2016 Annual Meeting, ARRL Board of Directors
Report of the Chief Technology Officer

I. WRC-15 Debrief

WRC-15 was briefed extensively, both as it happened and afterwards, in reports to the ODV reflector and in Dave Sumner's editorials in the January and February 2016 issues of *QST* (the latter of which is not yet published as I write this report, but will be by the time we meet in Windsor). A blow-by-blow report here would be redundant, so I will abandon my typical meeting-by-meeting reporting format for this iteration of my report to the Board.

In my final ODV message from Geneva, I indicated that IARU leadership was taking a critical look at our WRC-15 effort, and how we can improve in the 2019 cycle. I promised to brief the Board on this assessment, or at least my contribution to the assessment, in due time. Now's the time.

From the standpoint of an incumbent service, it is not incorrect to claim that WRC-15 was a success for Amateur Radio, even an "unqualified success," as Dave reported to ODV as the Conference was closing on November 27. No fewer than five agenda items had the potential to negatively and globally impact an Amateur Radio allocation. All five of these items were resolved without any significant negative outcome.

Contemplated satellite or radiolocation allocations at 10, 24, and 78 GHz were either not made at all or made with compatible services under conditions that do not effectively preclude radio amateurs from using the band. The outcome on our 3.3-3.5 GHz allocation saw about 30 countries (not including the United States, but including Mexico) identify the 3300-3400 MHz segment for IMT (modern cellular telephony and broadband data), and saw the 3400-3500 MHz segment identified for IMT worldwide, with language making it clear that these identifications do not preclude operation by other services to which the segments are allocated. While more sweeping than we had hoped (particularly in the 3300-3400 MHz range), the outcome doesn't really change the status quo that has existed since 2007: maintaining amateur access to the 9 centimeter band is a country-by-country fight, and it is one in which we are holding our ground, at least in the United States.

We also did well in shaping the agenda for WRC-19. In addition to obtaining an agenda item seeking to globally harmonize the amateur allocation at 50 MHz, we were able to exclude our two meter and 70 centimeter allocations from a WRC-19 agenda item considering how and where to accommodate telemetry, tracking and control for small satellites. Many non-amateur small satellites have been shoehorned into our amateur-satellite allocations for no reason other than the fact that radio amateurs proved the small satellite concept, and others with no spectrum management experience bought into the concept lock, stock, and barrel, right down to the frequencies used. This is less of a problem for satellites with an educational objective than it is for overtly commercial endeavors, but it has been a growing issue nonetheless.

Had the Amateur Radio bands remained under consideration, we would have been compelled to spend a very significant amount of personnel and financial resources defending

them, lest the untenable status quo in our amateur-satellite allocations be normalized. Working with receptive administrations, including the United States, to get these bands excluded took a great deal of effort right through the closing nights and early mornings of the Conference. While the WRC-19 agenda still poses challenges to some microwave allocations, particularly at 5.7 and 47 GHz, stemming the potential damage to our two most widely used VHF and UHF allocations was, for me, the most satisfying result of the Conference, bar none.

And then there's 5 MHz.

I have been encouraged by several people, including some of you reading this report, not to get too down about the outcome on 5 MHz, as achieving a global allocation of any type is a challenging task, and a successful effort was unimaginable for much of the last cycle—and indeed much of the last 20 or so years.

That's not incorrect, so I'm not going to get *too* down about it. But I cannot tell our members—or you—that the outcome is a good one for United States radio amateurs. I cannot credibly argue that it was worth an 11 dB or so reduction in authorized power under existing United States regulations to obtain one additional kHz and the increased flexibility that inherently comes with a band as opposed to channelized operation. Such an assertion simply does not pass the straight-faced test.

Nevertheless, it was an outcome that IARU leadership had to fight for, and every kilohertz and every watt of e.i.r.p. (all 15 of both) required a great deal of persuasion to overcome very vocal and determined opposition in the time allotted for the item. We did have some fairly broad support at the start of the conference, but support for an allocation of some type was much deeper than support for conditions that we would have found reasonable. This lack of depth of support on the conditions of a 5 MHz allocation is where I focus my criticism of our effort. I do not exclude my own contributions to the effort from this criticism, which is directed at our strategy as a whole rather than anyone's individual contribution to its formulation or execution.

The most generous allocation proposed by countries participating in the Conference was 175 kHz. Indeed, this was the number around which I crafted much of our early domestic advocacy. Several well-intentioned amateurs did a great deal of thoughtful and impassioned work to build support for this number—or, in the case of our CEPT effort, another three-digit number (100 kHz).

I now believe these efforts were unwise, despite the thoughtfulness and passion with which they were pursued. Any allocation in the triple digits of kHz was a pipe dream—one needed only to look at the WRC-12 outcome for HF oceanographic radar to reach that conclusion (oceanographers fought tooth and nail for a 25 kHz secondary allocation at 5250-5275 kHz). Any benefit from proposing three digits as our aspiration was more than offset by taking support from a number of large countries with large numbers of radio amateurs off the table from the start. Those countries included the United States, Germany, France, the United Kingdom, and Japan. Fortunately, Canada was not scared off from supporting us, but they declined to support an allocation at anywhere near the 175 kHz level.

Further, in my view, our efforts, both at the Conference and during the preparatory stage, were focused on the bandwidth to be allocated to the detriment of an effective response to the limitation of power to the unsatisfying level we achieved. The solution that was eventually adopted was initially proposed by France. It was quickly—too quickly—supported by a number of soft supporters as a way forward, and not effectively countered.

The United States, to its credit, had offered to support a 25 kHz allocation with no restrictions, *if* discussion on the bandwidth to be allocated stabilized to a point where larger numbers were no longer under discussion. In the view of federal agencies, a narrow allocation was necessary to minimize the impact to their systems to a level that assured their reliability. On the upside, they deemed that no further restrictions beyond a narrow allocation were necessary (or even helpful to protect their systems). But they were unwilling to engage as long as an allocation wider than 25 kHz was being discussed. Such an allocation continued to be discussed several hours into the second week of the Conference, and days after it was clear that such an allocation would not be made.

By the time the United States could speak up on the power issue—and they did so passionately and persuasively—it was too late. The momentum toward what became known as the 15/15 solution had spread too far, to the point where officers of IARU member societies not present at the conference were asking those of us about it from their home countries, having heard about it from their regulators' reports from Geneva. The option was simply to take the deal or leave it. Considering that the existing 5 MHz authorization in most countries of the world is for zero kilohertz at an authorized e.i.r.p. of zero watts, the decision to take the deal was reasonable. In my view, a decision to the contrary would have been as well.

I would have liked to have come to agreement a narrow allocation, which would have been the broadest we could have hoped for, earlier in the process, so we could have had time to have a meaningful discussion on power restrictions, with the hope of arriving at a reasonable number (no less than 50 W e.i.r.p. was the minimum figure I had in mind). Backing off on the bandwidth issue would have substantially deepened our support on the power issue, in my view. Would it have improved the outcome? I don't know. Perhaps not. But I fail to see how it would have worsened it.

I will not sugarcoat the likely future of 5 MHz. Most countries will adopt the outcome of WRC-15 as the worldwide default for amateur operation at 60 meters. While individual countries may make isolated exceptions on either bandwidth or power, they will be a decided minority, and there will be pressure on them to conform to the WRC-15 outcome in the long term.

Nevertheless, FEMA and NTIA have privately indicated some willingness to consider continued codification of one or more of our existing 5 MHz channels to provide meaningful capability and interoperability with incumbent services when needed. In his January editorial, Dave suggested that our domestic implementation should pursue the best of both worlds—the flexibility of the allocation we earned at WRC-15, and the capability of the channels with which our amateurs are familiar and upon which our public service communicators rely. I concur with

Dave's recommendation. We owe it to our members to make that ask. Otherwise, when the rules change—and they *will* eventually change—they will effectively change for the worse.

II. WRC-19 Agenda

The agenda of WRC-19 contains several items of concern to Amateur Radio. These items, in numerical order, are:

> 1.1 to consider an allocation of the frequency band 50-54 MHz to the amateur service in Region 1;
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> 1.7 to study the spectrum needs for telemetry, tracking and command in the space operation service for non-GSO satellites with short duration missions, to assess the suitability of existing allocations to the space operation service and, if necessary, to consider new allocations [although this item will not study amateur allocations, as described above, it is in our interest to move this to an affirmative conclusion that does not rely on amateur allocations];
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> 1.11 to take necessary actions, as appropriate, to facilitate global or regional harmonized frequency bands to support railway radiocommunication systems between train and trackside within existing mobile service allocations [some of which may overlap amateur service allocations];
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> 1.12 to consider possible global or regional harmonized frequency bands, to the maximum extent possible, for the implementation of evolving Intelligent Transport Systems (ITS) under existing mobile-service allocations [some of which may overlap amateur service allocations];
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> 1.13 to consider identification of frequency bands for the future development of International Mobile Telecommunications (IMT), including possible additional allocations to the mobile service on a primary basis [the 47 GHz amateur allocation is nominated for consideration];
>
> 1.15 to consider identification of frequency bands for use by administrations for the land-mobile and fixed services applications operating in the frequency range 275-450 GHz; and
>
> 1.16 to consider issues related to wireless access systems, including radio local area networks (WAS/RLAN), in the frequency bands between 5 150 MHz and 5 925 MHz, and take the appropriate regulatory actions, including additional spectrum allocations to the mobile service.

Additionally, WRC-19 will consider action on studies to be conducted "as a matter of urgency" on wireless power transmission for electric vehicles, which has the potential to be a BPL-caliber interference issue if handled incorrectly (i.e., expansively, and outside of existing

ISM bands). In my view, this issue, as well as the IMT at 47 GHz and RLANs at 5 GHz issues, merit the bulk of our attention in the next cycle.

The 2016 schedule of relevant ITU meetings on these items is still being determined, as is IARU volunteer and ARRL staff coverage at these meetings. The Plan for 2016 that you will consider at this meeting reflects our best estimate as to what will be scheduled when. The limitation in scope of the small satellite agenda item is not only welcome from the standpoint of spectrum defense, it is also very welcome from a budgetary standpoint.

III. Inter-American Telecommunications Commission (CITEL)

CITEL is the regional telecommunications organization for the Americas, part of the Organization of American States (OAS), with a secretariat in Washington. Jon Siverling participates in CITEL activities as a member of the United States delegation. IARU Region 2 is a recognized observer, usually represented by a member of the Executive Committee.

The technical work of CITEL is divided into two Permanent Consultative Committees (PCCs), both of which met in the second half of 2015. Jon attended both meetings.

PCC.I (Telecommunications/Information and Communication Technologies) met in Washington in September. Jon continues to chair the Rapporteur Group on the Use of Telecommunications in the Prevention and Mitigation of Catastrophes and Disasters. Jon's leadership and contributions in this capacity remain universally well received.

PCC.II (Radiocommunications including Broadcasting) handles matters affecting spectrum allocation, including regional preparations for WRC-15 (and now WRC-19). PCC.II met in Ottawa in August. Jon was in attendance as a United States delegate, and radio amateurs were present on the delegations of Canada and Brazil as well. Further, IARU President Tim Ellam attended for the first two days, and IARU Region 2 was represented by Jose Arturo Molina for the full week.

In spite of the efforts of Jon, Tim, and the delegations of Canada and the United States, other CITEL administrations declined to alter the previously agreed Inter-American Proposal on the 5 MHz WRC-15 agenda item in Ottawa. This result prompted the United States to initially take a no change position into Geneva and contributed substantially, in my view, to the result we eventually got. Both Jon and Tim did their level best to get the United States on board, and that effort is appreciated.

IV. United States Telecommunication Training Institute

I served as chief instructor of the annual Amateur Radio Administration Course that we host in Newington under the auspices of USTTI.

Due to unfortunate scheduling (NTIA scheduled the first week of their federal spectrum management class the same week) and a string of distressing visa denials (including an

enthusiastic regulator from Ghana who was self-funded), we only had one student, who works for the state-run telecom company in Nepal. Because Nepal is a country that could be very well served by more native radio amateurs, we held the class for the lone student, who was very engaged, enthusiastic, and appreciative. That said, we have stressed to USTTI that we need future classes to return to traditional participation levels to justify our continued commitment of resources.

V. United States ITU Association

USITUA seeks to develop positions on ITU activities reflecting the consensus of its private sector members and to advocate these positions to government officials responsible for forming United States ITU policy. ARRL is one more than fifty USITUA members, and has held a seat on the association's board (either via Paul Rinaldo, Jon Siverling, or myself) for a decade. Earlier in 2015, I relinquished my seat on the USITUA board to Jon, who won election to a two-year term in his own right in December.

WRC-15 was a major focal point for USITUA activities this year, as the association organized a delegation training day in September, a United States delegation reception during the first week of WRC in Geneva (to which ARRL made a small financial contribution), and a post-WRC debrief from delegation leadership during its annual meeting in December. After several years of activity focused on internet issues, this was a welcome change, to which Jon in particular made a significant contribution.

VI. General Technology Issues, Domestic FCC Advocacy, TAPR Digital Communications Conference, and Membership Contact Travel

I advised General Counsel Imlay and the Executive Committee on our filing to seek implementation of the international 137 and 475 kHz allocations domestically. Because of the demands of WRC-15, I have not participated in subsequent discussions with UTC and the FCC on the matter, and I defer to whatever Dave Sumner and Chris Imlay have to report.

Work continues on the AMSAT initiatives (a geosynchronous amateur satellite and a high earth orbit effort) on which I reported at the July 2015 meeting. I accompanied Kay Craigie and various Virginia Tech and AMSAT personnel to a September meeting to gain FEMA's endorsement of the concept of having an amateur geosynchronous satellite facility. There are still a number of things that need to fall into place for either of these initiatives to come to fruition, but things are as bright on the satellite front as they have been for some time.

At Marty Woll's invitation and with Dick Norton's approval (thanks to both), I attended Microwave Update 2015 in San Diego in mid-October. The 100 or so attendees were enthusiastic and engaged, and presented several instances of microwavers' contributions to our educational and outreach efforts and the advancement of the radio art. My presentation on the challenges we face defending our allocations between 1.2 and 81 GHz was well received and generated thoughtful questions. I came away keenly aware that a portion of our constituency makes effective and passionate use of our microwave allocations.

Tucson Amateur Packet Radio never responded to a 2010 ARRL proposal to establish an MOU to formalize the administration of the ARRL/TAPR Digital Communications Conference. In the years since, TAPR, a group that is as capable as it is independent, has essentially taken the initiative to organize the conference themselves, despite the dual billing.

There are good things and bad things about this status quo. Among the good things are the fact that a longstanding conference on a vital area of Amateur Radio technology is capably organized without substantial recourse to ARRL resources. Among the bad things is an issue that we might consider addressing: TAPR has felt free to make arrangements for a conference that has ARRL billing without going through our convention approval process.

In past years, I have tried to mitigate this by alerting the relevant Division Director whenever I learned that TAPR is considering a certain venue. I recently alerted Directors Rehman and Williams that they are considering St. Petersburg for 2016, with Ann Arbor as a potential alternate or future site. I appreciate Doug and Dale's receptive responses, which I passed on to TAPR.

In 2015, I was not informed of TAPR's plans until they unilaterally finalized them, as they are wont to do. This is a substantial departure from our convention approval process. As we consider whether and how to address this departure, I would suggest that due weight be given to the DCC's substantial role in our advancement of the art and science of Amateur Radio, as well as the independence of a stable partner that appears to do a good job with the conference. Nevertheless, the existing relationship can be improved, in my view. I have budgeted to attend the 2016 DCC, and will faithfully represent whatever the Board directs me to represent on the matter.

VII. Administrative

In accordance with the plan approved by the Board at the January 2015 meeting, the Fairfax office location closed on July 31, 2015. The part-time administrative position, last held by Virginia Macfarlan, was eliminated on the same date. Jonathan Siverling and I have transitioned to permanent telework from our homes in Northern Virginia, and in my view, we continue to effectively carry out our work using this arrangement. Jon and I frequently communicate through email and arrange to meet in person regularly, usually in conjunction with a meeting in the Washington area. Jon and I were both present for the entirety of WRC-15, and his contributions to our successes there were innumerable. Jon remains a valued colleague in the new iteration of what I sometimes call Baja ARRL.

VIII. Conclusion

As always, questions and input from members of the Board are welcome.

If Dave Sumner's announced retirement date remains as planned, this will be my last report to the Board during his long and productive tenure with ARRL. No one you will hire or could have hired to fill Dave's position could ever legitimately claim to be Dave's replacement. Dave's depth of knowledge of, commitment to, and achievements accomplished for Amateur

Radio speak for themselves, are too numerous to list here, and are literally impossible to duplicate. No matter how many consecutive days anyone ever spends in Geneva on ARRL's behalf, no one will *ever* match the eleven weeks Dave spent at the historic and famously successful WARC-79.

I've lost count of the times over the last sixteen years when an issue relating to Amateur Radio has perplexed me, and a quick consultation with Dave not only resolved my problem, but made me think, "Wow, that was logical, elegant, and plainly stated. Why didn't I think of that?" That ability to clarify a knotty issue quickly and concisely is invaluable to our advocacy effort, both at home and abroad. Dave sets a standard to which the entire advocacy team aspires, even if we rarely get there. I hope Dave will remain available to the cause in a volunteer capacity after his retirement. If he is, we would be well served by enthusiastically accepting his contributions.

I join the other staff officers in committing to support whomever the Board chooses as the next CEO as ARRL continues to move into its second century. At the same time, I must say that I will sorely miss the only GM/EVP/CEO I have ever known in my time as an ARRL member, and the best boss I have ever had. And among a group that includes Rosalie White and Joel Kleinman, that's not a characterization I give up easily.

Thanks, OM. You'll be missed.

73,

Brennan T. Price, N4QX
Chief Technology Officer
December 22, 2015