

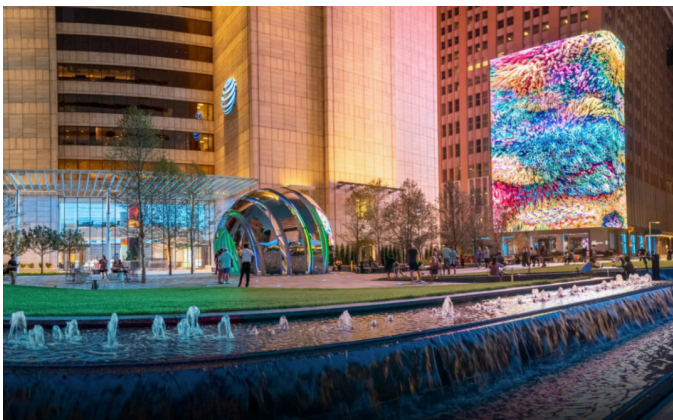
RAYCAP CASE STUDY

Keeping Innovation Connected with 5G in the AT&T Discovery District

To see the range of solutions for concealing small cell wireless sites, look no farther than Dallas, Texas. Working to provide technology solutions for AT&T in its corporate headquarters city, Raycap completed two very different small cell concealment projects that show how collaboration among stakeholders and experienced engineering can solve challenging wireless deployments: making 5G sites nearly invisible in the AT&T Discovery District and combining elegant design and engineering in small cell streetlight poles a few blocks away.

Celebration Of Innovation Relies On MmWave 5G

High-speed mmWave radios provide the ultimate in bandwidth for 5G services. When AT&T introduced plans for their Discovery District in downtown Dallas more than two years ago, mmWave 5G services for connectivity was to be a central feature, along with entertainment venues, dining and sustainability innovations such as smart irrigation and rainwater harvesting system, zero waste onsite recycling and composting.



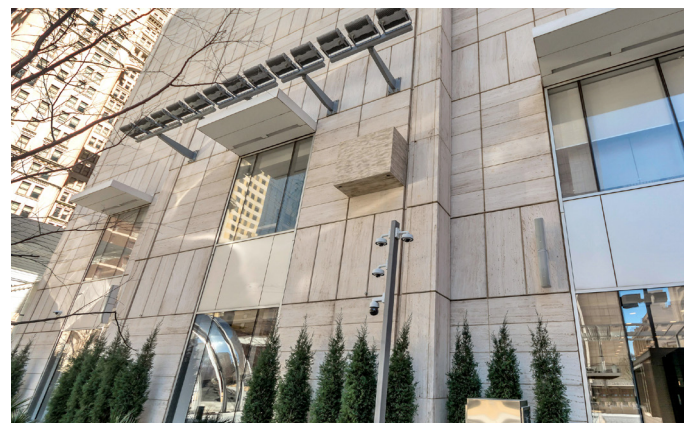
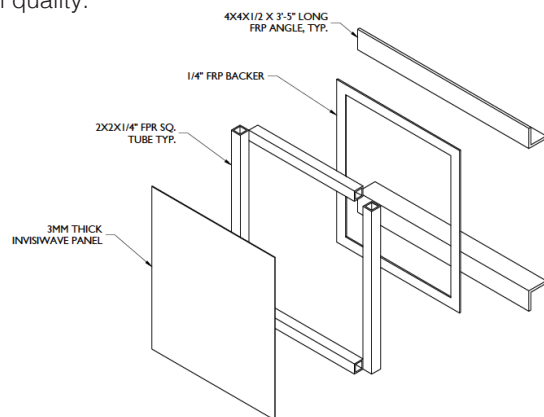
AT&T Discovery District in Dallas, TX. Photo credit: AT&T <https://discoverydistrict.att.com/about/>

The District has become a celebration of innovation in the heart of downtown Dallas, with AT&T inviting visitors to “Explore new ways to dine, new ways to play, and new ways to connect.” Being a top-tier carrier, AT&T wanted to get the 5G service right.

The limited signal range of mmWave 5G radios means that service needs to be maintained by a collection of small cell sites around the district. In dense urban areas, small cell sites need to satisfy a range of criteria from carriers (or tower companies), landowners, cities and utilities. Meeting performance objectives as well as a municipality’s aesthetic requirements can be difficult. In this case, AT&T also wanted the small cell sites to blend seamlessly with its own corporate headquarter architecture. Raycap was one of the vendors brought in to provide concealment solutions that ensure 5G mmWave performance while keeping radios out of sight of the public.

Concealment Structures Blend In To Building Walls

Raycap’s portion of the project required six custom-designed wall-mounted boxes to provide 5G coverage around the four-square-block District. Once the sites were identified, Raycap played a central role in collaborating with city and building engineers to get their 5G small cell site designs approved, using its patent-pending InvisiWave® concealment material. The InvisiWave material exhibits nearly zero dB loss for wireless signals ranging from sub 6 GHz frequencies all the way up to 100 GHz, including the ranges for AT&T’s mmWave radios. The wide frequency range makes InvisiWave sites backward compatible as well as future-proof with maximum signal quality.



Raycap’s InvisiWave material does not degrade 5G mmWave signals and can be painted to match any surface. Can you spot the 5G small cell site in this photo?

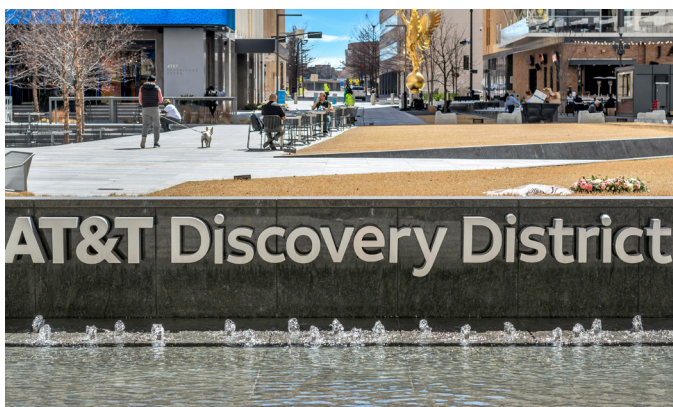
Working with AT&T, Raycap engaged the building manager to work through power and connectivity challenges for mounting on the sides of the building, as well as an approach to meet the look of its exterior. The building is sheathed in granite slabs, so Raycap had to accurately locate the crawl-space areas behind each small cell enclosure as well as the precise locations for holes for cabling: you don't want to have to cut granite more than once. In addition, the dimensions of the boxes needed to align with seams in the granite walls to help them appear part of the structure.

Raycap produced initial photosim renderings of the concealments for aesthetic review by the building owner and city engineer. With those approvals, Raycap produced preliminary engineering drawings for review by the carrier's engineers and the building management. Finally, Raycap led the final engineering stage to ensure the concealments met all the criteria for AT&T, EIA/TIA and the city of Dallas. The entire engineering process took about four months.

After manufacturing the product in its Charleston, S.C. facility, Raycap worked with a local contractor to oversee the installation of the box panels. To closely match the unique patterns in the building's granite surfaces, Raycap employed a local artist to hand paint them to match each specific location.



Working with the carrier, building owner and city of Dallas, Raycap designed and engineered concealed small cell sites such as this one (hint: it's across from the second-floor landing).



Plus, The City's First Customized Small Cell Poles

Near the District, Raycap also designed and manufactured small cell poles that further demonstrate its ability to customize installations to match precise aesthetic demands.



The poles had to match existing architectural cues in the area around the District, such as very specific fluting and decorative bands. One unique design challenge was an integrated Pegasus design, a distinctive symbol of Dallas since the days when the city was home to Mobile Oil Company. The poles also included two light arms (facing the street and sidewalk) as well as connections for stringing up banners. The surface of the poles was finished according to city color requirements.

In addition to the design features, Raycap accommodated a number of engineering requests. For example, the city required a lockable access panel in the base of the poles for installation of possible future equipment such as WiFi or video systems. AT&T also wanted the design to accommodate upgrades to 5G radios. At the same time, the local electrical utility wanted a power meter inside the pole, with the meter's face flush mounted. The power and fiber connections had to be accommodated from under the street in the base of the poles.

With design and engineering decisions made, Raycap did a thermal analysis of the pole designs to make sure the radios and electronics would not be affected by the Texas heat. The company then added a number of fans to the pole's design to ensure good thermal performance. The poles were fabricated at the Charleston, S.C. facility and delivered on time for installation by the contractor partner.

Meeting The Varying Needs For Concealed Small Cells

The “Pegasus poles” and the concealed sites on the AT&T Discovery District represent two very different sets of criteria, engineering and installation. In both cases, Raycap approached the challenges by understanding customer requirements, engineering solutions that meet a range of stakeholders, fast manufacturing and delivery, and expert support. Contact Raycap to talk about the unique needs of small cell deployments in your city.



About Raycap

Raycap is an international manufacturer and technology leader with decades of experience providing innovative infrastructure solutions for customers in the telecom, energy, defense, transportation, and other industrial markets. Its solutions protect mission-critical applications and ensure the best possible system availability. The company's product portfolio includes lightning and surge protection technologies, structured cabling and connectivity solutions, power management systems, custom enclosures, cabinets, and wireless network concealments. Since its founding in 1987, the company has experienced continuous growth. Its engineering expertise, test laboratories, and multiple manufacturing facilities guarantee quality, reliability, and innovation. Product design, testing, and approval processes comply with all international safety standards. Raycap operates in the United States, Germany, Greece, Cyprus, Slovenia, and Romania.

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