AESS Technical Operations Report to the Board of Governors
October 7th, 2002

1. Budget

There are no expenses to date for Technical Operations except for the Distinguished Lecturers Program. Issues associated with the Distinguished Lecturers program are discussed below and will be taken up at the October AESS Board of Governors' Meeting.

2. Technical Panel and Committee Reports

Technical Panels

Attachment 1 summarizes the present status of the technical panels.

Three (3) technical panels are now considered as active, an improvement of one since the last BOG meeting in April. This improvement is due to the hard work of Marina Ruggieri in leading the development of the Space Systems Panel. The September issue of the magazine provides an excellent overview article on this panel's activities and plans. Refer to Attachment 1.A for the Space Systems Panel report.

The Gyro and Accelerometer Panel remains very active. Refer to Attachments 1.B for the GAP report prepared by Sid Bennett. Unfortunately, after a tenure of a decade, Sid is leaving his position as panel chair. The AESS is highly indebted to Sid and needs to recognize him for his outstanding leadership of the GAP over this extended period of service. Randy Curey was selected at the last GAP meeting to be the new chair.

The Radar Panel remains very active under the leadership of Bob Trebits. Refer to the AESS Website for the Radar report prepared by Bob.

The technical panels for Formal Methods in System Design and Integrated Avionics are in a state of potential revitalization after a period of inactivity. Refer to Attachments 1.C and 1.E for correspondence from the respective chairs, James Alpigini and Glen Logan.

Two (2) panels remain in the formative stage with the Systems Engineering Panel under Paul Gartz potentially beginning to emerge. See Attachment 1.D for Paul's remarks that will be discussed further at the BOG meeting.

To provide some guidance to the less active panels in becoming more active, I have provided the chairs with the excellent documentation on Charter and By-Laws as developed by the Gyro & Accelerometer Panel.

An issue regarding voting on Standards prepared by technical panels appears to be re-emerging. This has to do with a desired requirement by the IEEE that all technical panel members voting on Standards be members of the Standards Association. The fee to join is $10 if you are an IEEE member. If not, it is proposed that a significant fee be charged for each vote. The GAP has a number of European and retired members that are not IEEE members and consequently sees a problem if this requirement is imposed.

Technical Committee Representatives
There are seven (7) technical committees with AESS representatives as summarized in Attachment 2. The reports from the representatives for six (6) of these committees are provided as Attachments 2.A through 2.F. Currently one technical committees is not active.

3. Distinguished Lecturers Program

The activity of the Distinguished Lecturers (DL) program for the years 1999 through 2002 (to date) is summarized in Attachment 3. Three (3) lectures for 2002 have been completed and three (3) more have been requested and approved. Since the travel for all these is within North America, the allocated budget should cover all incurred expenses.

Recently, Dale Blair and Yaakov Bar-Shalom (one of our DL's) recommended that Professor Itzhack Y. Bar-Itzhack of the Technion-Israel Institute of Technology be added to our DL roster. I am personally familiar with Professor Itzhack's work having reviewed some of his papers for the AIAA and heartily endorse this proposal. He would lecture on "The Evolution of Inertial Navigation" that would be a fine addition to our roster.

However, we have no policy that would cover his travel expense since he is not based in North America but in Israel. Travel to N. America from Israel could logically come under the $1500 limit. For travel from Israel to other locations such as Europe, there is no policy approved by the BOG. This issue will be raised at the BOG meeting for resolution.

However, the constrained budget for DL travel expense ($3,000) precludes much in the way of travel outside North America. The options within this budget constraint are:

1. No lecture outside N. America which will allow six (6) "domestic" lectures.

2. One (1) lecture outside N. America which will allow three (3) domestic lectures.

3. Two (2) lectures outside N. America which will allow no domestic lectures.

Alternatively, if the DL budget were increased by $1500, one (1) lecture outside N. America and six (6) domestic lectures could be accommodated.

A vote by the BOG on these options will be solicited at the meeting.

4. PLANS Conference

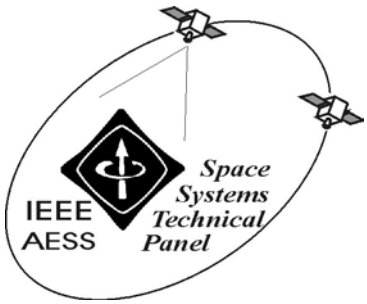
I prepared a report for the first planning session for the PLANS 2004 Conference that occurred on July 12th, 2002 at the next site in Monterey, California that is provided as Attachment 4. This report was forwarded to Barry Breen, VP Conferences on July 30th.

Respectfully submitted
Jim Huddle
Vice President - Technical Operations

Technical Panel Chairs (Attachment 1) [1]

Panel	Chair	E-Mail Telephone	Status	Report	Web Page
Gyro & Accelerometers	Sid Bennett	s.bennett@ieee.org 708-444-2800	Active	Attachment 1.B	Yes
Radar Systems	Bob Trebits	bob.trebits@gtri.gatech.edu 770-528-7915	Active	On AESS Website	Yes
Space Systems	Marina Ruggieri	Ruggieri@uniroma2.it +39-06-7259-7451	Active	Attachment 1.A	Yes
Formal Methods in System Design	James Alpigini	jja7@psu.edu 610-648-3357	In Process of Revitalization	Attachment 1.C	Yes
System Engineering	Paul Gartz	Paul.Gartz@PSS.Boeing.com 425-237-8172	Formative Stage	Attachment 1.D	No
Integrated Avionics	Glen Logan	LOGANGT@acq.osd.mil 703-578-6584 http://www.acq.osd.mil/osjtf/	Possible Revitalization	Attachment 1.E	No Link to Open Systems Joint Task Force Site
Target Tracking & Sensor Fusion	Dale Blair	dale.blair@gtri.gatech.edu 770-528-7934	Formative Stage		No
Electrical Power Systems	Open		Inactive		No
Satellite Navigation	Open		Inactive		Yes

[1] Revised October 7th, 2002 – J. R. Huddle



ATTACHMENT 1.A:

REPORT OF IEEE/AESS "SPACE SYSTEMS" PANEL

September 2002

The following activities have been carried out in the period April – September 2002:

- Activities related to the co-Chairing of Track 2 *Space Missions, Systems and Architecture* of the 2003 IEEE Aerospace Conference, to be held in Big Sky (March 2003) and in particular: i) two Italian experts in space technology and space-born radar have been appointed co-chairs of two sessions of Track 2 dedicated, respectively, to the International Space Station and the space missions envisaged for the 21° century; ii) conference has been promoted in the European space community, yielding to the submission of various abstracts from Europe. The involvement of those European experts brings benefit also to the Panel.

- Intense review activities of papers related to space topics in the frame of the various Technical Committees of international Conferences, such as IEEE GLOBECOM 2002 *Symposium on Satellite Communications* (Taipei, November 2002), *5th European Workshop on Mobile/Personal Satcoms (EMPS 2002*, Baveno-Stresa, Italy, September 2002), *WPMC 2002* (Hawaii, October 2002).

- Intense activities related to the role of Editor of *Space Systems* of the AES Transactions, where the number of manuscripts submitted in the area has increased quite significantly. Since May 2001, 14 manuscripts a have and a correspondence have been submitted, including 2 manuscripts whose handling procedure was not completed by the previous Editor. The latter are presently running a newly started handling procedure. Four procedures have been completed, two are waiting for authors' final revised manuscripts and nine are being handled at the moment. A network of reviewers, that are expert in the various space systems topics and, in some cases, are related to the Aerospace Conference team, has been created thanks to the activity as Editor.

- Activities as Mentor of the Student Branch at the University of Roma Tor Vergata, Italy, particularly for space-related activities. In this frame, an IEEE seminar entitled *The DAVID Mission* (speaker: myself) has been held on June 4, 2002 at the University Roma Tor Vergata. Students belonging to the space courses and experts of the field attended.

- Organisation of training and thesis activities of students at the University of Roma Tor Vergata in the field of space systems (ISS, Mars communications, satellites).

- Organisation of a Panel on the role of satellites in the future mobile and multimedia scenario, that will take place at the WPMC 2002 Conference (Hawaii, October 2002). In this frame promotion of AES and the Panel can be also performed.

- Development of the Special Issue of the *Wireless Personal Communications* Journal (Kluwer) on *Broadband Mobile Terrestrial-Satellite Integrated Systems* (editors: G.Maral, ENST-France, S.Ohmori, CRL-Japan and myself): 13 papers have been accepted for publication in the Issue. The Editorial has been written and the Issue should hence be published in early 2003, as planned.

- Organisation of the international *Advanced Workshop on AIR Traffic Management* (ref: G. Galati, member of the event Technical and Organising Committees), that is being held in Capri, Italy (22-26 September, 2002).

- Development of a status report on the Panel for the AES Systems Magazine, as asked from Ron Schroer and Joel Walker. The paper, entitled *The Space Systems Technical Panel* and authored by G.Galati and myself, and submitted in June 2002, has found a very positive feedback in the Systems Magazine team and will be published soon.

- G.Galati offered his help to Joel Walker for the Systems Magazine: *Centennial of Flight Issue*, with topics related to the Italian heritage in the field.

Among the envisaged activities:

- Activities related to the role of Editor of *Space Systems* of the AES Transactions.
- Activities related to the various mentioned Conferences, that will be held this year and in 2003.
- Development of a Meeting of the Panel participants at 2003 Aerospace Conference.

Prepared on September 23, 2002 by: Marina Ruggieri

REPORT OF IEEE/AESS GYRO AND ACCELEROMETER PANEL

September 2002

Panel Activity

The panel had four meetings since the last report. Two of them were in conjunction with IEEE/AESS sponsored meetings: PLANS2002 and the Saint Petersburg Conference on Integrated Navigation Systems. Meeting attendance is down and we are not sure if this is a result of deviation from our longstanding pattern of meetings to accommodate the conferences, or the general consolidation and cost consciousness in the industry. Writing standards is becoming more bureaucratic, the latest manifestation of which is the more stringent requirements for being eligible for participation in the balloting pool. Unsaid is the same problem that AESS faces, that of budget. The Standards Board also appears to be moving towards forcing conformance with a "model" set of ByLaws for each sponsor of standards. While it differs only slightly from our practice, it is likely to result in the need for a rewrite of the ByLaws in the next six months.

We continue active work on the following documents:

P1559 "Standard for Inertial Systems Terminology"
P1431 "Standard Specification Format Guide and Test Procedure for Coriolis Vibratory Gyroscopes" (industry survey phase)
P1554 "Recommended Practice for Inertial Sensor Test Equipment, Instrumentation, Data Acquisition and Analysis"

Meetings

Since January2002, the Panel has held 4 meetings:

Dates	Venue	Attendance
April	Palm Springs, CA	14
May	Saint Petersburg, Russia	11
July	Santa Ana, CA	9
September	Teterboro, NJ	8

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Membership

After the call for renewal of membership and for the information list, the status is:

Members	36
Info List	37

As we have many interdisciplinary members, the requirement that they be a member if the IEEE and SA to ballot as a right is causing problems for our panel. For some years I have been proposing the other members of the panel as “invited experts”, and this had been accepted. But there has been a change to the “Operating Manual” of the Standards Board that makes the process much more time consuming and detailed.

Other

This will be my last report to the AESS as chair of the panel. I will have completed 10 years as chair. During this time the panel has been quite active and seen a broadening of its worldwide membership, and the institution of a meeting a year outside the US. The officers and members of the panel have made it a pleasure to serve and I have no doubt that they will be capable of continuing the work. I hope to be able to continue to contribute as a member of the panel.

Respectfully submitted,

Sid Bennett
Chair, IEEE/AESS Gyro and Accelerometer Panel

ATTACHMENT 1.C - FORMAL METHODS TECHNICAL PANEL

From: Dr. James Alpigini [jja7@psu.edu]
Sent: Saturday, September 28, 2002 2:00 PM
To: Huddle, James
Subject: Formal Methods in System Design Technical Panel

Dear Jim,

I am very happy to report that from October 14-16 I will
be meeting with the majority of the panel members.
I hope to make some good progress at that time.

We have set the initial priorities of developing a
constitution/charter along the lines of the one that you
have sent me, and developing draft standard for parts of
formal methods in system design
(e.g. types of diagrams, diagramming methods, diagram symbols).

Regards,

James

James Alpigini, Ph.D., CEng, MIEE
Professor In Charge, Information Science
Assistant Professor of Systems Engineering
Penn State Great Valley School of Graduate Professional Studies
30 E. Swedesford Rd., Malvern, Pa 19355
e-mail: jja7@psu.edu Phone: 610-648-3357 Fax: 610-647-3377

ATTACHMENT 1.D – SYSTEMS ENGINEERING TECHNICAL PANEL

From: Gartz, Paul E [paul.e.gartz@boeing.com]
Sent: Tuesday, October 01, 2002 2:22 PM
To: Huddle, James
Subject: RE: Technical Panel Report

Jim, Thanks for being patient with me. Last night around midnight I did finish up what could be a key item. I will report on this in detail at the BoG as it could affect all of IEEE not just SE. It certainly also affects our BoG strategy. Jim Leonard is also working this one. Below is a report.

I would also like to officially change the name of the panel to: Systems Engineering/Integration and Large-scale Systems Panel. Paul

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10/1/2002 Panel Report
Systems Engineering/Integration and Large-scale Systems Panel

One of the key driving needs for systems engineering is on complex and/or large-scale systems projects. These are driven largely by large corporations, often aerospace and electronics firms. The AESS flagship conference, the DASC, now sponsored by this panel, has evolved to address many of these issues and corporations.

The Systems Engineering Panel has been focused on creating an environment between IEEE-AESS and these firms to support and drive requirements for systems engineering needs into AESS. This has been a difficult and on-going task for several years. This "customer-driven" relationship between corporations and IEEE-AESS is considered key to the formation and success of any systems engineering industry panel, committee or standard activity.

To this end a major breakthrough opportunity has presented itself and is underway. The number one aerospace company in the world, The Boeing Company, has been reorganizing it relationships with universities and professional organizations based upon value delivered and value potential delivered to their company. The undersigned, as part of a team, has become part of an IEEE-Boeing committee to define this value. The thrust of the value relationship is extremely high in both directions.

IEEE overall, and AESS and the Systems Engineering Panel in particular, offer high potential to Boeing in most of the areas that Boeing has defined as its future business vision, including large-scale system integration, internally efficient, common processes and electronics tools, datasets and networking and e-business. IEEE domains of expertise match this well. A presentation has been developed over the last few months that is now being scheduled for review with Boeing's world headquarters in Chicago. A few of the key charts are attached. The entire concept will be reviewed at the October, Los Angeles Board of Governors meeting.
The benefits to IEEE, AESS and the Systems Engineering Panel are twofold. 1) If, out of the 190 professional organizations Boeing deals with, IEEE becomes ranked in the top five, then this company will have a much greater focus on IEEE including the sponsoring of events. The undersigned has already requested a permanent yearly sponsorship of the DASC, for example. But this benefit would accrue to all the parts of IEEE that Boeing deemed of value. There would also likely be as part of the relationship an increased focus on Large-scale systems and systems engineering. The undersigned's intent would be to focus this into creating a "pull" for Systems Engineering Panel tasks and deliverables. 2) Being large, Boeing could set an example for IEEE and AESS that could be used to get other corporations more involved.

IEEE-Boeing Relationship

Submitted, Paul E. Gartz, Chairman

Technical Committee Representatives (Attachment 2) [1]

Committee	Representative	E-Mail Telephone	Report
Energy Policy (IEEE USA)	Henry Oman	h.oman@ieee.org 206-878-4458	Attachment 2.A
R & D (IEEE USA)	Russ Lefevre	r.lefevre@ieee.org 310-954-2200	Attachment 2.B
International Affairs (IEEE TAB)	Zafar Taqvi Hugh Griffiths	z.taqvi@ieee.org 281-244-4374 h.Griffiths@eleceng.ucl.ac.uk 44171-380-7310	Attachment 2.C
Communication & Information Policy (IEEE USA)	Mike Cardinale	cardinal@ieee.org 703-642-3538	Attachment 2.D
Transportation & Aerospace Policy (IEEE USA)	Cary Spitzer	cspitzer@avionicon.com 757-221-8031	Attachment 2.E
Standards Coordinating Committee SCC-20	Arnold Greenspan	a.greenspan@ieee.org 410-366-5411	Attachment 2.F
New Technology (IEEE TAB)	Bob O'Donnell	Rmod@ll.mit.edu 781-981-3028	Not Active

[1] Revised October 7th, 2002 – J. R. Huddle

ATTACHMENT 2.A – IEEE USA ENERGY POLICY COMMITTEE REPORT

19221 Normandy Park Drive SW
Seattle, WA 98166-4129
September 19, 2002

Dr. James R. Huddle, VP Technical Operations
IEEE Aerospace and Electronic Systems Society
Northrop Grumman Navigation Systems, MS-67
5500 Canoga Avenue
Woodland Hills, CA 91367

Subject: IEEE-USA Energy Policy Committee Report

Dear Jim:

In response to your E-Mail message of September 9, I enclose a report on the activities of the IEEE-USA Energy Policy Committee. I enclose both a written copy of the report and a computer disk that contains the report in Microsoft Word.

The IEEE-USA Energy Policy Committee is meeting on September 26, 2002, so I include in my report the agenda for that meeting. Also, at the 37th Intersociety Energy Conversion Engineering Conference, Narinder K. Trehan, from the U.S. Nuclear Regulatory Commission, presented a very pertinent paper: "Lessons Learned from California's Experience on Electric Power Regulation." I have in my enclosed report pertinent text and abstractions from Trehan's paper.

Tom Schneider has accepted an IEEE Congressional Fellowship for the Year 2003. Therefore, he is stepping down as Chair of the IEEE-USA Energy Policy Committee to avoid the appearance of too much conflict of interest.

Sincerely yours,

Henry Oman
(206) 878-4458, E-mail: h.oman@ieee.org

Draft Agenda IEEE-USA Energy Policy Committee

26 September, 2002
9:00 a.m. to 3:30 p.m.

IEEE-USA Headquarters
1828 L. St. NW, Suite 1202
Washington, DC 20036

I. 9:00 AM CALL TO ORDER/INTRODUCTIONS

II. Approval of Agenda/Minutes of Last Meeting

III. Chair's Remarks

Update on H.R.4

a. Reliability Language
b. Interconnection language

Appropriations Bills Update
Other Activities

IV. NEW BUSINESS:

1. Nomination and Election of Vice-Chair for 2003 – Wakefield
2. Strengthening EPC membership and Strategic Directions-Friedman
3. Identification of new position statements needed for 2003-All

V. UPDATE ON FERC AND ENRON ISSUES—POSSIBLE OUTSIDE SPEAKER

VI. TENTATIVE PLAN TO HAVE INVITED DOE SPEAKER, POSSIBLY PAUL CARRIER SCHEDULED AT 2 PM

VII. Position Statement Update

1. Electric Reliability Organization-**Schneider**
2. Need for a National Power Study-**Alvarado**
3. Nuclear Power for Today-**Jim**
4. Advanced Nuclear Power Research and Development-**Sauthoff/Schneider**
5. The Role of Engineers in Formulating Electric Power Policy-**Klein**
6. Electric & Hybrid Electric Vehicles-**Burleson, Bauman**

VIII. Old Business

1. National Transmission grid Study and Public Interest Transmission-**Schneider**

IX. ADJOURNMENT

LESSONS LEARNED FROM CALIFORNIA'S EXPERIENCE ON ELECTRIC POWER DEREGULATION

Narinder K. Trehan, P.E. Senior Member IEEE
U. S. Nuclear Regulatory Commission
9720 Overleaf Drive
Rockville, Maryland 20850

ABSTRACT

Lessons learned from the California's experience on electric power deregulation could make the transition to deregulation easier for the other states. California, that had not added a major power station even with increasing demand for power due to an emerging digital technology, ran short of electricity. Drought conditions throughout the Pacific Northwest had affected the available output of hydroelectric power resources and could not export electricity to California as it traditionally did. Higher emission costs, higher gas prices, under scheduling of loads and generation, unscheduled outages, unusual weather conditions and reluctance of out-of-state generators to deliver power, affected power supply. The reserve dropped below 1.5% (Stage 3) often and a rolling blackout was declared each time. California State signed long-term power contracts with companies. Since then, the wholesale electricity prices have dropped. Since January 1, 2001, about 4,300 MW of new generating capacity has been added in California. A limited price control may be the best way to handle a situation of rolling blackouts and surging wholesale electricity prices. The state should monitor power-generating stations' operations and set the rules to make sure they are not being intentionally shutoff. Industry experts concluded that the problem was isolated primarily to California.

1. INTRODUCTION

Twenty-four states including Texas have approved some form of electricity deregulation. Electric power deregulation has been successful in most states in the United States. Lessons learned from California could help the other states for a successful transformation under deregulation. In response to FERC's 1996 Orders Numbers 888 and 889, the deregulation of electricity supply in California started beginning January 1, 1998. The wholesale electric power market and customers' choice program worked for about a year and a half. In the summer of 2000, retail electricity prices in southern California reached all time high, and the shortage of active and reactive power forced rotating blackouts. The deregulation included an Independent System Operator (ISO) to administer the operation of the power grid and a California Power Exchange (CalPX) for spot market. At the beginning of deregulation the wholesale prices for buying power relied on a spot market instead of a long-term contract for power. Texas law does not include the short-term market for energy that proved so risky in California. With deregulation, open transmission access has resulted in increased electric power transfers that are closer to the stability limits.

II. WESTERN SYSTEM COORDINATING COUNCIL

The Western System Coordinating Council (WSCC)region is the largest of the ten regional reliability councils in the North American Reliability Council (NERC). There are 14 western states, two Canadian Provinces, and one Mexican state in the WSCC power grid. California ISO (CAISO) unifies six existing control areas and controls about 90% load demand of the California state. The generation capacity in California consists of 25% of hydroelectric power, 8% of nuclear power, and the rest from natural gas, oil, and coal fired generation. The Pacific Northwest has about 65% of hydroelectric power and this hydroelectric power is exported to California. To obtain low-cost energy, power transfers are required, all of which are carried over the transmission lines. During the summer, about 4000 MW of electric power produced by low-cost hydroelectric generation in the Pacific Northwest, is imported into California by three 500 KV ac Inter-tie lines and 3000 MW by one 500-kV dc Inter-tie line. Conversely, in the winter, when the runoff ceases, low-cost power from the nuclear power plants in California is exported to meet the electricity needs in the Pacific Northwest. The generating plants in California are interconnected by transmission lines spanning over long distances, and by that, require special relay protection schemes. The relays at the Malin and Captain Jack substations detect the voltage collapse and automatically disconnect the northern ties to Oregon and southern ties in Southern California and separate the grid into pre-engineered electrical islands. Each electrical island has generators and transmission lines to provide power to the customers. If the island were importing power before the separation, the generation would be insufficient to match the demand and the frequency within that system would drop and under frequency relays shed the unimportant loads and preserve services to rest of the customers. On the other hand, if the electrical island was exporting power before the separation, the frequency would rise because the generated power would exceed the demand. A few generating plants are automatically disconnected to bring the frequency back to 60 Hz. The transmission capacity linking between northern and southern California (called Path 15) is also limited. The limitation restricts the amount of power that can be transferred from southern to northern California even if surplus generation from the south is available.

III. Operating Reserves

Operating Reserves under ancillary Services consist of Spinning Reserve Service and Supplemental Reserve Service. A spinning Reserve Service consists of generation synchronized to the power system and responsive to Automatic Generation Control. A Supplemental Reserve Service consists of generation synchronized, or capable of being synchronized to the power system, that is fully available within ten minutes of the first contingency, or load fully removable from the power system within ten minutes of the first contingency in normal operation. CASIO keeps the operating reserve above 7%. If the generation cannot keep up with the demand and the operating reserves are below 7%, Stage 1 Emergency is entered. When the operating reserves are below 5%, Stage 2 Emergency is entered. When the Operating Reserves fall below 1.5%, Stage 3 Emergency is entered. CAISO declared Stage 3 Emergency a number of times, and declared rotating blackout to prevent potential widespread disturbances to California's electric transmission grid. Sometimes power consumed was 2000 megawatts over

forecasts due to temperatures that are 5 to 6 degrees F hotter than meteorologists predicted.

IV. Lessons Learned

Higher emission costs, higher gas prices, more under-scheduling of loads and generation, unscheduled outages, unusual cold weather and reluctance of out-of-state generators to deliver power, fearing that the utilities could not pay them and affected the electric power supply. Extreme drought conditions throughout the Pacific Northwest had affected the available output of hydroelectric power resources. Growth in demand in electric power due to booming economy in the Silicon Valley in California had exacerbated the energy situation in California. California Assembly passed legislation to fix the energy crisis by making the state a major electricity broker in buying and selling power. Following are the lessons learned from California's experience on electric deregulation.

Note: The text that follows contains summaries of the detailed descriptions in the "Lessons Learned" part of Narinder K. Trehan's 35th IECEC Paper No. 20006, "Lessons Learned from California's Experience on Electric Power Deregulation." The full text is available from the Institute of Electrical and Electrical Engineers, IEEE Operations Center, 445 Hoes Lane, Post Office Box 1331, Piscataway, N.J. 08855-1331. The Proceedings carries IEEE Catalog Number 02CH37298)

A. Short-term Contracts

At the beginning of deregulation California bought power from a spot market, instead of long-term contracts. Utilities had to pay high prices for the power. In 2001 California State signed 56 long-term power contracts, and the prices have dropped.

B. Selling of Fossil, Oil-fired, and Gas-fired Generators

Unlike in New York and other states, deregulation required California to sell its fossil, oil, fired, and gas-fired power generators, but not nuclear power plants. Power then had to be bought from independent power producers.

C. No New Generating Plants Built

After deregulation the transmission and distribution companies are not required to build new power plants. The generation capacity in California decreased 2% from 1990 through 1999, while demand increased by 11%. The booming economy, like in Silicon Valley, increased the demand for electric power. The state currently depends on 11,000 MW of out-of-state capacity. Tight federal emission standards have made it difficult for California to add new power plants. Since January 1, 2001 about 4300 MW of new generating capacity has been added in California.

D. Emissions Allowances

During the critical power shortages some of the power plants had to reduce their power output because they had used their allotted emission allowances. California lifted air standards and the fossil-fueled and gas-fueled power plants can now run at full capacity and avoid shutting down to satisfy air-quality standards.

E. Building Nuclear Power Plants

Financial troubles have delayed completion of new nuclear power plants in California. The present administration supports the expansion of nuclear energy in the United States. Nuclear power is environmentally cleaner as compared with the coal-fired plants. Acid rain due to coal-fired plants is causing greater damage to the environment than previously thought.

F. Constrained Power Exchanges from California Out and Into California

Widespread outages in the Western States in 1996 resulted in a 10% decrease in the power allowed to be carried in inter tie transmission lines. This decline provided a greater margin of stability. Similar limitations are in place in lines carrying power between northern and southern California. The CAISO control area had to curtail interruptible and firm customer-demands during peak periods and other times of stress.

G. Reluctance of Out-of-State Utilities to Sell Power

Out-of-state power-generating utilities feared that California could not pay them because its load demand had increased by 11%.

H. Maximizing Profit by Power Producers

The power producers would commit only part of their capacity into CalPX and would maximize their profits when the ISO had to buy electricity in real time to meet electric demand. The California electric utilities were required to buy power through the CalPX. They could not enter long-term contracts for power. As the wholesale power price on the spot market increased, the utilities had to pay higher prices

The big power-supplying companies manipulated the state's electricity market artificially to inflate the electricity costs and profits. One independent power producer charged $3322 per MWH. It should have charged no more than $273 per MWh.

The FERC subsequently imposed stricter controls on electricity prices in California and its ten neighboring states to prevent companies from transporting power to neighboring states where price restraints were not in effect, and transporting the power at a higher price to California.

I. Freeze on Retail Electricity

California had capped the retail prices of electricity at their June 1, 1996 level to protect agricultural, residential, industrial, and commercial customers from increased energy cost. Utilities, being unable to recover their increasing power-generating costs, incurred severe losses. On March 27, 2001 the California Public Utility Commission increased the retail rates by up to 46%, motivating customers to conserve energy.

J. Aging Components of Fossil Plants

Aging equipment was limiting the power-generation capacity in California.

K. Voltage Reduction During Peak Periods

In New England and in the rest of the world, the voltage of the power delivered to users is reduced during periods of crisis. A 5% voltage reduction reduces power consumption by about 2%. The manufacturing standards for electric motors and other equipment specify a +/- 10% voltage range.

In June, 2001 the electric utilities in California agreed to reduce voltage from the nominal 120 volts to 117 volts. The utilities will turn down voltages at substations statewide. This would save 500 MW of electricity-consumption in the state during hot days.

L. Inadequate Power Transfer from Hydroelectric Generating Stations

About 11% of California's electricity is imported from hydroelectric power plants in the Northwestern U.S. Extreme draught throughout the Pacific Northwest reduced the availability of this hydro power during the critical hot summer when air-conditioning loads in California were at their highest.

M. Awareness of Energy Conservation by Consumers

Rotating blackouts in California made the consumers aware of the need to conserve energy use. They reduced power consumption by 11%. One program offered a 20% rebate on utility bills if the consumer cut power consumption by 20%.

N. Inadequate Fuel Supplies

With hydroelectric power availability reduced, the power producers depended on gas-fired generating stations. This, plus limitations on the import of gas from Mexico, drove gas prices upward.

O. Generating Units Unavailable.

Some generating units were unavailable due to maintenance, and older units were out for repair. Air quality restrictions limited the allowable generating capacity of some units. Some power producers purposely shut down the power generating units to drive energy prices upward.

P. Long Distances between Generation and Load Centers

In California transmission lines that interconnect the generators span over long distances, and incur heavy voltage drops.

Q. Congestion of Path 15

Path 15 is a group of high-voltage lines that feed electricity back and forth between Northern and Southern California. Path congestion has grown as loads grew, and the power carrying capacity of these lines is limited. Traditionally, utilities add new transmission lines to handle unexpected increases in load. Because of the difficulty in obtaining permits due to environmental effects and the uncertainty of recovering healthy returns, the utilities are not adding new transmission lines.

R. Help from Advanced Technologies During Transition to Deregulation

Flexible AC Transmission System (FACTS) uses high-speed electronic controllers, advanced control technology, fiber optics, and advanced microcomputers to provide correct transmission voltage, line impedance, and the phase angle between them. The static VAR compensator and static synchronous compensator can be used to maintain reactive and voltage control of the electrical grid during heavy power transfers.

S. Help from Distributed Power Resources during Transition to Deregulation

Distributed power sources such as micro turbines, solar cells, wind turbines, fuel cells, and diesel generators can reduce dependence on the electrical grid while improving the adequacy and security. IEEE Standard P1547 provides criteria for such devices. When fully implemented, distributed power generators could provide to the consumer a low cost, uninterrupted power supply for avoiding losses that would occur when power is interrupted. These generators could also be used to generate peak-period power after the utilities place a higher charge for use of peak-period power. The owner of a distributed generator could even sell power to his supplying electric utility. Ratings of distributed-power generators range from less than a kilowatt to tens of megawatts.

V. Conclusion

Lessons learned from the California's experience on electric power deregulation could make the transition to deregulation easier for other states. California, that had not added a major power station even with increasing demand for power due to an emerging digital technology, ran short of electricity. Drought conditions throughout the Pacific Northwest had affected the available output of hydroelectric power resources and could not export electricity to California as it traditionally did. Higher emission costs, higher gas prices, under-scheduling of loads and generation, unscheduled outages, unusual weather conditions and reluctance of out-of-state generators to deliver power affected power supply. The reserve dropped below 1.5% (stage 3)often and a rolling blackout was declared each time. California State signed long-term power contracts with the companies. Since then, the wholesale electricity prices have dropped. Since January 1, 2001, about 4,300 MW of new generating capacity has been added in California. Federal Energy Regulatory Commission (FERC) imposed stricter controls on electricity prices in California and ten neighboring states. A limited price control may be the best way to handle a situation of rolling blackouts and surging wholesale electricity prices. The state should monitor power-generating stations' operations and set the rules to make sure they are not being intentionally shutoff.

ATTACHMENT 2.B - R&D POLICY COMMITTEE REPORT

1. Ron Hira testified at a Senate Hearing on the CyberSecurity Bill and the NETGuard Bill. I wrote the portion on the NETGuard Bill.

2. This committee is the most concerned of the IEEE-USA Policy committees on the ITAR issues and we had discussions at both meetings between our last BOG meetings. The publication part of this issue has been settled as I have pointed out in my emails.

3. The committee works with the Coalition for National Security Research (CNSR) and the Coalition for National Science Funding (CNSF). Each of these organizations' charters deal with increasing the Government support of R&D.

4. We are tracking the following bills: Cyber Security (HR 3394, S2182), National Emergency Technology Guard (NETGuard) (S2037), National Science Foundation Doubling (S2817, HR 4664), National Science and Technology Assessment Service (NSTAS) in HR 4, Homeland Security (HR 5005, S2452), FY2003 Appropriations.

5. We were briefed by Kei Koizumi of AAAS on the outlook for R&D in the budget process. We were also briefed by Bob Boege, Alliance for Science and Technology Research in America (ASTRA) whose charter is to double the Government funding for R&D in the Physical Sciences and Engineering.

Russ Lefevre

ATTACHMENT 2.C - Report on International Affairs

September 27th, 2002

1- Officially joined Region 9 Technical Committee to help coordinate AESS-related technical activities in Latin America. Efforts are underway on organizing a series of system-related presentations to the membership as well as boosting AESS chapter formation in Region 9.

   Regional Technical Committees in Region 8 and Region 10 are next to be contacted.

2- Attended IMEKO/Technical Committee 17 sponsored 12th International Symposium on Measurement and Control in Robotics, ISMCR2002, at ENSI, Bourges, France, June 20-21, 2002. The symposium theme was 'Towards Advanced Robots Systems and Virtual Reality'. Gave a Keynote presentation on 'Essentials of Space Robotics'.

   Delegates from 24 different countries attended ISMCR2002. Next ISMCR will be held in Spain in September 2003.

3- As a member of Aerospace Technology Working Group (ATWG- An Industry – NASA – Academia Technical Group), headed by Dr. Ken Cox/NASA-JSC, I have been attending the periodic teleconferences that deal with the latest developments in aerospace technology activities. Plans are underway to attend ATWG Fall Meeting slated for November 4-7, 2002 at Houston. Many of the sessions being considered are of direct concern to AESS.

   List of Potential Session Themes:

   -DOD View of Promoting Space Commercialization
   -SLI Technology and Mission Activities
   -ISS in a Tended Mode to support University and Industry Free Flyers and Platforms
   -FAA session
   -Expanded Utilization of Existing Space Assets
   -DOD Space Technology and Operations
   -Unmanned Space Operations - Architecture, Ops Concepts, Autonomous Operations
   -Session for Academia and Education
   -Scenarios for NASA Technology Leadership in Space
   -Session on Smart Systems Engineering
   -Earth Orbit Commercialization Opportunities
   -Outreach session - International Space University, Planetary Society, etc.
   -Scenarios for Human and Robotic Missions Beyond Earth Orbit
   -Advanced Technology Session
   -Advanced Power Systems including Nuclear
   -Space Commercialization beyond ISS

4- Have been in touch with NASA/Johnson Space Center, Robotics and Automation Division for a possibility of their support with selected papers on 'Robotics in Space, Tools and Aids' that could support an issue of technical AESS transaction. No significant progress as yet.

Respectfully Submitted:

Zafar Taqvi, Ph.D.
Communications and Tracking
International Space Station
Office: 281-244-4436
FAX: 281-244-4374

ATTACHMENT 2.D

Activities of the IEEE-USA Committee on Communications and Information Policy
Report to the AESS Board of Governors
October 22, 2002

Policy Statements. Two policy statements have been published by the Committee on Communications and Information Policy (CCIP) since the last Board of Governors meeting:

Critical Infrastructure Protection and Information Technology, and *Encryption Policy*. Their full texts can be found at http://www.ieeeusa.org/committees/CCIP/index.html#positions.

Activities

One regular meeting was held on March 22, 2002.

The CCIP cosponsored with Cornell University a broadband deployment workshop on June 17-18, 2002 in Washington, D.C. There were over one hundred participants. The workshop ended with a congressional briefing. A set of recommendations is still being developed with respect to the role of the Federal Government in supporting the deployment of infrastructure.

The CCIP continued working on a policy statement regarding *Computer Crime*, which will be jointly published with the Intellectual Policy Committee (IPC).

The *Privacy Online* statement is still under revision. The original revision before September 11, 2001 was very protective of individuals from Government snooping. The philosophy was significantly revised at the March meeting, and no activity has been apparent since then.

A joint CCIP and Energy Policy Committee (EPC) statement on *The Role of Engineers in Formulating Technology-Related Public Policy* was approved by the CCIP and forwarded to the EPC for approval.

A statement *Computer Industry Patents* is under development.

A statement *University Intellectual Property Policy Guidelines* is under development.

ATTACHMENT 2.E - TRANSPORTATION POLICY COMMITTEE

From: Cary R. Spitzer [cspitzer@widomaker.com]
Sent: Sunday, September 29, 2002 5:30 PM
To: Huddle, James
Subject: Re: Technical Committee Report

Jim:

September 27, 2002

To: AESS Board of Governors

From: Representative to the IEEE-USA Committee on Transportation Policy

Subject: Status Report

There have been two meetings of the CTP since the last AESS BoG meeting. One more is scheduled for this year on December 5, 2002 at IEEE-USA, Washington. AESS has been effectively represented at these meetings by Russ Lefevre, Saj Durrani, and Cary Spitzer.

One notable achievement has been the publishing of the IEEE-USA Position Statement on Aviation Safety. Also in work is one on upgrading the Air Traffic Control system. Both of these have strong AESS input.

A committee name change will be effective in 2003 to the IEEE-USA Committee on Transportation and Aerospace Technology Policy.

The Aviation Coalition
(AIAA, ASME, IEEE, National Aerospace Technology Committee) has been very active in relations with the U.S. Congress. The IEEE-USA, under AESS and CTP leadership, has been a signatory through membership in the Aviation Coalition to several letters to selected Congressmen and Senators concerning NASA and FAA budgetary issues. In contrast to generation and approval of Position Statements, Aviation Coalition matters move at a very rapid pace.

Cary Spitzer

ATTACHMENT 2.F - STANDARDS COORDINATING COMMITTEE

From: Meetco@aol.com
Sent: Tuesday, September 17, 2002 6:49 PM
To: Huddle, James
Subject: SCC20 Report

Dear Jim:

I'm afraid that I have little to report as regards SCC20. There has not been a meeting of SCC20 since my last report. A meeting is planned for next month in Huntsville Alabama. Unfortunately this will be well beyond the 27 September deadline. I will send you a report on the Huntsville meeting as soon as it is completed. The Steering Committee of SCC20 did have an electronic meeting to discuss modification of the groups By-laws. No conclusions were reached during this meeting and it was adjourned.

Sincerely,
Arnie Greenspan

Summary of Distinguished Lecturer Activities

Reviewed October 7th, 2002 – J. R. Huddle

Lecturer	Lecture	2002	2001	2000	1999
Jim Peters	Formal Methods in Design				Note 14
Bob Hill	Advances in Radar				
Dick Wiley	Electronic Warfare & Modern Radar Signals		Note 23	Notes 16, 17	
Pramod Varshney	Multi-Sensor Data Fusion	Note 33			
Myron Kayton	Navigation – Land, Sea, Air			Note 20	Note 11
Myron Kayton	Avionics for Manned Spacecraft				
Myron Kayton	Practicioners View of System Engineering		Note 27		Notes 12, 13
William Ward	Planetary Exploration		Note 25, 28 (4 Lectures)	Note 15 (2 Lectures)	Note 9
Eli Brookner	Radar – Past, Present, Future		Note 22		
Saj Durrani	Satellite Communication Systems		Notes 21, 26	Notes 18, 19	Note 8
Paul Gartz	System Engineering for International Development	Note 32	Notes 24,30		
Yaakov Bar-Shalom	Target Tracking				
Larry Chasteen	National Missile Defense and Early Warning Radars	Note 31	Note 29		
	Total	3	12	7	6

Details on the Locations of the Lectures

Note	Location	Date
1	Nagoya University, Japan	10-22-98
2	Thomson CSF Labs, France	7-98
3	Instituto Militar de Engenharia, Rio de Janeiro, Brazil	10-19-98
4	Instituto Tecnologico de Aeronautica, San Jose dos Campos, Brazil	10-8-98
5	Embraer Company, San Jose dos Campos, Brazil	10-8-98
6	Escuela Technica del Buceo, Montevideo, Brazil	10-13-98
7	Military Academy, Montevideo, Brazil	10-14-98
8	Section Meeting in Lahore, Pakistan	1-23-99
9	Swarthmore College Student Branch	3-23-99
10	Electrical & Computer Engineering, Villanova & Philadelphia Section (Al Gross)	11-4-99
11	Communications Research Center, Ottawa Section	8-26-99
12	Laval University, Quebec City	8-30-99
13	Dallas Chapter	10-26-99
14	Penn State University	6-8-99
15	Boston Chapter Providence Section	2-3-00 10-10-00
16	Atlanta Chapter	5-23-00
17	Central Georgia Section	7-26-00
18	Technical University of Finland, Helsinki Section	9-22-00
19	Electro Technical University, St. Petersberg, Russia, AESS Chapter	10-2-00
20	St. Louis University & the Missouri Conference	11-2,3-00
21	IEEE Panama Section	3-23-01
22	IEEE Section in Cairo – National Radio Science Conference	3-27-01
23	Dayton Section	3-8-01
24	AESS Dallas Chapter	4-24-01

Note	Location	Date
25	RadarCon 2001 Boston Section IEEE Student Branch, Boston University	5-1-01 3-18-01 2-1-01
26	AESS Chapter, Aristotle University of Thessaloniki, Greece	4-25-01
27	IEEE/INCOSE Meeting at NASA, Houston	5-16-01
28	Birmingham, Alabama Section	9-10-2001
29	Atlanta AESS Chapter	10-25-2001
30	University of Southern California	11-20-2001
31	Seattle Chapter	2-25-2002
32	University of Southern California	3-26-2002
33	Atlanta Chapter	5-30-2002

Distinguished Lectures in Planning Stage

Lecturer	Lecture	Location and Tentative Time
Jim Peters	Formal Methods in Design	
Bob Hill	Advances in Radar	
Dick Wiley	Electronic Warfare & Modern Radar Signals	
Pramod Varshney	Multi-Sensor Data Fusion	
Myron Kayton	Navigation – Land, Sea, Air	Vancouver, BC Chapter – November, 2002 Stratford, Connecticut Chapter – Fall, 2002
Myron Kayton	Avionics for Manned Spacecraft	
Myron Kayton	Practicioners View of System Engineering	
William Ward	Planetary Exploration	Student Branch - Portland State University - *Request* No Firm Date
Eli Brookner	Radar – Past, Present, Future	
Saj Durrani	Satellite Communication Systems	
Paul Gartz	System Engineering for International Development	Dallas Chapter - Fall, 2002
Yaakov Bar-Shalom	Target Tracking	
Larry Chasteen	National Missile Defense and Early Warning Radars	

Currently Approved

To: Barry Breen
Cc: Russell Lefevre (IEEE); Charley Gager; Bahar Uttam
Subject: PLANS '04 Executive Committee Meeting
July 30th

Barry

On July 12th, I attended the first planning session for PLANS '04 at the Monterey Hyatt, the venue for the next conference. A report on the highlights of the meeting is attached. An excellent team of people have volunteered to organize the next conference. One highlight of the planning & organizational approach is a 34 page Operating/Marketing Plan and the implementation of a web-based application called the "Virtual Office"

Regards, Jim

PLANS Exec Meeting 7-12-02.doc...