

# SEA PAC

*June 1-3, 1990*

*Seaside, Oregon*

*Seaside Convention Center*

*NW Division Ham Convention*



Oregon Tualatin Valley Amateur Radio Club

*OTVARC*



# O TVARC And ICOM AMERICA, INC.

## Present: The Winning Team At Wild West Casino Night

Friday June 1, 1990, 7:30-10:30PM.

Seaside Elks Lodge-3 Blocks South Of Convention Center.

**Blackjack♣Roulette♠Craps**

O TVARC  
and

ICOM will be co-sponsoring Casino Night this year. There will be food, lots of prizes and a no host bar for those who wish a strong libation.

*Good Luck To All*

*Fun Games & Prizes  
Room Still Available.  
You can register at the  
door Friday night.*





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## For Convention Information And Announcements

Listen On:

145.450<sub>MHz</sub> (-600)

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## English Award

A special certificate will be mailed to the first person who can locate an error in grammar, spelling or content that was not intentional (advertisements excluded). One per error.

To claim your personalized certificate bring our mistakes to the OTVARC booth.

A very special thank you to our  
proof readers:

Al Berg, WB7SIC

Lorna Campbell, KA7RFD

Ken Hart, N7JAS

Jim Schaeffer, KB7ADH

# Convention Schedule

## Friday, June 1

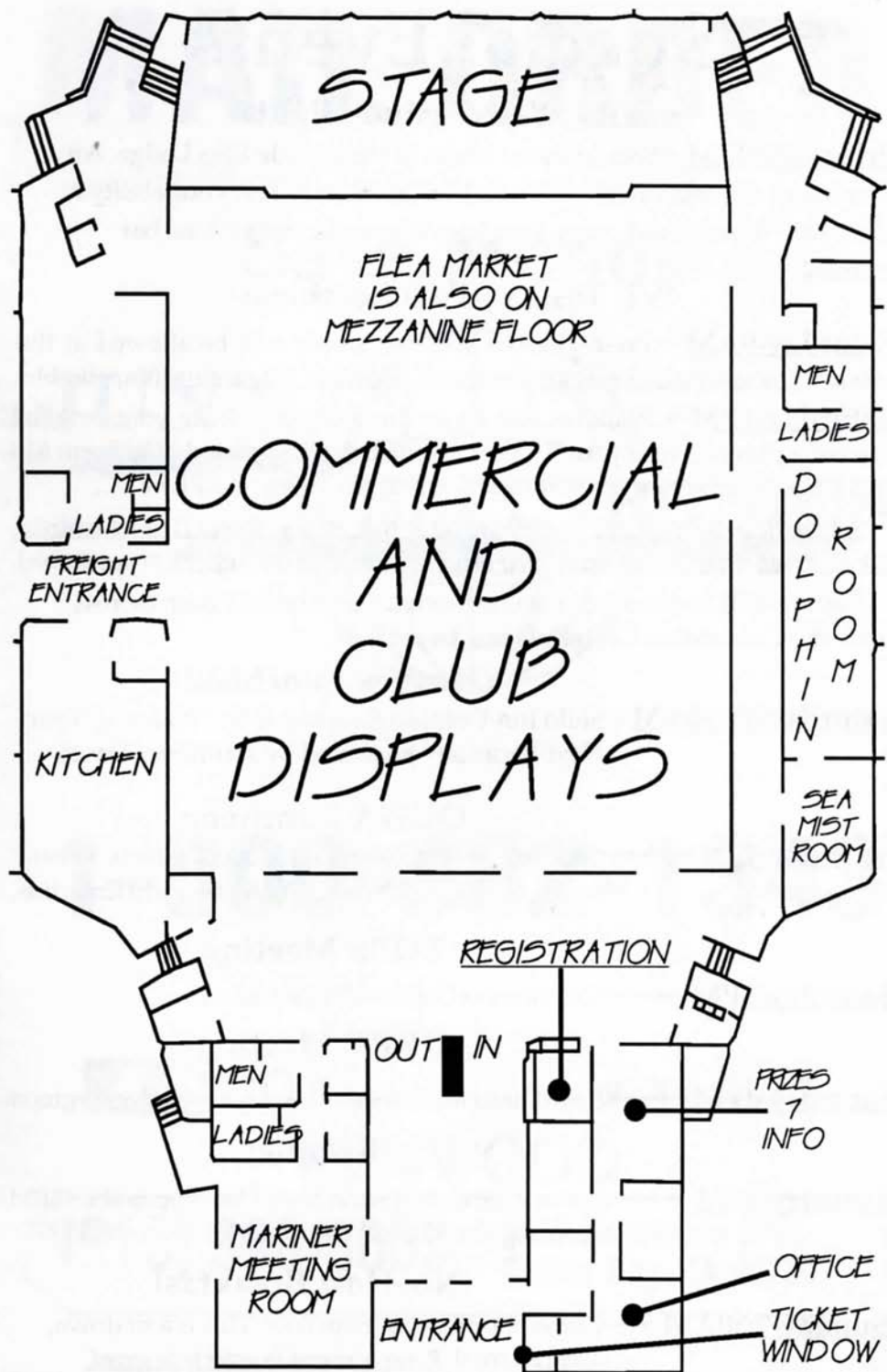
Registration -----	11AM-8PM
Exhibit & Flea Market Setup -----	11AM-9PM
Social Casino Night (Elks Lodge) -----	7:30-10:30PM

## Saturday, June 2

Registration -----	8AM-4:30PM
<b>Convention Hall Hours -----</b>	<b>9AM-4:30PM</b>
Ladies Treasure Hunt -----	All Day
Snack Bar -----	All Day
Kids Krayons & Kartoons (Sea Mist Room) -----	9AM-4:30PM
VE Exams (Pre-Registration)(Our Saviour Church)	9AM-12N
Seminars (Pages 10-13) -----	9:30AM-5PM
Ladies Luncheon (Dolphin Rm 2&3, Shilo Inn) --	11:30AM-2:30PM
QCWA Luncheon (Whale Room 1&2, Shilo Inn) --	12N-2PM
VE Exams (Walk-Ins, See Page 4 For Details) -----	1PM-4PM
ORRC Meeting (Town Center Mall Meeting Room)	1PM-???
TOPS Meeting (Mariner Room) -----	4PM-???
Banquet (Convention Center) -----	7PM-9:30PM
2 Meter Sprint Contest (Pages 35-36) -----	11PM-12MID

## Sunday, June 3

This is a catered, sit-down meal in the Convention Center.	
No Host Breakfast -----	7:30AM <u>SHARP</u>
Registration -----	8:30AM-12N
<b>Convention Hall Hours -----</b>	<b>9:30AM-2PM</b>
Seminars (Pages 10-13) -----	9:30AM-12N
Snack Bar -----	9:30AM-2PM
Kids Krayons & Kartoons (Sea Mist Room) -----	9:30AM-12N
Grand Awards (Convention Center) -----	1PM-2PM
<b>Convention Closes -----</b>	<b>2PM</b>





# Special Events

## Wild West Casino Night

**Friday-7:30PM** - Social Casino Night at the Seaside Elks Lodge. An evening of fun and exciting "No Stakes" gambling. Test your ability at blackjack, roulette and craps. Free hors d'oeuvres and no host bar available.

## VE Testing-Two Sessions:

**Saturday-9AM** - Pre-registered applicants only will be allowed at this session. You must also bring your original license to the session (if applicable).

**Saturday-1PM** - Walk-ins will be limited to 60. Bring your original license, a photocopy of your license (if applicable), a completed FCC Form 610 and a check or money order for \$4.95 made payable to ARRL/VEC.

All applicants must have legal photo ID or two other pieces of ID with address.  
All applicants must also bring their original license to the session (if applicable).

Testing will be conducted at Our Saviour Lutheran Church (across from the Convention Center). Please be prompt.

## Ladies Luncheon

**Saturday-11:30AM** - Shilo Inn-Dolphin Rooms 2 & 3. "Planning Your Next Vacation" presented by Azumano Travel.

## QCWA Luncheon

**Saturday-12N** -----Shilo Inn-Whale Rooms 1 & 2. Special guest Leland Smith, W5KL, National QCWA President Emeritus.

## TOPS Meeting

**Saturday-4PM** -----Convention Center-Mariner Room.

## ORRC Meeting

**Saturday-1PM** -----Town Center Mall (Brdway & Edgewood), upstairs meeting room.

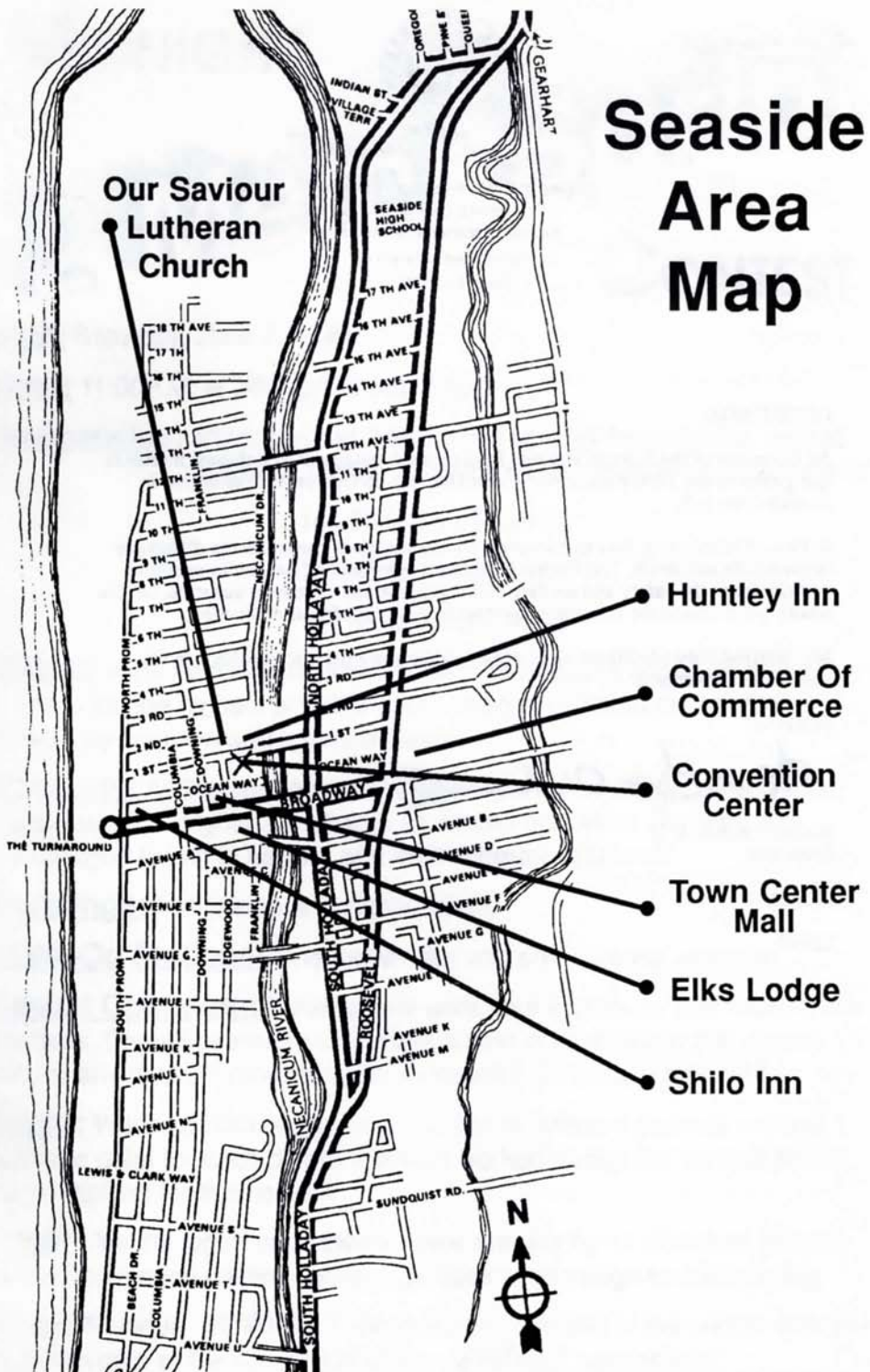
## Banquet

**Saturday-7PM** -----Convention Center main floor. Doors open at 6:45PM. Featuring The Khabarovsk Travelers as seen in QST.

## No-Host Breakfast

**Sunday-7:30AM** -----Convention Center main floor. This is a sit down, catered meal. Please be prompt in order to be served.

# Seaside Area Map



NEIL GOLDSCHMIDT  
GOVERNOR



OFFICE OF THE GOVERNOR  
STATE CAPITOL  
SALEM, OREGON 97310-0370  
TELEPHONE: 378-3111  
June 1, 1990

GREETINGS:

As Governor of the State of Oregon, I am pleased and proud to welcome members and guests to the 1990 Pacific Northwest Ham Radio Operators Convention in Seaside June 1-3.

In time of emergency, fast and accurate communications can make the difference between life and death. The Pacific Northwest's network of ham radio operators contributes to the safety and welfare of Oregonians and visitors to our state. On the whole, your efforts are voluntary, and that assures me of your dedication.

My heartiest congratulations to all of you, and my warmest wishes for a most successful convention.

Sincerely,

Neil Goldschmidt  
Governor

NG:cab

2249P



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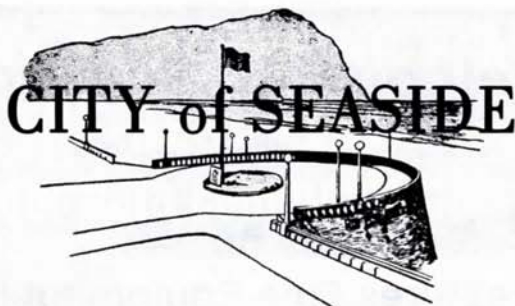
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June 1, 1990

PACIFIC NORTHWEST HAM RADIO OPERATORS,

Greetings from the great North Coast City of Seaside where good things are always happening! Our citizens are pleased you have chosen Seaside for your Northwest Ham Radio Operators Convention on June 1-3.

Your member's participation at this conference is certain to yield dynamic discussion of new challenges that may result in the emergence of new ideas for the coming year.

While visiting with us, I hope you will enjoy our famous historic Promenade and ocean beach, and all our town's improvements. Our latest improvement is a new City Hall and Fire Station. Numerous opportunities for your pleasure and relaxation exist throughout our beautiful City and every attempt will be made to make your stay in Seaside during your 1990 conference a unique and delightful experience.

Sincerely,

Joyce C. Williams  
Mayor

JCW:td





# SEAPAC 1990

## Seaside Elks Lodge

**Friday,  
June 1  
7:30PM**

### **WILD WEST CASINO NIGHT**

An evening of fun "No Stakes" gambling. Snacks, excitement and prizes. No host bar.

## Convention Center

**Saturday,  
June 2**

### **Mariner Room**

### **Dolphin Room**

9:30AM

**BEGINNERS SEMINAR ON RTTY**  
Ernie Austin, W7AXJ

**ANTENNA TOWERS**  
Ken Kopp, K0PP

11:00AM

**A PACKET PRIMER**  
J. Mike Dunlap, K7MYU

**ANTENNA BASICS**  
Roy Lewallen, W7EL

1:00PM

**INTERMEDIATE PACKET  
CONCEPTS**  
J. Mike Dunlap, K7MYU

**QST-GETTING IT TOGETHER  
EACH MONTH**  
Mark Wilson, AA2Z

2:30PM

**ADVANCED PACKET**  
Doug McMurdo III, W7XI

**ARRL OPEN FORUM**  
Bill Shrader, W7QMU

4:00PM

**TOPS OREGON PACKET  
SOCIETY MEETING**  
Fred Molsworth, AF7S

**TO BE ANNOUNCED**

**Sunday,  
June 3**

9:30AM

**OSCILLATOR THEORY  
FOR BEGINNERS**  
Jeff Damm, WA7MLH

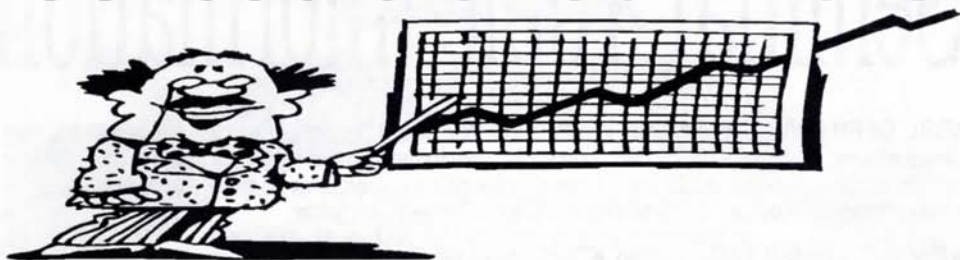
**DXING FOR BEGINNERS  
& OTHERS**  
Hon. Greg Milnes, W7AGQ

11:00AM

**TO BE ANNOUNCED**

**TO BE ANNOUNCED**

# Schedule of Seminars



## Shilo Inn

Saturday,  
June 2

Whale 3

Dolphin 1

<b>INTEGRATING AMATEUR RADIO INTO THE CLASSROOM</b> Larry Luchi, W7KZE	<b>MOBILE ANTENNA GAIN CHARACTERISTICS</b> David Phemister, WB7ESV	9:30AM
<b>EQUIPPING AND ORGANIZING DXPEDITIONS</b> Mary Lou Brown, NM7N	<b>AMATEUR TELEVISION</b> Edward R. Mellnik, WG2QHS	11:00AM

<b>RFI-CAUSES AND CURES</b> Everett Helm, WA7CYO	<b>NATIONAL TRENDS IN AMATEUR TELEVISION</b> Charles O. Northcut, W7SRZ	1:00PM
<b>SOLAR ACTIVITY &amp; EARTH'S IONOSPHERE</b> Brad Wells, KR7L	<b>ANTENNA NOISE BRIDGES</b> Jack Barnes, WA7KMR	2:30PM
<b>DX &amp; QSL'ING</b> James B. Borland, W7GRU	<b>DATA COMMUNICATIONS FROM MORSE TO PACKET</b> Dr. Alan Chandler, K6RFK	4:00PM

Sunday,  
June 3

<b>OREGON ARES ANNUAL MEETING</b> Bob Dorman, KV7F	<b>TO BE ANNOUNCED</b>	9:30AM
<b>TO BE ANNOUNCED</b>	<b>TO BE ANNOUNCED</b>	11:00AM



# Seminar Topic Information

**ARRL OPEN FORUM** Bill Shrader, W7QMU. Bill, Northwest Divisional Director, along with the Vice Director Mary Lou Brown, NM7N, will conduct an open forum where any subject within Amateur Radio can be discussed. With the 220 band issue and the no code license as possible topics this should be a lively hour. SATURDAY 2:30PM-Dolphin Room-Convention Center.

**A PACKET PRIMER** J.Mike Dunlap, K7MYU. Mike will discuss everything you need to know to get started in packet radio. The discussion will cover basic equipment, operation and techniques used in packet communication. The second seminar in a group of four hours devoted to packet radio. SATURDAY 11:00AM-Mariner Room-Convention Center.

**ADVANCED PACKET CONCEPTS** Doug McMurdo III, W7XI. Advanced level of packet radio techniques. The discussion will center on high speed, multiple port nodes, node linkage and bulletin board management. The hour will close with a discussion on the future of packet radio. SATURDAY 2:30PM-Mariner Room-Convention Center.

**AMATEUR TELEVISION** Edward R. Mellnik, WG2QHS. Ed will discuss the development of ATV on the local Oregon scene. There will be a complete status report on the Portland, OR., ATV repeater operation that was started this spring. SATURDAY 11:00 AM-Dolphin 1 Room-Shilo Inn.

**ANTENNA BASICS** Roy Lewallen, W7EL. Roy will discuss propagation principals and patterns of radiation of the various antenna configurations. SATURDAY 11:00AM-Dolphin Room-Convention Center.

**ANTENNA NOISE BRIDGES** Jack D. Barns, WA7KMR. Jack will make a presentation on antenna noise bridges and their application for Amateur Radio. The principals of operation and the various applications all will be discussed. SATURDAY 2:30PM-Dolphin 1 Room-Shilo Inn.

**ANTENNA TOWERS** Ken Kopp, K0PP. If you plan on erecting an antenna tower this is the seminar to attend. The planning, construction and erection procedures with all appropriate safety concerns will be discussed in depth. SATURDAY 9:30AM-Dolphin Room-Convention Center

**BEGINNERS SEMINAR ON RTTY** Ernie Austin, W7AXJ. Ernie will present a video entitled "What are Those Crazy Sounding Signals Saying?" Followed by a question and answer period. Topics covered will be computer generated and decoded slow and high speed CW, RTTY (Radio Teletype), AMTOR, ASCII and Packet modes. Ernie has been licensed since 1922 and worked actively in the communications industry until retiring in 1970. This is the first in a group of four hours of packet related seminars. SATURDAY 9:30AM-Mariner Room-Convention Center.

**DATA COMMUNICATIONS-FROM MORSE TO PACKET** Dr. Alan S. Chandler, K6RFK. Dr. Chandler, a research designer with Advanced Electronics Application Inc. out of Lynnwood Washington, will present a history of how digital communications has developed. From early morse to packet and beyond for the 1990's will be part of the presentation. SATURDAY 4:00PM-Dolphin 1 Room-Shilo Inn.

**DX & QSLing** James B. Boland, W7GUR. Jim is a member of the Willamette Valley DX Club. As Chairman of District 7 DX Bureau, he will discuss working DX, propagation, antenna needs and the use of contests and DXpeditions as sources of information. SATURDAY 4:00PM-Whale 3 Room-Shilo Inn.

**DXING FOR BEGINNERS & OTHERS** Hon. Gregory E. Milnes, W7AGQ. Greg will speak on beginning and intermediate "DXing". Greg is a resourceful and experienced DX chaser. As you can probably tell by the call sign he has been at this for a few years and has a lot of "secrets for success" he will share in this seminar. SUNDAY 9:00AM-Dolphin Room-Convention Center.



# Continued

**EQUIPPING AND ORGANIZING DXPEDITIONS** Mary Lou Brown, NM7N. Mary will share her many experiences in equipping and organizing the trips she has participated in. There is more to it than grabbing your radio and going off to some exotic location. This session will feature a slide presentation. A discussion, including a question and answer period, will follow. SATURDAY 11:00AM-Whale 3 Room-Shilo Inn.

**INTEGRATING AMATEUR RADIO INTO THE CLASSROOM** Larry Luchi, W7KZE. Larry, an electronics instructor at Sno-Isle Vocational Skills Center, will outline how Amateur Radio is used as a creative tool for preparing students in speech and global awareness in an ever changing work world. The discussion will include creative financing outside the normal public education funding process. SATURDAY 9:30AM-Whale 3 Room-Shilo Inn.

**INTERMEDIATE PACKET CONCEPTS** J. Mike Dunlap, K7MYU. This packet radio discussion centers on more advanced concepts. Details include message forms, collisions, error correction and HDLC. The third in the four part series on packet radio. Saturday 1:00PM-Mariner Room-Convention Center.

**MOBILE ANTENNA GAIN CHARACTERISTICS** Dave Phemister, WB7ESV. Dave is a service engineer with Larsen Electronics and an expert on mobile antennas and their signal propagation characteristics. Mounting types, location and design configuration will be part of the presentation. SATURDAY 9:30AM-Dolphin 1 Room-Shilo Inn.

**NATIONAL TRENDS IN AMATEUR TELEVISION** Charles O. Northcut, W7SRZ. Chuck will be coming to us directly from co-hosting the ATV presentation at Dayton. A video tape presentation along with a "state of the art and the direction it's taking" discussion will be featured. SATURDAY 1:00PM-Dolphin 1 Room-Shilo Inn.

**OREGON ARES ANNUAL MEETING** Bob Dorman, KV7F. Bob, a Section Emergency Coordinator, will open this annual meeting of the Amateur Radio Emergency Service Group. All members and interested Amateurs are urged to attend this important meeting. SUNDAY 9:00AM-Whale 3 Room-Shilo Inn.

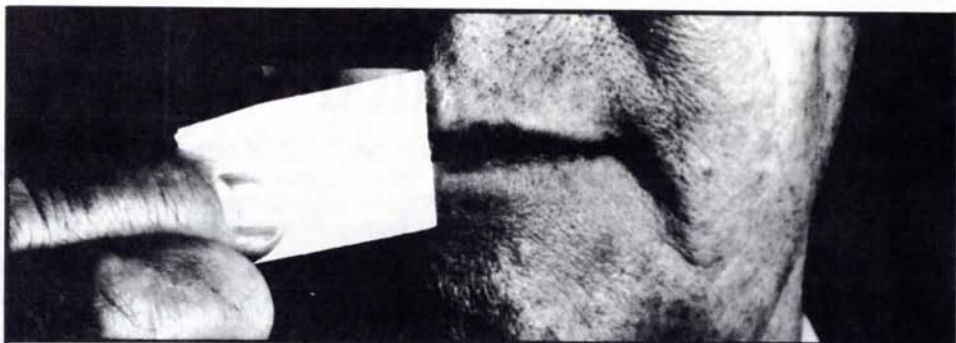
**OSCILLATOR THEORY FOR BEGINNERS** Jeffrey S. Damm, WA7MLH. Jeff will discuss the theory, design and the application of oscillators used in Amateur Radio. His refreshing style of presentation and use of common every day analogies will make this an exciting and interesting topic. SUNDAY 9:30 AM-Mariner Room-Convention Center.

**QST-GETTING IT TOGETHER EACH MONTH** Mark Wilson, AA2Z. QST's Managing Editor tells it like it is at deadline time. The discussion will center around putting together our QST Magazine and how you can write articles for QST publication. SATURDAY 1:00PM-Dolphin Room-Convention Center.

**RFI-CAUSES AND CURES** Everett Helm, WA7CYO. Everett, assistant chief engineer at KATU-TV2 will discuss Amateur interference with TVs and telephones. Practical methods to reduce common mode intrusion using ferrite materials and other techniques will be discussed. SATURDAY 1:00 PM-Whale 3 Room-Shilo Inn.

**SOLAR ACTIVITY AND EARTH'S IONOSPHERE** Brad Wells, KR7L. A short course on solar astronomy. How cycles of solar activity develop and interact with the earth's magnetosphere and how this interaction affects the visible features of the ionosphere and ultimately our forecasting of signal propagation. Is the band open? We'll hear why. SATURDAY 2:30PM-Whale 3 Room-Shilo Inn.

**TOPS OREGON PACKET SOCIETY** Fred Molsworth, AF7S. This will be the Oregon Packet Society's annual meeting with the election of officers for the next year. All members and interested Amateurs are urged to attend and participate. SATURDAY 4:00 PM-Mariner Room-Convention Center.



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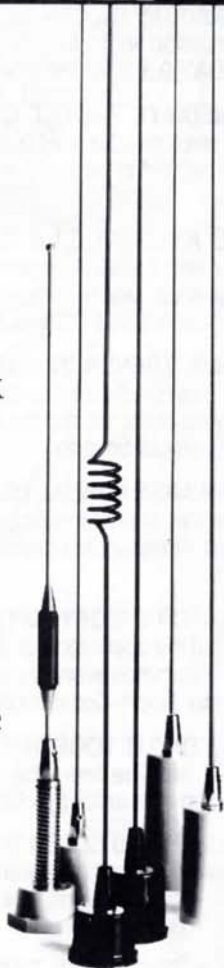


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# Ladies Programs

**Saturday, June 2**

**9:30AM-Huntley Inn-Room #125**

Ladies hospitality suite. Coffee-treats-friends-old and new.

"Your Medical Insurance Problems" presented by Peggy Till, N7MTL.

**10:00 -11:00AM-Huntley Inn-Room #125**

"Reason For Studying Peace" presented by Dr. Steele, Pacific University.

**11:30-2:30PM-Ladies Luncheon & Pgm.-Shilo Inn-Dolphin #2&3**

"Planning Your Next Vacation" presented by Azumano Travel.

**3:30-4:30PM-Huntley Inn-Room #125**

"Stress Management" presented by Jan Pahl, Clatsop County Extension Agent.

**All Day Saturday**

"Ladies Treasure Hunt" presented by Seaside Chamber Of Commerce.

**Sunday, June 3**

**9:30AM-Huntley Inn-Room #125**

Ladies hospitality suite. Coffee-treats-friends-old and new.

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CA-2X4M	140-155 MHz 440-460 MHz	4.5dB 7.0dB	150W	5'	MOBILE
CA-2X4SR	146 MHz 446 MHz	3.8dB 6.2dB	150W	3'4"	MOBILE
CX-902	146 MHz 446 MHz 1.2 GHz	3.0dB 6.0dB 8.4dB	150W	3'6"	BASE/REPEATER
CX-801	146 MHz 446 MHz 1.2 GHz	3.0dB 6.8dB 9.6dB	100W	3'3"	MOBILE
CA-630TN	146 MHz 446 MHz 1.2 GHz	2.15dB 2.15dB 5.5dB	150W 50W	1'5"	MOBILE

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# EXHIBITORS

10-10 International, Portland, OR  
73 Magazine, Hancock, NH  
Alinco Electronics, Torrance, CA  
Amateur Radio Relay Group, Beaverton, OR  
Amateur Radio Supply, Seattle, WA  
American Radio Relay League, Newington, CT  
Ameritron, Toledo, OH  
Antenna Systems Inc., Tigard, OR  
B.S. Press, Lynnwood, WA  
Bend ARC, Bend, OR  
C•COM, Seattle, WA  
Curley's Engraving, Portland, OR  
Cushcraft, Manchester, NH  
Electro Comm, Tacoma, WA  
Friendship Amateur Radio Society, Portland, OR  
Gene Hansen Co., Corrales, NM  
Harry Lewis, W7JWJ, Seattle, WA  
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ICOM America Inc., Bellevue, WA  
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MFJ Enterprises, Mississippi State, MS  
Mr. Nicad, Sauk City, WI  
NCG Company, Anaheim, CA  
Oregon Tualatin Valley Amateur Radio Club, Beaverton, OR  
Orlando's Electronics, Tangent, OR  
Portland Amateur Radio Club, Portland, OR  
Portland Radio Supply, Portland, OR  
Quarter Century Wireless Assoc., Eugene, OR  
Ramsey Electronics, Victor, NY  
Reno Radio, Reno, NV  
Smiley Antenna Co. Inc., El Cajon, CA  
St. Helens Electronics, St. Helens, OR  
Sunset Amateur Radio Club, Astoria, OR  
W. R. Robinson Enterprises, WA  
Willamette Valley DX Club, Portland, OR  
Young Ladies Radio League, Portland, OR

*Due to publication deadlines we apologize for any omissions.*

# Banquet Program



Standing L-R, Eugene Stavitsky, UW0CA, Mike Zavaroukhin, UW0CN/AA7CH, Rene Berblinger, KX7Z. Seated L-R, John White, K7RUN, Kevin Hunt, WA7VTD, David Wright, N7MYO. (Photo courtesy of Dick Fredrickson, WA0DIM).

## KHABAROVSK TRAVELERS AND THEIR HOSTS

As seen in QST for May, 1990, come meet the Northwest's own International Hambassadors, their Soviet hosts from The Khabarovsk Territorial Radiosports Federation and enjoy a professionally presented talk and slide show of the Khabarovsk Friendship Radiosport Games held in the USSR in September, 1989.

**Eugene Stavitsky**, UW0CA, was the primary organizer of the first Friendship Radiosport Games, a competition between four teams representing the Soviet city of Khabarovsk and its sister cities of Portland, Oregon and Niigata, Japan. The Soviets fielded a fourth team comprised of Amateurs from all over the Soviet Union. Also instrumental in founding the Friendship Radiosport Games was **Mike Zavaroukhin**, UW0CN, who will also be with us at our banquet.

Mr. Stavitsky chairs the Khabarovsk Territorial Radiosports Federation and is an accomplished and celebrated transceiver designer and constructor. He holds the top Soviet Amateur Radio title of Master.



Mr. Zavaroukhin is the first Soviet Amateur to pass U.S. license elements from Novice through Extra on Soviet soil. He holds the U.S. call sign of AA7CH. An avid tester, Mike has served as station manager for RZ0CZZ, an impressive collective station which has won countless worldwide DX contests.

Members of the Portland delegation were **Rene Berblinger, KX7Z; Dick Fredrickson, WA0DIM; Kevin Hunt, WA7VTD; John White, K7RUN** and **David Wright, N7MYO**.

Since returning from Russia this group has formed the Friendship Amateur Radio Society (FARS) Inc., which was incorporated as a public benefit corporation with the State of Oregon on March 16, 1990. Dick, WA0DIM, has the honor of being the first President for this organization.

Rene, KX7Z, holds an Extra class license. He is a past President of the Clackamas ARC and serves on the Board of Directors of FARS. He has been studying Russian since his return from Khabarovsk and was instrumental in organizing the first PTA sponsored language program for school children in this area. He's a musician by profession.

Dick, WA0DIM, is a Portland physician. First licensed in 1959 he now holds an Extra class licensee. He's a member and past President of Portland ARC and captured third place in the CW competition in Khabarovsk.

Kevin, WA7VTD, is an attorney and ARRL Volunteer Counsel residing in Oregon City. He has held an Advanced class license since 1974. He currently serves as General Counsel to FARS and won the individual DX competition championship in the Radiosport Games.

John, K7RUN, is a communications engineer and serves on the ARRL Public Service Advisory Committee. He is currently a board member of FARS, Portland ARC and TERAC. Along with other TERAC members he is co-holder of one end of the 47GHz world distance record.

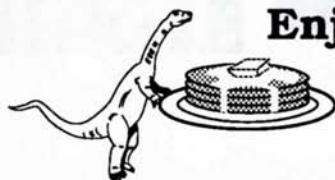
David, N7MYO, a resident of Woodinville, WA., has made a career in the field of electronics, most recently specializing in pulsed infrared optical sensing. Since the Games his enthusiasm for the hobby has been rejuvenated and he is currently working on a license upgrade, improving his shack and mastering packet radio and ATV - all of this while pitching in with the WWDX Club's own international projects associated with the Goodwill Games. 🐞 Lorna Campbell, KA7RFD

### **Special Guests:**

**Leland Smith, W5KL, President Emeritus QCWA**

**Mark Wilson, AA7Z, Managing Editor Of QST**

## **Enjoy The Meal!!!**





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## DJ-100T&DJ-200T

*Best 2M Micro Value Anywhere!*

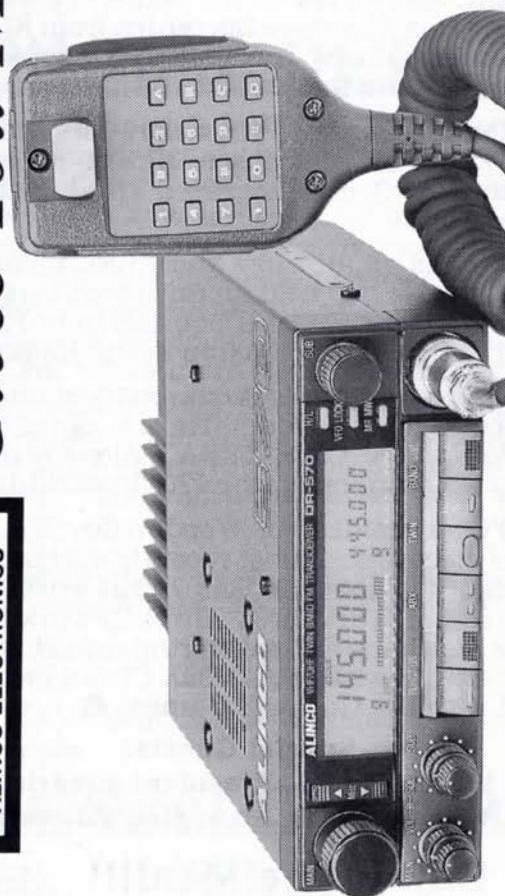
The Alinco DJ-100T is "Magnificent" for its tiny size, but stands up to the competition with power and capability. 10 memory channels store offsets and subtones. Has LCD readout with call channel and reverse at your fingertips. 500 mah battery with direct DC to DC is standard. 3W on standard battery, 6W on optional battery leaves the competition in the dust! DJ-200T for 220 MHz.



## DJ-160T&DJ-460T

*2M H/T is here! And wow!*

"Bells & Whistles" is a tame word to use for the new DJ-160T, newest "Magnificent" one from Alinco. Keyboard entry is just one of four ways to enter a frequency in



## DJ-500T

*Power-Packed Dual Handi!*

20 Memory channels, subtones, built-in DC to DC, 700 mah nicad battery, LCD readout with 6W on 2M and 5W on 70 cm (with optional battery) call channels, DTMF Touchtone, and direct

## DR-570T

*Set your sights for dual!*

The Alinco DR-570T "Twin Bander" has dual LCD readout, volume, squelch and tuning controls. Double barrelled power with 45W on 2M and 35W on 70 cm, plus simultaneous receive on both bands or intermix with four modes of scan. The DR-570T will win the "battle" with its illumi-



readout, readable in any lighting conditions. Don't let the "Tiny" DR-570T fool you! It's fast, and leaves the competition in the dust with many standard features you expect. Cross band repeat with the flick of a switch. Full duplex, 20 memory channels, call channels, 16-key DTMF Microphone, and subtones are just a few. "Reach" for the DR-570T today!



## DR-510T

### *Best Dual Value on the Market!*

The Alinco DR-510T has most of the outstanding features of its sister the DR-570T, including 14 memory channels, cross band duplex and cross band repeat. The multi-color LCD display, and simple tune control panel makes simplicity the key word. The DR-510T with 45/35 watts is the best, feature-packed dual bander on the Amateur market today. See the DR-510T along with the other Alinco "Magnificent" ones at your favorite dealer today!

the few winning features of the Alinco DJ-500T Dual Band Handheld. Easy to use, and Value Priced at your Alinco Dealer.

## DR-110T&R-410T

### *Tiny 2M Power From Alinco!*

DR-110T, this 2M Alinco, enters the nineties a proven winner with the "reputation" of best value. The DR-110T packs a powerful 45W on 2M and sports all the features you expect in today's transceivers. Tuning is a snap with the multi-functioned easy-to-see keyboard, 14 memory channels, subtones, scan, multi-colored LCD readout, reverse, are a few of the many features of the DR110T. The mobile of the future — today! DR-410T available for 70 cm.



## ALINCO ELECTRONICS, INC.


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TEL: (213) 618-8616 • FAX: (213) 618-8758



# New This Year

## Pacific Northwest

# Ham & Clubs Of The Year

SEA  PAC will present the first annual awards for an Amateur Radio Operator and two outstanding clubs at the banquet Saturday night, June 2, 1990.

### SEA PAC Ham Of The Year:

Someone who has made an outstanding achievement or contribution to our hobby. The winner will receive a plaque in recognition of this honor. This year we have 3 nominees at publication time.

Jakie Shepherd, WX7A, is a sightless ham. She faithfully participates in traffic nets and is President of the Bend Amateur Radio Club.

Larry Luchi, W7KZE, has developed a well respected Electronics Technical Program at Sno-Isle Skills Center in Everett, Washington. He has brought Amateur Radio to the classroom where his students receive an excellent exposure to global awareness.

George Herkert III, W2LLS, has been in Amateur Radio for over 50 years and is a member of the Emerald Amateur Radio Society. George has been tireless in his efforts to promote and advance Amateur Radio through recruiting, teaching, public awareness and youth involvement.

### Outstanding Achievement (Club):

Presented for outstanding achievement in an event or activity related to our hobby.

### Consistent Contribution (Club):


Presented for consistent contribution to amateur radio and/or outstanding participation in multiple areas.

*Each Club Winner Will Receive \$200.00*

# Oregon Tualatin Valley Amateur Radio Club Presents

## The 1990 Scholarship Winner

**KARL F. SCHILKE, KA7PPZ**

Each year OTVARC will be choosing a young ham that has made an outstanding achievement or contribution to our hobby and excelled scholastically. The winner will receive a scholarship for \$1250.00 to be used towards his or her education. This scholarship is funded in part by funds generated at SEA  PAC.


This year OTVARC has chosen Karl as the winner of the 1990 Scholarship. Karl will receive a check for \$1250.00 and has been accepted at Oregon State University.

When Karl was ten years old he and his Dad enrolled in a Novice-level class at Clackamas Community College. That summer Karl received his Novice license. He immediately got on the air and in the papers. Karl was one of the youngest hams in the area. As a Novice Karl could only use code so he took and passed his Technicians test and became active on 2 meters and RTTY.

In Karl's own words: "Last summer I had an experience that changed my life completely. After taking the PSAT, an envelope from Harvard University came to my door. I applied to the summer school program and was accepted. At Harvard I took a course on Existentialism and a course on 3-D Computer Graphics. I was fascinated by the curious mixture of mathematics and physics that make up the algorithms. I am a Senior at Oregon City High School and teach a class in 3-D graphics, and enjoy it immensely."

"Teaching my own class has been an intensely educational experience for me. Now I understand more clearly why teachers do the things they do. I have felt the frustration caused by inattentive students and the disappointment caused by low quiz scores. The things I have learned about teaching from this class will help me communicate in later life. As soon as I have time to devote to it, I want to upgrade to Extra and be involved in the administration of VE Testing."

Good luck to Karl from The Scholarship Committee: Pat Griffiths, KA7UFG; John Koenig, NB7W; Greg Milnes, W7AGQ; Dave Morrison, W7JXU and Bob Orr, WF7Q.

If you are interested in finding out more about The 1991 OTVARC Scholarship come to the OTVARC booth or write to: OTVARC Scholarship, PO Box 5132, Beaverton, OR 97006. 

Pat Griffiths, KA7UFG





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# nA qU tu9 oT woH rewoT snnethA

Reprinted from World Radio, April, 1989.

"I am writing in response to your request for additional information on my recent accident. In block No. 3 of the accident reporting form, I put "poor planning" as the cause of the accident. You said in your letter that I should explain more fully and I trust that the following details will be sufficient.

I am an Amateur Radio Operator. On the day of the accident I was working alone on the top section of my new 80 ft. antenna tower. When I had completed my work I discovered that I had, over the course of several trips up the tower, brought up about 300 pounds of tools and spare hardware. Rather than carry the now unneeded tools and hardware down by hand, I decided to lower the items in a small barrel by using a pulley which, fortunately, was attached to the gin pole at the top of the tower.

Securing the rope at the ground level I went up to the top of the tower and loaded the tools and hardware into the barrel. Then I went back to the ground and untied the rope, holding tightly to ensure a slow descent of the 300 pounds of tools and hardware.

You will note in block No. 11 of the accident report form that I weigh 155 pounds. Due to my surprise at being jerked off the ground suddenly, I lost my presence of mind and forgot to let go of the rope. Needless to say, I proceeded at a rather rapid rate up the side of the tower.

In the vicinity of the 40 ft. level I met the barrel coming down. This explains my fractured skull and broken collarbone.

Slowed only slightly, I continued my rapid ascent, not stopping until the fingers of my right hand were two knuckles deep into the pulley. Fortunately, by this time I had regained my presence of mind and was able to hold tightly to the rope in spite of my pain.

At approximately the same time, however, the barrel hit the ground and the bottom fell out of the barrel. Devoid of the weight of the tools and hardware, the barrel now weighed 20 pounds.

I refer you again to my weight in block No. 11. As you might imagine, I began a rapid descent down the side of tower. In the vicinity of the 40 ft. level I met the barrel coming up. This accounts for the two fractured ankles and lacerations of my legs and lower body.

The encounter with the barrel slowed me enough to lesson my injuries when I fell onto the pile of tools and hardware and, fortunately, only three vertebrae were cracked. I am sorry to report, however, that as I lay there on the tools and hardware, in pain, unable to stand, and watching the empty barrel 80 ft. above me, I again lost my presence of mind-I let go of the rope."

73 Magazine  
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Hats For Hams  
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NCG  
Portland Radio Supply  
Ramsey Electronics  
World Radio

*Due to publication deadlines we apologize for any omissions.  
Note: All registrants, including convention sponsors, are eligible for prize drawings and/or contest awards.*

SEA  PAC THANKS YOU!!!

**Contributors**

Azumano Travel, Ptl'd.  
Canyon Printing, Beaverton  
Cedar Hills Baptist Church, Ptl'd.  
Friendship Amateur Radio Society, Ptl'd.  
Hoodview A.R.C., VE Testing  
Ron Mayer, K7BT, Printing  
Greg Milnes, W7AGQ, Banquet MC  
Fred Molesworth, AF7S, TOPS  
John Newman, KA7QFY, ORRC  
North Coast Repeater Assoc.  
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Seaside Chamber Of Commerce, Seaside  
Seaside Elks Lodge, Seaside  
Seaside Safeway, Seaside  
Bill Shrader, W7QMU, NW Div. Director  
Dr. Steele, Pacific University  
Randy Stimson, KZ7T, OR Section Mgr.  
Peggy Till, N7MTL  
Jim Walsh, W7LVN, QCWA  
Alphabetical by last name & company.

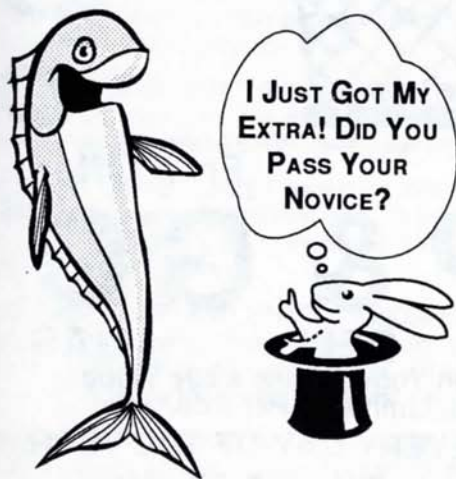


# PRIZE DRAWING INFORMATION

## Grand Awards

ICOM IC-725 And Power Supply  
Alinco DR-570T Dual Bander  
Kenwood TH 26 AT (2M HT)  
Yaesu FT-411 (2M HT)  
Yaesu FT-23R (2M HT)  
Heath HK-21 Pocket Packet TNC  
MFJ 949D HF Tuner  
And Many More!!!

You need not be present to win! If you are a winner, your prize will be shipped to you. The drawing time will be limited to one hour between 1-2PM Sunday. These prizes are purchased at or below cost from the dealers and manufacturers. We take this opportunity to express our appreciation.



## SPECIAL "IRS" Early Bird PRIZES

Bearcat 100 XL Scanner

Fluke 77 Multimeter

Astron 20 AMP VS 20M

### "I Registered Speedy"

You need not be present to win! The "IRS" prizes are a courtesy in appreciation to those who have registered by April 30, 1990. Quite a large amount of money is required early to pay the advertising and printing costs. Early registrants are benefactors of this need and are rewarded with special prizes. Good luck to those who can say "I Registered Speedy."

## HOURLY AWARDS

Winning numbers will be posted in the lobby and on stage for 2 hours to enable those attending seminars to see them. Prizes not claimed in 2 hours will be redrawn. Collect your prizes in the Prize Room. The hourly prizes are donated at no cost to the convention. Please express your personal thanks to the commercial exhibitors as you visit their booths!!! **Good Luck!!!**



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For more things to see & do and current activities,  
visit the Seaside Chamber Of Commerce Information Center at the  
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NW DX

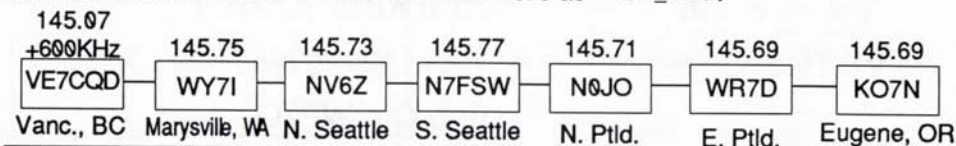
# PacketCluster™ Network

The NW DX PacketCluster™

System is a DX reporting and information system available to amateurs in the NW on several 2-Meter channels. This system consists of dedicated IBM-PCs ("nodes") running special software from Pavilion Software, with the PCs communicating with each other via a dedicated UHF link system. There are currently systems running in the Portland/Eugene, OR-Seattle, WA-Vancouver, B.C. and Spokane areas, with an ambitious linking system project underway so that any DX announcement made on any local node is sent to **all** users on **all** interconnected nodes.

One of the advantages of using a PacketCluster™ DX reporting system is that you do not have to be present to hear the DX announcements, as you would on a normal voice FM repeater. When you return to your shack, ask for a current DX report by typing "SHOW/DX" on your packet terminal and all the most recent activity will be summarized on your monitor. You can even be selective and ask for the last 10 callouts on 40 meters and the last 5 from ZA0, and so on. Other information quickly available when logged on to the system includes beam headings, distances and sunset/sunrise times for any DX country—all based on your individual QTH's coordinates. MUF calculations, WWV propagation reports and other important DX-related information is also immediately available to any user. A list of all users who are currently "on-line" is always available with the "SHOW/USERS" command. You can send messages to anyone on the system, or send a message for them to read the next time they log on. Regular packet BBS-type mail, file upload/download functions and a special conference mode are also available.

Special DX-related databases are available-W6GO/K6HHD QSLManager List-Russian Oblasts-Japanese Prefectures-Contest Calendars-Club Rosters-etc.- all by using special "SHOW" commands. There will be a discussion about the PacketCluster™ system and a User Command List will be available as part of the Advanced Packet Radio seminar here at **SEA PAC**.





# SEA PAC

## Co-Chairmen:

**Jim Schaeffer, KB7ADH**

**Ken Hart, N7JAS**

## Committee Chairmen

*In Alphabetical Order:*

Awards & Treasurer	----- Susan Benson, N7EPE
Casino Night	----- Ray Deeth, K7VDQ
Consultant	----- Randy Stimson, KZ7T
Exhibit Setup	----- Mike Boyd, N7DKQ
Exhibitor Hospitality	----- Bobbi Antons
Exhibitors	----- Al Berg, WB7SIC
Flea Market	----- Jack Smithson, KA7HOJ
Ladies Program	----- Katie Lapay, N7GCL & Val Roehl, KA7QEV
Printing/Advertising	----- Brad Beach, N7NVC & Ken Gilbert, WR7D
Prizes	----- Rick Schouweiler, KA5OLH
Registration	----- Lorna Campbell, KA7RFD
Security	----- Darwin Durr, K7PSD
Seminars	----- Phillip Weaver, KB7DLZ
Talk-In Booth	----- John Klein, KA7ICV
VE Testing	----- Jack Marsh, NA7H & Bob Orr, WF7Q



# THE COMMITTEES

Thanks To All The  
Volunteers That Helped Make  
This Convention A Success!!!

Due to publication deadlines we apologize for any omissions.

In alphabetical order:

## Awards:

John Koenig, NB7W  
Dee Lynch, KA7NPN

## Casino Night:

Wally Boleen, KC7TB  
Don Branda, N7DDK

## Exhibit Set-Up:

Wes Allen, K7WWG  
John Koenig, NB7W  
John Mackie, KA0SSF  
Neil McKie, WA6KLA  
David Nelson, WB7REC  
Brian Stevens

## Exhibitors:

Pat Griffiths, KA7UFG  
Ken Hart, N7JAS  
Dale LeBarron, W7FBP

## Exhibitor Hospitality:

Tony Antons, KA7ZDE  
Barbara Bailey, KA7WTF  
Janet Bell, WB7FJC  
Al Berg, WB7SIC  
Mary Berg  
Bud Butterfield, KC7PS  
Sally Butterfield  
Dave Funk, N7DWL

## Exhibitor Hospitality Cont:

Marion Funk  
Pat Griffiths, KA7UFG  
Marvel Noyes, KA7TZT  
Roger Noyes, KA7RNN  
Bob Orr, WF7Q  
Jo Orr, KA7MIE  
Joan Schouweiler, N7LMK  
Leonard Thompson, KA7IOB

## Flea Market:

Rick Doscher, KB7JFU  
Jeff Durr, KA7AKU  
Roger Noyes, K7RNN  
Bill Vesser

## Ladies Program:

Marian Funk  
Bobbie Mohr, KB7DME  
Debbie Smith, N7KAE

## Prizes:

Ed Fransen, KA7TCX  
Registration:  
Barbara Bailey, KA7WTF  
Brad Beach, N7NVC  
Jeff Durr, KA7AKU  
John Ewing, K7SHC  
Jeff Freedman, K7JF  
Dale LeBarron, W7FBP  
Randi Miller  
Joan Schouweiler, N7LMK

## Security:

Too many to mention.  
Thank you all.

## Seminars:

Hanford Van Ness, KE7BB

## Talk-In Booth:

Bob Bergert, K0PB  
Rex Danton, KA7YKR  
Carl Hokkanson, KA7CRN  
Marque Marriott, N7LWQ  
David Olson, N7IBI  
Handford Van Ness, KE7BB  
Roland West, K7MCK

## VE Testing:

Yoshi Abe, KD7AM  
Alan Churchill, AA7CV  
Ed Clulow, W7TWL  
Carroll Hermanson, KA7FJX  
Ray Kato, NO7X  
Jack Masterman, W7IMP  
Rolland Nielsen Sr., NE7S  
Armand Pilote, WA7IIM  
Rick Read, KW7B  
Bill Rogers, W7DYS  
Buck Summers, WT7S

# FRIENDSHIP AMATEUR RADIO SOCIETY

*Wants You!*



*Become a charter member of the newest and most exciting amateur radio organization under the sun - the Friendship Amateur Radio Society, Inc. (FARS).*

FARS is a non-profit, public benefit corporation dedicated to enhancing friendship, travel exchanges, radiosports games, and cooperative ventures between hams in the USA and USSR. FARS is an outgrowth of the first US/USSR Friendship Radio Games held in

Khabarovsk, USSR in 1989 (see March & May issues, **QST**). FARS has invited two Soviet amateurs from Khabarovsk to attend SEA-PAC to engage in planning for the 1991 games to be held in Portland, Oregon.

Your expertise, support and participation in FARS' programs is needed and welcomed! Charter associate memberships are being offered at SEA-PAC. The first 200 associate members will receive a special, numbered, charter members' certificate and commemorative FARS lapel pin bearing the logo you see here, made in USSR. All associate members will be eligible to serve on FARS committees, to apply for US/USSR exchanges, and to participate in radiosports games and awards programs. Join now and become a supporter of these pioneering efforts. Those joining as Benefactors will be honored with a handsome wall plaque.

☐ **YES!** I want to become a charter associate member of FARS, and receive my special certificate and lapel pin if I am in the first 200 members. Enclosed is my \$10 annual membership donation.

☐ **YES!** I wish to receive regular updates of FARS activities in the sPARC Gap. Enclosed is my \$15 annual newsletter donation.

☐ **YES!** I want to become a special member and be mentioned in FARS' annual report. Enclosed is my annual donation (includes basic membership) of:

☐ **SPONSOR \$50**

☐ **CONTRIBUTING \$100**  
\* AVAILABLE TO INDIVIDUALS

☐ **SUPPORTING \$250**  
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☐ **BENEFACTOR \$1,000**  
\*\*

☐ Please send me \_\_\_\_\_ FARS lapel pins (made in the USSR!). \$7.50 each enclosed.

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STREET \_\_\_\_\_ CITY \_\_\_\_\_

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**MEET EUGENE, UWØCA AND MIKE UWØCN/AA7CH**



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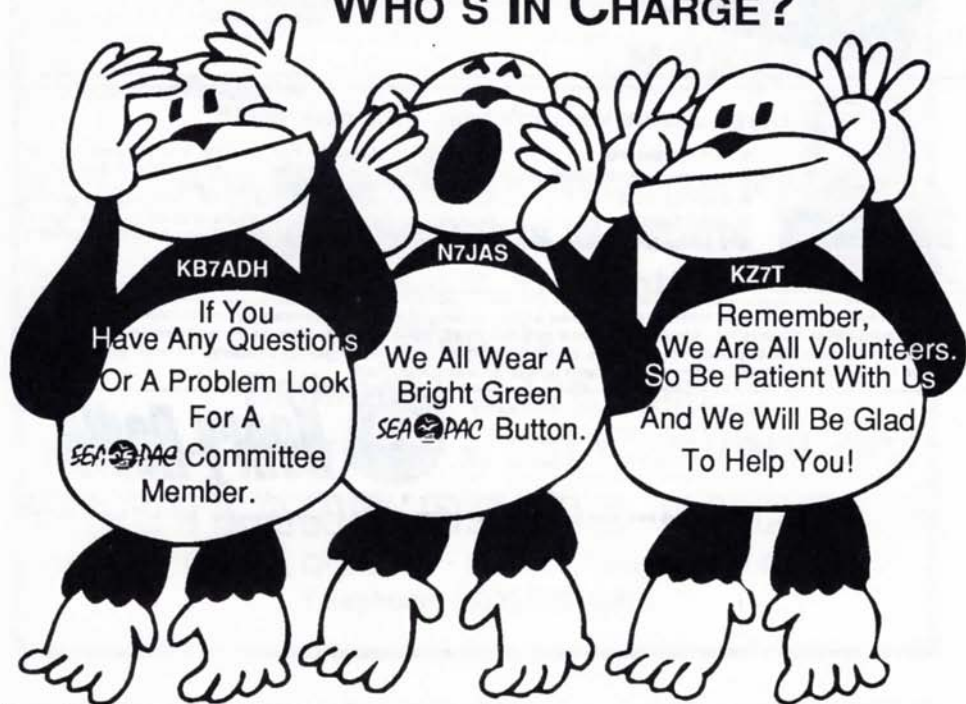
7  
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## The TEMPO MPP1 TNC/printer. . . \$249

A unique new mobile data printer. It incorporates a packet controller with a 40 column thermal printer that operates on 13.6 VDC and interfaces with any mobile radio. In a recent user test it proved to have about twice as much audio level range tolerance as other TNCs. It is also an ideal unit for emergency work and a commercial version is perfect for dispatching service, emergency and police vehicles.

## The FSTV-430A, AEA's newest

The exciting FSTV-430 fast scan television transceiver makes getting on ATV easy and inexpensive...live or taped. Almost any video camera can be used. Simply plug it into the FSTV-430, connect to your 70 cm antenna and you're on the air. Use a standard TV for receiving signals and, of course, an amplifier will extend your range. It's reliable, portable and light weight and can be used in-station or mobile from any 12 VDC source. The only license required is a technician or higher.



## The PK232/MBX by AEA

...the only controller offering Morse Code, Baudot, ASCII, AMTOR, Packet, and facsimile Transmission & Reception plus the ability to monitor the new Navtex marine weather and navigational system...7 modes in one controller. The PK-232 makes any RS-232 compatible computer or terminal the complete amateur digital operating position. All decoding, signal processing and protocol software is on ROM. Only a simple terminal program (like those used with telephone modems) is required to interface the PK-232 with your computer.



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If you have any questions concerning these units, or would like to discuss your requirements with a knowledgeable specialist, please call and ask for Fred, N6SFD. We also carry a large selection of excellent commercial products for data communications and emergency systems as well as a complete inventory of amateur equipment and linear power amplifiers.

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# MIDNIGHT

# 2 Meter Sprint

## CONTEST

**Date:** Saturday, June 2, 1990

**Time:** 11:00P.M. to Midnight (Local Time)

**Frequencies:** All recognized 2 Meter FM simplex frequencies, except 146.52 & 145.67. Recognized FM simplex frequencies are:

144.90 to 145.00 MHz

146.49 to 146.58 MHz

147.42 to 147.57 MHz

**Object:** Work as many different stations as possible and in so doing accumulate the highest possible score. Also to promote the spirit of friendly competition and sportsmanship.

**Eligibility:** All licensed Amateur Radio Operators holding a Technician class license or higher are eligible as control operators. Novices are encouraged to join in helping at a multi-operator station!!!

**Exchange:** Call, name and signal report.

**Multi-Op Stations:** One transmitter and one receiver at a time.

**Casual Operation:** Tune up and work your friends, or just make a few contacts. Casual operators contribute a note of excitement that makes this, or any contest, more fun and successful. So please tune in!!!

**Score:** Will be based on the total number of different stations worked. Add one point for each different station worked during the contest period. No multipliers for this contest.

**Logs:** Use the log of your choice. Logs are due by 11:00AM on Sunday in the Convention Center Lobby. See back of this page for sample log.

**Prize:** A unique SEA PAC T-Shirt will be awarded to the winner with the highest score at the conclusion of the SEA PAC convention.

# Sprint Log

Call	Name	RST
1		
2		
3		
4		
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# Registration Badges

Since all committee members are required to register, we also ask that everyone in attendance be registered. Please wear your registration badge at all times while in the convention center.

**Thank you very much  
for your  
Cooperation!!!**

## DO NOT READ THIS:

Unless you really want a small, potent two-element beam with lots of rejection where needed.

## DO NOT BUY THE II-DX ANTENNA!!

if you are the sort that chickens out readily. Unless, that is, you are willing and able to follow detailed, assembly/tuning instructions.

## AND DON'T TRY TO TUNE THE II-DX ANTENNA!!!

the way you would a yagi or quad beam.

The II-DX is a whole new ballgame. Two full-wave-loop elements, close-spaced and reshaped like -- well, reshaped! Broad-banded and needing no radials, no ground, no transformer balun (A choke coil or 1:1 current balun is necessary to cancel antenna currents on the line).

The II-DX demands adherence to a whole new set of tuning concepts and procedures, and rewards those who adhere in proportion to their performance.

### IT'S NOT FOR EVERYONE!

Here are some examples of what we're saying:

- \* Eight tuning adjustment points, plus radiator length, on each element.
- \* Coupling distance between end loops also adjusts, and must be correct!
- \* Dimensions (horizontal polarization): length about  $1/4 \lambda$ , width about  $1/8 \lambda$ , depth about  $1/10 \lambda$ , turning radius  $3/20 \lambda$ . Compact!
- \* Gamma match permits direct feed with 50-ohm coax.
- \* Gain equal to a 2-element quad.
- \* Rejection about 20 dB in each of two nulls about  $130^\circ$  back of heading.
- \* F/B ratio about 12 dB.
- \* Usable 2:1 SWR bandwidth, about 4% of "F".

You can see those results if you're willing and able to do your part. If you think you would be, see us at SEA-PAC, or write to:

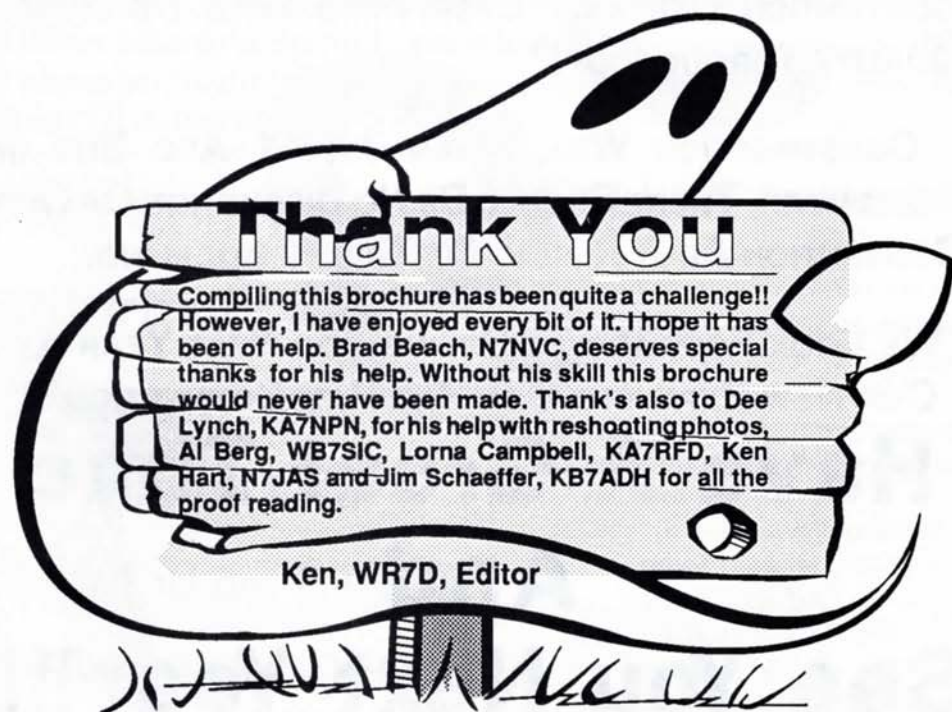
H. STEWART DESIGNS, P.O. Box 643, OREGON CITY, OR 97045



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The convention sponsors try to make certain all information in this brochure is accurate, however, we must be held harmless for any inaccuracies that may occur. Thank you.



# SEA PAC

**Is EXPANDING NEXT YEAR!!!**

**THE CONVENTION CENTER IS REMODELING!!!  
MORE FLEA MARKET SPACE AND MORE EXHIBITORS!!!**

**THE MAIN HALL WILL BE EXPANDED 50% FROM 10,000 SQUARE FEET TO 15,000 SQUARE FEET. MEETING ROOMS WILL BE ENLARGED FOR MORE COMFORT AND SEATING CAPACITY. THE KITCHEN AND LOBBY WILL UNDERGO A MAJOR REVAMPING ALONG WITH THE ENTIRE CONVENTION CENTER. "EVERYTHING WILL BE HOTEL QUALITY THROUGHOUT!"**

**CONSTRUCTION WILL BEGIN JULY 1 AND END IN SEPTEMBER. THERE SHOULD BE NO DISRUPTION OF OUR CONVENTION AS A RESULT OF THIS REMODELING.**

**WE LOOK FORWARD TO SEEING YOU NEXT YEAR AT OUR NEW EXPANDED SEA-PAC HAM CONVENTION!!!**

**Have A Great Time  
And**

**See You Next Year!!!**



# OTVARC

## The Oregon Tualatin Valley Amateur Radio Club

would like to take this opportunity to thank the many hard working individuals who have helped make **SEA PAC** a success.

A special thanks to all of the clubs in the Pacific Northwest who were of great help in advertising the convention.

We are deeply grateful to our many exhibitors for showing us their products. Without them this would not have been a successful convention.

**See You Next Year!!!**

**73 & 88**

**Jim Schaeffer, KB7ADH**

**Ken Hart, N7JAS**



ICOM

IC-24AT  
IC-32AT

# WE CHALLENGE YOU TO A DUAL.

## ICOM'S DUAL BAND HANDHELDS

ICOM's IC-24AT and IC-32AT call you to action with the most feature packed, power packed dual band handhelds available. Whether you prefer the convenience of a mini-handheld or the grasp of a full-size handheld, ICOM has the dual-bander fit for you.

The IC-24AT mini-handheld and the IC-32AT give you full operation on the 2-meter and 440MHz amateur bands. Outstanding Performance!

### POWER PACKED HANDHELDS.

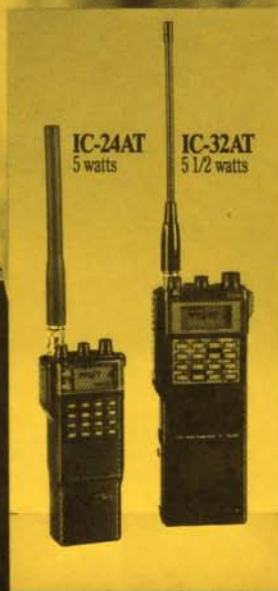
The IC-24AT provides up to 5 watts on 2-meters and 440MHz with a 12V battery while the IC-32AT is 5 1/2 watts on 2-meters and 5 watts on 440MHz.

**PLENTY OF MEMORIES.** Store any frequency, Tx offset and subaudible tone in any memory. Total flexibility to meet your needs.

**PROGRAMMABLE SCANNING.** Both units scan band and memories plus offer easy memory lockout and instant memory recall.

**PRIORITY WATCH.** Monitor the call channel, a memory channel or all memory channels every five seconds while operating!

**ADDITIONAL FEATURES INCLUDE:** Battery saver, multi-function LCD readout, dial selectability and



DTMF pad for memory channel auto-patching. The compact light-weight IC-24AT also features a 24 hour clock with timer, and an autodialer. Access to multi-digit phone numbers at the touch of a button.

**ACCESSORIES:** The IC-24AT uses accessories from the "S" Series handhelds while the IC-32AT is compatible with all IC-2AT/02AT accessories. An optional UT-50 provides all subaudible tones while the optional UT-40 beeper silently monitors a busy channel for your calls. When the preprogrammed subaudible tone is received, the unit beeps and the LCD flashes.

The dual is over. ICOM's IC-24AT mini-dual bander and IC-32AT full-size dual bander give you maximum performance in the package best suited for your needs. Check your local ICOM dealer for the finest dual banders available today. The ICOM IC-24AT and IC-32AT.

ICOM  
First in Communications.