FLYING IN PLACE:
THE FAA'S AIR-CONTROL FIASCO

The new IBM system is $1.5 billion over budget and years away

In January, 1982, the U.S. air-traffic control system seemed on the verge of collapse. Not only was it crippled by the dismissal of striking controllers the previous August but the computer system used to guide planes through the air was prone to breakdowns. The creaky computers, many of '60s vintage, would not be able to keep up with the anticipated boom in air traffic sparked by deregulation.

So airlines cheered when the Federal Aviation Administration proposed a $32 billion overhaul of the system. It would produce faster, safer trips and even save on fuel. The new, highly automated control network would first be introduced in the Seattle area in 1992 and be in place nationwide by the end of the decade.

But today, the new flight-control system exists mainly in a darkened demonstration room in Gaithersburg, Md. The heart of the project—which includes an array of radar equipment, weather-tracking gear, and new mainframe computers—is the FAA's Advanced Automation System (AAS), to guide airliners across the country. But the AAS is still at least nine years from completion and at $5.1 billion is already $1.5 billion over its original budget and climbing. The FAA and IBM, the prime contractor, both admit that their mistakes are a major reason.

Meanwhile, delays in AAS have held up other parts of the modernization, and the government is spending millions to keep the old system running. But the patches won't hold forever, airlines say. "The airline industry is appalled," says John R. Ryan, a vice-president at the Air Transport Assn., which represents the major airlines. The group's big fear: Without the new system, they'll see unacceptable air-traffic delays.

Now, IBM and the FAA say, the new system won't be completely in place until well after 2000. IBM has transferred four top executives of its Federal Systems Co., the unit managing the work. And acting FAA Administrator Joseph M. Del Balzo, under congressional assault for the muddled project, has begged lawmakers for "one more chance" to get it right.

What went wrong? The trouble begins with overly optimistic deadlines, unrealistic budgets, and cumbersome government procurement. Then things deteriorated as hundreds of changes were made and bureaucrats ignored problems until they became gargantuan.

When the FAA first conceived the system, the requirements were clear. To avoid delays and improve safety in increasingly crowded skies, it was essential to replace the flight controllers' antique gear—including some that still used vacuum tubes. The most important change would be replacing the huge, circular green scopes used in the FAA's 23 regional centers. These screens display only crude radar images of each flight.

COLOR-CODED. In the new system, each controller will sit at a console driven by an IBM RS/6000 workstation that will generate color maps of air routes on a 20-by-30-inch Raytheon Co. display. A controller will be able to zoom in on selected parts of the screen to "see" the planes' locations in greater detail. If two jets get too close, their flight numbers turn yellow first, then red, helping the controller spot danger sooner. A controller will be able to track more planes and guide them along the most fuel-efficient routes. Early on, the Transportation Dept. figured that AAS could save the airlines $13.3 billion in fuel costs through 2003.

Even before the IBM design was selected, however, the project hit turbulence. It took the FAA four years just to decide that IBM and Hughes Aircraft Co. would be the final bidders from an original field of half a dozen. After the two
Finalists spent three years and $500 million of FAA money to develop prototypes, the agency settled on IBM's fixed-price bid of $3.6 billion, even though the General Accounting Office warned that the job couldn't be completed for that amount. And, as almost always happens in such federal contracts, the loser protested, delaying the project's start by several more months. "It took longer to get this contract going than it did to put a man on the moon," says Gerald W. Ebker, chief executive of IBM Federal Systems.

In March, 1989, IBM and the FAA finally got to work. Nearly 2 million lines of computer code would have to be written, and because lives depended on the software, it all had to be perfect. IBM's initial raw material was a four-foot-high stack of specifications. Among the requirements: The system could be down only three seconds a year. And the programs had to be written in the obscure Ada computer language that the Defense Department demands for "mission-critical" software.

"Even so, many of the details were left to the imagination of FAA and IBM engineers. They spent more than a year refining the designs. It became obvious after a few months into that process that contractors should have more say in the design. So in mid-1990 IBM built the Caithness demonstration center, where contractors could visit and offer suggestions. They bombarded the FAA and IBM with proposed changes. The agency's managers, who focused more on building the best system than on hanging on to costs and meeting deadlines, dutifully gave the ideas to IBM.

HOLLOW ASSURANCES. With all the changes—500 to 700 of them over two years—deadlines crumbled. In December, 1990, the FAA and IBM announced a 19-month delay, which IBM said would inflate the price by $212 million, mostly to keep paying more than 1,300 software engineers employed by IBM and its subcontractors. But FAA and IBM officials assured legislators at an April, 1991, hearing that things were under control and later gave lawmakers and staffers tours of the demonstration facility.

At Caithness, however, they saw little more than a mockup. The real software writing didn't begin until several months later, and even then, the process was slowed by a steady stream of change orders. As soon as IBM finished one block of software, programmers would have to rewrite an earlier block. IBM didn't protest, partly because the FAA's cumbersome dispute-resolution processes would only add to the delays.

Meanwhile, an alarmed Congress began looking into the delays and cost overruns. Congressional staffers discovered that the FAA was asking for far more money than the IBM contract called for. A staffer learned this after noticing that the FAA had left out a page when submitting the 40-page contract to Congress. It was the one with the annual budget numbers. Then IBM supplied a copy of the missing page, the staffers found that the 1992 FAA request was a mind-bending $158 million higher than the contract cost. "Usually people ask for a little more than they need," says one House aide. "But this was incredible. Congress began paying more attention. It cut funding and recommended that one FAA official work full-time on the project. Until then, a single FAA manager had been dividing his time between AAS and a related project. The FAA balked, viewing the suggestion as congressional meddling."

Meanwhile, IBMers were beginning to take shortcuts to keep the project on its already-delayed schedule. Ebker says midlevel managers skipped IBM's formal software-review process, leading to serious bugs. The result, said a GAO report: In a recent test, the system could handle only 56 consoles at once for a sustained period of time, not the projected 250. In the end, IBM had to rework roughly 150,000 lines of computer code. About one-third stemmed from design changes and the rest from IBM's own failures, the company says.

By late 1992, the problems had become a crisis. IBM told the FAA that it couldn't meet its commitment to demonstrate the operational soundness of the new consoles that November—a deadline that had already been extended from February, 1990. Now, IBM says, the consoles won't be ready before early 1994. IBM estimates that the delay will cost $295 million, not counting what's needed to keep the old system up.

ACTION. That was the last straw. In November, 1992, the FAA issued a "cure letter," the first legal step toward terminating IBM's contract. The FAA, which conceives its changes caused many of the problems, doesn't want to fire IBM, since switching contractors would mean more delays and more millions. Instead, it hoped to get things back on track by jerking IBM's chain and showing Congress and the exasperated carriers that it was doing something. After news of the letter leaked to the media, the FAA finally put a full-time manager on AAS, and in April, it froze the specifications to prevent new delays.

At IBM, Ebker took personal charge and transferred four senior executives involved in the program. IBM issued a 54-page recovery plan and set up a "war room" to manage the program. Each Monday, Ebker now briefs FAA officials and, for the first time, IBM employees share problems and suggestions with Ebker via electronic mail and meetings. "I think all of the things we have done in the last 90 days, we probably should have done two years ago," says Ebker.

Both IBM and the FAA have good reasons for regret. With all of its troubles, IBM can hardly afford to alienate one of its best customers, the federal government. And an overweight, overdue project is an obvious target for congressional budget-cutters. But the biggest loser may be the ailing airline industry. A state-of-the-art flight-control system that cuts delays and saves billions in fuel would surely come in handy right now.

By Mark Lezyn in Washington