



IEEE

Broadcast Technology

The technologies to deliver information and entertainment
to audiences worldwide, at home and on the go

Repack Tests Tower Workers' Limits – p.15
Korea Hosts 2019 BMSB – p.6

President's Message

Ralph Hogan, BTS President



Welcome to this issue of **Broadcast Technology**.

Membership is one of the great reasons to belong to the IEEE community. When looking at the IEEE website, three things come to mind. There is knowledge, which is provided through the numerous publications such as **Spectrum**, the **Institute and Society** specialist publications. Sense of community, which comes through sections, chapters, societies, and conferences, and finally, professional development, which is available through career development and employ-

ment resources. The IEEE has been holding steady at around 400,000 members worldwide for a while. Because of this number it is the largest professional membership organization. Even though 400,000 is an impressive number, there are four million engineers in the world that could be potential members. We need to continue to find ways to provide value to these engineers so as to encourage them to try IEEE and become members. The value of membership varies with the individual, so there is no one thing that appeals to everyone. I would certainly like to know if you have ideas or strategies as to how we may be able to increase BTS membership.

Peter Siebert, BTS membership chair, has been tracking society membership this year, and figures indicate that we are finally holding steady after several years of a downward trend. The AdCom has been getting monthly reports so that we can keep track of membership. The year is half over and our Society membership has remained relatively flat as compared to this time last year. Membership remains at about 1,500, with the largest growth coming from students and affiliates. We are in the beginning stages of developing training and educational opportunities specifically targeted to BTS members. Some of the new possibilities will be training videos that will be only available to our members. During the rest of this year we will be expanding areas of our website that should appeal to members and potential members to gain additional knowledge in our field of interest. There may even be options to partner with the newly-renamed IEEE Consumer Electronics Society (CES) (now the IEEE Consumer Technology Society or CTSoc) to develop areas of common interests.

Our Distinguished Lecturer program is going strong, with BTS subject matter experts traveling around the world giving presentations to BTS Chapters and various other groups. Distinguished Lecturer requests have been increasing from Asia and South America. The mission of the program is to serve the needs of the members of the Broadcast Technology Society in order to enhance their professional knowledge and vitality by keeping them informed of the latest research results and their practical applications. The BTS Distinguished Lecturer Program exists to provide BTS members with quality lecturers who can potentially provide presentations at meetings, as well as funding necessary to support the travel expenses of the lecturer. The program allows BTS members to have access to well-known educators and authors in the fields of broadcast technology to lecture at Chapter meetings. If your Chapter or organization is interested in the Distinguished Lecturer Program, you can find out how to request a Distinguished Lecturer and the funding to support their appearance at your event at <https://bts.ieee.org/educational-programs/distinguished-lecturer-program.html>.

continued on page 5

Inside

President's Message	2
From The Editor	3
2019 IEEE BMSB Symposium Examines 'Next-Gen' TV	6
The 2019 BMSB In Pictures	12
Tower Industry Works Diligently To Keep Repack On Schedule	17
NATE Drives Tower Training Initiatives	22
'Next Gen TV' Conference Focuses On ATSC 3.0 Implementation	24
EAS Learns From Its Past; Faces Changed Future	27
BTS Readies For Annual Fall Broadcast Symposium	31
Television's Technical History Comes Alive At Ohio Conference	32
Propagation Studies And Coverage Analysis With Open-Source Tools: Part 18	34
The Downward Path To Broadcast Engineering—No. 16	38
2019 ConnextTechAsia/BroadcastAsia/CommunicAsia Event Draws More Than 40,000 To Singapore	40
ATSC Insider Update On ATSC 3.0—Next Gen TV	43
The Digital Radio Mondiale Report	46
DVB News	49
ITU Report	51
Upcoming Events Of Interest To BTS Members	52
BTS Chapter News	53
What's New	55
How To Write A Chapter Report	58

Cover photo: An ERI Channel 8 TRASAR antenna is on its way to becoming part of an "in-line stack" array at a newly constructed ERI tower at Block Communications' WLIO/WOHI in Lima, Ohio. The photo is courtesy of ERI's installation subcontractor Robbie Hulett of Tower Maintenance Corporation.

From The Editor

Recalling Television's Finest Moment, Wireless Broadband's Insatiable Spectrum Appetite, And Another 'Welcome Aboard!'

By James E. O'Neal, Editor-in-Chief,
BTS Life Member



It's late June as I write this, and although the broadcast media outlets don't seem to be making much of it just yet, the covers of a number of magazines arriving in my mailbox are calling attention to a very special anniversary. I speak of course of the successful landing on the moon and return of the Apollo 11 mission which took place 50 years ago between July 16-24, 1969.

Not only did this journey prove that man could successfully travel to the moon and safely return to Earth, it also showed how television had come of age since its introduction into the home following World War II. The coverage, which now in this age of UHD, HDR, universal connectivity, and all of the other technologies that have come to pass in the intervening half-century, would be considered primitive and crude by most viewers, but which on a very special night back in 1969, kept worldwide audiences glued to their screens.

In reviewing some television audience numbers, rating services pegged the Apollo landing coverage numbers somewhere between 125 and 150 million viewers in the United States alone. Globally, an estimated half-a-billion people watched. (I was told by a former employee at the Moscow broadcast center then that even the Russian state television operation pirated and aired a feed from Eurovision, although this U.S. feat of a manned moon landing badly upstaged the Soviet space program.) In examining other major U.S. television events, the biggest Super Bowl TV audience (the 2015 game) amounted to just 114 million, and there were just 89 million watching this year's big game. When President Nixon said goodbye to the Executive Of-

fice in 1974, an estimated 128 Americans watched live, and even the January 1991 start of "Operation Desert Storm" only managed to draw about 118 million of us to our TVs.

The 1969 moon landing coverage also (at that time) set a record for communication satellite usage, with the operating companies reporting some 230 hours of billable transponder time consumed, greater than that utilized in coverage of the Mexico City Summer Olympic Games the previous year.

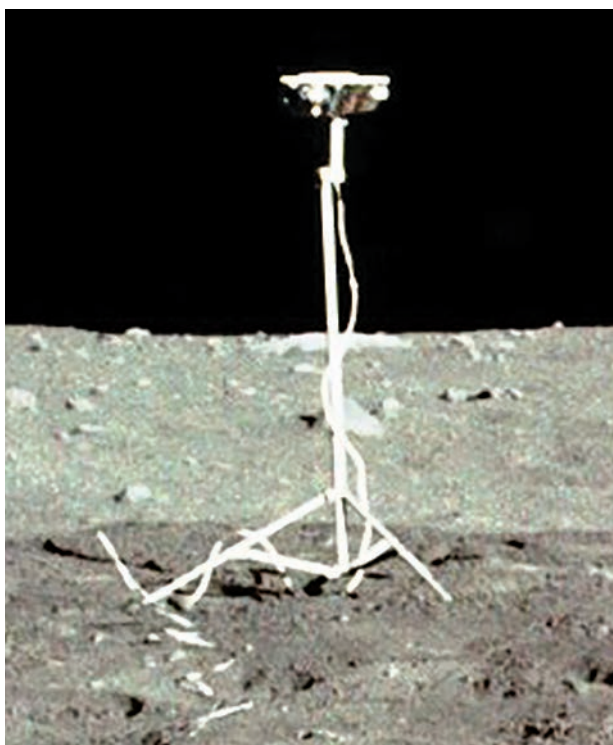
Even getting the single-camera monochrome video from the moon to U.S. television networks involved satellite earth stations on a couple of continents, as well as a lot of terrestrial microwave and coaxial cable pathing.

The really marvelous things about television's special night, was that—save for an initial glitch or two—everything went without a hitch. This was really an accomplishment when you stop to consider the many, many points of potential failure and that a goodly share of the electronic devices utilized still included vacuum tubes.

On the "big night" (July 20, U. S. Eastern time), I had been awarded my bachelor's degree barely one month earlier, and

was making the transition from part-time to full-time employment status at my first job in broadcast television. (My college town's first TV station had signed-on in February of that year and not long afterward hired me to work during my free time between classes in its engineering operations.)

In my zone of time (Central) it was Sunday evening and somehow, I had the night off. (Weekend and holiday shifts at the TV station were normally reserved for "newbies" such as myself). Several days prior to this the media had been advising the anticipated time of the lunar module touchdown, and I, just like millions worldwide, had my eyes glued to the screen of my television set (an Admiral 21-inch 1953 model which had been my family's



NASA photo