in mechanics and hydraulics. The electronic "smell" of VHDL-A might lead to acceptance problems in other engineering fields. Nevertheless, VHDL-A is the only standard, which will cover all necessary modeling subjects and will have soon a broad commercial basis.

VHDL-A for automatized model exchange

Model exchange between different simulators is almost as urgent as unified modeling. Problems with and possible solutions for automatic model exchange are discussed in more detail in [1]. VHDL-A's main aim is to allow software independent modeling. In a study for the MSR group of the German car industry we checked, if VHDL-A can be used for model exchange between different simulation tools.

A summary of the main results is: VHDL-A covers all modeling features needed by existing simulation tools. Most existing tools cover just a subset of VHDL-A's features. A completely automatic exchange of models will be only possible between tools which allow

complete VHDL-A or between tools which supply exactly the same modeling capability. In all other cases, parts of the models have to be manually rewritten.

Most existing tools could be able to write VHDL-A code soon. This would allow to simulate models from different simulation programs together in one VHDL-A simulator. Only some tools will be able to simulate complete VHDL-A models in the near future. Many tools could be developed into a VHDL-A simulator over a longer period.

Further information and E-Mail addresses: Information on the standardization process can be obtained from the following ftp-server: nestor@epfl.ch (128.178.50.20). Documents can be found under the directory: pub/vhdl/standards/ieee. The preliminary language reference manual will be available on this server.

VHDL-A-European Interest Group: At EUROSIM '95 a VHDL-A-European Interest Group (VHDL-A-EIG) was founded. Its prime interest is to allow people from various engineering domains to be aware of VHDL-A and to give fruitful input to the standardization process. VHDL-A-EIG is open to everybody interested in VHDL-A. It is exclusively organized and supported by future VHDL-A users and is independent of tool makers, although they are permitted to participate.

VHDL-A-EIG will:

- provide a users forum for various engineering disciplines
- It will be an active support for the IEEE standardization process by
 - a) providing a way to get the most up-to-date information
 - b) following the standardization effort and provide inputs without any particular tool interest

If you are interested to become a member of VHDL-A-EIG send a mail to: vhdl-a-eig-request@fli.sh.bosch.de and write in the first line: SUBSCRIBE VHDL-A-EIG. Additional information can be obtained from the ftp-server mentioned above under the directory: pub/vhdl/vhdl-a-eig

References:

- [1] Bausch-Gall, Ingrid: Modellaustausch zwischen Simulationsprogrammen. in: Simulationstechnik, 9. Symposium in Stuttgart, Vieweg-Verlag 1994.
- [2] Hessel, Ewald: Model exchange - illusion of future reality? Proceedings of the 1995 EUROSIM Congress. ELSEVIER, 1995, p. 469-474.
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- [4] Vachoux A., Berg J.-M.: VHDL-A: Analog and Mixed-Mode Extensions to VHDL. Proceedings of the 1995 EUROSIM Congress. ELSEVIER, 1995, p. 481-486.

Ingrid Bausch-Gall, München

ASIM

ASIM (*Arbeitsgemeinschaft Simulation*) is the association for simulation in the German speaking area. ASIM was founded in 1981 and has now about 680 individual members.

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ASIM Meetings to come

February 26-27, 1996: Meeting of the working group "Simulation Technischer Systeme" at Universität Ulm, on February 27th together with the working group "Simulationssoft- und hardware". Contact: Dr. Ingrid Bausch-Gall.

February 27-28, 1996: Meeting of the working group "Simulationssoft- und hardware" at Universität Ulm and Daimler-Benz AG. February 27 together with the working group "Simulation Technischer Systeme". Contact: Prof. Dr. D.P.F. Möller.

March 5-6, 1996: Meeting of the Working Group "Simulation und künstliche Intelligenz" in Ulm. Contact: Prof. Szczerbicka.

April 18-20, 1996: 7. Ebernburger Gespräche "Advances in Simulation in Medicine, Biology and Ecology". Contact: Prof. Richter or Prof. Möller.

Spring 1996: Conference of the Working Group "Simulation in der Fertigungstechnik" at University of Erlangen/Nürnberg. Date not yet fixed. Contact address see below.

ASIM 96

10. Symposium Simulationstechnik

Dresden, September 16 - 19, 1996

The traditional German speaking ASIM conference will take place in 1996 at *Fachhochschule Dresden*. The DUAL-Zentrum GmbH will supply the local organization on behalf of ASIM/GI.

Sessions (preliminary): *Simulation in der Produktionstechnik, Simulation und Optimierung von Kommunikations- und Multimediasystemen, Simulation von Verkehrssystemen, Simulation technischer Systeme, Simulation im Umweltschutz, in der Medizin und der Biologie, Simulation in der Verfahrenstechnik, Modellierungsmethoden, Simulationstools, Simulation betrieblicher Abläufe, Simulation in der Ausbildung*

Invited papers: *Direkte Wege zur Simulation und Optimierung von Geschäftsprozessen - Prozessorientierte Produktoptimierung* (H. Grabowski, Univ. Karlsruhe), *Simulation im Umweltschutz: Möglichkeiten und Chancen* (R. Grützner, Univ. Rostock), *Simulation von Kommunikationssystemen* (H. Löffler, F. Brauer, Ingenieurbüro für Rechnernetze, Dresden), *Einheitliche Modellierung mit VHDL-A* (E. Moser, Robert Bosch GmbH, Stuttgart) *Neue Entwicklungen der Informationstechnik und ihre betriebliche Anwendung: Multi-Agent Systems, verteilte Modellierung und Simulation, rechnergestützte Ausbildung* (A.-W. Scheer, Th. Allweyer, Univ. Saarbrücken), *Systemleistungen und Reservekapazität der Komponenten durch Simulation - Wieviel Sicherheit muß sein?* (D. Ziplies, Mannesmann Fördertechnik, Offenbach)

Tutorials (*Simulation und Optimierung, Simulation im Verkehrswesen, Simulation von Netzen, Objektorientierte Modellierung*), Exhibitions, User Group Meetings, Social Program, Excursions, etc. will be organized.

For a first call of papers please contact: Prof. Dr. W. Krug, DUAL-ZENTRUM GmbH, Gillesstraße 2, D-01219 Dresden, Tel: +49-351-47791-0, Fax: +49-351-47791-99 or Dr. Ingrid Bausch-Gall (address see above).

March 1997: 6. Symposium "Simulation als betriebliche Entscheidungshilfe" Braunlage. Contact: Prof. Hummeltenberg.

Working Groups

"Simulationenmethoden und -sprachen für verteilte Systeme und parallele Prozesse"

The 1995 workshop of the working group was held at the Fraunhofer Institute IIS/EAS in Dresden on October 23 and 24, 1995. The main topics of the (about) 15 papers were application of Petri nets to the description of parallel systems, experiences with parallel and distributed simulation (transputers and workstation clusters - especially for very large systems), partitioning, and design methods for various parallel-working technical systems. A report on this meeting will appear in the next issue of SNE. For details, please contact the speaker of the working group.

Speaker: Dr.-Ing. Peter Schwarz, Fraunhofer-Institut IIS/EAS, Zeunerstraße 38, D-01069 Dresden, Tel: +49-351 4640 730, Fax: +49-351 4640 703, Email: schwarz@eas.iis.fhg.de

Vice-speaker: Dr. Hans Fuss, GMD, D-53731 St. Augustin, Tel: +49-2241 143 125, Fax: +49-2241 143 006

"Simulationssoftware und -hardware"

The 1996 the working group will be on February 27-28 in Ulm. The first day will be held at University of Ulm together with the working group "Simulation Technischer Systeme" (see below). Special issues of the working group will be discussed on February 28 at DAIMLER- BENZ Forschungsinstitut at Ulm. For

further information and a program please contact the speakers of the working groups.

Speaker: Prof. Dr.-Ing. Dietmar P.F. Möller, TU Clausthal, Institut für Informatik, Erzstraße 1, D-38678 Clausthal-Zellerfeld, Tel: +49-5323 72 2402 or 72 2504, Fax: +49-5323 72 3572

Vice-speaker: Prof. Dr. Felix Breitenacker, TU Wien, Abt. Simulationstechnik, Wiedner Hauptstr. 8-10, A-1040 Wien, Tel: +43-1 58801 5374, Fax: +43-1 587 4211, Email: fbreiten@email.tuwien.ac.at

"Simulation und künstliche Intelligenz"

Das nächste, neunte Treffen des Arbeitskreises wird in Ulm vom 05.-06.03.1996 zum Thema "Multiagentensysteme und Simulation" stattfinden.

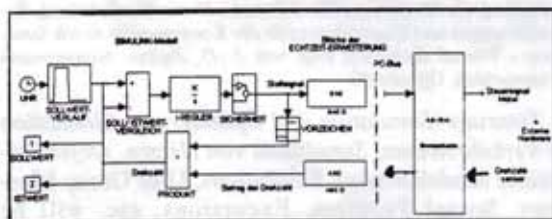
Dieser Workshop wird gemeinsam mit der GI-Fachgruppe Verteilte KI veranstaltet und wird zum zweiten Mal eine Diskussionsplattform für die Interessengruppen der KI und der Simulation bilden. Unser Arbeitskreis mit seinen über 150 Mitgliedern, einer der stärksten Arbeitskreise der ASIM, hat sich stark eingesetzt für die geplante Neugliederung der ASIM und die Umwandlung der Arbeitskreise in die Fachgruppen der GI. Zu der Diskussion über eine Ergänzung der Arbeitsziele, neue Formen der Zusammenarbeit und Verbesserung der Organisation laden wir sehr herzlich alle Interessenten und die, die im Arbeitskreis verstärkt mitarbeiten wollen, zu einer Sitzung während des Workshops in Ulm ein. Bitte senden Sie die Themenvorschläge an die Sprecherin.

Speaker: Prof. Dr.-Ing. Helena Szczerbicka, Universität Bremen, Fachbereich 3 - Informatik, Postfach 33 04 40, D-28334 Bremen, Tel: +49-421 218 7389 or 7390, Fax +49-421 2187385, Email: helena@informatik.uni-bremen.de.

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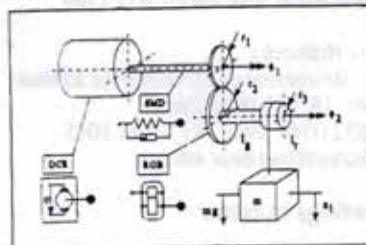
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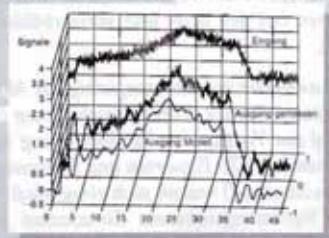
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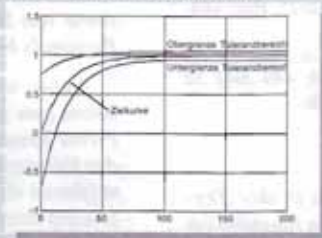
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"Simulation in Medizin, Biologie und Ökologie"

The next next conference of the working group, the 7th Ebernburg Working Conference, titled "Advances in Simulation in Medicine, Biology and Ecology" will be held from April, 18th to April 20th, 1996, at the castle Ebernburg at Bad Münster am Stein - Ebernburg. The main conference topics will be modelling and simulation practice and theory in biomedical/ecological research and the application of soft computing, e.g. fuzzy sets, neural nets, genetic algorithms, evolution strategy. For further information please contact:

Speaker: Prof. Dr. Otto Richter, TU Braunschweig, Institut für Geographie und Geoökologie, Langer Kamp 19c, D-38106 Braunschweig, Tel: +49-531 391 5627 Fax: +49-531 391 8170

Vice-speaker: Prof. Dr. Björn Gottwald, Universität Freiburg, Fakultät für Biologie, Schänzlestraße 1, D-79104 Freiburg, Tel: +49-761 203 2891, Fax: +49-761 203 2894

"Simulation technischer Systeme"

The working group met during the EUROSIM congress for a short meeting. The speaker reported on the success of the "Vorstellungsbücher der Arbeitskreise". They have been mailed to 173 persons with unbelievable 96 filled sheets being returned. Copies have been handed to those who visited the EUROSIM congress. Other members, who returned a "Vorstellungsbuch", receive copies of all returned Vorstellungsbücher with the mailing of this SNE.

The next meeting of the working group will be on February 26 and 27, 1996 at Universität Ulm. For Monday afternoon following reports are planned:

- *Simulation in der Radartechnik*
organized by: Dr. Uwe Bantle, DAIMLER-BENZ AEROSPACE
- *Simulation in der Prozeßkette*
organized by: Dr. Peter Schäfer, DAIMLER-BENZ AG, Ulm
- *Simulation in der Meß-, Regelungs- und Mikrotechnik*
organized by: Prof. Dr. E. Hofer, Universität Ulm

On Tuesday special discussion groups on "simulation in electronics" (Hans Gall, Ewald Hessel), "real-time simulation" (Harald Schmitz), "coupling of simulators" (Dr. Ingrid Bausch-Gall) and "Meß-, Regelungs- und Mikrotechnik" (Dr. Peter Schäfer, Prof. Dr. E. Hofer) are planned. A visiting program will be organized on Tuesday afternoon.

A specific topic of Tuesday will be organized together with the working group "Simulation von Software und Hardware" (see as well the report of this working group). A more detailed program is included in the mailing of this SNE to ASIM-members or can be obtained by the speaker of the working group.

The working group discussed furthermore a possible status report for the ASIM book series. If anybody is interested to prepare a status report, please contact as well the speaker.

Speaker: Dr. Ingrid Bausch-Gall, BAUSCH-GALL GmbH, Wohlfahrtstraße 21b, D-80939 München, Tel: +49-89 3232625, Fax: +49-89 3231063, Email: 100564.302@compuserve.com

Vice-speaker: Ewald Hessel, Hella KG Hueck&Co., Abt. EL-R, Werk II, Beckumer Straße, D-59552 Lippstadt, Tel: +49-2941 38 8572, Fax: +49-2941 38 8427, Email: hessel@hella.de

"Simulation in der Fertigungstechnik"

The ASIM-working-group "Simulation in der Fertigungstechnik" organized a working group meeting on 20th of June, 1995, at the Fraunhofer-Institut für Materialfluss und Logistik in Dortmund, Germany. Special topics of this meeting were the discussion of further working group activities and the preparation of the next conference, which will take place at the University of Nürnberg/Erlangen, Germany, in spring 1996. The ASIM members will be informed of the fixed date.

Additionally, the working group plans the publication of a book about industrial simulation studies and application oriented examples, which will be published in "Fortschritte der Simulationstechnik", Vieweg Verlag, Wiesbaden. This will be the second book produced by the working group. The first one a guideline for simulation technology with the title "Handbuch Simulationsanwendungen in Produktion und Logistik" was published by the working group in December 1993 as volume 7 in "Fortschritte der Simulationstechnik", Vieweg Verlag, Wiesbaden, Germany (ISBN 3-528-06581-8).

For detailed information about the last working group meeting you can order the protocol by Frau Dipl.-Inform. Sigrid Wenzel, Fraunhofer-Institut für Materialfluß und Logistik, Joseph-von-Fraunhofer-Str. 2-4, D-44227 Dortmund, phone: +49-231 9743-237, fax: +49-231 9743-234, email: wenzel@iml.fhg.de

Speaker: Prof. Dr.-Ing. A. Kuhn, Fraunhofer-Institut für Materialfluß und Logistik, Joseph-von-Fraunhofer-Straße 2-4, D-44227 Dortmund, Tel: +49-231 9743 132, Fax: +49-231 9743 234

"Simulation in der Betriebswirtschaft"

The sixth symposium "Simulation for managerial decision support - new tools and approaches in practice" is announced for spring of 1997 at the traditional place in Braunlage. For further information, please contact the speaker.

Speaker: Prof. Dr. W. Hummeltenberg, Universität Hamburg, Institut für Wirtschaftsinformatik, Max-Brauer-Allee 60, D-22765 Hamburg, Tel.: +49-40 41 23-40 23, Fax: +49-40 41 23-64 41

"Simulation von Verkehrssystemen"

Report on the VDI-Fachtagung "Simulation und Simulatoren für den Schienenverkehr": Aufgrund der Aktualität haben VDI, VDV und ASIM gezielt das Thema Rad/Schiene

in Angriff genommen und die Fachtagung "Simulation und Simulatoren für den Schienenverkehr" durchgeführt. Die Tagung gab einen Überblick über den heutigen Stand der Simulation im Schienenverkehr. In 38 Vorträgen wurden Grundlagen der Fahrzeug-Fahrweg-Wechselwirkung, der Einsatz der Simulation bei Fahrweg, Fahrzeug und Betrieb sowie von Simulatoren bei der Aus- und Weiterbildung des Personals behandelt.

Entwickler und Anwender nutzten ausgiebig die Möglichkeiten zum gemeinsamen Dialog. Eine Besichtigung bei der Firma Krauss-Maffei am Vortag der Veranstaltung rundete das Vortragsprogramm ab. 270 Experten und Führungskräfte (davon 40 aus dem Ausland) waren sich einig, daß bei der Lösung komplexer Verkehrsprobleme Simulation zu den Schlüsseltechnologien gehört und ausgebaut werden muß.

In seinem Schlußwort unterstrich der Vorsitzende des Programmfachausschusses Herr Dr.-Ing. H. Kellerer von der DAIMLER-BENZ AG, den Erfolg der Veranstaltung und die Bedeutung der Simulation. Die Tagung habe gezeigt, daß verkehrsträgerübergreifende Mobilität darüberhinaus sowohl politisch als auch technisch Koordinierungsbedarf hat.

Speaker: Karl-Heinz Münch, SIEMENS AG, Bereich VT2 SYS, Ackerstraße 22, D- 38126 Braunschweig, Tel: +49-531 226 2225, Fax: +49-531 226 4305

Ingrid Bausch-Gall

Liebe ASIM-Mitglieder!

Ich möchte auf diesem Wege den Veranstaltern der Tagung EUROSIM'95 zu einer der besten Simulationstagen gratulieren und ihnen herzlichst für ihre Arbeit danken.

Herr Kollege Breitenacker und Frau Husinsky haben bei dieser Tagung ihre bewährte Tagungserfahrung (ASIM-Tagungen 1984, 1990) zu einer Höchstform gebracht. Unterstützt von einer sehr effektiven Tagungsmannschaft mit einem genial-rührigen Herrn Salzmann an der Spitze haben sie mit diesem unter der Schirmherrschaft von ASIM stehenden europäischen Simulationskongreß neue Maßstäbe gesetzt.

Die Tagung hat auf wissenschaftlichem Gebiet und bei den Social Events vollen Anklang gefunden, und jede Nachfolgetagung ist um die Vorgabe durch EUROSIM'95 nicht zu beneiden.

Ich freue mich auch, daß viele ASIM-Mitglieder zu EUROSIM'95 kamen. Von den 480 Teilnehmern kamen 52% aus dem deutschsprachigen Raum, davon sind etwa 90% ASIM-Mitglieder (dieser Anteil erreicht nahezu die Größe unserer ASIM-Tagungen).

Mit dieser Tagung wurden auch erfolgreiche neue Wege des Session Organizing, der Posterrepräsentation, der Aussteller- und Industriekooperation und der Ankündigung bzw. Unterstützung durch neue Medien (WWW etc.) beschritten, wobei ASIM-Mitglieder involviert waren.

Diese Tagung hat auch den Stellenwert unserer Simulationsvereinigung ASIM im europäischen Raum unterstrichen, wofür ich Frau Husinsky und Herrn Breitenacker ebenfalls recht herzlich danken möchte.



Am Freitag, am Ende der Tagung, hatte ich das Vergnügen, eine Laudatio zu halten und Frau Husinsky, Herrn Breitenacker und Herrn Salzmann persönlich zu danken, und ihnen namens ASIM ein kleines Geschenk zu überreichen (siehe Foto) - was ich mit der Hoffnung und Bitte um weitere Mitarbeit in und um ASIM und SNE verband.

Man soll mit Superlativen sehr vorsichtig sein, aber diese Tagung war einer.

D. P. F. Möller, Sprecher von ASIM

CSSS

The Czech and Slovak Simulation Society organized, together with SCS, the European Simulation Multiconference ESM '95 (June 5-7, 1995 at Prague, Czech republic). There were 9 conferences, around 250 members and proceedings with 315 authors. The 153 papers of the ESM '95 covered the following areas: Theory and Methodology, Simulation Software, Tools and Applications, Simulation in Transport, Traffic and Telecommunications, Simulation in Economics, Simulation on Ecological and Environmental Systems, Simulation and Object Oriented Programming, Advanced Computing and Simulation, Simulation in Military and Defense, Session for Students. The members from CSSS who were working on the conference committee hope that ESM '95 was a very successful scientific and social event for all participants and we can prepare a Simulation Congress or Multiconference again in the future.

Coming Events

On April 23-24, 1996, the 30th International Conference **MOSYS 96 "Modelling and Simulation of Systems"** will take place in Krnov, North Moravia, Czech republic. Submission of the reply card should be addressed to Jan Stefan, CSSS Chairperson.

On May 21-23, 1996 the International Conference **ZEL '96 "Computer Control and Simulation of Transport Systems"** will take place at the University

of Transport and Communications in Zilina, Slovak republic. Submission of the reply card should be addressed to Ladislav Skyva or Mikulas Alexik (same address).

On September 10-12, 1996 the International Colloquium - Workshop **"Advanced System Simulation"** will take place in Zabreh na Morave, North Moravia, Czech republic. Information: Jan Stefan or M. Alexik.

In October 1996 the International Conference **"Process Control and Simulation"** will take place at Technical University Kosice, Slovak republic.

The opportunities are open to send your abstract. For more information, see contact addresses.

Contact Addresses:

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Velky Diel, 010 26 ZILINA, Slovak republic
Tel: +42 - 89 - 54042, Fax: +42 - 89 - 54806
e-mail: alexik@frtk.utc.sk
(member of the Editorial Board of SNE)

Mikulas Alexik

DBSS

General Information

The Dutch Benelux Simulation Society (DBSS) was founded in July 1986 for the purpose of creating an organization of simulation professionals within the Dutch language area. DBSS has actively promoted creation of similar organizations in other language areas. DBSS works in close co-operation with the EUROSIM members, and is affiliated with SCS International and IMACS.

DBSS-Membership

Both corporate entities (companies, institutes, etc.) in the Dutch/Flemish area of Benelux and individuals from anywhere are welcome to join DBSS as full corporate or individual members. They receive 3 copies per year, free of charge, of EUROSIM - Simulation News Europe. Elsevier Science B.V. offers them a discount on the subscription fee of the EUROSIM journal *Simulation Practice and Theory*. They enjoy reduction of the fees attending congresses, conferences, symposia organised by sister societies of EUROSIM.

The membership fee amounts to just Dfl. 50,- of Bfr. 900,- for individual and the double for corporate members. Those interested in joining DBSS are invited to write to:

Dutch Benelux Simulation Society Secretariat:
Computing Centre, P.O. Box 354
2600 AJ Delft, The Netherlands
Tel. +31-15 78 5698, Fax: +31-15 78 3787
E-mail: Zuidervaat@rc.tudelft.nl
(member of the Editorial Board of SNE)

(Please mention your name, affiliation and address and indicate whether you are interested in individual or corporate membership).

Membership fee 1995

Those who did not yet pay their membership fee are requested to pay their fee on

giro-account 3582241, J.C. Zuidervaat
Leeuwerikplantsoen 27, 2636 ET Schipluiden
The Netherlands

mentioning: DBSS membership 1995

Coming events

On June 10-12, 1996, the international EUROSIM Conference **"HPCN Challenges in telecom and telecom; parallel simulation of complex systems and large-scale applications"** will take place in Delft, The Netherlands. The provisional program will be available in November this year. For detailed information, see page 35. Conference On-line Information in the World wide web: <URL:http://www.twi.tudelft.nl/Conferences/EUROSIM/index.html> or <URL:http://euosim.tuwien.ac.at/>.

J. Zuidervaat

FRANCOSIM

FRANCOSIM was created in 1991 and has its legal seat in Roanne, France:

FRANCOSIM, Maison de la Productique
Esplanade Diderot, F - 42300 Roanne
Phone: +33-77 70 80 80, Fax: +33-77 70 80 81
Contact: M. Lebrun or N. Sarles
(member of the Editorial Board of SNE)

In Belgium FRANCOSIM is represented by

Mr. F. Lorenz
Centre Socran, Parc Scientifique

Avenue Prè-Aily, B-4031 Angleur
Tel: +32-41 67 83 75, Fax: +32-4167 83 00

Fees

Since last year several possibilities have been offered:

- The individual fee, FF 275, is still going to exist for individual members
- An Institutional fee will be created, for organizations, schools, universities, laboratories or even companies, and will allow for participation of up to 5 members. Its rate is FF 1000.
- Special rate for students, giving right to EURO-SIM issues is created too. It costs FF 50.

Next Events to Come

"La CFAO de la Mécatronique", November 16th in Paris, organized by MICAFO/FRANCOSIM, Hotel Mercure, Port de la Plaine, Vanves. Contact: MICA-DO, Marianne Bohssein, Tel: +33-40 01 04 20, Fax: +33-40 01 04 21.

Conferences will be animated by people in charges of Research Departments in large companies such as PSA, RENAULT, GIAT Industries, Mechanical Dynamics, AEROSPATIALE, DGA/ETAS or representatives of smaller companies working in the field of mechatronics.

Working group "Simulation of Continuous Event Systems": ESIEE, November 15, 1995. The September meeting had to be cancelled and a new date has been chosen. Prof. Hamam, ESIEE school, 2, boulevard Blaise Pascal, F-93162 Noisy le Grand, Tel: +33-45 92 65 00, Fax: +33-45 99 66 99, is the local contact.

N. Sarles

HSS

General Information

The Hungarian Member Society of EUROSIM was established in 1981 as an association promoting the exchange of information within the community of people involved in research, development, application and education of simulation in Hungary and also contributing to the enhancement of exchanging information between the Hungarian simulation community and the simulation communities abroad. HSS deals with the organization of lectures, exhibitions, demonstrations, round table discussions and conferences.

We would like to announce that our organization has changed its name from HSTAG to HSS (Hungarian Simulation Society) this year.

Activities

HSS as a co-sponsor with IMACS/Hungary participated in the organization of the **IMACS European Simulation Meeting on Simulation Tools and Applications** held in Győr, Hungary in August 28-30, 1995. The conference took at the Szechenyi Istvan College and papers were presented in the following sessions: Economy, Vehicle Kinematics, Traffic & Environments, Thermal Processes, Software Tools, Methodology, Man-Machine Communication, Petri Nets, Miscellaneous. There were two invited papers presented by Prof. Dr. Felix Breiteneker and by Prof. Dr. Axel Lehmann.

The participants were from Austria, Finland, France, Germany, Hungary, Italy, Japan, Moldavia, Poland, Rumania, Slovakia, Slovenia, Spain, UK, Ukraine, USA.

During the Conference there was an exhibition where various simulation software systems have been demonstrated by enterprises, institutes and universities.

The participants were greeted by the deputy Mayor of Győr at the City Hall and further publicity was given by several newspapers and the local TV.

Beyond the publication of the papers in the Proceedings of the Conference it is planned that a selection of extended versions of papers presented will be published in a special issue of the journal *Mathematics and Computers in Simulation*.

Summing up it can be stated that the Conference - similarly to the previous three IMACS European Simulation Meetings we have organized in Hungary (in 1980, 1984 and 1990) - was a high level Meeting and successful.

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(member of the Editorial Board of SNE)

András Jávör

ISCS

General Information

The Italian Society for Computer Simulation (ISCS) is a scientific nonprofit association of members from industry, university, education and several public and research institutions with common interest in all fields of computer simulation. Its primary purpose is to facilitate communication among those engaged in all aspects of simulation for scientific, technical or educational purposes.

The affairs of the ISCS are directed by a Steering Committee presently consisting of the following persons: Franco Maceri (chairman), Felice Cennamo (vice-chairman), Vincenzo Grassi (treasurer), Mario Savastano (secretary).

Membership

At present ISCS counts 132 members: 6 institutional, 4 honorary, 120 regular and 2 affiliate. Charges per annum are Lit. 30,000 for regular and affiliated members and Lit. 400,000 for institutional members.

Contact addresses

For further information or application for membership, please contact:

ISCS, c/o Dipartimento Ingegneria Elettronica
Università di Roma "Tor Vergata"
Via della Ricerca Scientifica
I-00133 Roma, Italy
Phone: +39 6 7259.4477, Fax: +39 6 2020519
E-mail: grassi@info.utovrm.it

(member of the Editorial Board of SNE is Dr. M. Colajanni)

Activities

The steering committee is promoting the following activities:

1. The sponsoring of the "**Seminario di Informatica**", a periodic scientific seminar held at the University of Roma "Tor Vergata". Main topics are simulation, performance evaluation, parallel and distributed computing, and high speed networks.
2. The organization of **Summer Simulation Schools (S3)** with the aim of extending the knowledge about simulation theory, tools, and applications. To this end, they should be mainly addressed to graduate and PhD students or young researchers working both in industry and academia.

3. The organization of **Working Groups** meetings among ISCS members interested in the same simulation field, in order to provide a forum for presentation of results, exchange of ideas and scientific discussions. At present, the following Working Groups have been established: Simulation in Industry and Management, Simulation in Agriculture and Environmental Sciences, Simulation in Training and in Education, Simulation in Biology and Medicine, Simulation in Electrical Engineering, Concurrent and Distributed Simulation, Software and Hardware for Simulation, Expert Systems and Simulation. Adhesions (even from non ISCS members) and new proposals are welcome.

4. Supporting activities to lead the progress in simulation projects that regard the implementation of a parallel discrete-event simulation environment based on Time-Warp strategy (SimCOR); a tool for the simulation of interconnection networks of parallel and distributed systems (IntNetSim); an emulator of several parallel database architectures (ParaDisE).

The annual meeting of ISCS members is scheduled to be held on December 1995 in Rome, at the Department of Electronic Engineering, University of Rome "Tor Vergata". On that occasion, we are organizing a meeting between members coming from academia and industry.

M. Colajanni

SIMS

The Scandinavian Simulation Society, SIMS, has at present nearly 300 members from Denmark, Finland, Norway and Sweden. For 36 years SIMS has served as the regional society in Scandinavia, gathering individuals and organisations involved in simulation. The activities have been concentrated on arranging annual meetings and courses, delivery of information letters, and co-operation at European and international level in the field of simulation.

How to join SIMS

Just send an informal application or recommendation for membership to the SIMS secretariat:

SIMS, c/o Eija Karita Puska
VTT Energy, Nuclear Energy, P.O.Box 1604
FIN-02044 VTT, Finland
Tel: +358-0-4565036, Fax: +358-0-4565000
Email: eija-karita.puska@vtt.fi
(member of the Editorial Board of SNE)

SIMS'95 Simulation Conference

The 37th Annual Simulation Conference of SIMS was held in Lyngby, at the Technical University of Denmark, June 28-29, 1995. The theme of the conference was Simulation in Theory and Practice. There were 14 contributed technical papers and some 20 participants. The technical papers have been collected into Proceedings.

Next years SIMS'96 will take place in Trondheim, Norway, in June 1996. More information and a call for papers will follow in the next issue.

E.K. Puska

SLOSIM

During the UKSC'95 Conference in North Berwick, Scotland (April 94), SLOSIM became the tenth EURO-SIM member society with observer status. The SLOSIM board nominated B. Zupancic as its representative in the EUROSIM board.

Recent Activities

On June 7, 1995 Prof. Dr. D. Murray-Smith from Glasgow University had a lecture on the Faculty of Electrical and Computer Engineering, Ljubljana for SLOSIM members: "Enhanced Environments for the Development and Validation of Dynamic System Models".

SLOSIM was one of the cooperative societies in the organization of the traditional **Electrotechnical and Computer Conference ERK'95** in Portoroz, Slovenia (Adriatic Coast). There were more than 200 participants.

The program consisted of 7 invited lectures, 31 conference sessions and a student session. Two invited lectures were very interesting for our simulation community: "Slovenian Virtual Gallery": (presented by students and their mentor Prof. Dr. F. Solina). The lecture dealt with the multimedia presentation of Slovenian fine arts and architecture from gothic period to the present days on Internet. The virtual gallery was realized as a multimedia combination of pictures, text, clickable-maps, video and 3D virtual architecture. "Continuous Simulation Software - Developments and Trends" (presented by Prof. Dr. Felix Breitenacker, TU Vienna). Most part of the lecture was devoted to the comparison of continuous simulation software. The emphasis was given to EUROSIM SNE Comparison 3 (Analysis of a Generalized Class E Amplifier), which focuses on the simulation of electronic circuits. Some

development trends concerning parallel simulation, AHDL standardized textual modeling language, DSblock standardized description, simulation backplane integration concept and the extension from the simulation into experimentation environment were discussed.

SLOSIM was responsible for the simulation sessions:

SIMULATION (8 presentations): The presentations partially deal with simulation tools which enable also some modern extensions e.g. real time simulation, parallel simulation, object oriented approach, intelligent supervision etc. and partially with more application oriented simulation studies.

IDENTIFICATION (7 presentations): The papers mainly deal with the applicability of AI approaches e.g. fuzzy sets and neural nets in dynamic systems identification.

MODELING (8 presentations): The papers deal with methodologies for the modeling of continuous as well as discrete event systems and with some modeling applications in different areas.

During the conference the past president of EURO-SIM Prof. Dr. F. Breitenacker delivered to the president of SLOSIM Prof. Dr. B. Zupancic an official document of Slovenian membership in the EUROSIM federation.



In the meantime the activities concerning presentations of modeling and simulation groups in Slovenia were continued. The next presentation will be combined with regular annual assembly in the middle of Nov. 1995.

Contact Address:

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Email: slosim@fer.uni-lj.si
borut.zupancic@fer.uni-lj.si
(member of the Editorial Board of SNE)

Borut Zupancic

UKSS

The UK Simulation Society is now in process of planning its next events, following its successful National Meeting in North Berwick in the spring.

A one day meeting on Simulation in Communications Systems is planned for the end of 1995. The organiser is Paul Luker (email: luker@de-montfort.ac.uk, FAX: +44-116 254 1891).

It is hoped to hold another one-day meeting in the spring on Simulation in Scheduling Problems. This is provisionally scheduled for Easter 1996. Contact Russell Cheng (email: R.C.H.Cheng@ukc.ac.uk, FAX: +44-1227 475453, member of the Editorial Board of SNE).

The next UKSS National Conference is provisionally arranged for Easter of 1997. The Conference Chairman is Graham Birtwhistle, who has recently returned from Canada to join the School of Computer Studies at Leeds University. Additionally he has been co-opted onto the Committee of UKSS. We are delighted to be able to call on Graham's services in helping to advance the activities of the Society.

As was reported previously, we have a new Membership Secretary:

Mr. Chris Bowyer,
CAM UK, Beckett House,
14 Billing road, Northampton, NN1 5AW.
Tel: +44-1604 259036/7/8, FAX: +44-1604 230086

If you are interested in finding out more about the activities of the Society or in joining, please contact Chris, or the General Secretary: Russell Cheng, or the Chairman of the Society: Rob Pooley (email rjp@dcs.ed.ac.uk, FAX: +44-131 667 7209).

Russell Cheng

AES

On 27-29 September, at San Sebastian, we had a meeting about two issues: experiences about the use of discrete-event simulation for transportation problems, and proposals on how to include modelling and identification in the current engineering curricula. We decided to organize a summer course on simulation, for 1996, and an international workshop, around April 1996 (please, if there are authors interested on presenting a paper, let us know: E-mail: gironsi@dia.ucm.es).

Contact Address: J.M. Giron-Sierra, AES, Asociación Española de Simulación, Avda. San Luis 146, E-28033 Madrid, Spain, Tel: +34-1 394 43 87, Fax: +34-1-394 46 87, E-mail: gironsi@dia.ucm.es (member of the Editorial Board of SNE)

CROSSIM

Croatian Society for Simulation Modelling

Contact Address:

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JSST

JSST (The Japan Society for Simulation Technology), originally founded in 1966, continues the following activities almost 15 years, after the formal establishment as an academic society in 1981. Now JSST has 635 individual and 34 corporate members. Periodical Journal: SIMYURESYON, 100 pages, quarterly.

Meetings:

1. Simulation Technology Conference, annual. 180 participants, 78 presentations, 370 pages proceedings.

2. Computational Electrical Engineering and Electronics Symposium, annual. 130 participants, 67 presentations, 310 pages proceedings. The next Symposium is scheduled on Dec. 5 to 6, 1995, and the next Conference is scheduled on June 21 to 22, 1996 both in Tokyo.

Working language in JSST is Japanese, but articles and presentations in English are welcome. Information on international conferences received is provided to JSST members for their participation.

Contact:

JSST Office, c/o JATIS,
1-6 Kojimachi, Chiyoda-ku, Tokyo 100, JAPAN
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Prof. Dr. Sadao Takaba, President, JSST
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Email: takaba@iis.u-tokyo.ac.jp

IMACS



2nd MATHMOD VIENNA

February 5-7, 1997
Technical University Vienna, Austria

Scope: All aspects of mathematical modelling of all types of systems are discussed, i.e. of systems which are * dynamic or static * deterministic or stochastic * continuous or discrete * lumped parameter or distributed parameter * linear or nonlinear * or of any other nature.

Organizer: Division for Mathematics of Control and Simulation (E114/5) at Technical University Vienna.
NOC: F. Breitenecker, I. Troch, F. Urbanek

IPC: Troch (Austria, Chairperson) Andronaty (Moldavia), Avula (USA), Babary (France), Borne (France), Breedveld (The Netherlands), Breitenecker (Austria), Bulirsch (Germany), Cellier (USA), Chernousko (Russia), Fasol (Germany), Foss (Norway), Frank (Germany), Furuta (Japan), Futagami (Japan), Hanus (Belgium), Juslin (Finland), Kabamba (USA), Karba (Slovenia), Kamopp (USA), Kheir (USA), Köhne (Germany), Ljung (Sweden), Maffezzoni (Italy), Marsili-Libelli (Italy), Matrosov (Russia), Möller (Germany), Murray-Smith (Scotland), Prasad (USA), Siciliano (Italy), Skelton (USA), Sugeno (Japan), Sydow (Germany), Thoma (Switzerland), Tzafestas (Greece), Vichnevetsky (USA), Wen (PR China)

Only papers not published and not being considered for publication elsewhere may be submitted. IMACS holds the copyright for publication of papers. Any paper submitted is automatically considered for publication in the official post-conference publications. Preprints will be available at the registration desk. Details about post-conference publications (Proceedings and/or special issue(s) of scientific journal(s)) will be announced later.

Submission of Abstracts: May 1, 1996;
Notification of Authors: Sept. 1, 1996;
Full Paper due: Nov. 1, 1996

All correspondence should be addressed to:
Univ. Prof. Dr. Inge Troch,
Technische Universität Wien (E114/5),
Wiedner Hauptstrasse 8-10, A-1040 Wien,
Email: itroch@email.tuwien.ac.at

LSS

The Latvian Simulation Society is organizing, in cooperation with the International Federation of Operational Research Societies (IFORS) and the Association of European Operational Research Societies within IFORS (EURO), the international conference "Simulation, Gaming, Training and Business Process Reengineering in the Field of Manufacturing" (September 19-21, 1996, Riga, Latvia).

The conference relates to both theoretical and practical aspects of Simulation and Operational Research in the field of manufacturing. Conference committees are chaired by Prof. Birger Rapp (Sweden; Programme Committee) and Prof. Yuri Merkuryev (Latvia; Organizing Committee).

Abstracts (1 page) should be sent to the address mentioned below (by email preferably) before April 15,

1996. The official conference language is English; the registration fee is 150 USD for early registrations (before July 15, 1996).

Accepted papers will be considered for publication in "International Transactions in Operational Research" (IFORS) and "Automatic Control and Computer Sciences" (Latvian Academy of Sciences) journals.

Address for correspondence:

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Fax +371-7820094
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RTworks

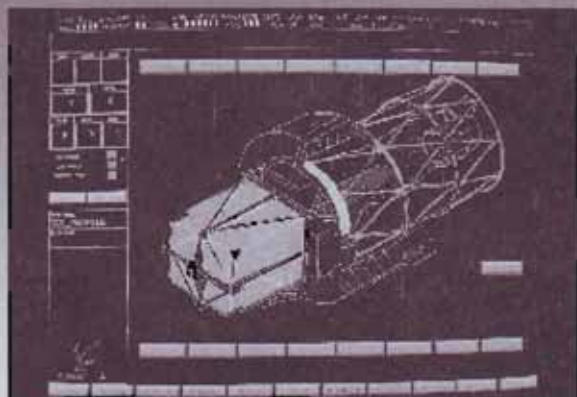
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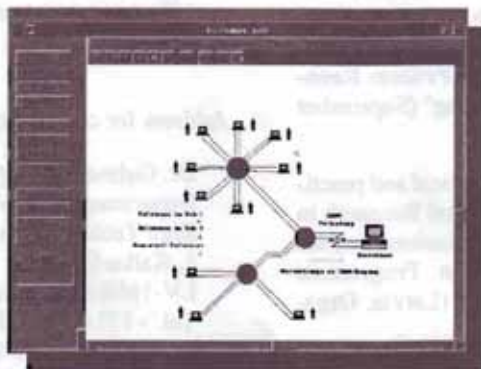
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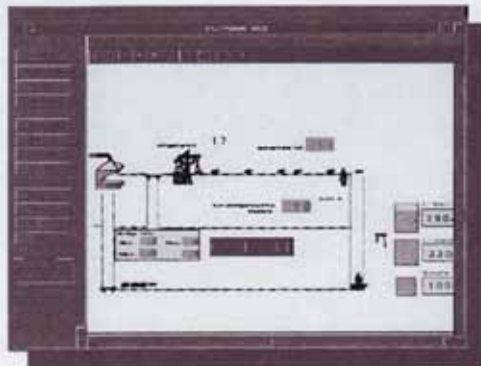
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**International EUROSIM Conference
HPCN Challenges in telecom and telecom:
parallel simulation of complex systems and large-scale applications,
10-12 June 1996, Delft, The Netherlands.**

Abstracts

The Scientific Committee was pleased to receive already approximately 90 abstracts, covering almost all the items mentioned in the first Announcement. The review meeting of these abstracts took place in September 1995. A provisional programme will be available in November.

Workshop High Performance Computing in Environmental Modelling

It is the intention to organize, within the framework of the Second International EUROSIM conference, a special workshop on high performance computing in environmental modelling. Especially for densely populated countries, the modelling of the transport of pollutants and the simulation of pollution reduction scenarios are becoming more and more important in view of the growing awareness of damaging effects. In the workshop contributions related to large-scale modelling of air pollution, ground water pollution and surface water pollution are welcome.

The Parallel Computing Contest

To encourage the use of High Performance Computing by students, a parallel computing contest will be organized as part of the conference. Every individual or a team of undergraduate and/or graduate students (excluding Ph.D. students) can participate in the competition.

Round table discussions

During the conference three round table discussions will be held in the fields of High Performance Computing, High Performance Networking and High Performance Measuring and Sensing.

Scientific Committee

The Scientific Committee has been extended with Prof. Dr. M.J. Plasmeijer, Catholic University of Nijmegen, The Netherlands.

Exhibition

Those who are interested to participate in the scientific and/or commercial exhibition are kindly requested to contact Congress Office ASD. This exhibition will offer you a unique possibility to present new developments within your organization.

Final Announcement

The Final Announcement, registration forms and detailed information on the Scientific Programme, registration fee and hotel reservation will be distributed in January 1996. If you wish to receive this brochure, please contact Congress Office ASD. We do hope that this information will contribute to encourage you to participate in our conference.

Conference On-line Information

Updated on-line information can be found on:

* world wide web:

URL: <http://www.twi.tudelft.nl/Conferences/EUROSIM/index.html>

* the EUROSIM information server:

URL: <http://eurosim.tuwien.ac.at/>

Information and Correspondence:

Congress Office ASD
P.O. Box 40
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Telephone +31 15 2120234
Telefax +31 15 2120250
E-mail: HPCN-Eurosim@TUDelft.nl

Further information on:

Workshop High Performance Computing in Environmental Modelling:

Prof. Dr. Ir. A.W. Heemink, Delft University of Technology, Dept. of Applied Mathematics and Informatics, Mekelweg 4, 2628 CD Delft, The Netherlands, Telephone +31 15 2785813, Telefax +31 15 2787209, E-mail: a.w.heemink@math.tudelft.nl

The Parallel Computing Contest:

Dr. Ir. H.X. Lin, Delft University of Technology, Dept. of Applied Mathematics and Informatics, Mekelweg 4, 2628 CD Delft, The Netherlands, Telephone +31 15 2787229, Telefax +31 15 2787209, E-mail: euromsim.contest@pa.twi.tudelft.nl

OOSlim - An Experimental Object Oriented Continuous Simulation Language

An experimental object oriented (OO) continuous simulation language OOSlim is presented. The language exploits all OO features (data abstraction, classes and inheritance). The simulation model can be partitioned and compiled separately. The sorting process is performed at runtime.

1. Introduction

Continuous simulation languages are implemented either as an interpreter or as a preprocessor for a general purpose programming language. Traditionally, preprocessor versions exploit FORTRAN as a host language (CSSL[2], ACSL, SIMCOS[1]) or C (COSMOS). The host language usually dictates simulation language syntax including the abstraction level. That is, one cannot expect to have a class structure if the host language does not support it. In order to alleviate that problem we started a project with the aim to develop an experimental continuous simulation language named OOSlim. This language:

- enables object oriented continuous simulation,
- involves model decomposition at the class and file level,
- has structured data (user defined constructs, symbolic constants) and code constructs (if, for, while, repeat, switch statements),
- can be easily extended.

We initially decided to use the C++ language as a host language and a PC compatible computer as the implementation platform. Due to the parallel nature of a simulation process we also planned to develop an implementation on a MIMD type computer. Currently, only a PC/ WinNT version is available.

2. OOSlim syntax

Initially we had two goals: we wanted to develop a language that would be recognized by the LL(1) subset of context free grammar, and a language that would follow the C++ syntax as much as possible. The building block of the language is a module. Modules are grouped together to form either a simulation model or a library of precompiled general purpose submodels. A module can consist of data declaration constructs and code implementation constructs. A basic structure inside the module is a class. The class is made of methods and attributes. Attributes can be scalar (int, long, float, double, char*) or complex (i.e. other classes). Methods must not have side-effects. Two integration methods

are available (Euler and RK4), but due to inheritance mechanisms others can be implemented easily.

3. OOSlim environment

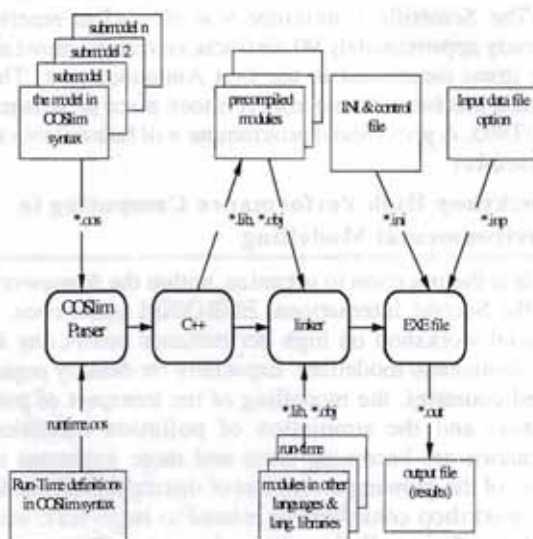


Figure 1: OOSlim environment

As it can be seen on each model goes through a triple transformation from the OOSlim source to the model executable. The ini-file controls the execution of the experiment, while the output file holds the information generated by the simulation. The distinct part of the language is an ability to link submodels at link time, and not at compile time like other similar tools. This goal is achieved by sorting process at runtime.

The language was presented at ERK'95 in Portoroz (25-27.Sept.). There is a full version of the paper in the proceedings. A binary copy in Word 6.0c format is available at <http://www-e2.ijs.si/People/Ostri/Biography.html>. Visual C++ sources are available upon request.

4. References

- [1] Matko, D., B. Zupancic, R. Karba: Simulation and Modeling of Continuous Systems, A Case Study Approach, 1992, Prentice Hall International
- [2] Murray-Smith, D. J.: Continuous System Simulation, 1995, Chapman & Hall

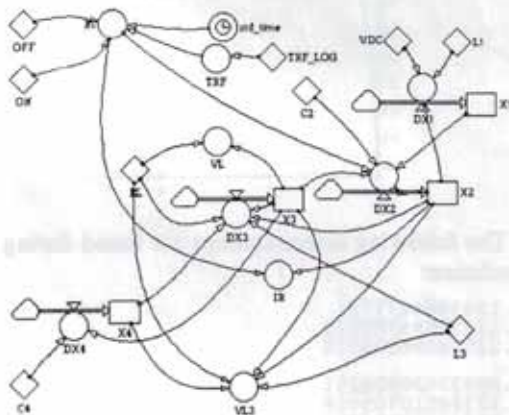
M. Ostrovernik, Josef Stefan Institute, Department of Computer Automation and Control, Jamova 39, 61 001 Ljubljana, Slovenija, matjaz.ostrovernik@ijs.si, D.J. Murray-Smith, Department of Electronics and Electrical Engineering, University of Glasgow, Glasgow, UK

Comparison 3 - POWERSIM

POWERSIM is a Windows based simulation program for modelling and simulation of dynamic systems. A mouse and menu driven graphical user interface allow to construct block diagram models, to control the experiments, and also to handle the output data.

POWERSIM's modelling philosophy is based on the *System Dynamics* approach. Main block in a model is the "level" element, representing an aggregating variable. A level receives input flows (input rates) and delivers output flows (output rates) - consequently the difference between input and output rates represents the derivative of the level. In the graphical model the causal connections between levels, rates and auxiliaries (linear or nonlinear functions of levels and rates) are realized by graphical links, which show the direction of the flow. This System Dynamics approach allows also non-expert users to set up complex models (even without any knowledge of differential equations).

Model description: The model consists of four levels (states) represented by rectangles in the following graphical model. The rates are described by the valve sign (circle with triangle) and parameters by a diamond. The nonlinear resistance $R(t)$ is modelled as auxiliary with a circle:



POWERSIM translates the graphical model layout into a semigraphical textual form which shows how the nonlinear resistance is modelled as IF-THEN-ELSE construct:

```

○ RT
= IF(std_time<=TRF,ON+((OFF-ON)/TRF)*std_time,
  IF(std_time>TRF AND std_time<=5*10^-6,OFF,
    IF(std_time>5*10^-6 AND std_time<= 5*10^-6 + TRF,
      ON+((OFF-ON)/TRF)*(5*10^-6+TRF-std_time),ON)))

○ std_time
= (TIME MOD 10^-5)

○ TRF
= F(TIME+0.0001,10*TRF_LOO,10^-15))

○ VL
= X3*RL

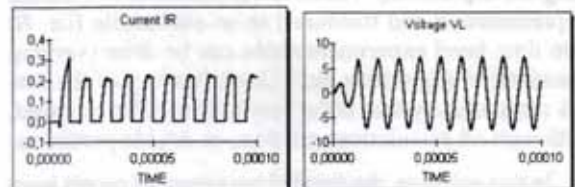
○ VL3
= (X2-RL*X3-X4)/L3

◇ C2
= 17.9*10^-9

◇ C4
= 9.86*10^-9
    
```

Results: a) Eigenvalue calculation: POWERSIM does not support eigenvalue calculation.

b) Simulation in the time domain: POWERSIM does not have any special integration algorithms for stiff systems. For that reason the very small time step of $5 \cdot 10^{-10}$ for the Euler-algorithm is necessary. The simulation took over 30 minutes. For the Runge-Kutta algorithm of 4th order with variable step size a minimal stepsize of 10^{-8} is sufficient. The following charts which are embedded into the model layout ("work-sheet") show the simulation results:



c) Parameter variation: The parameter variation can be done in different ways. First, the values of states at the end of (b) can be written into the initial condition vector and the system can be restarted with the new parameter TRF. The second - and in POWERSIM better - way is to control the model by a "co-model", which changes at the end of (b) the parameter TRF automatically to the new value, and the simulation is continued automatically. This procedure is also performed with the other values of TRF.

Because POWERSIM stores the results of previous runs, the results of all four runs can be plotted simultaneously. It has to be noted that phase plots can only be done in a "tricky" way.

K. Scheidenberger, K. Schleiss, c/o Dept. Simulation Techniques, TU Vienna, Wiedner Hauptstraße 8-10, A-1040 Vienna, Austria.

Comparison 5 - mosis

mosis is an all-purpose CSSL simulation language on a "C"-basis which was primarily intended as a simulation system for efficient hardware-independent parallelization, but which works on single processor computers like PCs as well. mosis has been developed at the Technical University of Vienna, Department Simulation Technique, and is distributed as freeware, i.e. it can be used and copied freely. It can be obtained from the institute's ftp-server <ftp://simserv.tuwien.ac.at>. Further developments are done by ARGESIM, the "Arbeitsgemeinschaft Simulation", e.g. an object-oriented modelling approach or the use of DAEs as well as several graphical environments (MS-Windows, X Window). Up to now, the SNE comparisons 1 and 7 as well as the parallel comparison have been solved successfully; a solution for comparison 3 will follow in one of the next issues of SNE.

The mosis modelling language has the possibility to find state and time events (the first with a specified precision, which is found by using a combination of the regula falsi and bisection method). To state event statements there can be added an optional condition that determines the validity of the state event statement (logical expression). The model is described in a textual representation and translated to an executable file. At run time level experimentations can be done (varying parameters, algorithms etc.). One advantage of the mosis simulation system is the very high simulation speed, although all calculations are done in double precision.

In this solution, the parallel structures of mosis have not been used at all (they can be seen in the solution for the parallel comparison). As an integration algorithm, the semi-implicit extrapolation method by Bader and Deuflhard for stiff systems has been used which gives very good results for this problem in a short time.

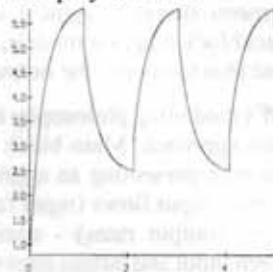
The mosis model description ("twostate.m") is as follows:

```
model twostate() {
  state y1,y2;
  int stat;
  param c1=2700000.0,c2=0.4,
  c3=3.5651205,c4=5.5;
  param endtime=5.0,c20=0.4,c21=-0.3,c40=5.5,
  c41=2.73,condsw1=5.8,condsw2=2.5;
  preinitial (tend=5.0;ialg=7;dt=cint=0.1;
  relerr=1e-10; )
  // initialization initial (
  t=0.0;
  stat=0; c2=c20; c4=c40;
  tevent(endzeit,term); )
  dynamic {
    sevent(y1-condsw1,_POS_,switch1,(stat==0));
    // optional condition
    sevent(y1-condsw2,_NEG_,switch2,(stat!=0));
    derivative {
      y1'=c1*(y2+c2-y1),4.2;
      y2'=c3*(c4-y2),0.3; }
    discrete switch1 {
      printf("state 2 at %.15g\n",t);
```

```
c2=c21; c4=c41; stat=1; }
discrete switch2 {
  printf("state 1 at %.15g\n",t);
  c2=c20; c4=c40; stat=0; }
discrete term {
  terminate } }
```

Results: The simulation was performed on a PC with 486 DX2/66 under MS-Windows (Watcom 32-Bit compiler) and took about 0.4 seconds for the complete simulation (relerr=1e-10).

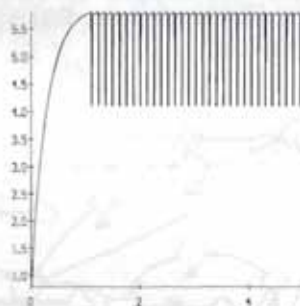
a) Graphical display of curve:



b) and c) the found discontinuities with the relative error boundaries are:

Error 1E-6	Error 1E-10	Error 1E-14
1.1083061660768	1.10830616777121	1.10830616777113
2.1296853727004	2.12968535515485	2.12968535515474
3.0541529293958	3.05415290699553	3.05415290699576
4.07553212319952	4.07553209437687	4.07553209437935
4.9999970697342	4.9999964619793	4.9999964622038 ylt
5.41731852036728	5.36929585574502	5.36931217880546

d) many discontinuities are found, the graphical display of the second solution is as follows:



The following discontinuities are found during the simulation:

```
1.1083061677711
1.12172996789139
1.23546396575072
4.80930610924251
4.92304010709908
4.93646390721955
```

y1(5.0) = 5.78040252055299

For more information about mosis contact: Günter Schuster, TU Vienna, Department Simulation Techniques, Wiedner Hauptstr. 8-10, A-1040 Vienna, E-Mail: guenter@osiris.tuwien.ac.at

Book Reviews

Mathematics of Models - continuous and discrete dynamical systems

H. B. Griffiths, A. Oldknow

Ellis Horwood, 1993, ISBN 0-13-563800-3

This is an interesting book for beginners as well as for experienced teachers. Its aims are to describe several dynamical models for students, and to introduce ways in which a computer can be used for exploring both discrete models and discrete approximations to existing models and, to interest thus the students in developing the relevant mathematics beyond the elementary (usually linear) stage.

It is not a book which teaches modelling or model validation but which intends to give readers a good mathematical understanding of models such as the Malthus or Verhulst model and two-population models in continuous-time or discrete-time version, van der Pol and Lienard equations etc.

As a consequence, the mathematics presented is sometimes rather elementary (tangent to a graph, mean value theorem, polynomials, logarithm and exponential function, linear differential and difference equations in the plane, vectors and matrices in the plane and in 3d-space) and sometimes rather elaborated (Poincaré-

Bendixson theorem, Hopf bifurcation, catastrophic behaviour including Thom's theorem, fractals including their construction) or, seldom found at all (dependence of zeros on the coefficients of a polynomial).

The efforts of the authors resulted in a book which yields an excellent access to classical and modern problems arising in the study of discrete and/or continuous dynamical systems. Reading it is easy and joyful for the interested student or newcomer as well as for the experienced teacher preparing a course.

I. Troch, Technical University Vienna

Simulation and Modelling of Continuous Systems A Case Study Approach

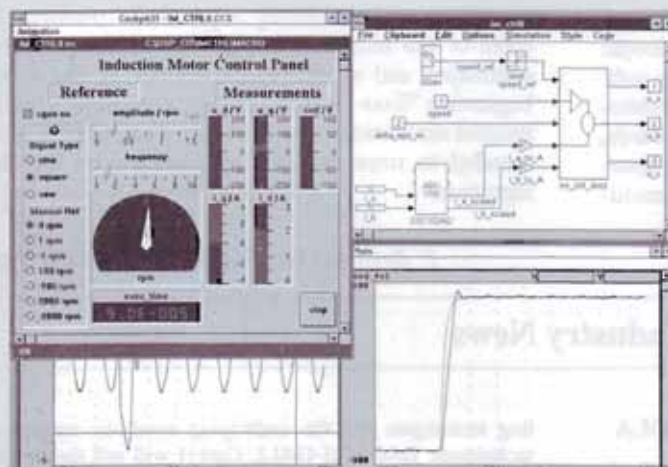
D. Matko, R. Karba, B. Zupancic

Prentice Hall 1992, ISBN 0-13-808064-X

The intention of the book is to analyse the whole modelling and simulation cycle in a clear way, exploring also those essential aspects which are rarely mentioned in other works.

Chapter 1 analyses the modelling and simulation cycle. Chapter 2 deals with differential equations and

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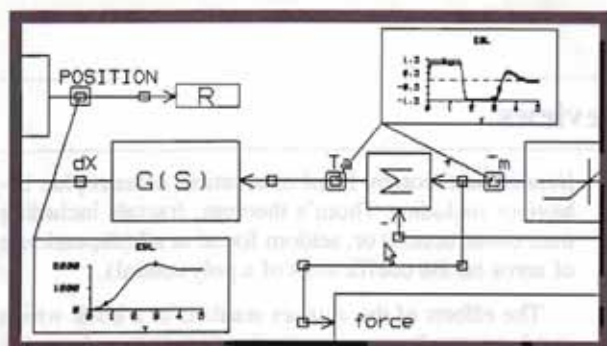
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- ♦ Real-time distributed simulation.

- ♦ Post-simulation graphics display package.
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- ♦ Eight integration algorithms, including improved Gear/Hindmarsh methods.
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transfer functions as base for modelling. Chapter 3 gives the basic feature and classification of simulation systems, and chapter 4 continues with tools for modelling and simulation - where not only CSSL languages like ACSL and SIMCOS but also as paradigm the real parallel analog simulation is reviewed, and the classical scaling procedures for states are discussed in a new view. Chapter 5 describes numerical integration methods, emphasizing also features like stability, error evaluation, algorithm choice, and algebraic loops. Chapter 6 discusses modern trends influenced by software engineering and the influence of modern technology on special purpose simulation concepts (standards, model modularity, flexible data structures, user interfaces, parallelism concepts, supercomputers, multi-

processor systems, etc.). The final chapter includes particular case studies from various areas. These case studies reflect some of the aspects discussed before (and not mentioned in other works).

First, the book can be highly recommended for teaching both undergraduate and graduate students. But it is also of benefit to anybody who is interested in modelling and simulating a particular problem. The roots of the book are in more than twenty years of simulation and modelling experience of the authors, beginning "from analog simulation to object-oriented parallel simulation", and therefore it can also be recommended to simulationists, as a review on the developments.

F. Breitenacker, Technical University Vienna

Industry News

BAUSCH-GALL GmbH Distributor for DYMOLA

Dynasim AB assigned BAUSCH-GALL GmbH as distributor for DYMOLA in Germany, Austria and Switzerland. Dr. Ingrid Bausch-Gall, co-owner of BAUSCH-GALL GmbH, works since many years in the field of simulation and knows various software products from own experience.

DYMOLA is an advanced tool for object oriented modelling. No other software supports these object oriented mode-

ling techniques and the underlying symbolic mathematics techniques. BAUSCH-GALL GmbH will sell the products, supply consulting and help with the application, organize and teach classes in German Language for object oriented modelling with DYMOLA.

Further information: BAUSCH-GALL GmbH, Wohlfartstrasse 21 b, D-80939 München, Tel: +49 89 3232625, Fax: +49 89 3231063.

New Tools Further Progress ACSL European Market Penetration

Rapid Data Ltd. is now experiencing dramatic increases in its ACSL (Advanced Continuous Simulation Language) business. Until the middle of 1994, the power and flexibility of ACSL were fully recognised by simulation experts, but the new generation of simulationists, more familiar with Graphical User Interface technology, had different requirements.

ACSL has now broadened its appeal with a new set of tools which offer the user a whole environment for graphical programming using the Graphic Modeller, animation with ACSL Vision, and real time simulation and rapid prototyping using ACSLrt. Furthermore there is a strong commitment to the constant improvement of ACSL with the inclusion of new features. In addition, C Code generation and seamless interface with ACSL/Math, a new visualization and matrix computation environment, are currently under development.

This had had a marked effect on ACSL sales and has already resulted in new orders well in excess of \$300,000 from major clients such as PSA Peugeot Citroen and the Swedish Defence Establishment, as well as smaller orders from other companies and universities.

To find out more about the ACSL family of products, please contact: Dr. Goucem, Rapid Data Ltd, Crescent House,

Crescent Road Worthing, West Sussex, UK BN11 5RW, Tel.: +44-1903-821266 Fax: +44-1903-820762, Email: radata@ibmpcug.co.uk

CAMAS / 20-SIM

Controllab Products inc. issues a new software package (MS-Windows en UNIX) for modeling and simulation of dynamic systems. The package, known as 20-SIM (formerly CAMAS) has been developed at the Control Laboratory of the University of Twente, to be the successor of the famous TUTSIM package. 20-SIM supports modeling (concurrently) based on bond-graphs, block-diagrams and equations. Special features of 20-SIM are:

- A comprehensive library of (sub)models.
- Graphical and textual model editors.
- Support of hierarchic modeling.
- Automatic computational causality assignment.
- High simulation speeds.
- DAE solvers are included for simulating stiff systems and systems containing algebraic constraint equations.

Product info: Controllab Products inc. P.O.Box 217 7500 AE Enschede, Tel: +31-53-4893096, Fax: +31-53- 4892223. email: clp@rt.el.utwente.nl www: <http://www.rt.utwente.nl/20sim>

Calendar of Events

December 1995

- 03-06 **WSC'95**. 1995 Winter Simulation Conference. Arlington, VA, USA
Contact: William R. Lilegdon, Pritsker Corp., 8910 Purdue Road, Suite 500, Indianapolis, IN 46268, USA, Tel: +1-317 471 6530, Fax: +1-317 471 6525, Email: wrilegdon@aol.com.

January 1996

- 14-17 **WMC '96**. Western Multiconference 1996. San Diego, CA
Contact: Hamid Vakildadian, Tel: +1-402 472 1977, Fax: +1-402 472 4732, Email: hamid@uninfo.unl.edu.

February 1996

- 01-03 **MASCOTS '96**. 4th International Workshop on Modeling, Analysis and Simulation of Computer and Telecommunication Systems. San Jose, USA
Contact: Dharma Agrawal, North Carolina State University, Department of Electrical and Computer Engineering, Raleigh, NC 27695-7911, USA, Email: dpa@ncsu.edu.

- 26-27 Meeting of the ASIM Working Group "*Simulation Technischer Systeme*". Ulm, Germany
Contact: Dr. Ingrid Bausch-Gall, Wohlfahrtstraße 21b, D-80939 München, Tel: +49-89 3232625, Fax: +49 89 3231063, Email: 100564.302@compuserve.com.

- 27-28 Meeting of the ASIM Working Group "*Simulationssoftware*". Ulm, Germany
Contact: Prof. Dr. D.P.F. Möller, TU Clausthal, Institut für Informatik, Erzstraße 1, D-38678 Clausthal-Zellerfeld, Tel: +49-5323 72 2504, Fax: +49-5323 72 3572.

29-March 1

sa. *Simulation und Animation für Planung, Bildung und Präsentation*. Magdeburg, Germany

Contact: Simulation und Animation, Otto-von-Guericke-Universität Magdeburg, FIN - ISG, Postfach 41 20, D - 39016 Magdeburg, Tel: +49-391-67-12868, Email: tagung@isg.cs.uni-magdeburg.de, <http://simrv.cs.uni-magdeburg.de/tagung96/>.

March 1996

- 05-06 Meeting of the ASIM Working Group "*Simulation und künstliche Intelligenz*". Ulm, Germany
Contact: Prof. H. Szczerbicka, Universität Bremen, Fachbereich 3 - Informatik, Postfach 33 04 40, D-28334 Bremen, Tel: +49-421 218 7389 or 7390, Fax +49-421 2187385, Email: helena@informatik.uni-bremen.de.

- 23-27 **Artificial Intelligence, Simulation, and Planning in High Autonomy Systems**. San Diego, CA, USA
Contact: Email: baltes@bigdog.engr.arizona.edu, <http://www-ais.ece.arizona.edu/>.

April 1996

- 18-20 **7. Ebernburger Gespräche**. ASIM Workshop. Ebernburg, Germany
Contact: Prof. Dr. Otto Richter, TU Braunschweig, Institut für Geographie und Geoökologie, Langer Kamp 19c, D-38106 Braunschweig, Tel: +49 531 391 5627 Fax: +49 531 391 8170.

- 23-24 **MOSYS 96**. Modeling and Simulation of Systems. Krnov, Czech Republic
Contact: Jan Stefan, FEI - VSB TU, tr. 17. listopadu, 708 33 OSTRAVA Poruba, Czech republic, Email: Jan.Stefan@vsb.cz.

- 25-27 **MS '96**. IASTED International Conference on Modelling and Simulation. Pittsburgh, USA

Contact: IASTED Secretariat MS '96, 1811 West Katella Avenue, Suite 101, Anaheim, CA 92804 USA, Tel: +1-800 995 2161, Fax: +1-714 778 5463, Email: iasted@ioron.oac.uci.edu, <http://www.cuug.ab.ca:8001/~warwodad/iasted.html>.

May 1996

- 06-09 **MSO '96**. IASTED International Conference on Modelling, Simulation and Optimization. Gold Coast, Australia
Contact: IASTED Secretariat MSO '96, 4500-16 Ave. N.W., Unit 80, Calgary, Alberta, Canada T3B 0M6, Tel: +1-403 288 1195, Fax: +1-403 247 6851, Email: iasted@istd.cuug.ab.ca, <http://www.cuug.ab.ca:8001/~warwodad/iasted.html>.
- 21-23 **ZEL '96**. Computer Control and Simulation of Transport Systems. Zilina, Slovak Republic
Contact: Mikulas Alexik, VSDS - KTK, Velky Diel, 010 26 ZILINA, Slovak republic, Tel: +42 - 89 - 54042, Fax: +42 - 89 - 54806, Email: alexik@frtk.utc.sk.

June 1996

- 10-12 **HPCN** challenges in telecomp and telecom: parallel simulation of complex systems and large-scale applications. Delft, The Netherlands
Contact: Congress Office ASD, P.O. Box 40, 2600 AA Delft, The Netherlands, Tel: +31 15 2120234, Fax: +31 15 2120250, Email: HPCN-Eurosim@TUDelft.nl.
- 18-21 **ITI'96**. 18th International Conference "Information Technology Interfaces". Pula, Croatia
Contact: Branka Radic, University Computing Centre, J. Marohnica bb, HR - 41000 Zagreb, Tel: +358-1-518-656, Fax: +358-1-518-656, Email: iti@srce.hr, <http://www.srce.hr/iti/>.
- 25-29 **ECMI 96**. 9th Conference of the European Consortium for Mathematics in Industry. Lyngby, Denmark
Contact: ECMI 96, Mathematical Institute, Technical University of Denmark, Building 303, DK-2800 Lyngby, Tel: +45-45 25 30 31, Fax: +45-45 88 13 99, Email: ecmi96@mt.dtu.dk, <http://www.mat.dtu.dk/ECMI96/>.

July 1996

- 01-05 **ICMMB '96**. 9th International Conference on Mechanics in Medicine and Biology. Ljubljana, Slovenia
Contact: A. Kregar, Cankarjev dom, Cultural and Congress Centre, Presernova 10, 61000 Ljubljana, Slovenia, Tel: +386 61 1767 133, Fax: +386 61 217 431.
- 09-12 **CESA'96**. IMACS International Conference on Computational Engineering in Systems Applications. Lille, France
Contact: Prof. P. Borne, Ecole Centrale de Lille, 59651 Villeneuve D'Ascq Cedex, France, Tel: +33-20-33-53-28, Fax: +33-20-33-54-99, Email: pborne@ec-lille.fr.

September 1996

- 10-12 **Workshop "Advanced System Simulation"**. Zabreh na Morave, Czech Republic
Contact: Jan Stefan, FEL - VSB TU, tr. 17. listopadu, 708 33 OSTRAVA Poruba, Czech republic, Email: Jan.Stefan@vsb.cz.
- 15-17 **CACSD96**. IEEE Symposium on Computer-Aided Control System Design. Dearborn, MI, USA
Contact: Prof. Georg Gruebel, DLR Oberpfaffenhofen, Institute for Robotics and System Dynamics, Postfach 1116, D-82230 Wessling, Germany, Tel: +49- 8153-28-2484, Fax: +49-8153-28-1441, Email: georg.gruebel@dlr.de, WWW: http://www.op.dlr.de/FF-DR/dr_er/CACSD96.html.
- 16-19 **ASIM 96**. 10. Symposium Simulationstechnik. Dresden, Germany
Contact: Prof. Dr. W. Krug, DUAL ZENTRUM Dresden,

Gillesstraße 2, D-01219 Dresden, Tel: +49-351 47791 0, Fax: +49-351 47791 99.

- 19-21 **Simulation, Gaming, Training and Business Process Re-engineering in the Field of Manufacturing**. Riga, Latvia
Contact: Dr. Galina Merkuryeva, Department of Modelling and Simulation, Riga Technical University, 1, Kalku Street, LV-1658 Riga, Latvia, Tel: +371-2-324480, Fax +371-7820094, Email: CONF96@itlpro.itl.rtu.lv, WWW site: http://www.itl.rtu.lv/Riga_Conf96.

October 1996

- 06-08 **ISIR 1996**. 27th International Symposium on Industrial Robots. Milan, Italy
Contact: ISIR '96 Secretariat, Centro Esposizioni Ucinu Spa, Viale Fulvio Testi 128, I-20092 Cinisello Balsamo, Tel: +39-2 26255 1, Fax: +39-2 26255 214, Email: mol-fino@dimec.unige.it.

December 1996

- 08-11 **WSC 96**. 1996 Winter Simulation Conference. Coronado, CA, USA
Contact: J.J. Swain, University of Alabama, Dept. Industrial and Systems Engineering, Huntsville, AL 35899, USA, Tel: +1-205 895 6749, Fax: +1-205 895 6733, Email: jswain@ebs.330.eb.uah.edu.

February 1997

- 05-07 **2nd MATHMOD**. IMACS Symposium on Mathematical Modelling. Vienna, Austria
Contact: Prof. Dr. Inge Troch, Technische Universität Wien/El145, Wiedner Hauptstr. 8-10, A-1040 Vienna, Austria

August 1997

- 25-30 **15th IMACS World Congress**. Berlin, Germany
Contact: Prof. Dr. A. Sydow, GMD FIRST, Rudower Chaussee 5, D-12489 Berlin, Tel: +49-30 67045610, Email: sydow@prosun.irst.gmd.de.

April 1998

- 14-17 **EUROSIM '98**. European Simulation Congress. Helsinki, Finland
Contact: Kaj Juslin, VTT Automation, P.O. Box 1301, FIN-02044 VTT, Tel: +358-0 4566 422, Fax: +358-0 4566 475, Email: Kaj.Juslin@vtt.fi, <http://eurossim.tuwien.ac.at/>.

An extended version of the calendar of events can be found on URL: <http://eurossim.tuwien.ac.at/>

EUROSIM - Simulation News Europe

Scope: Information on simulation activities, membership information for European simulation societies, comparisons on simulation techniques

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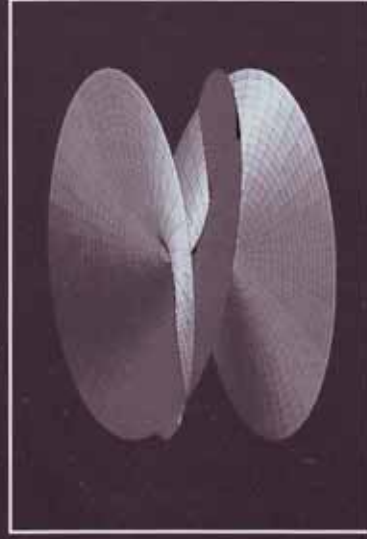
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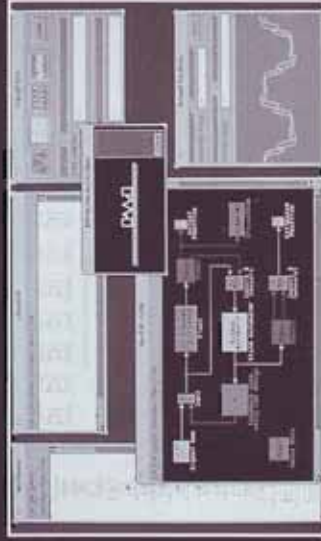
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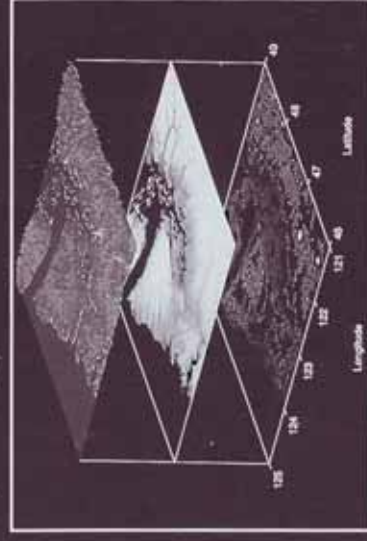
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