E-Voting in the Netherlands; from General Acceptance to General Doubt in Two Years

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Abstract: This document is a case study of a country in which e-voting used to be the general norm: The Netherlands. It gives a detailed description of the events in the last two years surrounding e-voting in the Netherlands. During this time, the security and reliability of the voting machines that were used were questioned successfully by an action group. This led to court cases, the withdrawal of the certification of these machines and eventually to a complete stop of their use. In the current situation, The Netherlands reverted back to paper ballot voting at least until a whole new system is designed, approved of by Parliament, built and implemented. In this document the author tries to explain why this happened at this particular time. The paper concludes with some ideas on what other countries that are considering the introduction of e-voting might learn from the Dutch experience.

1 Introduction

The last two years have been a rollercoaster for those involved with e-voting in the Netherlands. During the municipal elections of March 2006, nearly 99% of the voters cast their vote with the use of a voting machine. Both in the 2004 European Parliament elections and the national elections of November 2006, the voters living abroad could use the internet as a channel for voting. During the European Parliament elections of June 2009, both groups of voters will have to use the traditional methods of paper ballot and postal voting. It is still uncertain if e-voting will return shortly after those elections. Where the introduction of the use of voting machines in legislation in 1965 happened without any discussion and parliament was, as recently as 2005, asking for the introduction of internet voting for all voters, they now have an unprecedented interest in every little step that the Cabinet takes in regards to this subject.

What happened in the Netherlands to cause this complete turn away from e-voting and what are the prospects for the future? This paper will try to give more insight in the events that caused this landslide.

2 Voting machines

2.1 Legal Requirements for the Use of Voting Machines

The Dutch legislation on elections was set up in such a way that the election process that is used when voting with a paper ballot was also applicable to voting with voting machines. Only in the situations where voting with a machine significantly differs from voting with ballot papers, exceptions were made in lower legislation. Because the two processes existed alongside each other, there has never been, until now, a fundamental discussion concerning the question as to whether the introduction of e-voting should lead to a reconsideration of the way the fundamental principles of free, fair and secret elections are guaranteed.

The Dutch Elections Act was, as stated above, based on the principle of voting by paper ballot. It only contains three provisions regarding e-voting[1]. These provisions state that electronic voting is possible and give some general demands for electronic means that are used in the voting process. The most important requirement in the act is a certifying procedure. The act also states that the means must guarantee the secrecy of the vote. All other regulations for voting machines were found in lower legislation in chapter J of the Decree of 19 October 1989, establishing new regulations for implementing the Elections Act and the ministerial Regulation for the approval on voting machines 1997.

To obtain an approval, a supplier had to submit a prototype of a machine to an independent certification agency that tested the machine against the requirements stated in the ministerial regulation. The test results were not made public. Based on the test report of the agency, the supplier could apply to the Minister of the Interior for an approval of the prototype. Once the prototype was approved, the supplier gave the agency ten machines of which the agency tested one against the prototype. If the tested machine was built according to the approved prototype, the agency would conclude that the machine could be approved. Again, for the final approval, the supplier had to apply to the Minister. The regulation had an appendix which contained the demands that a machine had to meet before it could be approved. These demands had not been updated since the regulation came into force in 1997. The regulation also contained a number of grounds based on which the Minister could decide to withdraw a given approval.

[1] The articles J 32 to J 34 in the Dutch Elections Act.

2.2 History of Voting Machines

The use of voting machines in the polling station has known a long tradition in the Netherlands. Already in the 1950's there was interest for the electronic voting machines used in the United States. In 1966 the first machines of this type, made by Automatic Voting Machine Corporation (AVM), were introduced in the Netherlands. In 1965 the Electoral Act was modified in the sense that the possibility of elections with the use of electronic means was opened. It was left up to the municipalities, who are under Dutch law responsible for organising elections, whether they wanted to use machines or not. The legal provisions called for an approval of voting machines by the Minister of the Interior after which municipalities either bought or rented the machines from the suppliers. This led to a situation where, in 2005, there were two suppliers who divided the market: Nedap and Sdu. Nedap built voting machines with panels that were big enough to contain all the candidates for an election[2]. They were one of the first companies to build voting machines for the Netherlands and they supplied machines to approximately 90% of the municipalities. They are also active in other countries.

The Sdu machines are smaller and have a touch screen instead of buttons. The voting on these machines is done in two steps, whereby a voter first chooses a party and then, from the list of that party, a candidate. Sdu does not sell the machines to the municipalities, but rents them per election. Both types of machines are stand alone machines, although the Sdu machine does have a GPRS connection. This connection can only be used once the election is closed to send the results to the municipality.

2.3 Fraud during the Municipal Elections of 2006

In one municipality, there was a suspicion of fraud during the 2006 elections. A certain candidate obtained 181 preferential votes in one polling station. In all the other polling stations together he only obtained eleven votes. The fact that he was a polling worker and the person controlling the voting machine in the polling station where he got the large number of votes, led to an investigation. However, because the Nedap machine that was used does not have a paper trail, a manual recount of the votes was not possible. The District Attorney therefore asked all the voters to come in for a shadow election. The voters were asked to secretly cast their vote again. During this election the candidate only got a very small number of votes. Also, a number of voters testified that they felt that the suspect had told them too early that they had cast their vote. This gave the District Attorney enough reason to indict. The court in lower instance acquitted the suspect due to lack of evidence. However, when the District Attorney appealed, the appellate court did decide to convict. They found that the testimonies, combined with the results of the shadow election, gave enough cause to convict the suspect of election fraud. This case made people wonder if fraud was possible while using voting machines and if so if fraud had happened before. Was this person the first, or was he just caught because in his case it was so obvious?

[2] The Dutch system is based on a preferential vote for a candidate. In a general election, approximately 600 candidates compete.

2.4 Campaign by NGO we don't trust voting computers

In 2006 an action group by the name of we don't trust voting computers was founded[3]. This happened after the municipal elections of March 2006 during which the municipality of Amsterdam used voting machines for the first time. Most of the founders of the action group live in Amsterdam and were confronted with these machines. The leader of the group is Rop Gonggrijp, a well-known hacker and founder of the internet company xs4all. They started their campaign in the spring of 2006 with a series of requests based on the Freedom of information act. Through these requests they wanted to obtain as much information as possible concerning the voting machines and the decision making process surrounding the approvals. They also approached municipalities in an attempt to buy voting machines. This was successful; they managed to get a couple of Nedap machines. While they were doing this, the Cabinet fell and it became clear that there would be general elections in November.

The action group managed to decipher the operating system for the Nedap machine and wrote an overwrite program that would make it possible to commit fraud with the machines. This program would transfer a certain number of votes casts from one candidate to another. Because the machine did not have a paper trail, this fraud could go undetected if applied on a small scale. While examining the machine, the action group also detected that the radiation transmitted by the screen on the machine can be read from a distance[4]. This makes it possible to break the voter secrecy since in the Netherlands the name of a voter is read out loud in the polling station. The action group presented their finding during a press conference on October 4th [Gr06]. Although the fraud possibility is probably the biggest problem since it changes the outcome of the election, most attention went to the question of voter secrecy. This is caused by the fact that secret elections are not only guaranteed by the Dutch constitution, but also a requirement in the first protocol of the European Convention on Human Rights. The Dutch government is therefore obliged to do anything in their power to guarantee a secret election.

[3] The Ngo has a website, www.wijvertrouwenstemcomputersniet.nl, which also contains information in English.

[4] In computer science, this is known as the Tempest problem. The problem was detected in normal computers as early as the 1980's.

The Cabinet decided after the press conference to have the Secret Service test all types of machines in use for this Tempest problem. It turned out that the most common used Nedap machines did not radiate beyond 5 metres. The Sdu machines however could be 'read' from a distance of over 30 metres, due to their larger screen. This was such an uncontrollable situation that the Cabinet did not see any other option than to withdraw the approval of these machines, even though it was only three weeks before the election. The election did take place, with a crisis team supporting the 32 municipalities whose Sdu machines could not be used. Ten of them were able to use Nedap machines and in 22 municipalities, including Amsterdam, the voting was once again done with paper ballot and pencil. During the elections, which were observed by the Organisation for Security and Cooperation in Europe, there were no major problems with the voting machines [OD07]. The extra security measures that were taken seemed to function well, and although five machines were taken out of service because they might have been tampered with, tests revealed that they were all functioning normal.

After the elections preparations had to be made for the Provincial elections of March 2007. Sdu went to court to fight the withdrawal of their approval and managed to get a court order for a new test by the Secret Service. Although they got a number of attempts, they did not manage to deliver a machine with a radiation range under 5 metres. It was then decided not to renew their approval. For the elections, the same security measures as during the general elections were in place and everything went well.

2.5 Advisory Committees

The events surrounding the general elections led to an increased attention from Parliament. They asked the Minister to set up two independent advisory committees. The first looked into the past, especially to the decision making process concerning the use of voting machines. This committee published a report in April 2007 that stated mistakes had been made in the past. One of the major issues they detected was that the ministry did not have enough technical knowledge, which led to a situation where the suppliers not only controlled the market, but were also influential in the decision making process. Also, the responsibility for the elections and the electoral legislation had in the past shifted several times between different parts of the ministry. This caused a shattered knowledge of the system and its origins. Just before the elections of November 2006, it was not clear which division was responsible for what, which led to an inability to respond quickly to the problems that arose due to the criticism on e-voting. Furthermore, the committee concluded that the embedding of the voting machines within the legal framework was very weak. The lack of technical knowledge had caused a certification process in which the security of the machine was not tested properly. Therefore, they recommended an update of the regulation concerning the certification of the voting machines [He07].

The second committee was asked to give recommendations regarding the electoral process in general and on new ways of e-voting in particular. They published their report 'Voting with Confidence' on September 27th of 2007. One of the recommendations was that the Minister of the Interior should get more responsibilities in the electoral process. This would mean that the current legal position of the municipalities in the process would be changed. Another recommendation concerned a new way of using technology in the voting process. In light of the problems that arose because of the lack of a paper trail with the old machines, they recommended a new system. This system would consist of a voter printer and a vote counter machine. The printer should basically function like a pencil; the voter selects a party and then a candidate, after which the printer would print this selection. The printer does not store the votes. The voter takes the print and puts it in a ballot box. At the end of the day, the votes are counted with the vote counter, which is a scanner [Ka07]. The main advantage of this system over the traditional paper ballot voting is that it prevents voters from casting unintentional invalid votes. It also makes it possible to adapt the system for blind people, for example through the adding of a voice recorder. Last, it speeds up the counting process. Compared to the current system of voting machine, the main advantage lies in the paper trail and the fact that the voter can check whether the printer printed the vote correctly before casting it. Therefore, the proposed system does not require a high level of trust in technology by the voter.

2.6 Aftermath

During the press conference in which the 'Voting with Confidence' report was presented, the State Secretary for the Interior announced that the 'Regulation for approval of voting machines 1997' would be withdrawn. The action group had already filed a court case against the approval of the Nedap machines given in March 2007. As a result of this procedure, on October 1st 2007, the District Court of Amsterdam decertified all Nedap voting machines that were in use in The Netherlands. Since the approval of the Sdu machines was already withdrawn, there were no more certified machines at that time. On October 21st 2007 the 'Regulation for approval of voting machines 1997' was actually withdrawn. Also, the Decree of 19 October 1989 was amended, taking out the provisions that gave the Minister the competence for making new regulations for the approval of voting machines. Therefore, it was also no longer possible to certify new machines. This means that until new e-voting mechanisms are developed and the rules concerning their use are entered into legislation, the current legislation only allows for voting by paper ballot. However, Nedap did file an appeal against the decertification order by the District Court. They also lodged a complaint with the Ministry of the Interior against the withdrawal of the regulation. The State Secretary has recently decided to uphold the withdrawal decision. It is expected that Nedap will also file an appeal in this case. Both cases are therefore still running, so the situation might change once again in the near future. Since it is uncertain when the ruling in these cases will come and what the outcome will be, municipalities, the ministry and the Electoral Council have started preparations to hold the first nation wide election with paper ballots in over 40 years.

3 Internet and Telephone Voting

3.1 Experiments

In 1999 a project was started to investigate possibilities for remote e-voting. This project was in first instance mainly meant for voters from abroad. The intention of the Minister at that time was however to also in time expand the possibility of remote e-voting to voters within the Netherlands. The voters from abroad were seen as an ideal test group for this type of e-voting. Since 1985 almost all Dutch citizens living abroad have been eligible to participate in elections. The main requirement for them is that, in contrast to voters living within the Netherlands, they have to register separately to become a voter. Before 2004 they could choose to vote by mail, by proxy, or in person in a polling station within the Netherlands. Approximately 25000 voters register per election to participate. The procedure for voting by mail was seen as problematic and time-consuming and not all the votes were received in time to count in the elections. Therefore, an experiment was held during the European Parliament elections in 2004 whereby voters from abroad could choose to vote via the internet or the telephone. During the registration process they had to apply for this. The experiment was held under special legislation, the Online Voting Experiment Act. The Internet voting was a success; the telephone experiment was only used by a very small number of voters. Because of these results, the government decided to abandon the telephone experiment, but to carry on with the internet voting. During the national elections in 2006 a new experiment was held with the internet voting. Again, this was a great success; out of the 34.305 registered voters from abroad 21.593 voters (63%) chose to vote via Internet in the registration period. During the elections, 19.815 voters (92%) did eventually cast their vote through the Internet. These voters were asked to fill in an online questionnaire on internet voting. 11.003 voters (65%) responded to the questionnaire. Out of these voters, 99% preferred internet voting over voting via mail. 94% wanted the government to implement internet voting permanently[5].

3.2 Future

These figures and the positive experiences of the governments working with internet voting, led to the plan to implement internet voting for voters from abroad into the regular Election Act, since there was no reason to keep experimenting.

[5] See also www.minbzk.nl/bzk2006uk/subjects/constitution-and/internet-elections

However, the controversy surrounding the voting machines also rubbed off on the discussion surrounding internet voting. If a certifying procedure was deemed necessary for the machines, then why not for the internet service that was used during the election process? This question was asked by Parliament in a discussion with the State Secretary for the Interior in November 2007. The Parliament adopted a motion stating that a certifying procedure should be installed for internet voting. In January 2008 the State Secretary announced that the instalment of such a procedure would cost a lot of time and money and that it was therefore not possible to allow voters from abroad to vote via the internet in the European Parliament elections of 2009. Just before this announcement, the action group filed several Freedom of Information requests concerning internet voting. Now that the voting machines are out of the way, at least for the moment, it looks like the future of internet voting is going to be the next topic of debate in the discussion surrounding Dutch Elections. It is therefore still very uncertain if internet voting will in the future become a permanent option. The demand for nation-wide internet elections that Parliament still made in 2005 has not returned on the agenda and probably will not for a long time.

4 And now?

On the 30th of January 2008 the Parliament debated the proposed new system with the Minister. Several of the parliamentary fractions called for a very thorough approach and made it clear that they would rather vote with paper ballots a bit longer than to rush into new ways of electronic voting. The State Secretary decided to set up a technical advisory committee to examine the feasibility of the new system and to set up guidelines for the technical testing of the vote printer en counter. The results and recommendations of this committee are not known at this moment. They will report to the Minister shortly, as she had promised Parliament that Cabinet will decide on the future of this system before May 1st. Since then, she has announced that this decision will be delayed until probably half May. Already it has been made clear that the 2009 elections for the European Parliament will be held with paper ballot voting. After all, even if the Cabinet and Parliament decide to implement the new system, it will not be possible to develop and test it in time for these elections. This means that currently the Dutch municipalities are in the process of preparing elections in the old fashioned way. For a large group of voters this will mean that they will have to vote with paper for the first time in their lives, even though they have been voting for 30 years. A lot of effort will have to go towards explaining to these voters how this works. What will happen after the European Parliament elections is still a big mystery, even for those involved in the decision making process at this time. The biggest question is whether it will be possible to design a new system for electronic voting that can withstand the fast changes in computer science and the pressure of anti e-voting group and at the same time be voter friendly, easy to use and not too costly.

5 Conclusions

The mere fact that the introduction of voting machines in the Netherlands did not lead to discussion and seemed to go rather smoothly did not ensure that this topic would not be controversial later on. On the contrary, because the introduction went so easy, maybe the political attention for the subject was not great enough, causing neglect and a lack of knowledge with both the Ministry and the Parliament. New developments in computer science and security issues were not linked to voting machines even though there was enough reason to do so. A note hereby however is that also computer scientists have only recently started to consider the subjects of trust, transparency and verifiability in relation to the use of computers in elections. The consequence was that only when the actions of an action group led to a major crisis on the subject, was it acknowledged that there might be a problem.

What can we learn from this? First of all, an important lesson is that the introduction of e-voting should be accompanied by intensive testing. If possible, in this procedure both supporters and critics of e-voting should be involved. Another valuable lesson is that once e-voting is introduced government can not step back and let the market and suppliers take over. Close supervision is necessary to ensure the guarantees of fair, free and secret elections. It is also necessary to reconsider choices that have been made in the past to embed these basic principles in the electoral process. It is not correct to think that voting with a computer is almost the same as voting with a pencil and that the same rules can apply. Issues of transparency, voter secrecy and verifiability will have to be guaranteed, no matter which system you use. But the manner in which these fundamental demands are guaranteed in the process will have to differ. This means that when a change to e-voting is being considered, this has to involve a complete review of the voting process and most likely, an adaptation of certain rules and procedures. This prevents problems later on that might lead to the decline of trust in the system.

A last lesson is that once trust in the voting system declines, it is hard to win this back. Without this support, the legitimacy of the chosen legislator will diminish. It is therefore important to realise that the fact that e-voting can work in one country does not automatically mean it is suitable for all countries. A lot depends on the general level of trust in government, but also the level of trust in the corporations that supply the machines use in the electoral process. If government or the corporations are seen as biased towards certain parties or candidates, the use of voting machines will most likely fuel suspicion of fraud within the elections. In the Netherlands, there is a trend of declining trust. This trend is not only visible in the case of e-voting, but also with other technical solutions. In a recent case, government wanted to introduce a chip card as a means for payment in the public transportation system. This card would replace the current paper payment method. A lot of people feared that this could compromise the privacy of the traveller, especially after some experts proved it was possible to hack the card and read its contents. The further introduction of the card has once more become a topic of debate. Even trust in government in general seems to be declining. In the autumn of 2001, 70% of the voters expressed trust in political government. In the spring of 2004, this number had fallen to only 39% [AI05]. It is therefore not quite unexplainable that the controversy surrounding e-voting only started very recently.

Finally, it is important to realise that elections are not like other areas where computers are being used. E-Voting is often compared to electronic banking. There are, however, big differences between the two. First, with banking there is no need for public accountability of the system. It is sufficient if there is an independent auditor. With elections however, every voter should be able to verify that the system works correctly. If this is not possible, trust in elections and thereby trust in the legislator will decline. Another difference is that with electronic banking, a bank can afford a minor system problem once in a while. Mistakes caused by these problems can be corrected. They will also most likely be detected because millions of people can and will check their bank statements. With elections, there is no possibility for corrections. Even if detected, any minor glitch in the system can have a major impact on the question as to who will rule the country for the next four years. A few of these mistakes and the trust is gone, which can have disastrous effects. Therefore, there should be little room for experiments with new technology in elections. This does not have to mean that there is no future for e-voting. It does mean that new systems should not be used in legally binding elections without rigorous scrutiny and certification. And even when the system passes these requirements, it will always be necessary to re-evaluate the system and the certification of it on a regular basis.

References

[AI05] Andeweg, R.B.; Irwin, G.A.: Governance and Politics of the Netherlands. Palgrave MacMillan, New York, 2005; pp. 228-229.

[Gr06] Gonggrijp, R. et. al.: Nedap/Groenendaal ES3B voting computer a security analysis, October 6, 2006, to be found on www.wijvertrouwenstemcomputersniet.nl.

[He07] Hermans, L. et. al.: Voting machines, an orphaned subject", Report by the Advisory Commission regarding the decision making process for voting machines, April 17, 2007, only available in Dutch through the Ministry of the Interior and Kingdom Relations.

[Ka07] Korthals Altes, F. et. al.: Voting with confidence", Report by the Election Process Advisory Commission September 27, 2007, to be found on www.minbzk.nl.

[OD07] OSCE/ODHIR: Final Report on the 22 November 2006 Parliamentary Elections in The Netherlands, March 12, 2007.