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International Foundation for Electoral Systems

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TECHNICAL ASSESSMENT

Electronic Registration and Voting System

JAMAICA

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EXECUTIVE SUMMARY

After several meetings with the Chairman of the Electoral Advisory Committee (EAC), the International Foundation for Electoral Systems (IFES) was asked by the EAC to conduct an assessment of a proposed electronic registration and voting system. The EAC would like to implement the new system in Jamaica to help combat corruption and fraud in the electoral system, which according to the EAC has been steadily increasing, by lessening the degree to which individuals will be able to gain fraudulent access to it. Most of the information that the EAC has received to date has come from vendors that want to provide equipment to the EAC for the new electronic system. Because the vendors are trying to sell equipment, however, they may not always be a very objective and unbiased source of information. IFES was asked to conduct this evaluation because IFES could provide useful information to the EAC in an objective and unbiased fashion. IFES assembled a team of four persons, each an expert in one of the three core technologies of the proposed new system: computerization and registration databases, automated fingerprint identification, and electronic voting machines.

Jamaica currently conducts its enumeration every four years in a house-to-house fashion and on election day uses a traditional paper ballot, ballot box, and voters list. The EAC is planning the new system in two phases. The EAC envisions the following system for Phase I or the enumeration phase: 1) house-to-house or central registration sites in which all registration data is collected digitally on a computer, 2) photographs are taken with a digital camera, 3) fingerprints are taken with a live-scan fingerprint imager. All of the collected data is stored digitally on the ID card which can be read later by a special machine.

On election day (Phase II), the EAC envisions the following system: 1) As the voter enters the polling place, a live-scan fingerprint is taken (scanned electronic image) and validated against a previously scanned image that is digitally stored on the ID card. 2) The voter then goes to the voting booth where the fingerprint is scanned and verified once again. This second fingerprint verification activates the electronic voting machine and allows the individual to vote. 3) Each vote is recorded on the machine and might possibly be transmitted at intervals to a central tabulation network. 4) Finally, the voting machine will print out a receipt of the vote which can be reviewed by the voter for accuracy and then placed in a ballot box for a hard copy audit trail. At the close

of polls, the voting machine will produce a list of names of all electors who voted. A final electronic tabulation of votes will also be performed.

By law, the EAC should begin the next enumeration exercise no later than March 1995. To facilitate the planning and development of specifications for the writing of the Phase I RFP, the EAC has contracted with Price Waterhouse. Price Waterhouse will assist the EAC in the preparation of the Phase I RFP and may also take part in the development of the Phase II RFP. It is the team's understanding that the RFPs will be distributed internationally. The international RFP process should allow for the largest possible number of vendors to participate, both to receive the best cost proposal, as well as to find the best solution to the problems facing the electoral system in Jamaica.

On a parallel track, the European Union (EU) has financed a team of consultants to assess the feasibility, and assist in the design of, a national ID card that would be the single document for all public transactions such as registering for school, tax refunds, social security, etc. Depending upon the team's assessment, and its own budgetary constraints, the EU might commit funds to help develop this national registry and ID card program. Rather than running two enumeration exercises (one for voting registration and the other for national registration), the IFES team strongly recommends that the EAC use the proposed national registry for its voters list data and accept the new national ID card as the voters card. This will, however, depend on whether or not the national registry can be completed sufficiently in advance of the next elections to be useful.

The team examined three aspects in relation to the proposed electronic registration and voting system: technical aspects, operational aspects, and cost considerations. From the technical point of view, all of the technologies proposed are well-developed and should function exactly as planned under given ideal conditions. The only novelty is that the technologies have never been combined in this way before. An examination of the conditions, which are often less than ideal, results in the next section of the report which looks at operational aspects. Because the system is technically feasible, it also is, in theory, operationally feasible. However, to be operationally feasible in practice, a number of concerns and options that are presented in this report will need to be considered (along with others that will undoubtably surface as the development process progresses).

Finally, the report attempts to provide a very preliminary cost estimate for the system as proposed. This estimate is subject to strong variation, either up or down, depending on a number of factors outlined in the section on cost considerations. In the end, the financial feasibility will depend on whether or not the EAC can convince the governing party, influential Jamaican organizations and institutions, the international donor community, and the voters themselves that the funds necessary for the project will be money well spent.

I. INTRODUCTION

Over the last decade, numerous abuses to the Jamaican electoral process have been reported. These include voter intimidation at the polls, voter impersonation, and irregularities in the handling of ballots. During this same period, voter turnout declined, perhaps as a reflection of the disillusionment of the electorate with the process and its participants. The Electoral Advisory Committee (EAC) was created in 1979, to eliminate the governing party's authority over the administration of elections. However, transparency and credibility of elections in Jamaica were not improved, as first anticipated. The Committee has dedicated itself to examining the alternatives and developing ideas for electoral reform, with the hope that such reform will ameliorate problems with the process and foster credibility among the electorate. The EAC has developed a plan for computerizing the registration, voting, and counting process. To date, however, information provided to the EAC has come almost exclusively from vendors and each vendor has extolled the virtues of their particular product promising that it is the perfect solution to Jamaica's electoral difficulties.

At the invitation of the EAC, Jeff Fischer, IFES Chief of Staff, traveled to Kingston, Jamaica where he met on September 2, 1994 with the following members of the Election Advisory Committee: Mr. William Chin-See, Chairman and members Pamela Benka-Coker, Senator Ryan Peralto, V. Corrine McLarty. He also met with the new Director of Elections, Major W.A. Sutherland. The electronic voting system was the topic of discussion. At this meeting, the EAC requested IFES to perform a technical evaluation of the proposed system.

A follow-up meeting was arranged at the IFES Washington office with Chairman William Chin-See on September 8. The Chairman was traveling with Sherryl White, New Beginning Movement; Colin Blair, The Gleaner (Jamaican daily newspaper); Owen Murray, Returning Officer, all on a USIA-sponsored trip to study electoral reform in the United States. At the meeting, Mr. Chin-See reiterated his request for IFES to perform a technical evaluation of the plan. This meeting was the result of an exchange of questions and correspondence between the EAC and IFES on this issue.

Following this series of meetings and correspondence, IFES submitted a proposal to USAID/Global/DG/Washington. Following USAID's approval, IFES assembled a four-person team to conduct the technical assessment. The team members were: Mr. Robert Stock, a private consultant in automated fingerprint technologies and a former FBI engineer; Mr. Jorge Tirado, a private consultant in information technologies and computer law who has previously been involved in electoral technology issues with both IFES and USAID; Dr. Gary Greenhalgh, a vendor of electronic voting machines and former Director of the Federal Elections Commission's Clearinghouse; and Roger H. Plath, IFES Information Specialist.

II. CONTEXT

A. BACKGROUND

The EAC has noted in its Interim Report on Electoral Reform of July 13, 1994, that, "Unfortunately, there have been serious deficiencies in the enumeration process and in the preparation of a good, clean voters list^{",1} The current enumeration process is conducted at legally mandated intervals in a house-to-house manner.² Enumerators manually collect registration data on forms which are then processed at central sites. Citizens go to regional sites to have their photos taken. These photos are placed on the ID cards which are then delivered by the enumerators in a house-to-house manner. The enumeration process is flawed by: the poor quality of photographs and fingerprints, poor handwriting and training of the enumerators, lack of control of the enumeration forms resulting in loss and improper canceling, false names on the list, multiple registration of the same person, and registering of under-age persons. The EAC believes that establishing a continuous and technologically sophisticated registration process in permanent centers could help solve this problem. The registration process would provide an identification card to each voter that would contain a fingerprint and photograph for positive identification. The fingerprint would also allow the registration database to check for fraudulent or mistaken registrations by comparing each fingerprint against all other fingerprints in the database and eliminating any duplications.

Another problem recognized by the EAC is actual voting day fraud. This fraud involves voter intimidation either at the polling place or simply in the streets to create a climate of fear in which voters don't even try to go to the polls. When legitimate voters do not vote, there are more blank ballots available to be fraudulently marked. Fraud, however, is not limited to "thuggery" in the streets. In some constituencies, termed "garrison" constituencies, local leaders have gained such complete control of the constituency that the poll workers themselves commit massive fraud by not allowing supporters of any other party to vote or by simply marking all of the ballots

¹Page 6, Interim Report

²The law requires a full enumeration exercise every four years.

themselves. The second phase of the EAC's proposed project, electronic voting, attempts to use technology to reduce or eliminate these types of fraud.

The current voting system is a traditional system using paper ballots, ballot boxes, voters lists, voter ID cards, and indelible ink as a check against multiple voting. The EAC envisions the following system: 1) As the voter enters the polling place, a live-scan fingerprint is taken (scanned electronic image) and validated against a previously scanned image that is digitally stored on the ID card. 2) The voter then goes to the voting booth where the fingerprint is scanned and verified once again. This second fingerprint verification activates the electronic voting machine and allows the individual to vote. 3) Each vote is recorded on the machine and might possibly be transmitted at intervals to a central tabulation network. 4) Finally, the voting machine will print out a receipt of the vote which can be reviewed by the voter for accuracy and then placed in a ballot box for a hard copy audit trail. Under such a system design, the voter could select any polling station in his constituency to vote. At the close of polls, the voting machine will produce a list of names of all electors who voted. A final electronic tabulation of votes will also be performed.

The EAC has publicly discussed the proposal in the Jamaican press. Local elections have been postponed once, in anticipation of EAC action. The EAC has been exploring the effectiveness and feasibility of applying technology to the electoral process, thus reducing human involvement (and associated fraud) in the process.

The EAC has held discussions with such vendors as Dermalogue, Fingermatrix, Moore Business Forms, Unisys, AIS, EDS, Printrack, Polaroid, and Eastman Kodak. Most of the EAC's information has come from these vendors. In such a vendor driven environment, the need for an objective evaluation of the plan is important, and forms the basis for this report. Although there are various vendors for each of the components that would comprise the new system, there is no single vendor that can supply all of them. The IFES team members were specifically chosen for their expertise in the various technical areas that will comprise the final system, namely automated fingerprint technology, computers, database technologies, imaging technology, and voting machines.

B. ELECTORAL ADVISORY COMMITTEE PROPOSAL

After several studies, such as the <u>EAC Interim Report on Electoral Reform</u>, and numerous discussions with political party representatives, government officials, and vendors, the EAC is convinced that change is necessary and possible. Opinions vary, however, as to how much change and when. The opposition Jamaica Labor Party (JLP) is strongly pushing for an electronic registration and voting system and would like to see the system implemented immediately. The party has, in fact, publicly stated that it will not contest another election until these conditions have been met. The governing People's National Party (PNP) also agrees that change is necessary, but does not seem to be as convinced as the JLP that technology will necessarily solve all of the problems. The PNP expressed concerns about the high cost of the currently envisioned system in light of budgetary realities and other pressing concerns facing Jamaica.

The EAC has divided the project into two phases. The first phase includes voter registration, provision of a voter ID, and development of a reliable voter registration database. The second phase will be the actual electronic voting equipment necessary for election day activities. By law, the EAC must begin an enumeration by March, 1995. General elections need not be held until 1997 and there is some flexibility on the date of local elections. The first phase will probably be less complicated and costly and will not likely be such a radical change from previous methods of enumeration. It is important the Phase I be allowed to proceed immediately; this would be impossible if it were dependent upon Phase II.

The EAC itself prepared and sent out to bid a Request for Proposals (RFP) to find a company to assist it in the preparation of a second RFP to select a company for the design and implementation of Phase I. The responses to the first RFP were received during the team's stay in Jamaica and all of the respondents were large accounting firms. The EAC was in the final stages of analyzing the responses as the team was preparing to depart. The EAC has since chosen Price Waterhouse to assist in the development of the Phase I RFP. Price Waterhouse may also be asked to assist in the development of the Phase II RFP.

The IFES team believes that the RFP process, conducted on an international level, is the best way to proceed. Not only will competition tend to bring in better price proposals, but if the

RFP is well-structured, allowing the vendors latitude to develop innovative solutions to the problems facing the Jamaican electoral system, the EAC may be made aware of excellent and cost-effective solutions that had not been previously contemplated. It is also hoped that the EAC will be able to link its activities with those of the envisioned national registry. If the national registry can secure funding in a timely fashion, the EAC could simply extract the necessary voter list data from the national registry database. The new national ID card would serve as the voter ID as well. This arrangement would also allow the EAC to concentrate their efforts and resources on Phase II.

1. Phase I - Enumeration

The current Phase I design being contemplated by the EAC is largely based on what has been proposed to them by Advanced Integrated Systems (AIS), a Jamaican systems integration company. AIS has been heavily involved in the promotion of the proposed system for a number of years and has become the primary source of information for the project. This was the only detailed vendor proposal that was provided to the IFES team.

The current Phase I design calls for the traditional house-to-house enumeration, but utilizing new technology, as follows:

- (a) Laptop computer to electronically record voter registration information and to store other data collected.
- (b) Live-scan fingerprint imaging device to electronically scan and digitally store voters' fingerprints.
- (c) Digital camera to digitally store voters' photos without using film.
- (d) Bubble-Jet printer to provide a copy of information gathered to the voter as a receipt and as a double-check that the information was correctly entered.

Each of approximately 1,000 enumeration teams would need a set of this equipment. Also, a portable method would have to be devised to power all of this equipment in the field. Once the field enumerators have electronically collected the information, it is then sent to a central processing site. Data would be physically delivered to the central site by those teams operating in the Kingston area. For teams outside of the Kingston area, the data could be transmitted by modem. This would represent an additional cost both in the field, where modems and good phone connections would be necessary, and at the central site which would need the capability to receive numerous simultaneous data transmissions. Once the data has been received in Kingston, the ID cards are produced and the information collected is added to a central voter registry database. The database would contain not only vital statistics such as name, address, and date of birth, but also the photo and fingerprint images.

Once the cards have been produced, the enumeration teams would then return them to voters in the same house-to-house method. It is also anticipated that to further enhance the security of the system, the voter will need to have another fingerprint scan, which would be compared to the encoded and encrypted original scan which would be digitally stored on the card itself. Only if the person's fingerprint matches the one stored digitally on the card, would the card be delivered to the voter. This last step would require the enumerators to also carry an ID card reader which would connect to the laptop along with the live-scan fingerprint reader.

Another option mentioned to the team would be to set-up central registration centers at the constituency level. Voters would then come to the centers rather than the enumerators going to the voters.

2. Phase II - Electronic Voting

On election day, the technology involved becomes even more sophisticated. It is currently anticipated that the number of voting centers will be reduced to 1,000 and the number of voting booths will be reduced to 3,000 (approximately half the previous number). That is to say that there will be, on the average, three voting booths in each physical voting center. Each voting center will have an administrative computer system that verifies a voters identity and eligibility and that may keep track of results from the three voting booths in the voting center.

The administrative computer system at each of the 1,000 voting centers would be comprised of the following equipment:

(a) Desktop computer

To store information and to run other attached equipment.

(b) ID card reader

Upon arriving at the administration area, the voter inserts the ID card into an ID card reader. The reader verifies that the card is valid and allows the desktop computer to access the digitally stored data on the card. The poll worker would be able to access the person's encoded and encrypted fingerprint, photo (for comparison to the photo that is printed on the card), and vital statistics such as name, address, and birth date.

(c) Live-scan fingerprint reader

Once the computer has accessed the personal and biometric³ data stored on the card, the voter's fingerprint would be scanned and compared to the information stored on the card. If the two match, the voter's identification has been positively verified.

(d) Modem

The modem would be used to transmit and receive data from either a central EAC database or from regional centers. The modem would transmit the information that a voter has voted and check to see that the voter has not voted in another location previously.

³The measurement or feature used to identify the individual. In this case, it refers to the fingerprint but could be photo, voice pattern, retinal scan, etc.

(e) R/F transmitter (radio modem)

This transmitter would allow for communication between the administrative computer and the three voting booths at each voting center. A radio transmitter was chosen to eliminate the need for cables between the voting booths and the administrative computer. The primary data transmitted would be that of the fingerprint. The voter's finger will be rescanned in the voting booth to be sure that the person who was checked at the administrative computer is in fact the person who goes into the voting booth. If not, the voting machine will not accept voter input.

- (f) Printer
- (g) Standby generator (12 hour capacity)

All of this equipment is 100% dependent on electricity. A generator with 12 hours of capacity will therefore have to be provided to prevent disruptions due to unreliable power or power outages.

The three voting booths that would be linked to this administrative system would contain the following equipment:

(a) Computer

Necessary to run the equipment in the voting booth.

(b) Live-scan fingerprint reader

This would be used for the second verification of the voter's fingerprint which would then activate the voting machine.

(c) R/F transmitter (radio modem)

The transmitter communicates with the administrative machine, primarily to receive the fingerprint data against which the second fingerprint verification is compared.

(d) Electronic voting machine with printer

Voter makes selection of candidate and the machine outputs a receipt so that the voter feels that something concrete has actually happened and then the receipt is placed in a traditional ballot box as the voter leaves the voting center. This can also serve, if desired, as a hard copy audit trail.

It is anticipated that there would need to be 3,000 sets of this equipment.

C. PROPOSED NATIONAL REGISTRATION PROJECT

Of great interest to both the EAC and to potential funders of EAC projects, should be the work currently being done to establish a national registry. The European Union (EU) has sponsored a consulting team to assist in the design of a Jamaican national registry and to assess the cost and feasibility of said registry. The registry would be developed from scratch to ensure data collection quality and an ID card would be issued to each registered person. It is envisioned that the card would be the legal document required for tax matters, social security, welfare, school registration, drivers licenses, etc. The EU indicated that the card might also serve as a voting ID in the future and the national registration database as the source from which the voters list could be drawn. The EU may make funds available to Jamaica for the establishment of a national registry based upon the report of the consulting team and their own budgetary constraints.

The EAC mentioned its general support of using a new national civil registry as the basis for its voter list rather than the expensive and less reliable house-to-house enumeration now used. Aside from being a much more reliable source of data, the use of permanently maintained national registry data would remove the recurring cost to the EAC of having to repeatedly conduct an

enumeration to produce the voters list. The EU consulting team, however, seemed a little apprehensive about supporting such a proposal. They seemed concerned that by incorporating the voters list, as one of the primary functions of the national registry, early on, the process might become politicized. Another reason may be that since the national registry would be a separate organization, this could lead to interagency competition between the EAC and the national registry. Given the politicized nature of events surrounding elections, these are valid concerns.

IFES strongly supports the use of a national registry as the basis to establish and maintain the registry of voters. The current method of producing a voters list is also tainted by years of poor quality, fraud, and corruption. Therefore an obvious advantage to using the national registry as the basis for the voters list is that the national registry does not have a bad reputation to negatively influence public opinion. Even if a high quality voters list were produced using the traditional methods, its doubtful that the public would perceive the list as such. Since the national registry would not be used for strictly "political" activities like the voters list, it might avoid becoming the target of corruption as has the voters list, or, at least, it might be better protected from the corrupting influence of politically motivated individuals.

It was also explained to the team that since voter turnout has become very low, and intimidation very high, people do not go out of their way to ensure that they receive a voter card. However, since the national ID card would be required for all public and some private transactions, people would go to great lengths to get their card. This might also help reduce fraud as there would be fewer unregistered citizens or unclaimed cards.

Finally, by combining the projects, large amounts of money need not be wasted in the duplication of efforts. The EAC could simply let the national registry work independently and extract the names of eligible voters at election time from the database. The ID card issued by the national registry would serve as the voter identification and would contain the necessary data and biometric elements. The EU consulting team's ID-card type recommendation is already so similar to what the EAC is planning that this should not pose major difficulties.

The EAC is committed to finding a solution to the problems that face Jamaica's electoral system. The most significant part of that solution is based upon a high-tech approach that is

hoped to significantly reduce the opportunities to commit fraud against the electoral system. The approach has been largely defined by the vendors that hope to supply the components of the new system. The system is divided into two parts which reflect the two major components of the electoral system: Phase I, the enumeration or registration of voters; and Phase II, voting day itself. The following section looks at the technical aspects of the proposed system.

III. TECHNICAL ASPECTS AND FEASIBILITY

The individual technologies comprising the registration and voting system explained in the previous section can be divided into three broad categories: automated fingerprint identification, computers, and communications. Each technology relies on components that are considered to be well-developed and mature and to this extent are technically feasible. They simply have never been combined in this way before. The adoption of the system outlined will probably not be decided on whether or not it is technically feasible, but rather on operational feasibility: will it function as promised and be durable in the field, will it actually solve the problem, and will it solve the problem significantly better than other possible solutions. Once the operational questions have been adequately answered, the last question to be addressed would be cost considerations.

One area in which the team noticed significant amounts of misinformation was that of fingerprinting. This really is the one of the cornerstones of the system, and so a significant amount of attention will be dedicated to it.

A. FINGERPRINT TECHNOLOGIES

1. Automatic Fingerprint Identification Technology

In non-technical terms, automatic fingerprint identification technology involves the following: a fingerprint(s) is taken, the image is scanned and the details of the fingerprint (such as general fingerprint type, arches, swirls, and points where lines intersect) are converted to a digital representation. These details are known as minutiae points and they can be stored and analyzed by a computer.

To our knowledge, there are no voting systems in the world that are operational and use Automatic Fingerprint Identification System (AFIS) technology to verify voters' identity. However, there are other applications that use the same AFIS techniques and equipment that would be required in this application.

There are many law enforcement and welfare systems that use AFIS technology, and there are many vendors that offer partial or complete systems to perform similar functions as that required by the proposed registration and voting system in Jamaica. Therefore, we will break down the AFIS technology into components and functions to compare the Jamaica requirements with that in use in the world today.

2. Comparison of Large Files to Identify Duplicate Entries

This is a basic function of most of the law enforcement systems in the world. The usual configuration is to have a file of prior arrested subjects, and to search this file with a newly arrested subject to determine if he is in the file under another name.

The Jamaican application has only one file (all registered voters), and so a search of each subject in the file is made against the total file to develop the information on duplicates. In other words, as each voters fingerprint is added to the file, it is compared against all other voters' fingerprints in the file. If any duplicates are found, they are investigated and removed. A significant amount of computer time is required to do this type of large file search, but this phase of the voter registration process is conducted significantly in advance of elections and therefore time is not a critical factor.

The FBI has a current criminal file of approximately 25 million AFIS subjects, and it is searched daily with about 20,000 subjects. The state of California has a data base of about nine million AFIS subjects and it is searched with about 4,000 subjects daily. Therefore, the current files in use are operationally larger than the 1.2 million subjects anticipated in the Jamaica system.

3. Verification of Candidate Identifications

Law enforcement systems currently use a human to verify identifications made by the AFIS system. The AFIS system produces probable "candidates" which must then be manually verified. This is due to legal and operational requirements, as well as technological reasons. The implications of this human verification process are significant in the Jamaican application as the EAC has as a goal the elimination of human intervention to the greatest degree possible.

However, there are some law enforcement systems being developed that do not require human verification.

The NCIC 2000 system currently under development at the FBI will search a file of about 400,000 subjects, using only one fingerprint, and will provide an initial answer without any human verification. In this case, a special matcher program is used to replace the human verifier, and therefore this special matcher program is referred to as a verification matcher. Initial tests of this arrangement are encouraging and show the feasibility of this approach.

Another application that is run without human verification is the welfare system in Los Angeles County, California. This application does not use a verification matcher, but rather uses a second finger to verify the initial candidate identified by the AFIS. Although the file is not as large as that of the FBI, it demonstrates the feasibility of this system.

4. Mixing Inked and Live-Scan Fingerprints

Another question comes up when engaging in searches of a large file. That is the mixing of inked and live-scan fingerprint data and the searching of one type fingerprint image against the other. A basic requirement of all of the law enforcement systems is that these two fingerprint images be compatible in both the manual and AFIS systems. Many test and installations have shown this to be true.

The FBI has certified several live-scan systems as acceptable after exhaustive comparison (both manual and AFIS comparisons) of the fingerprints produced. Many state systems in the US are using live-scan booking stations which produce fingerprints that are searched against files generated years ago with only inked fingerprints. The live-scan fingerprint data is then added to the files, so the files end up being mixed. Robert Stock writes:

I personally operated a live-scan terminal at the U.S. Border Patrol in California, and identified subjects located at the inked file at the California Department of Justice (Cal-DOJ). Subsequently, the Border Patrol operated a live-scan reader at their San Clemente station for a year, and made thousands of identifications

against inked fingerprints in the Cal-DOJ files. The FBI is currently running tests on the NCIC 2000 system using a mix of live-scan and inked fingerprints.

The major difference in live-scan fingerprints and inked fingerprints is the quality. If an expert fingerprints a subject, the inked prints will be superior to the live-scan, just as film images will be superior to television images. But in an operational field situation, as a group, the live-scan prints are usually superior to the inked prints. This is due to the discipline and physical constraints added by the live-scan terminal, as well as the difficulty encountered during usual operations in handling the rolling of the ink and the rolling of the fingers.

Some of the operational problems encountered in using ink in recording can be minimized by use of newer technology called inkless fingerprints. Here, chemicals and coated paper replace the ink, and minimize the slipperiness of the inked fingerprint. It is recommended that the EAC test inkless techniques against inked fingerprints to determine which produce the best results in an operational situation.

The EAC should not avoid use of inked (or inkless) type fingerprints on the basis that livescan produces a better data base. Either technique will require that strict quality control procedures be used during enrollment of voters. The decision should be made on the basis of operational and economic factors, as well as technical ones.

5. Identity Verification While Voting

Up to now, we have talked about searching a file of fingerprints with a search fingerprint, and determining if there is a candidate ident in the file. A second AFIS operation is called verification of identity, or simply verification, where the AFIS compares two fingerprints and determines if they are from the same individual. The difference is that there is no searching involved in verification. On voting day, for example, a live-scan is taken of a voter's finger. This is then compared against the digital representation of the voter's fingerprint that was taken when the card was issued and then stored on the card itself. The verification is that the card belongs to the voter holding it, in contrast to matching the voter's fingerprint against all fingerprints in the voter registry.

Verification using fingerprints has been used commercially and in government for years. It is generally used where high security is required to control access to a secure area, or access to a special computer terminal. Usually, this is used with a live-scan terminal to satisfy time requirements at a door or terminal. However, there have been optical fingerprint comparators that compare two inked images to determine if they are ident that is from the same individual.

The technical feasibility of identity verification has been established, but it has also been shown that there are some people that have poor fingerprints, or no fingerprints, and they cannot be verified. Some of these people have a skin disease, while others are stone-masons or other tradespeople that have worn their fingerprint ridges off. The number of such cases is small, and the team is not aware of any studies that quantify the size of this category. Usually, some alternate method of verification is required for these subjects. This is something that the EAC will need to include in their RFP to vendors.

6. Secure Identity Cards and Encoded Identification Data

The technology for generating a secure identity card is mature and improving steadily. Encryption of codes is done so that when a machine reads the card, it can verify that the card itself is genuine. The usual problems that are encountered involve theft of genuine cards and bribery of individuals making and distributing the cards.

Both magnetic encoding (like the stripe on the back of a credit card) and optical encoding of data (Figure 1) can be done on the card and a sufficient number of bytes can be encoded to hold the required data for identifying the individual and his fingerprint. Figure 1 below is an example of the proposed technology. It is generally referred to as a two-dimensional barcode (or portable data file) as it consists of not only vertical, but also horizontal lines. The data storage capacity of the barcode is proportional to its size and it can be printed directly onto the ID card much like a standard barcode is printed

on packages.



Figure 1

Such a two-dimensional barcode could store the necessary data to allow a poll clerk on voting day to retrieve the voter's photo, fingerprint, and biographical data such as name and address. This information can also be stored, as previously mentioned, in an encoded format which would verify the authenticity of the data and prevent tampering. The card data would be read by a card reader attached to a computer at the polling place with the card's data being displayed on the computer's screen.

B. COMPUTERIZED REGISTRATION AND VOTING SYSTEM

As previously mentioned, there are few technical impediments to the implementation of the envisioned system. All of the technologies proposed are mature and well-developed. The only area that will require some technical analysis will be that of integrating the equipment to allow it to function as proposed. The integration of the equipment is what has not been done previously. The integration could take the form of software and interface cards which would allow the diverse and separate pieces of equipment to function together. It might also involve taking the diverse pieces of equipment and combining them into integrated units. For instance, in the proposed voting booth, there is a voting machine, an R/F modem, a printer, and a live-scan fingerprint reader. Instead of four separate pieces of equipment cabled together, it might be possible to build all of the pieces into the voting machine. This would simplify transportation, usage, and set-up. This would, however, be a custom designed piece of equipment and this could affect costs.

C. COMMUNICATIONS

The communications requirements for the project, namely communication between voting sites and some regional or central database will largely be handled by the existing communications infrastructure. A representative of the Jamaican telephone company told the team that they are actively pursuing a wireless technology to bring service to those areas where it is difficult and expensive to provide service by traditional copper lines. He assured the team that this service would be sufficiently advanced by the next time that general elections are held that the phone company could guarantee service to any area on the island. The wireless technology might be susceptible to jamming, but given that it would only be used in remote areas with few voters, it

is unlikely that it would be the target of efforts at electoral fraud which most often occur in urban areas with high concentrations of voters.

Because telephone communications can be intercepted, the EAC should put into place an encryption and authentication scheme to ensure that transmitted data is not compromised either by fraudulent activity or by telephone line conditions. The team also suggests that the possibility for intentional disruption of telephone service be considered. It would probably not be difficult to sever a phone line or to vandalize a phone company facility thereby eliminating phone service and database checks against multiple voting.

The team recommends that a secondary physical check be implemented as a back-up to the database checks. This might be using indelible ink, punching the ID card, or some other electronic method of altering the card immediately after voting so that if the card were checked later at another voting site it would show as invalid. Another method would be to only allow a person to vote at one pre-assigned polling place. In this case, the computer at the polling place records each voters ID number and will prevent a voter from voting twice. This method can also be done manually using the traditional voters list as an additional back-up.

IV. OPERATIONAL ASPECTS AND FEASIBILITY

As mentioned previously, the implementation of the proposed system will depend much more on the operational and financial feasibility than the technical feasibility. Because no actual working prototype exists, the team can only try to picture what the system would look like and what types of problems might present themselves. The section on operational and financial feasibility will concentrate on areas of concern and some possible options.

A. PHASE I - ENUMERATION

1. Areas of Concern

There is no technical reason that the enumeration equipment could not function as proposed. The team, however, would like to mention the following areas of operational concern:

- (a) The enumeration equipment is very technologically sophisticated and will require an equal level of sophistication from those who operate the equipment. The team was told that enumerators are often people who are unemployed or who may not have a high level of education. Certainly, with good basic skills, people could be trained to use the equipment, but the learning curve may prove to be quite steep for those with no prior computer-related experience. Enumerators will also need to be taught how to use the digital cameras and the live-scan fingerprint scanners. To get good results from the fingerprint scanners, training is critical, as is a degree of dedication to constantly and correctly apply the techniques learned.
- (b) The proposed equipment discussed in previous sections of this report, unless it were custom designed to be useless outside of the specific electoral application, is both highly desirable and easily marketable. In a situation where enumerators are outside and going house-to-house, this could lead to theft.
- (c) The proposed equipment is sensitive electronic equipment and being somewhat fragile would not stand up to careless handling. If the equipment is dropped or

banged around while it is being transported, or exposed to moisture or low quality electrical current, it might lead to a high degree of equipment failure.

- (d) If equipment is stolen or damaged, how will it be repaired or replaced, especially in areas distant from Kingston? This could become a significant and recurring cost.
- (e) All of the equipment also needs to have a steady and continuous power source. In areas where electricity is not reliable, all of the equipment could conceivably be battery powered, but any single battery pack could not be expected to last more than a couple of hours under continuous-use conditions. This means that either a large number of expensive, bulky batteries will need to be carried by each team or that a generator or some other power source must be found. Also, if batteries were used, how would the hundreds or thousands of batteries used by the enumeration teams be charged at the end of each day? It was mentioned that equipment could be powered from vehicles. Will enough enumeration teams have vehicles with them everywhere they go for this to be practical? If the equipment will need to be connected to equipment to protect it from fluctuations in the electrical current. This adds another cost and is bulky. It also assumes that most homes will have electricity available.
- (f) Specifically concerning fingerprints, Mr. Robert Stock offers the following comments:

One of the first ways to defeat the enrollment system check on multiple entries into the database is to use different fingers when being fingerprinted. A subject might enroll with one name, and use his thumbs for enrollment. The next time he enrolls, he would use a different name and use his index fingers. This could proceed until he has used five names and five different sets of fingerprints. None of his fingerprints would match in the subsequent search of the voter registry.

For this to happen requires only that the person taking the fingerprints cooperate, or not notice which fingers are being used. This elaborate fingerprint identity system requires that the persons operating the system, either during

enrollment or voting, maintain the integrity of the system. Elaborate physical devices to force the subject to use the required fingers would help, but they would probably not eliminate fraud if the personnel involved do not ensure the integrity of the system.

In US law enforcement, the subjects ten fingerprints are taken twice. Each finger is rolled in a specific box on the card. Then, the right four fingers are taken together, then each of the thumbs, and then the left four fingers. These latter sets of fingerprints are called the plain impressions or flats, because they are not rolled. The fingerprint technician then has two impressions of each finger to use, and has a method to determine if any of the rolled impressions are not in the proper sequence. In spite of these precautions, it still requires that the officer print the proper subject on the fingerprint card with the correct descriptive data and name.

Systems using less than this ten-print arrangement would have to provide other means to ensure the integrity of the fingerprint data. The RFP should require that this be included as part of the protection against fraud for a new system.

2. Phase I Options

It is recommended that the EAC utilize a national registry for the production of voters lists. As it appears that funding may be forthcoming for the national registry, the EAC would be able to save a large sum of money and time on Phase I and concentrate its efforts on Phase II. The advantages, other than financial, were previously mentioned in section II.

If circumstances do not allow this to happen, and the EAC is required to conduct its own enumeration this year to comply with legal requirements, the team would like to mention the following options:

(a) Conduct the enumeration at fixed sites, probably one site per constituency, instead of doing the house-to-house enumeration. Fixed-site registration would lower costs for personnel as well as for equipment. It would also allow for much greater control over quality and greater security against theft of equipment and attempts at fraud.

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- (b) If the enumeration must begin before funding has been secured for Phase I activities, a "low tech" approach could be utilized. This would include standard "ID"-type photos, manual entry of information on forms, and either inked or inkless chemical prints.⁴ The form that is used could be specially designed to facilitate scanning for electronic capture of data at a later time. Even if this approach is taken, sufficient time will need to be allowed to design the new form and then to select a vendor.
- (c) In the absence of an electronic fingerprint database and fingerprint matching equipment, the forms could be sent out to an AFIS vendor for scanning and comparison. In this way, the electronic information is created and duplicates could be eliminated. Mr. Stock contacted a company which could provide these services and was given an initial estimate of US\$1.25 per subject to be scanned with a comparison done of each fingerprint in the system against every other to find duplicates. Several months would be required to perform this task.
- (d) For either a high-tech or a low-tech system, the importance of well-trained staff members who feel pride and integrity in their work can not be overemphasized. Efforts could also be made to actively seek out those who try to defraud the system and to aggressively prosecute them to the full extent that the law allows.
- (e) If low-tech ID cards are used, the voter registration number could be encoded and encrypted on the card as a means of verifying the authenticity of the card on election day.

⁴Note that if the inkless method is used, the area on the registration form for the fingerprint(s) will need to be specially treated.

3. Suggestions for Voter Registration System Requirements

Appendix B is a list which summarizes some of the key capabilities and requirements that a voter registration system should offer to operate effectively. This list, and the three that follow, was prepared by team member Jorge Tirado who participated in the development of a similar voter registration system in Puerto Rico.

4. Suggestions for Voter Registration System Performance Requirements

Appendix C is a list that provides examples of performance requirements for the registration system that should be considered. Performance requirements that are below the standards eventually determined by the EAC may not be capable of meeting operational deadlines.

5. Suggestions for Delivery and Acceptance Criteria

Appendix D refers to phases through which each vendor who responds to the RFP might be assessed by the EAC.

6. Examples of Workflow Procedure Specifications

Appendix E discusses workflow procedure specifications as they relate to the production of the ID cards.

- B. PHASE II ELECTRONIC VOTING
 - 1. Concerns

The five numbered concerns listed in the previous section, which were: 1) sophisticated equipment will require an equal level of operator sophistication, 2) highly desirable and marketable equipment such as laptops may lead to theft, 3) equipment is very sensitive to environment and method of handling, 4) how will equipment be repaired or replaced, 5) how will equipment be powered in the field, apply equally to Phase II and some become significantly more

critical on election day due to the fact that enumeration occurs over a relatively long period of time while election day is just that--one day. Additional concerns are:

- (a) The team members commented on the sheer volume of equipment that would need to be delivered to each site. It is a concern not only for financial reasons but also for logistic reasons and because the more complex a system is the more chance there is that something will go wrong with it either during installation or operation. It might well be possible to have custom equipment produced in which many of the separate components currently proposed are integrated into a single unit.
- (b) It has also been proposed that the voting booths be connected to the administrative computer by way of "radio (R/F) modems". This technology certainly exists and is operationally reliable, but it is not mainstream technology and would be a complicated and very expensive alternative to a few cables run from voting booths to the administrative computer. There are also wireless devices that communicate using infrared. This is significantly less expensive than R/F and may be adequate for the application.
- (c) The EAC would like for a voter to be able to vote at any polling site within a given constituency. The reason being that in this way a voter who felt intimidated at one location could simply go to another safer location. The idea is very good in theory, but to implement the idea a way must be found to prevent a voter from going to all of the polling places in a constituency and repeatedly voting. The proposed solution is for each polling place to transmit by modem, to a regional or national database, the names of voters who have voted and to have each polling place query the regional or national database to determine whether or not a voter has already voted in another location. This system, however, depends heavily on reliable telephone service which may or may not exist at all polling places and which in many cases could be easily sabotaged. If adequate manual back-ups to prevent multiple voting can not be implemented, another possibility would be requiring voters to vote in pre-assigned polling places.

- (d) One of the key items of data required by the EAC in planning the election day activity is a survey of the potential voting sites. This number is a key driver in the economic analysis, and detail information is required to plan the operational aspects of this project. It is not sufficient to plan on the basis of 3000 average voting sites. There are differences between voting sites in Kingston and in the rural areas. It must be established that there are sites, having reliable power and telecommunications services, that are a reasonable distance from the population. Site security and the number of potential voting population, security, power, and communications, and backup requirements. A different mix of equipment might be proposed for each category of site. An initial plan should be developed from the site survey information regarding the distribution and maintenance of equipment on voting day.
- (e) If 75% of the enrolled voters are expected to vote, that will mean 0.9 million voters. The average number of voters per site will be 300. The voting hours are 8 am to 5 pm, or 8 hours or 480 minutes. This calculates out to 1.6 minutes per voter. This figure does not allow for peak periods and slack periods of the day, uneven distribution of voters per site due to geographic factors, equipment failures, and higher than expected turnout. If we use, for instance, the figure of 3.2 minutes per voter, we have a requirement for two times the estimated 3,000 sets of equipment, or 6,000 sets of equipment.

The above estimate of the number sets of equipment must be carefully evaluated to account for the uneven distribution of voters and times. It seems likely that 3,000 sets of equipment will not be sufficient to allow for an average of 300 voters to vote in one day at each site unless all voters are quick, the equipment works flawlessly, and people are always present to vote so that there are no slack times.

The proceeding estimate is primarily for illustrative purposes and is based on what the team feels might be reasonable numbers. Since this is a new system, and since the team members have never actually witnessed voting day in Jamaica, these

should be carefully reviewed by the EAC, particularly since the proposed system deals with new and different procedures for enrollment and voting. Potential vendors should also have to demonstrate the operational times of any equipment they propose.

- (f) Any electronic equipment can fail. There will need to be a procedure in place to repair or replace broken equipment rapidly and on a nation-wide basis.
- (g) The equipment is dependent upon a continuous and stable source of power. If electrical current in any given area is of poor quality or becomes unavailable throughout the course of election day, a generator will need to be in place to provide the necesary electricity. Also, to prevent data loss and damage to equipment, some sort of battery back-up (to provide power to the equipment until the generator can be brought on-line) and line conditioner will need to be utilized. Generators need to be placed outside and so might be targets for theft or vandalism if not well protected.
- (h) In a worst case scenario, where no power is available, there should be a way to conduct the voting process manually at affected sites.
- (i) Poll workers will need to be very well-trained in advance. The equipment is sufficiently complex that simply referring to a manual when problems arise will not be adequate. IFES has developed and implemented poll worker training projects all over the world and maintains a large collection of poll worker training materials in its Washington, D.C. Resource Center. These materials include manuals, posters, and videos among other things and are available for the EAC and any other interested party.
- (j) Equally important to the success of the process will be voter education and motivation. People will need to be shown how to vote using the new equipment. This will probably involve the use of all forms of mass media communications such as radio, TV, and newspaper, as well as posters, actual demonstrations at public

> locations, and other forms of training. This is important to avoid a chaotic scene at the polling place on election day, and will also serve the purpose of demonstrating to the public that significant changes have been made to the electoral system which should increase voter confidence and participation in the system. IFES has developed and implemented voter education and motivation campaigns all over the world and maintains a large collection of voter education and training materials in its Washington, D.C. Resource Center. These materials include manuals, posters, and videos among other things and are publicly available.

2. Phase II Options

The implementation of Phase II will necessarily be influenced by the manner in which Phase I is implemented. It also will be influenced by amount of time available and by financing. In any case, the following items could be considered:

- (a) A detailed analysis should be done by those intimately familiar with Jamaican enumeration and election day proceedings, to complement this report, that details the potential threats to the enumeration and voting system. The analysis should include both threats to the registration process as well as to the actual voting process. Included should be both past threats as well as those that could be anticipated under the new system. This analysis will be important to the RFP process to ensure that vendors are able to design a system with appropriate counter-measures.
- (b) An RFP should be prepared for Phase II and it should be distributed internationally to receive the widest possible range of responses.
- (c) The RFP should avoid asking for specific types of solutions, but rather should include the threat analysis described in number one, and basic parameters such as the fingerprint being used as the biometric for identification, and then allow the vendors to propose their own unique solutions to solve the problems and counter the threats that are outlined.
- (d) The desired changes to the voting system could be phased-in over time as funding permits. With each future election, new counter-measures could be introduced based upon an analysis of the previous election. This process would continue until an acceptable level of integrity has been reached. This will also allow voters to become accustomed to the new methods over a longer period of time.
- (e) As mentioned in the previous section, great attention should be given to training of staff. Pride and integrity in the job should be emphasized.
- (f) On election day, a way should be found to significantly increase security. Those who are entrusted with the security function should have the authority to interveñe and arrest when necessary. The team was told that no one has ever been convicted for a violation of the Electoral Law. Electoral laws should be aggressively enforced to make it abundantly clear that fraudulent and violent behavior will not only no longer be tolerated, but actively opposed and with serious consequences for those who choose to try and defraud the system. Those who try to commit fraud should be prosecuted and jailed. The common belief that electoral fraud can be committed with impunity must be challenged.

The team was told in meetings that people feel that the Police provide neither adequate protection nor enforcement of the Electoral Law on election day, but that the Jamaica Defense Force (JDF) is widely seen as being less biased and of strong integrity. The JDF is, however, a small force of only about 3,000 soldiers and is currently prevented, by law, from exercising any form of police activity unless there is immediate threat to life. It might be possible to grant the JDF extraordinary powers on election day to enforce electoral law thereby increasing election day security.

Some possible alternatives to the Phase II option as it has already been presented would be:

(g) Attempt to integrate the numerous components that make up the voting center equipment as much as possible. For instance, the individual components that

> comprise the voting booth system of the administrative computer system could be integrated into a single machine. This might potentially lower cost and would also make transportation, set-up, and operation significantly easier. If custom work is done to provide the component integration, some thought should be given to the possibility of modifying the computer in such a way that it is incapable of performing any other function besides election day activities. This may help reduce theft-related losses.

- (h) The following could be done to reduce costs without significantly reducing overall system objectives: use cables or infrared between voting booths and administrative computers instead of radio moderns, use only one instead of two fingerprint verification scanners (just one in the voting booth that prevents access to voting machine if the fingerprint doesn't match that stored on the voter's card), investigate component integration as mentioned in item seven.
- (i) Although in theory the idea of allowing a voter to vote anywhere within the constituency is good, in practice in necessitates a regional or national database and a significant investment in communications equipment such as modems (both at polling place as well as numerous at database to receive incoming information and queries) and wireless communication equipment for areas not yet served by standard telephone service. It would probably also not be difficult to temporarily disrupt telephone service in certain areas thus allowing for large scale multiple voting.

A solution is to assign each voter to a specific polling place and then only allow the voter to vote at that one location. This is standard practice throughout the region. The voting machine or computer can keep track of who has voted and not allow a voter to vote more than once. In areas where voter intimidation is a problem, effective security should be provided. It was also mentioned to the team that voter intimidation generally has as its goal gaining access to blank ballots. In a system without physical ballots and in which the fingerprint scanner prevents

> voting by unauthorized persons, voter intimidation might well decrease because there would be less to gain by such criminal actions.

Overall, in theory, the proposed system is operationally feasible. To be considered operationally feasible in practice, however, the concerns mentioned in this report will need to be addressed. Other concerns to be addressed will probably surface as development and planning of the system progresses. Attention should also be paid to reducing the complexity of the system and the number of individual components. The simpler and more straightforward the design is, the greater a chance it will have to successfully operate in the field.

V. COST CONSIDERATIONS

The greatest cost driver is the need for an estimated 1,000 sets of enumeration equipment, 1,000 administrative computer systems for the 1,000 voting centers and the 3,000 computer systems for the voting booths themselves. Given the relatively large amount of time available for the enumeration exercise, one can be reasonably certain that 1,000 sets of enumeration equipment will be adequate.

However, if 75% of the enrolled voters are expected to vote, that will mean 0.9 million voters. The average voters per site will be 300. The voting hours are 8 am to 5 pm, or 8 hours or 480 minutes. This calculates out to 1.6 minutes per voter. This figure does not allow for peak periods and slack periods of the day, uneven distribution of voters per site due to geographic factors, equipment failures, and higher than expected turnout. If we use, for instance, the figure of 3.2 minutes per voter, we have a requirement for two times the estimated 3,000 sets of equipment, or 6,000 sets of equipment. This would have a significant effect on total cost.

Determining even a roughly estimated cost for the system hardware is very difficult as there also does not yet exist a baseline configuration, or even agreement among all involved parties as to what that baseline configuration should be. If a definite configuration existed, the first step would be to determine the cost of each enumerator set of equipment and each voting day set of equipment and then multiply by the number of required sets. If this methodology is applied to the system as previously outlined in the report, a preliminary range of approximate costs might be from US\$28 million to US\$40 million (see table on following page). There is a wide range of costs given because the cost of each piece of equipment will depend upon how it is configured. For instance, for the computers, what size and type of monitor, amount of RAM, size of harddrive and whether magnetic storage should be internal or external, fixed or removable, and type of processor. Also, if the items are essentially "off-the-shelf," a volume discount could be negotiated that might be substantial. However, if some items are custom designed for use in the Jamaican application, a premium will be applied to the design and manufacture of those items. These discounts or premiums could significantly affect the final cost.

ITEM	QTY	LOW	HIGH	SUB-LOW	SUB-HIGH
laptop	1,000	2,500	4,000	2,500,000	4,000,000
live fingerprint scanner	1,000	1,000	1,500	1,000,000	1,500,000
Digital camera	1,000	800	1,000	800,000	1,000,000
bj printer	1,000	250	350	250,000	350,000
desktop computer	1,000	2,500	3,000	2,500,000	3,000,000
id card reader	1,000	300	500	300,000	500,000
live fingerprint scanner	1,000	1,000	1,500	1,000,000	1,500,000
modem	1,000	80	150	80,000	150,000
r/f transmitter	1,000	3,000	3,500	3,000,000	3,500,000
bj printer	1,000	250	350	250,000	350,000
generator	1,000	1,000	1,500	1,000,000	1,500,000
computer	3,000	500	1,500	1,500,000	4,500,000
live fingerprint scanner	3,000	1,000	1,500	3,000,000	4,500,000
r/f transmitter	3,000	3,000	3,500	9,000,000	10,500,000
electronic voting machine	3,000	700	1,000	2,100,000	3,000,000
TOTAL				28,280,000	39,850,000

Preliminary Range of Approximate Costs

Furthermore, it is the team's opinion that the configuration will eventually be different than that currently proposed as it is modified to conform to the realities of operational and financial constraints. Because the system will consist of thousands of individual components, a change in components required, or in the configuration of a component, could significantly increase or decrease the cost. Other costs not factored-in include: personnel costs, costs to train system operators and poll workers, education of electorate in how to use new system, software, interface cards, cables, connectors, extra batteries that might be required for the laptops that are proposed for the house-to-house registration, and Uninterruptible Power Supplies to protect the equipment from power losses and power fluctuations. Also, there is no way at this stage to evaluate the cost that would be incurred in paying for the actual services of the various vendors and the systems

integrator (their development time, overhead, and profit). Another cost that cannot be estimated is the equipment and design for the central voter registration database and ID card production facilities because they have not yet been discussed.

A final cost consideration would be that the EAC analyze the possibility of leasing equipment and outsourcing services. It might be possible that vendors involved in providing equipment for Phase I and Phase II would consider leasing some part of the equipment to Jamaica. If, for instance, the registration is to be conducted house-to-house, which necessitates large numbers of components such as cameras and laptop computers, but will eventually be conducted in permanently maintained registration offices (which would require less and different equipment), some of the components could be leased by the vendors to Jamaica. This would provide the EAC with the equipment when it is needed and also reduce the up-front capital required to initiate the project.

In a similar manner, services such as scanning of photographs, scanning and optical character recognition of registration forms, scanning and analysis of fingerprints, and production of ID cards could be outsourced to companies that already have the facilities, equipment, and personnel in place to provide these types of services. Outsourcing could also reduce the up-front capital outlay and allow the project to proceed more quickly because facilities would not have to be constructed, equipment would not have to be purchased, and personnel would not have to be trained. In the case of the ID cards, for instance, following the initial mass production of the million-plus ID cards, Jamaica would only need to construct a small facility for the on-going maintenance (replace and provide cards to newly registered voters) of the ID card program rather than a huge facility for the initial mass production of the cards.

VI. CONCLUSION

The team feels that the Phase I and Phase II systems could be technically implemented essentially as they have been proposed. The technology is, for the most part, mature and well-developed. The only new and untested element is the particular combination of the technologies. The primary determinants will more than likely be operational feasibility and financing. To be considered operationally feasible in practice, the concerns mentioned in this report will need to be addressed. Other concerns to be addressed will probably surface as development and planning of the system progresses.

The report has looked at both concerns and options. The following list represents the recommendations that the team developed and would like the EAC to consider. Some of these are taken from concerns, others from options, and others from the rest of the report. These list is not exhaustive, but covers the main points.

1) RFP Process

- (a) The RFP process is the best method to follow to guarantee not only the lowest costs and highest quality, but also to allow vendors to present innovative solutions to the Jamaican request that might not have been previously considered. The RFP should be sufficiently "open" to allow vendors to be creative in the solutions that they propose.
- (b) An analysis should be done to determine how many polling places will be needed to adequately serve the voters.
- (c) A study should be undertaken to identify the exact polling place locations to be used and whether or not they meet minimum infrastructure requirements such as reliable phone and electrical service.
- (d) A analysis of threats to the future and proposed enumeration and voting system should be conducted by those who are intimately familiar with these systems as

> they have operated in Jamaica. This would be a good complement to this report and should be provided to vendors to assist them in designing an effective proposal.

(e) Integration and simplification of the proposed registration and voting system electronic components should be considered.

2) Enumeration

- (f) The envisioned national registry should be used to establish and maintain the registry of voters. The national ID card should also serve as the voter ID card. This course of action will depend on whether or not the national registry receives funds and is able to complete its work in time for the voter data to be used in the next general election.
- (g) EAC should not avoid using manually taken inked fingerprints out of concern that they will not be compatible with, or of sufficient quality, the live-scan fingerprints. Inkless prints should be considered if the fingerprints are taken manually. A test should be conducted to evaluate inked versus inkless prints.
- (h) Whichever method is utilized, an alternative method will need to be developed to account for those people that do not have useable fingerprints.
- (i) If all ten fingerprints are not taken, another means will need to be developed by the vendors to protect against an individual who registers under multiple names while using a different finger for each name thus avoiding the fingerprint duplicate check.
- (j) Portable equipment, such as that used for enumeration, will need to have a reliable power source. This may include a large stock of batteries, using vehicles to power the equipment, using the electricity in the homes of those enumerated, or some

> combination thereof. If electricity is used, some sort of line conditioner should be used to protect the equipment from power fluctuations.

(k) Enumeration at fixed sites, rather than the traditional house-to-house method, should be considered. This would significantly reduce the amount of equipment necessary while allowing for greater control over the quality and security.

3) Election Day

- (1) If telecommunications between voting sites and central databases will be used as the primary means to prevent multiple voting on election day, a back-up or manual method will need to be developed in case the equipment fails or there are problems with the telephone lines. One method would be to only allow voters to cast their ballots in one pre-assigned location rather than at the location of their choice. Other methods would include: traditional indelible ink, some sort of punch mark on the ID card, or some form of electronic "mark" on the card that prevents its reuse.
- (m) A manual method should be developed as a back-up to allow voting to continue in areas where power becomes unavailable. This includes not only identity verification but also the act of voting itself.
- (n) Selection of qualified people will be important to the success of both the enumeration exercise and election day.
- (o) Training will be critical for both enumerators and poll workers. Voter education will also be necessary to avoid a chaotic election day and to change public perceptions of the Jamaican electoral system. IFES maintains a large collection of relevant materials, gathered from countries all over the world, in its Washington, D.C. Resource Center. All Resource Center material is publicly available.

- (p) Some method should be found to increase security on election day. This might include granting extraordinary powers to the JDF on election day. Violations of the Electoral Law should be aggressively investigated and prosecuted.
- (q) R/F modems, used to transmit data between voting booths and the administrative computer at each voting center, might be the single most expensive piece of equipment proposed. Less expensive alternatives such as cables or infrared should be considered.
- (r) A method will need to be devised to quickly respond to equipment failures, especially on election day when there will be people queued up the entire day waiting to vote.
- (s) All electronic equipment running on electrical current (vs. batteries) should be connected to line conditioners and preferably to Uninterruptible Power Sources (UPS).

In addition to the technical and operational elements, the proposed registration and voting system will be very costly and it appears that two factors will be important in obtaining necessary funds. On the domestic front, the governing party, influential Jamaican organizations and institutions, and the voters themselves will need to be convinced that the investment is money well spent. In these times of tight budgetary constraints, it may not be an easy task to convince people that this is the best possible use of limited funds. On the international front, donors appear to be looking at the electoral issue from two sides. On the surface, the new registration and electronic voting system represents a significant break with the past and an attempt to bring integrity back to the electoral system. This is seen as a positive step forward.

On the other hand, the question was raised as to whether those that benefit from the current fraudulent electoral environment are truly committed to change or would simply like to project an image that change is occurring so that business can go on as usual. In efforts to secure funding, it would be beneficial to the EAC to address this issue. The point is important because there is no substitute for personal integrity and honesty in an electoral system. Many people will

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still need to be involved during all stages of this ambitious project, and no amount of technology will ever eliminate vote fraud or intimidation of voters until those involved with the system practice integrity and honesty in their dealings with the system.

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APPENDIX A

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LIST OF INTERVIEWS CONDUCTED

1.	Major W. A. Sutherland
	Director of Elections
2.	Members of Electoral Advisory Committee (EAC)
3.	Douglas McA, Halsall
	Managing Director, Advanced Integrated Systems (AIS)
4.	Dr. Donald Walwyn
	Senior VP, Telephone Company
5	William Chin See
J.	Chaimman Flortenal Advisory Committee
	Chairman, Electoral Advisory Committee
6.	Members of EAC Technical Subcommittee
7.	Representatives of Moore Business Forms
Q	Senator Duan Derolto
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	Januarda Labor Farty
9.	Minister Mullings
	Minister of Agriculture (responsible for electoral affairs at time of team's visit)
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10.	Owen Murray
	President, Returning Officers Association
11.	Kathryn Hewlett-Jobes
	High Commissioner, Canada
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12.	Ian Worthington
	Second Secretary-Chancery, British High Commission

13.	Christopher M. Brown USAID
14.	Kirk Dahlgren USAID
15.	Don Smith Deputy Director, USAID
16.	Attended Presentation of European Union Consulting Team (Feasibility study of national identification card program)
17.	Alan J. Carlson Second Secretary, US Embassy
18.	Senator Maxine A. Henry-Wilson Minister Without Portfolio, General Secretary PNP
19.	Mr. Charles, Chairman and Ms. Jones-Kerr, Secretary Private Sector Organization of Jamaica
20.	Mr. Henry, President and Ms. Cooper, General Secretary Jamaica Council of Churches
21.	James Moran Head of Delegation, European Union
22.	Lacey Wright Charges Des Affaires, US Embassy

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APPENDIX B

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SUGGESTIONS FOR VOTER REGISTRATION SYSTEM REQUIREMENTS

Excerpted from Final Report of Jorge Tirado

1. General

- (a) All transactions should be tagged with the Constituency information. This enables the EAC to account for which constituency performed what transaction, when, and by whom.
- (b) Enable tracking of voter National Register Number (NRN). This gives constituency the flexibility to find and perform registrations based on the voter's NRN.
- (c) Register voters directly from the National Register records.
- (d) Enable fast and flexible on-line search against voter records.
- (e) Robust, multi-faceted, parameter-driven security system.
- (f) Demographic information for all offices and system users are centrally managed.
- (g) Integration with desktop business tools, e.g. Excel, Lotus, Word, WordPerfect, etc.
- (h) All transactions should be logged and stamped with designated operator.
- (i) User-friendly on-line help.
- (j) Most transactions should be performed on-line and in real-time.

2. Voter Registration Security

The voter registration system should be equipped with a robust and multi-faceted yet flexible security system. This allows management to fully control and track registration activities. It further helps ensure that fraud possibilities are minimized. The following are some of its highlights:

3. Security at Constituency Level

If a on-line system is implemented at the Constituency level the following security highlights should be observed:

- (a) Each constituency terminal should have a unique id, and log-on should be performed only from valid terminals.
- (b) Authorized log-on time-windows can be established for any of the Constituency terminals. This allows the EAC to control when Constituency activities can be performed.
- (c) All Constituency log-on users must be authorized to use the system.
- (d) Any function or transaction should be able to be enabled or disabled for a Constituency user instantaneously by a supervisor.
- (e) Constituency users can only perform transactions for voters within their authorized domain.
- (f) Constituency users can view and report on only their constituency activities.
- (g) EAC administrators can view and report (on-line) on which constituencies and what users are logged-on at what times.
- 4. User Access to Programs
 - (a) All users should have a password assigned to access the application.
 - (b) Any user or user group can be restricted (on-line) from having access to any program or function.
 - (c) Each user is assigned to a Security Group. For example, Central Site Group, Constituency Group, Managers Group, etc. This simplifies security management.

- (d) Extensive security facilities should be available for administrators and managers. These allows controlling and managing authorization levels for various programs, users, and security groups.
- 5. Data Security
 - (a) Constituency users should be able to perform transactions only against voter records within their authorized domain.
 - (b) Constituency users can view and report on registration activities only for their Constituency.
 - (c) Managers should be able to view and update their Constituency user security authorizations.
 - (d) EAC managers can view, but not update, user security information.
 - (e) Any user or user-group can be (on-line) restricted from having access to any class of information.

APPENDIX C

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SUGGESTIONS FOR VOTER REGISTRATION SYSTEM PERFORMANCE REQUIREMENTS

Excerpted from Final Report of Jorge Tirado

1. General

- (a) The system should maintain a table that relates ID card indices and physical location of images.
- (b) The system should integrate totally with existing hardware and software. Capabilities to integrate to electronic office and other administrative systems is desired.
- (c) System should provide the means for relocation of image records to a new filing media (like CD-ROM).
- (d) The system should be capable of generating usage reports about who accessed which functions of the system, which records, and date and time of access.
- (e) System should provide protection against voltage fluctuations, and for power outages for at least 30 minutes.
- 2. Hardware Specifications and Requirements
 - (a) Vendor should provide compatibility with hardware and software specifications.
 - (b) Software specifications included in other sections should also be taken in consideration.
- 3. Storage Requirements
 - (a) Disk drives should use RAID (Redundant Array of Inexpensive Disks) technology for on-line storage, but optical drives should be required for off-line storage.
 - (b) Optical drives disks should be WORM (Write Once, Read Many) type.

4. Workstations

- (a) Compression of images is highly recommended.
- (b) System workstations should have at least the capabilities of image rotation, and zooming.
- (c) Monitors should have a minimum resolution of 1024 x768 (SVGA) and .28 dot pitch.
- (d) Monitors should be a minimum of 15 inches.
- (e) The image of a record should display in the screen of the workstation on a mean time of 25 seconds, with a maximum of 50 seconds. Subsequent images of the same record should be available within 2 to 5 seconds of being called.
- (f) There should be the capability that when a record is called the system should present a list of all other images in the record, by ID card number, so the user can ask for a specific image.
- 5. Printers

The vendor that supplies the laser printers to be used in the production of the electoral lists, should provide a feature that would permit the voter's photo to appear alongside the voter's name on the voters list printouts.

- 6. Scanners or Photographic Equipment Specifications
 - (a) Establish a minimum number of documents per minute.
 - (b) Should have automatic feeder capabilities.
 - (c) Should accept a pre-established range of card sizes.

- (d) Scanning should be done at 300 dpi minimum.
- (e) Equipment should have dynamic and manual threshold to compensate for fluctuations in density contrast and reflection.
- 7. Data Communications and Network Requirements
 - (a) If a LAN system is used it should comply with Ethernet or Token Ring topology standards.
 - (b) System should provide the backbone and all required interfaces with Main Computer, including software bridges and controllers for all peripherals/server of the system, as specified by vendor.

8. Security Requirements

Security in the system should be achieved by the following methods:

- (a) Once an image is scanned and indexed no one can erase it, or its index from the database. It can be removed from a record to a file of removed images, by a supervisor. There should be a database record of when, why, and by whom the removal took place. These removed images should be kept in the magnetic image database for a year after the record is sent to dead files. Deletion has to be authorized by the Database Administrator.
- (b) Passwords should be assigned to all personnel utilizing the system. Access to functions should be assigned to each password. A record should be kept of all functions and files accessed by date and time. Printing of copies should also be monitored. Passwords should be known only by user and changed on a regular basis.

APPENDIX D

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SUGGESTIONS FOR DELIVERY AND ACCEPTANCE CRITERIA

Excerpted from Final Report of Jorge Tirado

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1. Pre-Contract Demonstration

Pre-contract demonstration should comply with requirements mentioned in other sections.

2. Delivery Schedule

Vendor should produce a schedule with completion dates for the following activities:

(a) Detailed Design

Vendor should provide a date for delivery of a detailed system designed for approval by EAC.

(b) Pilot System

Vendor should state in how many calendar days, after approval of the detailed design, a pilot system can be produced.

(c) Production System

Vendor should state in how many calendar days, after the approval of the pilot system, a working system can be produced.

(d) System Expansion

Vendor should state in how many calendar days, after the approval of the working system, the project can be completed, including conversion and training.

3. Systems Acceptance Test Plan

Acceptance test plans should be prepared by vendors. They should be discussed and incorporated into the contract. The acceptance test period begins on the date the installation is completed and operational from the hardware, software and application point of view.

4. System Acceptance Criteria

System availability is defined as the ability to:

- (a) Scan a ID card, index it, store the image in main storage, ID card verification and write the image to optical disk.
- (b) Search the index database, select a record, select an image for viewing or printing, retrieve the image from main storage or jukebox or similar storage device, route the image to a workstation, and display or print the image.
- (c) Percent availability is calculated by dividing the total time which comprises the normal work period (8 hours daily, Monday to Friday), into the total time the system is available. The percent must higher than 97 percent. To be acceptable individual components must meet minimum availability standards for a period of thirty consecutive days.
- 5. Component Acceptance Criteria

Component availability is defined as follows:

- (a) Workstations and their servers: Ability to access the indexing system, to perform a search, to select a picture for viewing, and to view or print the picture.
- (b) Image capture devices and Servers: Ability to scan a ID card, to display the image on the monitor associated with the image capture workstation, and to write the image to optical disk.
- (c) Main Disk Storage, optical drives, jukeboxes or similar devices and their servers: The ability of the component, following a user command, to access or load and access the correct disk, to locate and read the correct file, and to transmit the image data to the user's workstation; or to write an image file to the optical disk upon command.

(d) Percent availability is calculated by dividing the total time which comprises the normal work period (8 hours daily, Monday to Friday), into the total time the component is available, as described above. Availability of individual components which are repeated in the proposed design must be equal to or higher than 97 percent. To be acceptable individual components must meet minimum availability standards for a period of thirty consecutive days.

APPENDIX E

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EXAMPLES OF WORKFLOW PROCEDURE SPECIFICATIONS

Excerpted from Final Report of Jorge Tirado

1. ID card Organization

Vendor should include a layout of how the ID card images should be organized in the optical storage.

2. ID card (Image) Conversion and Verification Workflow

The flow of ID cards to be scanned or converted during the enumeration and verification process:

- (a) For each actual voter (paper) ID card to be converted, the receiving section should send all photo-related ID card information to the scanning section. If the photo ID information is received from the Constituency on electronic media, it should be received by the receiving section for verification and sent to the scanning section for electronic data translation.
- (b) The electronic image of the fingerprints should be previously captured and stored at Constituency's computer, then transferred to the Image Server located at the Central Site, via telecommunications or a diskette copy.
- 3. ID Card Receipt and Scanning Workflow

ID cards should be received by the scanning section in different formats, from the following areas:

- (a) From the receiving section: the ID cards should be received in paper form, identified with the voter's name and voter number in alphanumeric order by Constituency.
- (b) ID cards submitted in electronic media by the Constituency, such as diskettes, or sent via telecommunications, should be converted to main magnetic storage and then stored in an optical disk. There must be availability for automatic indexing of ID cards by utilizing ID card type, date, voter record number and name recognition. The ID cards are routed from the Constituency to the receiving

section, then sent to the scanning section, to be archived. In this case there must be an inventory of ID cards received for indexing.

- (c) Received at scanning section: when the ID cards are received at the scanning section, clerks/analyst should check them to verify the correctness of the information required for the conversion, eliminate staples and prepare for scanning. Once this is done, scanning takes place and images should be captured and stored.
- (d) Preparation of batches: ID cards should be batched daily by the scanning section, utilizing the electoral number within the Constituency number.
- (e) ID cards scanning: scanning of ID cards should be accomplished by identified batches or individual ID cards. In some instances the main index could be captured with a bar-code reader from a label attached to the card prior to scanning the ID card. Images to be scanned should be in forms with size up to 2x3 to 6x8 inches.
- (f) ID card quality control: once ID cards are scanned the system should allow the scanning station employee to look at them in order to check the quality of the scanned image. If the image quality is not satisfactory, the ID card is marked for substitution.
- (g) Analysis and archiving: for all the ID cards archived during the conversion process, automatic indexing should be available by utilizing ID card type, date, voter record number and name recognition. The least acceptable option should be that the ID cards are routed and available at the scanning section, in order to enter indexing information. In this case there must be an inventory of ID cards received for indexing, ID cards should be batched by Constituency.
- (h) Duplicate ID cards received at the scanning section: in that case there should be means of informing the scanning section that a previous copy of the ID card has been archived and verified and it should be available for comparison and acceptance as primary or secondary ID card.

4. ID Card Indexing

Should be achieved utilizing one or more of the following methods:

- (a) Host access: for all indices that can be obtained from the Main Computer's Database.
- (b) Automatic: for all indexing information that can be obtained from the scanned ID cards.
- (c) Barcode: the system would utilize the bar coded record number that should be used to identify the ID cards submitted by the receiving section.
- (d) Manual: for indices that are not available utilizing the above mentioned methods.

The Host Access and Automatic indexing methods should function in such a manner that as soon as one enters an index for archiving a voter's record, all of the remaining indices should be obtained from the Main Computer's electoral register database, as a result of an automatic index search. If a Main Computer and a Image Server are used, a copy of the main data base should reside in the Image Server, to minimize access to the main frame computer. At the analysis stations, the index key should be shown on the screen, so an analyst can verify if the index refers to the person whose name appears in the ID cards. Once indices are verified and approved, they should be used as the reference to the ID cards on the Image Server. The following indices should be used:

- (e) Voter Number: This is the number assigned by EAC to each of the voters. It should identify to whom the ID card belongs. This is the most important index for voter records.
- (f) Date: Should help locate a ID card that has been improperly indexed, together with the Constituency number.

- (g) Constituency Number: This is the number that should identify the location where the voter resides and received the services
- (h) Name of Voter: Surnames and name of Voter.
- (i) ID card Storage Volumes: Expected volumes of ID cards that should be scanned daily during the conversion, should be estimated in order to calculate the total disk space needed for temporary end permanent storage. If images should be kept active for an average of 10 years, percentage of future expected volumes should be calculated.
- (j) As a basic requirement, images should be scanned at 300 dpi minimum. Compression should be JPEG with a ratio higher than 10:1
- (k) ID card storage: ID cards should be scanned, indexed, and stored in magnetic media until the conversion and verification processes are completed. Once the ID card is verified the images should be stored in a permanent file in magnetic media and in optical media for backup.
- 5. Workflow at the Verification Section
 - (a) Once ID cards are scanned and placed in magnetic storage, the system should check for mandatory ID card information compatibility with the main system's Database (IBM-4381). If a record has all mandatory information correct, it should be routed to the verification section for final review. If more than one clerk is needed to verify the information, then the system should route the ID cards to the supervisor, who should decide who should verify the ID card against the image. No matter the routing used, the supervisor should have available the option of knowing who has a particular record and its status.
 - (b) The clerks should verify the scanned ID cards in order to detect which ID cards have been misread, so that appropriate measures are taken to find and re-scan them.

- (c) The verifying clerk should check the ID cards for quality and correctness of the indices. The clerk should have the authority to modify or enter indices, and to ask the scanning clerk to reenter an image.
- (d) Once ID cards are verified by the verifying clerk, the image should be automatically placed in permanent magnetic storage and in optical storage. The act of sending image records or ID cards to optical storage should produce a list of ID cards that are to be distributed by the receiving section.
- (e) The ID cards converted are sent daily to the receiving section to be filed. The ID cards should be filed under the receiving section's custody for a year, after which time they are distributed.

APPENDIX F

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EAC INTERIM REPORT ON ELECTORAL REFORM

ELECTORAL ADVISORY COMMITTEE

INTERIM REPORT

ON

ELECTORAL REFORM

13th JULY 1994

KINGSTON JAMAICA W.I.

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Page I of IV

EXECUTIVE SUMMARY

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OF

DECISIONS AND RECOMMENDATIONS

Page	Recommendations-Decisions	Action Required	Time Frame
5	Establishment of Permanent	An act to establish	1994
	Electoral Commission	same concurrently with the	
		repeal of the Representation of	
		the People (Interim Electoral	
		Reform) Act.	
5	Control of Budget	A Repeal of the Provision of	1995
		Section 8(1) of the Representation	
		of the People (Interim Electoral	
		Reform) Act.	
		Full effect to be given to Section 11	1994
		of the Representation of the People	
		(Interim Electoral Reform) Act,	
		instead of the present administrative	
		requirement for funds to be made the	rough
		the Permanent Secretary, Ministry of	
		Agriculture whereby the Ministry ma	akes
		a decision as to the quantum which i	s
		provided to the Electoral Office	

from time to time.

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5	Enumeration period Amendment of Section 7(2) of the		1995
		Representation of the People Act.	
6	Continuous Registration	A new section to be introduced as	1994
		Section 7 of the Representation of	
		the People Act with a renumbering of	
		the sections following.	
7	Access to Records of	An amendment to Section 8 of the	1995
	Births, Deaths,	Representation of the People Act by a	
	Immigration	new Section 8(1)(a).	
8	Fingerprints to identify	Section 29 (1) of the Rules contained in	1994
		the First Schedule to the Representation	
		of the People Act to be amended to allow	
		for the taking of two thumbprints or other	
		fingerprints if the thumb is missing.	
		Special provisions are to be made if	
		fingerprints cannot be captured.	
8	Publication of	An amendment to Section 17 of the	1995
	Official List	Representation of the People Act to	
		provide for the obligation of the	
		Electoral Office to publish an updated	
		list every six months.	
8	Abolition of	Section 38 of the Rules contained in the	1994
	Supplementary Lists	First Schedule to the Representation of	
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the People Act to be amended.

Restructuring

9	(a) field operations	Budget requirements to be submitted to 199			
		expedi	expedite implementation.		
12	(b) data processing	(i)	Awaiting provision of funds for	1994	
			equipment;		
		(ii)	Identification and recruiting of	1994	
			a suitable person. Request for		
			funding to follow.		
13	Administration:-	(i)	Re-establishment of separate posts	1994	
			of Assistant Director (Field) and		
			Assistant Director (Administration);		
		(ii)	Establishment of post of Training	1994	
			Officer;		
		(iii)	Establishment of four additional	1994	
			Regional Supervisors posts;		
		(iv)	Development of programme of	1994	
			continuous Public Education and		
			training of personnel which are		
			prime features of successful		
			Electoral Administrations.		
			Budget to be submitted.		
14	Minimum period between	Amendment to Section 21 (1) of the Representation of the People Act to		1994	
	announcement of Election				
	and Nominatino Day.	provide for a minimum of five days notice.			
14	Hours for Nomination	Amen	d Section 23 (1) to permit	1994	

Nomination between the hours of 10:00a.am. and 2:00p.m.

14	Restriction on	A new section to be included in the	
	Campaigning	Representation of the People Act after	
		S103.	
15	Register of potential Election Officers	Preparation to commence.	1994
16	Training of Security Personnel	Consultations to take place with the Chief of Staff and Commissioner of Police.	1994
16	"One day police" to be abolished.	Administrative Action.	1994

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ELECTORAL REFORM

ELECTORAL ADVISORY COMMITTEE INTERIM REPORT - JULY 13th, 1994

INTRODUCTION

An Electoral process which ensures "one man - one vote" is the cornerstone on which a democratic electoral system rests. A system is therefore required which gives to citizens the confidence that every person of voting age will enjoy the right to vote in elections that are free and fair.

The Representation of the People Act was introduced in the year 1944, and declared the entitlement to every qualified person:

- to be registered as an elector of the polling division in which he is ordinarily resident; and
- (b) to vote at an election of a member of the House of Representatives for any constituency if his name appears upon the official list for a polling division comprised in such constituency.

Similar provisions exist in the Kingston and St. Andrew Corporation Act and in the Parish Council Act with regard to election of a member of the Council of the Kingston and St. Andrew Corporation and of a Parish Council respectively.

Since its inception the Committee has accepted that a critical aspect of its mandate is the continuous evaluation of the performance of the system. Over the years it has made numerous adjustments for the purpose of achieving the objective of the entitlement of the citizen to be registered and to vote. Despite elaborate procedures for:

(1) the enumeration of qualified persons;

- (2) the identification of persons registered as electors;
- (3) the preparation and publication of official lists of electors;
- (4) the appointment of election officials and agents of candidates;
- (5) the accountability of presiding officers and polling clerks
- (7) securing the ballots amongst others,

there has in recent times, been a less than acceptable level of success in achieving the objectives of the Act. The Committee has therefore been unanimous in deciding that substantial changes are necessary.

The electoral system as currently designed relies heavily on the exercise of discretion by officials to operate it according to the procedures which have been developed and on the compliance and co-operation of citizens to allow this system to function properly.

The system has been plagued by:

- (a) Ineffectiveness in its administration, and
- (b) Widespread malpractices

This report speaks to these problems and sets out the Committee's decisions and recommendations to address them.

<u>APPRAISAL</u>

At a Retreat in June 1990, the Electoral Advisory Committee observed that the effectiveness of the present system was severely hampered by:

- (a) The withdrawal of more qualified and civic minded citizens from involvement in the system; and
- (b) The indisciplined, disruptive and fraudulent behaviour of certain groupings of citizens,

which had the effect of undermining the electoral process. As a result, the Committee has been exploring ways and means to develop reforms for implementation.

In November 1991, a sub-Committee under the Chairmanship of Professor L. H. E. Reid reported that a Computerised Voting System appeared to offer a real possibility of providing a competent and efficient system, secure against the abuses experienced over the years. This report was accepted by the Committee and extensive investigations into such a system began. Committee has been considering the views of technical experts on the different elements involved, as well as exploring the availability of such a system. The concept, benefits and concerns regarding the proposed system are set out in detail at pages 19-22 where the election day process is examined.

In September 1993, the Committee formed the view that in addition to any change to the actual voting system, the administration of the electoral system needed to be restructured to ensure that it functioned effectively. A Management Audit was commissioned and after the Committee examined tenders, Price Waterhouse was selected to undertake the study with the following Terms of Reference:

To examine and make recommendations in respect of:

- the system, procedures and resources required for the preparation of an accurate and reliable voters' list;
- personnel requirements and compensation;
- the company best suited to carry out the Electoral Office's fingerprinting requirements;
- the computer hardware and software required to generate the necessary reports/lists on a timely basis to achieve the Electoral Office's objectives;
- a suitable vendor to provide a national identification card.

The Committee further advised Price Waterhouse that the assessment of the suppliers of fingerprinting systems was of the highest priority, and that this needed to be concluded as quickly as possible.

Price Waterhouse submitted a series of interim reports in respect of each facet of the Terms of Reference, including an evaluation of senior staff, and, having had discussions with the Committee, a final report is soon to be presented.

THE ELECTORAL ORGANIZATION

The Committee was created under and by virtue of the provisions of the Representation of the People (Interim Electoral Reform) Act, 1979. The Director of Elections is recognised under the Representation of the People Act and the Electoral Office supports the Director of Elections in his functions.

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The Committee was set up as an interim body, in order to remove from the ruling political party the responsibility for electoral matters. An Electoral Commission was contemplated and was expected to have been established in the Constitution.

In budgetary matters, the Electoral Office is treated as a Department of the Ministry responsible for electoral affairs and is required to seek approval for each item of expenditure. This procedure causes serious delays in meeting deadlines in the performance of its functions.

The Committee feels strongly that it is highly undesirable to treat the Electoral Advisory Committee (or the Electoral Commission, when established), and the Electoral Office like other Civil Service bodies. The scope of their operations has very far reaching implications for Jamaica's democracy. The officers of the Electoral Office must not only be, but must be seen to be, persons of the highest integrity and capability, in order to operate in a political climate without fear or favour.

The Committee (Commission) must therefore be given the necessary resources and the flexibility to enable it to attract and retain highly qualified personnel; to put in systems to achieve the level of performance that will address the crisis of confidence that now exists, and to implement decisions free of the present cumbersome bureaucratic procedures for the release of funds.

In November 1993, the Cabinet accepted the following proposals of the Committee:

- (a) That the Electoral Commission should be made a corporate body;
- (b) That the emoluments of the Director of Elections should be of the order of \$750.000 to \$1 million;
- (c) That the tenure of the office of Director of Elections should be increased from eighteen months to seven years; and
- (d) That should an incumbent Director cease to hold office for any reason prior to the expiry of his term, the tenure of his successor should initially be for the full term provided under the Act, and not restricted to the

unexpired portion of his predecessor's term.

These decisions have facilitated the Committee in finding a suitable person to be Director of Elections.

The Committee has accepted the recommendation in the Management Audit that "the Electoral Advisory Committee and the Electoral Office should be combined as a single organisational entity with the overall responsibility for the management of the electoral system" and in turn recommends that:

- (A) THE COMMITTEE SHOULD IMMEDIATELY BE TRANSFORMED INTO A PERMANENT ELECTORAL COMMISSION, AND SHOULD BE AUTONOMOUS, VESTED WITH THE SOLE RESPONSIBILITY FOR THE ADMINISTRATION OF ITS BUDGET, BUT ACCOUNTABLE TO PARLIAMENT FOR THE USE OF SUCH FUNDS, AS WELL AS ALL OTHER MATTERS FOR WHICH IT HAS RESPONSIBILITY.
- (B) ITS ROLE SHOULD BE ANALOGOUS TO A BOARD OF DIRECTORS WHICH FORMULATES POLICIES AND ASSESSES IMPLEMENTATION, AND THAT THE DIRECTOR SHOULD BE THE CHIEF EXECUTIVE OFFICER, ACCOUNTABLE TO THE COMMITTEE (COMMISSION).

THE COMMITTEE, HOWEVER, STILL REQUIRES A BREAK OF THE LINKAGE BETWEEN ITSELF AND THE CIVIL SERVICE IN TWO IMPORTANT AREAS:

- (A) THE FLOW OF FUNDS AND
- (B) THE ABILITY TO OFFER COMPETITIVE EMOLMENTS UNRELATED TO THE CIVIL SERVICE SCALE.

INADEQUACY AND INEFFICIENCY IN THE ADMINISTRATION

The inadequacies and inefficiencies in the administration of the electoral system are most evident during the enumeration of voters and on polling day.

ENUMERATION

The law as it stands requires a full enumeration exercise every four (4) years, with an

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updating exercise between each full enumeration. The clear purpose behind this provision in the law is that persons attaining voters' age are given a reasonable opportunity to be enumerated and registered, so that at the time of an election they are qualified to vote. Unfortunately there have been serious deficiencies in the enumeration process and in the preparation of a good, clean voters list.

The problems which have been encountered are, inter alia:

- (a) Failure to contact the citizen.
- (b) Poor quality of photographs and fingerprints.
- (c) Poor handwriting of enumerators.
- (d) Failure of the full enumeration team to be present at the home of the citizen during the enumeration exercise.
- (e) Loss of or mislaying of enumeration forms.
- (f) Improper cancelling of enumeration forms.
- (g) False names on list (padding of list).
- (h) Under-aged persons enumerated (padding of list).
- (i) Multiple registration of the same person (padding of list).
- (j) That voters long deceased or who have emmigrated remain on the list.

The Committee is of the view that in order to alleviate most if not all of the problems, THERE SHOULD BE CONTINUOUS REGISTRATION WITH THE ESTABLISHMENT OF PERMANENT REGISTRATION CENTRES ISLANDWIDE, WITH CENTRES LOCATED IN APPROPRIATE BUILDINGS.

The benefits to be gained are, inter alia:

- (a) Consistency and efficiency in the taking of photographs and fingerprints.
- (b) Better policing of the registration process including safety of enumeration records.
- (c) Personnel of suitable educational standard appropriately trained to achieve optimum efficiency.
- (d) Convenience to elector and guarantee of the right to be enumerated.
- Production and posting of preliminary lists of new applicants for viewing on an on-going basis by members of the public.

(f) The preparation of up-to-date lists.

The Government has announced a programme of NATIONAL REGISTRATION which, if implemented, could provide a National Identity Card which would have encrypted thereon, such data as is required to identify the holder as an eligible voter.

Professor Gladstone Mills chaired a Committee which did considerable research on National Registration and placed before Government a detailed report with a recommendation that this programme should be implemented by the Electoral Advisory Committee.

The Committee has therefore decided:

- (1) THAT THERE BE A FULL ENUMERATION EXERCISE IN ORDER TO CREATE A CLEAN DATA BASE.
- (2) THAT THEREAFTER FULL ENUMERATION EXERCISES ALONE SHOULD BE UNDERTAKEN AND COMPLETED AT INTERVALS OF NOT MORE THAN SIX (6)YEARS IF NECESSARY.
- (3) THAT CENTRES BE ESTABLISHED TO FACILITATE THE PROCESS OF CONTINUOUS REGISTRATION.
- (4) THAT NO APPLICANT IS TO BE PLACED ON THE VOTERS' LIST UNTIL VISITED BY THE OFFICIAL ELECTORAL TEAM TO ESTABLISH PLACE OF RESIDENCE.
- (5) THAT ELECTORS SHOULD BE OBLIGED TO REPORT AT REGISTRATION CENTRES, ALL PERMANENT CHANGES OF RESIDENCE. NEW ADDRESSES TO BE VERIFIED BEFORE THE LIST IS ADJUSTED.
- (6) THAT STAFF BE IDENTIFIED AND TRAINED TO CARRY OUT REGISTRATION. TRAINING SHOULD ALSO BE GIVEN TO REPRESENTATIVES OF POLITICAL PARTIES.
- (7) THAT THERE BE LEGISLATION TO ENABLE THE COMMITTEE
 (COMMISSION) TO ACCESS THE RECORDS OF BIRTHS, DEATHS, AND IMMIGRATION.

The Committee recognizes that the system of continuous registration encompasses all the requirements of a full enumeration exercise and that when fully implemented, the Committee

will of necessity, re-examine its decision at (2) above. The logistics of this system require careful planning and implementation and is likely to involve mobile centres to deal with special cases such as hospitals, homes for the aged etc.

THE VOTERS' LIST

The voters' list has always been a subject of great controversy, and allegations of fraud in its preparation have come with each election.

The Committee is aware of the following problems:

- (a) Elector listed more than once.
- (b) Elector wrongly listed in a polling division or constituency in which he or she does not reside.
- (c) Unqualified persons listed as electors.
- (d) Failure to publicly exhibit the list in sufficient time to deal with objections.
- (e) Elector is enumerated but is left off official list.
- (f) The production of supplementary lists by Statement of Changes to the official list which has been a recipe for chaos.

Investigations carried out by the Committee reveal that fingerprints provide the most accurate and convenient method of identification for the preparation of a clean voters' list.

The Committee has therefore decided:

- 1. THAT THE SYSTEM TO BE IMPLEMENTED SHOULD HAVE FINGERPRINTS AS THE CRITICAL ITEM TO BE USED FOR IDENTIFYING THE APPLICANT FOR REGISTRATION AND FOR THE PREPARATION OF A CLEAN VOTER'S LIST. IN THIS REGARD STEPS HAVE BEEN TAKEN TO ACQUIRE THE NECESSARY EQUIPMENT TO CARRY OUT THIS EXERCISE.
- 2. THAT THERE BE PUBLICATION OF THE OFFICIAL LIST AT LEAST ONCE EVERY SIX (6) MONTHS AND THAT THE LIST TO BE USED FOR ANY ELECTION BE THE PUBLISHED LIST WHICH IS NOT MORE THAN SIX (6) MONTHS OLD AND IS CURRENT (NOT LESS THAN FIVE (5) DAYS BEFORE NOMINATION DAY).

3. THAT THE POWER GIVEN TO THE DIRECTOR OF ELECTIONS TO AMEND THE PUBLISHED LIST BY A STATEMENT OF CHANGE SHOULD BE REMOVED.

The Committee recognises that by its decision at (2) above citizens who attain voting age within five (5) days before the announcement of Nomination Day will be disenfranchised but has had to balance this against the chaos that obtains with the issuing of supplementary lists. Furthermore the cut-off date enables the electoral machinery to be in a better state of readiness for elections.

PROCESSING STEPS TO PROVIDE VOTERS' LIST

- (1) Enumeration data properly completed and audited to be put into the computer data-base.
- (2) Electronic cross matching of all data including fingerprint to remove duplications.
- (3) Preliminary list to be then produced and displayed for three (3) weeks at Electoral offices and at other public buildings to be prescribed. Copies to be provided to political parties.
- (4) Allow three (3) weeks to process omissions and objections from anyone.
- (5) After verification and approval of the data received, ensure that an effective security mechanism is triggered to restrict access to the data.
- (6) Print official Voters' List and process as at (3) above after approval by the Electoral Advisory Committee.

ELECTORAL STAFF AND SYSTEM

The problems which are being experienced have been substantially addressed in the Interim Management Audit Reports. Analysis reveals that there is an urgent need for the restructuring of the organisation and for the documentation of operating policies and procedures which are easy to understand and are accessible to members of staff. Two areas of operation which require urgent and critical attention are FIELD OPERATIONS and DATA PROCESSING

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FIELD OPERATIONS

These functions include inter alia:

- Ensuring that all qualified persons are given the opportunity to be enumerated and registered to vote in the polling division in which they ordinarily reside.
- 2. Providing each person so registered with an identification card or other document evidencing his identity and successful registration.
- Receiving nominations of such candidates as the electors desire to nominate for election to the House of Representatives, Parish Councils or the KSAC.
- 4. Supplying on Nomination Day to each candidate, copies of the official lists of electors for the relevant constituency/electoral division.
- 5. Ensuring that the accommodation and other facilities for voting prescribed by the law, are available to each voter on time and in good order.
- 6. Securing the voting process to achieve "one person one vote".
- Declaring elected the candidate who has received the largest number of votes.
- 8. Providing data and making recommendations to modify polling divisions, electoral divisions and constituency boundaries.

Currently the field operations is headed by an Assistant Director of Elections who also has responsibility for the Administration of the Electoral Office. His staff compliment consists of:

- 1. One Senior Supervisor
- 2. Three Regional Supervisors
- 3. One Senior Draughtsman
- 4. One Administrative Assistant

The Senior Supervisor (post now vacant) assists the Assistant Director by providing support in training, materials procurement and distribution, in addition to his role as Regional Supervisor for the twenty four (24) constituencies in Kingston, St. Andrew and St. Catherine. The three (3) Regional Supervisors have responsibility for the remaining eleven (11) parishes containing thirty six (36) constituencies.

Each constituency has a Returning Officer assisted by an Election Clerk and both are part-time officers. There is also a Constituency Clerk who is a full-time employee.

The Committee has decided:

- 1. THAT FIELD OPERATIONS BE SEPARATED FROM ADMINISTRATION WITH AN ASSISTANT DIRECTOR IN CHARGE OF EACH.
- THAT THE NUMBERS OF REGIONAL SUPERVISORS BE INCREASED FROM FOUR (4) TO SEVEN (7) ENABLING A MORE EQUITABLE DISTRIBUTION OF THE WORK LOAD. THE ASSIGNMENTS ARE TO BE AS FOLLOWS:
 - (A) WESTMORELAND, HANOVER AND ST. JAMES(NINE (9) CONSTITUENCIES).
 - (B) ST. ELIZABETH, MANCHESTER, TRELAWNY, (TEN (10) CONSTITUENCIES).
 - (C) ST. ANN AND CLARENDON, (TEN (10) CONSTITUENCIES).
 - (D) ST. CATHERINE (NINE (9) CONSTITUENCIES).
 - (E) KINGSTON AND PORT ROYAL.
 ST. ANDREW WEST, SOUTH WEST AND SOUTH (SIX (6) CONSTITUENCIES).
 - (F) ST. ANDREW NORTH EASTERN, EAST RURAL, EASTERN, SOUTH EAST, EAST CENTRAL, WEST CENTRAL, NORTH WEST, NORTH CENTRAL AND WEST RURAL, (NINE (9) CONSTITUENCIES).
 - (G) ST. THOMAS, PORTLAND AND ST. MARY, (SEVEN(7) CONSTITUENCIES).
- (3) THAT SEVEN (7) REGIONAL OFFICES BE ESTABLISHED WITH ADEQUATE STAFFING AND EQUIPMENT TO ENHANCE FIELD

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OPERATIONS AND TO CREATE A CLOSER LINK BETWEEN THE PUBLIC AND THE ELECTORAL OFFICE.

(4) THAT THERE BE CONTINUOUS TRAINING OF FIELD PERSONNEL IN ORDER TO CREATE EFFICIENCY, OPERATIONAL TRANSPARENCY AND A CULTURE OF IMPARTIALITY AND CREDIBILITY.

The Committee has examined the suggestion that Returning Officers become full time employees but this has not been accepted. The Committee instead opted to increase the numbers of Regional Supervisors in view of the fact that the greater part of the work-load of Returning Officers takes place mainly during enumeration and election periods.

DATA PROCESSING

This is the "back room" operation of the system which is managed by an Assistant Director Data Processing. It's role and functions can logically be divided into three areas, considered hereunder.

(A) <u>Operations</u>

This team is responsible for interface with the field staff, organising the collection and control of inputs and is the central point for managing the distribution of voters lists, other reports generated by the system, plus identity cards. It is also responsible for the creation, control and management of the Registration Records and the examination of Registration requests. This is followed by the preparation of schedules to facilitate the enumeration of voters.

The operation team also manages the production of ballot papers, the checking of the ballot papers and the distribution of these to the Returning Officers/electoral officials. The other function carried out by this team is the management of the vault. The Black Books, containing copies of Registration Records, filed by Polling Division are maintained and updated by vault staff and stored in vaults.

(B) <u>Systems</u>

This team is responsible for data entry of Registration Records and subsequent processing for the preparation of the official list of registered voters.

The official list used in the General Elections of March, 1993, was and continues to be a matter of great concern, as it is replete with errors. It was hoped that there would be substantial improvement by reason of the current up-dating of the list. The Committee, however, has grave doubts that a clean list will result. Some of the problems result from the records taken in the field exercise but many are attributable to lack of controls, (no audit trails). The use of out-moded, obsolete and unreliable data-entry machines which are inefficient to operate, gives rise to extensive requirements for corrections, and require double keying or verification of all data entered, as a means of ensuring accuracy, as no on-line validation is possible. Furthermore, processing procedures are not documented and different computer programs have been developed which appear to be incompatible with each other.

The Committee recognises that the Central Information Technology System needs to be redesigned, and tested to ensure:

- 1. That all processing is done using complimentary procedures and be part of a single system.
- 2. That documentation for the system is developed and properly recorded.
- 3. That master files are up-dated and freed of errors. THE COMMITTEE HAS DECIDED THAT STATE OF THE ART EQUIPMENT WILL BE ACQUIRED TO PROCESS AND PREPARE THE ELECTORAL LISTS AND THAT A TECHNICAL EXPERT SHOULD BE APPOINTED TO SET UP A RELIABLE PROCESSING SYSTEM AND TO TRAIN THE STAFF.

(C) <u>Identity Card Production</u>

This is another area of serious concern. The cards are of poor quality and in many instances bear wrong photographs and other incorrect data. In addition many individuals have been issued more than one card with data variations. Systems to overcome these problems are being considered.

ADMINISTRATION

THE POST OF ASSISTANT DIRECTOR (ADMINISTRATION)IS TO BE RE-ESTABLISHED WITH SPECIFIC RESPONSIBILITY FOR OFFICE ADMINISTRATION AND THE DEVELOPMENT OF A CONTINUOUS PUBLIC EDUCATION PROGRAMME. The Committee recognises that whatever may be the system and process to conduct free and fair elections, there is a critical need to educate citizens, especially young persons:

- (a) To an understanding of the electoral process;
- (b To a respect for the importance that the electoral process has for the preservation of democracy;
- (c) To the role of the Electoral Advisory Committee in promoting integrity in the electoral system:

There also exists the need to develop in the staff of the Electoral Office a culture of dedication and commitment to proper management of the system. It is anticipated that this will result from a programme of continuous training.

A training Officer is therefore to be employed who will report directly to the Assistant Director (Administration).

NOMINATION DAY

The law makes no provision for any time lapse between the announcement of an election and Nomination Day. The Committee feels that, in order to ensure fairness and to obviate the possibility for abuse by the calling of elections without reasonable notice, which might adversely affect citizens or groups wishing to participate, there should be a specific period set out in the law. A period of five (5) days should be the minimum.

This period of five (5) clear days should also be sufficient to place the Electoral Office in a better state of preparedness for the elections.

An extra two hours on Nomination Day for the handing in and processing of Nomination papers should have the effect of preventing rival factions from coming into contact with each other.

The committee has decided that THERE SHOULD BE AT LEAST FIVE (5) CLEAR DAYS BETWEEN THE ANNOUNCEMENT OF NOMINATION DAY AND THE ACTUAL NOMINATION DAY AND THAT THE HOURS FOR THE NOMINATION OF CANDIDATES SHOULD BE BETWEEN THE HOURS OF 10:00 A.M. AND 2:00 P.M.

CAMPAIGNING BEFORE ELECTION DAY

In order to dampen the fervor which tends to be exhibited immediately prior to voting, and which gives rise to improper behaviour, and to reduce the work load of the security forces so that they can be better prepared for Election Day Activities, the Committee has decided that:

ALL CAMPAIGNING BY OR ON BEHALF OF CANDIDATES BY WAY OF PUBLIC MEETINGS AND/OR PUBLIC MARCHES SHALL CEASE AT LEAST TWENTY FOUR (24) HOURS BEFORE THE TIME FIXED FOR THE OPENING OF THE POLLS ON ELECTION DAY.

PREPARATION FOR ELECTION DAY

The challenge for the Electoral Office and its field operations is to plan and coordinate the numerous activities which are necessary to achieve smooth polling.

The Electoral Office is required to produce ten copies of the voters' list for each candidate, issue grants of poll, print ballot papers, check Black Books (Registration Record Card with photograph, thumbprint and personal data for each voter) for completeness, package election materials for each Returning Officer for safe delivery at least two days before polling day.

The Electoral Office must also satisfy itself that suitable persons have been identified who are willing to serve as presiding officers and poll clerks.

The Committee's decision to remove from the law the discretion of the Director of Elections to make Statements of Changes which require the preparation of supplementary lists and for a five (5) day period between the announcement of elections and Nomination Day should enable the Electoral Office to perform its administrative functions efficiently and to be ready for election day.

With regard to <u>suitable personnel</u>, it is important that <u>competence</u>, <u>integrity and courage</u> be the hallmark. The availability of an approved list of persons to be electoral officials should remove a major difficulty faced by Returning Officers and would facilitate continuous training of such persons.

The committee has therefore decided that: THERE IS TO BE ESTABLISHED A REGISTER OF POTENTIAL ELECTION OFFICERS FOR EACH CONSTITUENCY WHICH WILL BE UPDATED AS THE NEED ARISES AND THAT RELEVANT TRAINING AND

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INSTRUCTION BE GIVEN ON AN ON-GOING BASIS.

official.

The Committee recognises that a compensation package may have to be factored in to ensure the availability and commitment of such personnel.

Security arrangements are perceived to be of great concern both in respect of the numbers of security personnel available and of the display of bias on the part of such persons. Furthermore, during the election period many members of the security forces will not exercise their normal peace keeping functions even when they are requested so to do by an election

Adequate security arrangements involving the Police and the Army must therefore be put in place on a well planned basis.

The Committee intends to set up meetings with the Commissioner of Police and the Chief of Staff of the Jamaica Defence Force, with a view to identifying a cadre of senior officers for special training on Election Day procedures. The Committee recommends that training for election day procedures should be a part of the training for all police and army personnel.

The practice of appointing special constables and special district constables for duty on Election Day (one day police) has proven to be ineffective.

THE ONE DAY POLICE IS TO BE ABOLISHED. Too many of this category of persons have failed to carry out their duties with impartiality. The Duffus Report of the 23rd day of April, 1987 at page 16 set out a finding that "in many areas in Kingston, St. Andrew and St. Catherine they were useless and a waste of money."

ELECTION DAY

On this day all the weaknesses in the system surface whether they relate to inadequacies and inefficiencies in the administration or to the opportunities that exist for the manipulation of voting.

The following are some of the problems which have been experienced:

- (a) Last minute withdrawal by polling station officials because of fear for their lives or their safety or because of inducement;
- (b) Election materials and voters' list do not reach the polling stations on a timely basis;

- (c) Poor level of officiating by reason of inadequate education and/or lack of proper training of some of the electoral officials;
- (d) Failure by electoral officials to record the process, properly or at all, in accordance with the requirements of the law;
- (e) Fraudulent behaviour on the part of electoral officials to wit;
 - (i) Permitting ineligible persons to vote,
 - (ii) Refusing to permit registered electors to freely vote,
 - (iii) Providing more than one ballot to same person,
 - (iv) Casting ballots,
 - (v) Destroying, defacing, or removing ballots.
- (f) Violence or threats of violence to electoral officials and/or voters to mark ballots or to give up ballots for marking;
- (g) The use of violence or threats of violence to restrict citizens to their homes or to prevent them from attending polling stations to vote;
- (h) Open voting whereby legitimate electors are intimidated, or feel intimidated, thus preventing them from casting the ballot for the candidate of their choice;
- (i) Stealing of ballot boxes. Some of these boxes turn up later at counting stations with ballots spoilt or additional ballots placed therein, and are counted.

In this catalogue of problems, those relating to organisational shortfalls have already been addressed and with appropriate legislative provisions coupled with proper systems and training, it is hoped that they will be satisfactorily resolved.

MALPRACTICES

All right thinking members of the society have every reason to be appalled at the level of malpractice. It is believed that many electors refrain from participating in the process for this reason, and it is generally felt that better security arrangements would eliminate the problems.

There is a popular view that if elections were to be held over a period of three (3) days, adequate security could be arranged as voting would be staggered to take place in different

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regions on each of these days .

The arguments against the proposal are as follows:

- (1) It will allow the entire machinery of political parties to be concentrated in the voting areas each day instead of being distributed across the entire island. Some constituencies are known to have centres of high volatility and it is feared that persons from those centres could be deployed to voting areas across the island instead of being confined to their constituency. The net effect could increase confrontation between rival fractions and with security forces. There could also be an increase in fraudulent activities.
- (2) It is notorious that the electoral process can be thwarted even if the security forces control unruly elements. If there is sufficient disturbance this will prevent numbers of electors from attempting to vote. This tactic can be used to benefit a particular side.
- (3) One of the requirements of a good electoral system is to prevent voting results in one area from affecting the voters in another area. Even if counting does not occur on the first and second day, a fair idea of which candidate is likely to win will be gained by political parties through their polling station representatives who are fairly familiar with the preferences of the voters in their area. This assessment which is normally done by the respective political parties may influence them to mobilize resources of personnel and locate them selectively in an attempt to influence the succeeding day's voting.
- (4) The knowledge of projected results in a given number of seats could have a undesirable psychological effect on citizens in other constituencies who have not yet cast their vote. Countries with different time zones have suffered this experience and have had to take steps to guard against it.
- (5) Election day is very stressful for many persons in Jamaica very little normal work is done, some people even go overseas or leave their homes for security reasons. To spread this over three (3) days will heighten the tension thereby creating more (not less) disruption.

- (6) Jamaica now has a problem of securing the boxes for the maximum.
 (3) hours between closing time and the start of preliminary counting.
 constituency headquarters. To stretch this period over three days creation an additional security problem.
- (7) This proposal does not address malpractice perpetrated by electeral officials who not only exercise a discretion on the issue of the identified persons who are permitted to vote, but also have control of ballot pape and votes. This authority and control have provided the opportunity to defraud the system and detection is extremely difficult, despite the presence of representatives of the political parties as officials in the polling station which was intended to be a safeguard but which has often been compromised either by inducement or by fear.

The Committee came to the view that a system which removed the important elements of the voting procedures from human intervention to an automated process offered the best prospect to solve the problems and accepted the concept of a Computerised Voting System.

THE OUTLINE OF THE SYSTEM

- A special ID Card with fingerprints and other means of identification (which are to be decided) encrypted thereon is to be provided to the registered elector;
- (2) The elector attends at any polling division within a constituency or region (to be decided after technical evaluation) and is identified by means of the ID Card -- through an electronic reader, with confirmation by a live fingerprint reader;
- (3) The elector is sent to the voting booth where there is an electronic voting machine with fingerprint reading capability. The elector then selects the Candidate of choice (opportunity to correct error in choice will be provided to the elector).
- (4) As the elector votes, the activity is recorded at the voting station and critical data is transmitted at intervals to a secure location for secondary storage.
- (5) The voting machine will electronically record the vote and will print out a receipt or ballot acknowledging registration of vote and that receipt or

ballot is placed by the elector in a box for audit check.

- (6) At the close of the poll the voting machine produces a list of:
 - (a) The number of votes cast for each candidate/party, and
 - (b) The list of names of all electors who voted

THE BENEFITS TO BE DERIVED FROM THIS SYSTEM

- (a) Elimination of impersonation;
- (b) The ballots cannot be tampered with;
- (c) It becomes immaterial if boxes with receipts or ballots are stolen as the votes are already recorded;
- (d) The Poll Book will be used as a duplicate record.
- (e) There can be no over-voting;
- (f) The number of polling stations should be greatly reduced thus enabling more effective security;
- (g) The ability for electors to cast their votes at a polling station where they do not feel pressured to vote for any candidate who is not the candidate of their choice.

THE AREAS OF CONCERNS WHICH ARE BEING EVALUATED

The areas of concern which have been the subject of extensive investigations and evaluation by technical experts are:-

- (a) That no tampering or manipulation of the data-base used to provide the voters list and for voting can take place after it has been approved by the Committee;
- (b) The equipment's ability to match a live fingerprint at the time of voting with the fingerprint stored in the data-base and permit voting;
- (c) That no person can access the data-base to vote if the match to their live fingerprint is not stored in the data-base;
- (d) That no elector can again access the data-base after casting a vote;

- (e) That communication network links are dedicated to the system and secured against interference during an election;
- (f) That adequate arrangements for operation and maintenance of the system can be achieved;
- (g) That any breakdown in the system for technical or other reasons will not prevent voting or loss of votes already cast.
- (h) The likely cost.

The Committee will make a separate report on the system after completing the evaluation. A FINAL REPORT will deal with the following issues:

- (a) The proposal to create a system to summarily declare the results of an election null and void.
- (b) Whether the Election Petitions Act should be amended to provide an additional ground for declaring the results of an election null and void on the basis of overvoting, tampering with ballot boxes or other serious irregularities. At present an election cannot be voided unless a Petition can prove that such irregularities would affect the numbers of votes which exceed the majority by which the candidate, whose election is questioned, was elected.
- (c) Procedures for minimising delays in the hearing and determination of election petitions.
- (d) Sanctions for breaches of the Electoral laws.

The Committee recognizes that (a) and (b) above are far reaching and thorny issues which require indepth research. The Committee intends to have consultations with interested and relevant parties on these two issues before completing the Final Report.

THE ELECTORAL ADVISORY COMMITTEE

Nominees - Peoples National Party

Hon. Donald Buchanan M.P.

Hon. Dr. Peter Phillips M.P.

Nominees - Jamaica Labour Party

Senator Ryan G. Peralto

Senator Anthony Johnson

SELECTED MEMBERS

E Bunda-Gk

Pamela Benka-Coker, Q.C.

Hon. V. Corrine McLarty, O.J., C.D.

Han Se-

William K. Chin-See, Q.C. Chairman

13th July, 1994

APPENDIX G

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PRESS CLIPPING

Companies display voting equipment

Committee (EAC) continues to make plans for the introduction of electronic voting, three United States companies yesterday displayed their equipment at the offices of Advanced Integrated Systems (AIS).

In January, a number of companies displayed electronic equipment, but to date none has been selected. To sensitise the public further, equipment now available will be displayed at the annual Jamaica Computer Conference at the Jamaica -Please turn to Page 3

AS the Electoral Advisory Grande Hotel, Ocho Rios, starting today.

> But inpsite of how impressive the equipment displayed so far might look, Director of elections, Major Winston Sutherland refused to comment on which firm will be contracted. He said competitive international bidding must be done before a contract is awarded as "there is a lot of money involved". The Elections Director said although the EAC was looking at what the



Systems. The cards were designed in collaboration with three top United States firms.

••.

Gompanies enspia electronic voting equipment

Continued from Page 1

different people had done, "they are doing it at their own expense and with the full knowl-



edge that they might not get a machine, it will be rejected. contract."

AIS is the integrator of the project involving Data Card Corporation, Symbol Technologies Incorporated, and Finger Matrix, all based in the United States: The three are considered leaders in the field of computer technology.

Under the project, a new National Identification system will be developed, which, according to a well-placed source, will cost the Government some US\$10 million. The Gleaner has learned that funding is being sought from the European Economic Community (EEC). Consultants from the EEC, examined the equipment yesterday, and were briefed on its intended functions.

Managing director of AIS. Douglas Halsall said a proper identification system cannot be in place unless the Portable Data File (PDF) system was adopted. Encoded in the ID card is a finger print, a photograph, and other demographics. AIS has already produced samples of the ID card it will be able to produce. The Jamaican flag will be displayed at the top left hand corner of the card, the photograph at the top right. Finger prints are not yet included in the samples that have been done.

In the second instance, the equipment will be used for voting, using finger print technology. Prints will be taken and stored in a card which will be inserted into a machine that will indicate whether the print belong to the bearer of the card. If at the time of voting the wrong finger is placed in the

And there are other advantages of the system, which will be assembled in Jamaica. Mr. Halsall said already, a number of countries including South Africa, Peru, Santo Domingo, and Haiti, have expressed an interest in the new technology "We could be exporting this technology," Mr. Halsall said. "This is a first," he said, adding that is being done. "right here".

If accepted, Jamaica could be the first country to use fingerprint technology to trigger a ballot. Mr. Halsall said.

The Opposition Jamaica Labour Party has repeatedly called for the introduction of electronic voting as part of electoral reform. Opposition Leader, Edward Seaga said the JLP estimates a maximum of one year will be used to implement the new system and two years to produce a clean list. In answer to whether politicians should so on the EAC, as is now the case Mr. Seaga said the highest pri onty now must be a fraud-proof electoral system".