June 2009 www.ieee.org/lmc

# | HEEE life members | newsletter



#### contents

Editorial	1
Grants Awarded	2
Panama Canal Tour	2
Global History Network	3
Affinity Groups	3
Planned Giving Donor Recognition	4
Humanitarian Tech Fund	4
LMF Donor List	5
Tales from the Vault 10	-11
Our Mailing List	12
Submitting Articles	12
Stopping IEEE Services	12
IEEE Member Services	12
LMC Roster	12
Qualifying for LM status	12
Have Questions	12



**Celebrating 125 Years** of Engineering the Future

## A Voice for 26,000 Life Members

Luis T. Gandia, Chair, IEEE Life Members Committee

Life-members@ieee.org

As I was thinking about a suitable greeting for this article, I found this quote by Winston Churchill: "We make a living by what we get, but we make a life by what we give."

There are over 26,000 Life Members (LMs), and I believe we have been very fortunate to make a living by developing the technologies that have improved lives throughout the world. I feel that the public may have underappreciated our efforts, which is why I'm glad that the IEEE has launched a public visibility initiative. The goal of this initiative is to increase the visibility of the IEEE and promote public understanding of how engineering, computing, and technology benefit humanity.

I would encourage you to view the "IEEE: One Voice" video, which was made as part of the larger IEEE Public Visibility Initiative. This video aims to make those in the technology community proud to be part of the IEEE and to encourage those who are not affiliated with the IEEE to feel good about the contributions of technology to society. The video is available on the IEEE Web site, at http://www.ieee.org/go/brand videos.

Daytona Section—Small Radio Telescope. In keeping with the theme of the quote by Winston Churchill, I would like to comment on the efforts of the IEEE Daytona Section LM Affinity Group. In February 2009, the Life Members Committee (LMC) members and Regional Life Members Coordinators visited the Daytona Section in Daytona, Florida, USA. We had the pleasure of meeting with the volunteers who are giving back to the community by constructing a small radio telescope (SRT) with funds donated by the IEEE Life Members Fund (LMF). The telescope has been constructed and will be placed in the Museum of Arts & Sciences in Daytona Beach. It is expected that approximately 8,000 students

and 12,000 adults will view the telescope as part of the museum's planetarium program. Once operational, the SRT will be used to conduct radio astronomy experiments and as a teaching tool for students and adults in the Daytona area. I congratulate the Daytona Section LM Affinity Group for their hard work and hope that their efforts will be an example for other LM affinity groups.

Grants Awards by the IEEE LMC. We are very fortunate that IEEE LMs continue to contribute to the IEEE LMF. Thank you for your continued support. The LMF/LMC grant proposal submission process has been consolidated with the IEEE Foundation process. This ensures that more proposals of a greater variety are submitted to the LMC for consideration. During our February meeting, the LMC approved five grant requests, totaling over US\$42,000. Please see the article on page 2 for more information.

LM Technology Travel/Tours. The LMC feels that IEEE LMs would be interested in participating in an IEEE-sponsored travel program. Each tour will focus on an IEEE historical milestone or similar attraction of interest to IEEE LMs. We are currently working on a Panama Canal tour. I would like to thank Ted Bickart, LMC member, for his efforts in organizing and developing this program. Please see his article on page 2 for more information.

LM Affinity Groups. The LMC has an ongoing effort to establish LM affinity groups to encourage LMs to take an active part in local IEEE Sections. A total of 57 groups have been formed. I would like to specifically congratulate the following Sections for forming an LM affinity group in 2009:

Region 1 – New Hampshire Section

Region 3 – Orlando Section

Region 6 – Los Alamos/Northern New Mexico Section.

## Life Members Committee Grants Awarded

The Life Members Committee (LMC) is pleased to announce its support for the programs in the following areas of interest:

#### **Students or Young Professionals**

- **IEEE/EESTEC Robotics Workshop:** The LMC agreed to provide US\$4,523 to support a robotics workshop organized by IEEE Student Branches and ESTEC (Electrical Engineering Students' European Association).
- **IEEE Student Branch iPhone GPS Robot:** The LMC agreed to provide US\$4,000 to the Wentworth Institute of Technology Student Branch to develop a robot that has capabilities that could be extended for security, investigation, and protection purposes. The robot will be controlled by an iPhone's accelerometer.

#### History

• Improved Historical Record of the Magnetron: The LMC agreed to provide US\$12,000 to support a two-day international conference on the evolution of the ed by the IEEE LMF.

Magnetron, to be held in April 2010. The goals of the conference include the creation of an up-to-date archival historical record of the Magnetron's origins and subsequent developments. The funding provided by the Life Members Fund (LMF) will support speaker invitations and student attendance.

#### **IEEE Life Members**

• *Eartbzine* – **IEEE Voice of Sustainability:** The LMC agreed to provide US\$22,100 to support *Eartbzine*, an Internet-based IEEE Webzine focused on the societal benefits of Earth information. *Eartbzine* is directed at, and benefits, the general public by informing on engineering contributions to society in a practical, day-to-day way. This proposal is to develop a sustainable funding model for *Eartbzine* through expanding *Eartbzine* readership.

Future editions of the *IEEE Life Members Newsletter* will include updates/progress reports on the projects supported by the IEEE LMF.

## **IEEE Technical Tour to Cruise Panama Canal in 2010**

The IEEE History Center's Milestones celebrate technological breakthroughs or turning points around which the Life Member Committee (LMC) intends to organize a number of technology themed tours. These IEEE Technical Tours could complement some of the video technical tours that have been developed for www.ieee.tv. The first of the LMC's IEEE Tech Tours will be of the Panama Canal in the middle of February 2010. The Milestone, in this instance, is of the Panama Canal Electrical and Control Installations of 1914. The dedication was held on 4 April 2003 under the auspices of the Panama Section. The lead paragraph from the commentary on the award, copied from the IEEE History Center Web site, is provided in the sidebar.

The tour will start with a partial (or, possibly, complete) transit of the canal from the Pacific toward (or to) the Atlantic, returning by bus. The next day will be dedicated to a special technology-oriented tour and presentation at the Panama Canal Visitors Center adjacent to the Miraflores Locks and to the power and control facilities for these locks that were the basis for the IEEE's designation of the Panama Canal as a History Milestone.

During the second day, the participants will view a presentation at the CATHALAC research, learning, and technology transfer center to learn about its efforts with respect to water resources in Latin America and the Caribbean. CATHALAC seeks to benefit the establishment of sustainable agriculture, preservation of natural habitats, and preparation for natural, often catastrophic, events. (To learn more about this organization committed to science, education, and policy for people, see www.cathalac.org.)

The third day will be spent touring the three cities now enveloped by Panama City—Old Panama from the days of the conquistadores (1500s), Casco Viejo from the days of the pirates who destroyed Old Panama (1800s), and the new and cosmopolitan City of Panama. This tour will include stops at museums and historic buildings, such as the Panama Canal Museum and the National Theater, and at traditional markets, including produce, arts and crafts, and

The Panama Canal project included one of the largest and most important electrical installations in the world, early in the 20th century. The use of 1,022 electric motors with an installed capacity of 28,290 horsepower largely replaced the commonly used steam and water powered equipment. Reliability and safety were also engineered into the innovative electrical control system, enabling remote lock operation from a central location.

souvenirs. Lunch will be enjoyed in a typical Panamanian restaurant and dinner will be held at another restaurant featuring local cuisine and culture.

Days four through six are currently in the planning stage and will likely include a boat trip into the tropical rain forest to the native Embera Indian Village to experience their culture. En route to or from this excursion will be a stop at the botanical gardens and the zoo.

The fifth day will include a choice of activities such as visits to galleries, museums, historic sites, and shopping. Later, an evening at a traditional restaurant with entertainment will be organized.

The morning into early afternoon of the sixth day is comprised of an excursion into the rain forest by canoe or may be spent on a Gatun Lake island. Sometime in midafternoon, the group will arrive at the Gamboa Rainforest Resort for an Aerial Tram ride over the rainforest and/or a climb into the rainforest canopy.

Stay alert for the announcement of the tour. As you might imagine, the size of the tour group will be limited by the size of the group that the Panama Canal Authority can accommodate at their facilities. So, make a reservation early to experience the history of the Panama Canal and the life of Panama. If you have any questions or comments on the proposed LM Technical Tour program, please e-mail LM-Tours@ieee.org.

## **Expanding the Global History Network**

The History Committee, the IEEE History Center staff has developed the IEEE Global History Network (GHN). The GHN provides the premier global network of the history of IEEE-related technologies, professions, and industries and supports the mission of the IEEE's historical activities to enhance the preservation, research, and dissemination of information about the history of electrical and informational sciences and technologies.

The GHN continues to integrate existing IEEE history resources with the capabilities of the Web for collab-

oration. A wiki-based environment enables individuals to share their experiences in "fostering technological innovation and excellence for the benefit of humanity." There are four major capabilities for IEEE Members to participate in the GHN:

- share their experiences as an individual
- share their experiences as a member of a group in a corporation or organization (including IEEE organizational units)
- share information about a particular technological innovation, products, or service

- Inder the guidance of the IEEE oration. A wiki-based environment on the GHN History Committee, the IEEE enables individuals to share their entries provided by others
  - store and share other historical resources, e.g., archival material from IEEE's organizational units, corporate R&D labs, and design units.

The wiki functionality allows members to find value and enjoyment in participating, while the resulting content increases the public's awareness and understanding of the role of engineering and technology, and of the IEEE, in the improvement of the quality of life for people throughout the world.

## Congratulations to the Outstanding Life Member Affinity Groups

The IEEE Life Members-Committee (LMC) is pleased to announce the inaugural list of Outstanding Life Member (LM) Affinity Groups. The Outstanding LM Affinity Groups were identified based on the number of LM events held, the average attendance at those events, and the number of contributors to the IEEE Life Members Fund (LMF) in 2008

As a total, the groups noted below conducted 76 events, with more than 630 participants and members within their Sections contributing more than US\$28,500.

Region	Section	Chair of LM Group
1	Boston	Edward Altshuler
1	New York	E. Elvove
4	Cedar Rapids	M.F. Wilson
5	Dallas	B.T. Vincent
5	New Orleans	J.F. Malm
5	Oklahoma City	Joe Watson
6	Buenaventura	Jerry E Knotts
7	Kingston	Vilayil John
8	United Kingdom and the Republic of Ireland	Roland J. Saam
9	Chile	Agustin Leon
9	Colombia	Alfonso Perez-Gama
9	Puerto Rico and the Caribbean	F.L. Perez-Bracetti
9	South Brazil	Jose Roberto Lacerda
10	Bombay	Pravin B. Parikh

The LMC believes that keeping LMs *active* and *engaged* is a key component to the success of the IEEE in local IEEE activities. This engagement can be conducted through the local Section and/or Technical Chapter but the LMC believes that it having a local LM Affinity Group is a more effective method in keeping LMs active.

If your Section doesn't have an LM Affinity Group, you are encouraged to discuss the formation of a group with your Section leadership. In 2008, IEEE LM Affinity Groups conducted over 150 events, which included more than 4,000 participants.

Future issues of the *IEEE Life Members Newsletter* will highlight specific activities of Outstanding LM Affinity Groups. The IEEE LMC would like to congratulate each Outstanding LM Affinity Group for its efforts.

## **IEEE Foundation Renames Planned Giving Donor Recognition Group**

their lifetime.

to announce that, effective in and Gertrude Goldsmith in recogni- vision seeded the IEEE Foundation's 2009, the Goldsmith League tion of their extraordinary commitability to support the IEEE's mission. will now be known as the IEEE ment to the IEEE. During his lifetime, Goldsmith Legacy League. The planned Alfred N. Goldsmith made a signifi- the IEEE Goldsmith Legacy League giving donor recognition group was cant personal commitment to further- will receive the IEEE Foundation renamed to make it more prominent ing the goals of the engineering Focus newsletter and are recognized and better affiliate the group to the profession. He was one of the found- annually in the Honor Roll of Donors. IEEE. Members of the IEEE Goldsmith ers of the Institute of Radio Engineers Going forward, the benefits offered Legacy League are forever generous. (IRE), a predecessor society of the to this special group have been They build for tomorrow by leaving IEEE, editor of the Proceedings of the expanded to include a keepsake legacy gifts to benefit future genera- IRE for 42 years, and a member of the coin, certificate of membership, invitions of engineers. Many members of IRE board for 51 years. He perpetuatthe League have included a bequest ed his commitment to the profession Honors Ceremony, recognition on in their wills or trust documents. Some after his death by providing a signifi- the "Wall of Fame," and eligibility to have named the IEEE Foundation cant bequest to the IEEE Foundation receive personal estate and tax planas beneficiary of a life insurance polithrough his estate. Gertrude honored ning information. To join or learn cy, retirement plan, or charitable her husband's legacy in the engineer- how you can make a planned gift, remainder trust. Others have made ing community by leaving a generous contact the IEEE Development Office outright gifts from their IRA during portion of her estate to the IEEE at +1 732 562 3860, or by e-mail at Foundation. Together, Alfred N. and donate@ieee.org.

The League is named for Alfred N. Gertrude Goldsmith's philanthropic

As was in the past, members of tation to attend the annual IEEE

## **IEEE Foundation Announces New Humanitarian Technology Fund**

engineers to make a difference to organizations. people all over the world, especially in developing areas.

power, and communication, the IEEE has an opportunity to serve people and improve their quality of life.

the Humanitarian Technology Fund logical solutions to problems includ-

lished a new fund that will pro- and communication. Grants may be part of IEEE's mission." vide unique opportunities for awarded to IEEE units or outside

the transfer of technology to those said Vig. "We hope the Humanitarian The Humanitarian Technology Fund who need it, and it has attracted the Technology Fund will inspire was created to support the develop- support of the IEEE president and ment and application of innovative uses two IEEE past presidents. The 1984 of technology for humanitarian causes IEEE President and current IEEE innovative technologies that will and to support the IEEE's activities in Foundation President Richard (Dick) working to benefit humanity. In regions J. Gowen seeded the fund along with of the world where technology is sparse John R. Vig, IEEE president, and and the need is not for high technology Lewis M. Terman, IEEE past president. but for basic needs like clean water. Staff members have also contributed to the fund.

"This fund will give IEEE members the opportunity to receive funding to ute to the fund, visit ieeefoundation. Through the awarding of grants, bring together industry and the needs of the developing world," said supports projects that provide techno- Gowen. "I was a proponent for the project grants awarded by the IEEE establishment of this fund recognizing Foundation that use technology to ing health services, disaster relief, that IEEE has a significant opportunity microfinancing, interactions with gov- to assist and bring necessary technol- You may direct your questions to ernment, disaster relief, economic ogy to people in developing areas donate@ieee.org.

The IEEE Foundation has estab- development, clean water, energy, and improve their existence, which is

"I am honored to be a founding contributor to this fund in celebra-This fund is important in aiding in tion of the IEEE 125th anniversary," individuals and organizations to contribute to the fund and to develop benefit humanity, globally."

Reflecting the IEEE mission to foster technological innovation and excellence for the benefit of humanity, the Humanitarian Technology Fund is accepting donations for this purpose. To learn more or to contriborg. Contributions to this fund will be dedicated to supporting humanitarian improve the quality of human life.

## A Voice for 26,000 Life Members

continued from page 1

does not have an LM affinity group, I encourage you to take the steps to form one. Please visit the LMC Web page (http://www.ieee.org/lmc) for a complete list of LM affinity groups and for information on forming an affinity group ship in a Society for five or more years, you are eligible to in your local area.

meeting in February, the LMC discussed, but did not make the basic society dues. any recommendation regarding, the change in the IEEE policy stating, "if you are an IEEE Life Member, you are to Norman Vincent Peale: "Live your life and forget your not eligible to receive the discount associated with the age." I wish you good health and happiness.

We have 115 sections with over 50 LMs. If your Section 'retired' category." This policy includes Society dues and subscriptions to IEEE Society magazines and journals not covered under the basic Society dues or IEEE-Standards Association dues. As an LM, once you maintain membermaintain this membership without payment, but no dis-LM Category and Retired Status. During the LMC count will be offered on subscriptions not covered under

I would like to close this article with a quote attributed

## 2008 IEEE Life Members Fund Donor Roll of Honor

he IEEE Life Members Committee acknowledges pursue a career in engineering, investigate the history of Lerously contributed and designated their 2008 IEEE Life Members or similarly mature members. calendar year donation to the IEEE Life Members **Fund.** We are fortunate to receive support from so many to ensure the accuracy of the listings in this report that we, unfortunately, cannot list them all. Each and every gift provides the resources the IEEE Life Members Committee needs to support philanthropic activities that email to donate@ieee.org or contact us by telephone at encourage students and young electrical engineers to +1 732 562 5550.

those IEEE members and other friends who gen- electrical engineering, and represent the interests of

The IEEE Development Office makes every effort including proper acknowledgement of gifts and correct spelling. Please notify us of any errors by sending an

Associate (US\$2,500 to US\$4,999) Paul Baran LF

#### Sponsor (US\$1,000 to US\$2,499)

Charles A. Eldon, LF Penelope Foley GE Foundation, Corporation Theodore S. Saad, LF

#### Gold Advocate (US\$500 to US\$749)

Anonymous (1), LSM Wallace E. Basco, LM Richard D. Gitlin, LF Yeichi Havashi, LM Choong-Ki Kim, LF Richard W. Landon, LM Howard E. Nichols, LM Lorenzo L. Wong, LSM

#### Silver Advocate (US\$250 to US\$499)

Jordan J. Baruch, LF Roger S. Boyd, LM David Brooks, LM Ray F. Campbell, LM V.R. Canino, PE, LM Michael W. Cresswell, Ph.D., LF Bliss L. Diamond, LM Kenneth P. Dixon. LM Steve O. Dixon, LM \*Luis Gandia, LSM Philip W. Gorman, Jr., LM Richard W. Grow, LF James J. Hagner, LSM

Dr. James S. Harris, Jr., LF C.D. Herman I.M. James V. Hirsch, LM Kazuo Horiuchi, LF Marko Jagodic, LM Hisashi Kaneko, LF Yuri Khersonsky, LSM George D. Kraft, LM Jaan A. Loger, LSM Bernard T. Marren, LM Alex McCulloch Joe L. Mumma, LSM I. Muroga, LM Allan D. Packler, LM Harry E. Poe, LM Robert W. Ramsey, Jr., LM Richard G. Rhoda, LM John D. Robbins, LSM Roland Schwerdtfeger, LM Kenneth D. Skiervem, LM Hisanobu Sugano, LM R.L. Sullivan, LF Richard I. Tanaka, LF Thomas L. Weaver, LF William M. Webster, LF Wayne L. Weigle, LM Robert L. Werner, LSM Thomas A. Williams, SM \*Arthur W. Winston, LF

#### **Bronze Advocate (US\$100** to US\$249)

Anonymous (1), LF Anonymous (4), LSM Anonymous (11), LM Carlton I. Abbott, LM

M.E. Acar, LM Herbert I. Ackerman, I.M. Kenneth Acton, LM Philip S. Adams, LM A.W. Adkins, Jr., LSM John S. Adler, LM Michael S. Adler, LF D. Adrian, LM Cary J. Ahrano, LM Ray E. Aker, LSM Y. Akiyama, LM Alessandro Q. Alberigi, LF L.R. Albright, LM Henry R. Aldag, LM James F. Aldrich, LM Winser E. Alexander, LSM V.R. Algazi, LSM Murray W. Allen, LM William D. Allen, LM Bipin C. Almaula, LM Tuna A. Alper, LM Robert A. Alpert, LM Samuel P. Altman, LM Seymour S. Altman, LM Edward E. Altshuler, LF Takao Amano, LM G.B. Amerault, Ir., LM George M. Ammon, LM Oscar C. Amrhyn, LM Richard I Anderson LM \*Ross C. Anderson, LSM Walter L. Anderson, LM William E. Anderson, LSM Juris K. Andreika, LM Kenneth W. Andresen, LM Frederick T. Andrews, Jr., LF

E. Aoki, LSM Michael Apcar, LSM Marc T. Apter, LSM Katsuyuki Ara, LM Jorge R. Arce, LSM Robert F. Arehart, LSM Desmond R. Armstrong, LM Dale T. Arnold, LM V. Arnold, LSM Donald A. Ashford, LSM I. Robert Ashley, LF John R. Asmus, LSM Theodore C. Asousa, LM Antonio D. Asprer, LM James L. Atchison, LM Michael E. Austin, LSM Rogelio M. Avenido, LM Henry L. Bachman LF A.S. Badger, LSM Arthur B. Baggeroer, Ph.D., LF James J. Bagnall, Jr., LSM David L. Bailey, LM Munnu Bajpai, LSM John A. Baka, LSM C. Vincent Baker, I.M. George C. Baker, LM Harold Baker, LM Samuel I. Baker, LM W.D. Baker ISM Anastasie A. Balafas, LM Frank J. Balash, LM Dan Balfe, LM T.R. Balgie, LM John W. Ball, LM Harold Balshem, LM

Stephen Angyal, LM

LM: Life Member, LSM: Life Senior Member, LF: Life Fellow, SM: Senior Member, M: Member, and GSM: Graduate Student Member

#2008 IEEE Life Member Committee Member

Ouirino Balzano, LF Amiva R. Baneriee, LM Robert M. Bania, LM James T. Barbera, Sr., LSM Christian Barfuss, LM Kenneth L. Baricevic, LSM T.N. Barker, LM Frank E. Baron, LM Yaakov Bar-Shalom, LF Robert A. Bartolini, LF David K. Barton, LF Paul E. Bassett, LM Sheldon Batterman, LM Lowell W. Bauer, LSM William J. Bauer, LM C.R. Baugh, Ph.D., LF Robert W. Bayma, Ph.D., LM Verden L. Beck, LSM James A. Becker, LM Nicholas A. Begovich, LF Paul Bender, LM Bengt E. Bengtsson, Ph.D., LM Justo Benitez, LSM John E. Bennett, LSM Keith L. Bennett, PE, LM Howard Bensen, LM I. Bentzen-Bilkvist, LF Robert J. Berkovits, LSM John E. Berndt, LM Eric Bernhardt, LSM Lawrence Bernstein, LF K.W. Betsh, LSM Arthur J. Beutler, LSM Inderjit S. Bhatti, Ph.D., LM \*Theodore A. Bickart, LF Henry Bing, Jr., LM Bruce A. Black, LSM Richard H. Blackwell, LM George F. Bland, LSM Arthur R. Blazejewski, LM Gerhard F. Block, LSM Nicolaas Bloembergen, LF Martin C. Blyseth, LM John V. Boehme, LSM James F. Bohren, LM Fabrizio Bonfigli, LM James T. Bonner, LM James V. Boone, LSM Sigmund Borax I.M. John H. Bordelon, LSM Cosimo J. Bosco, LM R.M. Boucher, LM Henry Boulanger, LM Paul Bourdius, LM Kenneth E. Bow, LF T.D. Bracken, LF Therlyn L. Brady, LM R.P. Brand, LM Donald A. Brandon, LM Harold D. Branstetter, LM Gary J. Braswell, LM Peter J. Bravman, LM Charles W. Bray, Ph.D., LSM R.C. Brickley, LSM Jack K. Bridges, LM Albert W. Bridgewater, LM William H. Bridwell, Ir., LM S.C. Bristow, LSM Fred A. Brock, LM J.E. Brock, LM Adrian P. Brokaw, LF Carl P. Brooking, LM Steven W. Brooks, LM Charles V. Brown, LM E. Miles Brown, LSM Max E. Brown, LM Samuel Broydo, LM Richard P. Brueggemann, LM Maurice Bruno, LM Robert B. Bruns, LM I.K. Bryan, LSM M.O. Bryant, LSM

William J. Buckley, LM Leo Budin, LM Fred K. Buelow, LM Eugene J. Buhmann, LM B.I. Bunin, Ph.D., LM William P. Burbach, LM E.J. Burckart, LM Albert R. Burge, LM A.G. Burgess, LM David L. Burgess, LSM Gerald J. Burke, LSM Dennis W. Burr, LSM R.C. Burrows, Ir., LM Richard G. Bushroe, LM Charlie W. Bussell, LM Norris H. Bussell, LM Brian K. Butler, SM C.M. Butler, LM John M. Butt, III, LM A.P. Cable, ISM Vaughn Cable, LM Salvatore F. Cagnina, LSM James T. Cain. LF Ross Caldecott, LSM Malcolm D. Calhoun, LSM Keith J. Callaghan, LM Mel Cammisa LM James C. Campbell, Jr., LSM Newton A. Campbell, LSM Ralph D. Campbell, LSM Thomas A. Campbell, LM Ben H. Cantrell, LM Edward A. Capouch, LSM Fred L. Capshew, LM Ted Carademos, LM James R. Carlberg, LM B. Leonard Carlson, Jr., LSM Edward B. Carne, LSM Ronald J. Carpinella, LSM Vivian A. Carr, LSM John J. Carroll, LSM Roderick D. Carroll, LM Louis J. Carter, Jr., LM Richard P. Case, LF Robert I. Casne. LM Robert L. Castleberry, Jr., LM Clive E. Catchpole, LM L. Wayne Catlin, LM Ricardo Cebrecos, PE, LSM Alfred Celestin, LM Tino Celio, LSM \*Roger Chabloz, LSM Stephen M. Chalmers, LSM Fung Y. Chang, LF Robert E. Chapman, LM Clyde E. Charles, LM James Cheal, LM Arthur C.M. Chen, LF Chi-Hau Chen, LF Dr Tu Chen LF Wee-Ling Chern, LM Frederick D. Chichester, LSM Michael T. Chier, LSM Charles V. Childers, LM Lendyl J. Chisholm, LM A.M. Chitnis, LM Junho Choi, LSM Alan S. Chong, LM John H. Christian, LM Van S. Christo, LM Chris Christopher, LM Noriyoshi Chubachi, LF San C. Chung, LM Allen B. Church, LSM Alan G. Chynoweth, LF Terry C. Cisco, LSM Kenneth D. Claborn, LM David L. Clark, LM Grafton C. Clarke, Jr., LM Jon K. Clemens, LM George V. Cline, LM Lee H. Clippard, LM

Arthur Cohen, LM Jules Cohen, PE, LF Nathaniel Cohen, LSM James B. Coker, LM Joseph D. Cole, LSM David L. Collins, LSM Robert J. Collins, LF Byron J. Comingore, LM Donald R. Cone, LSM John S. Conklin, LSM Esther M. Conwell Rothberg, LF Doyle Cook, LM Frederick E. Cooper, LM K.F. Cooper, LSM Robert E. Cooper, Jr., LSM William T. Corbin, LSM Henry A. Corriher, Jr., LM Joseph P. Costello, LM Whitworth W. Cotten, Jr., LSM John C. Coulter, III, LSM Milton E. Cox. LM Thomas L. Cox, LM Barry G. Craft, LM Herb Craig, LSM Frederick W. Crawford, LF George W. Crawford, LM D.L. Critchlow, LF Thomas H. Crystal, LSM Thomas J. Csermely, LSM Jane K. Cullum, LF William R. Cuming, LM Dale L. Cunningham, LM Robert A. Curtis, Ph.D., LM Joseph A. Curtiss, LSM Stanley A. Dallas, Jr., LM John B. Damonte, LF Laurence Danese, LM Sunil R. Das. LF David L. Davenport, LM Jack Davey, LSM Richard S. Davies, LSM Dean T. Davis, LM M.I. Davis, LM Donald L. Dawes, LSM \*Robert J. Dawson, LSM David S. Davton, LM Dennis L. De Semple, LM Kevin B. Deasy, LM George S. DeBeck, LM John J. Degan, LSM Frank A. Denbrock, LF Hugh W. Denny, LF Richard A. DePietro, LM Daniel J. Dere, LM Siegfried E. Derke, LM Bruce C. Detterich, LM George J. Dezenberg, LM Dennis M. Dickerson, LM Ernest J. Dieterich, LSM Walter Dietiker, LM Robin A. Dillard, LM Mahmoud M. Dillsi, LSM Andre Dion, LSM Thomas I. Dixon, LM Steven R. Doctor, Ph.D., LSM Dennis R. Don, LM Dr. Noel E. Donlin, LM Irwin Dorros, LF Claude W. Drake, Jr., LM W.E. Drummond, LM Karl F. Dudey, LSM Joseph A. Dudrick, LSM Raymond D. Dunlop, LM Joseph A. Durusau, I.M. W. Dutfield, LM Terry E. Dwan, LM Roger Dworak, LM Chester A. Dyrud, LM Antony C. Eaton, LM P.C. Economopoulos, LM Norman E. Edwards, LSM Daniel E. Eesley, LM

Bruce A. Eisenstein, Ph.D., LF E.L. Elizondo, ISM A.E. Ellis, Jr., LM Crockett Ellis, Jr., LM Lawrence W. Emark, Jr., LM George Emilio, LM Warren M. Emlen, LSM Lawrence D. Emmons, LM B. Eng, Jr., LM Thad H. Enloe, LM John N. Entzminger, LF T.M. Eppinger, LM Barry M. Epstein, LM Lynn W. Eury, LSM Roger F. Evans, LM Stanley T. Evelyn-Moe, LM Donald N. Ewart, LF \*Kenneth Ewen, LM Wallace O. Faison, PE, LM Robert M. Fano, Ph.D., LF Nick A. Farinacci, LM Albert B. Faris, LM Philip D. Farmar, LM David Farrar, LM F. Craig Farrill, M \*Lyle D. Feisel, LF Vernold K. Feiste I.M. Adolph Feifar, LM Robert P. Felton, LM David Ferber, LSM Donald R. Ferguson, LM Keith M. Ferguson, LM Paul M. Ferguson, LSM Frank E. Ferrante, LSM Howard M. Ferrill, LM Herman Fialkov, LM William H. Ficken, LM Melvin D. Field, LM William L. Firestone, Ph.D., LF David A. Fisher, LSM Robert H. Flake, LM Philip I. Fleming, LM Irving L. Fletcher, LM Robert H. Fletcher, LSM Samuel C. Florman, LM Gordon M. Floyd, I.M. Robert S. Flumach, LM William G. Fockler, LSM Richard P. Fogarty, LSM Harold W. Foodman, LM Glenn A. Fowler, LF Ronald J. Fraher, LM Henry H. Frank, PE, LSM Malden V. Frank, LSM Reinhard Frank, LM Douglas M. Franklin, LM Herbert Freeman, LF Robert Frias, LM Stephen H. Frishauf, LM R. James Fritsch, LSM Charles H. Fritz, LM Harold M. Frost, III, LM William M. Frost, LM Hiromasa Fukagawa, LF Hatsuaki Fukui, LF Hak-Ming Fung, LSM Gordon H. Gaertner, LSM Vernon M. Gale, LM Chester E. Gall, LM Robert G. Gallager, Sc.D., LF Homer C. Galloway, LM James H. Galloway, LSM Donald W. Gant, LSM Le Verne W. Garcia, Ir., LM Jesse J. Gard, Jr., LM E. Lee Garelick, LM John M. Garren, LM Patrick H. Garrett, LSM Thomas F. Garrity, LF Richard W. Gasdorf, LM Charles C. Gauder, LSM

Allan A. Gdalman, LM Hans P. Geering, LF Dietrich K. Gehmlich, LSM Ralph S. Gens, LF William P. Gibbons, LM George M. Gibson, III, LM Bertrand L. Giffin, LM Stephen P. Gill, LM I.F. Gilligan, LM Clinton R. and Mary Turner Gilliland, LM William G. Ginter, LM Lynn P. Giroir, LM Kirby E. Glazier, LM Aloys A. Godar, LM Richard E. Godfrev, LM Richard L. Goldman, LM Jack Golin, LM Alfonso L. Gomez, LM Mario J. Gonzalez, Jr., LF Paul M. Goossens, LM John F. Gorman, LM John K. Gotwals, LM L.E. Gough, LSM Robert L. Gove, LM Bertil S. Granborg, LSM Willard S Grant I.M. Gary D. Gray, LSM Robert M. Gray, Ph.D., LF Peter Greco, LSM Geoffrey D. Green, LM Randall V. Gressang, LSM Russell E. Griffin, LM Walter W. Griffin, LSM Kenneth L. Griffing, ISM Leonard L. Grigsby, LF Thomas H. Grim, LSM Carl F. Grindle ISM Davis Marshall Gritton, LM Calvin E. Grubbs, LM Stanislaw Grzybowski, Ph.D., LF A.F. Guerrero, LM Mario I. Guerrero, LM Walter Guggenbuhl, LF Edward Guilford, LSM William G. Guion, LM Ronald G. Gutru, LSM Henri G. Guyard, LM Roderic H. Haake, LM H.K. Haase, LM Mr. Jerrier A. Haddad, LF Marion Hagler, LF Jay B. Haines, LM Leon D. Hall, LM Richard H. Hall, LM Charles F. Hammer, LM James E. Hanna, LM A.J. Hansen, LM Calvin F. Hansen, LM James P Hansen LM H.A. Hanson, LM Koosuke Harada, LF Harold E. Harden, LM P.A. Hardin, LM Edgar E. Harp, LM David W. Harris, LM Fred Harris, LM Glenn C. Harris, LM James E. Harris, LM Jerry R. Harris, LM Robert E. Harris, LM O.J. Hart, Jr., LSM Roy E. Hart, LSM David P. Hartmann, Ph.D., LSM Masao Hashiguchi, LM E.B. Hassler, Jr., LM Mack A. Hataway, LM Richard M. Hatch, Jr., LM Richard M. Hatfield, LM George R. Haus, LM Douglas E. Hazelton, LM Dennis J. Gaushell, LSM Richard L. Healer, LM

Timothy J. Healy, Ph.D., LSM William T Heath IM Albert S. Heberlein, LM Herbert Hecht, LSM Richard I. Hedger, LM Charles P. Heinzman, LM Norris C. Hekimian, LF Denis A. Helm, LM Kenneth D. Hendrix, PE, LSM Paul R. Henneuse, LM Mogens Henriksen, LSM Stanley W. Henson, LM Troy F. Henson, ISM Frank A. Herman, LM John M. Herman, III, LM Juan I. Hernandez ISM Denver W. Herr, LM Otto E. Herrmann, LM Harold L. Hess, LSM Dor H. Hesselgrave, LSM Charles R. Hewes, LF Arthur Heyman, LM Carl W. Hibscher, LSM Fred S. Hickernell, LF George Hickey, LM Alfred K. Higashi, LM Robert A. Higgins, LSM S.F. Higgins, LM Walter T. Higgins, Jr., LM William L. Higgins, LM Donald A. Hildebrand, LM Douglas W. Hill, LSM Peter C.J. Hill, LSM Joseph S. Hills, LM Richard L. Hinchey, LM Narain and Joyce Hingorani, LF Glenber L. Hinkle, PE, LM Nobu Hirano ISM Khalaf H. Hirmina, LSM Donald W. Hitzeman, LSM Andrew Hobokan, LM Roy E. Hock, LM Wallace J. Hoff, LSM Brian M. Hogg, LSM Brian W. Hogg, LSM Leander H. Hoke, Jr., LF Egon R. Hollm, LSM John D. Holm, LM David E. Holman, LM Edward G. Holmes, LSM J.F. Holmes, LM Stuart B. Holoman, LM Duong B. Hop, LM William F. Horan, LM A. Hordvik, Ph.D., LM Hiroshi Hoshino, LM Robert T. Houk, LM R.W. Houskamp, LM Allen Q. Howard, Jr., LF Dean D. Howard, LF E. Keith Howell, LSM Jones V. Howell, Jr., LM Robert E. Howell, LM Tien C. Hsia, LF Baosheng Hu, LSM C.E. Huckins, LM Claude H. Hudson, Jr., LM Edward W. Hudson, LM Richard L. Humphrey, LM J.C. Hundley, LM John P. Hurrell, LSM John Hus, LSM Robert L. Hutchins, LSM Joseph W. Ianniello, LM Albert L. Ickstadt, LM Edgardo I. Igharas, LM Masaaki Imai, LSM John Impagliazzo, Ph.D., LSM Val T. Ipri, Jr., LSM J. David Irwin, Ph.D., LF Elmer L. Isaac, LM Charles E. Isbell, LM

Masayasu Ito, LM Noboru Ito Life, SM Tatsuo Itoh, Ph.D., LF Harold L. Ivey, LM Shun-Ichi Iwasaki LF Robert W. Jack, LSM Bruce B. Jackson, LM Everett V. Jackson, LM Ira Jacobs, Ph.D., LF Robert A. Jacobson, LM William J. Jameson, Jr., LSM Lewis E. Janetos, LM Cecelia Jankowski, SM J. Jankowski, Jr., LM Fred R. Jarratt, LM Frederic A. Jenks, LSM Richard J. Jerril, LM William B. Jervis, LM Jobst E. Jesse, LM Peter A. Johanson, LM Kenneth L. Johansson, LM Ben C. Johnson, LF Donald L. Johnson, LM Edward L. Johnson, LM Frank L. Johnson, LM G.L. Johnson, LSM Roger L. Johnson, LM William H. Johnson, LM Donald L. Johnston, LM Andrew Iones, LSM Colin M. Iones, LF Edwin C. Jones, Jr., LF Edwin R. Jones, LM Merrill C. Jones, LM Russ Iones, LM M.H. Jordan, LM Samuel A. Jordan, Jr., LSM Arlindo Jorge, LM Erik Jorgensen, LM Jules Joslow, LSM Jerry I. Jost, LM Peter Jubinski, LM Adolph J. Kachler, LSM Cyndee Kahn Takehiko Kahto, Ph.D., LM E.Y. Kameda, LM Seung N. Kang, LSM Mark D. Kankam, LSM Robert P. Kappler, LSM John G. Kassakian, LF Terry T. Katayama, LM Tohru Katayama, I.M. Gene R. Katkus, LM Robert H. Katyl, LM B.H. Kawaguchi, LM Haruo Kawahara, LF Tatsuo Kawasaki, LM Shigeo Kazama, LSM Edward P. Keenan, LM J.J. Keenan, LM Gary R. Keesecker, LSM Shewell D. Keim, LM Fred R. Keith, Jr., LM J.T. Kelly, LSM Arthur E. Kennedy, LM Michael A. Kennedy, LM Soyica J. Kerou, LM Frank F. Kerr, LSM J.R. Kesler, LSM Otto Kessler, LM David A. Kettler, Ph.D., LF Ibrahim Khalifa, LSM Henry K. Khoo, LSM E.B.C. Khu, LM Dallas L. Kibbe, LSM Joseph E. Kidron, LM Koji Kikuchi LF B.L. Kilday, Jr., LM Il Kim, LM John N. Kim, LM Clive W. Kimblin, LF Charles R. Kime, LF

James B. King, LM Julian V. King, ISM Russell C. King, LM W.K. Kinkead, LM Miles V. Klein, LSM D.R. Klose, LM David H. Knight, LM Dag I. Knudsen, LSM Cecil W. Koehler, LSM J.I. Koeper, LM Andry Kokidko, LM W.J. Komar, LM Malcolm K. Kong, LSM Eph Konigsberg, LM John M. Kopper, LF Robert I Kost LM Charles J. Kovarik, LSM Richard A. Kowalski, LSM Taisaku Kozuma, LSM Navin Krishen, LSM John C. Kroon, LSM Carl Kropp, LM Robert J. Krueger, LM Masaharu Kubo, LF Paul A. Kuckein, LM Doris Kuhlmann Wilsdorf, LM George M. Kunkel, LSM Aelred Kurtenbach, Ph.D., LM Luther W. Kurtz, Jr., LSM Frank W. Kussy, LF Pang C. Kwong, LM James W. Kyle, LSM Edward F. Labuda, LF Donald A. Lacer, ISM Paul I. Lackey, LSM Philip M. Lally, LSM Dennis W. Lamont, LSM Edward J. Lancevich, LM Peter Landgren, LSM Carl Landinger, LSM Raymond H. Lanier, LM Louis J. Lanzerotti, LF Almon E. Larsh, Jr., LSM Richard L. Larson, LM Richard R. Lattanzi, LM George T. Laughlin, II, LSM Louis Laursen, LM G.E. Lavean, LM Theodore Lavoot, LM Barry T. Lee, LM Chi H. Lee, LF Kwang Y. Lee, LF Low K. Lee, LF Richard C. Lee, LM Song P. Lee, LM Soong Hak Lee, LSM Wai Hon Lee, LM G. Robert Leef, LM Louis G. Leffler, LM Warren K. Legler, Ph.D., LM Gordon A. Leiter, LM \*Don Leland, LM Benjamin J. Leon, LF Donald J. Leonard, LSM Mark G. Leonard, LSM Branko Leskovar, LF Thomas W. Lesniakowski, LSM Harry Letaw, Jr., LSM Wai S. Leung, LSM M.E. Levi, LM Leslie S. Levine, LM Floyd V. Lewis, LM Gretchen and Peter Lewis, LF Richard E. Lewis, LM Anthony J. Ley, LSM Chiung-T Li, LM I.F. Libbe, LM Zvie Liberman, LSM H. Henry Liiv, LM Edward D. Lim, LM Burn J. Lin. LF Chin-Huang Lin, LM

Thomas L. Lincoln, LM M.S. Lindberg, Ir., LM W.I. Lindblad, LSM Carroll R. Lindholm, LM Lyndon E. Lindsay, LSM Duane P. Lingafelter, LM John C. Linz, LM Michael S. Liu, LSM Donald E. Lively, LM Bruce M. Lloyd, LM Charles J. Loeper, LM L.R. Lombardo, LM M.G. Long, LM Joseph R. Loring, LM J.F. Loude, LSM Donald C. Loughry, LSM Richard H. Low, LM Lester H. Lowe, Jr., LSM Albert R. Lubarsky, LSM David B. Luber, Ph.D., LM Fabrizio Luccio, LF Louis A. Luceri, LSM Edgar J. Luecke, LSM Gerald Luecke, LM G.J. Lusczek, Jr., LM Arch C. Luther, Jr., LF Kevin B. Luxford, LM William T. Lyford, LM M.L. MacMedan, LM Walter J. Macomber, LM Ernest A. Magyar, LM Haroun Mahrous, LSM Chao C. Mai, LM R.M. Malbon, LM Charles G. Mallery, LSM George A. Mann, LM John A. Mann, LM Salvatore J. Manno, LM Gregory Mansfield, LM Mohamed Mansour, LF M. Elliott Margolis, LM James T. Marrs, LM George T. Marsh, LM J.H. Marshall, III, LSM Richard O. Martin, LSM Ronald L. Martin, LM Tom A. Martin, LM E. Masada, LM Vukota Mastilovic, LSM Joseph W. Mathews, LM Lawrence W. Mattausch, LM George J. Matthews, LSM S.H. Matthews, LSM Peter T. Mauzey, LSM John Mavor, LF C. Walter May, Jr., LSM R.A. Mayers, LM Ehor Mazurok, LM Thomas G. Mc Bride, LM Don L. Mc Daniel, LM A.R. Mc Donald, LSM Paul A. Mc Govern, LM G.E. Mc Nair, LSM Will McAdam, LF Peter McAfee, LM David G. McChesney, LM M.E. McClanahan, LSM L. Bruce McClung, LF \*George F. McClure, LF Martin J. McCormick, Jr., LM Stuart McCullough, LSM James C. McDade, LSM Art E. McDole, LSM T. McDonagh, LM John P. McHenry, LM John F. McKiernan, LM Jack D. Mckinney, LM Brockway McMillan, LF A.J. McNerney, LSM Robert J. Mcsweeney, LM Henry E. Meadows, Jr., LF Thomas H. Mehling, LM Roy W. Meinke, LSM

H. Paul Meisel, LSM David Meltzer, LSM John W. Mench, LSM A.H. Mendel, LSM Donald F. Merritt, LSM Kenneth J. Metzgar, LM Jerry A. Meyer, LM James R. Meyers, LM Harold G. Miller, LM John O. Miller, LM Melvin Miller, LM George C. Milligan, LM William G. Minahan, I.M. Douglas B. Miron, LSM Glenwood J. Mitchell, LM W.J. Mitchell, Jr., LM Tsuneo Mitsui, LF John K. Miyasaki, LM Kunika Mizushima, LF John G. Mohr, LM James M. Moidel, LM C.J. Mole, LSM John I. Molinder, LSM William A. Monette, LM George Monter, LM Laurence L. Moon, LM Henry W. Mooncai, LM Paul I. Mooney, LM James L. Moore, LM Richard K. Moore, Ph.D., LF Thomas C. Moore, LM Wesley H. Moore, LM James M. Moran, LSM Robert J. Moran, LM Yuji Morita I.M. James B. Moritz, LM Lloyd A. Morley, LF William J. Morrill, LM Alan W. Morton, LM William M. Mueller, LM Hisakazu Mukai, LM Rangaswamy Mukundan, LSM Thomas P. Mulcahey, LM R.A. Munroe, LM G.T. Munsterman, LM Kaoru Murakami I.M. Hiroshi Murata, LF Jay H. Murdock, LM Edward Murphy, LSM James B. Murray, LM M.P. Musick, LM George J. Myers, LM Harold C. Myers, LSM Warren L. Nadler, LM Atsushi Nagano, LM H. Troy Nagle, LF Yoshihisa Nakamura LF Yoshimi Nakano, LM John Nakata, LM Toshihiko Nakayama, LM Seiichi Namba, Ph.D., LF Charles M. Nelson, LM Howard N. Nelson, LM Paul E. Nelson, LM Raymond J. Nelson, LM Robert E. Nelson, LM Russell G. Nelson, LM Thomas A. Nelson, LSM Robert G. Nettles, LM Peter G. Neumann, LF Joseph H. Nevin, LM Robert L. Nevin, LF Robert W. Newcomb, LF John F. Nicholas, LM Roger A. Nichols, LM David L. Nicholson, LM Alfio P. Nicolosi, LM James A. Niederer, LM Jorma U. Nieminen, ISM Charles W. Niessen, Ph.D., LM A. Niiholm, LM Martin Nisenoff, LF Tohei Nitta, LF

Robert D. Noble, LM Robert E. Noel, LSM Alexander R. Norden, LSM Richard Norman, LM George G. North, LM Paul J. Notarian, LSM Eddie T. Nozawa, LM Kaare J. Nygaard, LSM R.F. Nylander, LSM Samuel L. O Hanian, LM J. Barry Oakes, LF John J. O'Donnell, LM Boris V. Ohman, I.M. Thomas E. Ohnesorge, LM Ryoichi Ohnishi, LF Carl A. Ohsiek, Jr., LM Akira Ohte, LF Aksel Olesen, LM John K. Oliver, Jr., LM Arthur G. Olsen, LM William A. Olsen, LM Carl B. "Bernie" Olson, LSM Milton H. Olson, LM R. Craig Olson, LM Orville R. O'Neal, LSM James E. O'Neil, LF David O. Onstad, LM Y. Oono, LF William H. Oost, LM Joseph Orr, LSM Thomas W. Otto, LM Larry D. Paarmann, LSM Ram K. Paharia, LM Garrett Paine, LM Charles D. Palfreyman, LSM G. Pallo, LM L.D. Palm, LM James D. Palmer, LF Veikko A. Palva, LSM Joseph Paolillo, LM A. Ridgely Park, LM Kvu T. Park, LF Jerald V. Parker, LSM Robert D. Parker, LM Lowell C. Parode, LSM S.G. Patel ISM Richard G. Patrick, LSM John P. Patterson, LM R.B. Patterson, III, LM Harry R. Paulson, LM John Paulson, Jr., LM M.I. Payne, LM D.R. Pearson, LM Gabriel B. Peaseley, LM John B. Peatman, LF Leroy S. Pendleton, LM W.A. Penn. LF Carl M. Penney, LM E.G. Pereboom, LSM Douglas A. Perham, LM Robert E. Perkinson, LSM William L. Perlman, LSM Adrian G. Perotti, LM Richard T. Perron, ISM Joseph E. Perry, LSM H.R. Person, LSM Elmer M. Petercsak, LM Emanuel P. Peters, LM T.P. Petersen, LM Wayne A. Peterson, LSM Jack R. Petrak, LSM Hans K. Pfyffer, LM Robert R. Phillips, LM James E. Pierson, LM Victor M. Pillichi Clavijo, LM Arthur A. Pini, Jr., LM J.I.S. Pinole, LM Michael J. Piovoso, LSM PJM Interconnection, LLC, Corporation Dirk A. Plummer, LSM Harold I. Podell. LM

A.J. Poggio, LSM

G.E. Pokorny, LSM Joseph D. Polacky, LM Meyer Pollack, LSM L.K. Pollen, LSM Ansis Pommers, LM Charles W. Pond, LM Paul Popenoe, Jr., LM \*James R. Porter, LM Edwin L. Post, LSM H.L. Post, ISM Donald R. Potter, LM James G. Potter, LM Ramesh S. Pradhan, LM Leonid B. Preiser, LSM Ronald L. Prevost, LM Gary K. Pritchard, LM J.F. Prorok, LM James W. Pryde, LM PSE&G, Corporation Robert J. Puckett, LM Emerson W. Pugh LF Kenneth V. Puglia, LM Mallik S. Putcha, LSM Maurice J. Raffensperger, LSM John R. Ragase, LM Clifford E. Rahming, LM Orlando F. Raimondo, LM Douglas J. Ramseth, LM James C. Rand, LM Russell K. Raney, LF Kenneth F. Rath. LM R.L. Raybold, LM John J. Reche, LM Don L. Reed, LSM Earle B. Reese, LSM Konrad Reichert, LF Harold F. Reiher, LM I.W. Reilly, LSM Julius Reiner, LSM Clyde J. Reinhard, LM William F. Reinke, LM Carl F. Rench, LM Alexander M. Rende, LM Eugene A. Rheingans, LM John D. Richards, LM Paul Richman, LF Hans L. Richter, LM Leonard H. Richter, LM I.I. Risko, LM Allan F. Rister, LSM Lee W. Ritchey, LM Earl R. Robbins, LM Roger M. Roberge, LM Robert N. Riley, LSM John J. Roberts, LM Roland W. Roberts, LSM Joseph E. Robertshaw, LM J. Darrell Robinson, LM J.S. Robinson, LM Stanley A. Robinson, LM Joseph L. Rodgers, LM George P. Rodrigue, LF Solvelis Josefine Rodriguez, GSM John S. Roe, LM Dietrich Roesler, LSM Heljar B. Rognerud, LM John A. Rohr, LM Hans G. Rolfes, LM Salvatore A. Romano, Jr., LSM Vincent S. Rose, LM Ben R. Rosencrants, LM R.G. Ross, LM Thomas A. Rosse, LM John E. Rossi, LM William F. Roth, LM Henry W. Rouhof, LM James R. Rowland, LF Erlind G. Rover, LSM Lawrence G. Rubin, LF Louis Ruffini, LM Anne Rumfelt, LSM R D Ruth I.M

Ronald M. Rutkowski, LM

Paul T. Ryan, LSM Albert L. Rvff, LM Philip B. Saba, LM Sevier Sabin, LM Fabio P. Saccomanno, LM Howard G. Sachs, LM I. Sada-Gamiz, LM Samuel Saez, LM Roy Y. Sakamoto, LM Pedro A. Sala, LM Alan B. Salisbury, LSM Robert M. Salter, LM George E. Saltus, LM L.J. Sanders, LM Phillip A. Sandford, LM Gordon W. Sangster, LM Jun-Ichi Sano, LM Willy M. Sansen, Ph.D., LF G.G. Santaella, LSM John D. Santi, LM Tajji Saruwatari, LM Yozo Satoda, LM Walter I. Satre, LM S.G. Scaglia, LM John F. Scarzello, LM Martin M. Schaffel, LM Herbert Schanker, LM Patrick K. Scharff, LM Fred G. Schaufelberger, LF Rolf Schaumann, LF Harry E. Schauwecker, LSM Robert A. Scheman, LSM Alan L. Schildkraut, LSM I. Morton Schindler, LSM Theodore C. Schirmer, LM Hubert J. Schlafly, LSM Frank W. Schmechel, LM Dean J. Schmidlin, Ph.D., LM Guenther Schmidt, LF H.D. Schmidtke, LM Roland W. Schmitt, LF Dorothy L. Schnabel, LM Philip R. Schneider, LM Stanley M. Schreiner, LSM Rudolph F. Schreitmueller, LSM Eckhard J. Schulz, LM Fred M. Schumacher, LM Bernard Schwartz, LM Cameron C. Schweitzer, LM Felix Schwering, LF Steve Schwieterman, LM Richard J. Scott, LM David A. Sealer, LM Brian E. Sear, LM Charles R. Seashore, LM R.H. Seegal, LM B.R. Segal, LSM Robert L. Seitz, LSM John R. Seiver, LSM Masakazu Sekiguchi, LM Amos Selzer, LSM William J. Sember, LM Douglas R. Semmes, Jr., LM J.I. Sendlein, LM Ashis K. Sengupta, LM Dipak L. Sengupta, LF Horst Seperant, LM Jerry J. Servatius, LM John E. Setaro, LM Charles E. Seth, LM Goro Shirai, LM T.M. Shortal, I.M. Chen-Wen Shou, LM Rachad M. Shoucri, LSM Jerry F. Shoup, Ph.D., LSM K.R. Siarkiewicz, LF John J. Sideravage, LM Rubens A. Sigelmann, LSM H.R. Sigler, Jr., LSM Thomas W. Sigmon, LF Peter M. Silverberg, LSM Dolph Simons, LM William A. Sims, LM

J.M. Sirkoch, LM William A. Skillman, LF John W. Skooglund, LF James G. Slinev, Jr., LSM D.C. Smathers, LM Charles H. Smith, LSM Douglas B. Smith, LM Kirk W. Smith, LM M.E. Smith, LM Michael C. Smith, LM Robert B. Smith, LM Robert D. Smith, LM Robert H. Smith, LM Robert T. Smith, LSM Robert T. Smith, LSM Stanley O. Smith, LM Warren D. Smith, LM William H. Smith, LM Allen W. Smithson, Jr., LM Ronald C. Snare, LSM Richard M. Snell, LM W. Carmon Snipes, LM Donald D. Snyder, LM Charles Sobel, LSM Ricardo J. Solorzano, LSM Frank G. Soltis, LM James H. Somers, LM Robert D. Sommer, LSM Richard L. Speaker, LM Cary R. Spitzer, LF Martin Springel, LM David W. Springer, LM Ulrich Spycher, LM Walter O. Stadlin, LF Ronald J. Stahara, LM Gordon R. Stallings, LM Robert D. Staples, LM Malcolm G. Stearns, LM Robert W. Steele, LSM Roy H. Stehle, LM Gerhard Steinbrenner, LM Odd Steinsto, LM Joseph Stepchew, LM Robert A. Stern, LM William G. Stevens, LM A.C. Stevenson, LSM Robert B. Steward, LM Donald M. Stewart, LM Manfred H. Stiebler, LSM Jack I. Stiffler, LF William Stillman, Jr., LM John F. Stledger, LM Ronald B. Stokes, LM Albert O. Stoltz, LM Jay E. Stone, LM Douglas C. Strain, LF Robert A. Stratbucker, LSM Richard L. Strombotne, LM W.L. Stubkjaer, LM Kenneth L. Stuckey, LM R. Sudarsanam, LSM Roger W. Sudbury, LF Yoshitaka Suezawa, LM Yoshihiko Sugio, LM Yukiyasu Suguri, LM Timothy J. Sullivan, LSM Peter G. Sulzer, LF Thomas H. Sumida, LM David Sun, Ph.D., LM George S. Sunday, LM David E. Sundstrom, LSM Richard Sungaila, LM Jerome I. Suran, LF Jon M. Surprise, LM Tatsuo Suzuki, LM John D. Swank, LM James A. Swetlikoe, LSM D.W. Swift, LSM Peter Sypher, LM Zoltan G. Sztankay, LM Margaret R. Taber, LSM Keiji Tachikawa, LF W.C. Taft, LM

Ichiro Tagoshima, LM Kenneth A. Takaki, LM Yasuo Takemura, LF Terutaka Tamai, LSM Ting-Wei Tang, LF Duncan N. Tanner, LM Honorato M. Tapang, LM Mario B. Tatonetti, LM Charles A. Taylor, LM John H. Taylor, LM Kyun H. Tchah, LSM M.D. Teems, LM Stanton H. Telander, LSM Donald H. Temme, LM Albert H. Terp, LM Fred H. Terry, Ph.D., LSM Ronald J. Texel, LM James L. Thacker, LM Paul W. Thiede, LM Patrick A. Thiel, LM David M. Thomas, LM Louis C. Thomason, LM David L. Thompson, LM James R. Thompson, LSM William R. Thompson, LSM David Thorne, LSM J.R. Thornton, LM Howard A. Thrailkill, LM Robert G. Thurman, LSM John L. Tietze, LM John H. Tilley, LSM Gerald W. Timm, LSM Emery P. Todd, Jr., LM Sasson Toeg, LM Peter M. Tolliver, LSM George Tolos, LM Kivo Tomiyasu, LF Ben H. Tongue, LSM P. Torgrimson, LM Joseph J. Trocchia, LM Lester B. Troupp, LM Bryan C. Troutman, LM Richard True, Ph.D., LF Wiwat C. True, LM Henry P. Trujillo, LM Alexander A. Tseng, Ph.D., LSM Haruhiko Tsuchiya, LSM Seppo E. Tuominen, LM Hubbard C. Turner, Jr., LM John J. Turner, Jr., LM Edward G. Tutle, LSM George R. Ufen, LM Malcolm R. Uffelman, LF Wilfred O. Uhl, LM Arthur Uhlir, Jr., LF Warren W. Umholtz, LM Gottfired Ungerboeck, LF Lewis E. Unnewehr, LF Gerald S. Ustach, LM Shiro Usui, LF Donald J. Utech, LM Bernhard U. Vainik, LM E. Vambutas, LM D.G. Van Coevering, LM B.F. Van Dinter I.M. Arthur Van Gelder, LSM William A. Vaughan, PE, LM John E. Vetack, LM Alfred E. Victor, LM Richard C. Viinikainen, LM Percy B. Vinet, Jr., LM George J. Vlay, LSM Joseph R. Volpe, Jr., LM E. Wachsberg, LM Bernard F. Wadsworth, LM Vernon H. Waight, LM Kikuo Wakino, LF Edward L. Walker, LSM Harley E. Walker, LSM Ralph E. Walker, LM Michael A. Wallace, LM Robert M. Walp, LF Robert R. Walsh, LM

Mullins Walter LM Qi Wang, LSM Robert E. Warakomsky, LM Weldon W. Ward, Jr., LSM Brendan J. Ware, LF Edward L. Warren, LM Janusz Warszawski, LM C.M. Warthem, LM Kiyotaka Wasa, LF John T. Wasdi, LM Fred L. Watson, Ph.D., LM R.M. Watson, LM Robert E. Watson, Jr., LM Joseph D. Webster, LM Willard P. Webster, LM Felipe N. Weffer, LM H.L. Weidemann, LM Don M. Weigle, LM Marc R. Weinberger, LM Richard T. Weinsberg, LM Henry D. Weinschel, LM Stephen B. Weinstein, LF Raymond S. Weitzman, LM G.B. Welbourne, LSM W. Welsh, LM C.A. Wendelbo, LM David L. West, LSM Edward R. Westmeyer, LM Eugene S. Wheeler, LSM Joseph C. Wheeler, LM Richard E. Whipple, LSM Stanley A. White, LF W.L. White, LM Walter A. White, LM A.C. Whittlesey, LM Allen V. Whitwell, LM Frank W. Widmann, LSM Carl M. Wiggins, LSM Arthur E. Wilde, Jr., LSM Richard B. Wilkes, LM Dennis R. Williams, LM M.L. Williams, Ph.D., LF Neal T. Williams, LSM Robin Williams, LF J. Claude Williamson, LSM Erich R. Willner, LM N. William Wills, LSM Howard D. Wilson, LM Ralph E. Wilson, Jr., LM Thomas G. Wilson, LF Donald Wilton, LF Robert O. Winder, LF Charles E. Winn, LM Oliver H. Winn, LF James G. Winnette, LM John G. Winston, LM Ernest E. Witschi, LSM John F. Wittibschlager, LSM Horst R. Wittmann, LF Richard M. Wolfe, LM Harry J. Woll, LF R.W. Wong, LSM Allen I. Wood, LF H.L. Woodbury, LSM Lawrence R. Wozniczka, LM James R. Wright, LSM James W. Wright, LM John C. Wright, LM Yung-Kuang Wu, LSM Masamichi Yamanishi, LF Kiell-Olo Y. Yngvesson, LM Eiji Yodogawa, LSM Charles F. Yokomoto, LM Juan F. Ysita, LM Robert C. Zak, LM Kenneth D. Zastrow, LM S. Zelencik, LM Lars H. Zetterberg, LF Severyn Zoledziowski, LSM Javad Zoroofchi, LM Peter S. Zory, Jr., LF

## **Coupler Guys and a Thalamus**

I was associate chair of the engi-surgery was performed the following cal Leksell frame screwed to the neering science program, with my day. In the interim, the patient's skull neighbor, Dr. Les Organ, of the had to bear four stainless steel Faculty of Medicine. His speciality anchors and bandages covering the involved research in electrophysiolo- open bore holes while the surgical gy as it applied to understanding its team labored at making precise maps potential for the management of of the patient's thalamus. I found this pain. This association led to my appalling and suggested that a combeing introduced in 1973 to Dr. Ron puterized solution could be devel-Tasker, an eminent neurosurgeon oped with the goal of accomplishing and head of the Pain Clinic at all of the data collection, analysis, and Toronto General Hospital

Dr. Tasker, assisted by Dr. Organ, one session. was experimenting with treatment by stereotactic surgery for the control of involuntary movement as in Parkinson's and for the relief of intractable pain. This involved destroying plaques or real-time 3-D map that could be producing with precision a lesion deep in the brain by RF electro-coagulation. At that time they employed a frustratingly slow, risky, and delayed in the operating room and input thalamary care centers everywhere, aided two-stage technique for 3-D mapping mus landmarks and patient responses by a whole new array of imaging of the patient's thalamus by a process through an acoustic telephone coupler, techniques. There was not an acoustic of in situ electrostimulation and obser- connected back to the main IBM coupler in sight. vation of the patient's responses. The System 370/165 computer center at entry through the skull and the stimuthe university. There the computer lation session was performed on day morphed a standardized atlas map of one using a Leksell frame attached to the thalamus along with observed

had the privilege of carpooling to the patient's skull for spatial referresponses into the coordinate system the University of Toronto, where ence. The second stage of remedial of the patient, referenced to the surgipresentation as operative templates in thalamus and its diseased areas in

With the assistance of one of my fourth-year students. Peter Hawrylshyn, a computer-based method was devised for obtaining an almost employed immediately by the surgeon. During the stimulation session, Peter sat at my portable computer terminal

patient's head. When the output maps appeared on the university's wide-bed plotter, complete with precisely located figurines depicting a variety of responses, a runner tore off the paper and raced back to the operating room, a distance of about a kilometer. The surgeon could then complete his task, confident that he was dealing with a very accurate, scaled depiction of the three dimensions. This may have been the first use of computer-assisted surgery in Toronto and resulted in a lot of publicity as well as publication in a leading journal of neurosurgery.

Thirty years later I was in Seattle and happened across a PBS portrayal of stereotactic surgery. The procedure was now routinely employed in pri-

> lan Rowe, Ph.D., LSM Mount Hope, ON, Canada

## **Jarred Memory**

rticles in the December 2008 IEEE Life Members Newsletter led me to recall similar incidents. For example, "How Not to Test a Pressure Vessel" led me to recollect an incident at Convair, Fort Worth, Texas. In the summer of 1958, I was waiting for the bus to take me from the engineering offices on the hill to the radiation area, when a smoker threw his cigarette into the gutter. Grass clippings in the gutter started sputtering like a fuse. The guard standing there informed me that the dam between the water moderated reactor and a new dry area had been 150% proof tested with ammonium nitrate fertilizer. After testing the reactor pool integrity, several hundred pounds of the fertilizer (in the water) were applied to the grass around the Convair buildings. And since the fertilizer was quite flammable the sprinkler system had to be on all the time.

some time.

ings ("Flavor of the Weak") reminded me of a time in 1974 at the Sherman I took over your project and you Texas Instruments plant where the were incompetent." Later, a technidrive voltage to the gas discharge discian who made the boards told me play had to be reduced, which had that I had done an impressive and the side effect of reducing the IC driv- outstanding job. Go figure. er failure rate from 3% to .5%.

"Search and Destroyers" reminded me of a time in 1964 when I was doing semiconductor materials

Another time in 1958, Health research. It seems that a lab project Physics started collecting air sam- to build and outfit a buoy to calibrate ples using an aluminum-coated diri- sonar accuracy was running behind gible and used a small model engine schedule. I was drafted to breadwith filter paper over the carburetor board (on a piece of plywood) the air intake. Unfortunately, the wind telemetry circuits running over the always blows in Fort Worth, and tow cable, since I had worked at early on in the tests it blew the diri- Texas Instruments, which made trangible into our 13.5 KV power line. sistors at the time. One coworker The balloon was punctured, and the inquired if I would be asked to do helium spewing out wrapped the brain surgery if I had worked at a balloon around the line several hospital? At the time I thought, why times leading to a loss of power for not join (rejoin) the IEEE? I asked the electrical engineer that took the The tale on highlighting shortcom- telemetry project over from me to sign my application. He replied, "No!

> E.G. (Jerry) Bylander, LSM Sherman, TX

## **Retro-Style Housing is for the Birds**

project was to run this experiment for a period of about six months, which would include winter, under all the possible weather conditions that Montreal could throw at us including all the nice snowstorms and harsh attenuation constants at those two wavelengths could then be obtained along with statistical data. The actual link originated from our lab and ended at a retro-reflector installed on a weather radar tower at a McGill University campus. The total link had a length of about 1 km. The receivers were situated back at the lab.

anticipate all sorts of problems such as self calibration that would be consistent over the duration of the experiment, the effect of the sun on the retro-reflector, snow deposition, and

cation, we were setting up a laser inside a metal tube to act as a baffle Lover-the-air propagation experito protect from the direct rays of the ment in Montreal at MPB sun, and we heated the tube chamber Technologies, a spin off of RCA to keep the temperature above freez-Research Labs. The purpose of the ing and dew point. We actually started a few trial runs in the fall and went through the debugging phase and calibration procedure and were satisfied with our results

One morning, however, looking over the result of the night's run, we cold that we have learned to love. were surprised to notice a strong The laser links consisted of a CO<sub>2</sub> attenuation at both wavelengths that laser running at 10.6 µ and a He-Ne started at about sunset and ended laser running at .6328 µ. Comparative early in the morning before we got to than to cozy up in a heated tube work. We knew that the previous evening and night were uneventful in terms of the weather. Our first conclusion was that we had an equipment malfunction. We checked and rechecked and could not find anything wrong. We were afraid that it was one of those intermittent faults that are often difficult to pinpoint. We While building the link we tried to hoped that this was a one-time incident. Unfortunately, the next day we the cold! had a repeat performance. We knew that this time we had to find the cause. We installed a telescope to point at the retro-reflector and decid-

In the early days of laser communidew formation. We mounted the retro ed to stay in the lab that evening until the attenuation event that we now anticipated would start. At the same time, we would observe the retro though the telescope.

> As the sun was setting, we noticed that birds were flying happily around the tower. What we did not anticipate was that some of the birds were going into the retro tube and were not coming out. With each bird docking into it, the attenuation was increasing in step. The mystery was solved. Come to think of it, what better way for a bird to spend the night when the temperature was falling at sunset in autumn. We came back next day early at sunrise to watch the reverse events taking place with the birds leaving their night hotel for a presumably busy bird day. Needless to say that we quickly solved the problem by installing a screen in front of the retro, with some regrets that it would leave the birds out in

> > Armand Waksberg, LSM Montreal, Canada

## Serendipity

ield site on the island of Malta I for the Stanford University Radioscience Laboratory. The project was under the direction of Dr. O.G. "Mike" Villard. We were analyzing HF (shortwave) radio propagation during the sunspot minimum and thus the project was called "Minispot Malta."

The (British) Royal Army had given us a space for our equipment in an old powder magazine at Fort Bingemma, which was was built in 1875 as part of the Victoria Lines. A dry moat, cut into the native limestone, surrounded three sides of the fort. The fourth side was a cliff, part of the escarpment that crosses the island. Several abandoned gun Stanford. The Radioscience Lab had emplacements were located along the numerous projects that made use of this cliff edge. The fort was then part of a equipment pool. We needed the tape Royal Army Signals "torn tape" tele- recorder, and I was requested to have it printer relay station. We had space for modified to operate on 60 Hz power. It our HF beam antennas as well as a took some time to find the proper

rom 1962 to 1963 I operated a dropped over the cliff edge down to anything about this type of deck. Ampex a farmer's field. It was an excellent site for HF radio reception.

Our equipment consisted of a number of Collins 75S-1 HF receivers and a Sanborn-Ampex FM tape recorder. On Malta, ac power is 240 V, 50 Hz. We had a large 240-120 V transformer to operate our equipment. The power supply transformers tolerated the 50 Hz power, though some ran a bit hotter. The tape recorder deck was an Ampex 350 unit. The recorder was special ordered with a capstan diameter ground for 50 Hz, since the ac line frequency determined the tape motor speed.

At the end of the project I, as well as all of the equipment, returned to very effective sloping-V antenna that department at Ampex that knew

said that a new capstan would have to be made, and there would be a considerable cost as well as time in obtaining the part, as it was not a stocked part. The lady I was talking to said that a Mr. "Smith" in the engineering department might have more information on how long the part might take to be built.

I called Mr. Smith and described the problem. After looking up production times he commented that he might have a part that was removed from a deck several years earlier. He then looked in his desk drawer and pulled out a capstan unit. It was a 60 Hz capstan. The attached tag noted the serial number of the deck from which the part had been removed. It was our serial number! Mr. Smith said to come on over and he would give it to me, which he did.

> Clint Gilliland, LM Menlo Park, CA

IFFF

445 Hoes Lane, PO Box 1331, Piscataway, NJ 08855-1331, USA

#### **Our Mailing List**

The *IEEE Life Members Newsletter* is distributed to Life Members and those who are not Life Members but are 1) IEEE members 65 years and older, 2) retired IEEE members aged 62–64, and 3) members of special boards and committees.

**Submitting Articles** 

We welcome articles for this newsletter. In particular, we seek articles about projects that are initiated at the Section and Region level by Life Members as well as "Tales from the Vault," which should focus on novel or interesting technical issues. The suggested length for "Tales from the Vault" submissions is 500 words.

Acronyms should be completely identified once. Reference dates (years) also should be included. Editing, including for length, may occur. If you wish to discuss a story idea before hand, you may contact Craig Causer, managing editor, by e-mail at lm-newsletter@ieee.org. The deadline to submit an article for possible inclusion in the next issue is 16 October 2009. Please include your Life grade, town, state, country, phone number, member number, and/or an e-mail address with your piece.

### **Stopping IEEE Services**

Those Life Members who wish to have all services stopped should contact IEEE Member Services. If you are doing so at the request of someone else, submit the member's name, number, grade, address, change date and your connection, e.g., Section Chair.

#### **IEEE Member Services**

fax: +1 732 562 6380 or phone: +1 800 678 4333 (USA) +1 732 981 0060 (worldwide)

contact us online at: www.ieee.org/memberservices

#### 2009 Life Members Committee

Luis T. Gandia, Chair l.gandia@ieee.org

T. Scott Atkinson scott.atkinson@fullarmorgroup.com

Theodore A. Bickart tbickart@mines.edu

Lyle Feisel l.feisel@ieee.org

Graeme Gwilliam gb.gwilliam@ieee.org

George McClure g.mcclure@ieee.org

Aleksandar Szabo a.szabo@ieee.org

Richard Volz volz@cs.tamu.edu

Arthur Winston a.winston@ieee.org

Jerry Yeargan jry@uark.edu

Cecelia Jankowski Secretary (staff) c.jankowski@ieee.org

Dan Toland Manager, Geographic Activities d.toland@ieee.org

> Managing Editor Craig Causer c.causer@ieee.org

**Qualifying for Life Member Status** 

To qualify as a Life Member, an IEEE Member must be at least 65 years old, and the sum of the member's age and the number of years of paid membership effective the following January must equal or exceed 100 years.

#### **Have Questions, Ideas or Problems?**

Have questions regarding your Life Member status? Contact Member Services. Got something else you need to ask or discuss? E-mail the Life Members Committee or its staff at life-members@ieee.org, or call: +1 732 562 5501, or fax: +1 732 463 3657.