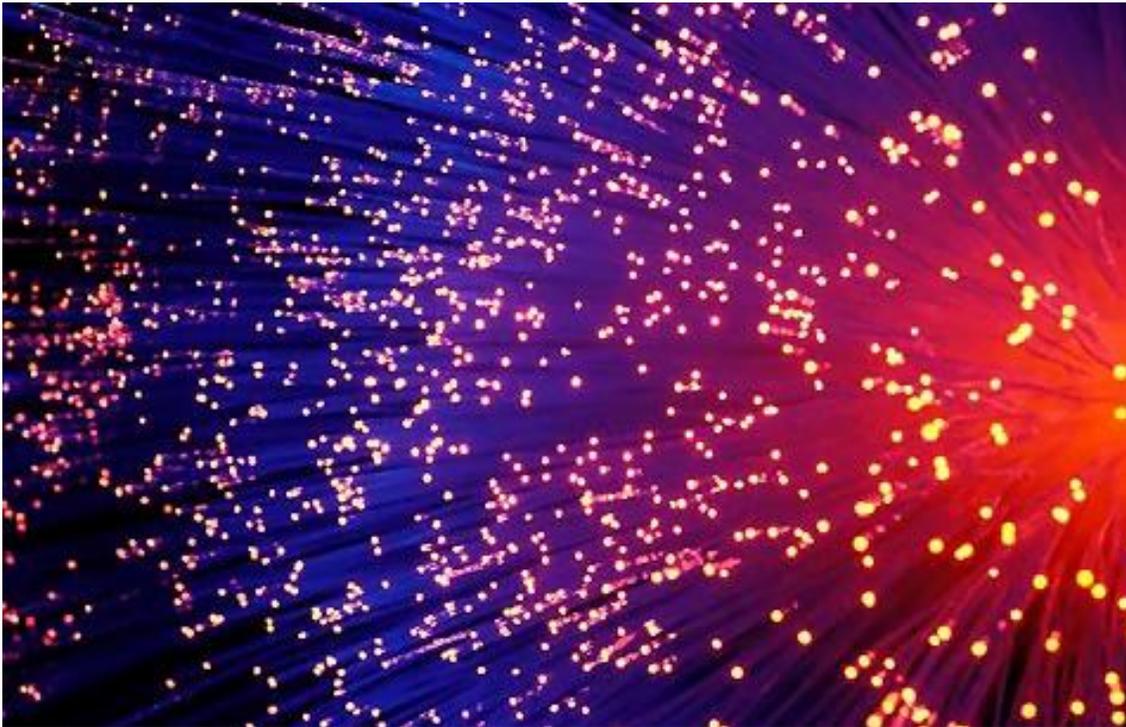**ACE** | Association of Communication Engineers

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Small/Rural Broadband Engineering Perspectives 2018

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Executive Summary

An old Chinese proverb states that there are many ways to move forward, but only one way to stand still. In the communications business, everything changes. That's nothing new. What is new is the pace of that change. And this pace is in no danger of slowing. In fact, it's accelerating; and this perspective may be out of date by the time of your annual meeting here in Hawaii. Will 5G, cryptocurrencies, AI, and quantum computer all pan out as now believed, or will they morph into some other areas that we have not even thought about?

Some say the demise of POTS (Plain Old Telephone Service) will arrive, as the saying goes, "not with a bang, but a whimper." POTS won't meet a sudden end; rather, it's undergoing a process of transformation. Telephone numbers as we know them may go away and certainly will no longer be confined to a certain area of the country. Now, the law requires that ETS wireline carriers maintain POTS over copper until they have a different solution; but all the large carriers are offering VoIP solutions over broadband for a cheaper price and better competition with the MSO offerings. The days of having the POTS to work without power service are going fast. These traditional land lines as of 2016 are dropping over 12% a year with about half of the 58M are business lines, while VoIP is growing at 10% a year and it is now over 68M lines and mobile has over 341M lines.   Broadband penetration continues to rise and is now approaching 80% of households. A quarter of Americans still have no broadband, and 12 percent live in places where they can get service from only one provider or from none. Most rural companies are still seeing broadband growth but at lower rates than in the past due to more coverage but the same customer base. Any companies with new homes and businesses are seeing better growth if they do not have a broadband competitor.

How long will POTS government-mandated support last in the fast-moving world of the internet broadband? We see that VoIP service and bill and keep settlements for everyone are coming very fast, but both items will most likely be driven by the Tier I's and the FCC in the end. Will FTTP be the best solution for the rural carriers, or will wireless become a bigger player? Many of the rural carriers have licensed and un-licensed wireless in certain areas, but the coverage and maintenance issues have kept wireless from being a major solution to date. 5G as now configured will not offer much help in this area due to the requirement for such small cells to get the large bandwidth planned and a lot of fiber to interconnect to haul this bandwidth.

The CAF II auctions coming up will try to take a little over $2B to solve a greater than $10B problem with funding rural internet access. Who will win in this auction is a big question. The rules and final census blocks have been determined; and, in March, all bidders will need to get registered if they want to bid in this complicated process. At this point, the winners of this auction could be electric co-ops and other new players; but time will tell.

The ACAM funding of $5.28B, awarded last year, is now moving forward with an 80% budget and no support after the first ten years with 207 companies participating. Many of these companies, along with TDS who received $75M, are now in the process of figuring out how to meet the implementation and funding requirements. As these companies get up to speed, many contractors should have more work.

The attempt at a Federal infrastructure project for broadband this year still is very much up in the air politically. The original article "Wired to Fail" from *Politico* in July 2015 tried to paint a picture of the failures of the RUS programs and may have tainted the waters, but the best option would be to distribute the funds in a manner that would accomplish the most for the rural areas. The NTIA use of the BTOP funds during the 2009 Recovery Act appears to be a boondoggle for statewide networks for government groups but would make it harder for other carriers to provide reliable long-term rural networks to everyone. My hope it that, if any monies are provided for Broadband, the funds would be distributed by the RUS program with streamlined guidelines mainly focused on making sure the funds are used properly to cover as many rural customers as possible without Davis-Bacon.

My recommendation regarding Broadband connectivity to every American is that the government should require the Tier I and II carriers to fiber out all the suburban as well as a large part of the rural areas over five years. By 2025, therefore, every American home and business would have fiber service at a minimum speed of 100M down and 25M up by taxing the large corporations for use of the fiber network that has made them so many billions of dollars to date. This would be comparable to the existing telephone support system that has been used successfully for almost 100 years in providing service to rural areas. At this next level, the Tier II carriers may have so much debt that they are forced to sell off some of the more rural areas to pay down the debt unless the plan outlined above is implemented. Net neutrality is not understood by many but will be one of the ongoing issues for all carriers. Should the Netflix, Alphabet, and Facebooks of the world get a free ride to the customers while they are making obscene amounts of money that could be used to help support the broadband network?

The next question to ask is why some rural carriers already have built FTTP and are being successful while others have sat on the sidelines. I often say that no one loses money building a proper fiber network that is properly maintained. We are now seeing more mid-sized Telco's buying up or merging with other Telco's to be able to survive.

The small rural Broadband carriers (Tier III) are in flux today due to all the regulatory, technology, and lifestyle changes in play as well as the issue of how to get more internet speed for less money.
For regulatory issues, we have ACAM, CAF II auctions, rate-of-return carriers' support uncertainty, etc.
For technology issues, we have FTTP, wireless, Cloud, SDS, internet of things, NFV, BYOD, etc.
For lifestyle issues, we have cable cutting, multiple screens, Z-Gen, aging baby boomers, etc.
We are seeing some Tier III companies sold or merged while others are finally recognizing the need to start building fiber. The next generation of customers—Generation Z—is an always-on, always-connected digital citizen of your network. These subscribers will count on Tier III networks like none before. Will Tier III companies be ready to deliver what these subscribers will demand? There is still much fiber to be constructed for Tier III companies.

What will the government-owned fiber networks do?
We see some cities and counties making a little headway, but will it last? Can a government-controlled network operate long term at an effective level to stay in business? Yes, if it has the right people; but, with no ownership, will it last? There are stories on this option that go both ways, and the verdict is not in yet.

What will the electric co-op and private company owned fiber network do?
These electric groups may be the ones that can use the advantage of owning the pole lines to get into the homes and businesses and to get a start on the nebulous Smart Grid. Small Tier III Telco's should fear these electric groups if they are in their area of service coverage and should attempt to partner rather than compete with them.

Who will win on the type of fiber electronics used for connection to the customer?
It appears that GPON standards are winning now for residential service and will in the future with what is now in the pipeline for XGS-PON, NG-PON2 and beyond.

Where is the RUS Telecommunications Program headed?
We are not totally sure at this point. With all the regulatory uncertainty over the last few years, the number of RUS loans processed has been extremely low. RUS has not used all its congressionally authorized money in some time. It now has an online loan process in place requiring a detailed pro-forma to show that the loan is feasible. The two current loan programs are the Farm Bill Broadband Loans and the Telecommunications Infrastructure Loans. Each program has a few different rules with the Infrastructure Loan being used for certificated areas only and the Broadband Loan also for CLEC areas. Will the new administration go after this program, or will it survive with help from both sides?

RUS Issues
- Environmental issues have been problems for some loans; and, to date, no real changes have been made with the new administration. If this problem is fixed, under new managers, we may see more loans applied for and received.
- Another concern is the **list of materials** that had been removed a few years ago. At this point, RUS has left it up to the engineers to determine what materials will be used on each project. No real problems have been identified to date; but, with all the vendor changes being made in this business, I can see a project receiving and installing some faulty materials that would create a major problem for the Telco and come back to the engineer and contractor. At this point, with the current 515 contract, we have no standards defined; so I see a need for the engineers and contractors to work together to implement a set of standards agreeable to all before we do have any problems.

Contract Issues
- We have been told that RUS plans to revise the 515 contract, but we have no dates and do not believe that it will happen any time soon. We all know that this contract is one-sided, but it has worked for a long time with fair people using it. It would be good at least to get it into the 21st century, however. Maybe a different contract form should be considered in place of the current 515 contract.
- The issue of increasing the amount of the 773 contract has been discussed, and the biggest need appears to be just adding a performance bond for any 773 greater than $250K. This measure would be appropriate for larger amounts as well.

Other Issues
- The availability of ribbon fiber continues to affect some projects.
- Micro-duct appears to be catching on, but we are not sure if it will be operationally friendly in the long term.
- Should there be standardized fiber sizes, such as 12, 36, 72, 144, 288, 576, with others not specified in contracts?
- Domestic turn-key projects are appearing more now and we will see more partnering between engineering and contractors.

ACE has another School and RUS Seminar planned for Atlanta on May 15-17 this year and invites all Contractors to help sponsor or attend.   See the attached brochures for more details, or go to the website.

Shown below are the RUS slides on how many loans in both programs have been made.

Telecommunications Farm Bill Broadband Program
(aka Rural Broadband Access Loan and Loan Guarantee Program)

Available Funding	Program Updates
FY 2016 • $64 million available in FY 2016 **FY 2017** • $27 million appropriated in FY 2017 • $115.2 million available in FY 2017 with both appropriated and carryover funding **FY 2018** • $TBD million available in FY 2018 • Loans finance the costs of constructing a broadband network • Serving rural communities of 20,000 or less • 15% unserved area • Cannot have 3 or more incumbent service providers • Service area cannot be in a RUS previously funded area • For additional detail, see the Code of Federal Regulations; 7 CFR 1738	**FY 2016** • 1 loan approved: $4.1 million **FY 2017** • 2 loans approved: $24.0 million **FY 2018** • 8 Loans in process: $101.2 million • RD Apply online application system • NOFA Released on July 25, 2017

	Window 1	Window 2
Pre Application Window (Application assistance available)	Jan 9, 2017 to Mar 24, 2017 [Closed]	Jul 1, 2017 to Sep 22, 2017 [Closed]
Application Window	Mar 1, 2017 to Mar 31, 2017 [Closed]	July 25, 2017 to Sep 30, 2017 [Closed]

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Telecommunications Infrastructure Program

Available Funding	Program Updates
FY 2016 • $690 million available in FY 2016 **FY 2017** • $690 million available in FY 2017 **FY 2018** • $TBD million available in FY 2018 • Loans finance new & improved telecommunications infrastructure, primarily for the benefit of rural populations of 5,000 or less <Typically> • Loans may serve non-rural subscribers in some cases • For additional detail, see the Code of Federal Regulations; 7 CFR 1735	**FY 2016** • 14 loans approved: $194.5 million **FY 2017** • 21 loans approved: $427.4 million **FY 2018** • 5 loans approved: $45.4 million • 8 loans in process: $108.6 million • Pipeline: 13 loans: $154.1 million • Applications are accepted year round • RD Apply online application system

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Shown below are the new leaders for the RUS Program and the Telecommunications Program.

Secretary of Agriculture Sonny Perdue today applauded President Donald J. Trump's intent to appoint **Kenneth Johnson** to be the U.S. Department of Agriculture's (USDA) Rural Utilities Service Administrator.

Chad Parker Assistant Administrator, Telecommunication Programs at USDA Rural Development