E-voting at Expatriates' MPs Elections in France

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The electoral law in France has been adapted to introduce e-voting. This voting method is however restricted to the eleven constituencies of French citizens living abroad in order to cope with the specificities of this electorate, notably its remoteness from polling stations. The legal framework as well as the technical solution was built in order to preserve the general principles applying to a political vote such as secrecy and sincerity.

Since the 2008 constitutional review, French expatriates have their own MPs at the lower Chamber of the Parliament[1], who will be elected for the first time in May and June 2012. Due to the specificities of the expatriates population, especially the remoteness they sometime experience from their polling station, the Government and the Parliament opened several voting methods, among them electronic voting. The general election is to take place in France on Sunday 10th June and Sunday 17th June 2012, and the e-voting will take place from Wednesday 23rd May to Tuesday 29th May for the first round and then from Wednesday 6th June to Tuesday 12th June for the second round.

The implementation of e-voting in the French electoral law required the drawing up of both a regulatory framework and a technical solution, both compliant with the general principles applying to political elections. The article will therefore present steps taken by the legislation in order to ensure the compliance of various principles, as well as a description of the electoral operation and their compliance with security requirements set by independent French national authorities.

As this article has been submitted (February 2012), the parliamentary election has not taken place yet. So far, the e-voting solution built in France has only been tested during a mock election that took place in January 2012.

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[1] For further information, see: http://www.diplomatie.gouv.fr/fr/les-francais-a-l-etranger/elections-2012-votez-a-l-etranger/les-elections-en-2012-a-l-etranger/

1   E-voting for Expatriates' MPs to Be Elected in Eleven "New" Constituencies

The French Constitution was reviewed on the 23rd of July 2008 in order to enable French expatriates to elect their own MPs. Eleven constituencies were created. Prior to this constitutional review, expatriates were granted the right to elect representatives at the Assembly of French expatriates. This assembly does not have a legislative power, but is meant to represent expatriates in relations with government departments. Since 1982, its members are elected by expatriates, and in 2003, e-voting was introduced for these elections.

Despite the huge French consular network, voting for the 1.1 million expatriates registered on a consular election board can sometimes be a complicated process, due to the geographical distance between the voter and his designated polling station[2]. Hence, the participation rate of voters living abroad is lower than the medium rate in France (see figures below).

Presidential election – Participation rate			
1st round	1995	2002	2007
Expatriates	50,87%	37,27%	40,30%
National average	78,38%	71,60%	83,77%
2nd round	1995	2002	2007
Expatriates	53,01%	44,22%	42,13%
National average	79,65%	79,71%	83,97%

Table 1: Participation in Presenditial elections 1995-2007

Such difficulties and the wish to boost participation encouraged the Parliament to grant expatriates four channels of vote casting at the parliamentary election: going to the polls, proxy-vote, postal mail or Internet.

This latter possibility is introduced for the first time into the French electoral law. Indeed, e-voting has not yet been experienced at a political election. Some limited experiments were done in the field of electronic democracy in the recent past. For instance, e-voting was implemented for trade-union elections at the Department of Education and for the election of the 155 counsellors of the Assembly for French expatriates[3] in 2006 and 2009. The introduction of e-voting did not have a noticeable impact on the participation rate[4] for this election. However, the French Government hopes that this new means as well as the creation of a specific representation for expatriates will increase the participation rate.

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[2]   Expatriates can vote at the embassy or in the consulate of the consular constituency they are attached to.
[3]   The Assembly for French expatriates is not a political body.
[4]   Participation rate: 24,08% (1997), 18,97% (2000), 21,82% (2003), 14,25 % (2006) and 20,44% (2009).

In 2009, when the law implementing the constitutional review was passed[5], the political choice was to limit e-voting (as well as postal voting) to the election of the 11 expatriates' MPs and not to extend it to the other elections expatriates are entitled to vote for, such as the presidential election or referendums. This choice can be explained by the different nature of the presidential election and of the parliamentary election: the first is based on a single national constituency whereas the second is based on 577 constituencies. Therefore it would be problematic, with regards to the principle of equality that expatriate voters dispose of more voting options than voters living in France or in overseas territories.

Electronic democracy is a matter of controversy in France, where a part of the population proved suspicious about electronic voting machines introduced for political elections since 2000. Quite a number of citizens went to court to call for elections to be canceled. Therefore, the Government decided to freeze the extension of voting machines in the municipalities that did not own them in 2008. For these reasons, there is no doubt that the electronic voting taking place in May and June will be highly scrutinized by opponents of electronic democracy. However, the system put in place has been designed to enable the constitutional principles and numerous control mechanisms have been implemented at different stages, notably by independent auditors.

2 A Long Process to Design the Regulatory Framework

The implementation of e-voting for expatriates' MPs required a strong cooperation between the Ministry of the Interior, in charge of the organisation of political elections, and the Ministry of Foreign Affairs responsible for the consular network involved in the electoral process. Both departments participated in the design of the legal framework, as well as the design of the technical solution.

Numerous independent authorities were also part of the design of the solution, among them the ANSSI (independent national agency in charge of ensuring the security of state information systems) and the CNIL (French independent authority in charge of personal data protection) and various auditors.

The 2008 constitutional review was completed by two laws, one in July 2009 (an ordinance) and one in April 2011[6] and by a decree signed on the 15th of July 2011[7]. The two laws passed by the Parliament opened the possibility of e-voting. The legislative part of the election law does not regulate the electoral operations in details.

However, the law foresees that a decree will be enacted, that ensures that electronic voting tools "respect vote secrecy and the sincerity of the election". It has to be noted that the legislative process in France imposes that before a bill is submitted to the

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[5] Ordonnance n°2009-936 du 29 juillet 2009 relative à l'élection de députés par les Français établis hors de France
[6] Loi organique n°2011-410 du 14 avril 2011 relative à l'élection des députés et des sénateurs.
[7] Décret n°2011-843 du 15 juillet 2011 relatif à l'élection de députés par les Français établis hors de France.

Parliament, it has to be examined by the Administrative Supreme Court. According to this court, e-voting is an acceptance between the constitutional principles of sincerity and secret of the vote and of access to the vote. No appeal was made against the text.

The decree (eleven articles) details the electoral operations, the main security requirements and the role of the polling station. According to the French legislative process, the 2011 decree, and each text on e-voting had to be submitted to the French independent authority in charge of personal data protection, before its publishing, in order to guarantee that e-voting respects provision of the 1978 law on data protection.

The responsibility of the data processing is given to the ministry of the interior and the ministry of foreign affairs. The decree foresees that before its implementation, the e-voting software has to be audited by an independent expert.

Both ministries are also in charge of the certification of the system. The certification is foreseen by a 2010 decree[8], which imposes that each State authority creating an information system has to certify to its users that it respects the security objectives set in the decree. The certification of the French system took place in March 2012: the secretary general of the MFA and of the MOI acknowledged that nothing more could be done to tackle residual risks, which have been reduced to the minimum. The certification was conducted under the scrutiny of the ANSSI, the independent national agency in charge of ensuring the security of state information systems. Before the certification, the ANSSI audited the architecture of the system, its code, and the hosting infrastructures of the system.

The decree specifies the list of members of the e-voting polling station, as well as the nature of their mission: it is composed by a member of the French Supreme Administrative Court, a member of the Ministry of Foreign Affairs, a member of the Ministry of the Interior, a member of the national agency for security of information systems, and three members of the Assembly of French abroad. Therefore, its composition is balanced between elected members, civil servants and technical experts of information systems. Only members of the e-voting polling station own fragments of the decryption keys. Additionally, there have to be at least 4 (the quorum) members out of 7 to generate the entire key.

The presence of members of the e-voting polling station is mandatory for the closing of the electronic ballot box and for its opening after the end of the voting process. Its mission is to ensure that electoral operations are managed properly. Publicity of the voting operations can only be limited by members of the e-voting polling stations in order to preserve the security of the process. Each issue that might occur during the vote has to be documented in the voting protocol. The communication of theses minutes obey to the general rule set in the electoral code (article R.70), meaning that each voter can ask for access to these documents to contest the electoral operations.

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[8] Décret n° 2010-112 du 2 février 2010 pris pour l'application des articles 9, 10 et 12 de l'ordonnance n° 2005-1516 du 8 décembre 2005 relative aux échanges électroniques entre les usagers et les autorités administratives et entre les autorités administratives

To protect the secret of the vote and fulfil anonymity requirements set by the law on privacy, the decree foresees that the voting ID should have not any link to the identity of the voter. This separation is set by the CNIL for each generated vote or file including personal data. Moreover, the voting ID is generated on an unpredictable basis. Finally, the ID and the password are sent by two separate means of communication.

The regulatory framework had to ensure the balance between the electoral principles, like election sincerity and vote secrecy (both are constitutional principles), protection of personal data and the objective of the reform to lessen difficulties faced by expatriates when going to the polls.

It was decided not to introduce a "right to regret" (vote multiple times) as some countries have. Hence, once the e-vote is cast, the voter is registered on the list and will not be able to vote in the polling station if he tries to. On the Election Day, authorities will have the list of voters who already cast their ballot.

3 The Technical Solution Had to Comply with the Constitutional Principles Ruling the Election

The focus of the authorities has been on the development of a user-friendly technical solution enabling e-voters to vote in one single session. The consortium in charge of the development of the e-voting system was chosen according to French procurement rules. The development of the voting system started a year before the election. All along the process, the Government delegated the project controlling to the French independent authority in charge of personal data protection (the Commission nationale de l'informatique et des libertés[9]).

The e-voting system had to fulfil important security requirements entitled by the 1978 law on protection of personal data and the specifications mentioned in the decree. Thus, the decree details the basic requirements written in the law and mentions that data created for the electronic vote has to guarantee the separation, in distinct files, of the data related to the identity of the voter and of the data related to the ballot.

Several controls were foreseen by the decree to ensure both the preservation of the vote secrecy and the sincerity of the election. Two audits are being run on the system built by Atos-Scytl: one by the national agency (ANSSI) in charge of ensuring the security of information systems, and a second one run by an independent audit agency. Moreover, a risk analysis has been conducted, according to the EBIOS method to ensure the utmost level of security.

To preserve the secrecy of the vote, the system relies on a strong identification of the voter. Anyone who is not identified by the system is not able to vote online. There is no pre-registration system for the use of e-voting at the general election day. Voters

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[9] http://www.cnil.fr/english/the-cnil/

registered on a consular election board are able to decide to use e-voting: each will be sent an ID by postal mail 15 days prior to the election. It will be valid for both rounds. It will be sent a second time by short message ten days before the first round. A password will be sent by email 5 days before each round, it will be different for both rounds. To secure the voter's computer, the connection to the e-voting website generates a secure electronic voting booth on the voter's machine. After he/she casts his/her vote, the voter is sent a receipt.

To ensure the sincerity of the election, the e-voting system and the ballot box have to be proofed against security breaches to assure that no one is able to enter the system while the poll is still opened and that fake ballots cannot be added to the voters' ballots. The system is operated by a two-key system. A public key ensures the encryption of the date while a private key ensures its decoding. The two keys are generated at the beginning of the poll, when the electronic polling station is opened. During the voting process, only the public key exists, the private key is being destroyed. Ballots and vote receipts are stored in a ceiled envelop. After the election is closed, both keys are necessary to start the counting of the ballots. Each operation is registered, so that members of the polling station should be able to notice any breach in the system and that any operation is detected that is not due to occur.

The whole voting process is supervised by an electronic board (EPS) composed of eight members. It is chaired by a magistrate and other members are either state officials, representative of the national agency for security of information systems, or members of the Assembly for French expatriates. Similarly to the right granted during traditional voting operations, each candidate can designate a delegate tasked with the observation of the voting operations.

The role of the EPS is to ensure the correctness of voting operations. At the beginning of the vote, the EPS ensures that the digital ballot box is empty and that the list on which each voter signs after casting the ballot is blank. At the end of the vote, members of the EPS sign the minutes of the voting process. In order to ensure the sincerity of the vote, members of the polling station have investigatory power and can decide to stop voting operations either temporarily or permanently.

4 A Mock Parliamentary Election Enabled Authorities to Test the Security and the Efficiency of the System

In order to test the e-voting system, both Departments decided to run an extensive test in January. 15.000 voters, registered on consular electoral boards volunteered to participate in this large-scale test. Participation was 30% for the first round and reached 33% for the second round. During the test, the ANSSI simulated various attacks to test the security of the system.

The outcome was considered positive and the e-voting system itself qualified. However various practical difficulties occurred that needed to be solved before the election day in May and June.

Indeed, the main difficulties concerned the accessibility of the voting site (compatibility of the voter's computer) and identification difficulties. The test raised the awareness of the Ministry of Foreign affairs to take actions to solve the issues revealed by the full-size test. The MFA created a testing system, which can be used by the voter, prior to the election day, in order to ensure that the computer is compliant with the voting site. Moreover, the assistance unit will be increased on election day to provide a quick support to each voter experiencing difficulties.

In order to cope with any difficulties preventing someone from voting on the day of the genuine election, each voting channel will be available at different times: first the e-voting, then postal voting, and finally voting at the polling station and proxy vote. This scheduled voting process aims at securing the ability to vote in any case for each voter.

First lessons learnt from the test proved that introducing a new voting method requires a strong communication effort so that voters are prepared to use e-voting and are able and confident to vote electronically.

A long term communication campaign was built by the Ministry of Foreign affairs, first to collect updated contact information from French expatriates to inform them of the option to vote electronically and for receiving their passwords and ID.

Very practical difficulties occurred during the test, such as delays due to dysfunction of postal services in several countries, or incompatibility of the voting software with some computer operating systems.

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In conclusion, the regulatory framework and the technical solution developed to enable French expatriates to elect their own MPs electronically were meant to measure up to the importance of the event. Political elections are regulated by intangible constitutional principles that ought to be respected. Audits and tests proved essential to tackle security weaknesses and organisational difficulties. The full-size test proved successful but also indicated there was room for improvements in the organization of e-voting. The test revealed practical difficulties, such as accessibility to the voting site or reception of identification and certification material in time for the vote. These issues have been addressed for the general Election in June.