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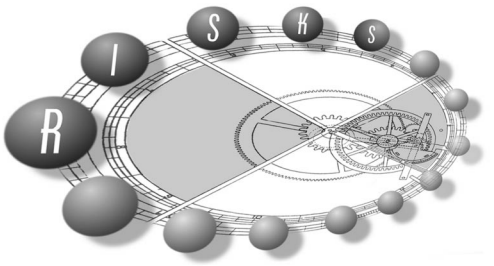


Peter G. Neumann

# System Development Woes

A past Risks column ("System Development Woes," Oct. 1993) considered some system development efforts that were cancelled, seriously late, overrun, or otherwise unacceptable. In the light of recent fiascos reported in the Risks Forum, it seems timely to re-examine new abandonments and failed upgrades.

***IRS modernization***. In early 1997, after many years, $4 billion spent, extensive criticism from the General Accounting Office and the National Research Council, and re-evaluation by the National Commission on Restructuring (reinventing) the IRS, the IRS abandoned its Tax Systems Modernization effort. A system for converting paper returns to electronic form was also cancelled, along with the Cyberfile system that would have enabled direct electronic taxpayer filing of returns. A GAO report blamed mismanagement and shoddy contracting practices, and identified security problems for taxpayers and for the IRS.

***Other government systems***. The FBI abandoned development of a $500 million, fingerprint-on-demand computer system and crime information database. The State of California spent $1 billion on a nonfunctional welfare database system; it spent more than $44 million on a new motor vehicles database system that was never built. The Assembly Information Technology Committee was considering scrapping California's federally mandated Statewide Automated Child Support System, which had already overrun its $100 million budget by more than 200%.

***The Confirm system***. The Intrico consortium's Confirm reservation system development was abandoned after five years, many lawsuits, and millions of dollars in overruns. Kweku Ewusi-Mensah analyzed the cancellation ("Critical Issues in Abandoned Information Systems Development Projects," *Communications*, Sept. 1997, pp. 74–80) and gives some important guidelines for system developers who would like to avoid similar problems.

***Bell Atlantic 411 outage***. On November 25, 1996, Bell Atlantic had an outage of several hours in its telephone directory-assistance service, due apparently to an errant operating system upgrade on a database server. The backup system also failed. The problem—reportedly the most extensive such failure of computerized directory assistance—was resolved by backing out the software upgrade.

***San Francisco 911 system***. San Francisco tried for three years to upgrade its 911 system, but computer outages and unanswered calls remain rampant. For example, the dispatch system crashed for over 30 minutes in the midst of a search for an armed suspect (who escaped). It had been installed as a temporary fix to recurring problems, but also suffered from unexplained breakdowns and hundreds of unanswered calls daily.

***Social Security Administration***. The SSA botched a software upgrade in 1978 resulting in almost 700,000 people being underpaid an estimated $850 million as a result of cutting over from quarterly to annual reporting. Subsequently, the SSA discovered that its computer systems did not properly handle certain non-Anglo-Saxon surnames and married women who change their names. This glitch affected the accumulated wages of $234 billion for 100,000 people, some going back to 1937. The SSA also withdrew its Personal Earnings and Benefit Estimate Statement Web site (see Inside Risks, July 1997) for further analysis, because of many privacy complaints.

***NY Stock Exchange***. The NYSE opened late on December 18, 1995, because of communications software problems, after a weekend spent upgrading the system software. It was the first time since December 27, 1990, that the exchange had to shut down, its closing affecting other exchanges as well.

***Interac***. On November 30, 1996, the Canadian Imperial Bank of Commerce Interac service was halted by an attempted software upgrade, affecting about half of all would-be transactions across eastern Canada.

***Barclays Bank's successful upgrade***. In one of the rare success stories in the Risks archives, Barclays Bank shut down its main customer systems for a weekend to cut over to a new distributed system accommodating 25 million customer accounts. This system seamlessly replaced three incompatible systems. It is rumored that Barclays spent at least £100 million on the upgrade.

The causes of these difficulties are very diverse, and not easy to characterize. It is clear from these examples that deep conceptual understanding and sensible system—and software—engineering practice are much more important than merely tossing money and people into system developments. Incidentally, we have not even mentioned the Year-2000 problem, primarily because we must wait until January 2000 to adequately assess the successes and failures of some of the ongoing efforts. But all of the examples here suggest that we need much greater sharing of the bad and good experiences. C

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