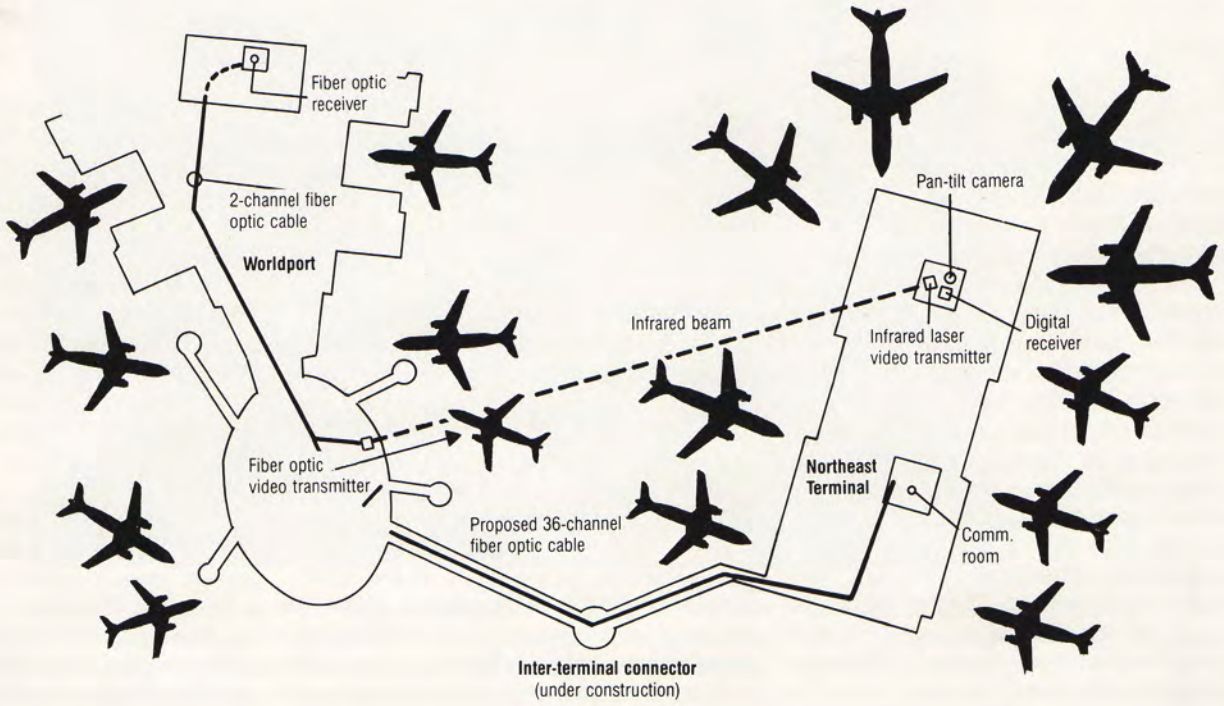
Pan Am controls passenger flow with video network



As on-time departure records become a competitive factor in the airline industry, Pan American World Airways is improving supervision of gate traffic. But the expansion of John F. Kennedy Airport in New York means extending the airline's traffic supervision to an adjacent building owned by Northwest Airlines. To get the expanded system up in time for the peak summer season, Pan Am is going to carry video traffic between the two buildings.

The project began taking shape last year, when Pan Am began plans to take over the Northwest Airlines terminal building. An elevated walkway, to be completed by the spring of 1989, will connect the two buildings. Pan Am controls the taxiing traffic at JFK for Eastern, Delta and Northwest airlines, all with 11 cameras mounted on the Pan Am Worldport.

Placing a premium on signal clarity, Pan Am's manager for communications, Peter Stolle, plans to run a 36-fiber cable through a 4-inch conduit from the control room in the Worldport to the Northwest building. The fiber will connect 10 fixed cameras—one aimed at the nose of each plane, plus one pan-and-tilt camera. Stolle planned to use two fibers for each fixed camera, four for the pan-and-tilt, and some of the remaining fibers to carry images for flight information (arrivals, departures, gate, time) displays.

When the inter-terminal is completed Stolle plans to run a 100-pair copper cable alongside the fiber cable to support voice traffic. The copper is much cheaper than using fiber, which would require a remote node in the Northwest building linked to Pan Am's Rome CBX in the Worldport. Instead, the copper will extend all the way from the Worldport building to the phones in the Northwest building. Until the 100-paired cable is installed, Stolle is leasing 40 copper-based lines from New York Telephone for the voice traffic.

Time means money

There is a kind of game among the various departments of an airline, Stolle says. The object is to finish with the gate as soon as possible so your department won't be charged for the extra time. With a camera aimed at the nose of each plane, there's no doubt who is tying things up; if the jetway canopy is still on the plane, the flight isn't ready to leave the gate.

There's also a scramble to have everything ready

Pan Am video net controls gate flow

Pan American World Airways plans to run a 36-fiber cable from the control room in its Worldport at Kennedy Airport to the adjacent Northwest Airlines building. The fiber will convey information from 11 cameras.

when the summer schedule takes effect, and Stolle's department has to play that game too. Because Pan Am wanted to run its 1988 summer schedule out of the Northwest building and the conduit for the planned 36-fiber cable would run along the underside of the elevated walkway, which would not be completed until next year, Stolle needed to find an interim solution. "Our ramp control and service control department, which is responsible for steering the planes off the runways and into the gates, needed a view of the far side of the Northwest building," Stolle says. "So the best way to go was with a 10-to-1 pan, zoom and tilt camera." But he still needed to get the video signal back to the control room in Pan Am's Worldport.

"The original plan was to run a temporary fiber cable from one patch panel to another, do all of the work on both ends now, and when they were able to pull the permanent cable they could just connect it to the patch panels," according to Roy H. Barth of Barth-Gross Electric Co., Pan Am's installation contractor.

A temporary cable would do the job, but it faced the same obstacle as the 36-fiber cable; it would have to run through the path of the walkway construction. Stolle considered a leased phone link, but Henry Brothers, Pan Am's communications systems contractor, advised against it due to the quality of the line and the complexity of treating the signal. A microwave link to carry both the video and voice traffic between the two buildings was discussed, but the cost of demultiplexing was prohibitive, Stolle says. It would also have involved long delays for licensing, and so probably wouldn't be up in time for the summer schedule.

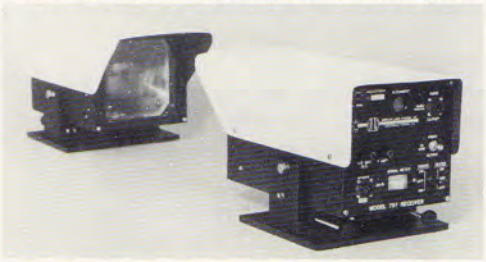
By this spring Stolle had settled on a free-space laser link recommended by Paramus, New Jersey-based Henry Brothers. installation contractor Barth-Gross started laying conduit for the Northwest portion of the link in April, and the link was up in early May. "The pan-and-tilt camera now gives us the capability so we won't push an aircraft back off of one of our gates into the path of an aircraft that may be taxiing from the other side [of the terminal]," Stolle says.

The temporary link consists of an American Laser Systems Model 761 Optical TV Transmission System which spans 800 feet of free space between the two buildings with an infrared laser and receiver, and a 900-foot run of Optical Cable Corp. two-fiber, tight-buffered cable from the laser receiver to the control room in the Worldport. Barth-Gross did all of the equipment installation plus fiber pulling, termination, and testing. Math Associates, in Westbury, N.Y., provided the fiber optic transmission equipment that employs one of the fibers for two-way communication.

The signal is transmitted by a low-power, light-emitting diode where optical output of 20 to 30 milliwatts is spread over a 6-inch-square lens. The total output is comparable to that of a pulsed laser used in fiber optic transmission, according to Charles Lytle, chief engineer at Americna Laser Systems, but because it is incoherent the transmitter poses no hazards. Looking straight into the transmitter lens for up to two minutes would not cause any injury, he said.

Free-space laser systems are nothing new, according to project manager John Nashmy of Henry Brothers. Motorola, he says, has been offering pulsed infrared systems for about 10 years, and Nashmy's company has a good deal of experience with the American Laser system. "The beauty of it is that it's a nonlicensed device, but its disadvantage [compared to microwave] is its distance [limitation]," Nashmy says. In addition to the model used for video transmission, he says other models are available for T-1 links. But T-1 applications generally call for distances greater than the 3,000-foot limit of free-space lasers.

American Laser says its TV transmission system can operate at distances up to a mile in moderate weather. Where visibility falls to half



Laser system *used in the Pan Am project has all of the alignment features built in.*

a mile, a 54-decibel signal-to-noise ratio can be expected at 2,500 feet. The system works with an amplitude-modulated 880-nanometer gallium arsenide light-emitting diode and a silicon avalanche photodetector.

American Laser touts the security advantages of its free-space laser systems over microwave transmission. Because nearly all of the beam's energy is deposited within a 6-foot diameter circle 2,000 feet from the transmitter, someone would have to be within that line of sight in order to monitor the signal, and so would probably be detected.

Minuses of microwave

Henry Brothers has been using the American Laser system for about six years, Nashmy says. Henry Brother's applications include an 1,800-foot span at a Pan Am facility in Miami, a Consolidated Edison link that spans the East River in New York City, and an American Cyanamid system in Pearl River, N.Y. "In applications where microwave is either too expensive or has too many licensing headaches and the distance is not too great, this product comes into the game," Nashmy says. Since it's weatherroof, there are no environmental constraints on the system, except that it isn't available for explosion-proof applications. The free-space laser costs around $8,000 for the TV transmission model, much less than a comparable 23-gigahertz microwave system which runs about $11,000 to $12,000.

Installation of a free-space laser system is relatively simple, Nashmy says. It has spotting scopes built in, so alignment usually takes less than 10 minutes. The laser beam is several feet wide, and the alignment can be done visually, although an amp-meter can confirm the point of maximum signal strength. "We've used them already as temporary hookups where a backhoe has dug up a cable between two buildings and severed a bunch of lines," Nashmy says. "We've put them on tripods to get them back on line just until they get their conduit restored."

Stolle is more than satisfied with the laser link, which he says has functioned flawlessly in all kinds of weather. He plans to buy the link, which he is now leasing, since he has found another application for the link—sending video signals from a maintenance hanger—when the fiber cable is cutover next year. "We had an incident where a 747 was coming down a taxiway in one direction and another one was coming out from a T-intersection, and there was a maintenance hanger at the corner, and all of a sudden the two planes had to stop," Stolle says. "And you can't back those things up that easily." Camera visibility would have allowed the ground traffic control room to tell one plane to stop and wait until the other had cleared the intersection.

Paul Susca

New York Telephone's airport loop

Another link at JFK is New York Telephone's phone's 10-mile fiber optic loop around the airport to provide digital telecommunication services for the airlines and businesses there. New York Telephone's 2,000 customers at JFK will be connected by the network and eventually will be connected by an integrated services digital network. All major airlines are accelerating their drive into computerized information systems, said Charles Ponsford, president of the JFK Chamber of Commerce.

New York Telephone has a switching center at JFK that handles about 18,000 lines. The company also maintains about 10,000 private lines, 6,000 Centrex lines and lines for computerized airline reservation systems. "The ducts carrying the lines were pretty packed," said Ron Putsis, New York Telephone's director of account marketing.

The fiber optic loop has both modernized and added capacity for New York Telephone's facilities to handle growth. The loop is connected to the Interboro Network, a fiber optic link that connects central Queens to Manhattan. The fiber optic ring around JFK reaches all major locations at the airport, with 15 splicing hubs available for connecting buildings in the terminal, hangar, cargo and trucking areas to the loop.

The JFK loop uses a 144-fiber, 12-ribbon singlemode cable connecting each airport location to the central office on a primary feeder fiber, with a secondary protection fiber running in the opposite direction on the loop. "If there was a cable break for any reason, there would be no interruption in service because the system would automatically switch to the backup circuit," said Michael Osborne, New York Telephone's manager of outside plant planning and construction.

JFK airport was built on marshland, so water seepage into cables is a problem with copper cables. "Fiber optic communication isn't subject to those electrical interferences," Osborne said.

Another advantage of fiber is its imperviousness to electrical interference and cross-talk, "so critical ground-to-air communication would be free of interference or garbling if transmitted over optical circuits," Putsis said. "Use of fiber will greatly enhance voice circuits so the customer will get a crystal clear conversation."

He added that fiber allows the aggregation of private lines on T-1 carriers, eliminating signal repeaters, lowering customers' needs for extensive floor space and making maintenance less costly.

Thomas R. Wirth, a SwissAir spokesman, agreed. "We were the first on-line user of the fiber network at JFK," he said. "We connected to New York Telephone with Flexpath DID/DOD, and we have three pipes of Superpath point-to-point T-1's to interconnect traffic to our PBXs."