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SEEV – SMS external encrypted voting

http://www.cd3wd.com/SEEV/index.htm

http://www.cd3wd.com/SEEV/seev.zip -
a word.doc version of this webpage along with a powerpoint file of the presentation as below

http://www.cd3wd.com/SEEV/SeevPPT.htm - a power-point presentation of the SEEV System

Press Release 23 July 2006 – version 17 - with revisions and additions as of 7 March 2007

Low-cost Tamper-proof electronic voting for the 3rd world - SEEV

Executive Summary

Elections in the 3rd world are a major problem. SEEV is a new innovative concept which uses entirely existing technologies (mobile phone sms and TAN-envelopes) in conjunction with an external international processing center to ensure that phantom voters, ballot-box stuffing, count fraud etc are a thing of the past.
And the cost of this electronic voting should be less than present-day paper voting systems. SEEV could hold its first election within 6 months of project go-ahead.

Main Document

It is a known but under-appreciated fact that corruption is a major obstacle to economic, social and human development in the 3rd world. It is known also that most if not all 3rd world elections are problematic, but Conventional Wisdom dictates that the efforts of the Carter Center, EU and others in stationing external election observers largely solves this problem; It does NOT.

The only way to ensure that 3rd
world governments bow out when the will of the people is against them is to make the election voting, vote counting and vote count aggregation processes run wholly by external parties (e.g. a UN-related or other independent Global Electoral Commission – GEC).

The problem with that scenario is that the cost and logistics of a worldwide mobile caravan could easily challenge the most organized organization and could break anyone's bank.

So why not take advantage of modern technology to solve the problem, with the following requirements:

- the national government must not have any idea of how any single individual voted
- each individual who voted must have some kind of confirmation that their vote for a certain candidate was indeed processed as a vote for that candidate and not as a vote for any other candidate

Of course national governments will still try to cheat by not registering voters, by giving their supporters multiple votes, by creating phantom voters, but even some of these methods of cheating can probably be addressed by a high-tech, low-cost solution.

A promising technique is to use mobile phone SMS (text) messaging. My proposed system would work as follows:

- each voter is issued a PIN- and TAN-number envelope, with secret numbers inside which are valid for the impending election only.
  On the outside of the sealed VE (voters envelope) there is a unique voters ID number (e.g. for Zimbabwe it may be like 263 999 999 999, with 263 designating the country, and there being enough digits for about 200 times the actual number of registered voters). Note that the VE has the UVN in normal number representation and also in barcode format, so that it can be accurately read and logged at the time of VE distribution.

- the candidates each have a 4-digit number, say 0001 through 9999 (in some elections there may be that number of candidates; although in presidential elections the candidates who matter are usually 2 in number).
  The Candidate Number (CN) of each candidate is highly publicized and cannot be changed by the sitting government at any time, and especially not close to the election itself. Indeed the CN will be prominently displayed on all election posters for that candidate.

- On the day of voting each voter uses his or her voter's envelope (or better still, a pen-and-paper copy of all or only part of that envelope's contents). There is an encryption grid.

Unique Voter Number = 263 925 837 169 (repeated from the outside of the envelope)

SEND

	1st digit	2nd digit	3rd digit	4th digit
0	217	174	131	288
1	947	904	861	818
2	833	790	747	704
3	267	224	181	138
4	183	140	997	554
5	569	526	483	440
6	933	890	847	804
7	102	959	916	873
8	384	341	298	255
9	778	735	692	649

RECEIVE

1st digit	2nd digit	3rd digit	4th digit
248	205	162	319
978	935	892	849
864	821	778	735
298	255	212	169
214	171	128	585
600	557	514	471
964	921	878	835
133	990	947	904
415	372	329	286
809	766	723	680

The above grid is used as follows:

If you choose the candidate 0001, then send a message as follows:

263 925 837 169 * 217 174 131 818

Soon after sending, you should receive a confirmation message which reads:

263 925 837 169 * 248 205 162 849

Similarly, the codes for candidate 9531 are:

263 925 837 169 * 778 526 181 818 (send)

and

263 925 837 169 * 809 557 212 849 (receive)

Note that every grid for each one of the 5 million or 50 million or 500 million voter's envelopes is different, and that these number grids are effectively one-time-pad encryption pads. The origin of these printed envelopes is a computer database table, which is stored under extremely high security at the IPC (and which is used to process the incoming SMS messages at the time of voting).

You get access to a mobile phone, you send an international SMS to the service center number at the IPC (which is in Norway or Sweden – as a convention we will used Sweden elsewhere in this document). Since you chose candidate #1, you send 263 925 837 169 * 217 174 131 818

Note that any and all erroneous, false or bogus sms's are logged and stored for later analysis by the Global Electoral Commission. 217 174 131 818
is the encrypted vote, which is de-encrypted on the database server in Sweden to read candidate #1.

Within some minutes the phone you used should get a message back which reads:

263 925 837 169 * 248 205 162 849

This is confirmation that the remote system received your vote and processed it for candidate # 1 – if you don't get any message in return or you don't get the message content 925 837 169 *
248 205 162 849
, then something went wrong somewhere – possibly due to your government fiddling with the process. You can resend several times, and hopefully after 2 or 3 tries you get a successful confirmation.

OK – that is an overview of how things will work. Here follows some FAQ's (frequently asked questions):

Q. **In a typical 3rd world country, only 5% of the population has a mobile phone**. How do you get around that?

A.
Sharing of one phone inside a family and extended family, a neighbourhood, and the use of mobile payphones and phone shops and kiosks..(these are widely prevalent in 3rd world countries). In some remote rural areas, international NGO's may be kitted up to provide sufficient mobile phone service for the voting period only.
Satellite phones provided by international NGO's can be used in very remote areas.

Q. The question of **getting that return/confirmation message could be a problem** if there are a lot of

people queuing up to make their outward voting sms..

A.

It is possible to have a virtual phone number for receiving sms messages – checkout the whole SAM concept at http://www.cd3wd.com/SAM/index.htm . Additionally, all results could be displayed on a website on a series of static webpages, maintained by the IPC; these results could be reprinted by national newspapers if they so wished.

Q. There are whole rural areas and **remote regions of some 3rd world countries with no mobile phone system or reception**?

A.

International development donors could provide funds for the necessary infrastructure to rectify that situation; and/or a paper vote could be necessary for those areas only. It should be possible for voters to travel (typically walk) up to 10 km to get to a mobile phone reception zone. Additionally, national government regulation of MPP's could require that between them the various MPP's inside the country should effectively subsidise remote communities from the proceeds of their urban operations, so as to install the necessary infrastructure for nationwide coverage.

Q. How do you handle a country like **Malawi, where only 1% or less have mobile phones**, and despite concentrated populations, then reception away from main roads does not exist?

A.

This requires 2 parallel programs – Malawi and similar countries require a 'phone-aid' program (similar to the 1985 BandAid) to donate 'obsolete' Nokia 3310 and 1100 phones and similar from advanced countries like UK and Germany free of charge to rural and urban communities and individuals. This is a great cause for Bob Geldof and Bono, especially when linked to democratic voting and to economic development.

The other side is that donors and commercial MPP's must input funds to install infrastructure and mobile masts, which must be network-independent – i.e. they must operate with all commercial networks… Note that the retail price of new handsets is typically US$ 75 even for the most basic, whereas the cost of a mobile line SIM card in most African countries is usually less than US$ 1; therefore the handset cost is the bottleneck, not the line (SIM Card) cost.

Q. What about **REALLY remote areas which cannot justify mast erection**?

A. Use Thuraya, Iridium or other satellite or gsm/satellite dual systems to effect the voting process – NGO trucks will turn up at voting week with banks of these phones to allow the extremely remote areas to exercise their democratic rights..

And here, people must be prepared to walk 20 km (not the usual 10 km) in order to vote…

Q. What about the ability of **old people to understand the grid concept to do the 'simple' encryption**?

A.

Since voting will no longer be location-dependent, and may be scheduled to take place over a 7-day period, then it should be possible for the (grown-up) children and/or grandchildren to travel to the grandparents to assist them in the voting process, even although they are not in the same Constituency.

Alternatively, people from the rural areas can travel to their relatives in the urban areas for the week of voting.

In any case, there will have to be some voter education prior to the election (and maybe even a trial or pilot election with bogus candidates, in order to determine the percentage of problems which would occur in the real election).

Q. Why should we have the Norwegians or **Swedes run this system and not the Americans** or the British?

A. The Americans and British have a credibility problem with some or even many 3rd world governments.

Q. **Why is the encryption so simple**? Can it not be cracked by malicious governments?

A.
It needs to be simple so that the codes can be calculated by a person with low or zero education and low numeracy. It is uncrackable because it is a 'one-time-pad' system.

Q. What happens **if you do not after some time receive a returned code/ confirmation**?

A.
You should resubmit the same message again – doing so may be logged as an error or a malicious action, but the system will also send out a second confirmation message (identical to the first).

Q. What about **the cost of all these SMS's**?

A.
Sending all SMS to that IPC number will be free of charge – that will be programmed into the national MPP (mobile phone providers) systems… This will apply only for the day or the week of voting. The GEC will of course fund all confirmation SMS's outgoing from the IPC.

Q. **How long should voting be allowed for**?

A.
If meddling and sabotage by the sitting government is suspected/expected, then best to allow several days or even one week for the process, with constant management of the process by the GEC, mainly to make sure that enough people are seen to be voting. If intimidation and vote-buying is seen to be a serious threat then maybe allow voting to take place over a 3-6 month period (trickle-voting).

Q. **Who distributes the VE's**?

A.
This could be a local operation of the GEC – if the sitting government is judged hostile to a fair process, one of its tools will be to make it difficult or impossible to get a VE, and/or they will mix-up and/or sabotage the process of allocating VE against National ID Number. Therefore VE's could be distributed effectively by NGO's against show of ID and against having the ID photo match the person who presents it.
When National ID's also have biometrics (e.g. fingerprint) then that could be used by the VE issuing authority (VEIA) as a cross-check.
I am planning that VE's are distributed over a 6-month period up to the election. Ideally the staff who

distribute the VE's do not include even one in-country national.

Q. **What about lost or compromised VE's**?

A.
Cancel those on the computer and issue a whole new VE (a different UVN - again against National ID Card). This should possibly be a chargeable process, so as to discourage carelessness and time-wasting.

Q. What about **intimidation to confiscate people's VE's, and attempts to buy** people's VE's?

A.
We have excellent strategies for that, but choose not to outline them at this point in time, so as to give the bad guys more self-confidence (the strategy is actually outlined below towards the end of this document).

Q. **Technical points** regarding VE's and UVN's?

A.
UVN's do not become validated in the GEC Computer System until they are linked to a National ID Card.
Therefore there is less possibility of rogue governments to grab wads of VE's and submit them (probably electronically and automatically) during the voting period. For this reason, the scenario where VE's are distributed by the GEC or by GEC-related and GEC-vetted NGO's is probably critical to SEEV.

Q. What about **backward countries like the UK which do not have National ID Cards**?

A. Such countries might use their postal system to distribute the VE's.

Q. What about the **Privacy of the Vote**?

A. The SEEV concept is flexible.
It should be possible to organize polling stations with polling booths, each with its captive (tied-down) mobile phone, where voters can choose to go to vote 'in secrecy'. But one must realize that in many countries, and especially outside the main cities and towns, such a system would be abused by the sitting government and their local representatives to force people to vote for them. Note that this is only a possibility, which should be decided against in any and every country where the remotest whiff of electoral fraud hangs in the air.

Q. What about the **timing of the distribution of the Voters Envelopes**?

A.
In theory (and once again, this is a sop to the conservative elections experts), the VE's could be distributed at the polling stations by the 'Independent' National Electoral Commission. But I maintain that this opens the public yet again to abuse by the sitting government; SEEV is designed specifically to remove such abuses.

Q. How do we **counter deliberate mistakes regarding constituency** perpetrated by the sitting government to disenfranchise voters?

A.
We make it possible for voters to vote either for a party or for a candidate. The parties standing will each have a virtual candidate number, and these numbers will not be allocated to candidates as such. Anyone voting for one of these party numbers will then automatically have their vote allocated to the candidate in the constituency to which the electoral register allocates them. This will ensure that trickery and voter movement by the electoral commission does not disenfranchise the voter. Additionally, the electoral register will be frozen and published several weeks before the election. Possibly an SMS-based enquiry and response service should be set up and operated during those last few weeks after the ER Freeze so that people can confirm the candidates for whom they are entitled to vote.

Q. What **other measures should be taken by the GEC to ensure fairer elections**?

A.
Mass issue of free low-cost short-wave transistor radios some weeks or months before the election; external broadcasts by opposition candidates on short-wave radio; commandeering of the local radio and/or TV network at certain week and daytimes by the GEC in the run-up to the election; close scrutiny of the voters roll for months before the election; putting the voters roll on the internet from Sweden; political radio and/or TV phone-in programs, etc etc etc

Q. **Can SEEV handle spoiled votes**?

A.
There can be one of the candidate numbers which is allocated to be a 'virtual spoiled vote' (VSV) – i.e. persons voting for that number will be 'wasting' their vote, but those VSV's will be counted by the system and issued with the election results.
Similarly, in the event that a popular candidate is disqualified for whatever reason (e.g. imprisoned on charges of fraud or homosexuality, or killed by state agents or unknown assailants), then the GEC will probably allocate a 'virtual candidate number' (VCN) to that would-be candidate, and voters can vote for that person, although their vote will once again be effectively 'wasted'; however that candidates total of VCN Votes (VCNV) will be announced by the GEC with the election results. In technical terms, all VCNV's will be subsets of VSV's.

Q. **Who processes the election results**?

A.
All processing is done at the GEC, with zero involvement of any and all persons with nationality and/or other connections to the country whose election is being processed. Results are announced from the GEC through internet, television and radio linkup to the subject country. Probably a live televised press conference is run for every election result announcement. Only enough aggregate information is released to the government and to the people of the subject country as is deemed necessary and/or reasonable (so as to avoid revenge and/or attacks on certain towns and regions by a deposed government / political party and their militias).

Q. **Is the vote processing auditable**?

A. Yes – the initial data file which corresponds to the numbers on the Voters' Envelopes can be copied and stored under high security with the chosen auditors (e.g. one of the major international auditing companies such as Price Waterhouse Coopers). The program(s) which processes the data can also be copied onto CD or DVD or external hard drive and stored similarly. Then, the file which is the result of

the distribution of the Voters' Envelopes is also stored. Finally, the incoming sms voting messages are stored in a giant text file, which can also be copied and given to the auditors. The auditors can then set up the program to run the incoming sms voting messages against the Voters' Envelope file, which should produce an exact copy of the result as announced by the Data Processing Center of the GEC. The program(s) can also be analysed by the Auditors to ensure that there is no false code which favours any candidate or party over any other.

Q. **Does SEEV have advantages for conflict areas**?

A. Most definitely – in many conflict areas, there are armed groups who are out to kill and/or maim those who dare to vote.
The act of physically going to a paper-based voting center can be literally taking one's life in one's hands. SEEV eliminates that process.

Q. **Will this scheme be welcomed by 3rd world governments**?

A. Some will welcome it, some will not.
But it could for example be made a condition of IMF, World Bank and other Donor assistance. And countries which adopt the system are conforming to good-governance practices (e.g. as per the NEPAD Scheme), which should be beneficial to them with respect to Donors. Finally, adopting such a system means that governments can get the whole-hearted support of the people, who will be in no doubt whatsoever that the elected government is 100% legitimate.

Q. **How does the West sell this concept to 3rd world governments**, both good and bad?

A.
By adopting this system also themselves – UK and USA can pledge to use this system themselves – best even if they adopt this system for elections BEFORE they ask any 3rd world country to do so…

Q. What about
Arabic and non-Arabic Islamic countries, which presently mostly have pro-western and/or corrupt dictatorships?

A.
They will almost certainly fall to opposition parties, which may be moderate centrist non-religious parties or which may be Islamic fundamentalists.
The important thing for the international community will be to ensure that even if Islamic Fundamentalists get into power, they are bound to holding further democratic elections every 4-5 years and cannot impose dictatorship.
It is probable that after 5,10 or 15 years the pendulum will swing and moderates will accede to power, at least for one term.

Q. What about **Saudi Arabia and China – strong friends of the West - who never hold elections**?

A. The question answers itself.

Q. What about **Cuba – darling of the radical chic – who also never hold meaningful elections**?

A. Again the question answers itself….

Q. **Will this scheme be welcomed by the national Electoral Bodies throughout the world** (including developed countries) ?

A. Some will feel that SEEV is a threat to their existing paper-based conventional systems. Others will fully understand the positive impact on 3rd world countries and will appreciate its huge advantages. Many will fear the employment-reduction effects of SEEV on their organization.

Q.
Will this scheme be welcomed by existing international voting-related organizations and existing international voting experts?

A. Based on empirical evidence during the period 2006/09 through 2007/01, the answer is largely no. Existing international voting experts seem to be under the (false) impression that existing election observer missions are effective.
They are also under the impression that their own stature will be diminished by the advent of systems like SEEV.
Additionally they are under the (correct) impression that most existing electronic voting systems are ineffective, error-prone, and easy to cheat.

In general, election industry experts do not appreciate and/or accept the widespread vote tampering and count fraud which occur in almost every 3rd world election at the moment using conventional paper techniques and technology.
The complacency with which the international community fails to address this problem is more than astounding. Any technology which offers an improvement on this present situation should be judged innocent until proven guilty, instead of being judged guilty until proven innocent.... But there seems to be an organized or a disorganized conspiracy against solutions such as SEEV which offer a solution to a problem which disbenefits the populations of 3rd world countries, but which benefits multinational corporations, which benefits the incumbent leaders of 3rd world countries, and with which problem the leaders of developed countries for reasons unstated seem to agree and concur.

Q. **Will this scheme be welcomed by politicians in the developed countries**?

A.
Those who understand the importance of global development, justice and stability will welcome it; some who tend to regard 3rd world governments as pawns to be manipulated may have negative sentiments.

Q. What would be **the impact of widespread fair and free voting throughout the 3rd world**?

A.
Frequent change of governments (many would last only 1 term – 5 years, and most would not exceed 2 terms) – this would be largely a good thing.
It should curtail corruption to a great extent although it would not eliminate it. In general there would be a great positive economic effect throughout the 3rd world as well as a great pro-democracy effect.

Q. **Will this scheme also work for developed countries**?

A. Certainly – and given its convenience, then it may be preferred by many voters. It may also help to counter voter apathy among the young, who are already very used to sms voting….

Q. Can this system be used in **proportional representation elections, with multiple choice candidates**?

A. Of course – with only a few modifications to the system.

Q. **What about the technical feasibility**?

A. The company Mobilearts of sweden (www.mobilearts.com) have reviewed this project in principle and are reasonably convinced that it is technically feasible. Moreover they have the technologies to implement this project for an international client

Q. **How do the economics of the system look**?

A. Quite good – the TAN-envelopes cost about US$ 0.04 each – and they are the one core element to the system.
It is probable that the international (i.e. foreign) workers or volunteers to distribute these envelopes may make up the largest cost – if we calculate that one such worker/volunteer can effectively distribute 250 VE's per day and log those envelope numbers against the recipients' National ID Cards on their laptop computer, then we can probably cost the distribution cost of each VE at US$ 0.20 (i.e. US$ 50-00 per day per volunteer to cover accommodation, meals etc). The cost of commercial sms-to-web or sms-to-PC gateway services seems to be US$ 0.05 per sms, i.e. US$ 0.10 per vote (receiving vote plus issuing confirmation).
Internationally-run elections in troublespots like East Timor, Afghanistan and Iraq cost typically US$ 10 to US$ 30 per voter. I do not at the moment have cost figures to hand for conventional paper elections.

Note that the Q & A below comes from email communication January 2007 between ourselves and IDEA of Sweden, the highly respected international elections body…. – the Q comes from IDEA, the A from SEEV….

Q. Who is the GEC, how will it be set up, elected/selected, structured, financed and monitored?

A.
The GEC will be operated by the UN or under UN monitoring. Financing will be by UN. But if the voting system is also used by developed countries (and there is no reason why not) then charges for the processing should enable the GEC to become a self-financing body.

Q.
When electoral processes are discussed, one of the main concerns today is how to build local ownership of the processes developed in order to ensure that the knowledge remains within the country, ensure long term sustainability and legitimacy for the process. It is unclear to me how this system would support local ownership of the electoral process.

A.
The electoral roll would remain the property of the country concerned. All or most other functions would be devolved upwards to the GEC. At this point it is necessary to point out that national elections are the only international process where is is deemed acceptable that the judge is also a contestant, and a contestant is also the judge. Of course the international community points out that the Electoral Commissions are 'Independent', but in the 3rd world such independence is highly questionable, and would remain so.

Q.
Voter registration etc. is usually carried out by the national Electoral Management Body (EMB); who are you suggesting would carry out these tasks when there is a GEC? The GEC? The national governments?

A. As indicated in my document, voter registration will continue to be carried out by the EMB (i.e. the national governments).

Q - Even if an ID card is needed to get the VE, no proof of identity is needed to actually cast the vote, is that correct? Everything needed to cast a vote is inside the envelope (the PIN and TAN numbers)? This would make the envelopes very valuable indeed, and if fraud is a salient risk in the country, there is reason to believe that these envelopes will be stolen/bought/destroyed. Under a paper ballot system, the ballot papers could be stolen too, but the use of ID cards on election day in the polling station reduces the negative impact such theft could have on the process.

A. since voting is done using mobile phone and can be done from home or even from anywhere inside or outside the country. Yes - the envelopes are very valuable indeed.

My strategy to counter theft, buying, etc of the envelopes is that voters are encouraged to make paper and pen copies of their voter's envelope at the time they receive it. They can make some good (exact) copies, and also some deliberately false copies. If they are coerced to hand over a copy (for money or for free) then they can hand over one of the false copies. There is no way of telling which copies are false and which are real until the first day of voting. When the copies are made, the original envelope can and probably should be destroyed or shredded. By the way, the false copies can be false in that for example each of the grid numbers is modified by the simple algorithm of adding a fixed number (e.g. 3) to every grid number..... then the false copies are also the good copies and the good copies are also the false copies...

Q - We have found that the issue of legitimacy and trust is related to, but by no means the same thing as the actual security of the system. Also, the issue of trust and legitimacy is likely to be especially salient in developing countries. My concern is thus, even if it is true that the system is “uncrackable”, how will people know? It may be difficult for voters to visualise and trust the process because it is done in a way which seems susceptible to fraud (especially to those unfamiliar to SMS technology), and no (international or domestic, NGOs, parties etc.) observers will be able to observe the voting, counting or tabulation.

A. Auditors will be able to audit the process after the end of voting (see the latest release at http://www.cd3wd.com/SEEV/
). One needs recognisable faces and voices on TV and radio announcing that the system is uncrackable (e.g. present and former heads of UN, present and former heads of state of USA, UK, Germany, France, Canada, Japan).

Q - What if the confirmation never comes when a voter has cast his/her vote? Can the voter launch a complaint? How will that complaint be followed up? By whom?

A. There will be an sms complaint submission procedure. The submitted VEUIN (voter envelope unique identification number) will be searched and all submissions and responses which were sent by the system will be published on webpage and also will be sms'd to the phone from which the complaint was submitted. Response should be immediate. If no record of that VEUIN was found that obviously will be communicated. Of course we need that collections of brains sit down and hammer this one out....

Q - You mention that the VEs could be distributed by the GEC if "the sitting government is judged hostile to a fair process". Who would make this judgement? Will the GEC be overruling decisions by governments in sovereign states?

A. In fact, all countries will have the VE's distributed by the GEC and/or foreign or international NGO's, utilising zero country nationals.

Q - How will the secrecy of the vote be ensured? Once the VEs have been distributed, are there any mechanisms to ensure that voter isn't intimidated into voting in a certain way or paid to do so? Even though intimidation or other types of coercion can occur in other systems, the key thing is that it should be impossible (or at least very hard) to prove how a person voted (even if the voter him-/herself wants to be able to prove it to collect his/her reward or avoid punishment). It seems that under the SEEV, it would be very easy to show somebody else that the vote was cast and for which candidate, and this makes me think that the secrecy of the vote is very hard to ensure. I see that you say you have excellent strategies for this, but I think that people would be interested in what these strategies are before being convinced that this problem has been addressed adequately.

A. Refer to the concept of making exact and false paper copies as above. Note also that if there are 500 million VE's then each VE is unique and different.....Even if the person has let us say 2 VE's, then note that only the first VE to be registered against the national ID card is logged by the system as legitimate. The second VE will be disregarded by the system when an sms with that number and codes is sent (what exactly the reply message says is a matter for discussion at this stage). Therefore a clever person can use the first envelope for voting and effectively sell a vote from the second envelope. We obviously need to discuss this further as a group. Note also that if the the envelope copying and destruction strategy is implemented then the authorities will immediately realise that all intimidation and buying is rendered useless...

Of course, there is one further radical variation of SEEV which would solve the Voters Envelope problem – conduct **Trickle Voting**, where people vote immediately or almost immediately after receiving their voters envelope, i.e. over a period of say 3-6 months before the election result is announced and the new president and/or government is sworn in. The long time-period is necessary because of the expense and logistical difficulties in placing enough foreigners in enough locations to correctly and accurately distribute the VE's over a short time-period (even 7 days would be a logistical nightmare).

The only real problem of course with Trickle Voting is that people's sentiments towards one or several parties might change during that period as news and revelations come to light, and therefore the result is dependent possibly on which geographical areas are covered in which sequence.

Q - Could the system handle even preferential voting and mixed systems such as Mixed Member Proportional and Parallel systems?
A. YES - The VE can have multiple grids - and sms can be sent which is structured say as
263 999 999 999 * 1 * 234 567 789 234 for the first candidate,

263 999 999 999 * 2 * 345 789 345 263 for the second candidate etc etc..

Q - Finally: Much effort goes into designing pedagogical ballots with clear instructions and colours and pictures to make casting the vote as logical, easy and self evident as possible. Even the simplest and most visually accessible ballot paper runs the risk of being misinterpreted by some voters, and this is something that EMBs try to minimize. Looking at your examples, it seems that writing a long line of numbers and asterisks coded for the voter and the candidate/party is not as self evident and logical as one could hope for in an ideal voting system. Also, will the voter receive a notification if he/she has made a mistake, with instructions how to rectify that mistake or will the vote be counted as an invalid vote?

A.
Yes - there will have to be a significant training effort, especially the production of very clear and simple voting instructions on video, DVD and on paper/graphics. And the reply sms message will have to be very very clear to enable the voter to respond without confusion.

The following brilliant idea for visual aids comes from Guido Sohne (www.sohne.net) from Ghana:

To make it easier to use I have a suggestion for the user interface. The structure of the pad and the candidates are known in advance. In
addition to the pad, you can ship pieces of paper with the candidate picture on it, with numbered holes cut out where the pad numbers will
be. To vote, you pick the overlay for your candidate and just return the symbols in the order numbered by the holes in the paper. I think
that can make it very easy indeed, especially where instructions are also on the overlay.

End of email interaction IDEA-SEEV

The Q and A below are taken from comments by other election experts…

Q - How you apply such technology in a country without wide cellphone coverage and still **maintain the secrecy and equal access of the vote**.

A . Secrecy is already discussed above and is well taken care of. Regarding equal access to the vote - use the 7-day voting period, use satellite phones, expand infrastructure before election, apply organisation and resources to solve the problem - do not judge the problem as insurmountable

Q. In this system,

whoever guards the database table has the possibility of tampering with the results

A. I fully understand the importance of this area - the DBA (database administrator) and associated persons - strategies for dealing with this include the auditing process but also some additional very high security measures which will be taken - I have in 2004 worked on a project for Rwandese Military Savings Bank which specifically addressed and resolved the potential problem of`insider tampering with database records.

Q. There's the question of access to mobile phones - your system would **concentrate considerable power in the hands of those who own mobile phones**, or who distribute them during and around elections

A. A legitimate point – we have to consider that and work out possible dangers and solutions… If we go for trickle-voting then the problem would be largely eliminated.

Q.
I can't see any way of ensuring unique codes remain in the hands of those for whom they're intended, or of knowing that the person who's used a particular code is the person accredited to do so (candidates or their agents could presumably buy or steal these codes in the same way they do ballot papers/votes under current systems)

A. See the stuff above on copying and destroying the Voters Envelopes…. [SEEV/Weir comment : So at last an election expert admits that the present paper-based system is prone to tampering and interference…..]

Q.
My over-riding fear is that you underestimate the tendency of non-western, non-liberal societies (elites *and*
ordinary people) to subvert and transform institutional transplants (like elections) in ingenious and surprising ways... that confound our western, liberal expectations.

A.
I think that having lived and operated in the highly corrupt and tricky Zimbabwean economic, social and electoral milieux, then I can and have imagined just about every possible electoral trick in the book – as detailed extensively above; but I will keep an open mind for yet more con-tricks perpetrated by politicians, presidents, secret service agents and intelligence personnel.

Q.
There's the question of the technology - simple in our eyes, not so simple in the eyes of many poor people.

A. Refer to stuff above about training videos and printed material, which is essential to the success of a scheme like SEEV.
But at the same time, do not be patronizing or underestimate the capacity of ordinary uneducated or semi-educated people to use their brains.

The Q and A above are taken from comments by other election experts…

Q.

What qualifications and/or experience do you personally have which entitles or enables you to design a voting system?

A.

I worked 3 months in Baghdad 2005 for IFES – the prestigious Washington-based International Foundation for Electoral Systems – as their Database Adviser, alongside UN and Iraqi Staff.
Also I worked as a volunteer 2003 in Rwanda for USAID/IESC/Geekcorps in Rwanda, developing a front-end for their electoral register database. Probably more important than either experience is 17 years developing computerized business systems and Management Information Systems, largely for International Blue-Chip Corporations – doing that kind of thing you get pretty good at designing systems in general and at predicting and avoiding problems of all kinds.

Q. **How do you propose to make money from your invention**?

A. I waive all rights to royalty income from elections held in the 3rd world, but hereby levy a royalty payment of US$ 0.001 per vote cast using this system or a variation thereof in developed countries. Additionally, I preserve my intellectual rights over the project.

There follows a short discussion of logistics as of 8 January 2007:

1. We need to line up in advance volunteers and potential **volunteers for the distribution of envelopes**.

   This will involve working probably in pairs in remote rural areas and in urban areas of 3rd world countries, living in cheap accommodation or even camping. You have to be between 18 and 80 years old, non-racist (sorry to have to say that), slightly computer literate only, ideally have your own laptop.
   The main requirement is that you should be completely incorruptable and responsible – the job you are doing might be sometimes boring but it is extremely important. If you are interested or tentatively interested please join the yahoo group http://groups.yahoo.com/group/SeevDistributionVolunteers/ - we will then keep you in touch with progress and will harden up the job description as we get closer to go-live. If you are a burnt out executive of any kind then this could be just what you need – unwind in some exotic location doing something useful for society, hopefully at your firm's expense…. Idealists, practical people, altruists, cynics and all kinds of persons are equally welcomed, so long as you are trustworthy and responsible. I guess probably the type of people who sign up as election observers might be attracted to this, but the job is hopefully much simpler and at the same time much more effective.

2. We need contributions to enable us to get taken seriously, and to do some of the legwork necessary for the first implementation of SEEV – **please contribute through** http://www.moneybookers.com and make payments to account alexweir1949@yahoo.com - everything from under a dollar to millions is highly welcomed. Of course we are also soliciting funds from Foundations and from International Organisations, but nothing is yet forthcoming in that respect.
   Please make all payments in Euros and use some odd amount – e.g. if you want to contribute 5

euros then choose a random amount between 4.50 and 5.50, e.g. 4.73 euros. That way then your contribution will stand out.
I would prefer to list all contributors, so please also send an email to
alexweir1949@yahoo.com
with the amount you paid, the date, and how you want your listing (e.g. Bill Clinton, Arkansas or Bono, Ireland).
If you want your contribution to be anonymous then either don't email us at all or else email us stating for example anonymous, or anonymous, St Petersburg Russia… All such email entries will be listed on the auditable contributions listing webpage. Companies and corporates are especially welcomed (since they have the money).

3. We need to line up **software developers** interested in developing the various modules necessary for the implementation of SEEV. Either on a free or on a paid basis. The module for envelope distribution should be under Windows XP or Vista; the other modules can be considered for development under Windows, Linux or Unix. We also need people who can write programs and systems for MPP systems and switches. Please email alexweir1949@yahoo.com . Everyone who helps will get the maximum possible publicity. Companies and corporates are especially welcomed (since they have the resources).

4. We need to line up **specialists for the development of training videos** and DVD's, to explain the whole process, and also to explain in particular how the envelopes and how the mobile phones are used.
The basic material should be in English, with dubbing possible in many international and local languages. As far as possible the material should of course be language-independent. Again we could be looking for volunteers and/or paid specialists. Please email alexweir1949@yahoo.com. Everyone who helps will get the maximum possible publicity. Companies and corporates are especially welcomed (since they have the resources).

http://www.cd3wd.com/SEEV/index.htm

http://www.cd3wd.com/SEEV/seev.zip - a word .doc version of this webpage

http://www.cd3wd.com/SEEV/SeevPPT.htm - a power-point presentation of the SEEV System

Press Release 23 July 2006

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Links and other media coverage :

BBC WorldService Radio covered this system Friday 29 September 2006 on their morning Network

Africa Program. Unfortunately there is apparently no electronic version of this on the BBC website… The interview was by David Amanor with Alex Weir, and lasted about 5 minutes.

http://home.developmentgateway.org/ict/rc/ItemDetail.do~1069514?itemId=1069514 - development gateway is THE web destination for all 3rd world development related material

http://www.thezimbabwean.co.uk/viewinfo.cfm?linkcategoryid=3&linkid=8&id=2317

http://www.zimbabwesituation.com/sep28a_2006.html#Z22

http://www.cd3wd.com/SEEV/thezimbabwesituation.htm#Z22

http://www.aceproject.org/ace-en/focus/e-voting/seevsmsvoting/ - ACE Project is THE global home of international election experts.

http://www.analogzone.com/grnrept33.htm
- a highly positive and very interesting article by a 'technie' online magazine, whose main argument is that SEEV seems rather superior to e-voting systems which are currently in use in the USA.

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