

# Cost, Schedule, and Staffing Implications

The FBI plan should consider the implications of various design factors for technical risk, schedule, and cost. Qualitatively, design parameters such as fingerprint volume, response times, fingerprint file sizes, and fingerprint storage requirements will affect the technical and schedule risk and automation cost.

The plan should weigh the risks and costs of delays that might result if system requirements exceed available technical capabilities. The FBI's desire to regain technological leadership in the fingerprint identification field is commendable. The current system is technically obsolete and incompatible with State systems. Even implementation of today's state of the art, or the state of the art as it might exist when requests for proposals are solicited and contracts awarded, should be a significant improvement over the status quo. The plan should provide for an easy upgrade to the system as technology advances and as needed if fingerprint storage and processing volumes exceed design capacity. A modular upgrade strategy may be especially appropriate in light of uncertainties about possible major noncriminal justice needs for fingerprint checks.

The FBI planning process needs to consider several alternatives simultaneously to help the user community and Congress, as well as the FBI itself, to better understand the tradeoffs among different alternatives. In particular, the FBI needs to clearly show the tradeoffs among volume and type of fingerprint checks, technical design, cost, schedule, technical risk, number and type of employees, training needs, and building requirements. A full tradeoff analysis is needed prior to finishing the strategic plan and issuing the Request for Information—the next major steps toward procurement.

The FBI is conducting a tradeoff analysis with the assistance of Mitre Corp., but because of procurement sensitivity it does not, at this time, plan to make the results public. The type of analysis needed is illustrated below. This is, of course, no substitute for a complete FBI study released in a format that both protects the integrity of the procurement process and better informs the public and Congress.

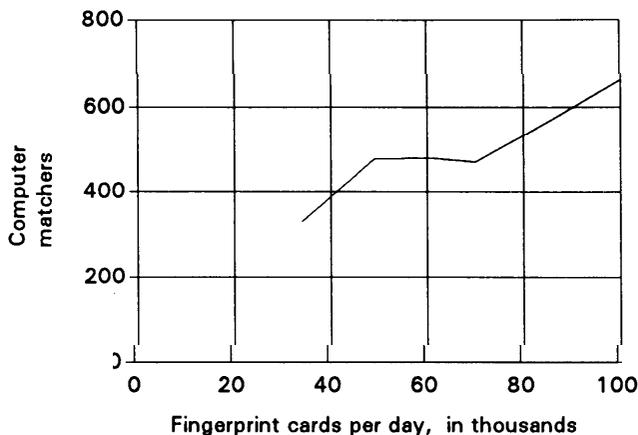
## Illustrative Review of Ident Automation Costs

### Computer Matcher Requirements

The analysis could begin by focusing on the number of computer matchers needed to handle the projected Ident 10-print workload. Matchers are computers that compare the minutiae of incoming fingerprints against the minutiae of prints on file. The projected workload is primarily a function of assumptions about processing volume (fingerprint cards or electronic images received per day), response (or turnaround) time, and file size. Projections of fingerprint processing volume range from 100,000 to 34,000 (see table 7). For this illustration, response time is assumed to be 2 hours criminal and 24 hours civil, and file size is assumed to be 34 million.

Roughly 480 matchers would be needed to process 61,000 fingerprint checks per day (the OTA-4 scenario) against a 34-million-fingerprint file—using 1990 technology.<sup>63</sup> A higher or lower daily volume would, other things being equal, increase or decrease the number of matchers required. Technical advances could, in the

Figure 8—Projected Number of Ident Computer Matchers, 2000



NOTE: See table 8 and accompanying text for detailed explanation. Assumes 1990 technology; technical advances are likely to reduce the number of matchers required to process any given volume of fingerprint cards

SOURCE: Office of Technology Assessment, 1991.

<sup>63</sup>OTA estimated the number of matchers for this illustration based on vendor assumptions about scaling up from the California AFIS. California uses about 5 matchers to process 5,000 10-print searches per day comparing 2 fingers per print against a file of about 8.5 million prints. The illustrative Ident system would process 61,000 searches per day (about 12 times the number processed by California), comparing 4 fingers (2 times the number compared by California) against a file of 34 million prints (about 4 times the size of the California file). Thus the estimated baseline number of Ident matchers is  $5 \times 12 \times 2 \times 4 = 480$ .

**Table 8--Number of Computer Matchers Required by Year 2000,  
as a Function of Daily Fingerprint Submissions**

Daily card submissions, FY 2000 <sup>a</sup>	Criminal matches <sup>b</sup>	Civil matches <sup>b</sup>	Total matches <sup>b</sup>	Number of matches <sup>b</sup>
100,000 (OTA-6) .....	17,500	47,000	64,500	663
70,000 (OTA-5) .....	1 1,900	33,840	45,740	470
61,000 (OTA-4) .....	1 2,500	34,200	46,700	480
49,000 (OTA-3) .....	1 1,830	34,560	46,390	477
43,000 (OTA-2) .....	11,830	28,800	40,630	418
34,000 (OTA-1).....	10,010	22,080	32,090	330

a From table 7.

b Number of matchers = (480)(matches at volume x ÷ matches at 61,000).

NOTES: All OTA scenarios assume the criminal/civil split shown in table 7.

OTA-1, OTA-2, and OTA-3 assume full NFF/III, 9-percent criminal name hit, and 4-percent civil name hit.

OTA-4 assumes half NFF/III, 50-percent criminal name hit, and 5-percent civil name hit.

OTA-5 and OTA-6 assume no NFF/III, 65-percent criminal name hit, and 6-percent civil name hit.

SOURCE: Office of Technology Assessment, 1991.

future, reduce the number of matchers needed for any given volume of matches and fingerprint checks.

The OTA-1 estimate of daily fingerprint card submissions (34,000) would reduce the number of matchers by about one-third (to 330), other things being equal (see table 8 and figure 8). The OTA-2 estimate (43,000 cards per day) would reduce the number of matchers by about 12 percent (to 418). The OTA-3 and OTA-5 scenarios (49,000 cards per day with full NFF/III, and 70,000 with no NFF/III, respectively) would reduce the number of matchers only slightly. The OTA-6 scenario (100,000 cards per day) would increase the number of matchers by more than one-third (to 663 matchers). An important caveat: This illustrative analysis assumes linear relationships among volume, number of matches, and number of computer matchers. Any nonlinear relationships, or any economies or diseconomies of scale, could change the results.

The results suggest that Ident could significantly reduce the number of matchers only by designing for a lower daily volume of noncriminal justice fingerprint checks (see table 8). The number of criminal checks does not have much effect on the number of matchers (except under the very high OTA-6 estimate), since the number of actual criminal matches is essentially the same whether the NFF/III is implemented or not. The NFF/III simply shifts the much less costly name hits from Ident to the States. The impact of technical advances, however, could be much greater. Vendors estimate that the number of matchers might be reduced

by 25 percent with 1991 technology and by 50 to 90 percent with 1993 technology (the year planned for actual procurement), other things being equal.

An analysis of the number of matchers required to handle projected latent matches shows similar results. The FBI has assumed a daily volume of 128 latent fingerprint searches in 2000. The number of latent print matchers could be reduced if the volume of latent searches is smaller. Many States have or are obtaining their own automated latent search capabilities. These States run latent prints against their own latent cognizant files first, thus substantially reducing the primary demand for FBI latent searches. Nonetheless, the payoff from successful latent searches is very high, and AFIS is the only viable means of conducting large-scale latent searches. The number of latent searches conducted by Ident has actually declined from about 90 per day in fiscal year 1981 to 50 per day in fiscal year 1990. The FBI believes that this trend reflects the severe limitations of Ident's current latent processing system, and that demand would rebound once Ident offered a state-of-the-art service. The 128 latent searches per day projected for fiscal year 2000 seems reasonable, if the real base is the 90 per day of fiscal year 1981. A reduction in matchers is more likely to result from technical advances.

This illustrative analysis focuses first on the computer matchers because they are the most expensive and technically complex components of AFIS systems. The matchers also are the most affected by volume.

The number and size of optical disk storage devices, for example, are determined largely by the size of the Ident fingerprint file (and the number of fingerprint images that need to be stored) and by the gray scale and data compression ratios (which determine the number of bytes of data per image stored). The number and size of magnetic tape or disk drives likewise are a function of the fingerprint file size (and the number of minutiae extracted per finger and fingerprint). The FBI's tradeoff analysis should cover all major AFIS components, including optical, tape, and disk drive storage as well as the matchers.

### ***Building Construction Requirements***

**The** FBI should analyze the implications of technical tradeoffs for building requirements. The FBI is planning for a 46,500-square-foot Ident computer center at the new Clarksburg, West Virginia, location.<sup>64</sup> The computer matchers, for example, typically account for over one-third of the total computer center space requirements—probably about 40 percent if peripheral equipment (e. g., controllers) and cooling units are included. The matchers typically account for perhaps half of the computer center's electric power needs.

Thus a hypothetical 20-percent reduction in the number of computer matchers, for example, could translate directly into an 8-percent reduction in computer center floor space and a 10-percent reduction in power requirements. A 50-percent reduction in the number of matchers, which may be possible with new technology, could cut floor space by about 20 percent and power by 25 percent. A 50-percent increase in matchers, needed for the OTA-6 scenario using 1990 technology, could increase floor space and power requirements by 20 and 25 percent, respectively.

The tradeoff analysis also should show impacts of volume on other building requirements—primarily the new office complex that will house most of the Ident employees. The FBI has assumed, as a baseline, that the daily fingerprint volume will nearly double by 2000 and the workforce will remain about constant. The current workforce is 2,500 (down from over 3,000 a decade ago), with 479 additional positions requested starting in fiscal year 1992 (to reduce the fingerprint and disposition backlog, and to convert remaining manual criminal history records). The new office

complex has been designed to accommodate 3,000 persons plus common areas (e.g., a cafeteria and auditorium).<sup>65</sup>

If the year 2000 daily volume is significantly less than projected, some reduction in staffing would be expected. This reduction would in turn reduce the required size of the new office complex. However, a lower projected daily volume does not translate directly into lower staffing requirements, since some staff functions do not vary much as a function of volume. Assume, for illustrative purposes, that one-third of the staff are fixed and the other two-thirds variable, that the variable staff changes in proportion to the absolute volume of fingerprint checks requested, and that 3,000 persons are required to process 61,000 fingerprint cards per day (with half implementation of NFF/III, as in the OTA-4 scenario).

Staffing levels would range from a low of 2,100 persons at 34,000 cards per day to a high of 4,300 persons at 100,000 cards per day (see table 9 and figure 9). A daily volume of 49,000 fingerprint cards, rather than 61,000, in the year 2000 would require a staffing level of about 2,600 persons, rather than 3,000. This could reduce the office requirements from 488,000 square feet to about 425,000 square feet—a reduction of about 13 percent (see table 9). A daily volume of 100,000 cards, rather than 61,000, would, in contrast, increase staffing and floor space by about 43 percent. The FBI's tradeoff analysis should more completely specify the staffing levels and required office-complex floor space for a range of fingerprint volume scenarios.

### ***Impact on Ident Costs***

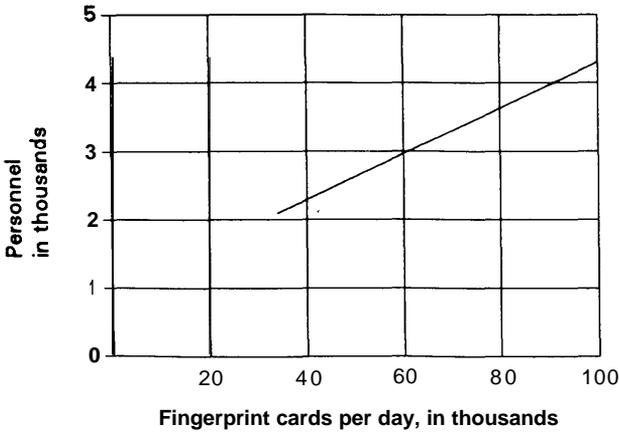
Reductions in the number of computer matchers combined with reductions in computer center and office space needs could significantly reduce Ident costs. Increases in the number of matchers and office space needs, on the other hand, could increase costs. Cost reductions or increases could be approximated as follows. First, assume that Ident modernization costs \$200 million for building construction (including design, inspection, taxes, and contingencies) to accommodate a volume of 61,000 cards per day. Second, assume that the office complex typically costs about 42 percent of the construction total, and the computer center about 18 percent. Third, assume that the computer

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<sup>64</sup>The total computer center size is actually 93,000 square feet, divided between two floors; only one floor is currently planned for Ident AFIS.

<sup>65</sup>With 488,000 gross square feet, the facility would be slightly larger than current Ident space in the Hoover Building (330,0(K) ft<sup>2</sup>) and two other buildings (1 10,000 ft<sup>2</sup>).

**Figure 9-Projected Number of Ident Personnel, 2000**



NOTE: See table 9 and accompanying text for detailed explanation.

SOURCE: Office of Technology Assessment, 1991.

**Table 9-Scenarios for Ident Fingerprint Volume, Staffing, and Office Complex Requirements, Year 2000**

Daily card submissions	Approximate staffing levels <sup>a</sup>	Office complex floor space (gross sq. feet)
100,000 (OTA-6) .....	4,300	620,000
70,000 (OTA-5) .....	3,300	540,000
61,000 (OTA-4) .....	3,000	488,000
49,000 (OTA-3) .....	2,600	425,000
43,000 (OTA-2) .....	2,400	390,000
34,000 (OTA-1) .....	2,100	340,000

a Assumes personnel are one-third fixed, two-thirds variable, and that a daily volume of 61,000 cards requires a staff of 3,000 persons.

SOURCE: Office of Technology Assessment, 1991

matchers cost about \$100 million (for 1990 technology) .66 The cost savings (increase) at lower (higher) projected daily volumes can then be estimated in proportion to lower (higher) estimates of the requirements for computer matchers, staffing levels, and computer center and office complex space.

This illustrative analysis of the sensitivity of cost to various assumptions about volume suggests that the matcher cost component is quite sensitive. Lower

volume (OTA-1 or OTA-2 scenario) reduces the number of matchers needed, with savings in the \$2 million to \$30 million range (see table 10). Higher volume (OTA-6 scenario) could increase matcher cost by \$40 million. The office complex cost is a function of volume and staffing: lower volumes and staffing levels (OTA-1, OTA-2, OTA-3) reduce the space requirements, with possible savings in the \$11 million to \$25 million range. High volumes and staffing levels (OTA-5, OTA-6) could increase the office cost by up to \$23 million. The computer center cost varies with daily volume and the number of matchers required. Lower volume and fewer matchers mean smaller space requirements, with a possible savings of up to \$4 million. Higher volume and more matchers could increase costs by \$5 million.

The analysis illustrates that costs for the computer matchers and computer center are not very sensitive to changes in daily volume within the range of 49,000 cards with full NFF/III implementation to 70,000 cards with no NFF/III implementation. This is because the actual number of full fingerprint searches and matches required (as compared with name checks of prior offenders and simple fingerprint verifications) is about the same at 49,000 cards with full NFF/III implementation, 61,000 cards with half NFF/III implementation, and 70,000 cards with no NFF/III implementation. A name check hit is confirmed by comparing the person's new fingerprint card (or image) for the current arrest with the card (or image) on file from prior arrest listed for that person, rather than having to conduct a search of the entire fingerprint file. With no NFF/III, these name checks and fingerprint verifications would be conducted by Ident. With full NFF/III, the States would do the name checks and verifications.

In this range, significant cost savings are more likely to result from technical advances in computer matchers (and related equipment) and, to a lesser extent, from smaller office complex requirements at the lower volumes and staffing levels.

Total potential savings for these three cost components range from about \$30 million to \$60 million (for the OTA-2 and OTA-1 scenarios, respectively), against a base of \$220 million—a possible savings in the 14- to 28-percent range (figure 10). The potential increases for these cost components could be as much as \$67 million, or 30 percent, for the OTA-6 scenario. The

<sup>66</sup>Assumes a cost of about \$210,000 per matcher with a volume discount. Some 1991 matchers cost in the range of \$350,000 each but have twice the processing capacity, for an effective cost of \$175,000 for equivalent matcher capacity.

**Table 10-Scenarios for Ident Daily Fingerprint Volume, Response Time, Matchers, and Cost**

Daily volume	Number of computer matchers	Matcher cost	Computer center cost <sup>a</sup>	Office complex cost <sup>b</sup>	Total Cost <sup>c</sup>
100,000 (OTA-6) .....	663	\$139M	\$41 M	\$107M	\$287M
70,000 (OTA-5) .....	470	\$ 99M	\$36M	\$ 93M	\$228M
61,000 (OTA-4) .....	480	\$100M	\$36M	\$84M	\$220M
49,000 (OTA-3) .....	477	\$100M	\$36M	\$73M	\$209M
43,000 (OTA-2) .....	418	\$88M	\$34M	\$67M	\$189M
34,000 (OTA-1) .....	330	\$70M	\$32M	\$59M	\$161M

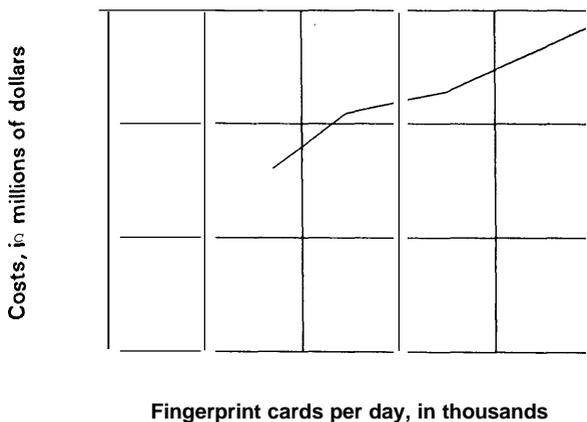
<sup>a</sup> Includes prorated share of other costs. Assumes matchers (including Controllers and cooling units to support them) account for 40 percent of computer center space. Assumes \$22M is fixed cost.

<sup>b</sup> Includes prorated share of other costs. Total cost is proportional to floor space (See table 9). concludes matcher, computer center, and office complex costs.

SOURCE: Office of Technology Assessment, 1991.

cost differences between OTA-3, OTA-4, and OTA-5 are less significant. Matcher and computer center costs do not appear to be very sensitive to daily fingerprint volume within the 49,000 to 70,000 range, due to the effects of NFF/III. Other automation components, including image processing and minutiae extraction systems, minutiae editing work stations, data entry terminals, scanners and printers, and telecommunications input/output equipment and line capacity, may be more sensitive.

**Figure 10-Projected Illustrative Ident Automation Costs, Selected Items**



NOTES: Costs shown are for computer matchers, computer center complex, and office complex only. See table 10 and accompanying text for detailed explanation.

SOURCE: Office of Technology Assessment, 1991.

The FBI tradeoff analysis should estimate potential savings (or cost increases) in the total automation budget, which can be roughly estimated as follows. Assume first that the total automation cost breaks down into 50 percent for AFIS (25 percent for matchers, 25 percent for other AFIS equipment); 25 percent for criminal record computers (including III computers); and 25 percent for telecommunications.<sup>67</sup> Assume second that the matcher cost is \$100 million (for 1990 technology). This suggests a total baseline automation cost of \$400 million to accommodate the OTA-4 scenario (61,000 cards per day). Technical advances should reduce the cost of the system somewhat if bought today, and more substantially by the time the contract is actually awarded (planned for fiscal year 1993). To develop an authoritative analysis, the FBI needs to carefully examine the cost impact of assumptions about overall volume, NFF/III participation, and the ability of users to transmit fingerprints electronically. The results should provide a better understanding of how the FBI might reduce, to the extent possible, costs of the AFIS, computer, and telecommunication capabilities needed to support Ident modernization. The results also should help the Administration and Congress better understand what capabilities can be purchased at various levels of funding.

The tradeoff analysis also should consider implications for the composition as well as the size of the workforce, for employee training, and for technical and schedule risk.

<sup>67</sup>Typical split for integrated AFIS/CCH systems at the State level, based on vendor estimates.

## Composition and Training of Ident Workforce

Over time, Ident will have fewer employees doing manual tasks, and more employees working directly with computer terminals and systems. The skill requirements will increase further for those already working with computers. Thus Ident will need an active retraining program for current employees and training for new employees. The balance between retraining and new hires will depend on total staffing requirements, number of current employees electing to move to West Virginia, employee attrition (retirements, separations, transfers to other FBI divisions), rate of transition from manual to electronic processing; and rate of implementation of NFF/III.

OTA's analysis of Ident job titles and staffing complements (as of Mar. 25, 1991) indicates significant retraining needs, for example:

- Identification record clerks doing typing will need to be retrained for computer terminal operation.
- Mail and correspondence clerks will need to be retrained for electronic mail and electronic filing/processing operations.
- Most arrest record examiners and assistants will no longer be needed with full NFF/III and will have to be phased out through attrition or retrained for other jobs.
- Coding clerks will need to be retrained for new AFIS/III systems.
- Fingerprint examiners will need to be retrained for new AFIS systems. The number needed will be a function of processing volume.

The majority of current Ident employees who elect to move to West Virginia will need retraining. New hires will need more intensive and computer-oriented training than in the past. Supervisory personnel at all levels will need not only retraining in the relevant technical skills but also training in changing to a high-tech organizational setting. This will be especially challenging for the supervisory coding clerks (64) and supervisory fingerprint examiners (110) who will have to contend simultaneously with changes in their own jobs and those of their employees. In addition, employees moving to West Virginia will have to manage their own personal relocation as well.

Ident will need a new cadre of in-house trainers, possibly supplemented with outside assistance for the

### *Box E—Ident Automation: A Necessary Risk*

The Ident automation program is high risk because of the combination of technical, personnel, and building requirements:

- Ž The new automated fingerprint identification system (AFIS) must process a much larger daily volume of fingerprint checks against a much bigger fingerprint file than even the largest State AFIS.
- The Ident automation schedule calls for designing, procuring, and implementing the new AFIS in the time frame typically needed for smaller State systems.
- Ž The Ident building schedule calls for construction (in Clarksburg, West Virginia) to proceed faster than normal for a facility of this size and complexity.
- Ž The Ident personnel schedule calls for moving perhaps 750 to 1,000 employees (to West Virginia), hiring 1,500 to 2,000 new employees, and training all employees in a compressed time frame.

But the Ident automation program is a necessary risk because:

- the current Ident fingerprint identification system is technically obsolete (and should be completely phased out);
- the current Ident system is too slow to meet many criminal justice and nonjustice needs for fingerprint checks;
- Ž the current Ident building space (at the J. Edgar Hoover Building in Washington, DC) is inadequate for making the transition to a fully automated system; and
- the current Ident workforce has experienced high turnover and low morale due in part to less competitive salaries and long commutes (in the high cost Washington, DC, area).

Ident therefore needs to give special attention to managing the risks of the entire revitalization process (automation, construction, moving, training), and should be prepared to make adjustments as new information becomes available.

Ident has an opportunity to break with the past and establish a new, state-of-the-art facility with a reenergized workforce. A modernized and revitalized Ident will help meet the Nation's criminal identification and records infrastructure needs at and beyond the turn of the century.

SOURCE: Office of Technology Assessment, 1991.

transition. Ident's current complement of nine fingerprint examiner instructors and two identification record instructors could be upgraded and expanded. These instructors would themselves need retraining. Additional trainers might be drawn from the ranks of the most senior, most experienced fingerprint specialists (75) and supervisory fingerprint specialists (22). Another possibility would be to involve the current group of computer personnel, including 24 computer operators, 20 computer programmers (all types), 26 computer system analysts, 5 computer scientists/specialists, 3 electronics engineers, and 15 electronics technicians. Again, retraining the trainers would be a necessity.

## **Technical and Schedule Risk**

The tradeoff analysis also needs to consider the implications for technical and schedule risk (see box E). The Ident modernization plan is, as it stands, on a rigorous schedule. The building construction timetable requires that decisions on the size of the computer center be made within the next few months. Bid packages for the computer center and central plant are to be issued in late 1991 or early 1992, with construction to begin in spring 1992. Bid packages for the main office building will be issued in spring 1992, with construction to begin in the summer and to be completed in late 1994. Some parts of the computer center and office complex are to be ready by April 1994, so phased occupancy can take place between spring 1994 and spring 1995. Full operation is planned for June 1995.

The building construction schedule is tight, but it allows some margin for slippage and depends on straightforward, proven construction techniques. The technical risk for the building is small, and most, if not all, of the necessary funding has already been appropriated by Congress.

The automation schedule, in comparison, is very tight and allows little if any margin for error. Further, the technical risk is inherently high, given the unprecedented scope and scale of the project. (By way of comparison, this project involves a file size about 3 to 5 times that of the California AFIS, a daily volume 7 to 12 times higher, and many additional features.) Little of the necessary funding for automation has been approved by Congress.

The current automation schedule is as follows: automation strategy decision, summer-fall 1991; Request for Information (RFI) issued to all interested vendors, fall 1991; Request for Proposal (RFP) issued to selected best qualified vendors, early 1992; prototype demonstrations by the most qualified vendors, mid to late 1992; contract award, early 1993; begin system installation, spring 1994; full operation, June 1995. The schedule allows little room for delays for any reason. The schedule is essentially a series of critical paths; delays at any point would be carried along to each subsequent step in the process. The time between contract award and full operation (about 27 months) is in the same range required for procurement and installation of systems at the State level (typically 18 to 30 months). Ident is proposing to do a much larger, more complicated system procurement and file conversion in about the same time, and with the further complicating factors of moving to a new building hundreds of miles away (although the move offers other advantages), relocating existing employees, hiring new employees, and training virtually all employees.

The move should, however, help the FBI develop a more stable, higher quality Ident workforce. Ident has in the past experienced high turnover and low morale at its current Washington, DC, location, in part because the high cost of living and comparatively low salaries require many Ident employees to commute long distances. Ident has difficulty filling vacancies with qualified persons. Ident expects salaries to be more competitive, living costs lower, and commutes shorter in West Virginia. As of September 3, 1991, over 7,000 new applicants had applied for the first 200 positions available at a satellite office opening in Clarksburg, West Virginia. Ident estimates that about one-third of the current workforce will elect to move to West Virginia and thereby provide a core staff for training and transitional purposes. (All current Ident employees who choose not to move have been guaranteed continued FBI employment in the Washington, DC, area at no loss of pay.)

The risks of moving to an area with a lower cost of living and a potentially more stable, motivated workforce seem necessary, given the current staffing problems. In addition, Ident's present home (the J. Edgar Hoover Building) is overcrowded and considered unsuitable for a fully automated Ident, especially since the transition will probably require several years of dual operation of the old and new systems. It

appears much easier to phase the new system in at a new location, and the old system out at the current location, rather than try to do both at the same location.

Moving an agency can be an important part of organizational change and renewal, as seems to be the case for Ident. The move to West Virginia should help Ident break with the past and establish a new, state-of-the-art facility with a reenergized workforce. The existing facility in Washington, DC, and its obsolete system will not be moved to the new location, but instead will be phased out over a transitional period. Current Ident employees who choose to move will, inevitably, face some stress in adjusting to a small-town or rural environment. Ident has hired human resource consultants to assist with the transition.

The move also illustrates the decentralizing potential of electronic technology. With a manual fingerprint process, Ident had to be located in close physical proximity to other FBI laboratory and investigative operations. In the electronic era, Ident can be located at a remote site, since fingerprints can be transmitted electronically and instantaneously between Clarksburg, West Virginia, Washington, DC, and law enforcement agencies around the country.

Some technical risk also is justifiable, since it is unclear whether simple extension of current technology can meet Ident needs. Vendors claim they can meet these needs without resorting to entirely new technical approaches, but some users are skeptical. Pushing for new technology solutions can be constructive, up to a point, but unproven systems are risky and potentially expensive. The FBI could reduce the technical risk after reviewing the RFI responses by using the RFP to procure the best commercially available technologies existing at the time of the procurement, rather than attempting to require significant additional R&D work by vendors as part of the procurement. Most vendors will do some development anyway, and will strive to provide the most advanced proven technologies possible. But if FBI requirements are such that substantially new and unproven technologies are required, then Ident would be faced with the prospect of significant shake-down and break-in problems associated with all

new systems (including hardware and software debugging). On the down side, Ident could face serious delays and budget overruns, with no guarantee that additional funds would be available.

If new technology solutions are not clearly evident after the RFI, the lower technical risk strategy then would be for Ident to: 1) push for the next generation of current systems, which would be more powerful and cost-effective, but which will be technically proven and commercially available in the 1993 to 1994 time frame; and 2) place the purely R&D work on a separate, longer term track pointing toward 2000 and beyond. The experience of Federal agencies that have attempted automation programs of this magnitude is that some problems will occur even with the best laid plans and proven technologies. But if the plan involves significant R&D and new technologies, the project is likely to encounter serious technical problems and schedule and cost overruns. This is true even for agencies with major continuing R&D programs. Ident does not have an extensive R&D track record. Making a long-term commitment to AFIS R&D may be desirable, but the real pay-off from R&D is typically 8 to 10 years or more in the future, not 2 to 3 years. Technical and schedule risk also could be lowered by reducing the demands on the automated system as much as possible.

Another option is to simply stretch the project out by 2 to 4 years. This would allow time for more R&D before procurement commenced. This option could, however, impact the cost of the project significantly. The cost of procuring the new system could increase due to inflation, perhaps in the range of \$1 million per month—\$667,000 for automation delays<sup>68</sup> and \$350,000 building construction delays.<sup>69</sup> Thus a 2-year delay could add as much as \$48 million to the project cost. The cost of delay could be even higher, if, for example, the new system is less expensive to operate than the current system, and potential savings are foregone. A delay could, on the other hand, reduce costs if further technical breakthroughs resulted in a more cost-effective system with even lower net procurement and operating costs. The FBI does not believe that additional technical advances of this magnitude are likely even with a 2-year stretchout.

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<sup>68</sup>\$400 million times 6-percent escalation over the life of the project, divided by 36 months (FY92, FY93, FY94).

<sup>69</sup>\$210 million times 6-percent escalation divided by 36 months (FY92, FY93, FY94).

Lack of funding could, of course, force a delay in the project. The new building construction is funded (against the current schedule), but the automation component is only partially funded (including some proceeds from Ident user fees). The Office of Management and Budget recommended zero funding for fiscal year 1992.<sup>70</sup> The FBI estimated that this would delay the automation program by 16 to 18 months, at an additional cost of \$11 to \$12 million. Congress is in the process of determining the fiscal year 1992 appropriation.<sup>71</sup>

The true cost of Ident automation delays—for whatever reasons—could be much larger, because delays prolong the unquantifiable but large number of criminal justice decisions made erroneously each day due to untimely or incomplete Ident fingerprint and criminal record checks. Ident fingerprint checks today cannot be completed fast enough for use in arrest, initial charging, or bail decisions. Even for sentencing decisions that have a longer lead time, Ident fingerprint and record checks could be incomplete because of the large backlog of unfiled arrest fingerprint cards and dispositions, and the 8.8 million Ident criminal history records not yet computerized (and not accessible via III). The FBI has requested fiscal year 1992 funds to begin clearing the backlogs and converting manual records. But these remedial actions will take years (about 2 years for backlog clearance, 4 years for records conversion), and offer only temporary improvement. The roughly 3 million unfiled dispositions represent only a small fraction of

missing dispositions, which could total up to 36 million.<sup>72</sup> In addition, Ident is receiving a large number of duplicate criminal fingerprint cards, all requiring some amount of processing. In fiscal year 1990, Ident received and processed about 3 million criminal fingerprint cards that duplicated cards already on file. Ident fingerprint identification and record check deficiencies also are affecting nonjustice decisions.

The intangible costs of compromised criminal justice decisions and employment, licensing, and security clearance record checks seem far greater than any strictly monetary costs or benefits of delay. Nobody has quantified how many repeat serious offenders are inadvertently released because of misidentification or missing criminal history records, how many nonserious offenders are detained because of misidentification or incomplete records, or how many serious crimes are not solved because of the inability to conduct latent fingerprint searches. But the public safety and civil liberties costs of delay are, undoubtedly, much larger.

The long-term solution to duplicate, incomplete, or inaccessible fingerprint cards and criminal history records is full implementation of NFF/III, combined with further improvements in the automation and quality of State criminal records and a realistic, appropriately sized Ident automation program. The result should be a criminal records infrastructure that can meet the Nation's needs at and beyond the turn of the century.

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<sup>70</sup>The Office of Management and Budget believed that the Ident system design and procurement process was not sufficiently far along to justify or require substantial FY92 expenditures.

<sup>71</sup>The Senate included an additional \$48.0 million for Ident automation and \$12.5 million for Ident record conversion and backlog reduction in the FY92 appropriations bill. The House included no additional funds. A Senate-House conference committee met to reconcile these and other differences. The conference committee agreed to the Senate funding levels, but with an additional requirement that the FBI set up an independent Ident automation and relocation program office that is completely separate from the Ident division itself. The committee provided \$1.5 million for this purpose. See U.S. Congress, House, *Congressional Record*, Oct. 1, 1991, pp. H7171-7172.

<sup>72</sup>Ident receives dispositions on about half the arrests, so up to 36 million dispositions could be missing from the estimated 75 million criminal arrest events reportedly on file.