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ANTENNA

Newsletter of the Mercurians

Special Interest Group

Society for the History of Technology

WWW.MERCURIANS.ORG

In this issue

Evolution

Conference Announcement

"EuroNets—EuroChannels—EuroVisions: Towards a History of Telecommunications in 20th-Century Europe"

The Swiss Federal Institute of Technology (ETH) in Zurich is sponsoring a workshop on telecommunications history to be held May 15-17, 2003. The conference organizers define telecommunications broadly and are interested in the many ways in which telecommunication technologies affect all aspects of public and private life in Europe, as well as the tight interlocking of technological and social change.

Their stated aim is to examine the knowledge and expectations that circulate among the main network actors, the existing interests and connections within and between organized actors, the strategies and procedures that enhance the implementation of specific technical settings, devices, and standards, and the hidden paths among organizational problems, system design, and political economy, including the problems of technological redundancy, transformations within institutional frameworks, and failed projects.

The organizers also are interested in such aspects as how societal standards, rules, and norms guiding public and private life form through telecommunications, and how legal and economic control over infrastructures occurs. Other areas of interest include public and private security and control, crime and political subversion, and the pronounced role of institutional outsiders, such as radio amateurs and hackers. They welcome papers that deal with the visions, expectations, promises, fears, warnings, and unexpected results that accompany the implementation of telecommunication networks. They also are interested in the interaction between culture and technology as expressed through exhibitions, sports, war, terror attacks, national and international tourism, the internationalization of finances, as well as telecommunications as a means for expressing social differentiation.

In addition to presenting their own work, workshop participants will receive a colleague's contribution in advance, which they will discuss with the author. Send an abstract (about 250 words) and a short biographical note, including a list of selected publications, before December 18, 2002 to:
bonhage@history.gess.ethz.ch.

For further information, visit www.tg.ethz.ch (Chair of the History of Technology) or http://www.histech.nl/tensions/ (Tensions of Europe).

Ed. Note: "Mercurial Matters" has taken a vacation in order to make room for the above last-minute conference announcement.

Business Matters

If you received an envelope with your copy of the newsletter, your subscription to ***Antenna*** and membership in the Mercurians end with this issue.
Two year subscriptions are US$5 for delivery to the United States and US$10 elsewhere.
Please make all checks payable to SHOT, write Mercurians on the memo line, and mail to :

Mercurians
P.O. Box 534
College Park, MD 20741-0534

Campaign for SHOT

Since SHOT's founding, *Technology and Culture* has depended financially on the institutions at which the editors resided. In light of the financial pressures on universities and museums today, SHOT cannot expect to be as fortunate in the future in finding an outstanding scholar-editor at an institution able to support the journal's editor and editorial office. Consequently SHOT wishes to endow the editorship of *Technology and Culture* and estimates a need for $2 to $2.5 million to generate the necessary income to subsidize the editorial work of *Technology and Culture.*

The National Endowment for the Humanities Challenge Grant program will provide a one-to-three matching grant, over a four year period. This means that if SHOT receives an NEH Challenge Grant, the endowment will provide one dollar for every three that SHOT raises through contributions.

SHOT believes that contributions from individual members necessarily must be the foundation for the Campaign for SHOT. SHOT's officers and all members of the Executive Committee have pledged their financial support to the Campaign for SHOT, and we Mercurians are asking members to join us in this endeavor.

To pay by check or money order, send your name and address, your pledge amounts for 2002, 2003 and 2004, and a check or money order drawn on a U.S. bank in U.S. dollars, made payable to the Society for the History of Technology, to the SHOT Secretary's office addressed as:

Campaign for SHOT
216 B Ames Hall
Johns Hopkins University
Baltimore, MD 21218

For all other payment methods, obtain a pledge card at:
http://shot.press.jhu.edu/pledge_card.pdf

Winners of Student Subscriptions

Thanks to the generosity of History Enterprises, Inc., we have been able to offer three gifts of a two-year ***Antenna*** subscription to the following graduate students:

Lisa Nocks

I am completing a Ph.D. in Modern Intellectual & Cultural History & Literature at Drew University, Madison, N.J. My research areas are: History of Science (esp. evolution) and Technology (especially artificial intelligence and robotics), Book History, and Victorian Britain. My primary methodology is mainly reception history.

Merav Katz

I am a doctoral student in the history and philosophy of science graduate program at Bar-Ilan University in Ramat Gan, Israel. I have a B.Sc. in biotechnology engineering from Technion (Israel Institute of Technology) and an M.A. in comparative literature from Tel Aviv University. Broadly speaking, my academic interests include: the history of communication technologies, the history of the internet, utopianism, technological utopianism, and the intellectual history of technology. I am especially interested in the cultural and social history of information and communications technologies.

Currently, I am writing my dissertation, temporarily titled "Technological Utopianism and the Rise of the Internet." In it, I explore the utopian extremes of the U.S. public discourse surrounding the internet and cyberspace. Studying the extreme utopian visions of the discourse has a unique fascination for me, as I believe that these visions formed a cultural *Geist*. For certain, they have a crucial part in shaping the image of the internet in the eyes of its users. I suggest that they affected its popularity and its quick adoption in the U.S.

Kathy Keltner

I'm a second year doctoral student in the College of Mass Communication, School of Telecommunication, at Ohio University. I also am enrolled in the school's Contemporary History Institute, a certificate program specializing in post-World War II studies.

My research analyzes media representations of the Apollo program to determine how science and technology became part of popular culture. I am particularly interested in the kinds of cultural products created as a result of Apollo, as well as the role of the media in creating meaning for those products.

"Life doesn't imitate art, it imitates bad television."
—Woody Allen.

More New Members

Mats Fridlund

Mats Fridlund specializes in the history of science and technology in 20th century Europe. His publications include a monograph on the collaboration between the state and private industry in the development of Swedish electric power, a book on Swedish education and research policy, and articles on technology and nationalism, the history of electric power and telecommunications, theories of technological and industrial change, and the history of physics. Currently he is working on the history of industrial nationalism and global collaboration in thermonuclear fusion. His broader interests include the role of the state in technological change, the history of Japanese technology, artefactual representations and the history of research policy, and the social studies of modern science, technology, and innovation.

Colin Hempstead

I am editing a history of 20th century technology for Fitzroy Dearborn. It should be out the middle of next year (2003). I am a member of SHOT and have written one or two papers on 19th Century submarine telegraphy (see page 5).

David Hochfelder

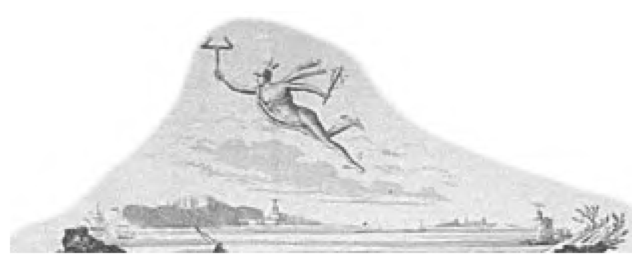
Assistant editor, the Thomas A. Edison Papers project.

Douglas J. Mudgway

Mudgway is the author of *Uplink/Downlink: A History of the Deep Space Network, 1957-1997*, NASA SP-2002-4227. See the book notice in the April 2002 issue of *Antenna*, page 10, or read it in text-searchable pdf files at: http://history.nasa.gov/SP-4227/Uplink-Downlink.pdf

Tim Wolters

I am a Ph.D. candidate in the History and Social Study of Science and Technology at MIT. My dissertation examines the adoption and integration of communications and sensor technologies aboard U.S. Navy ships from 1899 to 1945.



Chappe Telegraph Letterhead
An Early Mercurian?

News of Mercurians and Their Projects

Paul Israel

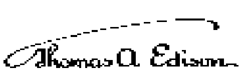
PAUL ISRAEL, a long-time member of SHOT and the Mercurians, has been named Director of the Thomas A. Edison Papers at Rutgers University. He has been with the project since 1980, and is the author of *Edison: A Life of Invention* (John Wiley, 1998), winner of SHOT's 2000 Dexter Prize. Working on the project under Paul's direction is a team of six editors and two indexers.

The Edison Papers is a major editing project that is publishing the most significant documents related to the inventor's life and work. There are over 5 million pages of documents at the Edison National Historic Site (West Orange, NJ), the primary repository of Edison Papers, as well as several thousand more scattered in other archives and private collections throughout the world.

The project will publish a microfilm edition of about 700,000 documents from the West Orange Site. It also will digitize these and other materials drawn from other repositories and make them available on the Edison project website, where researchers can search by name or date or view them in order by series.

The website also contains all of Edison's U.S. patents, chronologies, bibliographies, descriptions of businesses associated with Edison, the catalog of the microfilm edition of early motion picture catalogs (also published by the Edison Papers), and a collection of essays, images, and patents concerning Lewis Howard Latimer, an African-American inventor who was an associate and friend of Edison.

Eventually the website will include the annotated documents from the book edition of the Edison Papers. Four volumes have been published to date. Each contains about 400-450 documents, covering the period from Edison's birth in 1847 to 1878. Volume 5, covering the period 1879-March 1881, will appear in 2003.



Young "Al" Edison at age 14.

TV History Lecture Series

Mercurians in the Princeton area may be interested in a lecture series being held at the Sarnoff Corporation, where fellow Mercurian Alex Magoun is Director of the Sarnoff Library. The series began last November with two presentations on the invention of electronic color television at RCA Laboratories. The lectures are free and open to the public.

The following is a synopsis of the August 8 lecture given by Dr. Hiro Kawamoto and based on his article, "The History of Liquid-Crystal Displays," published in the April 2002 *Proceedings of the IEEE*.

"From Princeton to Japan to the World: The Development of Thin, Flat Liquid-Crystal Displays For TVs and Computers"

Shortly after RCA researchers in Princeton invented electronic color television in 1950, RCA chief executive David Sarnoff asked them to put television on a wall. In 1962, Dr. Richard Williams, a physical chemist at the Sarnoff Research Center, discovered the Williams Domain in liquid crystals, which he realized made the material suitable for flat-panel displays. Two years later, Dr. George Heilmeier invented an LCD using the dynamic-scattering mode. He believed that a wall-sized, flat-panel, color TV was just around the corner. By 1970, RCA staff had conceived such techniques as the Twisted-Nematic (TN) mode, Thin-Film-Transistor (TFT) arrays, and cholesteric doping, which are the basis of the current liquid crystal industry. RCA, however, decided not to pursue the commercialization of LCDs. Project researchers left the labs and founded LCD companies such as Optel and Microma.

During the 1970s, researchers at Hoffmann-La Roche, DRA, and Brown Boveri in Europe gained insight into the physics of liquid crystal behavior. Chemical companies, such as Hoechst, BDH, and Merck, developed new materials for LCD applications. In Japan, Sharp and Seiko supported LCD technology by designing and supplying small displays for niche market products, such as wristwatches and calculators.

Finally, in 1988, researchers at Sharp developed a 14-inch full-color, full-motion, liquid-crystal display. Sharp's accomplishment led IBM, Toshiba, and NEC to join the LCD industry. David Sarnoff's dream of a wall-hanging TV finally had become a reality. LCDs now could serve the computer and television markets. Today, calculators, watches, cameras, laptops, PDAs, airplane seat displays, computer monitors, and high-definition televisions use LCD. LCD sales surpassed those of cathode-ray tube (CRT) displays in 2000, and may exceed the $50 billion mark by 2005.

Conferences

Conference Review

"Communications Under the Seas: A Twice-Rejuvenated 19th-Century Technology and its Social Implications"

On April 19-20, 2002, the Dibner Institute for the History of Science and Technology hosted a conference organized by Dr. Bernard Finn (Smithsonian Institution) and Prof. Daqing Yang (George Washington University) on underwater cables and their social implications.

The conference organizers grouped the talks into five sessions titled: 1) "A Technologic History of Cables," with papers by Bernard Finn, Jonathan Winkler (Yale University), and Jeff Hecht (independent scholar); 2) "Management of Cables," with papers by Jorma Ahvenainen (Jyvaskyla University, Finland), Robert Boyce (London School of Economics), and Kurt Jacobsen (Copenhagen Business School); 3) "Impact on Diplomacy and Warfare," with papers by Daniel Headrick (Roosevelt University), David Nickles (State Department), and Daqing Yang; 4) "Impact on Business, Press, and Culture," with papers by Menachem Blondheim (Hebrew University) and Pascal Griset (Sorbonne); and 5) "Implications for the Internet," with remarks by Janet Abbate (University of Maryland) and Peter Hugill (Texas A & M University).

The conference audience consisted of the presenters and a small number of invited guests. Most of the participants had read one another's paper before the conference, so they were familiar with the general history of cables. The discussions therefore were very focused and informed, making this one of the most interesting and productive of conferences. The Dibner Institute plans to publish revised versions of the papers in the near future, though probably not until 2004.

A parallel effort undertaken by Bernard Finn is the exhibition "The Underwater Web: Cabling the Seas" on the Smithsonian Institution Libraries' website: http://www.sil.si.edu/Exhibitions/Underwater-Web/. Finn eventually hopes to include abstracts and other information from the Dibner conference there.

— Daniel Headrick

A dog walks into Western Union and asks the clerk to send a telegram. He fills out a form on which he writes down the telegram he wishes to send: "Bow wow wow, Bow wow wow."
The clerk says, "You can add another 'Bow wow' for the same price."
The dog responds, "Now wouldn't that sound a little silly?"

IEE History of Technology Meeting

The History of Technology meeting of the Institution of Electrical Engineers, and the official launch of its Professional Network in History of Technology, took place July 5 - 6, 2002, at the University of Birmingham, England. Among the papers presented were:

"Digital signal processing and the rise of consumer electronics," Frederick Nebeker (IEEE History of Technology Group, USA)

"The history of computing," Martin Campbell-Kelly (Warwick University, UK)

"At the roots of patents: the role of patent agents and scientific advisers in paving the way to Guglielmo Marconi's technological achievement," Anna Guagnini (University of Bologna, Italy)

"Cable route access in the Atlantic, 1857 - 1956," Lenore Symons, IEE Archives, UK

"Non-Maxwellian electrical theories in the 19th Century," Colin Hempstead, University of Teesside and Mercurians

"Electronic switching in the UK: systems evolution and standards, 1979 - 1983," L.R.F. Harris

Malcolm Muggeridge

Every standard film history begins with the famous race horse photographs taken by Malcolm Muggeridge. Wheaton College (Illinois) plans to explore the breadth of his life and opus in a conference, "Muggeridge Rediscovered: A Centenary Conference Celebrating the Life and Work of Malcolm Muggeridge," to be held May 22-24, 2003.

The conference is expected to draw scholars, clergy, media figures, and individuals from all walks of life, and intends not only to celebrate Muggeridge's diverse achievements as journalist, author, radio and television personality, soldier-spy, and Christian apologist, but also to introduce his work to new generations.

A preliminary program will be available in November on the website:
http://muggeridge.org
For additional information, contact:
David Malone
Wheaton College
Special Collections
Phone: 630-752-5707
Fax: 630-752-5855 david.b.malone@wheaton.edu

Books of Interest to Mercurians

Stay Tuned: A History of American Broadcasting, Third Edition, Christopher H. Sterling and John Michael Kittross, Lawrence Erlbaum Associates, Mahwah, New Jersey, 2002. 720 p., $59.95

A few months ago, I was hoping to teach an interdisciplinary introduction to telecommunications course. It would be the first course in the Telecommunications graduate program at George Washington University. I was looking for a textbook that covered the history, the technology, the regulatory politics, and as many other aspects of telecommunications as possible. I never found the appropriate book (suggestions still welcome), but somewhat later, Chris Sterling, the long-term director of the program, sent me a copy of his book: ***Stay Tuned***. While Prof. Sterling's book is about broadcasting rather than the more general field of telecommunications, it is a wonderful example of the type of book I was looking for.

Stay Tuned covers broadcasting from its prehistory (mass communications and early electrical communications) to the present day. The second and third editions brought the story forward a dozen years each time from the original end date of 1976. Two tables of contents are provided: a chronological table (the book is laid out chronologically) and a topical table. The pages devoted to chronological periods and individual topics seem well distributed. For a variety of reasons, it was fun to explore the topical contents. Programming, regulatory issues, and technology occupy the most space (in that order). Other topics, such as stations, networks, advertising, and audience, receive significantly less space. My own area of interest, satellite communications, receives a good amount of attention that emphasizes its effects on networks, distribution, and programming.

A chronology, glossary, 50 pages of historical statistics, and a bibliography complete the book. It is an excellent textbook for a history of broadcasting course, and could serve a variety of other courses as a main or supplemental text. While it satisfied my own interests in technology and politics (regulation), much of the pleasure of reading this book lies in the view it affords of the establishment and evolution of a form of mass culture in the United States. Contemporary photographs, advertising, and programming excerpts provide insights into 20th-century American history as much as they provide insights into the history of broadcasting.

— David Whalen

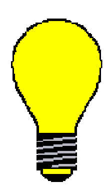
The Origins of Satellite Communications, 1945-1965, David J. Whalen, Smithsonian History of Aviation and Spaceflight Series Smithsonian Institution Press, 2002, 236 pages, $32.95

Conventional wisdom assumes that government research and development efforts—especially those of NASA—produced the satellite communications industry. Whalen's book argues, however, that private corporations, namely, AT&T and Hughes Aircraft Company, developed most of the earliest satellite technology, with the major exception of launch vehicle technology (rockets). They were willing to invest their own money in the technology, because they recognized that the satellite communications market would more than repay their investment. AT&T designed and paid for the first real communication satellite, Telstar 1. Had the market been allowed to operate freely, AT&T would have launched their commercial low-orbit telephone satellite system in the 1960s.

However, NASA, the White House, and Congress intervened in order to show the world that the U.S. was going to win the space race, and that the billions of dollars that the U.S. government planned to spend on that race would result in practical applications. Government intervention had several outcomes: the marginalization of AT&T in the field of satellite communications, the positioning of Hughes as the dominant commercial satellite manufacturer, the choice of geosynchronous as the preferred orbit for communication satellites, the establishment of a pubic-private monopoly (COMSAT), and the formation of INTELSAT.

Whalen examines the policy and technology background behind the origins of satellite communications, and provides a narrative history of developments from the launch of Sputnik to the decision by COMSAT in December 1965 to concentrate on geosynchronous orbit satellites. The epilog looks back at events since 1965.

David Whalen has been an engineer in the satellite communications industry for almost thirty years. He is currently a consultant living in Virginia. In addition to technical degrees, he has a Ph.D. in Science, Technology, and Public Policy from George Washington University.



"If it weren't for electricity we'd all be watching television by candlelight."
—George Gobol.

Books of Interest to Mercurians

Anytime, Anywhere: Entrepreneurship and the Creation of a Wireless World, Louis Galambos and Eric John Abrahamson, Cambridge University Press, Cambridge, 2002. 320 pages, $29.00.

Wireless entrepreneurs are transforming the way people live and work around the globe. In the process they have created some of the fastest growing companies on the planet. *Anytime, Anywhere* tells the story of the birth and explosion of cellular and wireless communications as seen through the eyes of one of the industry's pioneers, Sam Ginn. As deregulation and privatization swept the globe, Ginn and his team at AirTouch Communications fought for and won licenses on several continents. They built a successful business using strategic partnerships and joint ventures and demonstrated a new model for global entrepreneurship in an information-based economy.

Louis Galambos is Professor of History at Johns Hopkins University and President of the Business History Group. He has written numerous books and articles on entrepreneurship, innovation, and regulation, including *Networks of Innovation* (Cambridge, 1996) and *The Rise of the Corporate Commonwealth* (Basic, 1989). Eric Abrahamson is Principal Historian with The Prologue Group. His research has dealt with telecommunications, banking, and regulation in California.

—Cambridge University Press

GE 1928 "Octagon" Mechanical Television Set with Four-inch Screen

A History of Extremely Low Frequency (ELF) Submarine Radio Communications, John Merrill, Publishing Directions, Southington, Conn., 2002. 96 pages, $26.95.

In this book, John Merrill traces the research and development of a radio communications system for the Fleet Ballistic Missile (FBM) submarines first launched in 1959. These submarines operated thousands of miles from the U.S. mainland and at depths of hundreds of feet. Devising a communication system that would not severely reduce the speed, maneuverability, and depth of the submarines was a daunting challenge. Among the approaches researchers examined was extremely low frequency (ELF) radio. A June 1959 meeting at the Institute for Defense Analysis outlined an ELF communication system operating in the range of 3 to 300 Hertz. Difficult technological challenges related to ELF submarine receivers and receiving antennas, land-based transmitters, antennas and environmental issues, and budgetary battles created problems that became state and national issues and caused major delays in the navy's implementation of the system. In October 1989, the navy transferred the operational ELF system from its Space and Warfare Systems Command to the Naval Telecommunications Command. The book draws attention to the multitude of governmental, industrial, engineering, scientific, and academic organizations that were involved in the long development of a radio communication system suited to both strategic and attacks submarine requirements.

John Merrill was a career electronic engineer and former head of the Submarine Electromagnetics Department at the Naval Underwater Systems Center Laboratory, Fort Trumbull, in New London, Conn. Earlier, he was the Center's program manager for the development of the navy's ELF radio wave global communication system for strategic and attack submarines. He also is the author of *Fort Trumbull and the Submarine* (Publishing Directions, 2000) and *Looking Around: A Short History of Submarine Periscopes* (Publishing Directions, 2002), as well as coauthor of *Meeting the Submarine Challenge: A Short History of the Naval Underwater Systems Center* (GPO, 1997). In addition, John Merrill has taught science, mathematics, electrical engineering, and computer information systems at several colleges and universities, and he is a Mercurian.

"Television has brought back murder into the home -- where it belongs."

—-Alfred Hitchcock

News Of Interest to Mercurians

Journal of Space Communication

The *Online Journal of Space Communication* is a cross-disciplinary scholarly publication distributed online free of charge and designed to advance space communication as a profession and academic discipline. Issued four times a year, the journal will provide in-depth studies of satellite and space communication relating to education and manpower development, innovation and technology, economy and business development, services and applications, regulation and public policy, social impact, and regional development. To date, the first issue has dealt with education and training, while the second looked at innovation and technology (specifically NASA's Advanced Communications Technology Satellite). The third will survey services and applications, especially remote sensing. Each issue will strive to make complex historical, technical, economic, regulatory, and social issues more accessible and understandable, and will provide a historical perspective to stimulate discussion. The journal's editor is Prof. Don Flournoy Director of the Institute for Telecommunications Studies, Ohio University at Athens. The Academic Council of the Society of Satellite Professionals International (SSPI) serves as the journal's editorial board under the chairmanship of Joseph Pelton, Professor and Director of the Telecommunications Program at George Washington University. Prof. Flournoy welcomes suggestions for ways to improve the journal, as well as thoughts about future topics and guest editors. Readers will find the journal available at: www.spacejournal.org

Request for Mercurians' Help

Producer/Director Edward A. Wesolowski, Jr. is seeking members of SHOT and the Mercurians who specialize in the history of telecommunications and television. He is considering producing a broadcast documentary program that describes parallels between the transition from B&W to color television, 1954-1970, and the current transition to High Definition Television. He welcomes background information, locations of archives, and commentary about the technology, as well as the political and economic history of the transition. Mr. Wesolowski also is seeking recommendations of individuals to contact regarding potential project partners from academia, industry (manufacturers of retail and commercial production, transmission and reception equipment), and foundations. The program, being developed in cooperation with a PBS affiliate, examines:

- Penetration in the marketplace (projected and actual) of communications technology, color and HDTV.
- Social and economic implications of the current government, FCC, transition mandate (2003-2006).
- Analog spectrum-space return to the U.S. government.
- CRT and flat panel television hardware transition.

Mr. Wesolowski would prefer, but is not restricting, respondents to be individuals from the Research Triangle Park area of North Carolina. If you can help, please contact him at:
edwes@idisplay.com or 919-960-0023.

TV History in Previous Issues

Book Reviews:
David E. Fisher and Marshall Jon Fisher, *Tube: The Invention of Television* Vol. 10, No. 1 (November 1997): 10.
Albert Abramson, *Zworykin: Pioneer of Television* Vol. 8, No. 1 (November 1995): 9.

Publication Noted:
Christopher H. Sterling et al, *Early Television: A Bibliographic Guide to 1940* Vol. 9, No. 2 (April 1997): 9.

Short Note:
"The Zapper in History" Vol. 9, No. 1 (November 1996): 9.

AT&T Bell Labs TV

On April 7, 1927, a group of newspaper reporters and dignitaries gathered at the AT&T Bell Telephone Laboratories auditorium in New York City to see the first U.S. demonstration of something new: television. Secretary of Commerce Herbert Hoover provided the "entertainment," as his live picture and voice traveled over telephone lines from Washington, D.C., to New York City. "Today we have, in a sense, the transmission of sight for the first time in the world's history," Hoover said. "Human genius has now destroyed the impediment of distance in a new respect, and in a manner hitherto unknown."

A second telecast followed that day, via radio transmission from Whippany, N.J. The telecasts demonstrated television's potential as an adjunct to telephone service and as a medium for entertainment. Newspapers trumpeted AT&T's achievement as the latest wonder in an age of wonders. Herbert Ives, the AT&T researcher who led the television project, followed that triumph with color television in 1929 and two-way interactive television in 1930, using video telephone booths connecting the AT&T and Bell Labs headquarters buildings in New York.

To learn more, visit the web site that Mercurian Sheldon Hochheiser has created to celebrate the achievement:

http://www.att.com/spotlight.television

Television History in the News and on the 'Net

Alexander B. Magoun, David Sarnoff Library

The invention of television has been in the public eye as much in the last six months as it ever will be. Much of the publicity, seen in national book reviews, National Public Radio broadcasts, and at the Emmy™ awards, centered on the 75th anniversary of Philo Farnsworth's alleged invention of the first all-electronic system on September 7, 1927. Three writers have published and promoted books in the last six months on the invention of electronic television, and John Logie Baird's son recently has published a biography of his father. We may rest assured that the centenary will take place with less fanfare, because this commemorative moment is tied to three unique and influential factors: the transition from analog to digital broadcasting, baby boomer nostalgia for the monochrome shows of their youth, and the survival of the widow of a claimant to the title of television's inventor.

These events raise or revive a number of issues for historians of technology and historians in general. They begin with why "firsts" matter, a question subjected to some correspondence in recent issues of ***Antenna*** following Pamela Laird's Fall 1999 editorial. They continue with what defines a first; the role of technical knowledge in such definitions; the persistence of myths as frames for the popular understanding of, and conflicts over, history; and the relative power, or lack thereof, of academic historians in setting the terms or resolving the conflicts of popular historical debate.

The issue of pre-eminence is one that academic historians avoid assiduously. For example, in the latest study of television, Jennifer Bannister explicitly avoids it. We are trained to be objective and balanced; yet with the dream of objectivity taken down a few notches in recent decades, history becomes exceptionally indeterminate in its analyses. The history of technology highlights not accomplishments, but contingency; not the second-guessing of old disputes, but the tired theme of social construction. Self-consciously aware of our innate subjectivity, we bend over backwards to avoid judgment and therefore retain the dispassion that drives good scholarship.

Or does it? Balance and discipline have their merits, but by choosing indecision rather than judgment over a popular question, SHOT scholars leave a vacuum. Culture, like nature, abhors a void, which in this case is filled by corporate and romantic versions of the essential history of our field, the origins of things.

Television, like radio, offers a popular case study of this phenomenon for students or, perish the thought, your friends at a slow party with a fast web connection. It's worth our time and reputations to take a reasoned stand and provoke a scholarly argument or, failing that, a trip around the web. There we can see various portraits of a technology, and how those portraits can enable those in our charge to understand the complexity of being first. Students can explore the questions or issues posed above through sites and pages lumped in the following categories: researcher advocates, corporate advocates, researcher nonpartisans, collector researchers, collector restorers, and recreator restorers.

Researcher Advocates.

Paul Schatzkin deserves most of the credit for pushing Philo Farnsworth into the public eye as the inventor of television as we know it today. His site, "Farnovision," www.farnovision.com/, builds a mythology around Farnsworth based almost entirely on his widow's recollections. Is it good history? No. Does Schatzkin understand any of the "black-box" issues of the technology that might support his position? No. Yet in the absence of any contrary argument, the author of the privately published *The Boy Who Invented Television: A Story of Inspiration, Persistence, and Quiet Passion* persuaded PBS (www.pbs.org/wgbh/amex/technology/bigdream/index.html), NPR, and finally the National Academy of Television Arts and Sciences to accept his version of the priority of invention for television, much to the disservice of several other primary candidates, and much less the other people and groups who deserve credit.

Schatzkin dismisses John Logie Baird's work, while Baird's son Malcolm has worked steadily over the last six years to illuminate his father's career online, first in articles found in the spring and fall 1996 online issues of Kinema (www.arts.uwaterloo.ca/FINE/juhde/kinemahp.htm, and more recently at http://members.attcanada.ca/~antenna1/Baird.html, where one can also order copies of his new biography.

Glen A. Williamson, an electronics engineer, sponsors www.ntsc-tv.com/ntsc-main-01.htm. His site features some confusing if impressive graphics that explain the operation of analog and digital television. It also reproduces a 1981 history of U. S. television standards with some second-guessing and comments on the future under digital formats and increasing processing power.

Hardly noticed by Schatzkin (or almost anyone else outside of Hungary) is the work of Kalman Tihanyi. RCA bought his 1920s patents for an electronic television system at the same time as the company's entanglement with Farnsworth over priority. Tihanyi's daughter, Katalin Tihanyi Glass, scrupulously documents her father's patents and their relation to Zworykin's progress or lack thereof in electronic camera design: www.sci-tech.hu/history/tihanyi/.

Corporate Advocates.

Corporate histories on the internet are becoming more sophisticated. The unusual attention to detail

Television History in the News and on the 'Net (continued)

suggests that individuals actually wrote the content.

RCA, "a Thomson Business," provides an episodic history at www.rca.com/content/aboutmoreindex/0,2809,CI263,00.html?.

Zenith Electronics Corporation offers more illustrations, highlighting its invention of the wireless remote control and membership in the HDTV Grand Alliance: www.zenith.com/index.asp?url=./sub_about/about_index.asp

Researcher Nonpartisans.

Some sites embrace the history of television while balancing advocacy and information. The David Sarnoff Library, for which I take responsibility, has a website, www.davidsarnoff.org/, that features annotated print and on-line bibliographies, galleries of images related to Sarnoff and RCA technologies, annotated references, and linked timelines. The site aspires to provide a variety of library and archival resources, but some devil's advocacy, stated as such, might also provoke visitors to engage questions of invention, regulation, and market capitalism more seriously. Net-ready undergraduate projects that help to fill openings on the site are welcome.

Andre Lang, a French-Canadian scholar, presents the spectacular "Histoire de la Télévision" in multiple languages at http://histv2.free.fr/. The site documents what might be called the prehistory of the technology in the 19th century, and its relationship to the broader culture.

Clarke Ingram offers "The DuMont Television Network Historical Web Site" at http://members.aol.com/cingram/television/dumont.htm. The fourth television network and its inventive founder enjoy over ten chapters of linked content and a bibliography that does not account for the interviews that Ingram carried out.

The Museum of Broadcast Communications in Chicago offers a variety of commercially sponsored exhibits, an enormous catalog of broadcast shows and ads, and its Encyclopedia of Television in the Archives and Education pages at www.Museum.TV/index.shtml.

"The Video Veteran" provides a history of television in Chicago at www.chicagotelevision.com/, which is one way of tracking the technology and culture's evolution.

The IEEE History Center offers my history of the invention of monochrome-compatible, electronic color television in its Milestone section at www.ieee.org/organizations/history_center/milestones_photos/colortv.html. Interviews with three of RCA's leading television researchers—Harold B. Law, Paul Weimer, and Vladimir Zworykin—are also available at the RCA Oral Histories page: www.ieee.org/organizations/history_center/oral_histories/oh_rca_menu.html.

Collector Researchers.

Less artifact-based than those devoted to restoration, these sites provide documentation as they acquire it. Ed Reitan, Jr. hosts "The Following Program is Brought to You in Living Color" at www.novia.net/~ereitan/, which focuses on the invention of the American analog color television standard between 1945 and 1954. Reitan argues, based on documentation, for more credit to the rest of the television manufacturers in developing the analog color television standard based on RCA's system.

Steve Restelli started his site, "The Restelli Collection" or History TV.net, with Vladimir Zworykin's scrapbook, and has added sections with other acquisitions related to RCA's work in the 1930s: http://framemaster.tripod.com/.

Collector Restorers.

These people collect a wide array of TV memorabilia and restore many of the sets that they acquire. Tom Genova offers the best of these sites at "Television History—The First 75 Years" at www.tvhistory.tv/index.htm. This is an exceptional documentary site, organized by era and year, cross-referenced to sections in each with artifacts, ads, photos, documents, patents, articles, and images by country and inventor. The site is sometimes slow to load.

MZTV, the Toronto-based museum based on Moses Znaimer's collection, shows how a collection can become an institution of interest to more than other collectors. It offers several exhibits at www.mztv.com/.

Steve McVoy has applied much time and money to developing the Early Television Foundation, www.earlytelevision.org/index.htm, and its museum in Hilliard, Ohio, outside Columbus. The site is a monument to the wide array of TV sets that he has acquired and restored. It also includes information about production quantities and TV stations. The sets are now installed and demonstrated at his museum.

Finally, photos and some technical data for television camera and display tubes are available on five pages at Tubepedia: www.aade.com/tubepedia/1collection/tubepedia.htm.

Recreator Restorers.

We should be in awe of those who build Nipkow-disc televisions in the spirit of Baird or who make a fifty-year-old color television work again. Peter Yanczer maintains the richly detailed Experimental Television com/Tour/home.html. This offers nonpartisan histories and illustrated lessons on building your own 32-line flying spot scanner. Its British cousin, The Narrow-Band Television Association at www.nbtv.org is less detailed but well-linked.

Television History in the News and on the 'Net (continued)

The relentlessly enthusiastic Chuck Pharis documents a variety of restoration projects at www.pharis-video.com/p21.htm. He specializes in cameras and studio equipment more than receivers.

There are two affiliated groups working on the first RCA (http://home.att.net/~pldexnis/restoration_menu.html) and Westinghouse (http://home.earthlink.net/~marlinmackley/westlist.htm) color sets from 1954. Both illuminate the complexity of the state of the technical art two generations ago, as well as the continuing collaborative nature of making a technology work.

Some larger questions.

The larger question that arises with these sites and pages is, who are they for: their creators or some public? And if so, why, and which public? We can joke at the obsessive dimensions of the collectors and the advocates, their attention to all details in the first case and selective grasp in the second. We might remark at the audacity, the ego gratification, the cost in time, money, and missing relationships. But we might also remind ourselves that these people care about history as deeply as we do, albeit in ways quite different than our own. As a result they help recreate the inventive process of the past. For better *and* worse, the quality of their work and the attention gained by their presence on the web leads to two suggestions. These are the sources, along with televised documentaries, to which the public increasingly resorts for their understanding of the past. Scholarly historians need to engage them critically and, secondly, post more of their work on-line as both a counter and a complement.

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E-Mail Directory Update

Membership in the Mercurians has been increasing, and so has our E-mail Directory!
Do we have your current e-mail address? Also, please check your listing for accuracy and case sensitivity.
Thanks!

The People's Telephone: Technological Populism and the System Idea

Robert MacDougall

"It is not the telephone apparatus, central office equipment, or wires that independently afford or can afford any service," wrote Theodore Vail, president of the American Telephone and Telegraph Company (AT&T), in 1917, "It is the machine as a whole. All the telephones, all the equipment, all the central offices are vital and necessary parts of that machine." Today, as in Vail's day, the telephone network is a classic example of an integrated technological system. A single telephone, on its own, is essentially useless. It only acquires utility and meaning as part of a larger system—a network not only of wires and switchboards, but also of laws and commerce, cultural expectations and social forms.

Theodore Vail

Historians of technology have made the study of systems central to their work, yet rarely have we interrogated the idea of system itself. We should not adopt systems as organizing concepts before first investigating systems history and its implications. In the case of the telephone, it is quite clear that popular ideas about technological systems shaped the early development of the phone, and the telephone, in turn, altered the public understanding of systems.

The companies that formed to exploit Bell's patents—the companies that would become AT&T and its regional subsidiaries—enjoyed a patent monopoly in the United States until 1894, when Bell's patents expired. The Bell companies now faced a double threat: competition and hostile political action. In response, they audaciously appropriated their enemies' rhetoric, and, in due time, the "technological populism" that they embraced changed the way Americans thought about networks and networked technology.

The system idea embraced all sorts of activities, organizations, and processes, and construed them as consisting of discrete but interlocking components. By the start of the twentieth century, Frederick W. Taylor and his followers had spread the gospel of system and systematic management to factory, farm, and home. They imagined workers, farmers, and housewives all working together as human cogs in a single, efficient machine.

It is hardly surprising, then, that AT&T and its subsidiaries came to call themselves "the Bell System," using the term interchangeably to refer to both the physical networks of phones and wires and the corporate system that controlled them. This elision of distinction between the physical and the corporate is important, because it points to the fact that technological systems, and the idea of systems in general, had political and social implications.

In the late nineteenth century, people invariably associated systems and networks with order, hierarchy, and centralized control. The whole thrust of Taylorism shifted authority away from workers and lower-ranking managers toward standard operating procedures and predefined rules. Of course, reality did not always live up to the ideal. Undoubtedly there was a lot of ad hoc improvisation and jerry-built organization, and assuredly too, in some ways technologies decentralized authority and disrupted existing hierarchies. But the perception and public understanding of these organizations and machines was always one of order and efficiency.

The men who built the Bell System initially embraced this same vision of hierarchy and centralized control. By renting, rather than selling, telephones, the Bell System was willing from the start to forego immediate revenue in order to maintain ownership and control of the network. The more than six hundred patent infringement suits the company filed between 1877 and 1893 also demonstrated their will to control the network. Bell also devoted considerable effort into training and controlling its customers.

During the four years after the expiration of the Bell patents in 1894, over a thousand independent telephone companies sprang up everywhere, often in small towns or rural areas that the Bell companies did not serve, but many more competed directly with Bell. "The Bell Trust," as its rivals called it, proved to be a fierce competitor. It slashed prices and expanded rapidly. But the competition expanded too, and by the

The People's Telephone (continued)

first decade of the twentieth century, the Bell System was in genuine trouble. AT&T was financially over-extended and hemorrhaging business to its independent competitors. By 1907, Bell's market share had fallen from 100% to just 49%. In Midwestern states, such as Indiana and Illinois, independent phones out-numbered Bell phones by a factor as high as four or five to one.

Even more frightening to AT&T than competition was the specter of antitrust action and nationalization. Already, nearly every European state had nationalized its telephone system, and Canada too came close to doing so. In the United States, the American Populist Party platforms of 1892 and 1896 called for nationalizing the telephone. The next decade saw a flurry of state regulation and movement by both major parties towards government control. This was the era of muckraking and trust-busting; the threat of political action against AT&T appeared very real.

In 1907, at the nadir of Bell's financial fortunes, J.P. Morgan and other Wall Street financiers wrested control of AT&T from the Boston bankers that had owned the company since the 1880s. The new owners installed Theodore Vail, one of Bell's first general managers, as president. Although the reasons for Morgan's coup were financial, Vail and his colleagues understood the political and cultural aspects of the firm's woes. Much of the country distrusted, if not actively despised, the company.

The assault on Bell's legitimacy had its roots in the Midwest, nourished by hostility to monopoly and Eastern capital. Bell's competitors gave themselves populist appealing names such as the "People's Telephone," casting themselves as local Davids against a foreign Goliath. Unease with the classic nineteenth century ideal of systems also drove hostility toward Bell. To them, AT&T was a sinister concentration of power, "a wire spider, stretching his deadly tentacles" across the plains.

Such was the dilemma that Theodore Vail faced in 1907. He had to promote the Bell System and fight off competitors, while Bell's major advantages—its size and ubiquity—also were its biggest political liabilities. Vail proceeded to streamline Bell's corporate organization, encourage more scientific innovation within the company, and reverse AT&T's policy against interconnecting with other networks. However, his first major action as president was the launch of an extensive public relations campaign at the heart of which was a long and influential series of magazine ads created by the N.W. Ayer & Son advertising agency.

Walter Gifford, Vail's successor, observed that the company's old ways of lecturing and even berating its customers had failed. "We have got not only to be efficient, but we have got to be liked," he declared.

The campaign that AT&T launched after 1907, however, achieved something fundamentally more important and more powerful than simply portraying the company as being nice. They appropriated the populist rhetoric of some of its most resolute foes.

From trying to control its customers, Bell now talked about empowerment. The ads stressed how the telephone network gave power to all its users. Early Bell executives were openly skeptical that rural or working-class Americans had any real or valid use for telephone service. Now Bell embraced the notion that every American could and should have a telephone. From arguing that an efficient telephone system demanded a single centralized authority, the firm now declared: "Every Bell Telephone is the Center of the System."

This was a new way of talking about the telephone, as well as a new way of talking about technological networks. It differed manifestly from the classic late-nineteenth-century idea of system. Admiration of order, hierarchy, and control gave way to praise for flexibility, decentralization, and individual empowerment.

This strategy is so common today that one might not recognize how audacious it was in 1907. Inadvertently, AT&T succeeded in promoting a new view of technological systems as flexible, decentralized, and empowering to the individual. This view became the default rhetoric for talking about communication technology in the twentieth century. As rhetoric, it became as influential in its time as the old ideals of hierarchy and control once were. It became the language amateur operators used to describe wireless and radio during the 1910s and 1920s. It was how RCA and NBC spun television in the 1940s. It also is how we think about computers and the internet today.

Historians like to look for the ways in which modern technologies empower the individual. Certainly, the telephone can be empowering, and there is little doubt that it improved the lives and expanded the horizons of many ordinary Americans. But the very idea of populist technology, of the allegedly empowering nature of networks owned and controlled by mammoth corporations, has its own history and its own deep implications.

In the early twentieth century, AT&T built something besides a continental telephone network. It built a new understanding of networks and systems, and a language of technological populism that has survived and thrived for almost a century to block alternatives to private monopoly and co-opt public criticism of corporate control.

Satellite Command and Control in the USSR, 1955-1965

David C. Arnold

Satellites perform a variety of scientific, reconnaissance, navigational, weather observing, and communications missions. Satellite telemetry and command systems (also called command and control systems) provide the essential link between satellites and the people who operate them. Because radio signals travel in a straight line, tracking stations can communicate with satellites only when they are within sight of the station's antenna. For low-orbiting satellites, tracking periods are limited, sometimes as brief as five minutes. Tracking stations, therefore, are scattered widely, yet they also must maintain a communications link to a central control center.

Scholars have paid far more attention to the history of satellites than to the role of civilian and military tracking stations. But without those facilities, no one would have been able to verify space successes. Although satellite control developed haphazardly, it has been as vital to national politics as any single satellite program, perhaps more so, because satellite command and control systems support many different satellite programs. Furthermore, without satellite command and control systems, the space race between the United States and the U.S.S.R. could not have happened.

During the 1950s, several organizations researched satellite command and control systems in the United States and the Soviet Union. In the U.S.S.R., it was the Command Measurement Complex. In accordance with Eisenhower administration policies, the United States developed two separate but equal sets of satellite command and control networks: a public one to support civilian space science and the military's secret one, designed specifically to support the top secret National Reconnaissance Program. The Soviet Union, in contrast, built a single network, which reflected the influences of geography and politics.

The Soviet totalitarian state did not distinguish between civilian and military space programs. Its space program served the purposes of the state, whether scientific, military, or propagandistic, and like its U.S. counterpart, it included elements of scientific exploration, technology development, national image building, practical applications, and military uses. Thus, the Soviet Union needed but a single network to track satellites.

Between 1957 and 1981, the U.S. Defense Department conducted about 57% of the nation's space flights, 44% of which had exclusively military missions, while the U.S.S.R. launched about 66% of their successful space flights for strictly military purposes.

Regardless of the mission, the Soviet Union's space program needed a tracking network to verify space achievements and to maintain command and control over satellites. And, like the United States, the Soviet Union developed its tracking network from systems originally designed to evaluate the success of missile test flights.

In 1953, in an address to the World Peace Council in Vienna, the president of the Soviet Academy of Sciences declared: "Science has reached a state when it is feasible to send a stratoplane to the moon, [and] to create an artificial satellite of the Earth." Soviet Scientist G. I. Pokrovskii speculated that, although a satellite the size of a billiard ball would be of sufficient size to be observed from Earth, a satellite several decameters in diameter would be more useful. Meanwhile, Soviet scientists and engineers began planning for a missile tracking network.

The unique political structure of the U.S.S.R. impacted the design of the Command Measurement Complex (KIK), which served every piloted, interplanetary, scientific, and military space mission from 1957 to the present time. A government decision in January 1956, following fierce wrangling among ministries, placed responsibility for developing the satellite command and control network on the shoulders of the military.

Engineers, scientists, and military officers expended considerable effort to create a ground infrastructure to track and communicate with Sputnik I. After fierce competition between the Academy of Sciences and the Ministry of Defense for the contract to build the telemetry, tracking, and command network, the military took on the job of satellite command and control.

KIK initially comprised seven major stations spread across the country's vast expanse. In order to justify the high ranks and salaries of the commanders and personnel, the stations euphemistically took on the name Scientific Measurement Installations. The KIK, under the command of Maj. General Ivan I. Spitsa, served both scientific and military satellites. All ground stations of the Command Measurement Complex were under the direct control of the Strategic Rocket Forces. In December 1957, the Ministry of the Defense moved the KIK control center from Bolshevo to Moscow, and in January 1963, the control center came under the direction of the General Staff of the Strategic Missile Forces as military unit No. 32103.

Scientists and engineers in the U.S.S.R. sited their satellite tracking stations in order to keep their locations secret and to provide an acceptable environ-

Satellite Command and Control in the USSR, 1955-1965 (continued)

ment for communications, power, and living arrangements. The military established new units at each site, with their own seal, banner, and guard. The stations, often in the arid desert or the steppe, operated independently with their own supplies, technical support, and financial resources, and employed five or six officers and thirty to eighty conscripts. Officers' families lived with them, but without schools and other support facilities.

Life at the tracking stations swung dramatically between monotony and the excited throes of a launch. At first newcomers felt elated because of the apparent freedom and independence of the isolated sites. Then boredom set in, and they would volunteer for transfer to anywhere else. In one case, the lieutenant colonel in command of one outpost committed suicide.

Each KIK station relayed all its tracking and telemetry data to the Coordination Computation Center, established at headquarters in Moscow in early 1957 under the command of Pavel A. Agadzhanov. The Ministry of Defense, in addition to its responsibility for the missile-tracking network, was in charge of the tracking, telemetry, and command network for all Soviet satellites. As early as 1961, the U.S.S.R. did data processing for orbital calculations using an advanced digital computer capable of 20,000 operations per second, and later with another computer capable of probably around 50,000 operations a second. These computer capabilities easily rivaled their U.S. counterparts during the 1960s.

The size of the U.S.S.R. presented unique problems and advantages for the developers of their satellite command and control network. The country was two and a half times wider than the United States, but only nine of every twenty-four hours of a satellite's orbit passed over the tracking network. When tracking requirements became more stringent for the piloted space program, the Soviets added six new ground-based tracking stations. The lack of a global tracking network capable of continuous observation and communication with satellites became the chief restraint on Soviet satellite command and control capabilities.

The U.S.S.R. filled in the gaps in its worldwide tracking coverage with ocean-based stations positioned at strategic points around the globe. Either reluctant or unable to negotiate agreements with foreign countries for the placement of tracking stations overseas, the Soviet Union relied on a fleet of fully-equipped, self-contained, floating tracking stations. These first set sail during the ICBM tests of the late 1950s.

The Soviet missile-testing program ships later became their satellite command and control ships. By the mid-1960s, several tracking ships, including *Kosmonaut Vladimir Komarov*, *Kosmonaut Yuri Gagarin*, and *Akademik Sergei Korolev* were in place. Each displaced at least 17,850 tons and had a crew of 121 plus a science team of 118. When the Soviets failed in their bid to send a piloted mission to the moon in December 1968, the United States knew about the failure, because the Soviet tracking and recovery ships in the Indian Ocean dispersed or returned to port.

Soviet engineers sometimes had to improvise in creating their satellite command and control system. In 1959, when Sergei Korolev first began developing interplanetary spacecraft to fly to Mars and Venus, he proposed building a tracking network comparable to NASA's Deep Space Network. Because they had a deadline of just eight months, Korolev came up with the ingenious idea of creating mounts for the dishes using leftover parts from the Soviet Navy.

Construction workers dug a huge crater out of the rocky ground, poured a foundation, took the revolving gun turret of a battleship consigned to the junkyard, and placed it on the foundation. Then workers mounted the open framework of a railroad bridge over the gun turret. The solid hull of a scrapped submarine, to which they had fixed antennas, covered the bridge. The facility was fully operational by December 1960. Located at Yevtaporia on the Black Sea, it ultimately would consist of three complexes, each with eight 16-meter antennas separated by several kilometers: one to send commands, and two to receive telemetry.

In this manner, the Soviet Union created a single satellite command and control network that was perhaps more economical and more efficient than its U.S. counterparts, because it served both civilian scientists and the military, while the United States had two separate systems for civilian and military uses. The Soviet totalitarian state did not distinguish between civilian and military space programs. The single dual-purpose network thus mirrored the Soviet political system, which required that it serve the multifarious purposes of the state, whether scientific, military, or propagandistic, and because it also reflected the dominance of the Ministry of Defense.

The nation's vast breadth allowed the Soviet Union to construct a substantial network within its own borders; however, that network could track satellites only nine out of every twenty-four hours. The nature of satellite orbits demanded construction of a global tracking network, which the U.S.S.R. built not out of overseas facilities, like NASA's Deep Space Network, but with floating stations positioned strategically around the globe.

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It takes a lot of hands and eyes to put together an issue of ***Antenna***. We especially need people who can volunteer from time to time to edit text. If you are willing to help, please contact Andrew Butrica. Thank you.

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