



Distributed Antenna Systems (DAS) 101

Federal Communications Commission
July 23-28, 2008

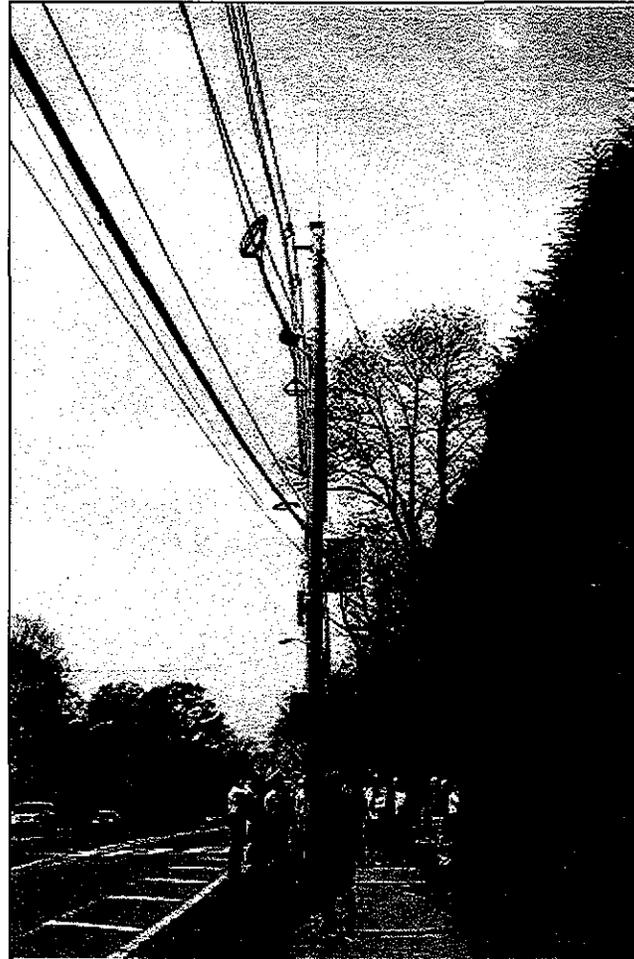
 **the DAS forum**
Distributed Antenna Systems 
www.thedasforum.org

Overview of the DAS Forum

- **Mission:**
 - The DAS Forum (a membership section of PCIA-The Wireless Infrastructure Association) is a broad-based non-profit organization, dedicated to the development of the distributed antenna system (DAS) component of the nation's wireless network.
- **About The DAS Forum:**
 - Founded in 2006, The DAS Forum is the only national network of leaders focused exclusively on shaping the future of DAS as a viable complement to traditional macro cell sites and a solution to the deployment of wireless services in challenging environments.
 - DAS Forum members own and manage all of the neutral host and many of the carrier-owned outdoor DAS installations in the U.S.
 - The DAS Forum's membership includes all of the major outdoor DAS infrastructure providers, as well as major carriers, equipment manufacturers, and professional services firms.

DAS 101

- What is DAS?
- History of DAS
- Benefits of DAS
- Applications of DAS
- Pole Attachment Issues
- Regulatory/Policy Issues

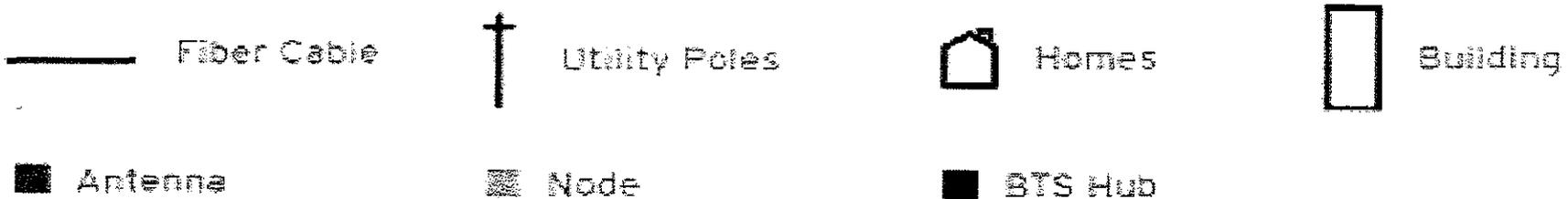


What is DAS?

A distributed antenna system (DAS) is a network of spatially-separated antenna nodes connected to a common source via a transport medium that provides wireless service within a geographic area or structure. DAS antenna elevations are generally at or below the clutter level of nearby trees and buildings.

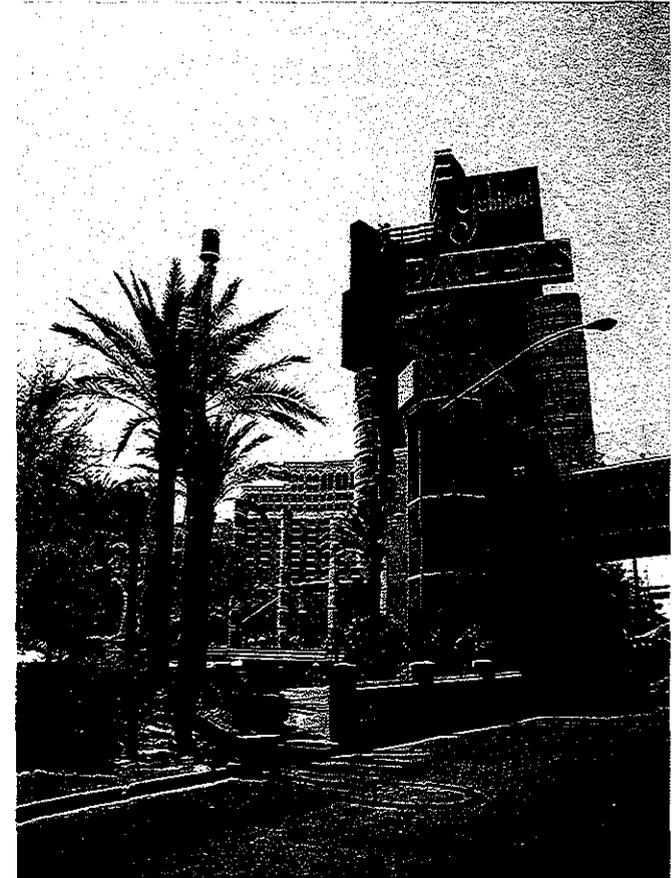


Legend



History of DAS

- Fiber was used to carry RF signals to discrete modules in the early Phased Array Radar systems designed in the 1970s.
- Saleh proposed a commercial antenna system in an IEEE paper in 1987.
- DAS networks were first commercially viable in the late 1980s with the advent of optical fiber installed as a transport medium.
- Allen Telecom and AT&T introduced a commercial analog fiber DAS network in 1989.
- ADC introduced an outdoor digital DAS network in 1993.
- Today, DAS networks are deployed across the country. The visual unobtrusiveness of these networks means that many networks are not noticeable to the casual observer.

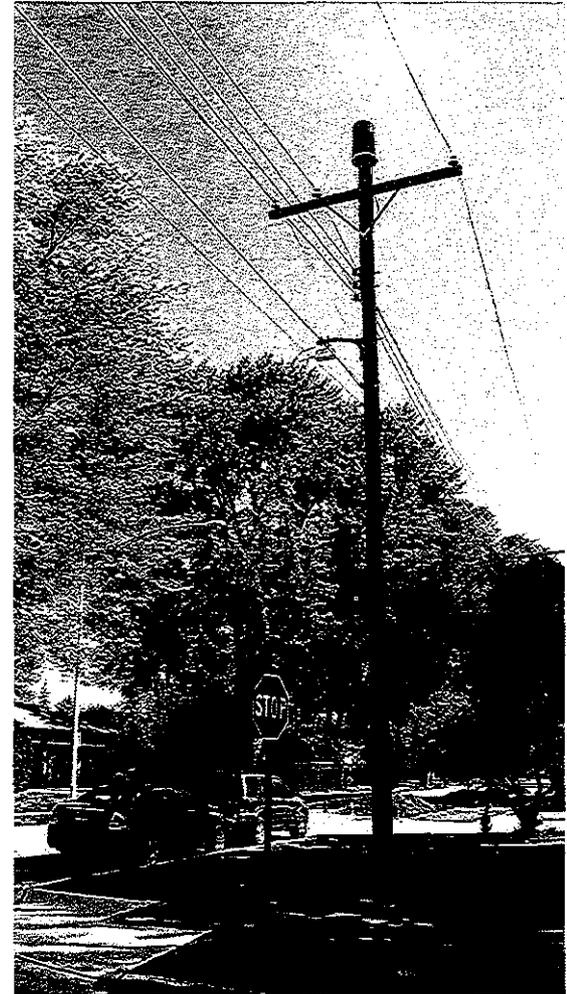


Benefits of DAS

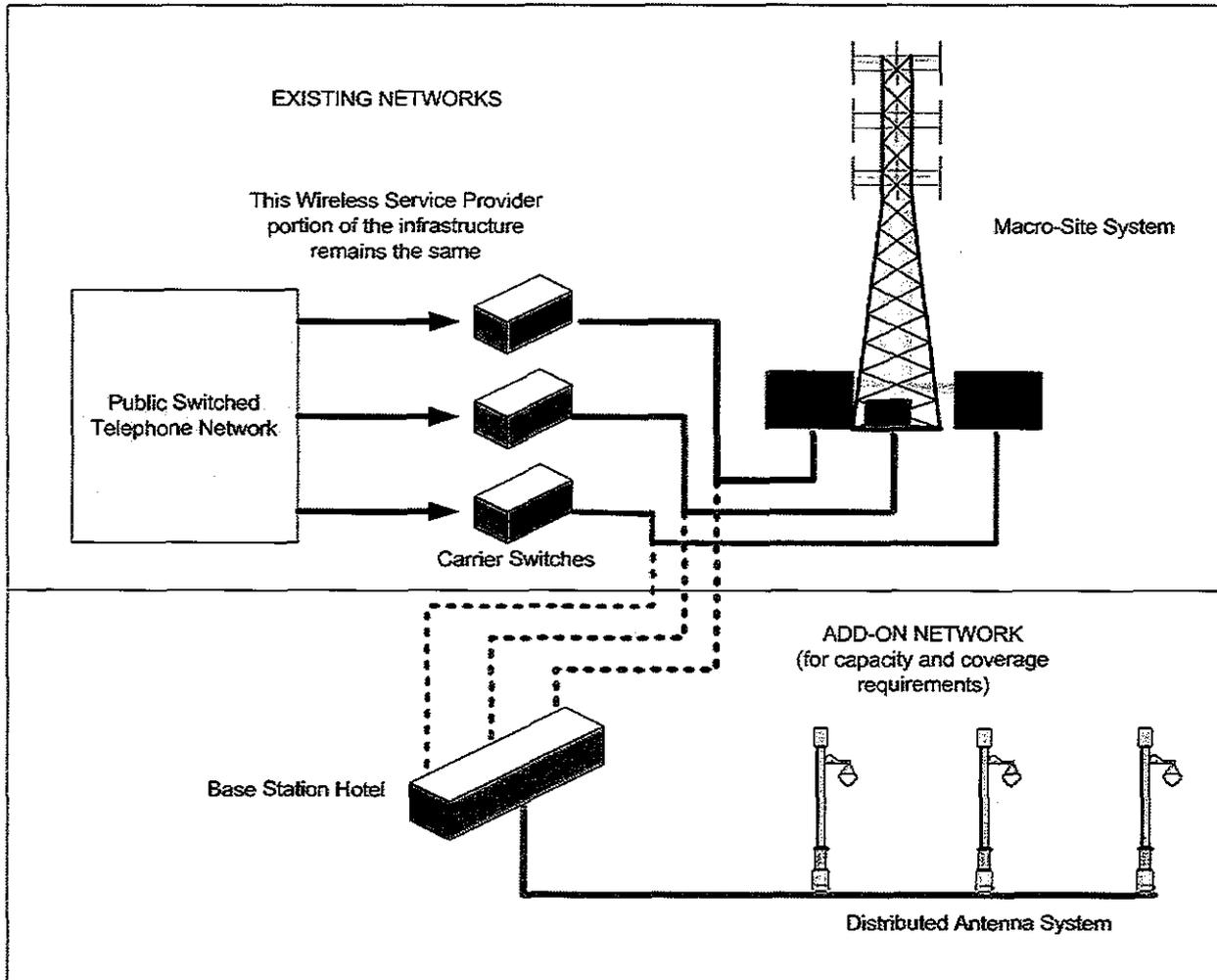
- **Coverage:** DAS architecture provides coverage in areas that cannot be effectively addressed with traditional sites.
- **Capacity:** DAS can closely align capacity to actual market requirements, managing available radio resources.
- **Spectrum:** DAS uses available frequency spectrum efficiently through multiple low-power transmission points.
- **Interference:** DAS reduces interference through low radiation centers and lower output power.
- **Data:** DAS provides better data throughput given signal strength and proximity of transmission points to user equipment.
- **Scalability:** DAS is a scalable network that can meet future capacity requirements, or additional carriers, by adding additional nodes.
- **Adaptability:** DAS can respond to market dynamics, equipment architecture changes and new technologies.

Radio-Frequency and Equipment Components of DAS

- DAS distributes radio-frequency signals from a central location to remote antennas. This allows the antennas to be very simple, as they only require conversion devices and amplifiers.
- A simple, remote antenna only requires a small equipment box (for easier and more flexible installation).
- Centralization means equipment sharing, dynamic resource allocation and more effective management.



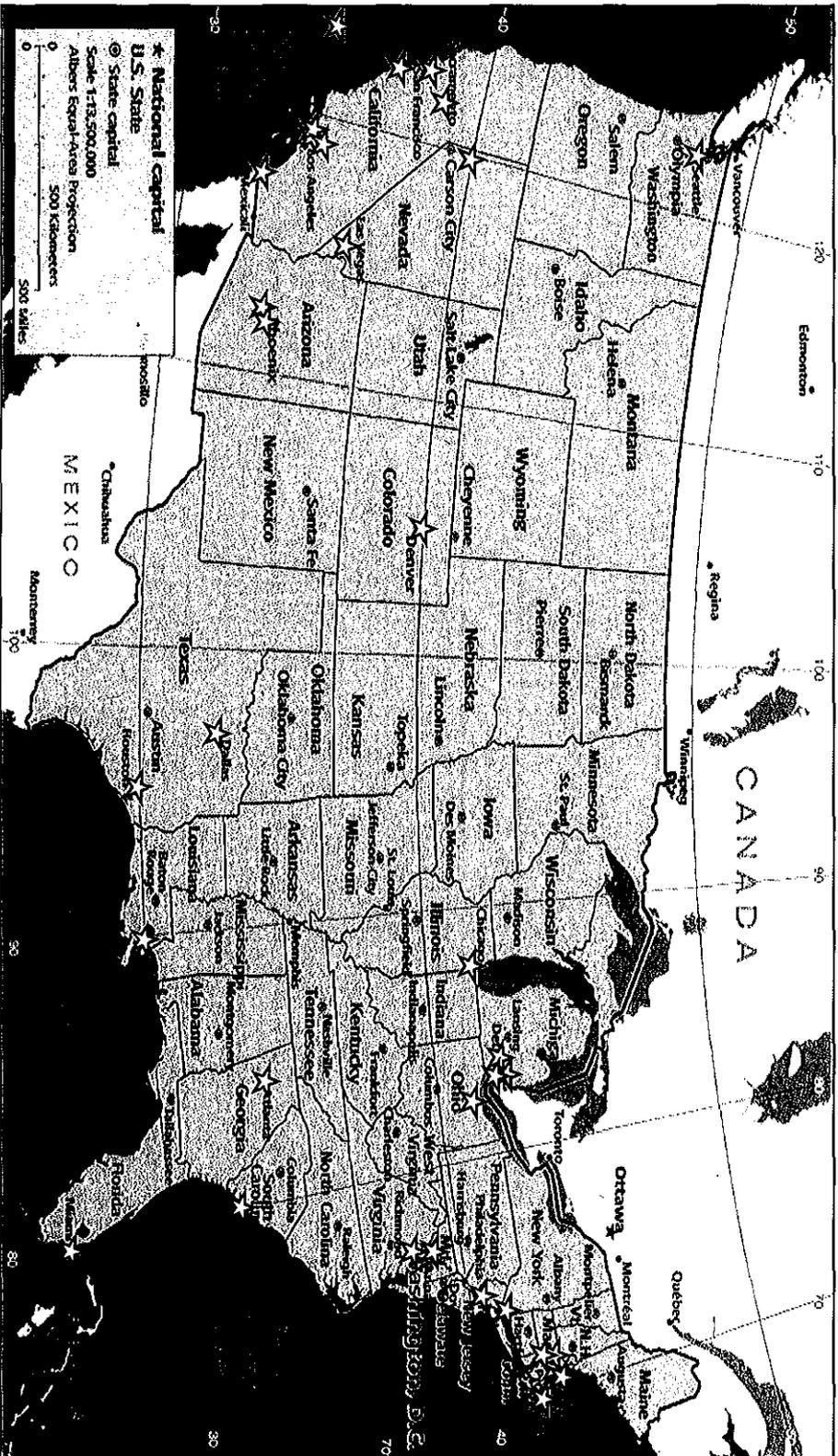
Comparing DAS to "Macro" Sites



200-foot tower with multiple equipment sheds (one per carrier)

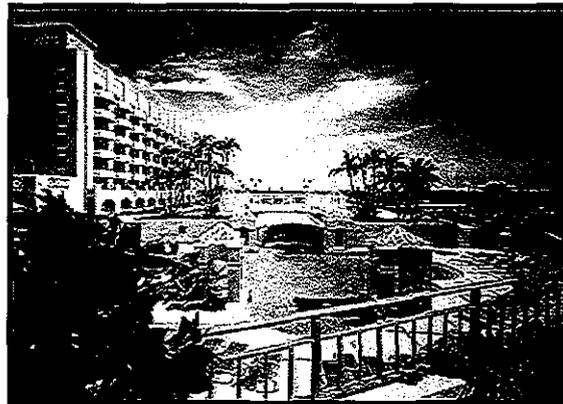
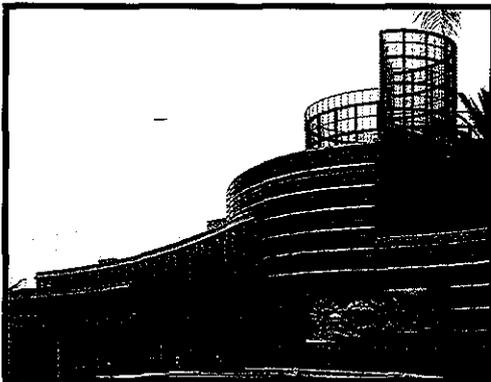
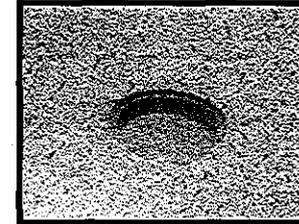
40-foot light poles (existing) with one "hotel" housing multiple carriers' equipment

DAS Networks Nation-Wide



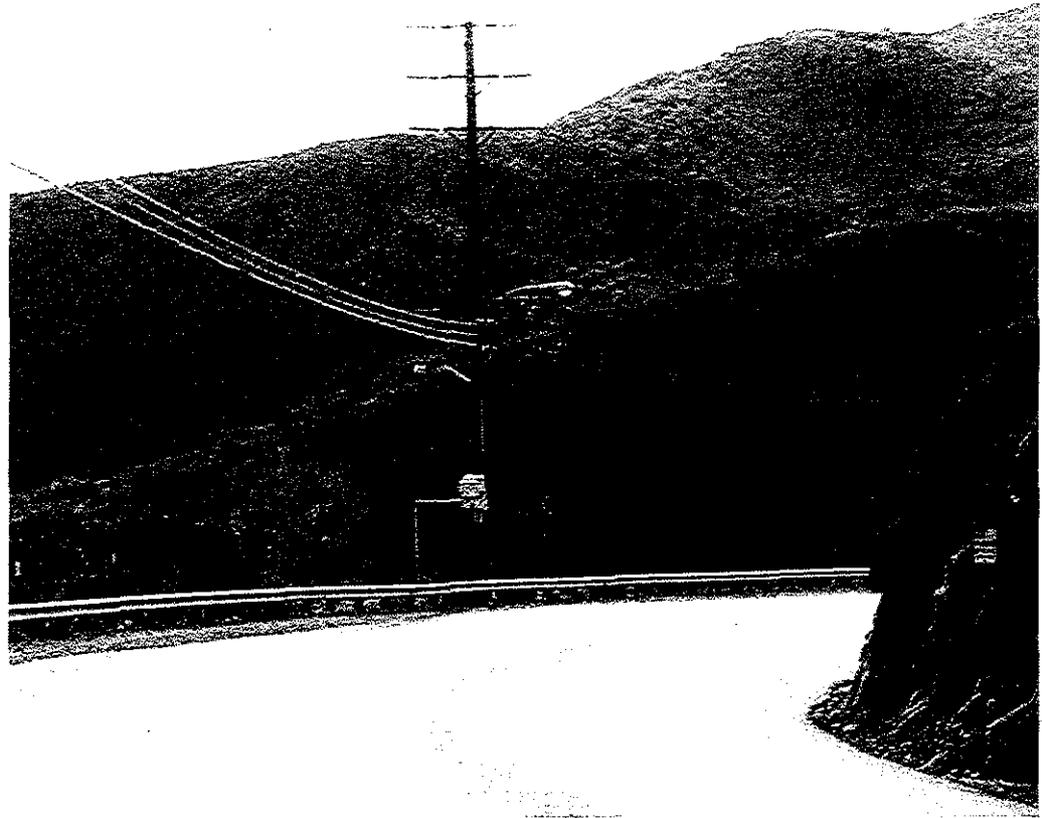
DAS Applications: In-Building Systems

- DAS is ideal for large buildings (e.g., malls, convention centers)
- DAS enables easier installation through small nodes in roof/ceiling



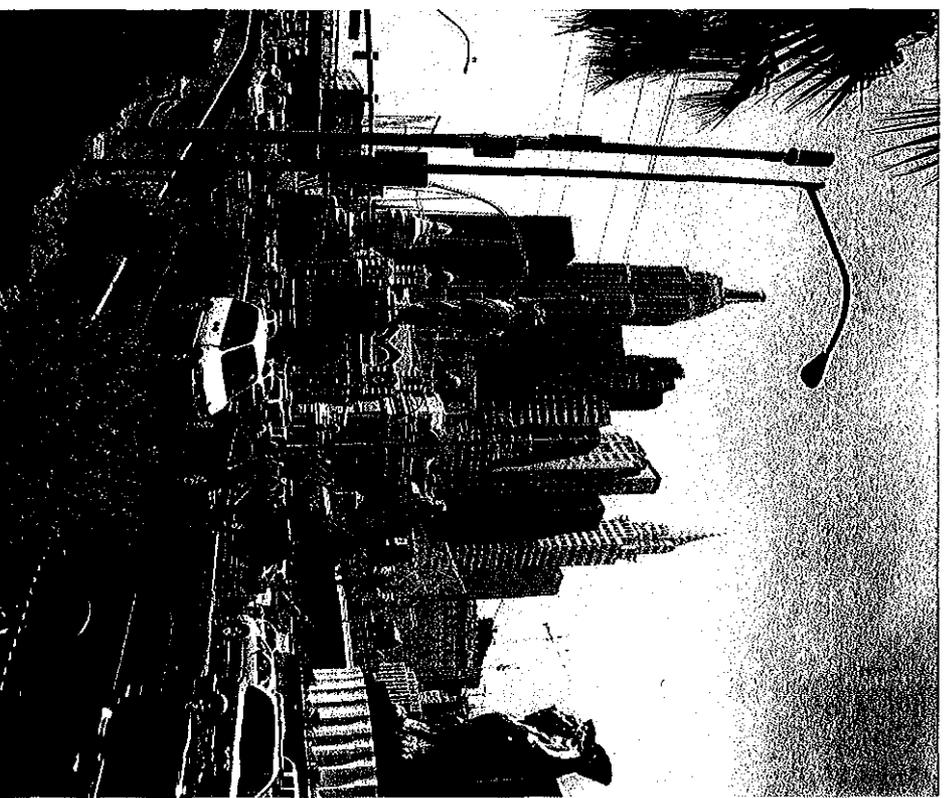
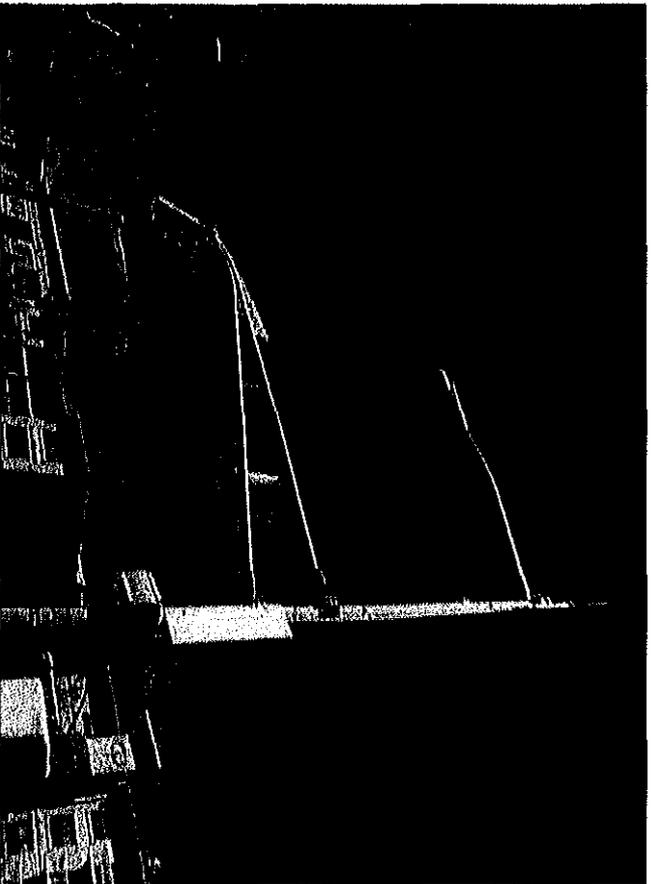
DAS Applications: Canyon Coverage

- Pole attachment on Pacific Coast Highway, north of Los Angeles
- Dual-directional antennas above communications space



DAS Applications: Dense Urban Area

- Network deployed on various platforms
- Dense construction in surrounding areas



DAS Applications: Stadium coverage

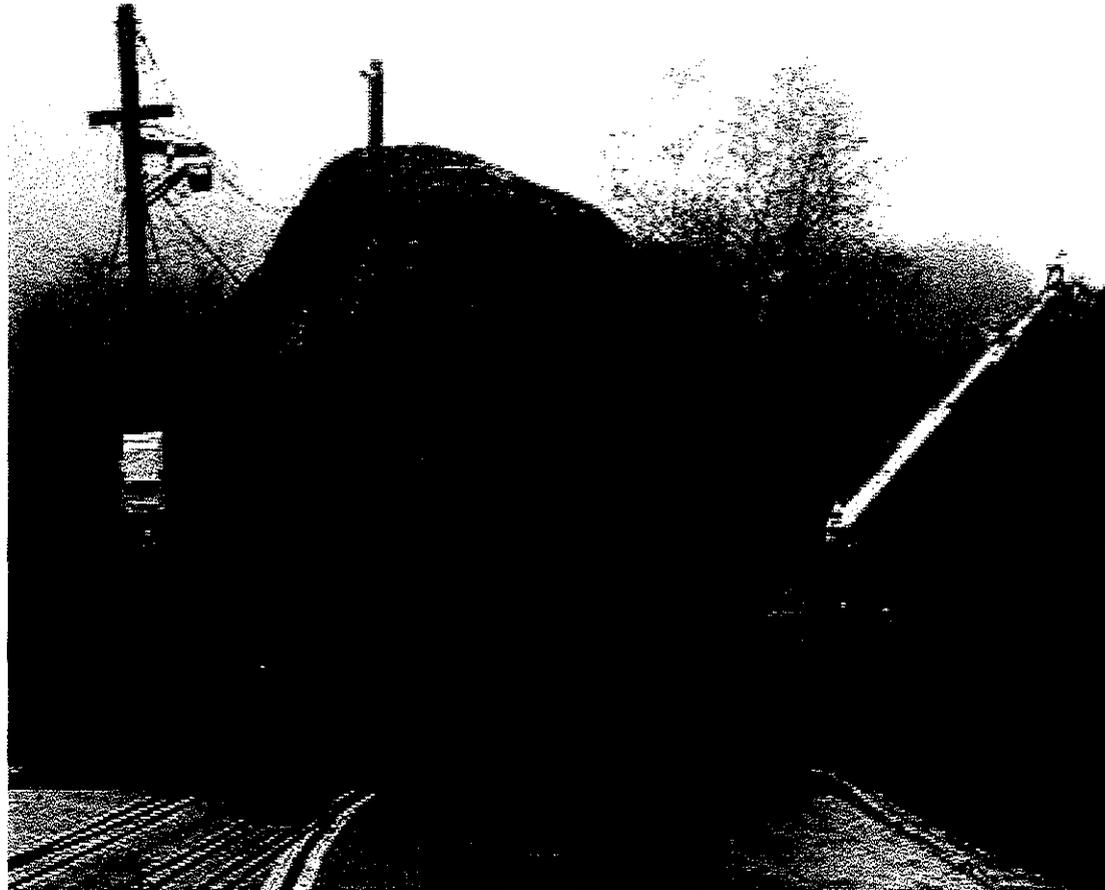
- Comerica Park (Detroit Tigers stadium)
- DAS antennas placed in stadium lights
- Antenna placement reaches wireless users in stadium



DAS is Tough!!

- This DAS network remained operational after a rainstorm and mudslide in Malibu, CA.

- DAS pole attachments meet National Electric Safety Code standards.



Contractual & Regulatory Challenges for DAS Deployment

- Pole attachment agreements (access and rates)
- Pole attachment regulations (FCC and certified states)
- Franchising and certification
- Local zoning and entitlements



Pole Attachment Issues

The FCC's current rules encouraging good-faith negotiation are thwarted by some pole owners that refuse access to poles, or that charge unreasonable attachment rates.

Access

- Some electric utilities refuse to allow DAS attachments on utility poles.
- Some pole owners demand unreasonable terms & conditions in pole attachment agreements (e.g., too-short terms, restrictive make-ready provisions).

Rates

- Some utility companies require the acceptance of pole attachment rates on a "take it or leave it" basis.
- Wireless attachers often demand unlawful "market rates" of up to *two to one hundred-twenty times greater than the regulated telecommunications rate*.

Pole Attachment Solutions

The FCC can effectuate its policy goals of enabling robust wireless deployment through providing for pole attachment reforms, including the following:

- Cost-based rate structure;
- Confirmation of right of wireless attachers to place equipment in right-of-way and antennas at pole top according to reasonable terms and conditions; and
- Clarification of safety standards and make-ready timelines.

Pole Attachments (Certified States)

PCIA and The DAS Forum urge more equitable pole access at all levels of government. Recent examples include the following:

- **CA PUC** Rule-Making on pole-top antenna safety/separation issues
- **CT DPUC** docket opening on access, make-ready and rates (proposed)
- Outreach to **VT DPS** re: engineering issues, role of pole attachments in statewide wireless/broadband initiative
- Legislative testimony supporting continuation of **WA** policy encouraging pole access for wireless attaches.

State Certification Issues

- In *National Cable & Telephone Ass'n v. Gulf Power* (534 U.S. 327, 340-41(2002)), the Court determined that attachments by wireless carriers fall within the definition of “telecommunications services.”
- Further, the federal pole attachment statute defines a “pole attachment” to include “any attachment...by a provider of telecommunications service.” 47 U.S.C. 224(a)(4)
- Clarification of wireless carriers’ status as valid pole attachers provides for non-discriminatory policy and will enhance wireless competition .
- CMRS providers attaching to poles should not be required to obtain a Certificate of Public Convenience and Necessity (CPCN).

Zoning/Franchising Issues

- Most local zoning ordinances do not address DAS networks, so the application of local regulation to DAS is often unclear.
- Some DAS providers obtain local entitlements or franchises through the right-of-way process.
- Others submit applications as collocations on existing structures.
- While jurisdictions tend to look at DAS favorably because of its low-profile visual design and use of existing “vertical real estate,” many of the wireless siting challenges faced when building “macro” sites are still present when deploying DAS.
- For this reason, FCC standardization of local zoning standards would effectuate development of this technology.

The Outlook for DAS is Influenced by FCC Policy

DAS is a viable alternative to traditional wireless sites. It provides an excellent platform for the wireless services consumers demand.

- The FCC can promote the deployment of DAS and other wireless infrastructure through policies that remove unreasonable barriers to market entry.
- Clarification of pole attachment access and rates would provide certainty to DAS providers in a crucial and complicated stage of the deployment process.
- DAS plays a role in the FCC's overall policy goals of encouraging deployment of next-generation wireless communications to our nation.

Contact

Jackie McCarthy

Director, Government Affairs, PCIA and The DAS Forum

(703) 535-7407

Jacqueline.McCarthy@pcia.com

Mike Saperstein

Public Policy Analyst, PCIA and The DAS Forum

(703) 535-7401

Michael.Saperstein@pcia.com