

David A. Minster, NA2AA
Publisher

Becky R. Schoenfeld, W1BXV
Editorial Director

Dana Kasowitz, KC1SEB
Managing Editor

Sam Shaner, KE1SAM
Editor

Tanjah Fryer
John McKenna
Assistant Editors

Paul Bourque, N1SFE
Contest Program Manager

Phil Salas, AD5X
John Stanley, K4ERO
Technical Editors

Dave Casler, KE0OG
Leanna Figlewski, KC1RMP
Steve Ford, WB8IMY
Steve Goodgame, K5ATA
Sierra Harrop, W5DX
Jon Jones, N0JK
Bernie McClenny, W3UR
Rick Palm, K1CE
Pascal Villeneuve, VA2PV
Paul Wade, W1GHZ
Contributing Editors

Terese Newman
Assistant Production Supervisor

Matt Ali
Layout & Production Specialist

Maty Weinberg, KB1EIB
Production Coordinator

David Pingree, N1NAS
Senior Technical Illustrator

Janet Rocco, W1JLR
Advertising Relationship Manager

Bob Inderbitzen, NQ1R
Director of Marketing & Innovation

Steve Ewald, WV1X
Field Organization Supervisor

9

Second Century
IARU Restructuring

30

Multi-Vee: A Compact Rotary Antenna for 14 – 30 MHz
Jacek Pawlowski, SP3L

35

An All-Band 160-Meter OCF Antenna
Bob Glorioso, W1IS, and Bob Rose, KC1DSQ

37

A Ground-Independent Beverage on the Ground
Jim Spaulding, W0UO

40

Product Review
Pascal Villeneuve, VA2PV
RigExpert MATCH Upgradeable Antenna and Cable Analyzer;
Long Island CW Club Haptic CW Decoder;
SignalStuff Signal Staff Collapsible OSJ Antenna;
Venus DR-4020 QRP Digital Radio

56

ARRL Activities at Hamvention® 2025
Rich Moseson, W2VU



★
60

Special Section: HamSCI: The Ham Radio
Science Citizen Investigation

■ **HamSCI: The Future of Ham Radio is Here**
Nathaniel A. Frissell, W2NAF

■ **About Traveling Ionospheric Disturbances**
Ethan Miller, K8GU, and Nathaniel A. Frissell, W2NAF

■ **2025 HamSCI Workshop: Oral Sessions Sampler**

■ **An Invited Tutorial: The Role of the Polar Vortex in**
Atmosphere-Ionosphere Coupling
Dr. V. Lynn Harvey

■ **A Glimpse of the Workshop Poster Session**

82

2025 ARRL International DX CW Contest Results
Mark Beckwith, N5OT

85

2025 ARRL RTTY Roundup Results
Jeff Stai, WK6I

88

The 2025 ARRL September VHF Contest

88

The 2025 ARRL International EME Contest

89

The 2025 ARRL 10 GHz and Up Contest



An icon next to an article means there's bonus content in the digital edition at www.arrl.org/qst.

Columns

Ask Dave	52
Club Station	90
Contest Corral.....	81
Correspondence	24
Happenings.....	74
Hints & Hacks	54
How's DX?.....	92
Member Spotlight.....	13
Public Service	77
The World Above 50 MHz.....	94
Up Front	20
100, 50, and 25 Years Ago	100

Departments

ARRL Section Managers.....	16
ARRL Special Service Clubs.....	91
Certificate of Code Proficiency Recipients	80
Convention and Hamfest Calendar	96
Feedback	55
Field Organization Reports	97
Guide to ARRL Member Benefits.....	14
Ham Ads	124
Index of Advertisers	126, 127
Life Members	79
Officers, Division Directors, and Staff.....	15
QST Cover Plaque Award	79
Silent Keys	101
Special Event Stations	98
Strays	34, 39
This Month in QEX.....	89
Volunteer Monitor Program Report	99
W1AW Qualifying Runs	80
W1AW Schedule	28

Digital and Mobile Editions

ARRL members can access the digital edition via a link at www.arrl.org/qst, download our iOS app from the iTunes Store, and download our Android app from the Google Play Store.

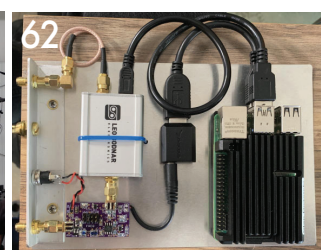
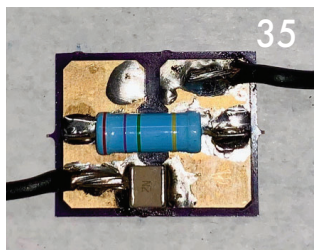
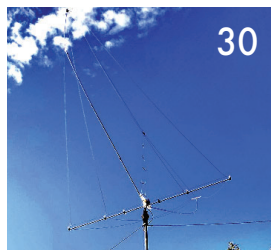
Write for QST

www.arrl.org/qst-author-guide
email: qst@arrl.org



Our Cover

This issue shines a spotlight on HamSCI: The Ham Radio Science Citizen Investigation, featuring just some of the research that was presented at the 2025 HamSCI Workshop. This 10-year-old organization brings hams and professional scientists together to advance scientific research through amateur radio activities. The cover photo shows University of Scranton, W3USR, and New Jersey Institute of Technology, K2MFF, students and faculty meeting at the United Astronomy Clubs of New Jersey Observatory to service HamSCI Personal Space Weather Station (PSWS) instruments. HamSCI members are building a PSWS network to collect data — a citizen science project that you can get involved with, too. For more details, visit hamsci.org. [Nathaniel Frissell, W2NAF, photo]



QST (ISSN:0033-4812) is published monthly as its official journal by the American Radio Relay League, Inc., 225 Main St., Newington, CT 06111-1400, USA. Canada Post: Publications Mail Agreement #90-0901437. Canada returns to be sent to The Mail Group, 1501 Morse Ave., Elk Grove Village, IL 60007.

POSTMASTER: Send address changes to: QST, 225 Main St., Newington, CT 06111-1400, USA. Canada Post: Publications Mail Agreement #90-0901437. Canada returns to be sent to The Mail Group, 1501 Morse Ave., Elk Grove Village, IL 60007.

ARRL Membership and QST cannot be separated. All ARRL members have digital, online access to QST. Print subscriptions are available and sold separately. For ARRL members in the US, a subscription to QST via mail is

\$25 per year. For libraries and institutions, a subscription to QST is available for \$84 per year; single copies \$7.

ARRL Membership is available to individuals at \$59 per year. A reduced rate is available for licensed radio amateurs under 26 years old, for \$30 per year. Membership is available to the immediate family of a member living at the same address, and to anyone who is legally blind, for \$12 per year. A complete list of dues rates is available at www.arrl.org/join. Foreign remittances should be by international postal or express money order or bank draft negotiable in the US and for an equivalent amount in US funds.

Copyright © 2025 by the American Radio Relay League, Inc. Title registered at the US Patent Office. International copyright secured. All rights

reserved. Quedan reservados todos los derechos. Printed in the USA.

QST®, DXCC®, VUCC®, DX Century Club®, ARES®, Amateur Radio Emergency Service®, Logbook of The World®, LoTW®, and ARRL The National Association for Amateur Radio® are registered trademarks of the American Radio Relay League, Inc.

ARRL and QST in no way warrant the products described or reviewed herein.

QST is available to blind and physically handicapped individuals from the Library of Congress, National Library Service for the Blind and Physically Handicapped. Call 1-800-424-8567 or go to www.loc.gov/nls.

Indexed by Applied Science and Technology Index, Library of Congress Catalog Card No: 21-9421.

To ensure prompt delivery, we ask that you periodically check the address information on your mailing label. If you find any inaccuracies, please contact Member Services at circulation@arrl.org or 860-594-0200.

Reprints and permissions: permission@arrl.org

Online Privacy Policy: www.arrl.org/online-privacy-policy
Telephone: 860-594-0200