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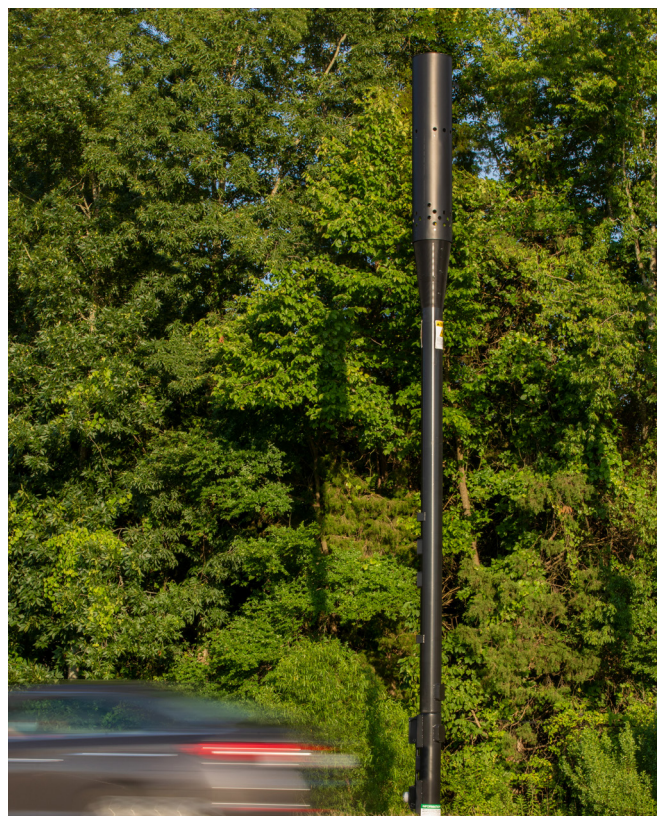
Raycap 5G Small Cell Deployment Update

The U.S. sees accelerating 5G progress in spite of—and in some cases because of—the challenges of the COVID19 crisis and its related issues.

In this report, Raycap, a leader in 5G small cell concealment and protection solutions, has collated media reports from March to September 2020 to assess the state of 5G wireless deployments in the U.S.

Executive Summary

Media coverage from the past six months shows how the COVID19 pandemic has raised awareness of the critical role of wireless infrastructure in society. Therefore, instead of a slowing 5G build-out, the last six months have seen continued momentum. Media reports indicate that some municipalities have reconsidered the tradeoffs of encouraging 5G in their cities, towns and neighborhoods, despite ongoing concerns over the location and appearance of 5G small cells. This is occurring against a backdrop of positive announcements from carriers and favorable rulings and guidance on how to install 5G small cells, as well as technology that helps to minimize their visual impact.



COVID19 supports the case for faster 5G adoption

One result of the COVID19 crisis was that people and businesses expect even more from their wireless networks. This has led regulators, carriers and municipalities to consider which sectors would benefit most from a fast and reliable 5G connection, in particular healthcare, education and telecommuting.

For example, **Tech Republic** reported that Chris Pearson, president of 5G Americas, said that the new rules of work and daily life showed how critical mobile wireless technology is for first responders, workers and consumers to maintain social distancing while staying connected.

The need to educate students via remote learning also made some local authorities consider how 5G wireless technology can help bridge the digital divide. For instance, **San Jose Inside** reported in April how city officials were researching if they could use money from FEMA or the Coronavirus Aid, Relief, and Economic Security Act to fund its digital inclusion

Raycap acquisition completes 4G/5G small cell portfolio

*In May, **Inside Towers** reported on Raycap's recent acquisitions of telecom and switchgear manufacturer Apelio this past January, and earlier STEALTH® concealment which focuses on both macro and small cell pole concealments. Raycap now offers a comprehensive set of solutions and products designed for telecom operators to build and deploy small cell 4G and 5G networks with fully integrated and concealed small cell sites. This portfolio includes the patent pending and ground breaking concealment technology, InvisiWave™. Fabricated from a rigid, RF friendly material, InvisiWave products effectively cover and conceal mmWave radios attached to streetlight poles, on rooftops or other structures, without interfering with radio performance. It has been approved for use on 5G networks by all major U.S. carriers and most OEMs."aesthetic environment.*

efforts during and immediately after the pandemic. San Jose had been focused on small cell deployment for both 4G and 5G networks. Deputy City Manager Kip Harkness was reported as saying the city had processed permits for 1,700 cells, which were halted due to the shelter-in-place order. As a result, San Jose asked the Santa Clara County Public Health Department if the cell deployment projects could be deemed essential business.

Some cities appear to be shifting from previous positions and now leaning toward 5G adoption. For instance, **Inside Towers** reported in September how city council officials in Trenton, New Jersey have announced support for bringing 5G to the state's capital. Ironically, this was after one Trenton city council member made headlines in April after appearing to support 5G COVID-19 conspiracy theories that were swirling around at the time. In the latest development, Trenton city mayor Reed Gusciora was reported as saying that AT&T and Verizon will "pay the city for each 5G small cell device they install" and "work with Trenton historians to ensure that important landmarks and historical properties are not disrupted by installations."

Carriers and tower companies continue 5G deployments

Carriers and tower companies pushed ahead with 5G deployments in spite of the COVID-19 outbreak. Striking an optimistic note in early May, Crown Castle CEO Jay Brown was reported by **Light Reading** as saying "We haven't seen any impact to date from COVID-19." This was during the company's quarterly conference call with analysts. "I don't want to say that I have perfect visibility to what that's going to look like into the future. But thus far our crews have been able to continue to work and install our tenants and deliver the infrastructure that's necessary," Brown continued.

In addition, U.S. Cellular, the nation's fourth-largest infrastructure-based wireless carrier, announced in July that it was planning to deploy 5G in 11 more states, including California, Maine, Maryland, New Hampshire, North Carolina, Oklahoma, Oregon, Texas, Virginia, Washington and West Virginia.

Fierce Wireless also reported in July how U.S. mobile operators are forging ahead with their 5G buildouts during the pandemic, and spending money on 5G equipment and cell sites, which in turn is fueling more wireless companies in the ecosystem. For instance, Verizon was reported to be on track to spend between \$17.5 billion and \$18.5 billion in 2021. Verizon CEO Hans Vestberg was quoted as saying, "We are deploying more fiber and cell sites for our 5G rollout."

Meanwhile, AT&T said it spent \$4.5 billion in CapEx in the second quarter of 2020 and a portion of that went toward acquiring 5G spectrum. In April, AT&T won 379 MHz of the 39 GHz millimeter wave spectrum and spent \$1.2 billion in auction 103 to get that spectrum.

Elsewhere, Verizon announced in June that it has introduced an "enhanced" form of its 5G Home fixed wireless service in parts of Houston. The launch in Houston followed the debuts of the enhanced version of 5G Home in Detroit, Indianapolis, Los Angeles and Chicago. **AGL Magazine** reported that 5G Home Internet will be available in 10 cities nationwide by the end of 2020, with Verizon to set to use repeaters to improve mmWave coverage.

In a move of wide significance for the telecoms industry, T-Mobile completed its merger with Sprint in March. **Fierce Wireless** reported that the company took the occasion to remind everybody that the deal will put it in the best position to serve the public in times during crises like the current one, when people need to be connected at an affordable price. However, T-Mobile's top networking executive did indicate in mid-June that its interest in adding small cells to its network has "certainly softened" following the close of its merger with Sprint. He said that T-Mobile plans to add capacity to its network by deploying Sprint's 2.5GHz spectrum onto macro cell towers instead of adding more small cells.

That said, 5G industry analyst Sue Marek from **Fierce Wireless** highlighted at the end of July that, while other countries are seeing their 5G deployments delayed or scaled back, the U.S. operators are staying on the same pre-pandemic schedule. This, Marek claimed, is making the U.S. wireless industry more resilient.

Raycap named
'Best Mobility
Innovative Provider'
by Carriers

As reported by AGL media in August, Raycap was named "Best Mobility Innovative Provider" at the fourth annual Carrier Community Awards in Berlin. The international

jury of experts recognized Raycap's InvisiWave technology, which protects and conceals 5G installations, as a ground-breaking development in the expansion of 5G infrastructure in cities around the world.

5G spectrums open for auction

As more stimulus for the market's development, the FCC had concluded its auction of Priority Access Licenses (PALs) in the 3.5 GHz band, with gross proceeds raising \$4.58B, as reported in **Fierce Wireless**.

Known as the Citizens Broadband Radio Service (CBRS), the 3.5 GHz PALs auction was highly significant as it offered the first auction of mid-band spectrum for wireless carriers' 5G services. The CBRS spectrum is expected to greatly increase the number of private networks in the U.S., and expectations are high for a healthy secondary market as PAL licensees seek to lease their spectrum to other entities.

The CBRS auction was unusual in that many qualified bidders included non-traditional auction participant thanks in part to the smaller size of the licenses. Utilities, rural service providers, universities and others joined wireless and cable service providers in bidding. Auction 105 also offered up the most licenses – 22,631 – ever auctioned in a single event.

In March, the FCC also announced the winners of its third-mmWave 5G spectrum auction. The main beneficiaries were T-Mobile, Dish Network and Sprint who came away controlling 99% of the 47 GHz spectrum. However, **Fierce Wireless** reflected that these carriers could be waiting on a 47 GHz ecosystem for some time; as devices and infrastructure might not be ready to support 47 GHz in the near-term. By contrast, carriers including AT&T and Verizon have already deployed commercial mmWave 5G service that rely on 28 GHz or 39 GHz frequencies.

FCC ruling helps clear the way for carriers

In a widely reported development of major importance for the US telecoms industry as a whole, the 9th Circuit U.S. Court of Appeals in San Francisco ruled in mid-August to uphold a 2018 decision made by the FCC that prohibited local governments from imposing excessive regulations on wireless carriers seeking to deploy 5G. The decision upholds the vast majority of the FCC's wireless infrastructure orders and caps local fees for the installation of "small cell" towers.

In its analysis, **Light Reading** reported that while a number of cities around the country have welcomed small cells and 5G as high-tech investments that can improve residents' lives, other localities argued the rules amounted to federal overreach into local regulations.

The ruling followed legal action by a large group of U.S. cities and counties – most prominently Portland, San Francisco, Las Vegas and Chicago – who had filed a suit against the FCC in objection to its rules that are designed to speed up the deployment of 5G small cells.

How concealment streamlines 5G deployments

In July, Dr. Apostolis Sotiriou, AVP Telecom Sales at Raycap, spoke to **AGL Magazine** about

how concealing small cell sites will reduce time-to-deployment and simplify the installation and upgrade of 5G sites. Since 5G small cell poles are expected to become a common element in the urban landscape, they need to fit in seamlessly with the rest of the architecture, public spaces and pedestrian right of ways. Because each city has its own history, challenges, ordinances and aspirations, small cell poles will need to be easily adapted to different designs and, crucially, combine and conceal all the electronics. Dr. Sotiriou revealed how the Raycap integrated small cell pole, as an example, can integrate 5G and 4G radios, AC disconnect functions with surge protection, as well as fiber management and connectivity enclosures.



New rules and technologies ease deployment on existing infrastructure

In the past six months, new rulings and guidance have appeared that should help streamline 5G deployments. **Inside Towers** reported in July on an FCC ruling that utilities are no longer able to tell carriers that existing poles are summarily off limits. The ruling is perceived as a victory for CTIA, which sought clarification to the agency's pole attachment rules. The trade group said some utilities were misinterpreting the Commission's pole attachment rules in a way that hampered broadband deployment.

Specifically, CTIA asked the FCC to clarify that "pole" includes light poles and that utilities must afford non-discriminatory access to light poles at rates, terms, and conditions consistent with the requirements of section 224 and the Commission's pole attachment rules. The trade association also asked the Commission to affirm that utilities may not impose blanket prohibitions on access to any portions of their poles; and declare that utilities cannot ask providers to accept terms and conditions that are inconsistent with the Commission's rules.

In a declaratory ruling, the Wireline Competition Bureau found evidence to support two of CTIA's concerns. The bureau said,

money cities can charge providers for access to existing utility structures.

The Alabama League of Municipalities had opposed the bill over concerns that cities would lose the ability to oversee their right-of-way resources. However, **Alabama Daily News** reported that the group dropped its opposition after the Senate adopted amendments aiming to provide more local control for 5G infrastructure and ensure that any existing contracts with wireless companies would remain intact

At a local level, **AGL Magazine** reported how the city of Oceanside, California has approved a template master lease agreement (MLA), which sets a basic framework including standard terms and conditions for obtaining individual small cell site licenses on city-owned streetlight poles within the public right of way. MLAs are an example of how cities are trying to streamline their zoning and application process to speed small cell deployments. The MLA paperwork asks for the proposed location of the small cell site or sites, and the basic configuration of the equipment proposed for the pole.

On the industry side, the **Small Cell Forum (SCF)** published new specifications to help standardize the construction of small cells using components from different vendors. The SCF also published new APIs to assist in the management of smart antennas and for small cells to "listen" to each other.

Residents continue to debate the visual impact of 5G

As 5G deployments pick up steam, some resident groups and local town councils continue to try and implement rules to limit the appearance and placement of 5G small cell towers that they anticipate are coming.

New screen simplifies upgrade of 4G site to 5G

*An August 2020 **Government Technology** magazine article explained how Raycap's InvisiWave concealment material will allow*

governments and telecommunications firms to put small cells necessary for 5G in places where existing infrastructure is installed without dominating the cityscape with gray boxes.

*In the same month, **RCR Wireless** reported how Raycap had released a new drop-in 5G small cell panel upgrade for concealed 4G deployments. Called the InvisiWave™ Screen Panel, the new 5G concealment panel speeds up and lowers the cost of 5G deployment by allowing for the easy transformation of existing cell sites into 5G sites without degrading equipment performance.*

*Concerning this panel, **Light Reading** quoted Raycap SVP of Telecom Sales Kelly Richards as saying, "Carriers across the U.S operate thousands of 4G sites on rooftops and in other concealed areas which, until now, were prohibitively expensive or technologically infeasible to upgrade for 5G while meeting strict aesthetic and electronic regulations. For the first time, operators can seamlessly and cost-effectively bring 5G to communities, by simply retrofitting these types of existing installations."*

For example, both **Government Technology** and **Inside Towers** reported on how residents in McCandless Township, PA expressed concern that a 5G rollout will 'bulldoze' their right to decide what their town looks like. During a council meeting at the time, the ways that towers can be unobtrusively incorporated into the landscape were discussed, such as banners and camouflage paint. According to town attorney Gavin Robb. "We wanted to focus on mitigating the impact (of the antennas), especially as they start to proliferate in the town, and add features such as 'stealth' technology that allows these small cell systems to blend in and not be eyesores."

"We wanted to focus on mitigating impact... and add features such as 'stealth' technology that allows these small cell systems to blend in." - McCandless Township, PA

There was also concern in the city of Toledo, Ohio about the placement of small cell towers near homes. Although 5G has not gone live in the city, **Government Technology** reported how small cell sites installed in commercial areas have attracted little attention. However, when small cells appeared in neighborhoods, residents complained. Since all small cells are installed in city rights-of-ways, they're not subject to zoning approval like towers, so they're arrival came as a surprise to many.

Meanwhile in Illinois, state representative Deanne Mazzochi announced a "Protect Me from 5G!" bill in August, with the aim of safeguarding residents from the proliferation of



Integrating 5G Sites into Streetlights for Los Angeles

small cells. **Inside Towers** reports Mazzochi as saying, “Our neighborhoods welcome technological advances, but those same neighborhoods also need the right to decide at the local level whether certain aesthetic or safety costs are worth it.” According to numerous sources, the motion was filed by Mazzochi after residents from several 5G pilot communities in her district complained about small cells being placed in front of homes and playgrounds and expressed their desire for expanded local control over 5G sites.

Regarding safety concerns, **RCR Wireless** reported how a panel of international experts had announced that, after extensive research, 5G was found to be safe for the public. The International Commission on Non-Ionizing Radiation Protection (ICNIRP), the Germany-based scientific body in charge of setting limits on exposure to radiation, called for minor updates to 20-year-old guidelines for mmWave 5G. In the broader public sphere, **c|net** published a long article carefully explaining how 5G radiation works and debunking the “false conspiracy theories about links between 5G wireless networks and the origins of the coronavirus have been circulating widely online.”

Towns and cities are more accepting of 5G small cells if they blend in seamlessly with neighborhoods

In the past six months, there were several media reports about successful 5G small cell installations in the US. Cities have also been consulting with residents about small cell pole designs.

For instance, **Inside Tower** reported how the City of Los Angeles has recognized that citywide coverage of wireless service is an important element to support smart city services. The city considers streetlights to be the best location for new wireless sites since they are at the optimum height, have existing electrical infrastructure, and do not add an additional structure into the public right of way. To facilitate new services, such as 5G Fixed Wireless Access (FWA) and mobile applications, the LA Bureau of Street Lighting (BSL) has established policies, specifications and procedures for co-location of cellular sites on streetlight poles. Furthermore, the city of Los Angeles proactively works with carriers to attach small cells to existing streetlight poles to eliminate additional unsightly poles and cabinets installed in already busy sidewalks.

In a further development, the New York City Department of Information Technology and Telecommunications (DoITT) issued a press release in July to announce it was seeking the public's feedback about a potential small cell pole design, which could facilitate the citywide deployment of 5G. As reported in **RCR Wireless**, the DoITT had directed the wireless industry to collaborate and design a uniform and minimally obtrusive small cell “concealment” solution to be mounted on street poles.

Another recent installation saw a weathered wooden pole design with 5G cell equipment on top be deployed in a seaside location in Rehoboth Beach, Delaware. As reported by **Inside Towers**, it is the sixth AT&T installation in the last two years

Power Systems Design reported how Raycap had earned regulatory approval from the Los Angeles Bureau of Street Lighting (BSL) for its steel integrated pole design for 4G and 5G small-cell wireless sites, broadening Raycap's regional deployment capabilities and enhancing local smart city readiness while meeting the BSL's strict aesthetic and technical requirements. Raycap worked with a tier-one carrier customer to engineer a small cell streetlight design, based on LA BSL specifications. After the article was published, the city announced that Raycap is now an Authorized Fabricator for its small cell streetlights.



and is hiding in plain sight, with equipment atop the AT&T poles visible, but relatively discrete, according to company representatives.

Elsewhere, the City of Fishers in Indiana decided to move forward with permit requests for 5G towers in residential neighborhoods, according to the **Hamilton County Reporter**. City Attorney Chris Greisl was reported as saying that Fishers can look at where towers are located within a neighborhood but cannot ban or deny all requests for 5G small cell towers based on state and federal law. The city may also consider the aesthetics within a neighborhood when evaluating permit requests.

Let Raycap help your municipality optimize 5G rollouts

Raycap is ready to help you define a 5G deployment strategy that appeals to service providers and constituents alike. Our responsive engineering and consulting services can work with your departments to design small cell sites that maintain aesthetic standards. Then, through our broad range of products, patented technologies and multiple domestic manufacturing sites, we can streamline installation of 5G integrated streetlights and other solutions that take advantage of our unique concealment, surge protection, and power and fiber management technologies.

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About Raycap

Raycap is a solutions provider and manufacturer of telecommunications infrastructure products for mobile and broadband networks with operations throughout Europe and North America. Raycap has a large installed base including connectivity and lightning protection solutions for telecommunications infrastructure and RF concealments. In June 2018, Raycap acquired STEALTH® Concealment Solutions, the pioneer in concealment solutions for RF antenna equipment, and in 2019 it acquired APELIO Integrated Industries, a manufacturer of custom enclosures and mounting solutions for the next generation of wireless networks. As a known and trusted vendor for Tier-1, Tier-2 & Tier-3 carriers, Raycap products can be found in a wide variety of telecom sites with more than 400,000 site installations across North America alone.

Raycap has the small cell experience, technology and the reputation for understanding customer needs and delivering the right products on-time for smooth product installation.

Talk to Raycap about integrated small cell poles and all 5G concealment options.

Contact us today at info@raycap.com

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