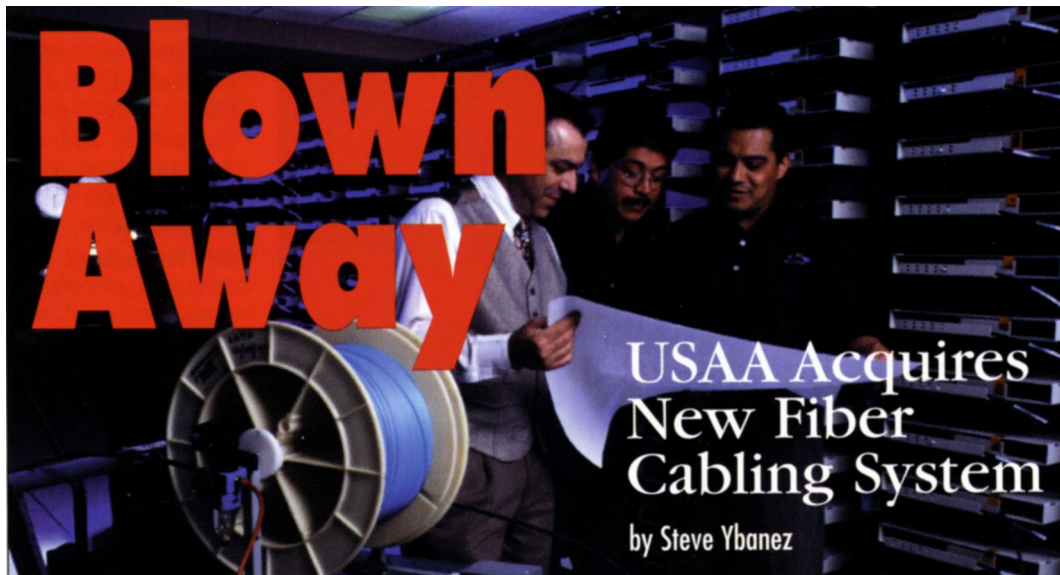


CABLING

Business

MAGAZINE



FIBER OPTICS

It is no small task to design a flexible cable infrastructure with the uncertainty of what your company's future requirements will be. The FutureFlex Air Blown Fiber system, recently acquired by USAA, provided the company with just such a cost-effective and large-scale fiber network. With an average of 250 workstation moves per week throughout some five million square feet of office space, USAA executives looked for the most flexible cable system available. A total of 4838 miles of cable would be used, with the longest run totaling 6,500 feet. The obvious choice was fiber optics and the best choice was an air blown fiber system.

USAA, an insurance and financial services association based in San Antonio, Texas and ranked 207th on the Fortune 500 list, is the nation's sixth largest auto and sixth largest homeowner insurer.

In 1997, Fortune magazine named USAA one of "America's Most Admired Companies." USAA's headquarters sits on 283 acres and includes eight buildings, 12,400 employees and 34,000 workstations. USAA's headquarters is second only to the Pentagon in contiguous office space.

Putting together a cabling system for this large an installation required a solid plan and careful execution. At the onset, conventional fiber was considered for the backbone between buildings and closets: however, to remove or replace conventional fiber means pulling it out, tossing it away, or installing new cable. Because of the mobility of the employees and the flexibility of moving, adding or changing an air blown fiber system the networking group at USAA selected Sumitomo Electric Lightwave (SEL) FutureFlex, air-blown

fiber optic products from AIDCO Inc., a leader in the design and installation of this system.

Conventional Fiber Optic Cable vs. Air Blown Fiber

The primary differences between air blown fiber and conventional fiber optic cabling are found in the unique packaging and cable routing mechanisms incorporated into the system.

In most cases, installing conventional fiber for the future means installing fiber optic cables with high strand counts. "Once conventional fiber is in, it's in," said Pat Gorrell, special project manager for AIDCO, a Chino, California-based installation company that supplied the blown fiber manufactured by Sumitomo. "That's why many people put in more strands of conventional fiber than they need. If you find that you need more, you cannot add to it later."

You would have to install an entirely new cable, and this can get expensive. With air blown fiber, the tube cable infrastructure is 100 percent

range from two to 18 strands per bundle. The reduction in size is due to the fact that materials that are added into conventional fibers to improve strength characteristics

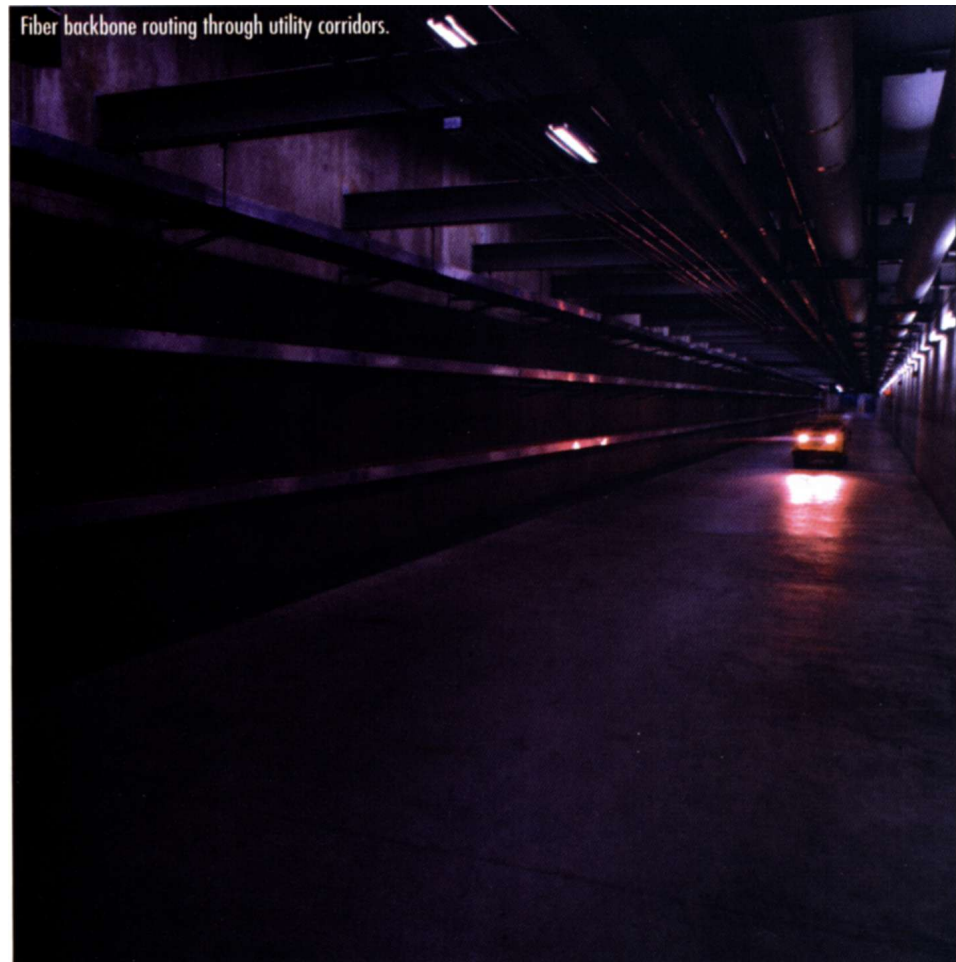
are not necessary with air blown fiber.

Fiber bundles contain few of the bulky strengthening materials because they are not needed. Air blown fiber has a unique method of blown in' installation which totally eliminates all pulling exertion force. Conventional fiber optic cables are pulled in and can be easily damaged during a rigorous installation process. With the air blown fiber, the fiber bundles are blown through the inner tubes, which eliminates all pulling exertion force. The entire process is stress free and, therefore, damage to the fiber bundle during installation is eliminated.

A Grand Scale Installation

Installation of air-blown fiber at USAA required installing backbones between the buildings and telecommunications closets, including some fiber to desks for multimedia and security applications. This arrangement would support USAA's new Switched Ethernet LAN (local area network) protocol. At USAA, this meant that the cabling system had to support 12,000 PCs, 700 servers and about 2,000 printers-as well as support the 250 workstation moves that occur on a weekly, basis.

"Bringing all the pieces together on such a grand scale-from thousands of miles of air blown fiber from AIDCO to tens of thousands of Methode connectors-made this installation one of the largest in networking history"



reusable with no waste. Once the tubes are in place and the fiber is blown through, it can easily be blown out and put back on the reel and re-used," he explains, initially, the cost of blown fiber is less expensive than conventional fiber optic cabling. Savings increased even more as adds, moves and changes occurred in the network."

Conventional fiber is installed either on trays or in conduits as backbone cabling, but air blown fiber is more compact since it is placed in tubes containing up to 19 cells. Each cell carries a capacity of up to 18 fiber bundles. The tube with the largest diameter and a capacity, for 19 internal cells, is approximately two inches in diameter. In contrast, a single inner-duct ranges from one to two inches.

The fiber optic cabling used with the FutureFlcx system comes in fiber bundles, which is more compact than conventional fiber optic cable. A typical conventional fiber optic cable is approximately a half to one inch in diameter. A fiber bundle is one-twentieth the size of a conventional fiber optic cable and can



says Tim Stuart, RCDD of Datacom Sales & Associates, Austin, Texas, the manufacturers representative for many of the products used in the installation.

Cisco Systems is providing the network infrastructure for this new Switched Ethernet LAN environment at USAA. "The new network, based on a client-server environment, will give USAA faster access to information, enabling the company to expand its offerings in the areas of insurance and financial services, such as banking, investment, and real estate, says Billy Shoemaker, an account manager for Cisco. The infrastructure consists of approximately 1,000 Catalyst LAN switches, 110 LightStream ATM (asynchronous transfer mode) switches and 65 Cisco 7500 routers. The Catalyst switches provide high-speed switching services to the desktop, the LightStream ATM switches provide the ATM switching backbone fabric, and the routers furnish the routing services and Channel Interface Processor cards that off-load networking functions from the central mainframes. "The advantages provided by such an environment are quicker access to needed data and increased growth scalability for bandwidth-intensive applications, adds Shoemaker.

The entire installation took one and a half years in three phases. During all three phases, the raised floor telecommunica-

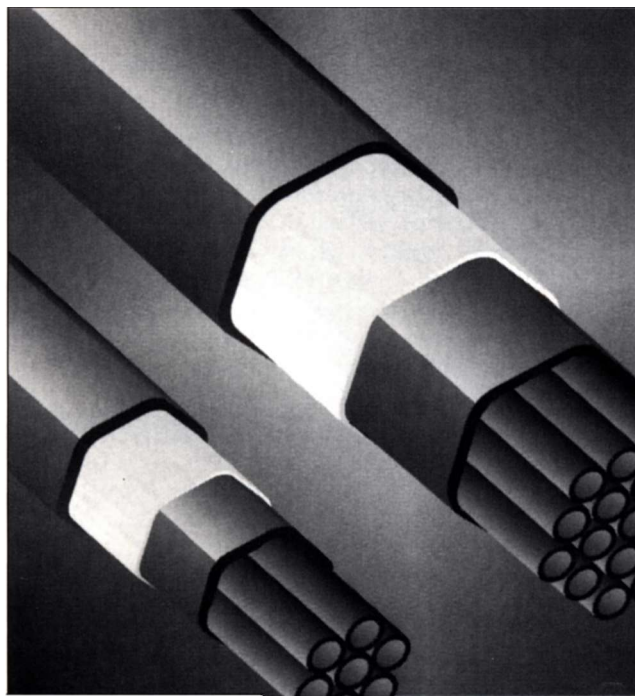
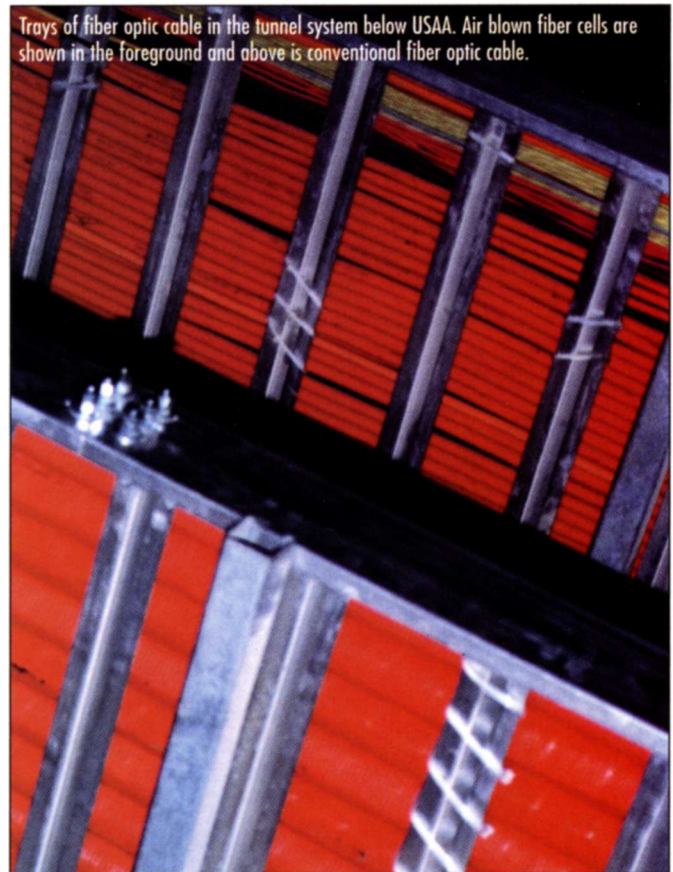
have telecommunications outlets every four feet along their length. Workstations were connected on each beam via Category 5 cable to a 24-port patch panel in the data cabinet. One Ethernet switch was dedicated to each beam.

After installing three buildings this way, the plan was reviewed and it was decided to centralize the cabinets into bay areas that would contain (or house) up to 80 workstations per bay.

There are five bays per floor and 35 beams per floor plate. Each bay area contains a bay data cabinet that includes fiber distribution panels for the backbone and Category 5 patch panels for horizontal distribution. With this new layout, USAA dramatically reduced the number of distribution switches, reducing installation time and labor that will result

McDermott Building was 6,500 feet. For that segment, we used single-mode that included 42 blows.

The first step was installing the tube cable, which is similar to an elaborate



tion rooms were built.

The original design included fiber from the telecommunications closets to data cabinets at each furniture beam, which

in saving the association millions of dollars.

USAA's Air Blown Install

"Since USAA can't predict many of its moves ahead of time, blown fiber was the perfect fit. Given this scenario, we needed the flexibility to move around the fiber (or bandwidth on demand. Blown her can do this,"

as Joe Fleming, RCDD and IAN specialist in network cabling and infrastructure at USAA.

The first phase was the placement of the FutureFlex Air Blown Fiber system, which took six months.

Most of the backbone runs were 1,200-1,500 feet of multimode fiber but one run that tied the Bank Services Building to the

plumbing system. The tubing installed underneath the complex consisted of 19 cell tube cable, each carrying bundles of six strands of multimode, 18 strands of multimode or six strands of single-mode. Cell feet totaled 2,100,000 and strand feet totaled 25,550,000-nearly 5,000 miles.

More than 20,000 feet of 19-cell tubing was installed between buildings through manholes. Most of this tied the bank services building to the home office. Some

84,000 feet of 19-cell riser cable connected equipment rooms. For unique applications in the corporate area, 1,000 feet of seven-cell cable was installed. The two-cell riser cable, which consisted of 45,000 feet, connected the telecommunication closets with the bay data cabinets. The 217,000 feet of single-cell plenum rated cable was used in equipment rooms for ties between data cabinets. Once the intricate tubing system was in place, the 18-strand fiber bundles were blown through the cells with pressurized nitrogen at 150-250 pounds per square inch (psi), depending on the length of the run. The average pressure was 175 psi for average runs of 1,200-1,500 feet.

The exception was the run of 6,500 feet between the Bank Services Building and the Central Office, which accounted for a maximum 250 psi.

This unique method of blown-in installation totally eliminates all pulling force on the cable. The lightweight jacket that is sheathed around the bundle has a low coefficient of friction and a porous surface. The surface pores catch the nitrogen to sail down the tubes. This process becomes stress-free and cannot result in damage to the bundle during installation, unlike conventional cables that can easily be destroyed during the installation process.

In this configuration, the fibers were ended with a spider breakout kit and used 56,000 Methode SC connectors on patch panels or fiber distribution switches. The connectivity was accomplished with 1,700 corresponding patch panels and 14,000 duplex SC patch cords from Methode Electronics.

Fiber for the Future or No End in Sight

So far only two departments at IJSAA have required their own dedicated backbone for video applications: security and media resources. Backbones run the

length of the building, which allows them to just plug-and-play from any fiber port. Previously, media resources had to haul all their cameras and equipment with them. Now all they need is tape equipment and a fiber connection. Videos will soon be able to be accessed from any conference room or any other fiber access point.

The success of USAA's cabling infrastructure at its home office has led to a FutureFlex ABF system upgrade at our regional offices in Sacramento, Calif.; Colorado Springs, Colo.; Norfolk, Va.; and Tampa, Fla.; and our office serving the identical infrastructure at each regional location allows compatibility with the home office's networking system. All existing Token Ring backbones eventually will change over to 100 MB Ethernet to the desk over an ATM backbone.

We designed USAA's cabling infrastructure with flexibility for the next millennium. "FutureFlex is the only true futureproof fiber optic cabling system because of its flexibility and reusability" says Pat Gorrell, AIDCO's special project manager. FutureFlex cables can easily be removed and replaced, re-used after replacement, or re-routed to any new destination.

This provides a realistic futureproofing capability as an inherent feature and benefit of the system."

To date, this has been found true at IJSAA. The entire installation has been completed and the tube cabling and air blown fiber-based backbone has been operational for a year. USAA has already used all the cells and has added more tubes as the demand continues. With everyone getting on the new network, everyone is switching from copper to fiber, which increases the magnitude of the installation.

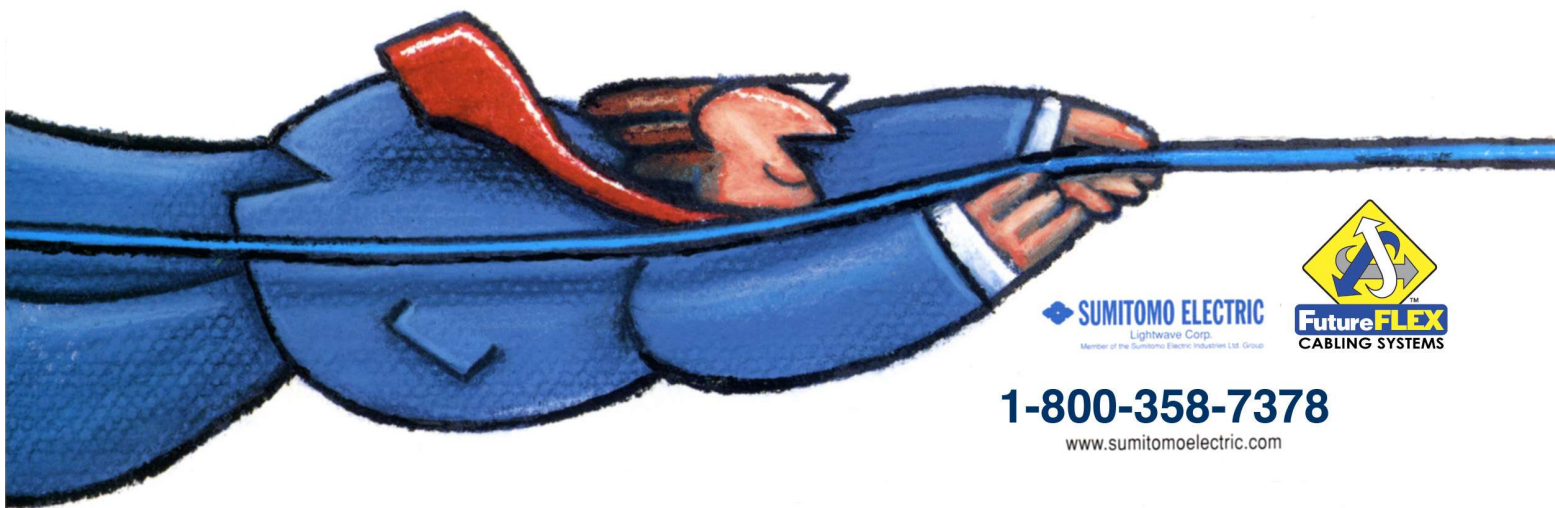
"The next step after this will be providing total fiber to the desk capability," says Gorrell. With USAA's own internal web site and with the onslaught of full motion video and video phones in the future, plans for 1,100 T-1 lines and full fiber to the desk capabilities are now being planned. "USAA becomes a successful role model for an ABF (air blown fiber) system in proving its versatility, reliability and cost-effectiveness for one of the largest organizations in the country adds Gorrell. "And, we've just scratched the surface of the myriad of applications that fiber allows."

Steve Ybanez is network cable analyst for USAA in San Antonio, Texas.

FTTD is the future. FutureFlex To The Desk can get you there faster Fiber-optic bandwidth to the workplace that can change as fast as your requirements.

To stay competitive, you have to deliver bandwidth when and where it's needed. Fast. And that's where Sumitomo's new FutureFlex TTD system comes in.

The FutureFlex ITD system utilizes Air Blown Fiber technology and is "blown" into place through a tube cable network, which saves installation costs. When you have moves, adds or changes in your network, simply "blow out" the old fiber and "blow in" the new. Disruption to the workplace is minimal. You save time and money. Call us today. We can deliver the future... faster.



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Blown fiber technology developed by British Telecommunications PLC and manufactured by Sumitomo Electric.