In Honor of our exceptional colleague and friend

KENNETH McKECHNIE ELDRED

167th meeting of the

Acoustical Society of America

May 2014

Providence, Rhode Island

Posted on the INCE/USA website for colleagues not able to attend the session, provided here are copies of the agenda and slides by five presenters followed by a photograph of family members who attended and a photograph of the presenters.

Session 2aNSa

Noise: Session in Honor of Kenneth Eldred

Louis C. Sutherland, Cochair
lcs-acoustics, 5701 Crestridge Rd., Apt. 243, Rancho Palos Verdes, CA 90275

Paul D. Schomer, Cochair
Schomer and Associates Inc., 2117 Robert Dr., Champaign, IL 61821

9:00

2aNSa1. Kenneth McKechnie Eldred—A distinguished noise control engineer I. William W. Lang (Noise Control Foundation, 29 Hornbeck Ridge, Poughkeepsie, NY 12603, lang1ww@gmail.com) and George C. Maling (NAE Member, Harpswell, ME)

Elected in mid-career in 1975 to the U.S. National Academy of Engineering (NAE) "For outstanding accomplishments in noise and vibration control of air, space, and transportation vehicles and in delineating acceptable noise environments for people." His NAE peers recognized him "...as one of the five best noise and vibration control engineers in the country." Ken's first job after graduating from M.I.T. in 1950 with studies of advanced courses in acoustics was as head of the Boston Naval Shipyard's lab working on the reduction of the noise and vibrations of submarine auxiliary equipment. In 1953 on active duty in the U.S. Air Force, he became Chief of the Bio-Acoustics Branch, Wright Air Development Center. In 1957, he moved to California for a career with Western Electro-Acoustic Laboratory and Wyle Laboratories prior to joining Bolt Beranek and Newman. This paper is primarily devoted to his activities in support of INCE/USA, his role in the passage of the Noise Control Act of 1972, and his activities in connection with the Office of Noise Abatement and Control in the U.S. Environmental Protection Agency.

Some Papers by Ken Eldred

Assessment of Community Noise
K.M. Eldred
NCEJ, **3**(2) 88-95, 1974

Paper 2aNSa1

This is George Maling's portion of the paper "Kenneth McKechnie Eldred – Distinguished Noise Control Engineer I

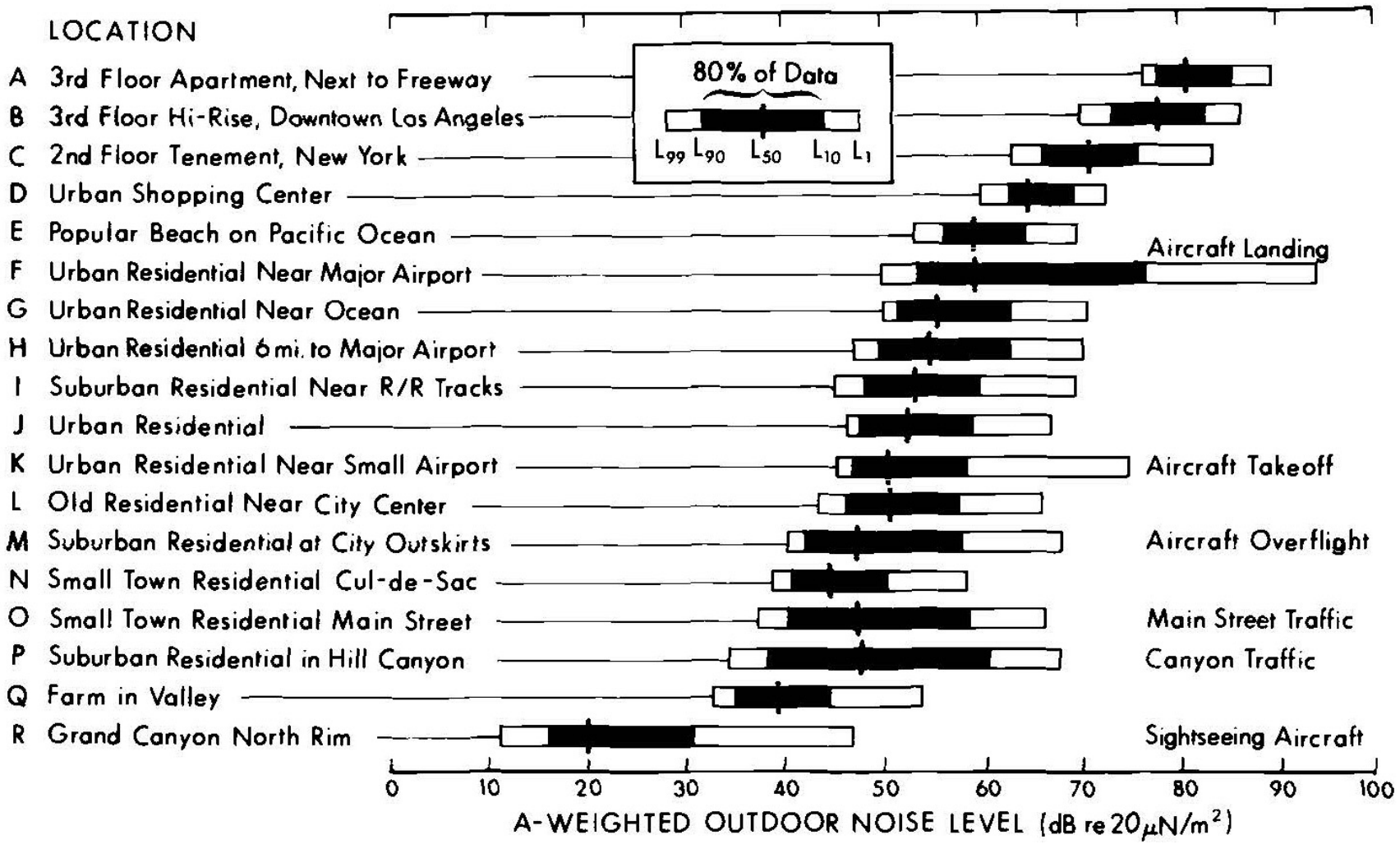
May 6, 2014

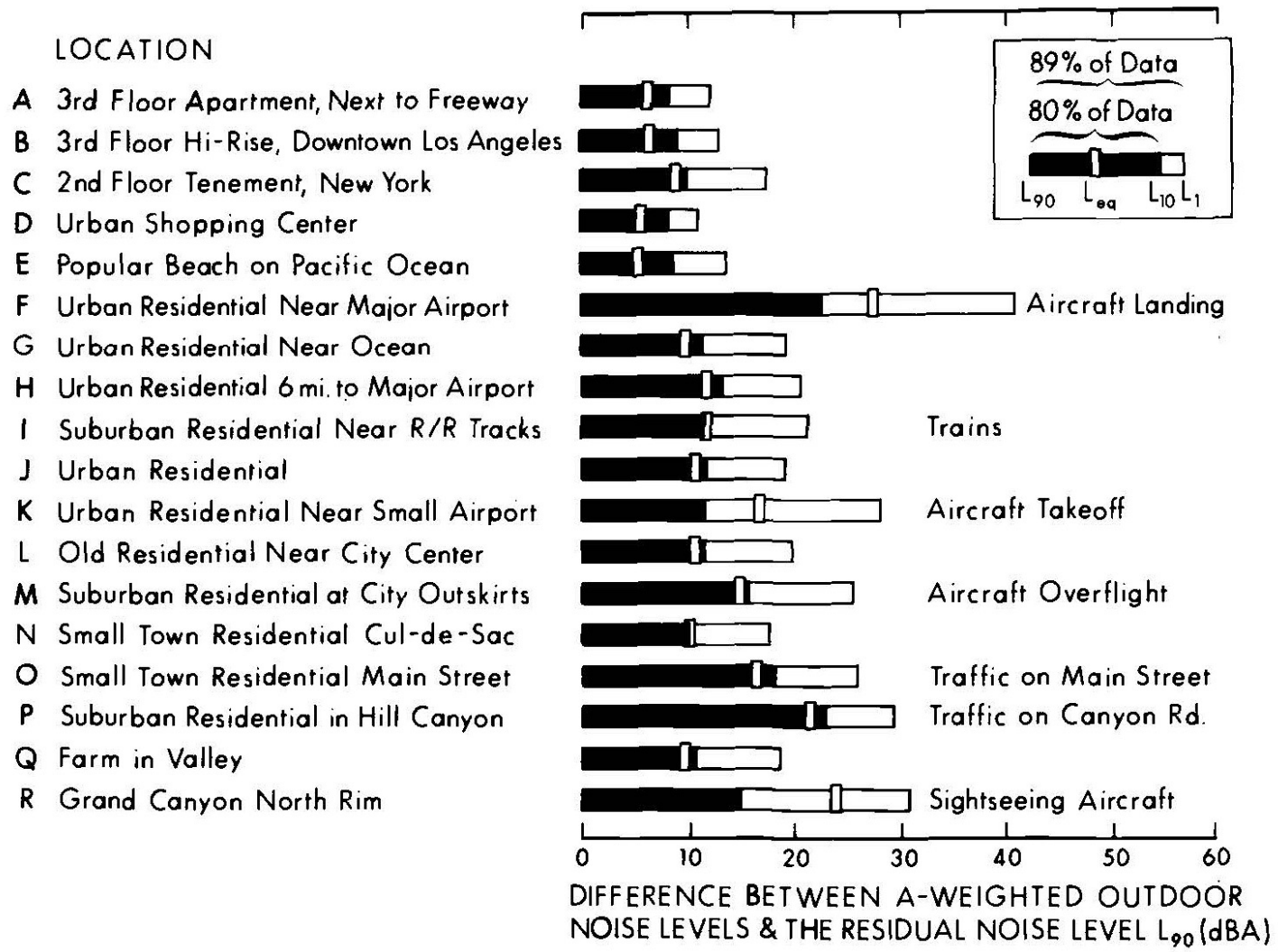
Paper 2aNSa1

George Maling’s portion of the paper “

Assessment of Community Noise

- Done when Ken was at Wyle
- Based on an EPA report which was written before passage of NCA 72
- Several items in the report are of interest to me
  - "Noise Thermometer" with ranges
  - Levels above baseline
  - Normalized L_{dn}


LOCATION
A 3rd Floor Apartment, Next to Freeway
B 3rd Floor Hi-Rise, Downtown Los Angeles
C 2nd Floor Tenement, New York
D Urban Shopping Center
E Popular Beach on Pacific Ocean
F Urban Residential Near Major Airport
G Urban Residential Near Ocean
H Urban Residential 6 mi. to Major Airport
I Suburban Residential Near R/R Tracks
J Urban Residential
K Urban Residential Near Small Airport
L Old Residential Near City Center
M Suburban Residential at City Outskirts
N Small Town Residential Cul-de-Sac
O Small Town Residential Main Street
P Suburban Residential in Hill Canyon
Q Farm in Valley
R Grand Canyon North Rim
80% of Data
L99 L90 L50 L10 L1
Aircraft Landing
Aircraft Takeoff
Aircraft Overflight
Main Street Traffic
Canyon Traffic
Sightseeing Aircraft
0 10 20 30 40 50 60 70 80 90 100
A-WEIGHTED OUTDOOR NOISE LEVEL (dB re 20 μN/m²)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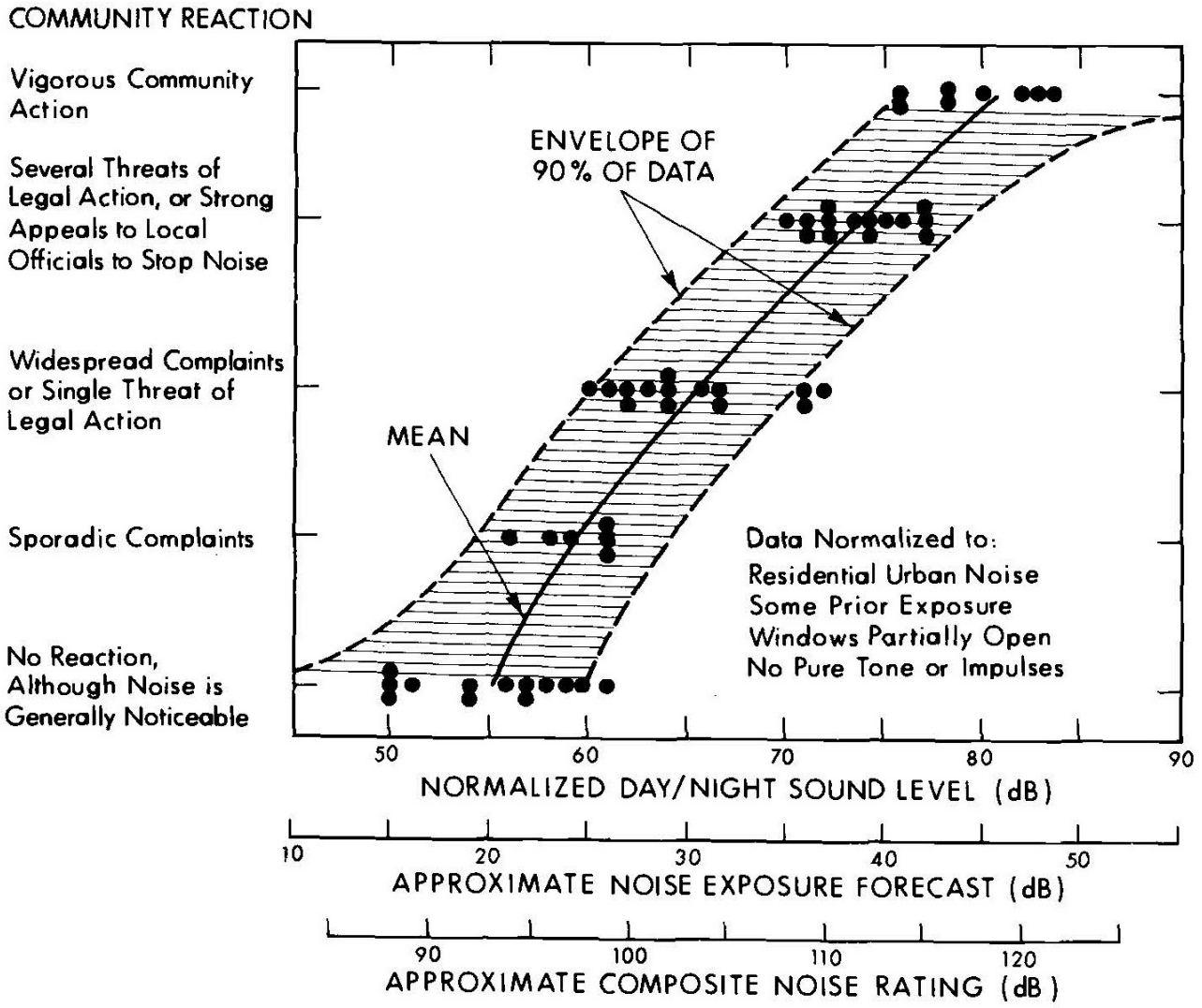
L90 Leq L10 L1
Aircraft Landing
Trains
Aircraft Takeoff
Aircraft Overflight
Traffic on Main Street
Traffic on Canyon Rd.
Sightseeing Aircraft
0 10 20 30 40 50 60
DIFFERENCE BETWEEN A-WEIGHTED OUTDOOR NOISE LEVELS & THE RESIDUAL NOISE LEVEL L90 (dBA)

Assessment of Community Noise

- Discussed several metrics currently used for the assessment of community noise
- Along with the day-night average sound level, L_{dn}, he discussed the normalized L_{dn}
- A way to account for environment in judging reaction to community noise by applying weighting factors to different environments.


COMMUNITY REACTION
Vigorous Community Action
Several Threats of Legal Action, or Strong Appeals to Local Officials to Stop Noise
Widespread Complaints or Single Threat of Legal Action
Sporadic Complaints
No Reaction, Although Noise is Generally Noticeable
ENVELOPE OF 90% OF DATA
MEAN
Data Normalized to:
Residential Urban Noise
Some Prior Exposure
Windows Partially Open
No Pure Tone or Impulses
50
60
70
80
90
NORMALIZED DAY/NIGHT SOUND LEVEL (dB)
10
20
30
40
50
APPROXIMATE NOISE EXPOSURE FORECAST (dB)
90
100
110
120
APPROXIMATE COMPOSITE NOISE RATING (dB)

Assessment of Community Noise

- Well before the “Schultz Curve”
- A preview of what was to follow after passage of the Noise Control Act of 1972.

Standards and Criteria for Noise Control—an Overview

K.M. Eldred

NCEJ,

Standards and Criteria for Noise Control-an Overview

- A people-oriented article in the sense that the criteria are related to the effects of noise on people.
- Considered regulatory criteria and voluntary standards
- Listed available documents in both areas
- Covered speech interference, community noise, and occupational noise

Standards and Criteria for Noise Control-an Overview

- Also covered: criteria for offices and other enclosed spaces
- Extensive background material in all cases
- Discussed the dual nature of criteria
  - Levels compatible with human activity or protective of hearing
  - Criteria based on relative intrusiveness

Standards and Criteria for Noise Control-an Overview

- Four years between submission and publication so it spans the late years of the EPA program

Effects of Noise on People

H.E. von Gierke and K.M. Eldred

Noise/News International,
1(2),67-89, 1993

Effects of Noise on People

- Why NNI?
- Partly based on a navy EIS
- Presents the many descriptors for environmental noise. EPA and standardized
- Made use of pascal-squared seconds (pasques) as the unit of sound exposure

Effects of Noise on People

- Noise effects for several situations, including:
  - Speech interference
  - Effects on learning
  - Task performance
- Used normalized L_{dn}
- Included updated Schultz curves and the FICAN fit

9:20

2aNSa2. Kenneth McKechnie Eldred—A distinguished noise control engineer II. George C. Maling (NAE Member, 60 High Head Rd., Harpswell, ME 04079, maling@alum.mit.edu) and Eric W. Wood (Acentech Inc., Cambridge, MA)

Ken's accomplishments in noise control engineering cover the spectrum from basic engineering research to recommendations for noise control in six areas: measurement of industrial noise; measurement and reduction of structural vibration in space vehicles; noise radiation from jet flow; noise reduction of jets by multiple nozzles and turbofans; vibroacoustic environmental simulation for aerospace vehicles; and community and transportation noise control. Some of these areas are discussed in consulting reports, and others in papers published in the open literature. He was a consultant at Bolt Beranek and Newman from 1973 until 1982 when he formed Ken Eldred Engineering. His publications appeared in the journal NOISE Control, several NOISE-CON and INTER-NOISE Proceedings, *Noise Control Engineering Journal*, and the *Journal of the Acoustical Society of America*. Representative samples of his accomplishments taken from the above sources will be presented.

Experienced Blue-water Sailor Enjoying Time Away from His Office

In Honor of Kenneth Eldred

Acentech

We were honored for Ken to join Bolt Beranek and Newman in February, 1973 after his graduation from Wyle Labs

At BBN, he served as Vice President and Director of our Architectural Technologies and Noise Control Division

He formed Ken Eldred Engineering in 1982, located first in Concord, MA and later along the coast in East Boothbay, Maine

Ken provided environmental noise consulting services to many clients while also fulfilling his role as a BBN executive

He prepared many technical papers and client sponsored reports

Titles of some of his client reports shown on the next few slides illustrate the range of his consulting services while at BBN

Examples of Ken's Reports While at BBN
Airport Clients

- Preferential Runway Alternatives for Logan Airport
- Aircraft Noise -Takeoff Flight Procedures and Future Goals
- Estimate of the Impact of Noise from Jet Aircraft and Air Carrier Operations
- Analysis of Selected Topics in the Methodology of the Integrated Noise Model

Examples of Ken's Reports While at BBN

Noise Abatement Clients

- Reduction of Noise Generated by Rapid Transit Cars: Noise Control Recommendations
- Noise Control for Rapid Transit Cars on Elevated Structures: Preliminary Investigation of Vehicle Skirts, Sound Absorption, and Noise Barriers
- Noise Control Technology Evaluation for Supersonic Transport Category Aircraft

Examples of Ken's Reports While at BBN
Regulatory Clients

- Economic Impact of Acoustic Measurement Uncertainty
- Comparison of Alternative Strategies for Identification and Regulation of Major Sources of Noise
- **Objectives of a National Noise Abatement Program**
- **Potential Effectiveness of EPA Regulation of Industrial Machinery Noise Emissions**

Objectives of a National Noise Abatement Program

Questions acknowledged:

- What is the definition of the health or welfare noise problem?
- What would be recognized as a satisfactory solution?
- What is the urgency of effecting a solution?
- Do technological solutions exist?
- How much of the national resources should be expended?
- Are these resources sufficient to effect a total solution?

Potential Effectiveness of EPA Regulation of Industrial Machinery Noise Emissions

Co-author with Bruce, Potter, et al

Identify industrial machinery causing chronic noise overexposures to > 2.5 million workers

Consider effectiveness of machine noise emission standards by EPA via the Noise Control Act of 1972

Summarize 68,000 OSHA noise inspections: violation rate (18%)

In situ noise controls often unavailable or considered too expensive

Machines analyzed include: screw machines, metal stamping presses, grinders, pneumatic hand tools, spinning frames, saws, and crawler tractors

In Honor of Kenneth Eldred

Acentech

Two Additional Projects

Ken, Dave Keast, and I worked together during 1988 to help the State of Maine develop a new comprehensive environmental noise regulation

Ken and Jim Barnes worked together to help Puerto Rico convince the US Navy to stop using a small nearby inhabited island (Vieques) as a target for artillery fire and bombing runs

Steve Levy, Our BBN President Remembers Ken

as an amiable colleague, able manager, and consummate professional with whom I and others at BBN had a very happy and productive relationship

Ken quickly earned the respect and admiration of all of his BBN colleagues for his technical expertise, his managerial abilities, and his leadership skills

Ken as a Mentor

Fortunately Dick Potter will share with us his memories about Ken as a mentor.

What others have said about Ken:

-Nick Miller says of Ken: "What a great mentor!"

-Jim Barnes says: "entire experience was most educational"

-Mike Lucas says: "eager to learn from Ken … a master"

-Erich Bender says: "to integrate technology, human factors and diverse organizations was one of his hallmarks"

-Andy Harris says: "most lasting memory of Ken is his joy for life, family, friends, sailing, and doing things well"

Ken While Away from His Office

Most presentations this morning focus on Ken's many technical contributions to our profession

There is another important aspect shown in the following family photographs

Ken with daughter Heidi and granddaughters Tess and Ceysa on the water in the Caribbean

In Honor of Kenneth Eldred

Acentech

Ken sailing with granddaughter Tess

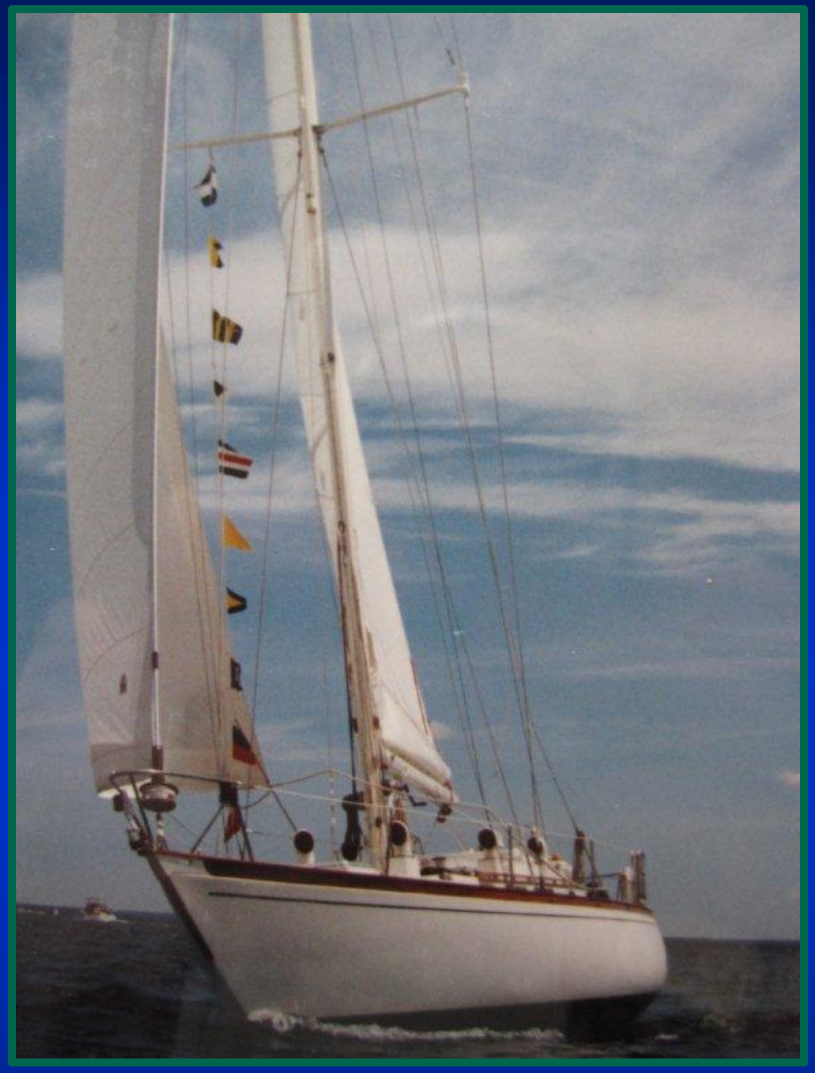
In Honor of Kenneth Eldred

Acen*tech*

Ken sailing with granddaughter Ceysa

In Honor of Kenneth Eldred

Acentech



Ken's Boat the Ammersee, 1991

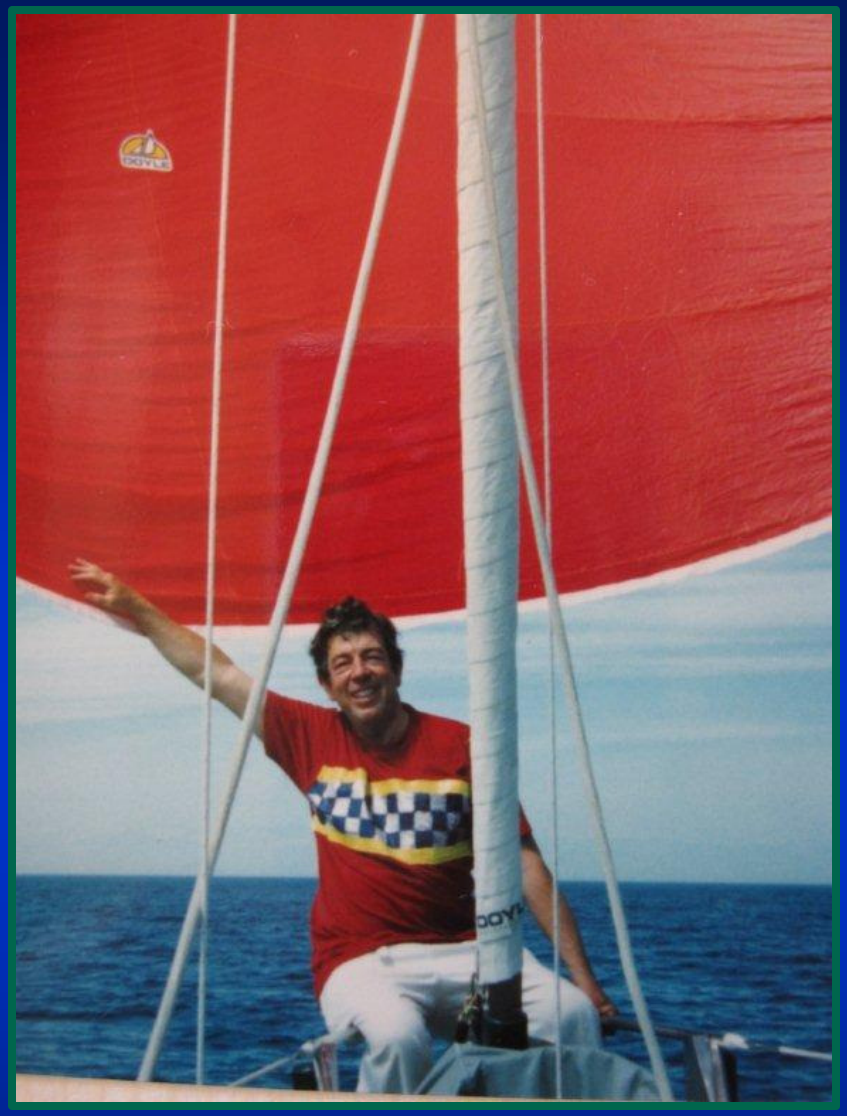
In Honor of Kenneth Eldred

Acen*tech*

Ken Sailing the Bermuda Race on the Ammersee

In Honor of Kenneth Eldred

Acentech



Ken with a bright new spinnaker

Ken and Barbie newly-weds
at the Balboa Yacht Club

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Ken and Barbie onboard together

In Honor of Kenneth Eldred

Acentech

Onboard Ammersee with family in the Caribbean

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Ken and Barbie celebrating his Scottish heritage

In Honor of Kenneth Eldred

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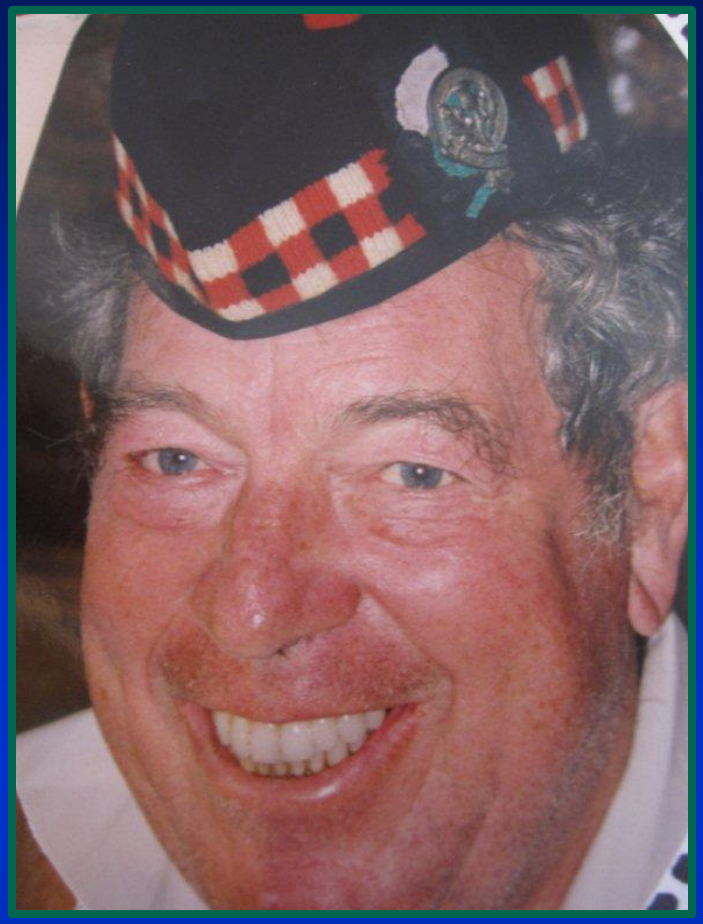


Ken's warm smile, we wish him smooth seas and full sails with the wind at his back, the sun on his face, and stars to guide his way

In Honor of Kenneth Eldred

Acentech

Thank you Barbara and Heidi for helping us to share such lovely and meaningful family photographs

Wood-Maling second half

More publications by Ken Eldred

The Role of ANSI in Managing Noise Standards

K.M. Eldred

Proc. NOISE-CON 75, 251-258, 1975

The Role of ANSI in Managing Noise Standards

- Ken was very much involved in noise standards through ASA
- American National Standards are approved by ANSI
- Main interaction through the Board of Standards Review
- A long process

The Role of ANSI in Managing Noise Standards

Tough criteria to meet before BSR approval

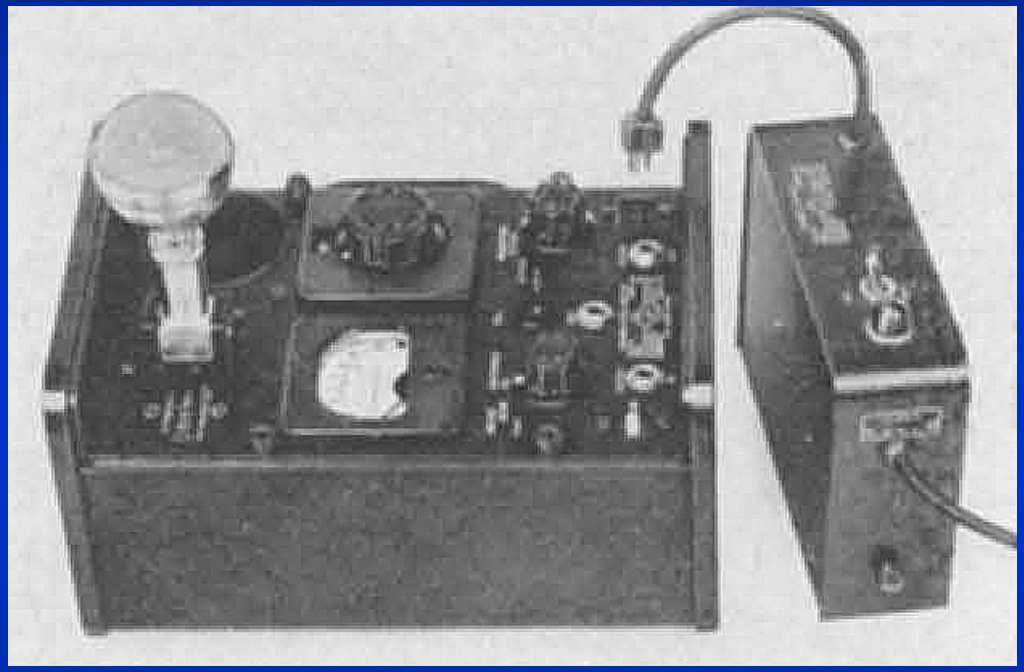
Examples:

- Generally-accepted procedures
- All interested parties participate
- All comments resolved
- ANSI procedures followed

Measurement of Industrial Noise

K.M. Eldred

Noise Control, 4, 40-61, 1958



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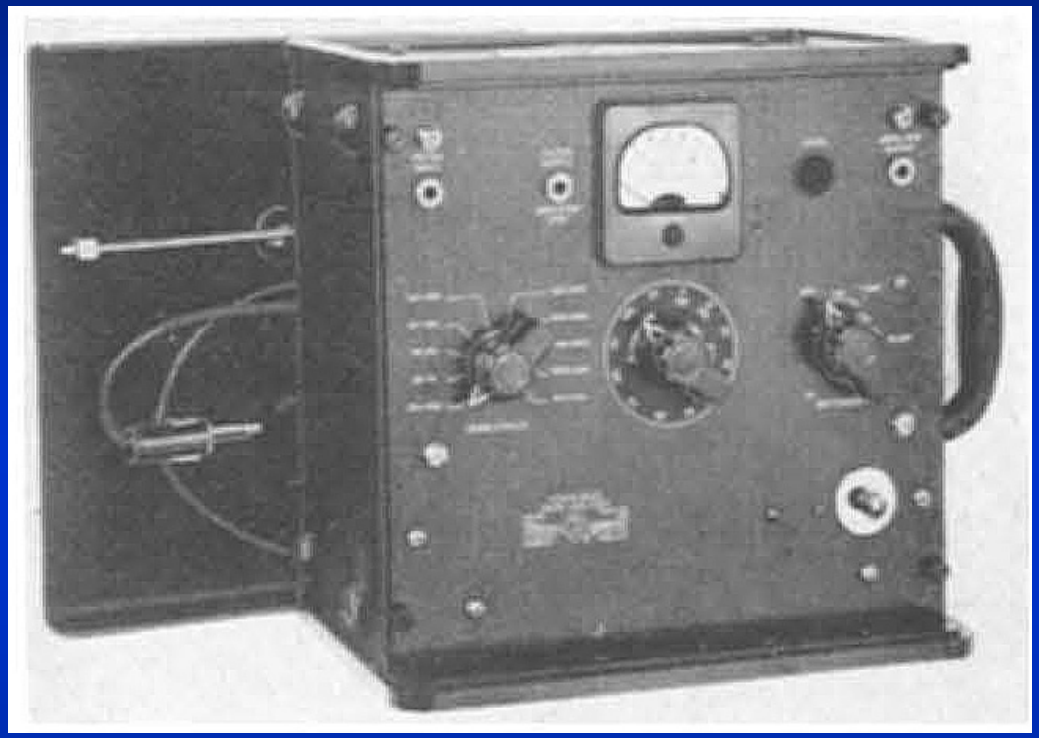

In Honor of Kenneth Eldred

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Acentech

9:40

2aNSa3. Ken Eldred—Mentor. Richard Potter (Retired, 129 Wilder Dr., Harvest, AL 35749, dickpotter@bellsouth.net)

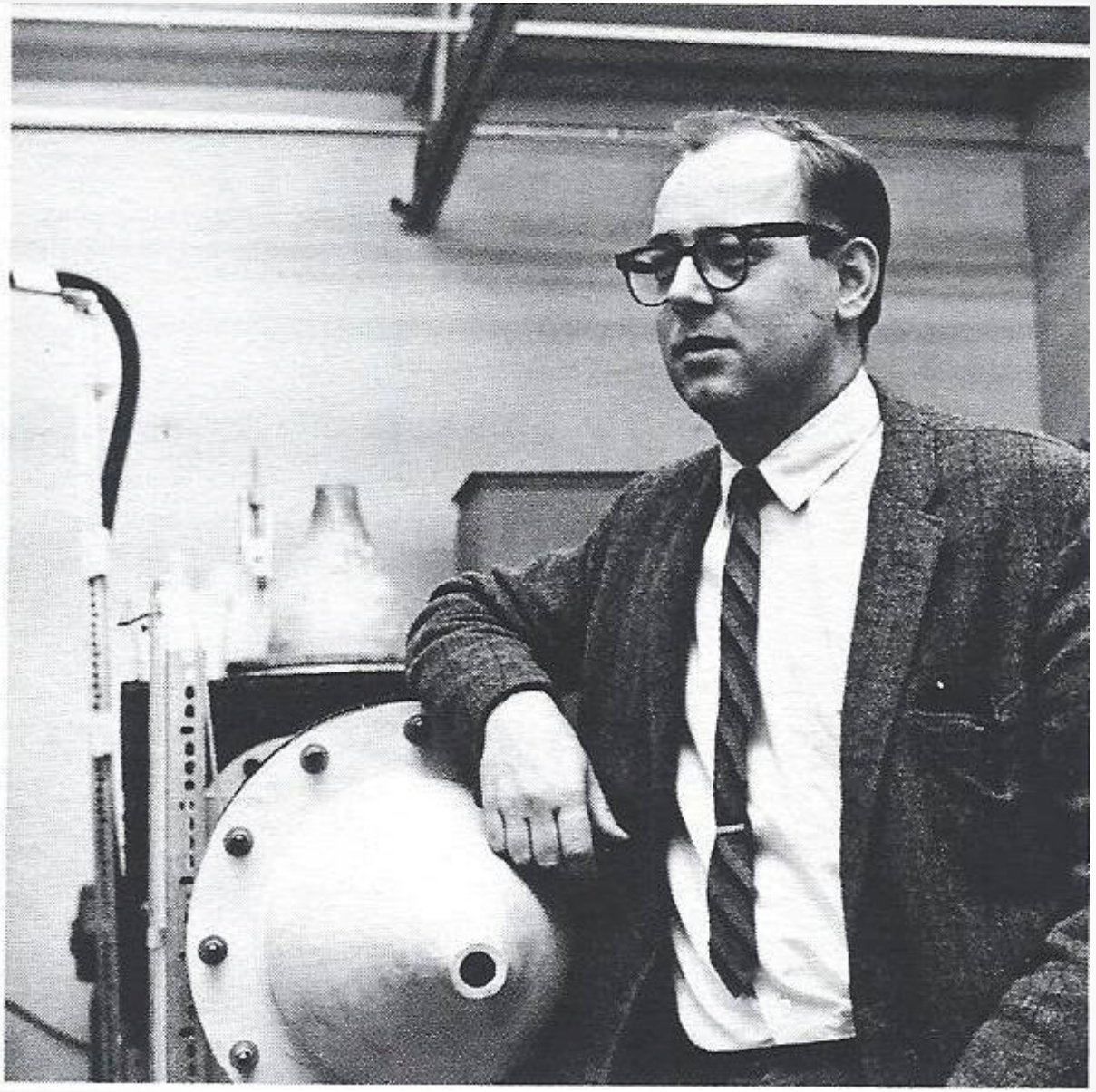
I met Ken Eldred at Wyle Laboratories in Alabama in 1963 as a young, green engineer shortly after he formed a staff to support NASA's Apollo program. Later, I was joined by other graduates of the Institute for Sound and Vibration Research, Southampton University, England. Ken led us as we undertook exciting and challenging projects. At Wyle, Ken actively mentored us, encouraging us to develop our investigative skills, adapt to new technologies, and write understandable, readable, and useful reports. He encouraged me to produce ideas and he listened to my suggestions, which he carefully reviewed and then, gently, offered corrections and suggested direction. I, and many of us, owe our successful careers to his mentoring. I will describe some particular work and list some who prospered under his leadership. I moved back to England but then, later, returned to the United States and rejoined Ken at Bolt Beranek and Newman in Cambridge. Again he showed interest and encouragement as I expanded my noise work to other aspects of industrial hygiene, later forming my own companies.

Ken Eldred - Mentor

Ken Eldred at Wyle (1966)

Martin Lowson from the University of Southampton, England (1966)

John Ollerhead from the University of Southampton, England (1966)

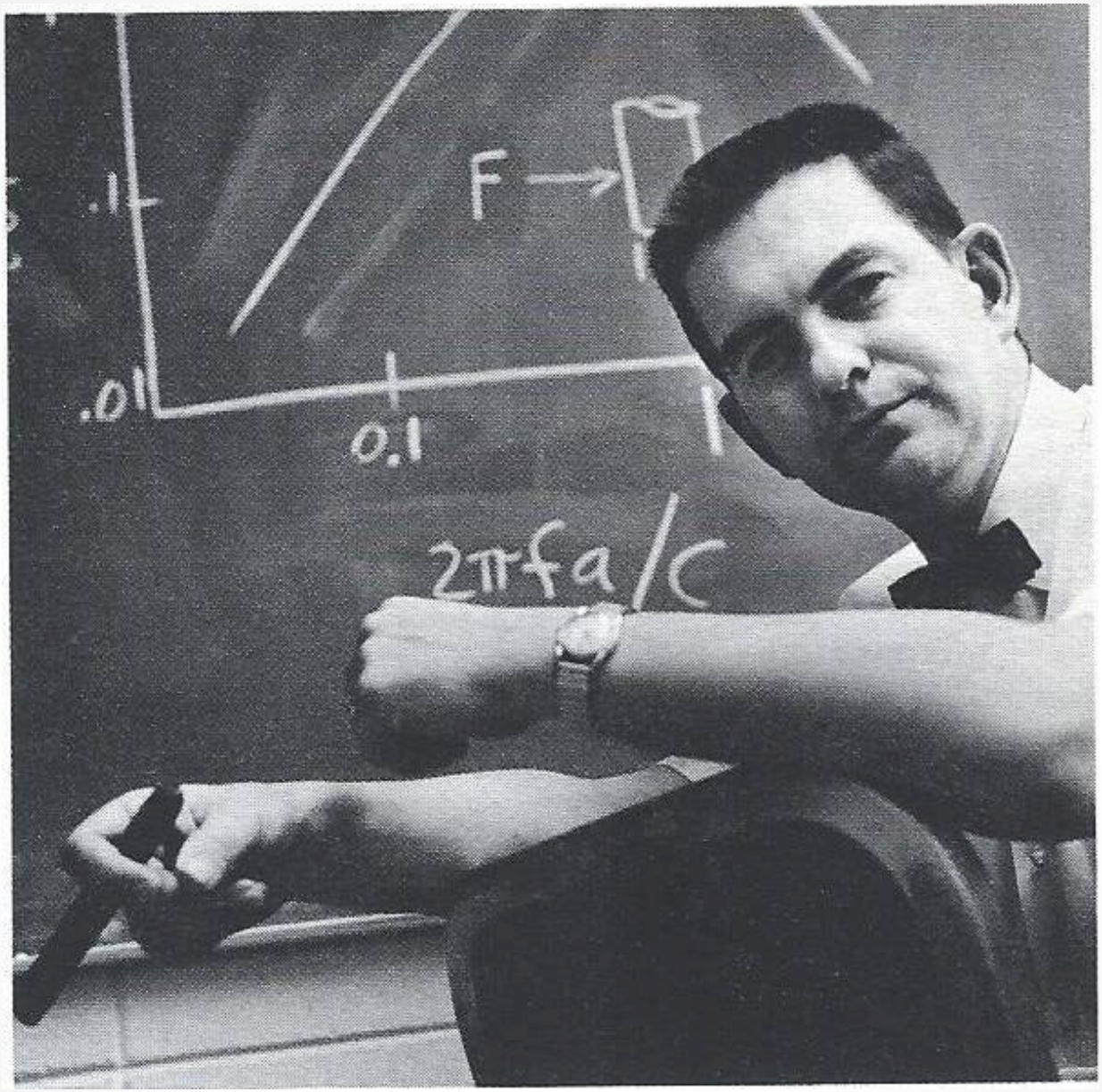


Dick Potter (Wyle 1966)

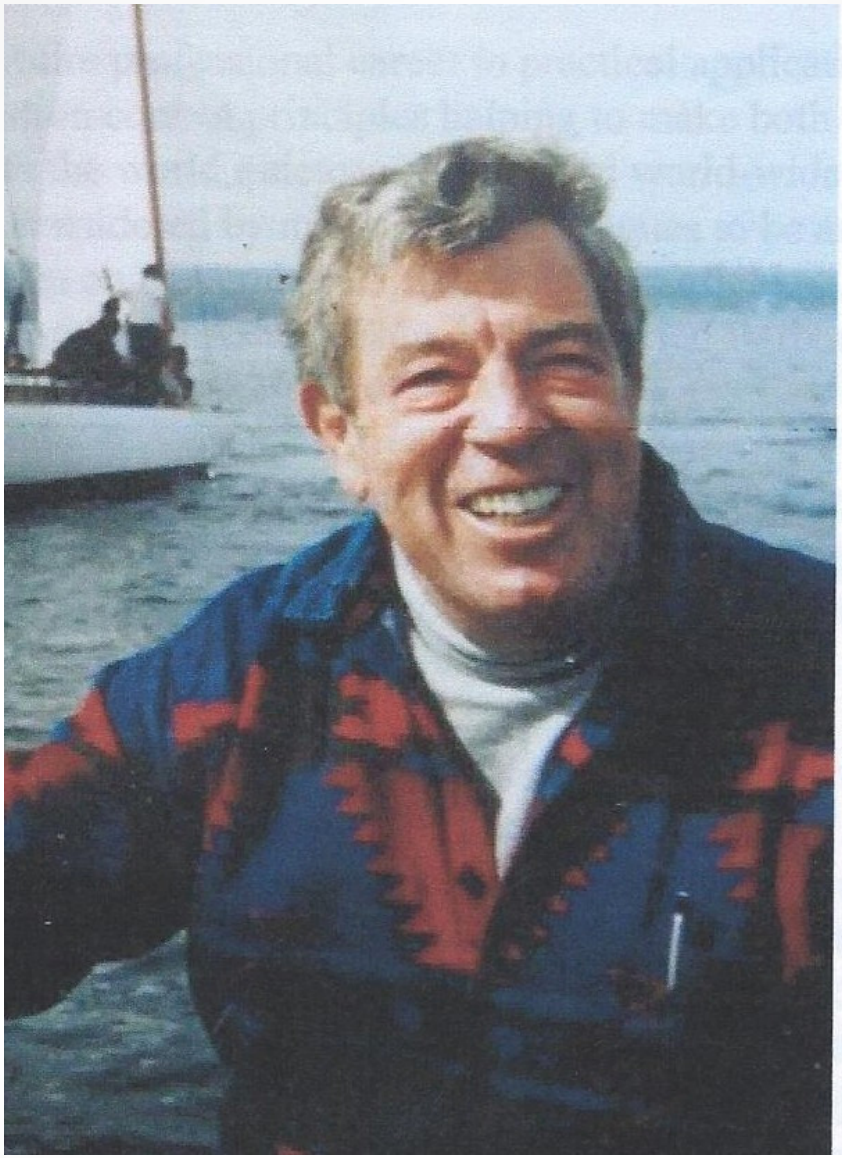
Photo is Dick Potter, Martin Lowson, and Malcolm Crocker with their wives Sylvia, Ann and Ruth (Wyle 1966)

Bob White (Wyle 1966)

Fancher Murray (Wyle 1966)



Lou Southerland (Wyle 1966)



Ken sailing

Thank you.

Ken Eldred – Mentor

Richard C. Potter
Paper 2aNS3 to the 167th Meeting of the Acoustical Society of America, Providence, RI - May 7, 2019

I also am so glad to see Barbie, Heidi and her husband, Ken's brother, and so many of Ken's colleagues and friends here today.

Others in this session are discussing Ken's many accomplishments in noise control and service to our country, and I join them in this tribute. But, now I want to concentrate on his influence on those persons he directed, inspired and aided in their professional careers. And I stand here as one who owes a lot to Ken.

I recently contacted some of the people who worked with Ken at Wyle, Huntsville, Alabama in the 1960s and at this time I would like to summarize the theme of my talk with a direct quote from one of them: He said: - "I had a lot of respect for Ken and remember him particularly for his tutoring and encouragement. It was always a pleasure and usually very rewarding to sit with him for half an hour. I learned a lot from him." - That simple statement sums up what many of us recognized and emphasizes a lot of what we owe to Ken.

In 1963, Ken (PHOTO) was at Wyle in Huntsville putting together a Research Staff in support of NASA's Marshall Space Flight Center. There was the difficulty of attracting engineering talent to Alabama at that time of Civil Rights unrest in the South. And so he called to his many contacts but he also looked abroad to find employees. (OFF)

At that time, I was graduate research assistant at the University of Southampton in England when those of us studying noise and vibration had just been gathered together to form the Institute for Sound and Vibration Research. As a boy, I had always been interested in space travel and in 1954 I had given a talk to the disbelieving members of my high school class on how a rocket carrying a man might get to Mars using the earth's rotation round the sun to achieve a boost on take-off. And so on hearing of the openings at Wyle, I leapt at the chance and dragged Sylvia, my new wife of less than four months, to the USA to work on the Apollo Program.

I met with Ken for the first time and he immediately threw me into the deep end to come up with a prediction method for rocket noise at the test stand and during launch. Two weeks later I was joined on this project by Malcolm Crocker, also just arrived from the ISVR. The prediction

of the noise of the rocket exhaust and the resultant loading of the vehicle structure was particularly important to the Apollo Program. The engine for the SC-1 first stage of the Saturn "Moon" rocket was still under design and development and it would be the largest liquid-fueled rocket engine ever built and was expected to produce mega-decibels of noise. This engine was so big that it used a 60,000hp turbo-driven pump to deliver the 6900 gallons of fuel and liquid oxygen burnt each minute to produce 1.5 million pounds of thrust – and there were five such engines in a cluster powering the first stage of the Saturn V vehicle making noise which would shake the vehicle and the instrumentation containing vacuum tubes.

Ken had already collected just about every report of noise measurements taken in the last 10 years from both liquid and solid fueled rocket engines. Under Ken's guidance, Malcolm and I worked to break down these results using the then limited work on jet flow mixing to produce a reliable prediction method for the level, the spectrum, and distribution of the noise field. We met almost daily with Ken to identify relevant parameters and to relate the noise to the exhaust flow properties. Ken reviewed and guided us as we massaged the data, pounding away on the Monroe electric calculators and hand-plotting spectra. Four months later a report was issued and published as a NASA Contractor's Report "Acoustic Prediction Method for Rocket Engines, including the Effects of Clustered Engines and Deflected Exhaust Flow". In time the whole document was revised and continued to be used at NASA to predict rocket noise through to the year 2000.

It was in these early years at Wyle that I learned from Ken on how to write a technical report. He emphasized the need to produce a useful and workable document in a clear logical form to encourage the reader to continue reading and to avoid the risk of the work being passed over, or worse, discarded and ignored.

- Start with a concise description of what the report was about, what was done, and present the conclusions and recommendations. The body of the report then contains the detailed analysis ending with the repeated conclusions and recommendations. -

Our education was continued by Ken's direction as we wrote and rewrote the report (in long hand) to produce the final document. And I must comment that this experience was the first time I felt I had been properly instructed.

The characteristic of Ken's leadership – which was a combination of review and indirect comment - was the way he nudged you in the right direction. He advised and he directed without taking over. I also must mention that NASA Contractor Report 566 listed R. C. Potter and M. J. Crocker as the sole authors, which was typical of Ken's lack of any self-promotion.

Over the next four years Ken's mentoring continued for me and for the other engineers as the Wyle Staff grew. In particular, there were four of us who had come over from the ISVR and were undertaking our first real job. Ken was our first boss and our interaction with him was a significant starting point of our professional careers.

Martin Lowson, (PHOTO) who authored several fundamental papers on aerodynamic noise generation, eventually returned to England to become Chief Scientist at Westland Aircraft and a Professor at Bristol University, finally forming his own company designing and installing Personal Transportation. Unfortunately, Martin suffered a stroke last year and is not with us anymore.

John Ollerhead (PHOTO) got involved with helicopter blade interaction noise at Wyle, a principal concern of the US Army in Vietnam. In later years, he returned to Britain, where he was asked by the Government to head up the Noise Group at the Civil Aviation Administration – the British equivalent of the US FAA - finally retiring with the award of OBE by the Queen for service to British aviation.

There was me (PHOTO), and I've already mentioned Malcolm Crocker. The only photo I could find of Malcolm in the 60s also includes several other people whose lives were also influenced by our rime at Wyle (PHOTO) namely our wives who had come with us to Huntsville. Malcolm went on to become Head of Mechanical Engineering at Auburn University, was a founding member of INCE and for many years the Editor of that society's journal. (OFF)

But there were also many talented Americans, including Bob White (PHOTO) and Fancher Murray (PHOTO) who Ken directly influenced in their careers as they later followed him to BBN. And, of course, there was Lou Sutherland (PHOTO), who will be speaking next in this tribute to Ken. (OFF)

Without exaggeration, I can truthfully say that there were many of us in Huntsville who were directly influenced by Ken's interest in us.

Other work on jet flow mixing and noise source definition and prediction followed under Ken's direction

In 1967, Ken moved from Alabama to Wyle's head office in El Segundo, California and later he started a new office in Washington DC under the direction of Ben Sharp – yet another English immigrant. I immediately asked to join Ken in California and so in June 1967, Sylvia, my two

Alabaman sons and I set out for the west. I welcomed the opportunity of continuing to work under Ken's guidance on projects for Lockheed, Douglas and the Air Force, and, most significantly, on studies for the City of Los Angeles to evaluate the potential of soundproofing homes around the Los Angeles airport against the aircraft noise.

This last program introduced me to Ken's philosophy in dealing with community response to noise. He emphasized the importance of the people affected and how it was essential to understand the reason for their response to a particular problem in order to come up with realistic and relevant solutions. After all Noise is defined as Unwanted Sound and it is the human response to the unwanted "sound" that drives the whole exercise. While the levels, spectrum and exposure time give a measure of the noise, the full extent of the problem cannot be defined without including the concerns of the affected community.

In 1969, as a result of my work on the Lockheed L-1011 airliner, I received an offer that I just could not refuse and returned to England. However, that job did not pan out and so, in 1973, I wrote to Ken asking about any opportunities for returning to the US. He graciously invited me to rejoin him at Bolt, Beranek and Newman where he was now the Director of the Noise Consulting Division. At BBN, I worked for Bob Bruce on the OSHA Noise Standard. From our interaction with industry, we realized that noise was only a small part of the occupational exposure of workers who also experienced chemical, biological and other physical hazards. BBN had always had a policy of encouraging its staff to investigate new fields - which is why the original acoustics company became a computer company and a major player in developing the internet. On the basis of the Dept. of Labor's work, we branched out to cover the whole industrial hygiene field using a small core staff and sub-contracted companies and we were lucky to obtain major contracts to evaluate commercial foundries and later the US Army's industrial facilities. And in time BBN eventually became seriously involved with the asbestos problem in schools, and other government and commercial buildings.

However, there was one final noise job at BBN when I worked directly for Ken, before he left to his own consulting company, spending time calculating take-off and landing profiles for use in the FAA's computer airport-community noise model.

In 1983, following a reshuffle of BBN's priorities, I and two other BBNers started our own environmental consulting company. With a rapid growth our new company joined with others and the 1990s found me in Florida consulting mostly on building environmental problems. However, I still undertook some noise work mostly in evaluating both old and new commercial facilities to control community noise.

Now, the purpose of my talk is to emphasize that it was Ken's mentoring – his interest, his succinct observations and his shared experience – that was particularly responsible for my own development and successful career. And it was in evaluating any annoyance and exposure situation, that I always remembered Ken's insistence to recognize the people element. Working with and for Ken taught us how to evaluate a situation, define the problem, review alternative approaches, come up with workable solutions and, to prepare a clear and concise report that was useful to both the client and those directly affected by the problem exposure. To write a clear and organized report so that the reason for the conclusions and the recommended solutions were understandable to the lay community, and especially to those persons affected by the exposure - be they individual employees, pupils and their parents, or whole residential communities.

Finally, in searching for a concise description of what Ken meant to me and to the other young engineers, particularly in those early exciting years in Huntsville, and to sum up Ken's career especially, I direct your attention to Ralph Waldo Emerson's definition of success.

"Success", he said was:

"To laugh often and much,
To win the respect of intelligent people and the affection of children.
To earn the appreciation of honest critics and endure the betrayal of false friends.
To appreciate beauty to find the best in others!
To leave the world a bit better, whether by a healthy child, a garden patch, or a redeemed social condition.
And - To know even one life has breathed easier because you have lived –
This is to have succeeded."

Accordingly, I have always appreciated Ken for his personal attention and I would like to propose to you that, given Ken's body of work, and especially his influence on those of us who were mentored by him and also not forgetting those communities that were affected for the best because of him, that –

"Kenneth McKechnie Eldred, you succeeded!" (PHOTO)

And we and the people and the communities that were affected by you and your work, thank you. (PHOTO)
(OFF)

10:00

2aNSa4. Tribute to Kenneth McKechnie Eldred. Louis C. Sutherland (lcs-acoustics, 5701 Crestridge Rd., Apt. 243, Rancho Palos Verdes, CA 90275, lou-sutherland@juno.com)

I first met Ken while at the Boeing Co and he was Vice President at the Western Electro-Acoustics Laboratory in Los Angeles. I met him again at Wright Patterson Air Force Base, Dayton, Ohio, where he was Chief of Physical Acoustics under Henning von Gierke. He recruited me to come to Huntsville, Alabama, to join the new branch of Wyle that Marshall Space Flight Center wanted for rocket noise programs supporting NASA's rocket noise programs. To augment this Wyle staff, Ken recruited several outstanding acoustical scientists from Southampton University in the UK, including the late Martin Lowson. More on this in Richard Potter's paper. Ken's Wyle staff worked with the Federal Aviation Administration, the Boeing Co. and Lockheed Aircraft in pursuing the environmentally failed development of the SST. Ken supported the U.S. Environmental Protection Agency Office of Noise Abatement and Control (ONAC) and guided Wyle in their preparation of key documents on Noise Policy. He left Wyle to join Bolt, Beranek and Newman (BBN) and later left BBN to form Ken Eldred Engineering. He was a Fellow of ASA, received the ASA Silver Medal in Noise in 1994, and was active on ASA Standards committees, the National Research Council, the Society of Automotive Engineers, and the National Academy of Sciences. The other speakers will discuss other aspects of Ken's many contributions, including those for the Institute of Noise Control Engineering (INCE).

TRIBUTE TO KENNETH McKECHNIE ELDRED

Paper 2aNSa4 before 167th Meeting of

Acoustical Society of America
May 6, 2014

by

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OUTLINE

- My First Contacts with Ken.
- His activity at Wyle – Huntsville, AL
- His activity at Wyle – El Segundo. CA
- Association with Ken and INCE-USA and ONAC.
- Ken's Other Professional Activity
- Summary

o My First Contacts with Ken

- o While I was at Boeing, in the 1950s, first met him in LA where he was Vice-President at Paul Veneklasen's Western Electro-Acoustics Laboratory.

- o I met him during visits in the early 1960s to Henning von Gierke's Laboratory at Wright Patterson Air Force Base where Ken was Chief of the Bio-Acoustics Branch.

- o In 1969, Ken recruited me to join his growing staff in Huntsville, AL. in support of NASA's Marshall Space Flight Center.

Ken's major activity as Director of Wyle's Huntsville Research Staff.

- Oversaw design and construction of 100,000 cu.ft. Reverberation Chamber to conduct acoustic tests simulating launch noise for NASA's Rocket Booster payloads.
- Directed Wyle's rocket noise research to support NASA in their Rocket booster programs including Apollo
- Directed Wyle's effort, including report to Congress, supporting Boeing and Douglas in plan to build SST.
  - Program cancelled due to concern of potential impact of Sonic Boom environments in residential communities.

Other oversight activity by Ken at Wyle, Huntsville

- Design of Reverberation chambers for:
  - NASA's Space Flight Center, Houston, TX
  - Douglas Aircraft facility in El Segundo, CA

- Wyle's preparation for NASA of Manual on "Sonic Loads on Launch Facilities" for NASA's Kennedy Space Center in Florida.
  Contributors included: Dick Potter, Malcom Crocker, John Ollerhead, myself.

- Oversaw preparation of key report for FAA
  - Reported aircraft noise impact at 23 US Airports.
  - This helped FAA assess effectiveness of FAR 36 rule for noise reduction of aircarrier aircraft.

Ken's Activity at Wyle, El Segundo after they transferred him from Huntsville to become Wyle's Director of Research.

- **Oversight of Wyle's preparation, in 1974 for Environmental Protection Agency's Office Of Noise Abatement and Control (ONAC) of the "Levels Document"**

(See preceeding paper by Maling & Wood)

- Contributors included:

James Miller, Wash. Univ, St. Louis

Karl Kryter, Santa Barbara, CA

More Activity by Ken at Wyle, El Segundo

- Direction of Wyle's key role in development of Residental Soundproofing Requirements for Airports using FAA's financial support for Cal. Airports surrounded by residences.

- Oversight of Wyle's establishment of Branch Wyle office's throughout the US.
  - Staffed by Architects to guide residental communities and Airports in their use of:
  - The Airport's (FAA-funded) financial support for application of:
    - Residental sound proofing for homes within a CNEL 65 dBA boundary in Cal.

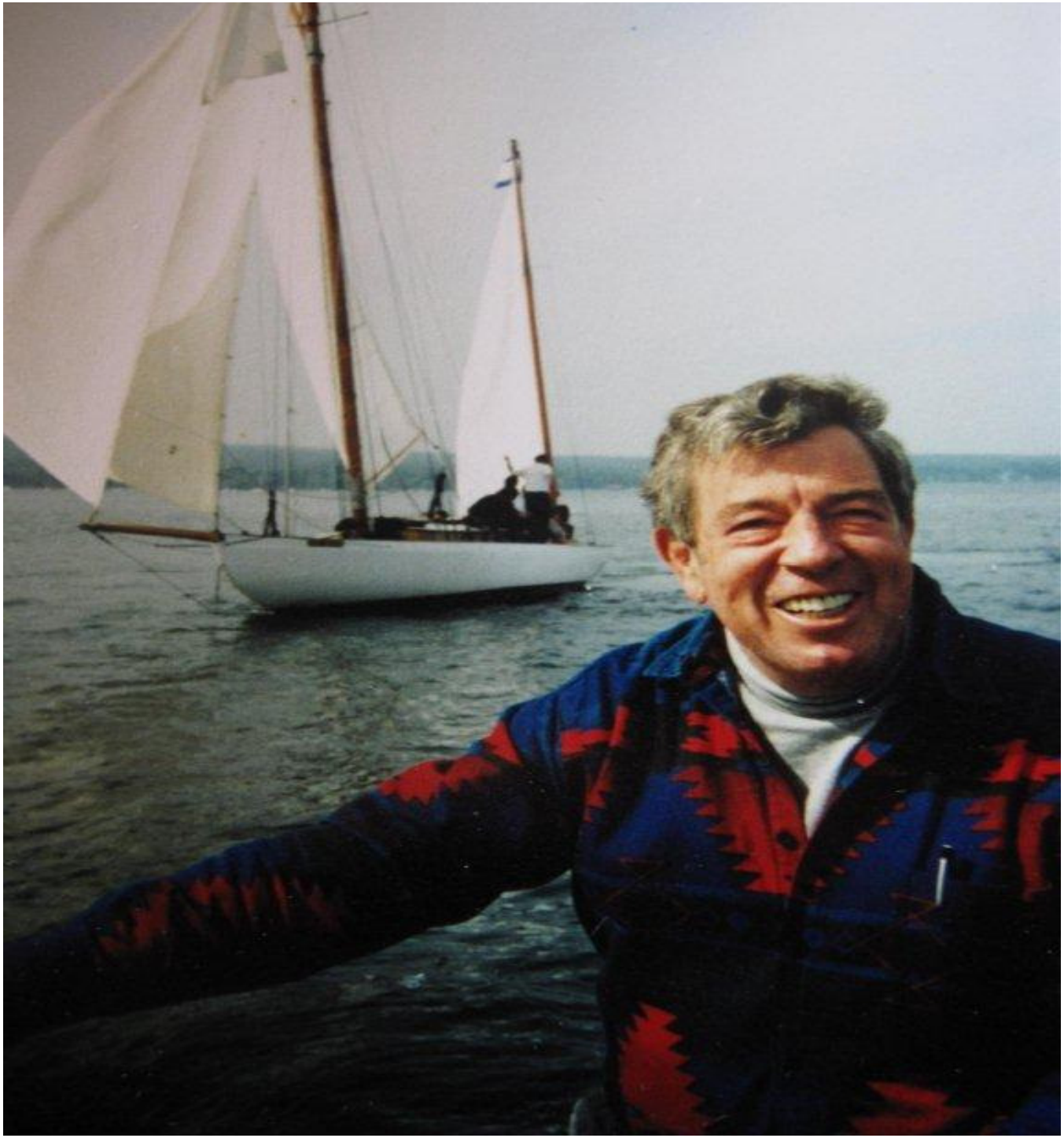
Ken's other Profesional Activity included:

- Served INCE-USA as a Founding Member, President, Director of Finance Committee, Treasurer, and Fellow.
- Worked with DOT personel l to assist in passage of the Noise Control Act by the 92nd Congress.
- Worked on many ASA Standards Activities including:
  - Serving as ASA Standards Director from 1987-1993
  - Helped establish the S-12 Committee on Noise
  - Chaired the S1/WG 45 on Sound Level Meters.
- Fellow and Silver Medalist for ASA.
- Member, SAE A-21 Committee, Aircraft Noise.
- Member of National Academy of Engineering.
- Member, BBN and, finally, founder of his own firm: Ken Eldred Engineering
- Professional Engineer Licence, California & Alabama.

SUMMARY

- His activity after Serving as Director of Shipboard Vibration and Noise Control for Submarines at Boston Naval Shipyard consisted of:

- Vice-President at Paul Veneklasen's Western Electro-Acoustics Laboratory in Los Angeles.
- Chief of the Bio-Acoustics Branch for Henning von Gierke's Laboratory at WPAFB where Ken met his wife, Barbara who was Henning von Gierke's sister-in-law.
- Director of Research at Wyle Laboratories in Huntsville, AL.
  - Oversaw Rocket Noise Research for NASA MSFC
  - Studies in rocket noise generation and acoustic testing.
- Moved to direct Wyle's Acoustic Reseach Staff in El Segundo, CA.
  - Oversaw wide range of studies relating to Airport noise
  - Directed Wyle's research supporting ONAC programs and preparation of key documents such as the Levels Document.
  - Later joined BBN and finally estabished his own firm, Ken Eldred Engineering
- Many professional activities with, and honors from ASA & INCE
- Continued to pursue his passion, sailing in Booth Bay, Maine.



Finally, to conclude this session, we're Honored to have the following members of Ken's Family here in the front row.

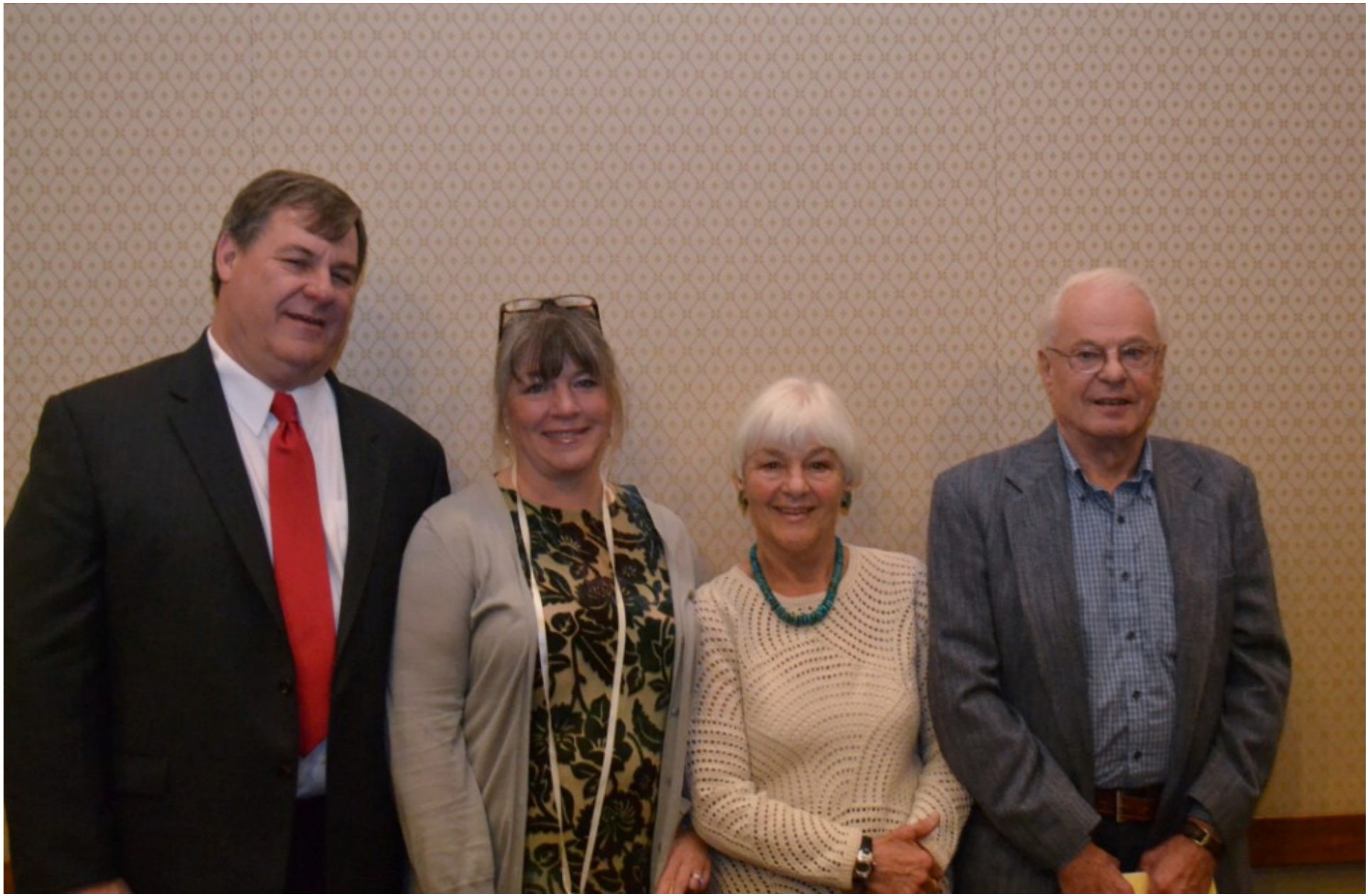
We ask you to please stand and remain standing so we can arrange to take your picture.

O Ken's beautiful wife, Barbara (Barbie) Eldred.

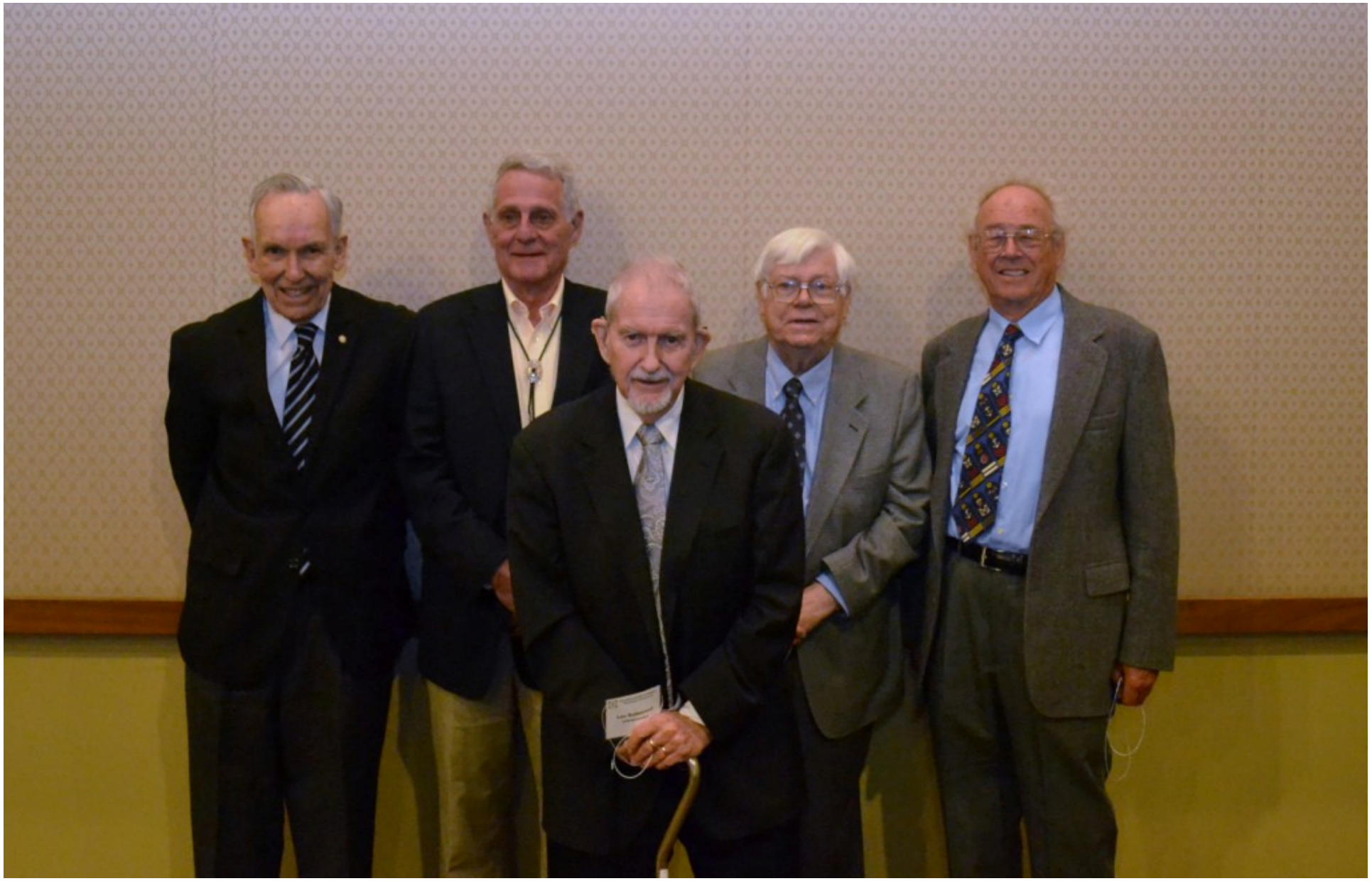
O Their daughter Heidi & her husband Charles Bamberg.

O Barbie's brother, York Fischer.

O Unfortunately, Ken and Barbie's two grandchildren were not able to attend.



Family Members Attending: Charles Bamberg (Heidi's husband and Barbara's son-in-law), Heidi McKechnie (Barbara and Ken's daughter), Barbara Fischer Eldred, and York Fischer (Barbara's brother)



Speakers Bill Lang, Eric Wood, Lou Sutherland, George Maling, and Dick Potter