

**IEEE Robotics and Automation Society AdCom Meeting Minutes**  
**Hyatt Regency Hotel, Sacramento, California**  
**April 8, 1991**

**LIST OF ATTENDEES**

N. Caplan, President  
R. D. Klafter, Vice President for Finance  
H. E. Stephanou, Vice President for Member Activities  
C. S. G. Lee, Vice President for Technical Affairs and AdCom member  
D. E. Orin, Secretary  
T. J. Tarn, President-Elect in 1991 and Program Chairman, 1991 Conference  
A. C. Sanderson, Past President and Chairman, Nominations Committee  
G. N. Saridis, Founding President and AdCom member  
R. H. Taylor, Editor of Transactions and AdCom member  
M. B. Leahy, Jr., Editor of Newsletter  
R. Snyder, Managing Editor of Newsletter  
R. B. Kelley, Chairman, Publications Committee and AdCom member  
T. C. Hsia, General Chairman, 1991 Conference and AdCom member  
L. S. Haynes, Chairman, Standards Committee  
P. K. Khosla, Chairman, Education Committee  
G. Menga, General Chairman, 1992 Conference and Chairman, Internat. Comm.  
G. Giralt, Program Chairman, 1992 Conference  
W. J. Book, AdCom member  
G. Hirzinger, AdCom member  
A. K. Bejczy, AdCom member  
A. A. Desrochers, AdCom member  
T. Kanade, AdCom member  
J. Y. S. Luh, AdCom member  
V. J. Lumelsky, AdCom member and Chairman, Rob. Mot. Path Plan. Tech. Comm.  
G. A. Bekey, AdCom member  
J. M. Hollerbach, AdCom member

A. C. Kak, AdCom member  
A. J. Koivo, AdCom member  
P. Dario, Chairman, Micro Robots & Cellular Robots Tech. Comm.  
T. Fukuda, Chairman, International Committee  
W. Khalil, Chairman, International Committee  
P. Luh, Chairman, Computer-Aided Production Management Tech. Comm.  
J. Sztipanovits, Chairman, Intell. Instr. & Meas. Sys. in R. & A. Tech. Comm.  
W. Snyder, Neural Networks Liaison  
A. Goldenberg, Guest  
W. Gruver, Guest

**1. APPROVAL OF AGENDA AND MINUTES OF LAST ADCOM MEETING**

The meeting was called to order by President Caplan at 12:33 p.m. President Caplan announced the results of the recent election for AdCom membership for a three year term ending in 1993 and greeted the new members. The minutes of the December 8, 1990 AdCom meeting were approved without modification. The meeting agenda was approved without modification.

**2. REPORT ON STATUS OF THE SOCIETY**

President Caplan gave a brief presentation on the status of the society. He summarized by indicating that the society was doing well and he wished to defer any other discussion to the items on the rather full agenda of this meeting.

**3. VICE PRESIDENT FOR TECHNICAL AFFAIRS REPORT**

Lee, Vice President for Technical Affairs, gave a ten-page handout (Attachment A) and reported the following items:

3.1 The role of the Vice President for Technical Affairs was discussed with his role as Chair of the Technical Activities Board (TAB) being one of his major responsibilities. One of the motion items recommended by Lee was the formation of the TAB. However, President Caplan indicated that no vote was needed since the structure of the TAB was a part of the Bylaws of the Society. Plans will proceed with the formation of the TAB and scheduling of a meeting, the timing of which should be coordinated through the Secretary of the Society.

3.2 The role of the Technical Committees was discussed. There are presently 9 Technical Committees and 13 Chairmen or Co-Chairmen. Reports of four are included in Attachment A. Lee recommended that the Technical Committees be restructured and Motion Items 2, 3, and 4 were written in this regard. Again, no vote was needed. Some discussion followed on this matter. It was suggested

that the Technical Committees be consolidated somewhat so as to reduce the number. It was felt that the newly-formed TAB could further respond to these Motion Items.

#### **4. VICE PRESIDENT FOR MEMBER ACTIVITIES REPORT**

Stephanou, Vice President for Member Activities, gave a one-page handout (Attachment B) and brief presentation. The 1990 Membership of the Society was summarized in the handout. Membership is holding steady with a slight growth. He also referred back to his report of the last AdCom meeting in which the 1989 Membership and Region/Grade Distribution were also presented. The focus of much of his activity is to continue to encourage the formation of new chapters.

#### **5. VICE PRESIDENT FOR FINANCE REPORT**

Klafter, Vice President for Finance, distributed an eight-page financial report with budget figures for 1990 and 1991 (Attachment C) and reported that basically our Society is in excellent financial condition. We have a good surplus at close to one-half of a million dollars. With the difficulty that the IEEE is experiencing (outside of the Societies), he again warned that we should continue to watch for a "tax" to the Societies.

Questions arose concerning the budget including the size and reason for the surplus being so large. It was remarked that the IEEE generally would like to see the Society's surplus at one to two times the annual budget. The surplus is large because of the success of the conferences along with a few other factors. A recommendation by George Bekey to create a travel scholarship fund for Third World attendees to our conference was deferred to new business.

#### **6. NOMINATIONS COMMITTEE REPORT**

Sanderson, Chairman of the Nominations Committee, reported on the function of the Nominations Committee whose membership is the past presidents of the Society. Their task is to make nominations for President-Elect for this meeting, and for the positions of Vice Presidents and AdCom membership for the fall meeting.

6.1 Nominations for President-Elect in 1992 (President for 1993) were presented. Two were nominated by the Committee with one withdrawing. The recommendation of the Committee was that T. J. Tarn be nominated for a second term as President. (He will take office as President in 1992.)

After T. J. Tarn left the room, the nomination was discussed. A motion was made by George Saridis, and seconded, that T. J. Tarn be re-elected as President for 1993. The question arose as to the length of term of a President. One recommendation was that it be for 2 years, not the present 1 year term. After some discussion on the latter topic, the motion to re-elect T. J. Tarn was approved. After he returned to the room, Prof. Tarn was congratulated on his election to a second term as President.

- 6.2 President Caplan made a motion to form a Committee on Constitution and Bylaws to clear up any inconsistencies in these documents and to make recommendations as to changes in the term and duties of the officers. This committee would be chaired by David Orin, the Secretary of the Society, and would report back to the AdCom at its next meeting. After a second, the motion was approved. Membership on the Committee will include George Lee, Harry Stephanou, T. J. Tarn, and Russ Taylor.

## 7. MEETINGS COMMITTEE REPORT

- 7.1 **1991 Conference.** Hsia, Chairman of the Meetings Committee and General Chairman of the 1991 Conference, gave a brief status report on the conference including information on the banquet, best student paper contest, exhibitors, conference tracks, video proceedings, etc. This was followed by a presentation by T. J. Tarn, the Program Chairman for the 1991 Conference. See Attachment D for details of the Program Committee Report. Congratulations were extended to Steve Hsia and T. J. Tarn for an excellent program for the conference.

Several questions were raised concerning future conferences. It was suggested that the conference be moved to begin on either Monday or Wednesday since the Tuesday start can cause travel to be more difficult. Also, the review process in which one Technical Program Committee (TPC) person handles all of the reviews for a single paper was discussed. To eliminate bias, it was suggested that each paper be sent to more than one TPC person. However, this would in general increase the work load. It was felt that while these suggestions should be considered by future Program Chairpersons, we should not overly impose our views upon them.

Peter Luh, Chairman of the Video Proceedings Committee, reported on the work of the Committee. (See Attachment E.) He showed the beginning clip from the Video Proceedings and discussed the cost of the tape. He indicated that a PAL version was also available for purchase and that a booklet was available with each tape. Thanks were given to Peter Luh and his Committee for their hard work and excellent results.

- 7.2 **1992 Conference.** Giuseppe Menga, the General Chairman of the 1992 Conference, reported on the status of the conference. He distributed a copy of the Call For Papers. The General Vice-Chairpersons are Antti J. Koivo and Arthur Sanderson. Georges Giralt is the Program Chairperson, Richard Klafter the Treasurer, and Gerhard Hirzinger is in charge of workshops and tutorials. The budget is similar to previous conferences but with some differences. (See Attachment F.) The conference budget reflects the sponsorship of a number of other organizations. Final approval is set for this meeting.

Georges Giralt, the Chairman of the Program Committee, reported on the organization of the Committee. Hirochika Inoue is the Program Vice-Chairperson representing the area of robotics and Stanley B. Gershwin is the Vice-Chairperson for automation. Pierre Bernhard is the Local Arrangements Chairman. There

will be 45-50 persons on the Technical Program Committee. The reviews will be based on full papers. The Program Committee is scheduled to meet at least 2 days to complete the review process.

A question was raised concerning the Call For Papers which had information given on the organizer of the exhibition, A. F. - The Automated Factory Show. After some discussion, the basic objection was with the last line following the organization's address: "Organizer of A.F. Show - Genoa, 17-21 February 1992". There was a feeling that we should not allow others to advertize in our conference's Call For Papers, etc. To eliminate any confusion in the announcement, the line under question would be eliminated from further copies of the Call For Papers.

Following extensive discussion concerning the conference, a motion was made by Richard Klafter to accept the budget of the 1992 Conference. After a second and further discussion, the budget was approved unanimously.

- 7.3 1993 Conference.** Wayne Book, the General Chairman for the 1993 Conference, made a presentation concerning the conference (Attachment G). Information was given as to proposed dates, hotels, conference theme, budget, and schedule. Johnson Luh, proposed as the Program Chairman for the 1993 Conference, discussed the timetable for submission, etc. A discussion followed over the information provided.

A procedure for approval of the location and chairs of the 1993 Conference was agreed upon, with the General Chairman and Program Chairman being approved separately. A motion was made by President Caplan that Wayne Book be approved as General Chairman of the 1993 Conference in Atlanta. After a second, the vote was unanimous.

A motion was made by Wayne Book, in his role as a member of the AdCom, and seconded that Johnson Luh be approved as Program Chairman of the 1993 Conference. After Johnson Luh left the room, the matter was further discussed. Concern was raised as to the load of being both Program Chairman and an Associate Editor for the Transactions. The motion to approve Johnson Luh as Program Chairman for the 1993 Conference was approved.

Approval of the budget for the 1993 Conference was postponed to the fall meeting of the year.

- 7.4 1994 Conference and beyond.** President Caplan gave some background on the conferences in 1994 and beyond. Without objection, it was agreed that the 1994 Conference would be held in North America. A motion was then made by Steve Tsia that the 1995 Conference be held in Japan. With a second, the motion was approved. (Secretary's note: This agenda item was revisited later in the meeting with the following action.) George Bekey made a motion that Toshio Fukuda be selected as the General Chairman for the 1995 Conference. After a second, the vote to approve was unanimous. The site, budget, and Program Chairperson will be considered at later meetings.

William Gruver made a presentation and proposed that the 1994 Conference be held in San Diego with him serving as the General Chairman (Attachment H). With approval as to the location, he would prepare a full proposal to be submitted later for final approval. With some discussion, President Caplan postponed any formal action until the fall meeting. Submission of other proposals will be encouraged by the Meetings Chairman and President through advertising in the Newsletter, announcing at the Conference banquet, etc.

- 7.5 **Other Meetings.** Richard Klafter discussed the sponsorship of the MEMS '92 Workshop chaired by Dr. Wolfgang Benecke. This year's workshop in Japan was quite successful. However, the budget submitted for MEMS '92 has several problems including anticipated number of attendees and registration fees and could be a significant potential liability to the Society. Klafter indicated that the budget was not yet ready to approve. After some discussion, George Saridis moved that the final decision on sponsorship of MEMS '92 be made by the Executive Committee after Klafter works with Dr. Benecke to modify the budget. With a second, the motion was approved unanimously.

Hsia distributed a copy of the Call For Papers for IROS '92 which we had previously agreed to Co-Sponsor.

## 8. AWARDS COMMITTEE REPORT

Saridis, Chairman of the Awards Committee, reported on the election of new Fellows of the IEEE from our Society. Six candidates were submitted with two receiving the award. The two new Fellows were T. C. (Steve) Hsia and Arthur Sanderson who received congratulations from those present for this noteworthy award.

## 9. NEURAL NETWORKS LIAISON REPORT

Wesley Snyder, our Liaison with the Neural Networks Council, made a brief presentation concerning the activities in the area. He announced the dates of a number of upcoming meetings. Because of a surplus of the Neural Networks Council, our Society has received a transfer of some funds to our account. The Transactions on Neural Networks has some 8300 subscriptions.

The Society has been invited by the Neural Networks Council to formally accept an invitation to be a Cooperating Society for the International Conference on Fuzzy Systems in March 1992 in San Diego. George Saridis made a motion to accept this invitation, and with a second it was unanimously approved.

## 10. NEW BUSINESS

- 10.1 **Second AdCom Meeting, 1991.** The original plan to have the Second AdCom Meeting for 1991 in Washington D.C. in December does not work because of the unavailability of rooms there during the holiday season. Considerable discussion followed concerning the time and location of the meeting. It was agreed to meet on Saturday, November 9, 1991 in Atlanta. The timing of the meeting will be coordinated with the Editorial Board Meeting to hopefully allow morning flights into Atlanta.

The question of support for the travel of the AdCom members for the fall meeting was discussed. With a number of views expressed, John Hollerbach moved that travel support be provided for all AdCom members, and this motion was seconded. Considerable discussion ensued with the motion being clarified – travel support would be provided to all AdCom members to cover the smaller of one-half of their expenses or \$500. The motion with clarification was approved.

- 10.2 **TAB Report.** President Caplan reported on the activities of the IEEE Technical Activities Board. The major item reported concerned the IES Revised Field of Interest Proposal. Because of the lack of agreement among the Society Presidents, this proposal was essentially tabled.
- 10.3 **Future Conference Directions.** Some issues related to future conference directions were brought to the table for discussion by Alan Desrochers. One idea presented was that of having two conferences each year, one oriented to robotics and the other oriented to automation. This may give a greater place to the area of automation. Much discussion followed concerning the number of papers submitted/accepted, their quality, and the acceptance rate as compared to other conferences. Russ Taylor made a motion that the TAB make a report before the next AdCom meeting to outline issues for discussion including the topic of two conferences and the size and direction of this conference. With a second, the motion was approved with three opposed.
- 10.4 **Editorial Services Contract for Newsletter.** President Caplan brought a contract before the meeting that provides for Editorial Services by Roz Snyder for the Newsletter. He suggested that the contract be modified slightly from that coming from the IEEE so that the agreement could be terminated in writing by either party with 30 days notice. A motion was made that the President be empowered to sign the agreement. After a second, the motion was approved.
- 10.5 **Request from Singapore Chapter.** President Caplan presented a request from the Singapore Chapter to send a distinguished speaker to Singapore for a Robotics Festival and to cover the expenses of the speaker. It was considered a bad precedent to provide funding for such local meetings. With a motion by Russ Taylor and a second, the request was turned down.
- 10.6 **IEEE TAB Meeting.** Approval was given in the previous AdCom meeting to provide up to \$4000 for travel by the President to the IEEE TAB Meeting & Symposium in October, previously set for Milan. The site for the meeting is being reconsidered, and with a motion by Richard Klafter, and second, the vote to approve the travel expenditure was made with the specification of location left open.

## 11. PUBLICATIONS COMMITTEE REPORT

Kelley, Chairman of the Publications Committee, made a brief presentation giving an overview of the activities in the publications area (Attachment I). Among other items, he indicated that a committee may be formed to look at the concept of video proceedings in general and to consider a video educational publication.

- 11.1 Russ Taylor, Editor of the Transactions, gave a status report on the Transactions. A summary of submissions was given showing that submissions are slightly higher for 1991. We are accepting about one-quarter of our papers. There continues to be an effort to reduce the number of papers that have been under review without decision for long periods of time.
- Just-in-time scheduling of galley proofs has caused some difficulties with the publication. He continued by reporting on the work of the Editorial Board Meeting of the morning, which work included a review of old papers, consideration of proposals for special issues, and consideration of delays in the review process. He requested that he receive an electronic form of the table of contents and author list from the past conference proceedings. This will be very helpful in selecting reviewers, with address given, for the Transaction's submissions.
- 11.2 Mike Leahy, Editor of the Newsletter, distributed a seven-page handout on the costs and budget of the Newsletter (Attachment J). He went through the proposed budget for 1991. A 32-page Newsletter is budgeted. Some discussion followed with support given to the budget by Richard Klafter, the Vice President for Finance. A motion was made by Russ Taylor to accept the budget in the amount of \$69,052, and after a second, the motion was approved unanimously. Final discussion on the Newsletter resulted in a recommendation being made that the Managing Editor look into the possibility of creating a bulletin board as an adjunct to the Newsletter.
- 11.3 Russ Taylor made a request that the Editorial Board members also be provided travel support for the fall meeting in the same amount as the AdCom members. This was moved by George Bekey and seconded. Much discussion followed. The question of travel support for the Technical Program Committee for the conference was also raised. The motion was amended to limit the total extra expenditure to \$3000. With vote, the motion failed for lack of a majority of those voting members present.
- 11.4 Richard Klafter provided a handout and gave information concerning the co-sponsorship of the *Transactions on Micro Electro Mechanical Systems* (Attachment K). The IEEE Electron Devices Society (EDS) is subsidizing the cost in the first year which will be of benefit to the members of our Society. He indicated that it represents a minimal net cost to our Society for the first year and some \$1000 per year or less during the second and third years. Our liability is approximately \$5000, which is the amount of the loan which represents our part of the startup money for the Transactions. After a discussion of the budget, a motion was made by George Bekey that we accept this proposal for a three-year budget for the MEMS Transactions. After a second, the motion was approved.



## **12. EDUCATION COMMITTEE REPORT**

Khosla, Chairman of the Education Committee, made a brief report. A panel discussion on education has been organized at the conference and is being planned for the next two conferences. Strategically selecting tutorials and workshops was seen to be an important aspect of the work of this committee. A series of IEEE Press books may be considered at some point. Some discussion centered on the relationship of the Chairman of the Education Committee to the Program Committee of the conference. No motions were brought to the table at this time, but after further consideration, motion items will be brought for action at the next AdCom meeting.

## **13. STANDARDS COMMITTEE REPORT**

Haynes, Chairman of the Standards Committee, distributed a two-page handout (Attachment L) and made a brief presentation. Provided was a list of all the standards that ANSI or ISO have adopted or are currently on the table. This list will be provided for use in the Newsletter.

## **14. OTHER BUSINESS**

14.1 George Bekey moved that the Society allocate \$25,000 to be used at the discretion of the General Chairman of the 1992 Conference to provide scholarships for attendees from Third World countries, to provide them with assistance with registration fees and travel. A number of questions arose including ways to publicize this scholarship fund and to determine eligibility. Because of the need for more detailed plans, the motion was withdrawn and a small committee will be formed to study the issue further.

14.2 A motion was made by George Saridis that \$5000 be allocated for travel scholarships for the five finalists for the Best Student Paper Award. The motion was seconded and carried.

14.3 The meeting was adjourned at 7:20 p.m.

## **Vice-President for Technical Affairs**

- Responsible for all the technical affairs of the Society, including the technical contents of Society meetings and publications
- Direct responsibility for the following:
  - 1) The Editorial Boards of the Transactions and the Newsletter
  - 2) The Conference Board
  - 3) The Technical Committees and the Working Groups
  - 4) The Technical Liaison Representatives
  - 5) The Technology Review Committee
- Chair a Technical Activities Board (TAB) which shall be responsible for coordinating all of the technical affairs of the Society

## **Technical Activities Board (TAB)**

- **Purpose:**
  - Responsible for acquainting the members of the Society.
  - Responsible for coordinating all of the technical affairs of the Society.
- **The TAB consists of:**
  - 1) Chairman — Vice-President for Technical Affairs
  - 2) Editors of the Transactions and the Newsletter
  - 3) Chairman of the Conference Board
  - 4) Chairmen of the Technical Committees
  - 5) Up to 5 additional members appointed by the Chairman
  - 6) Technical Liaison Representatives  
(non-voting members)
- **The TAB shall meet at least two times a year to review the technical activities of the Society.**

## **Technical Committees**

- The Technical Committees (TC) shall provide a focus for the technical activities of the Society independent of the Conference Board and of the Editorial Board of the Transactions.
- Each Technical Committee may sponsor and monitor a number of Working Groups.
- Technical Committee Chairmen shall be appointed by the President-Elect for one-year terms.
- These Chairmen shall be charged with the guidance of the regular activities of the Technical Committees.
- They shall be responsible for making yearly reports to the AdCom on the activities of their Committees and the Working Groups monitored by their Committees.
- These reports must include recommendations on the continuation or dissolution of these Working Groups and their Committees for the next year.

## **Current Technical Committees**

- 9 Technical Committees and 13 Chairmen or Co-Chairmen.
- Robot Motion and Path Planning  
— Vladimir J. Lumelsky
- Robot Dynamics & Control  
— Oussama Khatib
- Computer Vision  
— Roger Tsai
- Manufacturing Automation  
— Walter Trybula  
— Ali Sharifnia
- Micro Robots and Cellular Robots  
— Paolo Dario
- International Committee  
— Toshio Fukuda  
— Giuseppe Menga  
— W. Khalil
- Computer-Aided Production Management  
— Peter Luh
- Future Directions in Robotics and Automation  
— M. Vidyasagar  
— John Baillieul
- Intelligent Instrumentation and Measurement Systems in Robotics and Automation  
— Janos Sztipanovits

# **Robot Motion and Path Planning TC**

## **Chairman: V. J. Lumelsky**

### **Field of Interest**

- Planning, generation, sensing, and control of robotic motion.
- Related areas — computational geometry, computer graphics, CAD-CAM systems, and VLSI design.

### **Past Activities**

- Guest editor for a Special Issue on Robot Motion Planning, *IEEE Trans. on R & A*, June 1987.
- Special sessions at professional conferences.  
For example, IROS'89, IROS'90, and ICRA's.
- Tutorials and workshops at professional conferences.  
For example, "Sensor-Based Planning and Control," 1990 *IEEE Int'l Conf. on Robotics and Automation*.

### **Future Plans**

- Special sessions at the 1991 IEEE CRA and at the IROS'91.

# **Intelligent Instruments and Measurement Systems**

## **Chairman: Janos Sztipanovits**

### **Field of Interest**

- Acquisition and interpretation of sensory data in robotics and automation systems.
- Intelligent sensors and processing, sensor fusion, intelligent monitoring and diagnostics, hardware and software architectures for IIMS in robotics and automation.

### **Past Activities**

- Workshop on Intelligent Sensory Processing at 1990 IEEE CRA (35 participants).
- Workshop on Intelligent Sensory Processing for Space-Based Robotics at 1991 IEEE CRA.
- An invited session at 1991 IEEE CRA on Real-Time Diagnostics.

### **Future Plans**

- Workshops related to Intelligent Sensory Processing at 1991 IEEE CRA and initiation of regional symposiums on this topic.

# **Micro Robots and Cellular Robots**

## **Chairman: Paolo Dario**

### **Field of Interest**

- Methodologies and technologies required to investigate and develop autonomous or semiautonomous machines capable of carrying out, individually or collectively, useful tasks in the micro- or millimeter-scale world.

### **Past Activities**

- Special sessions, tutorials and workshops at professional conferences.

### **Future Plans**

- Special sessions, tutorials and workshops at the 1991 IEEE CRA and at the ICAR'91.



**International Committee**  
**Co-Chairman: Toshio Fukuda**

**Activities**

- IROS'92 will be held on July 8-10, 1992, in Raleigh, NC.  
Co-sponsored by IEEE RAS.

## **Action Items**

- **Form a TAB**
- **Restructure the Technical Committees**

## **List of Technical Areas**

- |                                      |  |
|--------------------------------------|--|
| — <b>Compliant and Force Control</b> | — <b>Telerobotics</b>                      |
| — <b>Adaptive Control</b>            | — <b>Underwater Robotics</b>               |
| — <b>Kinematics and Dynamics</b>     | — <b>Programming Systems</b>               |
| — <b>Dynamics and Control</b>        | — <b>Sensors and Actuators</b>             |
| — <b>Manufacturing Systems</b>       | — <b>Navigation and Locomotion Systems</b> |
| — <b>Assembly</b>                    | — <b>Manipulator Systems</b>               |
| — <b>Neural Networks</b>             | — <b>CAD/CAM Systems</b>                   |
| — <b>Redundant Manipulators</b>      |  |
| — <b>Flexible Manipulators</b>       |  |

## **Motion Items**

- (1) Recommend the formation of the TAB with the composition as stated on page 2. The additional members are: Alan Desrochers, Toshio Fukuda, Dick Klafter, Art Sanderson, and Harry Stephanou.
- (2) Recommend that the International Committee be "transferred" to as one of the Standing Committees.

**Reason:** International Affairs Committee is one of the Standing Committees as stated in the Society's Bylaws.

- (3) Recommend that the "Future Directions in Robotics and Automation" Technical Committee be dissolved.

**Reason:** Future Direction in Robotics and Automation will be handled by the newly formed TAB.

- (4) Recommend that we form at most 18 Technical Committees. The term of each TC Chairperson shall be three years, with 6 TC Chairpersons to be appointed/re-appointed each year. No TC Chairperson shall serve for more than two consecutive three-year terms, but eligibility is stored after a lapse of two years or serving different TC.

1990 Membership

	Feb-90	Mar-90	Apr-90	May-90	Jun-90	Jul-90	Aug-90	Sep-90	Oct-90	Nov-90	Dec-90	Jan-91	Feb-91
STUDENT	1292	1370	1383	1357	1324	1355	1416	1188	1302	1481	1607	1514	1346
REGULAR	3720	4029	3816	4094	4290	4396	4464	4793	4839	4933	5022	4581	3724
RET/UNEMP	74	79	75	76	76	77	78	83	85	89	96	92	75
AFFILIATE	84	88	82	85	87	87	87	89	90	90	87	87	66
TOTAL	5170	5566	5356	5612	5777	5915	6045	6153	6316	6593	6812	6274	5211
% of IEEE	1.75	1.76	1.72	1.73	1.75	1.76	1.79	1.8	1.82	1.84	1.84	1.79	1.77
ARREARS	2355	2196	2245	2155	2112	2073	2084	2067	2061	2049	2045	2111	2324
ARR/ACT													
R&A	0.46	0.39	0.42	0.38	0.37	0.35	0.34	0.34	0.33	0.31	0.3	0.34	0.45
CS	0.35	0.29	0.33	0.31	0.29	0.28	0.28	0.27	0.26	0.25	0.24	0.24	0.34
SMC	0.32	0.26	0.29	0.27	0.25	0.24	0.24	0.23	0.23	0.22	0.21	0.22	0.29
IE	0.45	0.41	0.49	0.41	0.37	0.35	0.35	0.34	0.34	0.33	0.32	0.42	0.46
COMP	0.32	0.25	0.27	0.24	0.23	0.22	0.22	0.22	0.21	0.21	0.2	0.18	0.4
TOTAL	0.31	0.25	0.27	0.25	0.24	0.23	0.23	0.23	0.22	0.21	0.21	0.2	0.33

ATTACHMENT B

# ATTACHMENT C

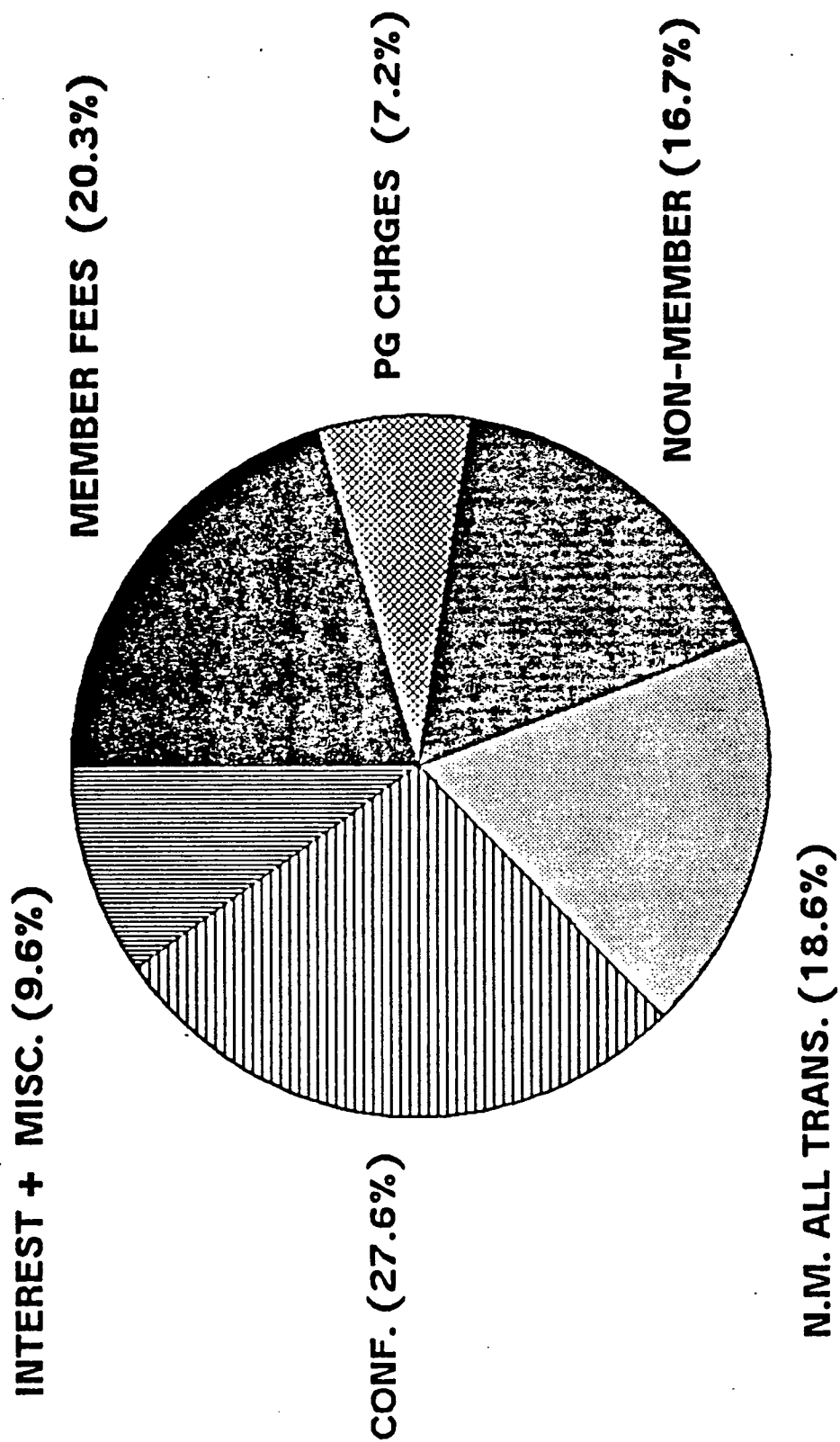
## RAS - BUDGET REPORT [SACRAMENTO] - APRIL 8, 1991

ITEM	BUDGET 1990	ACTUAL 12/31/90	BUDGET 1991
1. MEMBER AND AFFILIATE COPIES	5334	4542	4989
2. STUDENT MEMBER COPIES	583	1415	949
3. INDIVIDUAL NON-SOCIETY COPIES	387	507	450
4. IEEE NON-SOCIETY AND MEMBER	0	0	0
INCOME (\$1,000)			
5. MEMBERSHIP FEES	\$89.0	\$80.6	\$95.8
6. INDIVIDUAL NON-MEMBER SUBSCRIPTIONS	\$44.0	\$66.1	\$55.8
7. NON-MEMBER ALL TRANSACTIONS	\$69.4	\$73.6	\$66.5
8. PAGE CHARGES	\$27.0	\$28.6	\$37.6
8A. VOLUNTARY PAGE CHARGES	\$9.0	\$11.5	\$11.5
8B. EXCESS PAPER LENGTH	\$18.0	\$17.1	\$26.1
9. CONFERENCES	\$190.6	\$109.5	\$205.7
9A. 89 R & A CONFERENCE		\$42.9	
9B. 89 MEMS CONFERENCE		\$48.3	
9C. 90 MEMS CONFERENCE		\$18.3	
10. MISCELLANEOUS INCOME	\$9.7	\$9.7	\$8.0
11. INTEREST	\$12.1	\$28.4	\$12.1
TOTAL INCOME	\$441.8	\$396.5	\$481.5
EXPENSES (\$1,000)			
12. TRANSACTIONS [INCLUDES EDITOR EXPENSE=36k]	\$226.4	\$185.0	\$234.5
13. NEWSLETTER	\$34.0	\$17.3	\$35.0
14. MSC. PERIODICAL EXPENSE	\$6.1	\$6.7	\$8.0
15. CONFERENCES	\$186.2	\$40.8	\$202.6
15A. 89 MEMS		\$39.9	
15B. MISC R & A CONFERENCE		\$0.9	
16. MSC. EXPENSES	\$0.0	\$7.1	\$0.0
17. MSC. IEEE EXPENSES	\$6.4	\$17.4	\$12.5
18. AD COM	\$14.5	\$6.5	\$14.5
TOTAL EXPENSES	\$473.6	\$280.8	\$507.1
19. SURPLUS FOR THE YEAR	(\$31.8)	\$115.7	(\$25.6)
20. NET SURPLUS [\$374.7 AS OF 12/31/89]	\$342.9	\$490.4	\$464.8
ADDITIONAL INCOME [ESTIMATED]			
21. 90 MEMS WORKSHOP - LOAN [PAID 1/2/91]		\$21.0	
22. 90 R & A CONFERENCE		\$224.4	
23. TOTAL ADDITIONAL INCOME [ESTIMATED - 3/31/91]		\$245.4	
ADDITIONAL EXPENSES TO 3/31/91 [ESTIMATED]			
24. TRANSACTIONS		\$60.0	
25. EDITOR EXPENSES [FOR 1989-90]		\$35.7	
26. 90 R & A CONFERENCE		\$155.5	
27. AD COM [MSC TRAVEL EXPENSES]		\$6.0	
28. TOTAL ADDITIONAL EXPENSES [ESTIMATED - 3/31/91]		257.2	
NET ESTIMATED SURPLUS - 3/31/91		\$478.6	

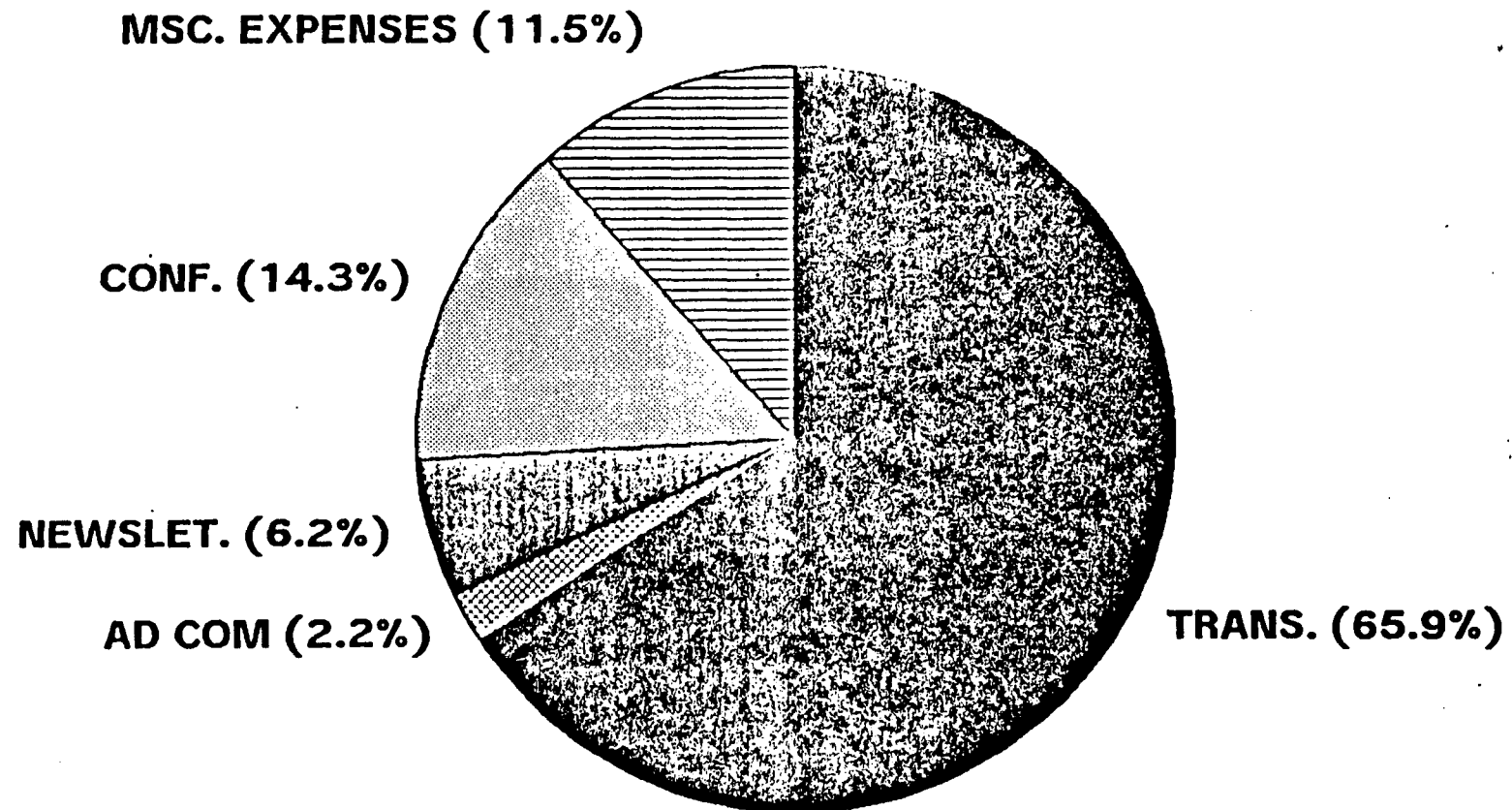
**EAS - BUDGET REPORT [SACRAMENTO] - APRIL 8, 1991**

ITEM	ACTUAL 2/28/91	BUDGET 1991
1. MEMBER AND AFFILIATE COPIES		4989
2. STUDENT MEMBER COPIES		949
3. INDIVIDUAL NON-SOCIETY COPIES		450
4. IEEE NON-SOCIETY AND MEMBER		0
INCOME (\$1,000)		
5. MEMBERSHIP FEES	\$56.1	\$95.8
6. INDIVIDUAL NON-MEMBER SUBSCRIPTIONS	\$42.2	\$55.8
7. NON-MEMBER ALL TRANSACTIONS	\$33.3	\$66.5
8. PAGE CHARGES	\$16.7	\$37.6
8A. VOLUNTARY PAGE CHARGES	\$5.2	\$11.5
8B. EXCESS PAPER LENGTH	\$11.5	\$26.1
9. CONFERENCES	\$0.8	\$205.7
10. MISCELLANEOUS INCOME	\$2.1	\$8.0
11. INTEREST	\$4.5	\$12.1
TOTAL INCOME	\$155.7	\$481.5
EXPENSES (\$1,000)		
12. TRANSACTIONS	\$76.4	\$234.5
13. NEWSLETTER	\$2.3	\$35.0
14. MSC. PERIODICAL EXPENSE	\$0.7	\$8.0
15. CONFERENCES	\$0.8	\$202.6
16. MSC. EXPENSES	\$1.9	\$0.0
17. MSC. IEEE EXPENSES	\$3.5	\$12.5
18. AD COM	\$8.0	\$14.5
TOTAL EXPENSES	\$93.6	\$507.1
19. SURPLUS FOR THE YEAR	\$62.1	(\$25.6)
20. NET SURPLUS [\$490.4 AS OF 12/31/90]	\$552.5	\$464.8
ADDITIONAL INCOME [ESTIMATED]		
21. 90 MEMS WORKSHOP - LOAN [PAID 1/2/91]		\$21.0
22. 90 R & A CONFERENCE		\$224.4
23. TOTAL ADDITIONAL INCOME [ESTIMATED - 3/31/91]		\$245.4
ADDITIONAL EXPENSES TO 3/31/91 [ESTIMATED]		
24. TRANSACTIONS		\$0.0
25. EDITOR EXPENSES [FOR 1991]		\$11.3
26. 90 R & A CONFERENCE		\$155.5
27. AD COM [MSC TRAVEL EXPENSES]		\$6.0
28. TOTAL ADDITIONAL EXPENSES [EST. - 3/31/91]		172.8
NET ESTIMATED SURPLUS - 3/31/91		\$625.1

**ACTUAL INCOME - 12/31/90**

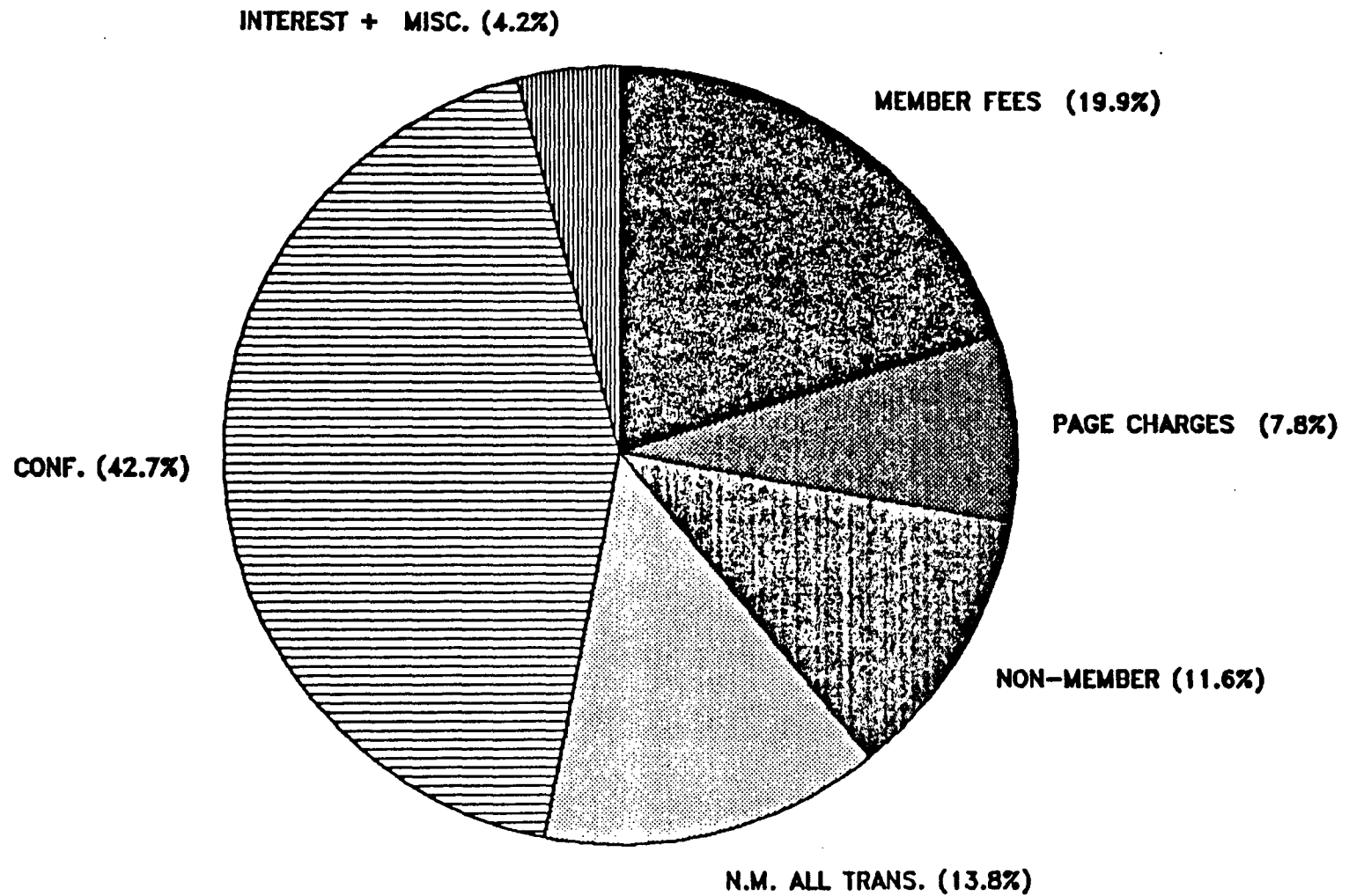


**ACTUAL EXPENSES - 12/31/90**

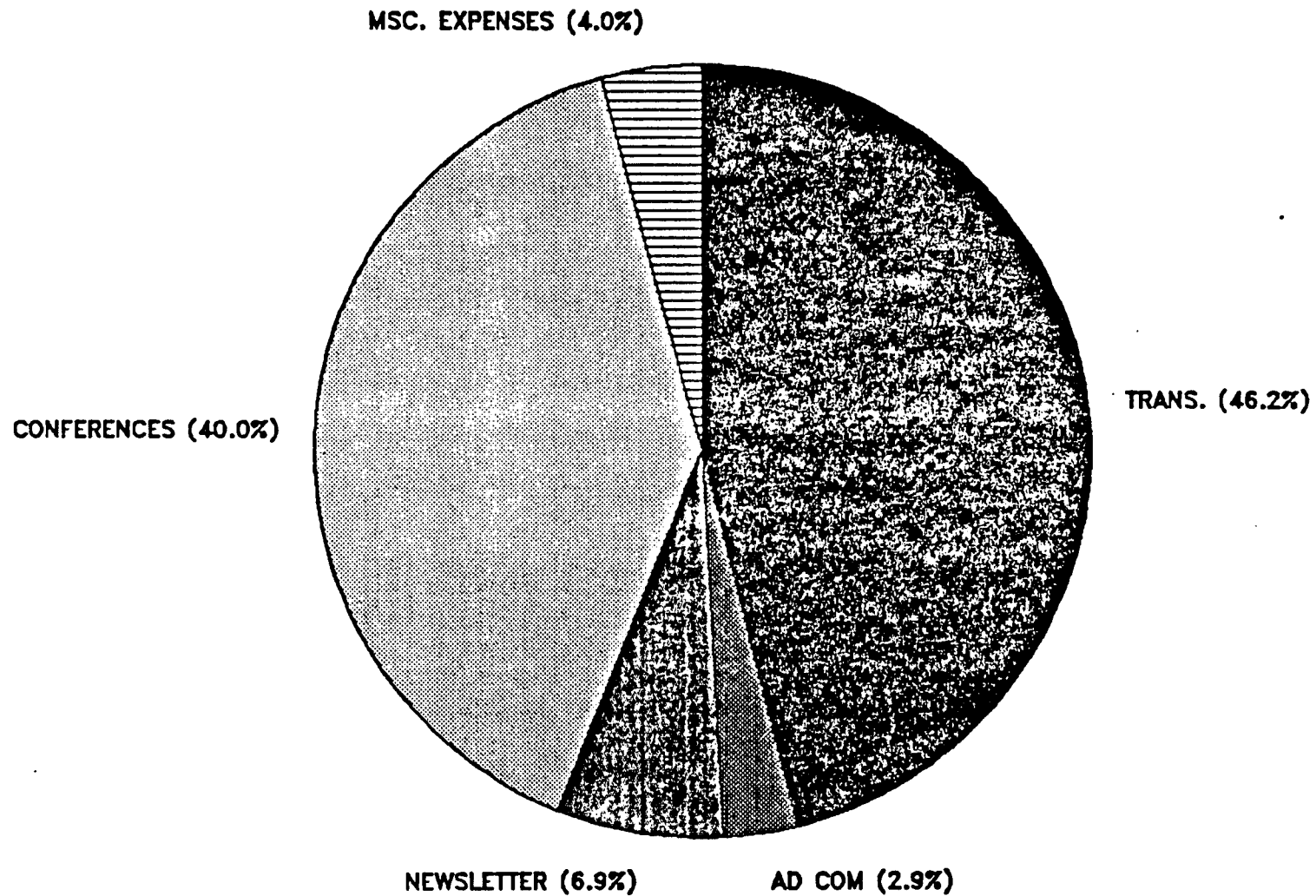




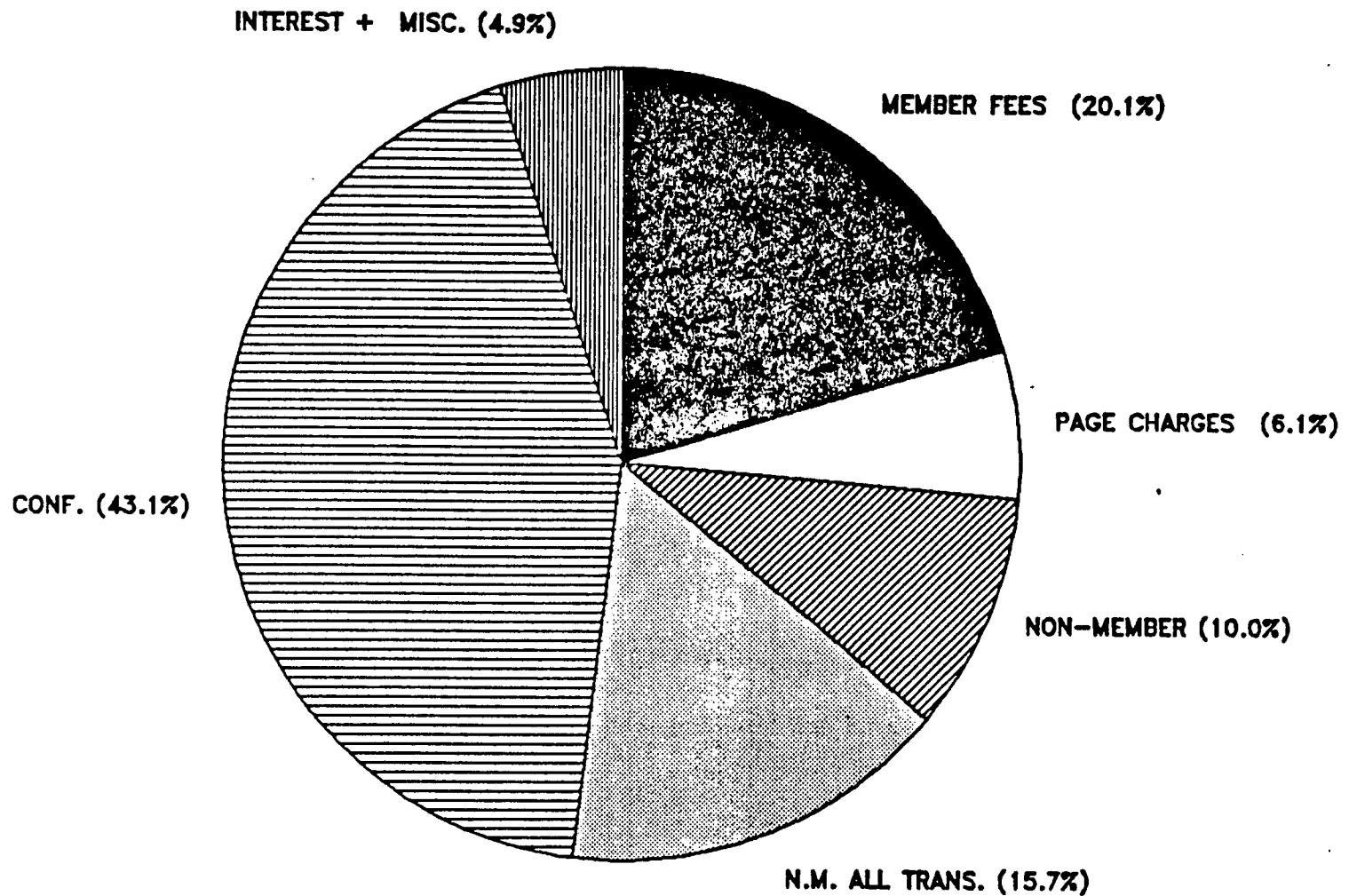
# 1991 - BUDGETED INCOME



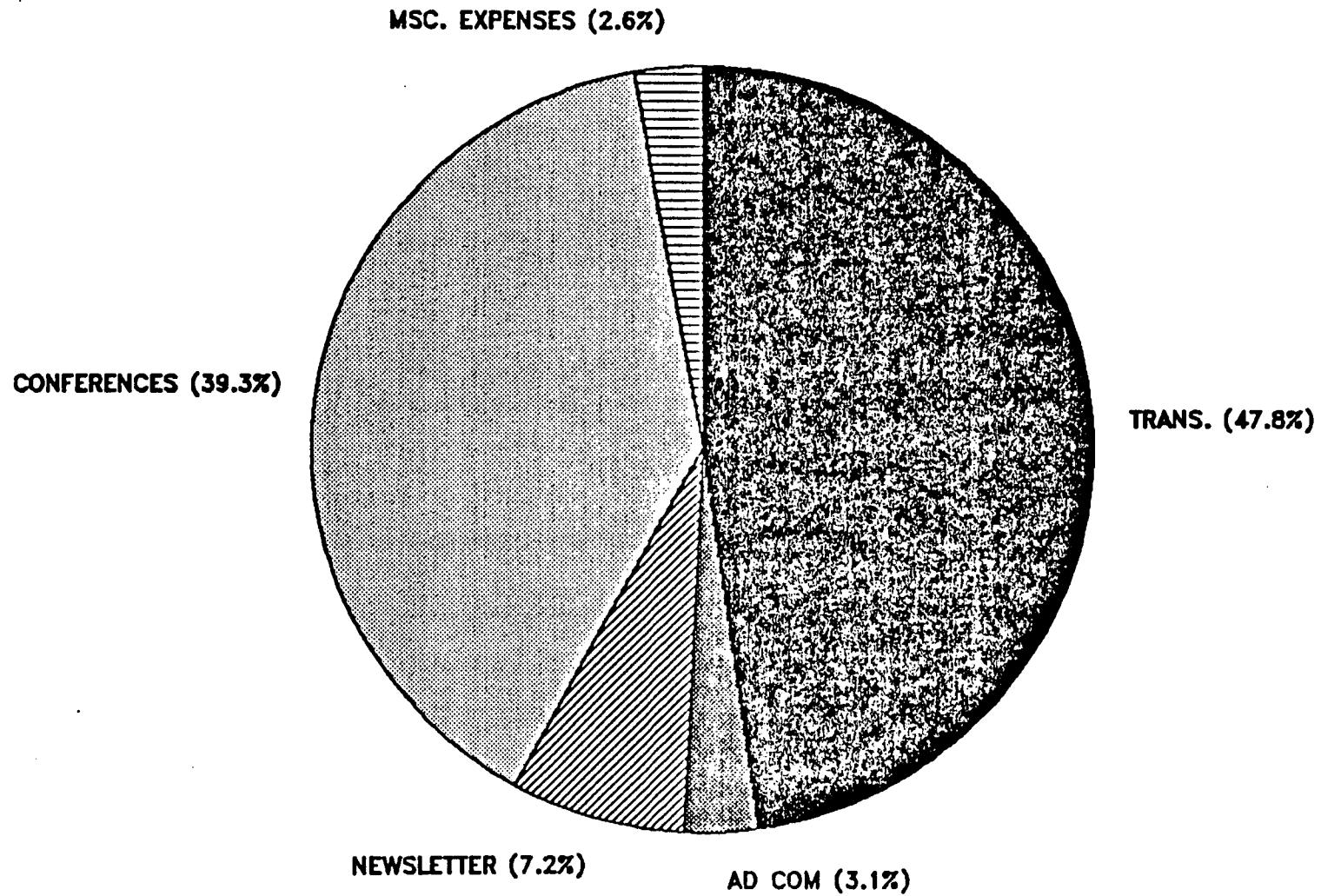
# 1991 - BUDGETED EXPENSES



# 1990 - BUDGETED INCOME



# 1990 - BUDGETED EXPENSES



# **PROGRAM COMMITTEE REPORT**

## **OVERVIEW**

785 Submitted Papers (28 Countries)

420 Accepted Papers (24 Countries)

U.S.	456	(274)	Hong Kong	6	(1)
Canada	57	(26)	India	7	(1)
Japan	62	(36)	Korea	11	(8)
China	41	(7)	Germany	18	(11)
France	41	(18)	U.K.	13	(4)
Italy	13	(7)	Norway	6	(5)
Belgium	7	(6)	Others	47	(16)

# **TPC MEETING**

**December 1, 1990, St. Louis**

**420 Papers Selected (53.5%)**

**9 Parallel Sessions:**

**105 Technical Sessions**

**3 Panel Discussions**

**Tutorial:**

**2 Full Day Sessions**

**2 Half Day Sessions**

**Workshop:**

**2 Full Day Sessions**

**4 Half Day Sessions**

1991 IEEE International Conference on Robotics and Automation  
Program At A Glance

Session #		I	II	III	IV	V	VI	VII	VIII	IX
Time Rooms April 9		Regency A	Regency B	Regency C	Regency D	Regency E	Regency F	Golden State A&B	Big Sur A&B	Carmel A&B
8:00 - 8:45 a.m.		Plenary Session I in Regency B&C Dr. A. Bensoussan, Some Trends in Control and Automation								
Tu A I	9:00 - 10:40 a.m.	Adaptive Control of Robot Manipulators	Force Control for Manipulators	Planning For Robotic Systems	Dynamic Modeling For Manipulators	Analysis of Manufacturing Systems	Robot Vision	Multiple Robotic Systems	Robotic System Planning	Analysis And Control of Manipulators
Tu A II	11:00 a.m.- 12:40 p.m.	Learning Applications	Impedance and Force Control	Mobile Robot Planning	Robot Modeling and Design	Manufacturing Applications	Tactile Sensing	Grasping	Planning Among Moving Obstacles	Control of Redundant Systems
Tu P I	14:20 - 16:00 p.m.	High Level Control of Robotic Systems	Nonlinear Control of Robotic Systems	State Based Method in Motion Planning	Kinematic Analysis and Design	Assembly Planning	Visual Servoing - 1	Design of Multifingered Hands	Path Planning and Collision Avoidance	Redundant Robots - 1
Tu P II	16:20 - 18:00 p.m.	Learning Control - 1	Panel Discussion - 1	Motion Planning and Reasoning	Real-Time Issues in Robotic System Design	Scheduling in Manufacturing Systems	Visual Servoing - 2	Dextrous Manipulators	Collision Avoidance	Redundant Robots - 2
19:00 - 21:00 p.m.		Reception: Regency B&C Hosted by Intel Corporation								
Time Rooms April 10		Regency A	Regency B	Regency C	Regency D	Regency E	Regency F	Golden State A&B	Big Sur A&B	Carmel A&B
W A I	9:00 - 10:40 a.m.	Estimation and Learning in Robotic Systems	Coordination of Multiple Industrial Robots	Geometry Based Path Planning	Mechanism Design and Kinematics	Practical Scheduling of Manufacturing Systems	Stereo Vision	Robot Languages	Feedback Control of Nonholonomic Mobile Robots	Computational Algorithms for Robot Arms
W A II	11:00 a.m.- 12:40 p.m.	Robot Control - 1	Force Control for Non-Rigid Manipulators	Kinematics and Motion Planning	Robot Design - 1	Modeling of Manufacturing Systems	Intelligent VLSI Based Robotic Sensors	Industrial Applications	Mobile Robot Control - 1	Software/ Simulation Techniques
W P I	14:20 - 16:00 p.m.	Learning Control - 2	Force Control	Path Planning	Robot Design - 2	Intelligent Sensing and Control for Factory Automation	Object Recognition - 1	Micro Devices	Panel Discussion - 2	Experimental Results in Robotics
W P II	16:20 - 18:00 p.m.	Adaptive Control of Manipulators	Control of Robotic Systems	Motion Planning With Uncertainty	Robotic Applications of the Spatial Operator Algebra	Routing and Scheduling in Flexible Production Systems	Object Recognition - 2	Control Architectures	Panel Discussion - 3	Experiments in Robot Control
20:00 p.m.		Conference Banquet: Regency Ball Room Banquet Speaker: Dr. Craig R. Barret, Executive Vice President Intel Corporation								
Time Rooms April 11		Regency A	Regency B	Regency C	Regency D	Regency E	Regency F	Golden State A&B	Big Sur A&B	Carmel A&B
8:00 - 8:45 a.m.		Plenary Session II in Regency B&C Professor Hirofumi Miura, What is the Intelligence of Robots								
Th A I	9:00 - 10:40 a.m.	Modeling and Control of Manipulators	Distributed Intelligent Robotic Systems	Path Planning/ Applications	Programming Environment for Computer Integrated Manufacturing	Vision for Navigation	Telerobotics - 1	Applications	Legged Locomotion	Free Space Control of Multi Links Flexible Manipulators
Th A II	11:00 a.m.- 12:40 p.m.	Adaptive Control	Optical Design and Kinematics	Kinematics	Integrated Manufacturing Systems	Sensory Feedback	Telerobotics - 2	Sensory Applications	Mobile Robot Control - 2	Modeling of Multi- Linked Flexible Manipulators
Th P I	14:20 - 16:00 p.m.	Robot Control - 2	Application of Neural Networks	Neuromorphic Control and Identification of Robots	Automatic Assembly Modeling and Implementation	Navigation	Space Manipulators	Petri Net Modeling in Manufacturing Systems	Mobile Robots	Control of Flexible Objects
Th P II	16:20 - 18:00 p.m.	Robot Control - 3	Neural Networks	Kinematic Analysis	Inspection and Automated Manufacturing	Sensor Fusion	Underwater Robotics	Diagnostics	Mobile Robot Navigation	Flexible Manipulators

## **First Plenary Speaker, Tuesday**

Prof. A. Bensoussan  
President, INRIA, France

Some Trends In Control And Automation

## **Second Plenary Speaker, Thursday**

Prof. Hirofumi Miura  
University of Tokyo, Japan

What Is The Intelligence of Robots

## **Banquet Speaker**

Dr. Craig R. Barrett  
Executive Vice President  
Intel Corp.

Automation And The Computer Revolution:  
What Will Happen To Automation With the  
Move From Mainframes and Minis To The  
Local Client/Server Form Of Computing



# ADVANCE REGISTRATION

(April 4, 1991)

	M	NM	S	Total
Conference	194	101	100	395
Conf. & Video	92	28	8	128
	<u>286 (257)</u>	<u>129 (114)</u>	<u>108 (140)</u>	<u>523 (511)</u>
Tutorial	38 (38)	30 (26)	5 (0)	73 (64)
Workshop	61 (76)	35 (51)	9 (0)	105 (127)

## **PAGE CHARGE**

1990

1991

\$250/page

\$150/page

Total Charge

?

\$28,000

Collected

\$500 (9/12/90)

\$22,000 (4/4/91)

CDC: \$100/page

In the upper corner of the first page of each paper the following is printed:

Proceedings of the 1991 IEEE  
International Conference on Robotics  
and Automation  
Sacramento, California - April 1991

# **The Anton Philips Award for**

## **Best Student Paper**

### **List of the "Finalists"**

**"Principal Base Parameters of Open and Closed Kinematics Chains" by Modjtaba Ghodoussi.**

**Session TuA I-4, Tuesday, April 9, 9:00 - 9:25.**

**Room: Regency D.**

**"Automated Sensor Planning for Robotic Vision Tasks" by Konstantinos Tarabanis.**

**Session TuA I-3, Tuesday, April 9, 10:15 - 10:40.**

**Room: Regency C.**

**"Grasp Admittance Center: A Concept and Its Implications" by K. B. Shimoga.**

**Session TuA II-2, Tuesday, April 9, 12:15 - 12:40.**

**Room: Regency B.**

**"Control of Robots with Discrete Nonlinear Model: Theory and Experimentation" by Sugato Ganguly.**

**Session TuP I-2, Tuesday, April 9, 15:10 - 15:35.**

**Room: Regency B.**

**"Vision and Control Techniques for Robotic Visual Tracking" by N. Papanikolopoulos.**

**Session TuP II-6, Tuesday, April 9, 17:35 - 18:00.**

**Room: Regency F**

**Congratulations to the students and their co-authors (Professors)!**

**The winner for the Anton Philips award for the Best Student Paper will be announced Wednesday, April 10th, at the banquet.**

The North American Philips Corporation will present a certificate to each one of the five finalists this year in addition to presenting the prize to the winner at the Banquet.

## OPERATIONAL TIME

	CDC	R&A
Paper Submission	March 1	Sept. 15
TPC Meeting	June 20 (3.5 months)	Dec. 1 (2.5 months)
Conference	Dec. 15 (6 months)	April 10 (4.5 months)
No. of Papers	1280 (800)	785
No. of TPC Members	20	47
Review of Papers	Associate Editor (Regular Papers) TPC Members (Short Papers & Invited Sessions)	TPC Members
No. of Paper Reviewed by TPC	300 Short Papers 60 Invited Sessions	700 Papers 20 Invited Sessions
Acceptance Rate	64% (higher before)	53.5%

## VIDEO PROCEEDINGS

### OVERVIEW

- May 90: Call for Videos
- Sept. 90: Contract signed with IEEE
- Oct. 90: **66 submissions**, 5 hours
- Dec. 90: **33** conditionally accepted, 1 hour
- Jan. 91: Revision by authors, **32** returned
- Feb/Mar 91: Editing and production of the Video and **Booklet** by IEEE

Canada - 2

China - 2

France - 1

Germany - 2

Italy - 1

Japan - 5

USA - 18

Yugoslavia - 1

- Apr. 91: **Error correction, marketing and sales**

# **STRUCTURE OF THE VIDEO**

**First frame:** Conference logo with General Chairperson's message narrated

**Then:** Table of Contents with montage

**Then:** Presentation of each group

A: Manipulator Design (3)

B: Sensing (3)

C: Manipulator Control (6)

D: Vehicles (5)

E: Automation (3)

F: Robotic Hands (3)

G: Tele-Robotics (2)

H: Walking Machines (6)

**Then:** credits and order information



## **GENERAL COMMENTS**

1. Contain many exciting segments, shall be a **Conference Feature**.
2. **Music** and background noise generally interfere with presentation.
3. **Flow charts** and **diagrams** cannot be seen clearly.
4. Showing **computer components** or **operators** usually does not add much value.
5. A good video should be **dynamic**, and contain information that **can not** be easily conveyed in a paper.
6. Purpose is to disseminate technical information, not for **promotion**.
7. Authors generally are **cooperative**.
8. Experience gained would be valuable for the **future**.

## **People involved**

Steve Hsia,	T. J. Tarn
Peter B. Luh	Marc H. Raibert
Oussama Khatib	Vincent Hayward
Katsuhisa Furuta	Peter Wiesner
Beth Babeu Murray	

**Conference discount price: \$55 (vs. 66)**

# ATTACHMENT F

**BUDGET**  
**1992 IEEE INTERNATIONAL**  
**ROBOTICS AND AUTOMATION**  
**May 10-15**  
**Nice, France**

## ESTIMATED INCOME

### REGISTRATION

1. Advance		
a. Members	\$ 225 x 280	63.000
b. Non-members	\$ 275 x 130	35.750
c. Students	\$ 100 x 100	10.000
2. Late		
a. Members	\$ 275 x 50	13.750
b. Non-members	\$ 310 x 20	6.200
c. Students	\$ 120 x 20	2.400

Total: \$ 131.100

## WORKSHOP

1. Advance		
a. Members	\$ 100 x 80	8.000
b. Non-members	\$ 125 x 30	3.750
2. Late (& at Conference)		
a. Members	\$ 110 x 15	1.650
b. Non-members	\$ 135 x 5	675
Total:		\$ 14.075

## TUTORIAL

1. Advance		
a. Members	\$ 100 x 80	8.000
b. Non-members	\$ 125 x 30	3.750
2. Late (& at Conference)		
a. Members	\$ 110 x 15	1.650
b. Non-members	\$ 135 x 5	675
Total:		\$ 14.075

## PROCEEDING SALES

a. At Conference & by mail	\$ 125 x 50	6.250
b. Sales back to IEEE Society	\$ 50 x 500	25.000
c. Page charge net		7.000
Total:		\$ 38.250

**SPONSORSHIPS:**

Chamber of Commerce and City of Nice	50.000
Chamber of Commerce of Turin	20.000
A.F. Show	12.500
Commission of European Communities	6.000
Industrial sponsorships	7.500
Total	\$ 96.000
Total Income	\$ 293.500

## ESTIMATED EXPENSES

### PROMOTION

a. Call for Papers	5.000
b. Advance Announcement	6.000
c. Advance Program	8.000
d. Final Program	2.000
e. Promotion in Europe	6.000

Total: \$ 27.000

### CONFERENCE PROCEEDINGS

a. Printing 1500 copies x \$ 45	58.500
b. Shipping & Handling	4.000

Total: \$ 62.500

### ADMINISTRATION

a. *	
b. Consultant (H.H.)	9.000
c. Secretarial	3.000
d. Office Material	1.500
e. Telephone & Elect. Mail	1.500
f. *	
g. Visa & Master card discount	2.500
h. Miscellaneous	1.000
i. Secretarial Europe	3.000

Total: \$ 21.500

\* Registrations and signs have been transferred to "On site expenses".

## SOCIAL

a. Reception 500 x 20\$	10.000
b. Coffee Break 4000 x 3.38\$	13.500
(including workshops and tutorials	
c. Banquet (400 x \$ 45)	18.000
d. Author's breakfast	4.725
e. Committee & Society Banquet	3.750
75 x 50 \$	

Total: \$ 49.975

## COMMITTEE

a. General Chairman	
Travel	7.000
Miscellaneous	1.000
b. Program Committee	
Travel	6.000
Plenary Speakers	4.500
Mailing/Telephone	1.500
Miscellaneous	500
Secretarial	1.500
c. All other Committee	3.000
d. Travels in Europe	
and Europe/U.S.	14.000

Total: \$ 39.000

## WORKSHOP EXPENSES

a. Workshop notes	3.000
b. Speakers honoraria	4.000
c. *	

Total: \$ 7.000

## TUTORIAL EXPENSES

a. Tutorial notes	3.000
b. Speakers honoraria	7.000
c. *	

Total: \$ 10.000

## ON SITE EXPENSES

a. Rooms Rental	26.800
b. Equipment rental	15.500
c. Exhibition expenses	14.000
d. Miscellaneous	1.500
e. Registration 650 x \$ 8	5.200
f. Signs	2.500

Total: \$ 65.500

Total expenses: \$ 282.475

Total income: 293.500

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Surplus \$ 11.025

\* Workshops and tutorials set up expenses have been included in the "on site expenses".



**Proposal for 1993 IEEE International  
Robotics & Automation Conference  
Atlanta, Georgia**

**General Chairman:** Wayne J. Book, Georgia Institute of Technology

**Program Chairman:** Johnson Luh, Clemson University

**Proposed Dates:** May 2 (Sunday) through May 8 (Saturday)

One of the prime reasons for the exact choice of dates is the American Nuclear Society Topical Meeting on Robotics and Remote Systems, that will be held on the preceding week in Oak Ridge, TN. Our choice of dates will avoid a conflict and will enhance the trip for foreign attendees. The estimated attendance at that meeting is 450, with an estimated 20% overlap with our conference. It is recommended that we attempt to accommodate attendees to both conferences through coordination, transportation and tour arrangements, and perhaps a reduced registration fee for combined attendance. The IEEE Robotics and Automation Society will be asked to participate in the ANS conference on a no risk basis as soon as the date is approved by the American Nuclear Society.

Religious Holidays (Passover and Easter) are over by April 11.

**Alternate Hotels:**

Atlanta Hilton and Towers, \$97 single or double for 1991, + maximum 6%/year

Westin Peachtree Plaza, \$97 single, \$117 double for 1993, but only if we shift the meeting to Wed., May 5 through Sunday, May 9.

**Conference Theme:** Integration of Intelligent Robotic Systems with Automated Manufacturing Systems

**Conference Budget:** (See attachment)

The budget is based on assumptions similar to those used in the 1991 Budget. A \$5 increase in registration fees is proposed. Major social events have been checked for feasibility in Atlanta in 1993. The Video Proceedings is listed in the budget with no income or expenses pending the results of the experiment in 1991. Included in administration is the traditional amounts for consultants and an amount for secretarial and local arrangements. The local arrangements will be assisted by Judith Book.

**Conference Program Schedule:** (See attachment)

**B U D G E T**  
**1993 IEEE INTERNATIONAL**  
**ROBOTICS & AUTOMATION CONFERENCE**

**INCOME**

	\$/person	No.	Extension
<b>I. Registration</b>			
<b>A. Advance</b>			
1. Members	\$230	250	\$57,500
2. Non-Members	\$280	120	\$33,600
3. Students	\$110	110	\$12,100
<b>B. Late</b>			
1. Members	\$280	75	\$21,000
2. Non-Members	\$330	45	\$14,850
3. Students	\$130	20	\$2,600
<b>TOTAL CONFERENCE REGISTRATION:</b>		<b>620</b>	<b>\$141,650</b>
<b>II. Workshop</b>			
<b>A. Advance</b>			
1. Members	\$125	90	\$11,250
2. Non-Members	\$150	30	\$4,500
<b>B. Late</b>			
1. Members	\$150	15	\$2,250
2. Non-Members	\$175	5	\$875
<b>TOTAL WORKSHOP INCOME:</b>			<b>\$18,875</b>
<b>III. Tutorial</b>			
<b>A. Advance</b>			
1. Members	\$100	90	\$9,000
2. Non-Members	\$125	30	\$3,750
<b>B. Late</b>			
1. Members	\$125	15	\$1,875
2. Non-Members	\$150	5	\$750
<b>TOTAL TUTORIAL INCOME:</b>			<b>\$15,375</b>
<b>IV. Proceedings Sales</b>			
A. At Conference and by Mail	\$125	100	\$12,500
B. OOPS Plan	\$50	500	\$25,000
C. Video Proceedings	\$55	0	\$0
D. Page Charge Net			\$12,500
<b>TOTAL PROCEEDINGS INCOME:</b>			<b>\$50,000</b>
<b>V. Exhibits Income</b>	\$750	10	\$7,500
<b>VI. Total Income:</b>			<b>\$233,400</b>

# **EXPENSES**

	Amount	Totals
I. Promotion		
A. Call for Papers	\$4,500	
B. Advance Announcement	\$6,500	
C. Advance Program	\$9,500	
D. Final Program	\$3,500	
TOTAL PROMOTION:		\$24,000
II. Conference Proceedings		
A. Printing (1300 @ \$50)	\$65,000	
B. Video Duplication	\$0	
C. Shipping & Handling	\$2,500	
TOTAL PROCEEDINGS:		\$67,500
III. Administration		
A. Registration (650 @ \$8 +\$2500)	\$6,400	
B. Consultant	\$6,000	
C. Secretarial and Local Arrangements	\$2,000	
D. Office Material	\$2,500	
E. Equipment Rental (AV & Word Processing)	\$9,000	
F. Miscellaneous Administration	\$2,500	
G. Signs	\$2,000	
H. Telephone & Electronic Mail	\$1,500	
I. VISA/Master Card Discount	\$4,000	
TOTAL ADMINISTRATION:		\$35,900
IV. Social		
A. Reception (500 at \$15)	\$7,500	
B. Coffee Breaks (includes workshop and tutorial) (3900 @ \$2.50)	\$9,750	
C. Banquet (500 @ \$35)	\$17,500	
D. Author's Breakfast (80x3 @ 17.50)	\$4,200	
TOTAL SOCIAL:		\$38,950
V. Committee		
A. General Chairman		
1. Travel	\$1,000	
2. Miscellaneous	\$2,000	
B. Program Committee		
1. Travel (including committee)	\$12,000	
2. Plenary Speakers	\$2,000	
3. Miscellaneous	\$500	
4. Secretarial	\$2,000	
5. Mailing/telephone	\$2,000	
C. All Other Committee	\$2,500	
TOTAL COMMITTEE:		\$24,000
VI. Workshop Expenses		
A. Workshop Notes	\$2,500	
B. Speaker Honoraria & Travel	\$2,400	
C. Setup Expenses	\$1,000	
TOTAL WORKSHOP EXPENSES:		\$5,900
VII. Tutorial Expenses		
A. Tutorial Notes	\$2,500	
B. Speaker Honoraria	\$6,000	
C. Setup Expenses	\$1,000	
TOTAL TUTORIAL EXPENSES:		\$9,500
VIII. Council Expenses & Banquet		\$3,750
TOTAL EXPENSES:		\$209,500
SURPLUS:		\$23,900

**Proposed Time Table for the Technical Program Committee of  
the 1993 IEEE International Conference on Robotics and Automation**

- January 1992:**
- (1) Prepare a list of names and form a tentative International Program Committee.
  - (2) Make contact with them and send them invitations.
- February 1992:**
- (1) Finalize the membership list for the International Program Committee.
  - (2) Seeking the Committee member(s) who will handle the video part of the Conference (solicitation, selection, and editing).
  - (3) Seeking the Committee member(s) who will handle the tutorials and workshops in conjunction with the Conference.
- March 1992:**
- (1) Finalize the subcommittee members for handling videos, tutorials and workshops.
  - (2) Draft a First Announcement for the 1993 IEEE International Conference on Robotics and Automation. The proposed theme for the 1993 Conference is: Integration of Intelligent Robotic Systems with Automated Manufacturing Systems.
  - (3) The proposed dead-line for submitting paper is December 1, 1992.
- April 1992:**
- (1) Finalize the First Announcement for the 1993 Conference.
  - (2) Contact Harry Hayman regarding the printing of the Announcement.
- May 1992:**
- (1) Distribute the Announcement for the 1993 Conference at the conference site of the 1992 Conference in Nice, France from May 10th to 15th, 1992.
  - (2) Ask the foreign Program Committee members to mail the Announcement in their respective country.
  - (3) Obtain mailing lists to mail the Announcement in the U.S. and abroad for those countries that are not covered as described in (2) above.

Page 2

June-November 1992:

December 1992: (1) Sending out the submitted paper to International Committee members for review.

(2) Organize a meeting for Committee members for selecting papers and video tapes.

(3) Seeking one or two persons who will solicit the vendors for their exhibitions at the conference.

(4) Decision on accepting tutorials and workshops in conjunction with 1993 conference.

(5) Notify authors on acceptance or rejection of their submissions.

(6) Draft an Advanced Program Announcement

January 1993: (1) Finalize the Advanced Program Announcement

(2) Contact Harry Hayman regarding the printing of the Advanced Program Announcement.

(3) Prepare a list of names for serving as possible Session Co-Chairpersons for the Conference.

February 1993: (1) Mailing out the Advanced Program Announcement

(2) Finalize the list for Session Co-Chairpersons for the Conference.

March 1993: (1) Prepare the Final Technical Program.

(2) Contact Harry Hayman for printing.

April 1993: (1) Finalize the exhibitors at the Conference.

(2) Mail the Final Technical Program to those who have already sent in their registrations for the Conference.

May 1993: (1) 1993 Conference

(2) Prepare a final report on the Conference.



## Memorandum

April 5, 1991

To: Norman Caplan, President  
IEEE Robotics and Automation Society

From: William A. Gruver 

Subj: 1994 International Conference on Robotics and Automation

I propose that the *1994 International Conference on Robotics and Automation* be held in San Diego, California. Following the 1992 conference in Nice and the 1993 conference in Atlanta, a west coast location in the United States would be very appropriate. San Diego easily satisfies the criteria for a host city having outstanding weather, excellent hotels and restaurants, and direct flights to many cities. San Diego would be a very popular site for the conference, drawing especially from the U.S. and Japan.

There appears to be substantial support for holding the conference on the West Coast. I would be willing to serve as the General Chairman. As qualifications for this position, I was one of the founding officers of the Robotics and Automation Society, the program chairman for the 1984 ASME International Computers in Engineering Conference and Exposition, and served on many IEEE international program committees. I have extensive program management experience from my work in industry and through my current position at the University of Kentucky. John Luh would be an excellent person to work with me to plan the technical program and to help us develop a theme. I would work with him and other members of the ADCOM to select a local arrangements chairperson and a treasurer. After receiving approval of the location, I will prepare a full proposal to be submitted for final approval.

# ATTACHMENT I

## IEEE Robotics and Automation Society Publication Committee Report

April 8, 1991

Robert B. Kelley, Chairman

### Transactions

Russ Taylor, Transactions Editor, has been directing the operation of the Transactions. I am not aware of any issues which might warrant external intervention.

Russ will submit his own report on the operation of the Transactions.

### Newsletter

Mike Leahy, Newsletter Editor, has the operation of the Newsletter well in hand. The transition which took place a year ago appears to have been accomplished seamlessly. Mike has maintained a close liaison with Roz Snyder, the Managing Editor, via e-mail and has keep me informed as well.

Mike will submit his own report on the operation of the Newsletter.

### Other Publications

*Transactions on Micro Electro Mechanical Systems* — There seems to be no publications related problems with the establishment of the proposed journal. Approval by the AdCom will necessitate the appointment of three R&A Society delegates to the IEEE Steering Committee.

*Video Publications* — The experience of producing and publishing the video proceedings for this conference should provide a good basis to consider the more general question of repeating this experiment. Given the expertise of the present Video Committee, the viability of this activity could be assured by continuing their involvement in future endeavors. The larger possibility of publishing edited collections of contemporaneous (and historical) robotic achievements could also be considered.

*Conference Proceedings* — These reflect the individual conference and have not been subject to any external intervention. With the advent of having international meetings, perhaps a standard such as that of the IEEE Press might be adopted in this regard.



## R&A Newsletter

### Actual Costs

	Summer 90	Fall 90	Winter 91
Printing and prep.	\$2,888	\$3,004	\$3,593
Production	\$3,720	\$2,531	\$3,771
Domestic postage	\$705	\$991	\$1,040
Foreign Postage	\$1,831	\$1,432	\$2,594



**Ad Revenue**

Summer 1990	\$400
Fall 1990	\$400
Winter 1991	\$475
Solicitation sent to 1990 Conference Exhibitors	
Spring 1991	\$1092



**Estimate for 91-82 (per issue)**

	24 pages	32 pages
Printing and prep.	\$3,700	\$4,440
Production	\$3,820	\$5,110
Domestic postage	\$1,040	\$1,248
Foreign Postage	\$2,700	\$3,200



### Use of color

Annual cost estimate	B/W color	Spot color throughout
24 pages	\$45,040	\$48,000
32 pages	\$55,992	\$60,000

**Travel costs**

	air	lodging	perdiem	total
IEEE editor's Workshop	1,270	110	50	\$1,430
1992 conf.	3,000	800	400	\$4,200



**Other costs:**

Scanner and OCR SW  
(Fig and text input)

\$5000

## Newsletter Budget

Printing & Mailing	\$17,760
Production (inc. e-mail calendar)	20,440
Domestic Postage	4,422
Foreign Postage	12,800
Spot color	3,000
Travel (Ed. & Mg. Ed)	5,630
Scanner	5,000
 TOTAL	 \$69,052

# ATTACHMENT K

## INTRODUCTION

The IEEE Electron Devices Society (EDS) and the IEEE Robotics and Automation Society (RAS) shall be the IEEE co-sponsors for the *Transactions on Micro Electro Mechanical Systems* which is a joint publication of IEEE and ASME, hereafter the Journal. The copyright is held by the IEEE. The relationship between IEEE and ASME regarding this Journal is described in the "Agreement for the Publication and Marketing of the *Transactions on Micro Electro Mechanical Systems* between IEEE and ASME".

## STEERING COMMITTEE

An IEEE Steering Committee (hereafter called the Steering Committee) shall act as Trustee for the IEEE, with administrative responsibility for the interests of the sponsoring Societies. The membership of the Steering Committee shall consist of six members, three delegates from each of the above-stated IEEE sponsoring Societies. Delegates shall serve staggered two year terms and will be appointed by their respective societies. Each delegate shall have one vote on matters before the Steering Committee. The Steering Committee shall meet a minimum of two times a year. All actions of the Committee shall be by a two-thirds vote of the full voting Committee.

The Steering Committee shall biannually elect a Chairman from among its current membership. The Chairman shall serve as the focus for Committee communications and shall direct its operational matters. On a biannual basis, the Committee shall also elect from its members a Secretary and a Treasurer. In addition to the usual duties regarding minutes, reports, records, etc., the Secretary shall serve as Chairman pro tem in the absence of the Chairman.

It will be the responsibility of the Steering Committee to recommend three members of the Committee to be the IEEE representatives on the IEEE/ASME Coordinating Committee. All recommendations for representatives must be approved by both sponsoring Societies (EDS and RAS).

## AVAILABILITY AND PRICING

The Journal will be available to members of the sponsoring Societies (EDS and RAS), to IEEE members who are members of at least one IEEE Society and to non-members. For the first year of the publication (1992), the Electron Devices Society will include a subscription to the Journal as part of its membership fee.

The subscription price to members of the sponsoring Societies will be set independently by each Society. The price to IEEE members who are members of at least one IEEE Society shall be determined by the Steering Committee in accordance with IEEE guidelines. The non-member subscription price shall be set in accordance with established IEEE practices.

## FINANCES

The joint IEEE/ASME agreement specifies IEEE's financial obligation to the Journal. The IEEE Journal sponsoring Societies (EDS and RAS) will each be responsible for a portion of the IEEE commitment in proportion to the number of member subscribers from each sponsoring Society. Income derived from IEEE member subscriptions of non-sponsoring Societies and income derived from non-member subscriptions will be credited as income to the IEEE Steering Committee's account.

The IEEE/ASME Coordinating Committee shall be responsible to obtain all necessary budgetary approvals from the sponsoring Societies and to submit the overall IEEE/ASME joint publication plans annually to IEEE in accordance with IEEE's budget development cycle.

## AMENDMENTS

Changes in the procedures specified in this letter will, as required, be enacted by amendments which require the unanimous approval of the sponsoring Societies.

## IMPLEMENTATION

This agreement shall be approved by the Presidents of the sponsoring Societies on behalf of their respective Administrative Committees. Should either choose not to participate in this agreement, it is understood that their allocated positions on the Steering Committee and their participation in sponsorship or funding of this publication shall be voided. Intent to withdraw from this agreement after ratification must be submitted in writing no less than 12 months prior to January 1st of the intended year of withdrawal. This letter, when signed by the Society Presidents, signifies approval by their respective Administrative Committees. The original of this letter and of letters of transmittal indicating sponsorship agreement from the respective IEEE Societies shall be filed with the Technical Activities Headquarters Office.

ELECTRON DEVICES SOCIETY - As President of the Society my signature signifies approval of the agreement by my Administrative Committee.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

ROBOTICS AND AUTOMATION SOCIETY - As President of the Society my signature signifies approval of the agreement by my Administrative Committee.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_



## IX. IEEE/ASME JOINT THREE YEAR BUDGET FOR TRANSACTIONS ON MICRO ELECTRO MECHANICAL SYSTEMS (MEMS)

MEMS to be jointly sponsored by IEEE (Electron Devices & Robotics and Automation Societies) and ASME, with ED providing the Journal free to all its members for one year (1992).

### A. GENERAL

	<u>1992</u>	<u>1993</u>	<u>1994</u>
• Issues Per Year	4	4	6
• Number of Editorial Pages	320	320	480
• IEEE/ASME Non-Member Price	\$100	\$100	\$120
• IEEE Member Price			
- EDS	N/A	\$7	\$11
- RAS	\$5	\$7	\$11
- Society Member Price (Non-sponsoring)	\$10	\$12	\$16
• ASME Member Price	TBD	TBD	TBD

### B. PRINT QUANTITY (Per Issue)

• EDS Members	11,200	1,200	1,350
• RAS Members	700	700	800
• IEEE Society Members (Non-sponsoring)	100	100	100
• IEEE Non-Members	100	100	100
• ASME Members	300	300	400
• ASME Non-Members	100	100	100
• All Periodicals Package (APP)	950	950	950
• IEEE Publishing Services	25	25	25
• IEEE & ASME Complimentaries	100	100	100
• Back Issues, Replacements, Single Sales	100	100	100
<b>Total Print Quantity</b>	<u>13,675</u>	<u>3,675</u>	<u>4,025</u>

### C. INCOME

• All Periodicals Package (APP) - 50%	[I-1]	\$20,500	\$20,500	\$25,750
• Voluntary Page Charge (VPC)	[I-2]	17,600	17,600	26,400
• Single Copy Sales	[I-3]	1,000	1,000	1,000
• Microfilm	[I-4]	1,000	1,000	1,000
• Member Air Freight	[I-5]	Minimal	Minimal	Minimal
<b>Total Income</b>		<u>\$40,100</u>	<u>\$40,100</u>	<u>\$54,150</u>

Note 1: Only included in income are items for which the Joint IEEE/ASME Coordinating Committee will be the recipient.

Note 2: Not included in 1992 income is the \$15,000 loan (\$5,000 from each sponsor) that will be provided to the Joint IEEE/ASME Coordinating Committee in mid 1991.

\* Attached is a separate Income and Expense Formula and Calculation Table for the determination of each item for each year (1992-1994).

**DRAFT**

April, 1991

## D. EXPENSES

### Production, Distribution & Handling

		<u>1992</u>	<u>1993</u>	<u>1994</u>
• Composition, Printing and Distribution				
- Composition	[E-1]	\$19,520	\$19,520	\$29,280
- Press Prep./Run Time	[E-2]	8,103	5,103	7,181
- Binding/Mail Prep.	[E-3]	8,000	4,800	7,200
- Paper	[E-4]	16,410	4,410	7,245
- Labels	[E-5]	2,493	653	1,076
- Postage	[E-6]	29,673	7,773	12,816
• Indexing	[E-7]	1,560	1,560	2,080
• Voluntary Page Charge (VPC)	[E-8]	3,200	3,200	4,800
• IEEE Editorial Costs	[E-9]	13,440	13,440	20,160
• Publication Administration	[E-10]	3,800	3,800	5,700
• Non-Member Subscription Handling	[E-11]	8,768	8,768	8,768
• Joint Committee Editorial Fees/Expenses	[E-12]	10,000	10,000	12,000
• Microfiche	[E-13]	156	156	234
Total Production, Distribution & Handling		<u>\$125,123</u>	<u>\$83,183</u>	<u>\$118,540</u>

### Staff Administration

• IEEE Administration	[E-14]	\$3,870	\$3,870	\$4,513
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### Non-Periodical

• Back Issues and Replacements (Processing charges and postage)	[E-15]	\$2,000	\$2,000	\$2,800
• Warehousing and Inventory	[E-16]	1,000	1,000	1,400
Total Non-Periodical		<u>\$3,000</u>	<u>\$3,000</u>	<u>\$4,200</u>

### Committee Activity - External Costs

• Publication Promotion	[E-17]	\$2,000	\$2,000	\$2,000
Total Expenses		<u>\$133,993</u>	<u>\$92,053</u>	<u>\$129,253</u>

Note: Not included in 1992 and 1993 expenses is the repayment by the Joint IEEE/ASME Coordinating Committee of the \$15,000 loan (\$5,000 from each sponsor) that will be received in mid 1991.

\* Attached is a separate Income and Expense Formula and Calculation Table for the determination of each item for each year (1992-1994).

**E. SUMMARY**

	<u>1992</u>	<u>1993</u>	<u>1994</u>
• Total Income	\$ 40,100	\$40,100	\$54,150
• Total Expenses	133,993	92,053	129,253
Net (Deficit)	<u><u>\$(93,893)</u></u>	<u><u>\$(51,953)</u></u>	<u><u>\$(75,103)</u></u>

**F. SUBSCRIPTION PURCHASE AGREEMENT ANALYSIS**

		*			
• Purchase Price Per Sub. to IEEE and ASME	[P-1]	\$7.52	\$20.79	\$26.36	
• Cost to IEEE for Member & Non-Member Subs.	[P-2]	90,992	43,659	61,946	
• Cost to ASME for Member & Non-Member Subs.	[P-3]	3,008	8,316	13,180	
Income To Be Received from IEEE	[P-4]	<u><u>\$94,000</u></u>	<u><u>\$51,975</u></u>	<u><u>\$75,126</u></u>	
& ASME for Purchased Subscriptions					

\* Attached is a separate Income and Expense Formula and Calculation Table for the determination of each item for each year (1992-1994).

## X. IEEE THREE YEAR BUDGET FOR TRANSACTIONS ON MICRO ELECTRO MECHANICAL SYSTEMS (MEMS)

MEMS to be jointly sponsored by IEEE (Electron Devices & Robotics and Automation Societies) and ASME, with EDS providing the Journal free to all its members for one year (1992).

### A. GENERAL

	<u>1992</u>	<u>1993</u>	<u>1994</u>
• Issues Per Year	4	4	6
• Number of Editorial Pages	320	320	480
• IEEE Non-Member Price	\$100	\$100	\$120
• EDS Member Price	N/A	\$7	\$11
• RAS Member Price	\$5	\$7	\$11
• IEEE Society Member Price (Non-sponsoring)	\$10	\$12	\$16

### B. SUBSCRIPTIONS TO BE PURCHASED BY IEEE

• IEEE Non-Members	100	100	100
• EDS Members	11,200	1,200	1,350
• RAS Members	700	700	800
• IEEE Society Members (Non-sponsoring)	100	100	100
<b>Total Subs. to Be Purchased By IEEE</b>	<u>12,100</u>	<u>2,100</u>	<u>2,350</u>

### C. INCOME

	*			
• All Periodicals Package (APP) - 50%	[I-1]	\$20,500	\$20,500	\$25,750
• Non-Member Subscriptions	[I-2]	10,000	10,000	12,000
• Non-Member Air Freight	[I-3]	Minimal	Minimal	Minimal
• IEEE Society Members (Non-sponsoring)	[I-4]	1,000	1,200	1,600
<b>Total Income</b>		<u>\$31,500</u>	<u>\$31,700</u>	<u>\$39,350</u>

Note: Only included in income are items for which the IEEE Steering Committee will be the recipient.

### D. EXPENSES

• Cost to IEEE for Member and Non-Member Subs.	[E-1]	\$90,992	\$43,659	\$61,946
<b>Total Expenses</b>		<u>\$90,992</u>	<u>\$43,659</u>	<u>\$61,946</u>

\* Attached is a separate Income and Expense Formula and Calculation Table for the determination of each item for each year (1992-1994).

**DRAFT**

April, 1991

## E. SUMMARY

• Total Income	\$31,500	\$31,700	\$39,350
• Total Expenses	90,992	43,659	61,946
Net (Deficit)	<u>\$(59,492)</u>	<u>\$(11,959)</u>	<u>\$(22,596)</u>

## F. SUBSCRIPTION PURCHASE AGREEMENT ANALYSIS

• Purchase Price Per Sub. to EDS and RAS	[P-1]	\$5.00	\$6.30	\$10.51
• Cost to EDS for Member Subs.	[P-2]	56,000	7,560	14,189
• Cost to RAS for Member Subs.	[P-3]	3,500	4,410	8,408
Income To Be Received From EDS & RAS For Purchased Subscriptions		<u>\$59,500</u>	<u>\$11,970</u>	<u>\$22,597</u>

\* Attached is a separate Income and Expense Formula and Calculation Table for the determination of each item for each year (1992-1994).

## IEEE Robotics and Automation Society

### Standards Committee Report

April 8, 1991

prepared by Leonard S. Haynes, Ph.D.  
Chairman, Standards Committee

**The most important standardization efforts now underway are:**

Real-time POSIX	JTC 1 / SC 22 / WG 15 N679
Digital Data Link for Motion Control	IEC / TC44

This work was originally named SERCOS (Serial Communication System), and was primarily developed by the Germans. It is a synchronous optical fiber link which interfaces motors to controllers.

Manufacturing Message Service Companion Standard for Programmable Logic Controllers	IEC / SC65A
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A draft document has just been released. If adopted, this standard would be the Application Layer of the OSI reference model for Programmable Logic Controllers.

Manufacturing Message Service Companion Standard for Robots	IEC / SC65A
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The U.S. contribution to this work was originally done by the RIA R15.04 committee and was then submitted as a U.S. contribution to ISO. It is now ISO/DIS/9506/3. It is, in effect, the Application Layer of the OSI reference model for Robots.

Intermediate Code for Robots	TC184 / SC2
------------------------------	-------------

This work has been ongoing for years and still does not appear to be nearing completion.

PDES / STEP Produce Data Exchange Specifications	ISO/TC 184/SC 4
--	-----------------

PDES/STEP is a very large program to standardize on the product data necessary to manufacture and re-manufacture a wide range of product types.

Static and Dynamic Robot Performance Measures	RIA R15.05
---	------------

"Evaluation of Point-to-point and Static Performance Characteristics of Industrial Robots and Robot Systems" was published by ANSI in May 1990. The objective of this standard was to provide customers with the ability to compare and evaluate the static performance of robots from different vendors. The international version of this standard is ISO/9283, "Standard Manipulating Industrial Robots, Performance Criteria and Related Test Methods." R15.05 is also working on a dynamic performance standard which is scheduled for release to canvasees on the third quarter of 1991.

**Computer Integrated Manufacturing Open System Architecture (CIMOSA)  
CEN/CENELEC WG-ARC Working Group**

**This work may also be picked up by ISO.**

**Next Generation Controller**

**AF project**

**The NGC program is primarily focused on machine tool standards but they also hope to develop standards for robots. This work is being done independent of ANSI and ISO with the hope that at some future date, ANSI/ISO will adopt standards developed by NGC. To date they have not produced any material which is in review by any formal ANSI or ISO committee.**

**"Industrial Robots and Robot Systems - Common Identification Methods for Signal and Power Carrying Conductors"**  
**ANSI/RIA R15.01-1-1990**

**This standard was published by ANSI on November 16, 1990.**

**"Human Engineering Design Criteria for Robot Control Pendants"**  
**ANSI/RIA R15.02-1-1990**

**Received ANSI approval on December 28, 1990.**

**"Circular Mechanical Flange Interface,"**  
**and "Shaft Mechanical Interface"**  
**ANSI/RIA R15.03-1-1990**  
**ANSI/RIA R15.03-2-1990**

**Both these draft standards have been through one cycle of review and should be re-submitted in the second quarter of 1991.**

**"Draft Technical Report on Industrial Robots - Simulation/Offline Programming - Terms and Notations for Characterizing Industrial Robots."**  
**RIA R15.07 work item**

**Technical Report is available as of March 1991.**

**"NASREM"**

**NASA and NIST**

**NASA/NIST Standard Reference Model for Robot Control System Architecture. This effort hopes, among other contributions, to develop standards related to interfaces between hierarchical control levels, sensors, and a world model. To date, no specific draft documents have been submitted to any ANSI or ISO committees.**