2020 Overview

The Alliance for Telecommunications Industry Solutions

— Advancing ICT Industry Transformation

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From the President and CEO

As we enter a new decade, the ever-increasing demands of new technology continue to drive innovation in the highly competitive North American marketplace. ATIS is delivering the standards and solutions that are advancing our industry's transformation in this environment. Our work helps networks deliver services that support a competitive, interoperable market.

The *ATIS Overview* provides insight into some of this work as well as what's on the horizon. You'll learn about initiatives in process now to:

- Ensure that satellite systems are integrated as a vital part of the 5G ecosystem
- Harness the power of distributed ledger technology to achieve members' business objectives
- Deliver vertical enablement platforms to help members reap the benefits of more effective engagement with other industries
- Advance development beyond 5G best practices and guidelines to create supply chain standards that can be operationalized in both the public and private sectors
- Set a compass for ICT market innovation and collaboration by analyzing the future network-enabled marketplace

As we enter the 2020's, the pace of innovation is accelerating. And so are ATIS' activities. Keep up to date at www.atis.org.

Sincerely,

Susan M. Miller
ATIS President & CEO

ATIS Overview

Our work takes place through our Board of Directors-driven Innovation Agenda and other strategic initiatives, our Technology and Operations Council and our committees.

Advancing Transformation

ATIS is where companies in the ICT industry come together to address common, critical priorities. Whether it's aligning on how to address challenges and progress new business opportunities; taking the long-term, strategic view on how to advance industry transformation; or creating a platform for collaboration with other industries, ATIS drives innovation.

In any emerging technology area critical to the industry's future, ATIS is at work. Our value-driven mission identifies how and where to collaborate as well as share resources, effort, and cost to develop large-scale, interoperable solutions for the common industry good.

Our projects are as diverse as the challenges they address. They encompass technology assessments for strategic industry planning, business use case formulation, open source projects, requirements, specifications, standards, interoperability testing, software toolkits, industry best practices, user guidelines, industry-supported testbeds, and more. While technical in nature and addressing members' business priorities, the work often integrates a policy component, which contributes to its success. This *Overview* provides insight into how ATIS works and some of our recent priorities.

National and Global Accreditation

ATIS is accredited by the American National Standards Institute (ANSI). The organization is the North American Organizational Partner for the 3rd Generation Partnership Project (3GPP); a founding Partner of the oneM2M global initiative; a member of the International Telecommunication Union (ITU); as well as a member of the Inter-American Telecommunication Commission (CITEL).

Our Members

Our membership represents all sectors of the ICT ecosystem. It spans wireless and wireline service providers/network operators, cable operators, equipment manufacturers and suppliers, content providers, government agencies, applications providers, as well as subsystem and professional

services forums. The key to our solutions' success is the collaboration that takes place across our diverse member constituency.

For Network Operators

ATIS provides a collaborative structure to:

- Engage operators as well as a broad range of vendors, web services companies and application providers
- Share the costs of technology assessments and standards development
- Identify and explore new technology and business opportunities
- Investigate and apply solutions across networks and domains that require cooperation and alignment

For Equipment Manufacturers and Suppliers

ATIS brings together the vendor community with service providers, allowing them to:

- Directly engage their customers
- Drive standards development approaches
- Gain insight into deployment scenarios
- Unlock new commercial opportunities by aligning industry and resolving technical problems that may block market adoption

For Web Services, Content and Application Providers

ATIS delivers the benefit of:

- Participation in global standards development initiatives such as 3GPP and oneM2M
- Early insights into how networks and systems will be deployed and support future applications
- Partnering in the larger solution space for industry and government-driven needs
- Creation of technical alignment between content and content-access ecosystems
- Collaboration with key vertical markets

Setting Our Priorities - The Innovation Agenda

Board-Driven Industry Transformation.

ATIS' Board of Directors sets the organization's strategic, technical, and operational direction. It is made up of C-level executives from the leading ICT companies and offers a future-orientation that only a view from the top can bring.

Specific priorities are set by our Board-driven Innovation Agenda. It is a framework for defining and prioritizing our strategic initiatives. With a focus on the future and disruptive technology, it asks the big picture questions and provides leadership in answering them:

- What do we see the state of the industry and technology to be in the next few years and beyond?
- What disruptive technologies are on the horizon and how will they impact the marketplace?
- What opportunities do disruptive technologies create for ATIS members and consumers?
- What action should we take today to have the future we want as an industry?

ATIS Board of Directors - Leadership (Officers)

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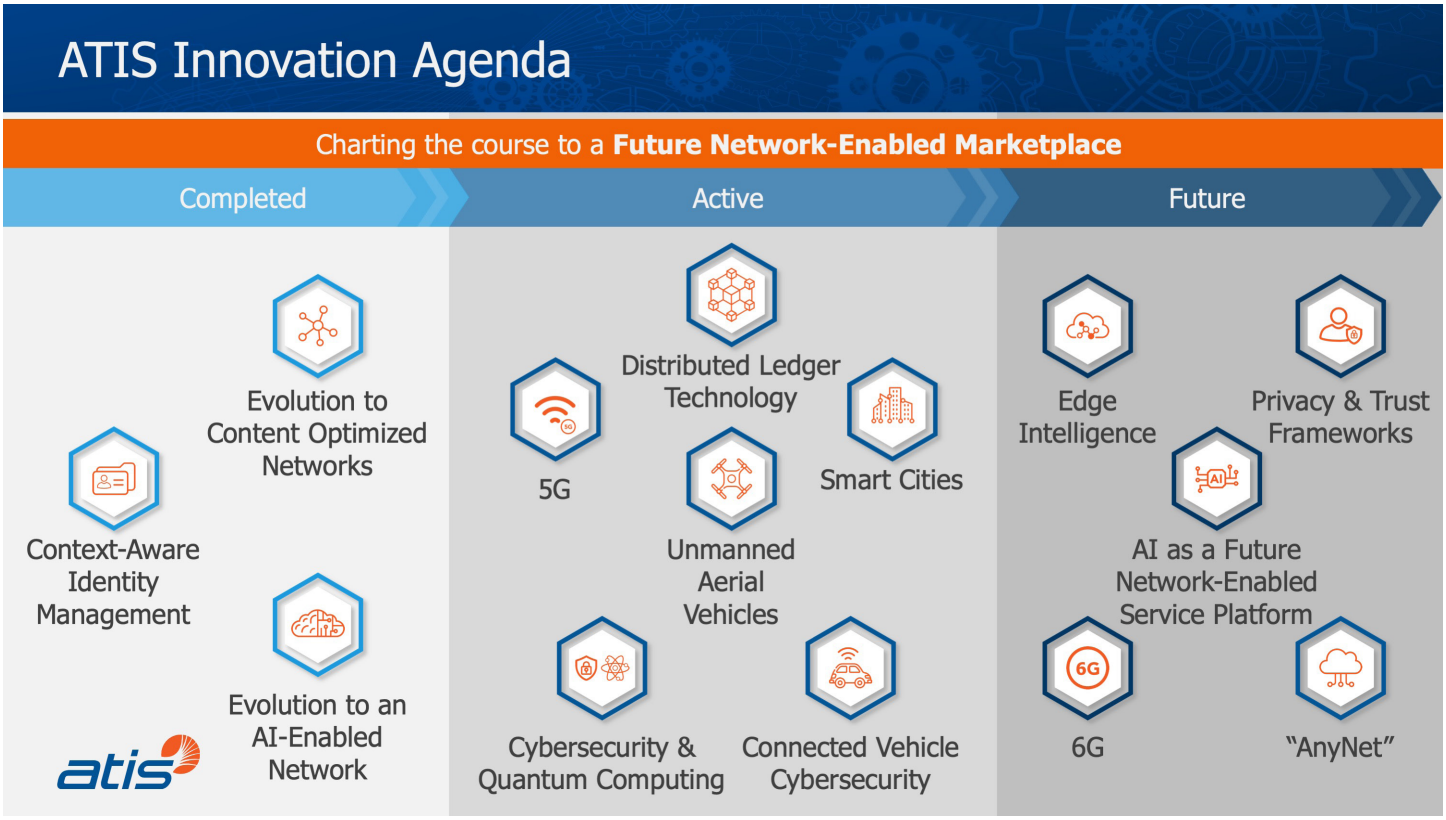
Susan M. Miller
President and CEO
ATIS

View full board.

Most recently, ATIS' Innovation Agenda is advancing a range of initiatives to deepen cross-industry collaboration, enable innovations in the network and improve infrastructure and access as mapped out on the following page:



Innovation Agenda Initiatives

Cybersecurity

IoT Device Security - Delivering an industry consensus on IoT security worldwide.

Along with the tremendous benefits that the rapid growth of the Internet of Things (IoT) brings to consumers, businesses, governments, and the global digital economy, this growth also brings increased threats. ATIS, as part of the Council to Secure the Digital Economy, played a lead role in developing and advancing industry consensus on baseline security capabilities for new devices.

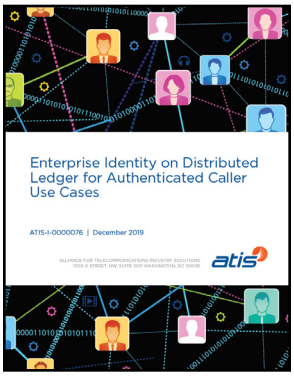
The top industry conveners developing this resource – known as the "C2," which includes USTelecom, the Consumer Technology Association (CTA), and a total of 13 global ICT organizations – are some of the lead trade associations, standards development organizations, industry alliances and coalitions working on securing the IoT. Together, they have developed the *C2 Consensus on IoT Device Security Baseline Capabilities*, the broadest and most technically deep industry consensus on IoT security worldwide. This effort is based on the principle that the best way to achieve IoT security is for technical experts to develop and advance security specifications that will spread throughout the global market.

The report provides expert guidance to industry and government on securing new IoT devices in order to raise the market's expectations for security and advance global policy harmonization. It is expected that this global approach will prove more effective than disparate local initiatives that would fragment security requirements and cause inefficiencies in the market that result in weaker security. In 2020, ATIS' Cybersecurity Ad Hoc Group is at work considering potential enhancements that may be needed to this document. Access the *C2 Consensus on IoT Device Security Baseline Capabilities*.

Leveraging Distributed Ledger Technology for ICT Applications

Bringing DLT innovation to ICT priorities.

ATIS' Distributed Ledger Technology (DLT) Project is harnessing key aspects of DLT innovation to address real-world challenges facing today's communications industry. Most recently, it delivered a new report Enterprise Identity on *Distributed Ledger for Authenticated Caller Use Cases* (ATIS-I-0000076). The "enterprise identity use case" that ATIS has identified is to study how DLT and its cryptographic principles can be applied to combat illegal robocalling and caller ID spoofing of telephone calls. This use case provides a verified enterprise identity that enables communication service providers to attest that an originating enterprise is authorized to place calls with an allocated telephone number.



When a number is allocated to a verified enterprise, the intended purpose of the call is registered in the distributed ledger. This serves a very important purpose of conveying to the consumer the reason for the call. Consider a call center that's originating calls on behalf of an enterprise, using third-party calling platforms and multiple originating service providers for a short-term calling campaign — a product recall, for example.

The insights in this ATIS report specifically address the issues associated with the attestation of a telephone number in enterprise multi-homing scenarios where the originating service providers are not the allocation provider of the telephone number used. This attestation is especially difficult – and valuable – in complex multi-party calling scenarios.

This ATIS resource offers the first-ever description of how to use DLT to provide enterprise identity verification to authenticate originating party caller information in IP communication networks. It is another example of how ATIS is advancing the opportunities inherent in DLT innovation to help our members advance their business objectives.

Smart Cities Data Exchange

Creating a Smart Cities Data Exchange Framework — with implications for promoting economic development.

The growing use of Smart Cities technology presents opportunities for the ICT industry and ATIS is helping our members benefit from these. Cities are increasingly leveraging Smart Cities technology and the data it delivers to improve life in urban regions and surrounding communities. That's why ATIS is undertaking a Smart City Data Exchange initiative through a joint effort with U.S. Ignite. This partnership is now in the software-design phase of building a new economic development tool for smart communities. The aim is to provide communities with the ability to see development potential in their neighborhoods on a property-by-property basis and to attract commercial investment and foster economic growth.

This data visualization resource is being developed on a Geographic Information System (GIS)-based demographic map and will use numerous datasets obtained both from open data portals and through our partnerships with cities and other private stakeholders. It will have the ability to extract information from data sources via API, and then translate that data for further processing, analytics and visual presentation. Users will be able to enter the characteristics of a particular business into the application, and the software will suggest optimal locations for investment based on business type and specified attributes of interest. The tool helps municipal leaders by enabling them to:

- Illustrate/calculate the economic and social impacts of different development scenarios on a property
- Explore snapshots of development potential based on zoning, development standards, infrastructure requirements and funding options
- Analyze land-use scenarios in the context of building healthier neighborhoods that feature multimodal transportation, walkability and ease of access to community services

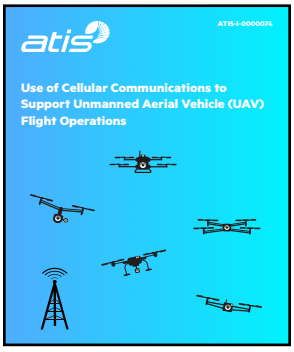
This initiative is also currently developing a smart city data catalog specification that will allow cities to register and make available datasets, as well as approved third-party data, in a common catalog. Smart city data consumers will benefit by experiencing a common approach to discovering, searching and accessing these data resources across city landscapes.

Combining a common data catalog approach for exchange of data with critical applications, including those in the areas of economic development, will enable data-centric cities to fully leverage their data assets. Each community wants to understand what drives the local economy and how to maximize assets to attract investment and sustain growth. ATIS is working with select pilot cities to help them do just that. Learn more.

Unmanned Aerial Vehicles

Supporting integration of UAV and cellular systems.

The ATIS report, *Unmanned Aerial Vehicle (UAV) Utilization of Cellular Services: Enabling Scalable and Safe Operation*, published in 2017, was a pivotal industry contribution on the advantages of using cellular network technology to meet the communication requirements of low-altitude UAVs. Since then, the industry and regulators have continued to work on solutions to address the communication needs of UAV and to ensure their safe operation. A 2019 ATIS report reviews this work in light of its potential to help define 3GPP Release 17 standards and requirements for UAV use of cellular networks.



Use of Cellular Communications to Support Unmanned Aerial Vehicle (UAV) Flight Operations addresses four technical areas in which communications technology can assist in addressing flight operations of UAVs:

- The Command and Control (C2) interface
- UAV Traffic Management (UTM)
- Remote UAV Identification (ID)
- Detect and Avoid (DAA)

This piece considers requirements in these areas that may apply to the North American region.

In December 2019, the FAA issued a notice of proposed rule-making that would require UAVs to support both networked and broadcast remote identification. This rule will require integration of mobile networks with UAV flight operations as envisaged in the group's earlier reports. This ATIS group is ensuring that the specific requirements of the emerging regulatory rule-making are reflected in mobile network standards.

Other Strategic Initiatives

While our Innovation Agenda priorities are driven directly by the ATIS Board of Directors, there is another way in which topics can become a target for ATIS action. Our Strategic Initiatives help the industry address emerging priorities as their potential impact becomes clear. These are often brought to ATIS from our member companies.

5G Supply Chain

Collaboration to support better network security.

ATIS has developed many of the standards that are setting the 5G network into action. In this role, it recognizes the need to operationalize supply chain (SC) requirements into a process that provides assurance and can lead to certifying 5G infrastructure and devices to a common set of standards. That's why the organization has launched the 5G Supply Chain Working Group (5GSC WG). The Group will extend the development of 5G best practices and guidelines to create SC standards that can be operationalized in both the public and private sectors.

The 5GSC WG will work to establish "assured" commercial 5G networks; develop or identify standards to be applied to 5G systems; and evaluate audit/certification options for ICT solution providers, infrastructure, and endpoint device original equipment manufacturers. The work will address end-to-end ICT supply chain visibility, coordination of existing supply chain management best practices, industry alignment with federal guidelines, improved threat monitoring tools, and a method to influence national/international standards development.

ATIS works closely with the Department of Defense, other government agencies, and industry partners in this initiative. DoD sees 5G as more than a faster wireless network. The 5G era introduce new technologies, players and risks at a rate far outpacing current Supply Chain Risk Management (SCRM) policies and practices. Its many contributions in this area uniquely position ATIS to lead this initiative to apply SCRM principles in development of supply chain standards for trusted 5G networks and services. Learn more.

DNS Privacy, Security and Services

Addressing the challenges and opportunities in DNS encryption.

In late 2019, ATIS announced its new ATIS DNS Privacy, Security and Services Initiative (DNS-PSS). The Domain Name System (DNS) is a critical Internet service that resolves human readable domain names to IP addresses. Almost all web traffic and other Internet applications rely on DNS to allow the client to find the required server. Currently, approximately 80% of DNS queries are handled by the user's Internet Service Provider (ISP). This allows ISPs to use DNS to fulfill operational needs and offer services.

This new working group is addressing the technical challenges and the opportunities that could be created from the recent IETF standardization of the use of encrypted DNS: DNS over HTTPS (DoH) and DNS over TLS (DoT). These technologies can enhance the security of the DNS protocol but may be implemented by browsers and mobile operating systems in a way that could dramatically change the Internet architecture and have marked impacts on important DNS-based features.

The DNS-PSS Working Group is analyzing the possible impacts of changes to DNS and is developing talking points to help ISPs, as well as other relevant parties, communicate about the changes to end customers, enterprise network administrators and internal stakeholders. The group is also developing a report titled *Technical Impacts of DNS Privacy on Network Service Scenarios*. The aim is to document different options for DNS deployment and to understand their advantages and disadvantages.

The working group is chaired by Jason Livingood, Comcast. Iain Sharp, ATIS Principal Technologist, is ATIS' Technical Lead.

Future Network-Enabled Marketplace

Setting a compass for the next decade of ICT market innovation and collaboration.

An ATIS initiative has delivered an analysis that ICT organizations can use as they take a broad view of the future for strategic planning purposes. The report, *The Future Network-Enabled Marketplace (FNEM): Setting a compass for the next decade of ICT market innovation and collaboration*, lays out the relevant societal trends, technology innovations as well as new business models and network structures that forward-focused organizations need to know about.

Understanding the FNEM increasingly requires being aware of factors beyond technology developments alone. This is because services and applications are increasingly intersecting with many vertical industries. Further, consumers increasingly expect services that are customized to meet their unique needs. Considering these factors, the challenge for the industry is to lay the groundwork for a future set of services and business models that can be enabled through advanced network capabilities and collaboration. It is expected that the following trends and market-driving factors will shape the future marketplace: cloudification, privacy and trust, personalization, adjoining industries, and new business models. The report provides further insight into how these factors will create new opportunities related to networks, services and applications over the next decade.

Non-Terrestrial Networks/5G Integration

Creating standards and solutions to enable a future where global communications and connectivity are seamless and ubiquitous.

Satellites maximize the inherent value of 5G networks by solving coverage problems and difficult use cases that ground-based infrastructure alone cannot address. 5G standards make Non-Terrestrial Networks (NTN) — including satellite segments — a recognized part of 5G connectivity infrastructure. Advantages of satellite networks in 5G systems include providing a solution for ubiquitous coverage, broadcast/multicast provision, and emergency/disaster recovery. 3GPP 5G standards under development provide a promising opportunity to integrate previously independent terrestrial and satellite networks. However, there is more work to be done to ensure that satellite systems are integrated as an intrinsic part of the 5G ecosystem.

ATIS launched the Non-Terrestrial Networks 5G Integration Working Group (NTN 5G WG) in 2019 to drive the creation of normative standards for satellite NTNs in 5G. The initiative brings together satellite operators and other organizations specifically to develop and coordinate technical positions and create aligned contributions to advance support of NTNs in 3GPP 5G standards. The Group is chaired by Intelsat, a leading provider of satellite communication services.

Beyond the satellite operator community, however, this initiative has received great interest from across the industry including from satellite suppliers, major RAN suppliers active in 3GPP, chipset vendors, and terrestrial operators (e.g., for 3GPP priority setting).

The WG's priorities and use cases will be driven by satellite operators' needs, while ensuring that mobile network operators and others can seamlessly and cost-effectively integrate with satellite systems. Technical recommendations for integration should consider the unique characteristics of satellite systems. The WG will generate aligned technical proposals between the satellite community and major terrestrial 3GPP ecosystem contributors. Ultimately, the goal is to ensure an end-to-end standard in the Release 17 timeframe.

Technology and Operations Council Initiatives

Whereas the Innovation Agenda and our Strategic Initiatives are concerned with a longer-term horizon, ATIS' Technology and Operations (TOPS) Council identifies industry imperatives that need addressing in the 12-to-18-month timeframe. This work has a technical and operational emphasis with strong focus on implementation. It promotes the readiness of new technology and consists of work outside of any single ATIS Committee boundary. Most recently, it is delivering results in the areas of:

Assessment of 5G Vertical Enablement Platforms

Accelerating engagement with 5G-enabled vertical industries.

Emerging 5G and IoT technology solutions are creating new business opportunities for ICT to deliver value to multiple vertical industries. Rapid innovation is driving opportunities to develop frameworks and platforms that span — and can address the unique needs of — both ICT and vertical sectors. To advance these, ATIS is assessing the landscape of 5G-enabled vertical industries to know where the potential for cross-industry platforms and other ICT collaboration is strongest. This assessment will be based on the latest industry data. Prioritizing the needs identified will provide the guidance ATIS requires to seize near-term opportunities for industry vertical engagement.

ATIS plans to engage a list of verticals to discuss the value-added platform opportunities beyond 5G networking. At the completion of this process, a prioritized set of vertical needs mapped to potential platforms (e.g., identity, trust, security, transactions, etc.) will be developed, leading to recommendations for deeper-dive initiatives surrounding specific 5G-enabled platform features.

3GPP Release 17 and Beyond

Taking a long-term view of important 3GPP standards with an eye toward 5G.

With the industry push to 5G progressing rapidly, recent ATIS work is concerned with how 3GPP standards in Release 16 and beyond can expand 5G capabilities and enhance the mobile system's technical performance. Release 16 has been defined by 3GPP, and ATIS is playing an important role by helping the industry to consider what happens next, particularly in relation to the evolution of 5G.

A key priority is to assess ongoing technology evolution and research to help evaluate/predict impact to future standards. This focus on the 3GPP landscape post Release 16 is identifying key technologies and priorities relevant to the North American market and how the transformational impacts of these technologies will drive future requirements. This effort will provide the opportunity to impact 3GPP Release 17 work during the critical requirements phase — and beyond. With completion of the Release 17 and beyond report, the group will continue to monitor the landscape for changes that may impact North American priorities.

IoT Categorization

A better understanding of the IoT from a network perspective.

The burgeoning growth in the IoT ecosystem — in terms of the number of connected devices globally and total spending on end-point devices and services — is driving a wide range of new uses and requirements on the network infrastructure. Network slicing is a way to structure a network to support diverse classes of services in a guaranteed way on the same network. An ATIS report, *IoT Categorization: Exploring the Need for Additional Standardized Network Slices*, considers the network requirements across the multidimensional landscape of IoT devices and applications to identify any additional network slice

types that may be defined to ensure consistent service quality across operators.

The work is timely in light of findings such as the report from Strategy Analytics predicting that 38.6 billion devices will be connected by 2025, and 50 billion by 2030. To support this upsurge, networks will need to handle a diverse set of use cases across different industry verticals – smart cities, automotive, healthcare, transportation, and industrial automation, to name a few.

These vertical applications will require the underlying network infrastructure to meet a variety of different requirements on functionality (e.g., priority, security) and performance (e.g., latency, availability, mobility, data rates, connection density). Some applications, for example, such as ultra-high definition video and augmented reality require high-speed, high-capacity communications yet are generally capable of handling medium to high latencies. Others, such as autonomous vehicles, absolutely require ultra-low latency, ultra-reliable services to guarantee road safety.

Through network slicing, operators can allocate their network resources based on a precise set of performance requirements. The IoT Categorization report provides a comprehensive analysis of the multidimensional landscape of IoT across devices and applications to ensure a broad set of standardized slice types to address the most commonly used services and associated performance characteristics.

One of the new network slice types that has been proposed from this work, High-Performance Machine-Type Communications (HMTC), will be submitted by ATIS members as a change request to the 3GPP standard slice type definitions.

Robocalling/Caller ID Spoofing

Taking a comprehensive view of robocalling mitigation work to see what is needed.

Considerable progress has been made in mitigating unwanted robocalling, addressing caller-ID spoofing, and enabling traceback with STIR/SHAKEN, as well as the use of advanced analytics. Yet ATIS recognizes there is an opportunity to apply a more holistic approach to understanding the industry's needs surrounding these issues. This work, for instance, could boost SHAKEN's effectiveness and contribute recommendations around deployment approaches and mitigation techniques.

An initiative launched in January 2020 addresses these goals. The Robocalling and Caller ID Spoofing Initiative is developing a coordinated landscape view of all robocalling and spamming mitigation efforts across the industry with the purpose of considering needs for further standards development. The work would include consumer education and coordination opportunities with other organizations.

Neutral Host Solutions

Innovation to boost multi-operator wireless capacity and coverage in managed spaces and advance the economic deployment of dense 5G.

ATIS has been putting innovation into action to lower the costs of providing enhanced cellular capacity and coverage in shared spaces. July 2019 marked the release of *Neutral Host Solutions for Multi-Operator Wireless Capacity and Coverage in Managed Spaces*, a report advancing solutions for the economic deployment of dense 5G as well as traditional small cells to provide enhanced cellular capacity and coverage in shared spaces. The innovations presented can help service providers avoid the high cost and complex arrangements needed to deliver 5G capacity in places as varied as metropolitan areas, enterprises, campuses, shopping malls, entertainment venues, outdoor festivals, and more.

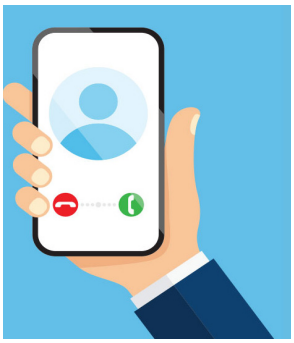
Typically, within a managed space today, different wireless operators must each deploy small cells dedicated to their own customers. Small cells supporting each operator are needed, creating complex and costly parallel infrastructures. In this new report, ATIS presents a neutral host solution in which one common infrastructure system is deployed and shared by all. In this case, a third-party provider, such as an independent access provider, landlord, or delegate, becomes a neutral host (in terms of not being aligned with any specific operators) for small cell deployments.

The potential of neutral host solutions becomes even more exciting when we consider their ability to help service providers advance their 5G business objectives. They can help make 5G deployments more ubiquitous and cost effective as well as help service providers gain access into real estate they might not otherwise have access to — all benefits critical to growing the capacity to deliver 5G service.

Addressing Leading Regulatory Issues

Mitigating Unwanted Robocalling

Addressing the FCC's leading cause of consumer complaints.



In addition to speeding the industry's transformation to the future, ATIS also develops solutions to high-priority immediate challenges. Our work to mitigate unwanted robocalling, the FCC's leading cause of consumer complaints, is one example. Our initiatives toward this goal are not just about problems solved, but opportunities advanced. The work not only provides critical technology and policy input to achieve industry, FCC and consumer objectives, but, at a greater level, it is helping to restore trust in the voice network.

Chosen to manage the Secure Telephone Identity Governance Authority (STI-GA), the body charged with implementing an industry-wide solution to mitigate unwanted robocalling, ATIS made major progress in 2019 by setting the STIR/SHAKEN protocol into action in the network. ATIS collected bids and assisted the industry in selecting a vendor to implement the system. The goal was to drive forward SHAKEN implementation by year-end. Under ATIS' leadership, on December 16, 2019, the system launched successfully.

Yet this is only a first step. Moving into 2020, ATIS is focused on broadening industry participation in STIR/SHAKEN ecosystem. We will work to achieve this both in our role as the STI-GA as well as through the joint IP-NNI Task Force. ATIS' work on robocall mitigation encompasses not just service providers within the U.S., but other nations as well. Canada and other countries are following the U.S. STIR/SHAKEN efforts, ushering in not just provider-to-provider, but nation-to-nation cooperation in the fight against illegal and unwanted robocalls.

Examining Hearing Aid Compatibility in Mobile Handsets

Advancing the hearing aid compatibility of wireless devices.

With a long-standing track record serving as a key focal point for ICT industry collaboration with the deaf and hard of hearing community, ATIS has been named as the administrator to manage a new Hearing Aid Compatibility (HAC) Task Force. The Task Force will bring together key stakeholders to make recommendations to the FCC on its proposed requirement that 100% of covered wireless handsets be hearing aid compatible.

This effort was initiated via an agreement presented to the FCC by the Competitive Carriers Association, CTIA, the Hearing Loss Association of America, the National Association of the Deaf, Telecommunications for the Deaf and Hard of Hearing, and the Telecommunications Industry Association — collectively known as the Consensus Proposal Participants (CPPs).

ATIS, the CPPs, and the Task Force participants have convened two preliminary organizational meetings to identify areas for exploration and discuss next steps. The first official Task Force meeting was held on February 11, 2020, where among other things, leadership elections occurred. The Task Force will begin collecting data relating to current technical and market conditions involving wireless handsets and the landscape of hearing improvement technology.

It will deliver its final report and recommendations to the FCC by the December 31, 2022 deadline, which will include its operations and accomplishments to date, information collected on the HAC issues being evaluated, and a summary of the achievability of requiring 100% of covered wireless handsets to be hearing aid compatible.

On behalf of the CPPs, ATIS is currently seeking stakeholders including wireless OEMs, wireless service providers, representatives of consumers with hearing loss, hearing aid manufacturers/representative associations, research and academic institutions and other stakeholders to join this collaborative effort. Learn more.

Standards and Solutions

ATIS' committees develop the standards that are needed to deliver and enhance key communications services. Their work brings a collaborative, innovative approach to creating solutions to leading industry challenges. This section presents key highlights of some of the work taking place in these committees as well as what's on the horizon for 2020.

Priority and Emergency Services Communication

ATIS is where the industry comes together to identify and resolve technical and operational issues to facilitate interconnection of emergency services networks with wireline, cable, satellite, Internet and other networks. The ATIS members doing this work represent the full ICT ecosystem, including industry, government, standards bodies, public safety organizations and more. Here are some of their high-impact initiatives:

Priority Services

Understanding Contention Issues Between Different Services During Network Degradation Conditions.

Both Emergency Services and National Security/ Emergency Preparedness (NS/EP) Next Generation Network Priority Services (NGN-PS) will have to coexist in commercial Long-Term Evolution (LTE) network service deployments. The two are expected to be served along with commercial priority services and nonpriority commercial services under network degradation conditions (e.g., congestion and overload conditions).

3GPP-defined mechanisms for admission and congestion controls exist. These include the Access Class Barring mechanism, and scheduler-imposed restrictions on throughput. However, it is not clear how and when these capabilities may be invoked in an optimal manner. It might be possible, for example, for a flood of Emergency Services sessions and normal sessions (e.g., voice, video and messaging sessions), initiated as a result of a disaster or emergency event, to monopolize LTE access resources.

Published in 2019, an ATIS technical report provides a study analyzing contention issues between different services such as Emergency Services and NS/EP NGN-PS communications during network degradation conditions (e.g., network congestion during certain disaster events). Access the Study of Emergency Services and National Security Emergency Preparedness Next Generation Network Priority Service (NS/ EP NGN-PS) Coexistence on LTE Access Networks (ATIS- 0700044).

Advancing Support of NS/EP Priority Services in NGN.

During periods of network congestion, National Security/Emergency Preparedness (NS/EP) Priority Services require priority treatment. This treatment is required end-to-end and from invocation to release in the IP-based NGN.

Several parameters have been defined within LTE, IP Multimedia System (IMS) and supporting protocol standards applicable for providing network priority to NS/EP communications in the NGN environment. These include the LTE Allocation and Retention Priority, Access Class, Multimedia Priority Service Identifier, and Resource Priority Header. However, national specific values and/or the rules for their use need to be identified and reserved in order to effectively support NS/EP NGN Priority Service. At a minimum, operational rules must be specified such that the values reserved for NS/EP priority communications are unique, where possible, and provide priority treatment over all other services.

ATIS provides operational guidance on protocol parameters and values (e.g., QoS/Priority Values) relevant to NS/EP Priority Services support in NGN. A standard published in 2019 provides guidance on the national specific values and/or the rules for their use, such that NS/EP priority communications receive the appropriate prioritization of delivery over other traffic. Access LTE and IMS Parameters for Supporting NS/EP Priority Services in NGN (ATIS-1000086).

Emergency Location

Location Accuracy Test Methodologies.

ATIS has developed many of the solutions and standards that establish the requisite test methodologies to enable consistent and measurable methodologies for the testing of existing and future location accuracy technologies. An ATIS standard, Unified X/Y and Z Indoor Test Methodology (ATIS-0500040), provides guidelines for assessing the performance of wireless location technologies in various types of indoor conditions and environments.

Drawing from existing ATIS standards, this document defines an integrated test methodology for simultaneously measuring horizontal (X/Y-axis) and vertical (Z-axis) position accuracy performance. It also extends the testing methodology to account for additional emerging vertical height determination technologies, including WiFi-based techniques, so that testing of such approaches in the production environment is technology agnostic.

Before this standard, the X/Y and Z coordinates were assessed separately. This ATIS innovation will help the industry more efficiently assess how effective wireless technologies are in locating individuals in an emergency situation.

Routing

Enhanced Location-Based Routing of Emergency Calls.

Another 2019 deliverable is an ATIS technical report presenting a feasibility study analyzing the Location Based Routing (LBR) methods for Commercial Mobile Radio Service (CMRS) wireless emergency calls. The report addresses issues as described in a recent Communications, Security, Reliability, and Interoperability Council (CSRIC) V LBR Report and any other methods to enhance LBR that have been identified since the publication of that report. It includes analysis of whether existing standards support a particular LBR method, and if not, what standards gaps may exist. Access the ATIS study, Enhancing Location-Based Routing of Emergency Calls (ATIS-0700042).

Cell-Sector-Based Routing.

Another pivotal ATIS technical report, explored specific characteristics of sub-optimally routed wireless emergency calls, such as where they occurred as well as the distribution of their distances from the boundaries of the Public Safety Answering Points (PSAPs) to which they were routed. The report also includes recommendations derived from these findings for cell sector-based routing and LBR solutions based upon the findings of this study.

The document offers insight into the routing behavior of wireless emergency calls, specifically those delivered to a PSAP other than that which would be considered as being optimal based upon the caller's actual location. By focusing on sub-optimally routed calls, it explores the location characteristics of calls using cell-sector-based routing which are most susceptible to this condition. It also identifies some potential benefits of LBR solutions in mitigating these behaviors and lists recommendations for the implementation of both routing approaches. Access Analysis of Predetermined Cell Sector Routing Outcomes Compared to Caller's Device Location (ATIS-0500039).

Wireless Emergency Alerts

Setting WEA 3.0 Into Action.

ATIS work has enabled the Wireless Emergency Alert (WEA) system and continues to advance its value to the mobile device consumer. In 2019, a new group of ATIS standards created WEA 3.0, which supported the delivery of potentially life-saving messages in a more precise geographic range and more accurately target at-risk populations while minimizing disruption to others. The new standards were implemented by commercial mobile service providers (CMSPs), infrastructure vendors, OS providers, device OEMs and chipset manufacturers in developing the WEA 3.0 system.

In December 2019, FCC Commissioner Ajit Pai announced the successful launch of this suite of enhancements. Specifically, WEA 3.0 advances:

- Geographic Accuracy: Participating CMSPs must deliver the geo-targeted messages to the area specified by the alert originator with no more than a 1/10 of a mile overshoot, as opposed to the prior "best approximation" standard.
- Longer Messages & Better Reach: Wireless Emergency Alerts will accommodate longer messages — an increase from 90 to 360 characters — and messages in Spanish.
- New Alert Type: There is a new class of alerts ("Public Safety Messages") for officials to convey recommendations for saving lives or property, such as the location of emergency shelters after a disaster.
- Better Testing: Emergency managers can now conduct state and local Wireless Emergency Alert tests that reach only consumers who choose to participate, and these tests do not require a waiver from the FCC.

In addition, all participating CMSPs must support "clickable" links in alerts so that messages can include links to photos and other additional information.

As with the other WEA standards ATIS has developed, ATIS members introduced these requirements into the 3GPP process for global adoption. Access all ATIS WEA 3.0 standards in the ATIS document store.

Network Reliability

ATIS' Network Reliability Steering Committee (NRSC) is home to a set of industry advisors on the health of the nation's communications networks. It provides timely consensus-based technical and operational expert guidance and best practices to many segments of the public communications industry. The Committee proactively holds quarterly public meetings with the FCC and provides information to help minimize the number of agency rule-makings and mandates. Among its recent accomplishments:

Best Practices Website on Network Reliability

Improving access to valued industry practices.

In 2019, ATIS launched a new Best Practices (BPs) website. It features an easy-to-use search functionality as well as a portal for CSRIC members to directly propose Best Practices. The User Guides and Best Practices Tutorial have also been updated with the launch of this new site.

The majority of the BPs were created and modified by a series of FCC-chartered Network Reliability and Interoperability Councils (NRIC), the federal advisory committees that preceded the CSRIC. They continue the theme stated by the first NRIC: "The Best Practices, while not industry requirements or standards, are highly recommended. The First Council stated, 'Not every recommendation will be appropriate for every company in every circumstance, but taken as a whole, the Council expects that these findings and recommendations [when implemented] will sustain and continuously improve network reliability.'"

ATIS believes that mandating compliance with particular BPs would impact the ability of organizations, their customers, and other constituents to manage the value proposition, the pricing that defines their business models, and participation in the industry. Access the ATIS Best Practices website.

A Comprehensive Overview on Recent Reliability Issues

Improving the nation's networks.

A report published in 2019 provides a snapshot of the issues addressed by the NRSC over the last two years and shows how they impact priorities in 2019 and beyond. It shows that the efforts of the NRSC, guided by input from member company subject matter experts as well as the FCC, are primarily directed toward ensuring that meaningful data is being collected and analyzed to better understand the cause and mitigation of outages.

Ultimately, the NRSC utilizes this information to develop industry guidance that directly impacts and improves the nation's networks. These efforts build upon previous NRSC work and form a strong foundation for ensuring that communication networks continue to be reliable and resilient. This foundation is especially useful in light of ongoing momentous changes to the communications network, including the significant growth of wireless networks and the evolution to All-IP.

As these changes advance, the NRSC remains committed to, and will continue working toward, maintaining network reliability and resiliency and advising on the data collection it takes to achieve this. NRSC member companies' continued efforts have directly and positively impacted the resiliency and reliability of the nation's networks. Access the Network Reliability Steering Committee 2017-2018 Operational Report.

Standard Operating Procedure for PSAP Outage Contact Information

Improving situational awareness during 9-1-1 outages.

In January 2020, ATIS delivered the Standard Operating Procedures (SOP) for Updating Public Safety Answering Point (PSAP) Outage Contact Information (ATIS-0100068). This document provides information on how PSAP contact information is to be collected and documented. This new process addresses the challenges associated with identifying PSAP and 9-1-1 authority recipients of outage notifications and the mechanisms for collecting and standardizing contact information.

One of the industry challenges in the delivery of outage notifications is knowing whom to notify, by telephone and electronic means, in the event of a potentially impacting 9-1-1 outage. Today, requirements to notify PSAPs make it necessary to obtain accurate outage contact information for each PSAP. This new ATIS resource presents an industry consensus on improvements in collecting PSAP information.

Advancing ICT Industry Emergency Preparedness and Response

Disaster Mitigation.

ATIS contributions are key to helping ensure the network performs reliably during natural disasters and other emergencies. As part of this work, the NRSC published the Emergency Preparedness and Response Checklist (ATIS-0100019).

A valued ICT industry resource, this document provides general guidance regarding preparedness for and response to a wide array of emergency situations including hurricanes, earthquakes and other events that cause major disruptions to operations, service and supplies. The Checklist provides industry Best Practices offering guidance from assembled industry expertise and experience vital to maintaining the reliability of the nation's public communications networks and services.

Numbering

Reassigned Numbers Database.

As it advances the fight to mitigate illegal robocalling on all fronts, ATIS is addressing the numbering-related aspects for this issue. In late 2019, FCC Chairman Ajit Pai noted that the establishment of a national Reassigned Numbers Database (RND) will provide "a solution that will reduce the number of mistaken calls to reassigned numbers." In response to these recommendations, ATIS has reviewed the Commission's Second Report and Order establishing the RND (FCC 18-177) and recognizes the need for Guidelines related to the service providers' responsibilities to collect and provide disconnected number data into the RND.

ATIS' Industry Numbering Committee (INC) has insight into service provider operations and processes and has informed the FCC it stands ready to develop such Guidelines. It also has significant expertise in developing guidelines and recommendations that are used by the North American Numbering Plan Administration (NANPA) and the national Pooling Administrator (PA) as well as by service providers in the management of numbering resources. As such, INC has respectfully assumed the responsibility to develop service provider guidelines for the RND. INC has reported to the FCC that it is ready to begin working on these guidelines when the FCC makes the technical requirements document public.

Ordering and Billing

Resources for Inter-Provider Interaction.

ATIS' Ordering and Billing Forum (OBF) creates the collaborative standards and solutions that ensure accurate billing for the industry's core services as well as emerging innovations. It is the industry's go-to resource for resolving issues and developing documents to enable automated exchange of information needed to support Local, Access, and Wireless service ordering, along with the standards for inter-company billing and record exchange, for IP-based and TDM-based networks. A full listing of documents OBF creates is here. In 2019, OBF:

- Updated the *Access Service Ordering Guidelines (ASOG). Version 60* was published in September 2019. It includes an update to the Access Service Request Ordering Overview (Practice 000a) to address new ordering scenarios for dark fiber. In March 2020, ATIS will release Version 61, which will include updates to fields as a result of revisions made to Version 60.
- Updated the *Local Service Ordering Guidelines (LSOG) Version 2Q19*, in May 2019. This includes several updates, one of which includes a new Data Unified (DU) form which consolidates administrative, bill detail and service details necessary for the provisioning of requests for local data services such as high-speed Internet. New shipping address fields were added to this new form as well as the End User Form (Practice 072) which are specific for shipping high-speed Internet equipment to an end user on the Local Service Request (LSR).

Resources for the Industry

Telecom Glossary.

Another innovation to speed access to industry knowledge, the ATIS Telecom Glossary, has been upgraded with interactive capabilities. The new Glossary provides an authoritative source of definitions for standards developers, engineers and all who are active in the telecommunications field. Upon reading a term and its definition, users will have the option to provide feedback via the Glossary.

ATIS Committees

- **AIDC** - Automatic Identification & Data Capture Committee
- **ESIF** Emergency Services Interconnection Forum
- **INC** - Industry Numbering Committee
- **IOC** - International Mobile Subscriber Identity Oversight Council
- **NGIIF** - Next Generation Interconnection Interoperability Forum
- **NRSC** - Network Reliability Steering Committee
- **OBF** - Ordering and Billing Forum
- **PTSC** - Packet Technologies and Systems Committee
- **SNAC** - SMS/800 Number Administration Committee
- **STEP** - Sustainability in Telecom: Energy and Protection Committee
- **SYNC -** Synchronization Committee
- **TMOC** - Telecom Management and Operations Committee
- **WTSC** - Wireless Technologies and Systems Committee

To learn more about ATIS' initiatives, contact Rich Moran, ATIS Director of Membership, at 202-434-8858 or rmoran@atis.org.