



# Status Paper on Electronic Voting Machine (EVM) (November, 2021)-Edition-4



Election Commission of India





**STATUS PAPER  
ON  
ELECTRONIC  
VOTING  
MACHINE (EVM)**



**ELECTION COMMISSION OF INDIA**

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# Abbreviations & Acronyms

|              |  |
|--------------|--|
| <b>AC</b>    | Assembly Constituency                    |
| <b>BEL</b>   | Bharat Electronic Limited                |
| <b>BU</b>    | Balloting Unit                           |
| <b>CU</b>    | Control Unit                             |
| <b>DRM</b>   | Direct Recording Machines                |
| <b>ECI</b>   | Election Commission of India             |
| <b>ECIL</b>  | Electronics Corporation of India Limited |
| <b>EMB</b>   | Election Management Body                 |
| <b>ERC</b>   | Electoral Reforms Committee              |
| <b>EVM</b>   | Electronic Voting Machine                |
| <b>HC</b>    | High Court                               |
| <b>IIT</b>   | Indian Institute of Technology           |
| <b>ISI</b>   | Indian Statistical Institute             |
| <b>OTP</b>   | One Time Programmable                    |
| <b>PC</b>    | Parliamentary Constituency               |
| <b>PSU</b>   | Public Sector Undertaking                |
| <b>SC</b>    | Supreme Court                            |
| <b>TEC</b>   | Technical Experts Committee              |
| <b>VVPAT</b> | Voter Verifiable Paper Audit Trail       |



## INTRODUCTION:

India is the largest Participatory Democracy of the world, with about 937.1 million registered voters. The Constitutional mandate of superintendence, direction and control of Elections to the Parliament and the State Legislative Assemblies has been conferred on the Election Commission of India.

The Election Commission of India is an independent Constitutional entity, which has successfully conducted regular elections to the Parliament and various State Legislative Assemblies since 1952 in a free, fair, participative, informed and credible manner. The Commission is widely acknowledged as a "Global Gold Standard" in Election Management across the World, setting ever-higher standards of efficient and professional conduct of Elections.

The Commission has been at the forefront of embracing, adopting and implementing the latest technological advancements in improving and fine-tuning the election processes and systems. The Commission has taken the pioneering initiative of introducing Electronic Voting Machine (EVM) for recording, storing and counting of votes across the length and breadth of the Country in a transparent, credible and secure manner, backed by appropriate legal support. The use of EVM demonstrates the Commission's unflinching resolve to continually improve, upgrade and strengthen the Electoral Process in the country.

The Commission has successfully used EVMs in conducting 132 General Elections to the State Legislative Assemblies and 4 Lok Sabha Elections over the last two decades. The List of States, along with the years in which 100% EVMs were used in the Assembly Elections is placed at **APPENDIX - 1**. 55.41 crore (554 million) voters exercised their franchise in 2014 Lok Sabha elections using EVMs. 61.3 crore (613 million) voters exercised their franchise in 2019 Lok Sabha election using EVMs with VVPATs. Since the very inception of the EVMs in 1982, as a positive electoral reform on the electoral scene in India, EVMs are now well accepted by the voters, political parties and other stake holders, backed by various judicial pronouncements. Party with maximum number of seats in Legislative Assembly and Lok Sabha elections is placed at **APPENDIX – 2**.

In the meeting of All National and State Recognised Political Parties held on 12th May, 2017, the then Chief Election Commissioner announced that the Commission will ensure 100% coverage of VVPATs in all future elections to the Parliament and State Assembly Elections.

In General Elections to State Legislative Assemblies of Gujarat and Himachal Pradesh in 2017, mandatory verification of VVPAT paper slips of 01 randomly selected Polling Station of each Assembly Constituency was done on pilot basis. On 13th February 2018, the Commission mandated verification of VVPAT paper slips of randomly selected 01 (one) polling station per Assembly Constituency/each Assembly Segment of the Parliament Constituency, in all future General and Bye Elections to the House of the People and State Legislative Assemblies.

On 15th March, 2019, the Honourable Supreme Court of India admitted a petition filed by 23 political parties on counting of printed slips of 50% VVPATs. On 8th April 2019, Honourable Supreme Court upheld the integrity of EVMs, however, in the interest of greater satisfaction of stakeholders, increased the sample size of number of VVPAT slips to be matched with EVM count from existing 1 polling station per Assembly Segment/Constituency to 5 polling stations per Assembly Segment/Constituency (*“ We are certain that the system ensures accurate electoral results” and “Verification of VVPAT slips of 5 polling Stations per Assembly Constituency or Assembly Segment in Parliament Constituency would lead to greater satisfaction.”*). The review of this judgment was also dismissed by the Honourable Supreme Court on 07.05.2019. This historic judgement sets at rest all the issues on EVMs as well as the demand to count large number of VVPATs. Till 2nd May 2021, mandatory verification of 31,054 VVPATs have been conducted and matched with the electronic count of CUs.

## THE JOURNEY OF EVM IN INDIA:

Voting system in India has gone through multiple changes. During the first two General Elections to the Lok Sabha in 1952 and 1957, each candidate was allotted a separate ballot box pasted with the symbol of the candidate. The names and symbols of the candidates were not printed on the ballot paper and voters had to drop a pre-printed ballot paper in the ballot box of the candidate of their choice. This system ignited fears of tampering, booth capturing, and manipulation in the minds of the various stakeholders and was soon replaced. In 1960-61, a marking system on the ballot paper was introduced during the mid-term elections to the Legislative Assemblies in Kerala and Odisha and this system continued till the 1999 Lok Sabha elections.

Before introduction of the EVM, the ubiquitous Ballot papers were used to cast votes in the Indian Elections, with considerable success. The use of ballot papers was time consuming, prone to malpractices like booth-capturing and ballot-box stuffing, large number of invalid votes due to wrong/incorrect marking, subject to prolonged counting drills, more disputes and delayed result announcement besides being an ecologically straining and environmentally unfriendly method.

However, in comparison, EVM has substantial comparative and noticeable advantages.

- I. The manner of voting by EVMs is much simpler and voter-friendly as the voter has to merely press the button on BU for casting his votes in favour of the candidate of his choice.
- ii. Under the EVM system, there is no invalid vote, whereas in the ballot paper system large number of ballot papers were invalidated and, in some cases, the number of such invalid ballot papers was even more than the winning margin of the elected candidate. As per a joint study of Indian School of Business, Indian Statistical Institute and Brookings Institution, “There are no invalid votes under the system of voting with EVMs. Invalid votes under the ballot paper system were result of improper stamping of the ballot. This is important as the number of invalid votes is often more than the winning margin. Therefore, the choice of the electorate will be more correctly reflected when EVMs are used”.
- iii. It is auditable, transparent, accurate, secure and helps reduce human error.
- iv. It gives faster results in hours, which is particularly relevant in large countries like India having Constituencies of several hundred thousand voters, where counting



used to take days and weeks earlier.

- v. Earlier crores of ballot papers were printed requiring hundreds of tonnes of paper for printing the same and the printing of ballot papers had to be undertaken in large number of Government Presses for very long periods, involving hundreds of election officials in each constituency. In addition, EVM voting saves time, energy and money, not to speak of the millions of trees it saves in the process.
- vi. Additionally, the innovative use of advancements in modern electronics for voting in the country provides for a fulsome endorsement of the creativity, inventiveness and pioneering acumen of the Indian society at large and serves to enhance the image and prestige of the country in the international arena.

As can be easily appreciated, the weight of cumulative comparative experience of conducting elections since 1952, both with ballot papers and EVMs, and the numerous undeniable merits in the use of EVMs, render the EVMs as a preferred instrument of casting votes. Quite evidently, the use of ballot papers was a traditional, anachronistic and archaic voting method. In order to overcome the aforementioned problems associated with the erstwhile practice of using ballot papers, and also to keep updated with the advances of technology, the ECI mooted the idea of EVM in 1977.

In 1977, Mr. S.L. Shakdhar, the then Chief Election Commissioner of ECI, during a tour to Hyderabad requested the Electronics Corporation of India (ECIL) a PSU of the Department of Atomic Energy to study the possibility of using an electronic device for conducting elections and to design and develop an electronic gadget for recording of votes. In 1979, a proto-type was developed and its operation was demonstrated by the ECI before the representatives of political parties on 6th August, 1980.

The Bharat Electronics Limited (BEL), Bengaluru, a Defence Ministry PSU, had also developed a “microcomputer based voting equipment, which they had used for the elections for the various unions of the company”. In January 1981, BEL approached ECI for manufacturing EVMs and on 29th July, 1981, the Commission held a meeting with the representatives of BEL, ECIL, the Ministry of Law and Chief Electoral Officers of some states regarding use of EVMs in elections.

On 19th May, 1982, the ECI issued directives under Article 324 of the Constitution of India for the use of EVMs and conducted elections at fifty polling stations using the machines in an election in 70-Parur Assembly Constituency (AC) of Kerala on an

experimental basis. The EVMs were further used in 10 Bye-elections across the country in 1982-83. However, due to the absence of any specific law prescribing the use of EVMs, the election was challenged in a petition (Election Petition 01 of 1982 filed by A.C. Jose) and on 5th March, 1984, the Hon'ble Supreme Court of India held that EVM cannot be used in an election unless a specific provision is made in law for its use. Consequently, the law was amended by the Parliament in December 1988 and a new Section 61A was included in the Representation of the People Act 1951, thereby empowering the ECI to use EVM. The amendment came into force on 15th March, 1989. The Supreme Court upheld the Constitutional validity of Section 61A in its judgment in *AIADMK versus Chief Election Commissioner and Others* {(2002 UJ(1)387)}.

However, doubts and speculations regarding this new entrant in the voting system of India persisted in the political atmosphere of the country. In order to gain popular trust and affirm the integrity of the new electronic voting system, the Government of India instituted an Electoral Reforms Committee (ERC) in January 1990, consisting of representatives from several national and state-level political parties under the chairmanship of Mr. Dinesh Goswami. The ERC recommended the examination of EVM by a team of technical experts.

Consequently, a Technical Expert Committee was formed under the chairmanship of Mr. S. Sampath, Chairman, RAC, DRDO with eminent scientists like Dr. P.V. Indiresen (IIT, Delhi), Dr. Rao C. Kasarbada (ER&DC, Trivandrum) in the list among others. The members of the TEC have always been renowned professionals of technical excellence and eminent academic/research record. In April 1990, the Expert Committee unanimously recommended the use of EVMs without any further loss of time marking it technically sound, secure and transparent. On 24th March, 1992, necessary amendments to the Conduct of Elections Rules 1961 were notified by the government vis-à-vis the use of EVMs.

In 1998, a general consensus was reached on the use of EVMs for conducting Indian elections. In 1998, EVMs were used in 16 Legislative ACs across three states of Madhya Pradesh, Rajasthan, and Delhi. The use of EVMs further expanded in 1999 to 46 Parliamentary Constituencies (PC), and later, in February 2000, EVMs were used in 45 ACs in Haryana state assembly polls. In 2001, the state assembly elections in Tamil Nadu, Kerala, Puducherry, and West Bengal were completely conducted using EVMs. All state assembly elections thereafter witnessed the use of this machine. In 2004, the EVMs were used in all 543 PCs for the elections to the Lok Sabha. A new technologically advanced

voting system completely replaced the erstwhile voting method of using ballot papers. Since 2000, India has witnessed 132 State Assembly Elections and 4 General Elections to the Lok Sabha (2004, 2009, 2014 and 2019) where votes were cast and recorded using the EVMs (**APPENDIX-1**)

A number of technological changes were made in the EVMs in 2001 and the machines were further upgraded in 2006. The pre-2006 era EVMs are known as '**M1 EVMs**', while EVMs manufactured between 2006 to 2010 are called '**M2 EVMs**'. The latest generation of EVMs, produced since 2013 are known as 'M3 EVMs'.

In a meeting of all political parties held on 4th October, 2010, the parties expressed satisfaction with the EVM but some parties requested the Commission to consider introducing Voter Verifiable Paper Audit Trail for further transparency and verifiability in poll process. In India, the demand of VVPAT to increase transparency was floating in the air for some time after such a tool was first demonstrated in New York City in March 2001 and first used in Sacramento, California in 2002. The demand was referred to the Technical Expert Committee (TEC) by the ECI.

Introduction of VVPAT implied that a paper slip is generated bearing name and symbol of the candidate along with recording of vote in Control Unit, so that in case of any dispute, paper slip could be counted to verify the result being shown on the EVM. Under VVPAT, a printer is attached to the balloting Unit and kept in the voting compartment. The paper slip remains visible on VVPAT for about 07 seconds through a transparent window. The Commission referred the matter to its Technical Expert Committee (TEC) on EVMs for examining and making a recommendation in this regard. The Expert Committee had several rounds of meetings with the manufacturers of EVM, namely, BEL & ECIL, on this issue and then had met the political parties and other civil society members to explore the design requirement of the VVPAT system with the EVM.

A prototype was manufactured and field trials were conducted in Thiruvananthapuram (Kerala), Delhi, Cherrapunjee (Meghalaya), Jaisalmer (Rajasthan) and Leh (Jammu & Kashmir) in July 2011. Following the first field trials, the Commission directed the manufacturers to re-design the VVPAT.

A second field trial was conducted in July-August 2012 after the new model was manufactured. On 19th February, 2013, the final model was approved by the TEC. The model was demonstrated to the political parties in a meeting on 10th May, 2013. The Conduct of Elections Rules, 1961 were amended and notified on 14th August, 2013,

thereby, allowing the ECI to use VVPATs along with EVMs. On 4th September, 2013, VVPATs were first used in the bye-election for 51-Noksen AC in Nagaland.

In the meanwhile, on 8th October, 2013, in a Public Interest Litigation matter, the Honourable Supreme Court directed the ECI to introduce the VVPAT system in a phased manner. In All Political Parties held on 2nd May 2017, the Commission decided to use 100% VVPATs at every polling station in all future elections to Parliamentary and Assembly constituencies. Since May 2017 VVPATs being used in all General/Bye-election to Parliamentary and Assembly Constituencies. During the General Elections to Lok Sabha 2019, VVPATs were used in all Parliamentary Constituencies.

The Commission had received demands from various political parties for increase in the mandatory VVPAT slip count ranging from 10% to 100% at different points of time.

For a systematic and scientific examination of the issue, the Commission engaged Indian Statistical Institute (ISI), one of the most prominent and reputed national institutes devoted to research, teaching and application of statistics and sampling knowledge in the country, to give its expert findings in the matter of appropriate sampling size of VVPAT paper slips count. The Expert Committee comprising of Prof Abhay G Bhatt, Head ISI, Delhi Centre, Prof Rajeeva Karandikar, Director, Chennai Mathematical Institute and Shri Omkar Prosad Ghosh, DDG (SSD), CSO, MOSPI nominated by Director General, National Sample Survey Office (NSSO) had wide ranging consultations with other experts in the field of statistics and examined suggestions received from other groups. The Expert Committee has submitted its Report to the Commission on 22.03.2019. The ISI report unequivocally finds that adoption of a particular percentage as a sample for VVPAT is devoid of any scientific logic or statistical basis. It was further submitted that absolute number of the sample adopted for verification determines the ability of such sample to represent overall accuracy.

On 15th March, 2019, the Honourable Supreme Court of India admitted a petition filed by 23 political parties on counting of printed slips of 50% VVPATs. The Commission submitted its views based on the systematic and scientific examination by the Expert Committee of Indian Statistical Institute. On 8th April 2019, Hon'ble Supreme Court upheld the integrity of EVMs (*“ We are certain that the system ensures accurate electoral results” and “Verification of VVPAT slips of 5 polling Stations per Assembly Constituency or Assembly Segment in Parliament Constituency would lead to greater satisfaction.”*), however, in the interest of greater satisfaction of stakeholders, increased the sample size of

number of VVPAT slips to be matched with EVM count from existing 1 polling station per Assembly Segment/Constituency to 5 polling stations per Assembly Segment/Constituency. The review of this judgment was also dismissed by the Hon'ble Supreme Court on 07.05.2019. This historic judgement sets at rest the issues on EVMs as well as the demand to count large number of VVPATs.

In pursuance of the Honourable Supreme Court of India's order dated 8th April, 2019, the Commission directed to conduct mandatory verification of VVPAT paper slips of randomly selected 05 (five) polling stations in all future General and Bye Elections to the House of the People and State Legislative Assemblies, in addition to the provisions of Rule 56D of the Conduct of Elections Rules, 1961, after the completion of the last round of counting of votes recorded in the EVMs, as under:

- (a) In case of General and Bye elections to State Legislative Assemblies, verification of VVPAT paper slips of randomly selected 05 (five) polling stations per Assembly Constituency.
- (b) In case of General and Bye elections to the House of the People, verification of VVPAT paper slips of randomly selected 05 (five) polling stations of each Assembly Segment of the Parliamentary Constituency concerned.

Chronology on journey of EVMs/VVPATs is placed at **APPENDIX –3**.

## **SOCIO-POLITICAL FEEDBACK**

The use of EVMs meant an amalgamation of technology and trust, tradition and modernity, like moving away from horse-drawn carriage to motor vehicles.

In 1982, when EVM was first used in Kerala, a candidate Sivan Pillai challenged its use even before the election. But Kerala High Court did not entertain his challenge and EVM was introduced as a pilot project. Interestingly, Mr. Pillai, the challenger, won the election when the result was declared. However, Mr. Pillai's opponent challenged the introduction of EVMs thereafter. The said election was re-conducted with paper ballots after Supreme Court ruling in 1984. However, the 1984 SC ruling against EVMs had been on a legal technicality, and not about their fundamental suitability, and the legal glitch was corrected through amendment of the Representation of the People Act 1951 in 1988.

The introduction of EVMs for voting in India was met with certain reservations considering the then existing large-scale illiteracy and socio-economic backwardness of the country. It was often asserted by the naysayers that the multitudes of poor, illiterate, down-trodden, especially in the rural areas, would face hardships and problems in accessing the EVMs and may get dis-enfranchised out of ignorance, lack of voting education or awareness. However, the concerted and focused information, education and communication programmes launched by the Commission, especially to spread awareness and familiarity with the EVMs and its commitment to reach the last elector, effectively nullified all reservations and doubts in this regard. It is heartening to see the cross-section of Indian society eagerly and positively embracing the EVMs and actively and enthusiastically participating in the electoral process by casting their votes on EVMs. A joint study of Indian School of Business, Indian Statistical Institute and Brookings Institution establishes that introduction of EVMs led to greater participation in electoral process by the marginalised and vulnerable voters such as women, scheduled caste and scheduled tribe.

Since the advent of EVMs on the electoral scene aspersions on its use have been cast from certain quarters, including political parties and individuals. To meet the challenge raised against the EVMs, the ECI, as an extra-ordinary measure, threw an **open challenge** to all stakeholders between 3rd and 7th August, 2009 to come forward and prove if the ECI-EVMs could be tampered. However, none could do so.

In 2017, after the results of the 5 State Assembly elections were declared, some political parties had again cast aspersions on the credibility of EVMs. On 12th May, 2017, a meeting with all recognised National and State Political parties was organised at



Constitution Club, New Delhi. One of the major issues under deliberations during the Meeting was the use of Voter Verifiable Paper Audit Trail (VVPAT) along with EVMs during the elections. The Hon'ble CEC assured 100% coverage of VVPATs in all future election to the Parliament and State Assembly Elections. He informed the political party representatives that the Commission would hold a Challenge and offer opportunity to political parties to demonstrate that EVMs used in the recently concluded Assemblies elections in early 2017 (Uttar Pradesh, Uttarakhand, Goa, Manipur and Punjab) were tampered or that EVMs can be tampered even under the laid down Technical & Administrative Safeguards.

Commission held a Press Conference on 20th May, 2017 to announce EVM Challenge and sent invitation to all National and State Recognized Political Parties to participate in the EVM Challenge from 3rd June, 2017 onwards. Only two political parties, namely, Nationalist Congress Party (NCP) and Communist Party of India (Marxist) submitted their interest in participating in the EVM Challenge and reported at the Challenge Venue on 3rd June, 2017. However, they did not wish to participate in the Challenge but only expressed their interest in understanding the EVM process. They interacted extensively with the Technical Expert Committee of the Commission to clear their doubts. The EVM Challenge concluded on 3rd June 2017 itself.

## LEGAL INTERVENTIONS AND COURT CASES

Since 2001, the issue of possible tampering of EVM has been raised before various Courts. Some of these are mentioned below:

|   |
|---|
| Karnataka High Court (1999)                     |
| Madras High Court (2001)                        |
| Kerala High Court (2002)                        |
| Delhi High Court (2004, 2021)                   |
| Bombay High Court (Nagpur Bench) (2004, 2018)   |
| Uttarakhand High Court (2017)                   |
| Madhya Pradesh High Court (2018)                |
| Gujarat High Court (2019)                       |
| Supreme Court of India (2013, 2017, 2018, 2019) |

### **Karnataka High Court (1999)**

The Honourable Karnataka High Court held that *“This invention is undoubtedly a great achievement in the electronic and computer technology and a national pride”*. The order was delivered on a plea filed in 1999 by a defeated candidate who had challenged the role of EVM machines in Yelahanka Parliamentary Constituency. The court studied the safety features and examined BEL scientists and ruled that machines were tamper-proof and any attempt to doctor them cannot be kept away from the public eye.

### **Madras High Court (2001)**

The Honourable Madras High Court also categorically ruled out any question of tampering of the EVMs. The following observations made by the Madras High Court may be taken note of:

*“There is also no question of introducing any virus or bugs for the reason that the EVMs cannot be compared to personal computers. The programming in computers, as suggested, has no bearing with the EVMs. The computer would have inherent limitations having connections through Internet and by their very design, they may allow the alteration of the programme but the EVMs are independent units and the programme in EVM is entirely a different system.”*



Both the Karnataka High Court and the Madras High Court observed that use of EVMs in election has several advantages over the system of ballot paper/ballot box election.

### **Kerala High Court(2002)**

In one of the cases, the Honourable High Court of Kerala in its order dated 6th February, 2002 had recorded its appreciation on the efficiency of the EVM mechanism. The judgment of the Kerala High Court in the said Election Petition was upheld by the Hon'ble Supreme Court in Civil Appeal (AIR 2003 SC 2271).

### **Delhi High Court (2004, 2021)**

In 2004, this matter was placed before the Honourable Delhi High Court by advocate Pran Nath Lekhi who had alleged that EVMs were tampered with to favour UPA in the election results. But HC found no merit in the petition. In this context,

High Court of Delhi in its Order dated 03.08.2021 dismissed plea seeking to stop the use of EVMs and imposed a fine of Rs. 10,000 on the petitioner terming the petition as a 'Publicity Interest Litigation' based on hearsay and 'baseless allegations and averments.

### **Bombay High Court (Nagpur Bench) (2004, 2018)**

The Honourable Bombay High Court (Nagpur Bench) examined certain witnesses who claimed to be experts in the field of electronics and electronic gadgets. These witnesses, however, admitted before the Court that tampering of EVMs was not possible unless the persons new entire things and had free access to the machines.

In EP No. 15 of 2014, the Bombay High Court ordered a detailed forensic examination of the EVMs from CFSL, Hyderabad for checking any manipulation etc. The CFSL report clearly ruled out any tampering, alteration or manipulation in the EVMs. The said report was accepted by Hon'ble High Court and petition was dismissed vide its order dated 23.02.2018.

### **Uttarakhand High Court (2017)**

The Honourable Uttarakhand High Court in its judgement dated 2nd June, 2017 has observed as under:

“Prima facie, it is evident from a combined reading of the entire press release of ECI that this system is seal proof. The EVMs are not hackable. There cannot be any manipulation at manufacturing stage. The results cannot be altered by activating a Trojan Horse through

a sequence of key presses. The ECI-EVMs cannot be physically tampered with. The EVMs use some of the microcontrollers, dynamic coding of key codes, date and time stamping of each and every key press etc. These EVMs also cannot be tampered with during the course of transportation or at the place of storage. There are checks and balances to ensure tamper-proofing of EVMs”.

### **Madhya Pradesh High Court (Jabalpur Division Bench) (2018)**

In WP No. 28295/2018, regarding counting of all VVPAT slips alongwith the counting of votes through EVMs in the ongoing State Assembly election, the Honourable Madhya Pradesh High Court (Jabalpur Division Bench) vide its order dated 07.12.2018 had dismissed the WP, stating that ‘we do not find any merit in the present and the same is accordingly dismissed’.

### **High Court of Gujarat (2019)**

“....as will be evident from the extensive reproduction of the status report on EVMs/VVPATs, the system of registering vote of the voter and reflection of his vote has become more transparent and apparent to regain the voter’s confidence in the system. What essentially was the object of introduction of the VVPATs was the restoring of the voter’s confidence by logging and registering of his vote correctly in the EVM. The Voter Verifier Audit Trail as the name suggests assures the voter of his vote having been correctly recorded in the system.” Once the object of the audit of the voter’s vote, from his perception is achieved, who is the end consumer of the franchise, the mere apprehension voiced by the candidate, pales into insignificance”.

### **Supreme Court of India (2013, 2017, 2018 and 2019)**

In Oct 2013, to bring about greater transparency, the Honourable Supreme Court allowed ECI to introduce VVPAT in phased manner.

Further, on 9th August, 2017, Hon’ble Supreme Court of India while deciding the bunch of Petitions on 100% use of VVPAT, observed that

“The above statement of the Election Commission of India contained in the counter affidavit acknowledges, that all prayers made in the group of petitions, stand fulfilled and satisfied. It is also apparent, that the Government of India has sanctioned funds for the purchase of the VVPAT units, needed during the course of the elections, which are to take place in the immediate future. The position expressed leaves no room for any doubt, that

all future elections will be held by using VVPAT. The above stance is reiterated during the course of hearing by the learned counsel representing the Election Commission of India.

In view of the above, we are of the considered view that the present bunch of matters does not require any further adjudication at our hands. All the cases clubbed together, are accordingly disposed of in terms of the counter affidavit filed by the Election Commission of India, duly supported by the Government of India”.

In WP (Civil) No. 1332/2018, regarding use of ballot papers, the Honourable Supreme Court of India vide its order dated 22.11.2018 had dismissed the WP, stating that ‘we are not inclined to entertain the writ petition’.

Supreme Court of India in its Order dated 08.04.2019 stated that

- (I) “We are certain that the system ensures accurate electoral results”
- (ii) “Verification of VVPAT slips of 5 polling Stations per Assembly Constituency or Assembly Segment in Parliament Constituency would lead to greater satisfaction.”

Review Petition against above order dismissed on 07.05.2019.

The Hon’ble Supreme Court on 21.05.2019 dismissed a PIL seeking counting of VVPAT slips of all EVMs while rebuking the petitioner NGO for making a “mockery of democracy” by moving the court despite a clear ruling by the apex court directing counting of VVPAT slips of five polling stations per assembly segment.

**Analysis:** All the aforementioned Honourable High Courts as well as Honourable Supreme Court after going through various aspects of the technological soundness and the administrative measures involved in the use of EVMs/VVPATs, have held that the EVMs/VVPATs are credible, reliable and totally tamperproof.

## **TECHNICAL EXPERTS COMMITTEE (TEC):**

### **Composition of First Technical Expert Committee on EVMs**

Central Government appointed the Electoral Reforms Committee in January, 1990 (Goswami Committee) consisting of representative of several recognized National and State Parties.

The Electoral Reforms Committee felt that the machines should be tested by technical experts with a view to removing any doubts or misapprehensions in the minds of the public with regard to credibility of the working of the machines and desired that a clearance from the technical experts to the effect that doubts and misapprehension entertained about the credibility of the machines were not well founded should be obtained.

An Expert Committee for the evaluation of the electronic voting machines was constituted under the chairmanship of Professor S. Sampath, Chairman Technical Advisory Committee, Defence Research & Development Organization (DRDO), Ministry of Defence, Professor P.V. Indiresan of the IIT Delhi and Dr. Rao C. Kasarabada, Director, Electronic Research & Development Centre (ERDC), Trivandrum.

The Committee, after a review of the material presented to it, technical presentation by the manufacturers, meeting election administrators and technical experts and also detailed laboratory tests, came to the conclusion that the electronic voting machine is a secure system. The expert committee, therefore, unanimously recommended, in April, 1990, the use of the electronic voting machines without further loss of time.

### **Composition of Second Technical Expert Committee**

The Commission constituted the Second Technical Expert Committee in December, 2005 comprising Prof. P.V. Indiresan, Prof. D.T. Shahani of IIT Delhi and Prof. A.K. Agarwala of IIT Delhi to get the upgraded EVMs (Post 2006 EVMs) evaluated before finally accepting these machines for actual use in elections.

### **Expansion of Technical Expert Committee**

In November, 2010, the Commission expanded its Technical Expert Committee by including two more experts, namely, Prof D.K. Sharma from Department of Electrical Engineering, IIT Bombay and Prof. Rajat Moona from Department of Computer Science and Engineering, IIT of Kanpur (now, Director IIT Bhilai)

The current composition of TEC is as below:

1. Prof. D.T. Shahani of IIT Delhi
2. Prof Rajat Moona, Director IIT Bhilai
3. Prof Dinesh Sharma of IIT Bombay
4. Prof. A.K. Agarwala of IIT Delhi

The members of the TEC are eminent professionals and renowned specialists in their respective areas of expertise. The members of TEC have an illustrious academic record with proven technical excellence with numerous creditable and pioneering achievements to their credit. The fact that they hail from different Centres of Excellence in public domain, further adds to their calibre, competence and credibility. The honorary contribution made by the TEC towards the design and development of EVMs/VVPATs has also been recognized by the Hon'ble President of India.

### **Role of Technical Expert Committee on EVMs:**

ECI has maintained an independent Technical Expert Committee to help evaluate specific technical features, designs and performance improvement of EVMs.

The role of TEC has been to:

- i. Give technical advice to build specifications and design of newer versions of EVMs/VVPATs so that they incorporate latest technology both in hardware and software design and improving robustness against tampering
- ii. Examine design proposals of manufacturers on EVMs and offer recommendations for improvement
- iii. Mentor designs process wherever asked.
- iv. Examine concerns raised on EVMs tamperability.
- v. Any other advice that Commission may seek or any other technical work that the Commission may entrust from time to time.

The Commission holds regular intensive and extensive meetings with the TEC and reviews the design, technical specifications and related issues of the EVMs/VVPATs or any other technical matter emerging from time to time.

## **INDIAN EVM: DESIGN AND MANUFACTURE PROTOCOL:**

Indian EVMs and VVPATs are manufactured by Bharat Electronics Limited (PSU under Ministry of Defence, Govt. of India) and Electronics Corporation of India Limited (PSU under the Department of Atomic Energy, Govt. of India). The software of EVMs is developed in-house by a selected group of Engineers in BEL and ECIL independently from each other. This select software development group of few engineers design and develop the source code. After completion of software development, testing and evaluation of the software is carried out by another independent testing group in the PSUs as per the software requirements specifications (SRS). Entire software is vetted by the Technical Expert Committee and sealed by them. Golden copy remains under sealed condition only. This ensures that the software has really been written as per the requirements laid down for its intended use only.

In M1 and M2 EVMs manufactured till 2010, Machine code compiled from source programme code was given to the micro controller manufacturer for writing in ONE TIME PROGRAMMABLE (OTP) micro controllers. From this machine code, the exact original source code cannot be derived. For such OTP microcontrollers, the code once programmed cannot be modified and cannot be read by any means. The technological advancements now permit the writing of the machine code into the chips at PSU premises, hence in M3 (post 2013) EVMs, the program is burnt into the chip at PSU premises itself. Due to absence of requisite facilities to produce micro-controllers in India micro-controllers are procured from manufacturers abroad.

During production of EVMs in the factory, functional testing is carried out by production group as per the laid down Quality plan and performance test procedures. Samples of EVMs from production batches are regularly checked for functionality by Quality Assurance Group, which is an independent unit within the PSUs. In addition, a third-party testing agency, STQC, tests and clears the EVMs before these are shipped out from BEL/ECIL.

Post supply to ECI, the EVMs are kept, transported and used under strict administrative and secure conditions. When used for elections they are operated and kept in full view of stake holders and media scrutiny.

The EVM software is so designed that it allows a voter to cast the vote only once. The vote can be recorded by a voter from the ballot unit only after the Presiding

Officer enables the ballot unit from Control Unit. On press of “candidate” button by voter, the voter sees lighting of red LED near the candidate button, and a long beep is heard signifying that vote has been recorded. The CU machine is designed not to receive any signal other than that from BU. It cannot respond to any outside signal (nor receive any signal from outside at any time). The next vote can be recorded only after the Presiding Officer enables the ballot on the Control Unit for the next voter. In between, the BU becomes dead to any signal from outside (except from the Control Unit). Vote stuffing is not possible due to a specially designed feature that CU cannot accept another vote in less than 15 seconds. Votes are date and time stamped, and no votes can be cast before or after the poll.

Voter Verifiable Paper Audit Trail system (VVPAT) was introduced in 2013 to provide even greater transparency to the poll process. The VVPAT is an additional unit attached to the EVM, which prints a small slip of paper that carries the symbol, name and serial number of the candidate voted by Voter, which is visible for about 7 (seven) seconds in the viewing window. The voter after pressing the button on BU can view the printed slip on VVPAT through the viewing window and thus can verify that the vote is recorded for the Candidate of his/her choice. The printing of slip in VVPAT is an additional verification to the voter, besides glowing of LED near candidate button and the beep in EVM system.



## **EVM SAFETY AND SECURITY FEATURES:**

**The machines are non-tamperable, both due to technological measures, and also due to strict administrative and security procedures laid out by ECI, whereby no access to EVM/VVPAT is allowed to any unauthorized person. Hence, these are protected from any tampering/manipulation whether before the polls, or during the polls, or after the polls, in storage or transportation from manufacturer to the State/District or vice versa, or when transported from one state to another.**

**A. Technological safeguards that contribute to non-tamperability of EVM are the following.**

- i. EVM used by the Commission is a stand-alone non-networked, one time-programmable (OTP) machine, which is neither computer controlled, nor connected to the internet or any network; and hence, cannot be 'Hacked'.
- ii. The machine is electronically protected to prevent any tampering/manipulation. The programme (software) used in these machines is burnt into a One Time Programmable (OTP)/Masked chip so that it cannot be altered or tampered with.
- iii. The software of EVMs is developed in-house by a selected group of Engineers in BEL (Defence Ministry PSU) and ECIL (Atomic Energy Ministry's PSU) independently from each other.
- iv. After completion of software design, testing and evaluation of the software is carried out by an Independent Testing Group as per the software requirements specifications (SRS). This is then fully vetted and sealed by the TEC. This ensures that the software has really been written as per the requirements laid down for its intended use only.
- v. The source code for the EVM is stored under controlled conditions at all times. Checks and balances are in place to ensure that it is accessible to authorized personnel only.
- vi. The software is so designed that it allows a voter to cast the vote only once. The vote can be recorded by a voter from the ballot unit only after the Presiding Officer enables the ballot on the Control Unit. The machine does not receive any signal from outside at any time. The next vote can be recorded only after the Presiding Officer enables the ballot on the Control Unit. In between, the machine becomes



- dead to any signal from outside (except from the Control Unit).
- vii. Samples of EVMs from production batches are regularly checked for functionality by Quality Assurance Group, which is an independent unit within the PSUs. During production in the factory, functional testing is done by production group as well as independently by third party agency as per the laid down Quality plan and performance test procedures.
  - viii. Several security features in the design itself: such as dynamic coding between Ballot Unit (BU) and Control Unit (CU), real time clock, full display system and date and time stamping of all key-presses in EVM.
  - ix. Unauthorised Access Detection Module disables EVM, if any attempt is made to access microcontroller or memory.
  - x. The Report of the Expert Committee for the Technical Evaluation of the Upgraded EVMs in 2006 has concluded that any tampering of CU by coded signals by wireless or outside or Bluetooth or WiFi is ruled out as CU does not have any radio frequency (RF) receiver and data decoder. CU accepts only specially encrypted and dynamically coded data from BU. Data from any outside source cannot be accepted by CU.

## **B. Stringent Administrative Procedures for handling of EVMs.**

The Commission has put in place an elaborate administrative system of security measures and procedural checks-and-balances aimed at prevention of any possible misuse or procedural lapses. These safeguards are implemented by ECI transparently with the active and documented involvement of Political Parties, Candidates and their representatives at every stage, so as to build their confidence on efficacy and reliability of EVMs. All these functions and procedures are implemented through the District Election Officers (DEOs), Returning Officers (ROs), Assistant Returning Officers (AROs) and other officers and officials of the State Government concerned, who are on deemed deputation to the ECI and are under its superintendence, direction and control in so far as election related duties are concerned. These safeguards are:

### **(I) First Level Checking of EVMs/VVPATs**

Before every election, a first level checking (FLC) is done for every EVM and VVPAT to be used in the election by the engineers of the manufacturers **in the presence of political**

**parties' representatives.** The entire FLC process is carried out at the District level under the supervision of the DEO concerned. Any malfunctioning EVM i.e. EVM either not switching on or not displaying results etc., is kept separately and is not used in the election.

Manufacturers certify at the time of FLC that all components in the EVM are original. After this, the plastic cabinet of Control Unit of the EVM is sealed using a “Pink Paper Seal”, **which is signed by representatives of political parties** and stored in strong rooms. After this stage, the plastic cabinet of control unit of the EVMs cannot be opened. There is no access to any component of inside of EVMs. Mock poll with a few votes is conducted on every EVM at the time of FLC. Additionally, 1200 votes are cast in 1% of EVMs, 1000 votes in 2% and 500 votes in another 2% of EVMs using VVPATs in the presence of the representatives of political parties. After the Mock Poll, the printed VVPAT slips are counted and the result tallied with the electronic result of CU. The tally is also shown to the representative of political parties present in the FLC. **Representatives of political parties are allowed to do mock poll themselves.** It is all documented by DEOs/ROs.

#### **(ii) Randomizations of EVMs/VVPATs**

Subsequently, stored EVMs are **randomized twice by EVM Management System twice (developed by ECI), once for allocation of machines to assembly constituencies and second to polling stations in the presence of candidates or their representatives before they are distributed for use in individual polling stations.** The randomization is carried out through EVM Management System (EMS) by the DEO in the presence of the representatives of political parties/candidates and Central Observers deputed by the ECI for complete transparency. The lists of EVM containing serial number of EVM randomly allocated to the constituency and then to particular polling station are provided to the political parties/candidates.

#### **(iii) Candidate Setting**

During the process of Candidate setting on the EVMs, Ballot Paper is fixed on the Ballot Unit and the EVMs are prepared for the number of candidates in fray in a particular constituency. It must be noted here that the arrangement of names in the ballot paper, and hence the Ballot Unit, is in alphabetical order, first for the National & State Recognized parties, followed by other State Registered Parties, and then by Independents. Thus, the sequence in which the candidates appear on the Ballot Unit is contingent on the names of the candidates and their party affiliation and cannot be ascertained beforehand. **This arrangement of sequencing names of candidates in ballot paper effectively precludes**

**the possibility of any pre-determined manipulation of software for rigging the votes.**

Once the **candidate setting** is done, the Ballot Unit of the EVM is also sealed with thread/Pink Paper seals so that nobody has access to the inside of the Ballot Unit too. These Pink seals also bear signatures of representatives of political parties/candidates.

**Mock poll on each EVM/VVPAT** at the time of EVM Preparation and Candidate Setting. **In addition**, a mock poll of 1000 votes is cast in 5% of randomly selected EVMs, as well as VVPATs. The electronic result is tallied with VVPAT slip count by the RO and his designated officers in the presence of the candidate or his agents for complete transparency.

#### **(iv) Poll Day Safeguards**

On the poll day, a mock poll by casting at least 50 votes is conducted at every polling station by the Presiding Officer **in the presence of the representatives of the candidates/polling agents with their signature and a mock-poll certificate to that effect is obtained from every Presiding Officer.**

After the mock poll is over, another thread seal and green paper seals are put on the Control Unit to block access to all buttons on the CU, except those, which are used for the conduct of poll. **These paper seals and thread seals are allowed to be signed by the polling agents. Seals are procured from Indian Security Press, Nashik which prints currency notes.** After the poll is over, the

Presiding officer presses the “Close” button on the CU in the presence of polling agents. Thereafter, no votes can be polled in the EVM.

After this, the entire EVM is sealed. **Candidates and their agents are allowed to put their signatures on the seals**, which they can check for the intactness of the seal before counting. Candidates/representatives are allowed to follow vehicles carrying EVMs from polling stations to counting storage rooms.

In addition to this, the strong rooms where EVMs are stored, for counting are also sealed and secured fully by Central Armed Police Force (CAPF) guards round-the-clock. **The candidates and their representatives are allowed to put their own seals on the strong rooms.** They are also allowed to keep a watch round the clock on the strong room. Security forces are deployed in three layers around storage rooms with Central Armed Police Forces (CAPF) guarding the inner ring.

FLC, Preparation of EVMs before poll, mock poll, etc., are mandatorily conducted in the presence of the representatives of candidates or political parties and duly documented.

**(v) EVM Management System (EMS):**

The Commission has introduced an EMS as a modern inventory management system where the identity and physical location of all EVMS/VVPATs is tracked on real time basis by the Election Commission of India and any movement of these machines ordered by ECI has to mandatorily be through this system. **Allotment and Randomisations is also done only through EMS.**

**(vi) Storage and Transportation Protocols:**

Election Commission of India ensures the storage and transportation of EVMs/VVPATs remain under the strict control of ECI at all times through the following procedures and instructions:

**I. DURING NON-ELECTION PERIOD:**

[Non-election period means, after passage of the Election Petition (EP) period (i.e. 45-days from the date of declaration of the result of the last election) and upto the announcement of next election in the constituency.]

**(a) Storage of EVMs**

- i. EVM should be stored in Treasury, wherever possible.
- ii. Where not stored in the Treasury, EVMs must be stored in a separate warehouse where nothing other than EVM is kept.
- iii. Normally the EVMs should be stored at District Head Quarters.
- iv. However, if it is not possible to store the EVMs at District HQs, then EVM storage warehouse should not be at a place below Tehsil headquarters.
- v. No EVM shall be kept outside the EVM warehouse (i.e. all the EVMs should be kept in EVM warehouse and not at any other place) for any purpose without specific approval of the Commission
- vi. EVM storage warehouse must not have more than one (1) entry point. If there are any other doors or windows in the warehouse, they should be sealed using brick-masonry or concrete.

- vii. Entry of EVM storage warehouse must be secured by a double lock system. The keys shall be in custody of DEO and Dy.DEO, each having all keys of one lock. Handing over and taking over of keys to be a part of CTC.
- viii. 24x7 Police Security of EVM/VVPAT warehouses. In addition, CCTV from start of FLC till EP completion period.
- ix. Security:        Non Poll (Post EP to FLC)- Minimum ½ Section  
                               FLC to Polling- Minimum 1 Section  
                               Poll to EP- Minimum 1 Platoon

**(b) Movement of EVMs:** During non-election period, EVMs shall not be moved in or out of the EVM warehouse without specific approval of the Chief Electoral Officer/Commission. In case of intra or inter State shifting of EVMs, on the direction of the CEO/Commission, the following shall be strictly followed:

- i. The CEO will communicate the direction of the Commission on shifting of EVMs to the DEO concerned.
- ii. DEO(s) will issue written order to the officer in-charge for opening of EVM-warehouse to shift the required number of EVMs.
- iii. On receiving the written order of the DEO, the nominated Officer shall identify the EVMs to be moved out and make an entry of the details of such EVMs in the Master Stock Register/Movement Register and shall take a written acknowledgement from the officer, who is receiving the EVM, as proof of having received the EVMs.
- iv. The shifting of EVMs/VVPATs is managed through EVM Management System (EMS) for which each unit is scanned using Mobile App while sending and receiving.
- v. Containerized trucks or sealed trucks on which proper locking arrangements can be made are used for transporting EVMs and VVPATs, so that these could be locked and sealed with paper seals.
- vi. Vehicles with GPS tracking only are used for movement of EVMs/VVPATs.
- vii. Political Parties are informed in advance about opening, stocking and sealing of warehouses while shifting EVMs and VVPATs.

### **(c) Protocol for Repairs:**

EVMs found defective during the poll period or non-poll period and requiring electronic repairs are sent to the manufacturers BEL and ECIL for repairs and are tracked under ETS. The repaired EVMs are allocated by the Commission once the report of repair is received from the manufacturer.

## **II. DURING ELECTION PERIOD:**

**(a) Pre-Poll Storage:** After FLC and first randomization of EVMs, EVMs shall be handed over to the Returning Officer/Assistant Returning Officer concerned. The Returning Officers shall follow the following guidelines:-

- I) RO/ARO shall store the EVMs, allocated for his constituency, in a strong room in the presence of representatives of National/State Level Political Parties, under videography. EVMs meant for training and awareness of voters shall be kept in a separate strong room so that strong room having EVMs (including reserve EVMs) meant for poll need not be opened before preparation of EVMs. Reserve EVMs are those EVMs which are used to replace a malfunctioning/defective EVM on the poll day.
- ii) Thereafter, RO shall open the strong room having EVMs (including reserve EVMs) meant for poll at the time of preparation of EVMs (candidate setting) in the presence of candidates/their representatives, under videography.
- iii) The Reserve EVMs are also duly prepared with Candidate setting and ballot paper fixing like other EVMs earmarked for polls and are subjected to the same standards of security and storage protocols.
- iv) After preparation of EVMs at RO level, EVMs including reserve EVMs shall again be kept in strong room in the presence of candidates/their representatives, under videography.
- v) Thereafter, RO shall open the strong room having EVMs (including reserve EVMs) on the day of dispersal of polling parties in the presence of candidates/their representatives, under videography.
- vi) After completion of poll on the Polling Day, the polled EVMs shall be escorted back to the strong room for storing in double lock system in the presence of candidates/their representatives, under videography.



**(b) Storage of polled EVMs in strong room:**

All Presiding Officers or the Collecting Parties should deposit the voting machines and election papers and materials at the storage centres without any avoidable delay and stored in the Strong Room in the presence of candidates/their authorised representatives. Any officer who defaults in this respect will make himself liable to disciplinary action.

If any of the contesting candidates so desires, he may be permitted to post an agent to keep watch at the place where the voting machines are stored pending the counting and allow him to affix his own seals to the doors and windows of the building in which voting machines have been stored in addition to the seals that may be affixed by you. It should also be ensured that immediately after all the voting machines have been received and stored, the room is locked forthwith. Thereafter, no one is allowed to go in until the morning of the day fixed for counting. If during this interval, for some unavoidable reason, the room has to be opened you should send for the candidates or their authorized representatives by giving them intimation in writing and open the room in their presence and immediately after the purpose for which the room is opened is over, this room should be closed and sealed and the candidates or their representatives should again be allowed to put their seal on the door lock and windows.

Strong Room having polled EVMs/VVPATs is opened only on the day of counting of votes in the presence of contesting candidates/their agents, Returning Officer and Observer (appointed by ECI), under videography.

**(c) Post-Poll Storage:** The following instructions shall be strictly followed for the security and safety of strong rooms where the polled EVMs are kept for counting of votes –

- i The strong rooms should have double lock system. All keys of one lock should be kept with District Election Officer and all keys of the other lock with Returning Officer of concerned assembly constituency.
- ii Three cordoned security arrangements should be made round the clock for the strong rooms having polled EVMs kept for counting of votes. The CPF should man the innermost perimeter security immediately outside the strong room and the State Armed Police should man the outermost perimeter security.

- iii All contesting candidates should be intimated in writing to depute their representatives to keep a close watch on security arrangement of strong room. They should be allowed to stay outside the inner perimeter at a location, which enables them to view the entry points of the strong room. As far as possible, facilities such as proper shade, drinking water, etc. shall be provided to them. If there is no direct view to the entry point of the strong room, CCTV may be arranged at such location, from where they can see the strong room door on CCTV. In such a case, they may be taken periodically to the inner perimeter in batches, to see, verify and satisfy themselves regarding the security of strong room. The CCTV display of Strong Room shall be arranged on a large TV screen at the place earmarked for the representatives of Political Parties and agents of the candidates, so that they can continuously monitor the Strong Room.
- iv A control room adjacent to the strong room should be operative round the clock.
- v A Gazetted officer along with a senior police officer should be put on duty round the clock for monitoring the security arrangements of strong room.
- vi There should be sufficient arrangement of fire extinguishers outside and inside the strong room.
- vii There should be an arrangement round the clock for the security of unused EVMs also.
- viii No one should be allowed to enter the inner perimeter without adhering to the following protocols:-
  - a) The log book shall be maintained by the CPF in which entry should be made about date, time, duration and name(s) of person(s) crossing the second security ring i.e. the middle perimeter. This includes visits by the Observers or DEOs or SPs or candidates or their agents or any other person.
  - b) Video cameras should be provided to the CPF contingent to record all visits made by such visitors.
- ix It should be ensured that there is uninterrupted power supply at the strong room



locations during the entire period wherein EVMs are stored.

- x The phone nos. of CEO, Addl. CEOs, DEC in-charge in the ECI and the DEO/SP/COP/ROs concerned should be given to the candidates, who may provide the same to their representatives, keeping vigil at the strong room location(s). The candidates may advise their representatives to contact the officials, in case of any emergency.
- xi All the entry points (doors etc.) of strong rooms should be under constant videography using the web-cams. If there are other doors of the strong room, they should also be covered by the web-cams/videography.
- xii Returning Officers should visit the storage campus (upto the inner perimeter only) every day in the morning and evening and check the log book and videography and send a report to the DEO on the status every day. In case of strong rooms located in the district headquarters, the DEO should do the same. Where the strong rooms are situated outside the District Headquarters, DEO should visit the same as frequently as possible and at least once in 3 to 4 days.
- xiii No vehicle, including that of any official or ministers or any other political functionary, should be allowed inside the secured campus where the EVMs are stored. Alighting point for the vehicles should be marked clearly ahead of the outer security perimeter itself beyond it, it should be a pedestrian zone only.
- xiv DEOs and SPs shall be personally responsible for security of strong room within the district and meticulous implementation of the protocol. The copy of this Manual should be made available to all candidates, DEOs, ROs and CPF commandant.
- xv On the day of counting of votes, the strong room shall be opened in the presence of candidates/their representative, RO and Observer under videography.
- xvi After completion of counting of votes, Control Units shall be sealed as per existing instruction of the Commission. Thereafter, EVMs (Balloting Units and Control Units) shall be shifted back to Strong Room for safe storage.

**Under rule 94(aa) of the Conduct of Elections Rules 1961, the guidelines of the Commission on retention period of the EVMs after using in election and for using the**

**same in the subsequent elections, are as under:**

Every Voting Machine (EVM) used in an election and kept in the custody of the District Election Officer shall be kept untouched, under the standard protocol of security, till confirmation of Election petition position from the High Court concerned after the completion of the period for filing Election Petition i.e. 45 days from the date of declaration of the result.

In the case of elections, where no election petition has been filed or no other court cases are pending, after the aforesaid period, the EVMs may be allowed to be used by the Election Commission for any future election or any other purpose like movement, physical verification of EVMs, etc.

In case of any election where election petition has been filed, the EVMs used at all Polling Stations in the constituency concerned shall continue to be kept in the safe custody of the District Election Officer, till such time the Election Petition is finally disposed of by the Courts.

**Thus, the technological security features along with administrative safeguards defined by ECI, together make EVMs non-tamperable, leaving nothing to chance, whether in manufacturing, storage, transportation or during use in elections. While design features like using OTP chips, technical safeguards like non – connectivity of EVMs with computers, internet, wireless or wired for any unwanted communication, and numerous internal precautions like encoding to protect data integrity, the administrative safeguards rule out any possibility of tampering by offering transparency via 24x7 scrutiny by party representatives and their participation in sealing and signing important spaces during election.**

**In this way the Indian EVM used by ECI is unique in the world and non-tamperable under the control and custody of ECI.**

## INTERNATIONAL COMPARISON:

A point is raised from time to time that several foreign countries have discontinued the use of voting machines and why India is using EVMs.

With the rapid advances in technology over the years, Election Management Bodies, professionals, experts, and activists (particularly Green Activists) have mooted the idea of using paperless electronic voting methods in different parts of the world in order to overcome the disadvantages of manual marking of paper ballots. The marriage between technology and election management goes back to at least 1892, when the first ‘lever voting machine’ was used in New York, after using the paper ballot for a long time. In the 1960s, punch-card machines were introduced in the USA, and the first EVM was introduced there in 1975. Electronic Voting has moved quite ahead since then.

### Types of Electronic Voting:

The process of electronic voting can be of three types:

- (i) Direct Recording Machines placed at designated polling station,
- (ii) Internet Voting
  - Remote Online Voting
  - At Designated Polling Stations
- (iii) Optical Scanners
  - Stand-alone
  - Networked for centralized counting of results

EVMs used in India fall under the first type of stand-alone direct recording machines with no possibility of any kind of network connectivity where voters cast their votes at an assigned polling station on the day of election under strict administrative security ensured by the ECI.

Even though ECI EVMs are also direct recording machines ECI EVMs are completely different from any of the EVMs used internationally either for direct recording or for internet voting or for optical scanning. This is clearly highlighted in the comparative analysis of ECI EVMs with the DRMs used in countries like Germany, The Netherlands, Ireland, and USA as follows:

### **(a) The Netherlands**

Electronic Voting was used in The Netherlands in between 1990-2007. The voting machines were manufactured by a private Dutch-company called NEDAP (*Nederlandse Apparaten Fabriek NV*). In 2006, the government ordered an independent testing of the voting machines. Two independent commissions, The Voting Machines Decision-making Commission and the Election Process Advisory Commission (EPAC) were also established on December 19, 2006 and January 18, 2007, respectively, to review the security and reliability features of NEDAP machines.

Following the observations of the two Commissions, the use of NEDAP machines and electronic voting was discontinued in 2007 on the following grounds:

- The Ministry of Interior and Kingdom Relations (MOIKR) of The Netherlands lacked adequate technical knowledge vis-à-vis the NEDAP machines, leading officials to depend on external actors for the conduct of elections.
- Technology vendors became part of the decision making process and the ministry was not in a position to exercise effective oversight.
- The Dutch Organization for Applied Scientific Research (*Toegepast Natuurwetenschappelijk Onderzoek*, TNO) certified and tested these machines following “outdated standards” which were not immune to modern IT and security threats.
- Moreover, the certification and testing reports were not made public depriving independent experts to verify the analysis.
- The legal framework, particularly the necessary security requirements, was inadequate to deal with the specificities of the electronic voting process. (For a comprehensive report on electronic voting in The Netherlands, see link: [https://www.ndi.org/sites/default/files/5\\_Netherlands.pdf](https://www.ndi.org/sites/default/files/5_Netherlands.pdf))

### **(b) Germany:**

In Germany, the e-voting machines manufactured by NEDAP were used in between 2005 – 2009 before it came under criticism and finally discontinued. The Bundesverfassungsgericht (the Federal Constitutional Court of Germany) ordered the discontinuation of the use of NEDAP machines in 2009 because of the below-mentioned reasons:

- The use of Nedap electronic voting machines violated the principle of the public nature of elections (Article 38 in conjunction with Article 20.1 and 20.2 of the Basic Law) that requires that all essential steps in the elections are subject to public examinability unless other constitutional interests justify an exception.
- It also observed that “it must be possible for the citizen to check the essential steps in the election act and in the ascertainment of the results reliably and without special expert knowledge”.

(See the judgment in the following link:

[http://www.bundesverfassungsgericht.de/SharedDocs/Entscheidungen/EN/2009/03/cs20090303\\_2bvc000307en.html;jsessionid=FEA71E86E2CEE030FF7AAAC90572279C.2\\_cid383\)](http://www.bundesverfassungsgericht.de/SharedDocs/Entscheidungen/EN/2009/03/cs20090303_2bvc000307en.html;jsessionid=FEA71E86E2CEE030FF7AAAC90572279C.2_cid383)

**(c) Ireland:**

NEDAP machines were used in Ireland in between 2002 – 2004. The use of these machines was questioned following which two independent commissions were set up. The two Commissions on the Secrecy, Accuracy and Testing of the Chosen Electronic Voting System, concluded the NEDAP machines could not be used in elections in Ireland on the following grounds:

- Inadequate technological safeguards
- Insecure transfer of data by the use of CDs
- Absence of a comprehensive independent end-to-end testing, verification and certification by a single accredited body
- Inconsistencies in physical security of machines across constituencies
- Absence of a clear policy guideline vis-a-vis storage, transport, set-up, use and disposal of voting equipment; and
- Absence of comprehensive electronic register to record the identity, location and movement of the electronic voting devices.

(See links: <http://www.unic.pt/images/stories/publicacoes1/00Index.pdf>; <http://www.unic.pt/images/stories/publicacoes1/Part%20%20Index.pdf>)

#### **(d) United States of America:**

In 2000, after the dispute on the voting method in the USA presidential elections, the voting method was reviewed (Esteve, Goldsmith, & Turner, 2012: 185). Accordingly, Direct Recording Electronic (DRE) Systems (like the widely used AccuVote TS developed by Premier Election Solutions, commonly called Diebold) were introduced. DRE Systems uses “one of three basic interfaces (pushbutton, touchscreen or dial)” through which “voters record their votes directly into computer memory. The voter’s choices are stored in DREs via a memory cartridge, diskette or smart card...Some DREs can be equipped with Voter Verified Paper Audit Trail (VVPAT) printers...” Currently, in the USA, the Direct Recording Machines are used in 27 states, among which paper audit trails are used in 15 states. The other voting methods include: Optical Scan Paper Ballot Systems, Ballot Marking Devices, and the Punch Card Ballot.

(See link: <https://www.verifiedvoting.org/resources/voting-equipment/>)

#### **Other countries:**

In Brazil, the machines used in elections are called ‘electronic ballot boxes’ which are stand-alone direct electronic recording systems. In Venezuela, SATIS (Smartmatic Auditable Election Systems) voting machines are used which were fully implemented across the nation in 2004. (Esteve, Goldsmith, & Turner, 2012: 185)

#### **India:**

Indian EVMs are truly unique compared to the e-voting machines used in other parts of the world for the following reasons:

- ECI-EVMs are stand-alone non-networked machines
- The ECI-EVMs are manufactured in two PSUs namely ECIL and BEL, unlike machines used in other countries, which were manufactured entirely by private entities. Hence there is no chance of involvement of vested interest of private players or technology vendors in decision making or production of the ECI-EVMs.
- ECI-EVMs have been time and again successfully verified and certified by an independent Technical Experts Committee after an end-to-end testing process. STQC under Ministry of Information and Technology, an accredited third party entity, conducts standardization and certification of ECI EVMs produced by manufacturers, unlike the machines used in Netherlands,

- In ECI EVMs data is stored internally and not transferrable by any device, unlike other countries where voting data recorded in the DRM is transferred by means of CD, etc.
- Commission has evolved full end to end security protocol and administrative safeguards for the use, storage, transportation and tracking of ECI EVMs, unlike in other countries where NEDAP machines were used.
- Unlike MOIKR of Netherlands, the Commission is fully backed by a Technical Expert Committee comprising of eminent professors.
- Every EVM has a unique number attached to it, which is recorded in the Election Commission's database through EVM Tracking Software. This number of the EVM can always be cross-checked against the database.
- The software used in these EVMs is One Time Programmable (OTP), which can't be re-written after manufacture.
- The ECI-EVMs are always under strict, uniform, high profile administrative and physical security as per legal framework across the country.
- Section 61 A of the Representation of the Peoples Act 1951 allows the use of EVMs by ECI. The different High Courts across the country have also upheld the use of EVMs time and again in various judgments and the Karnataka High Court in 2004 declared ECI-EVMs as "national pride" because of its transparency and robustness.
- Following the direction of the Hon'ble Supreme Court, the ECI has introduced the technology of VVPAT in order to ensure public examinability. The Commission is committed to implement VVPATs nation-wide by 2019. Thus there will be 100% voter verifiability and auditability of every vote cast as opposed to lack of such facility in the NEDAP machines which was struck down by the German Supreme Court as un-Constitutional. Whereas Indian Supreme Court has upheld the validity of use of EVM for conducting elections in the country.
- Thus any comparison of ECI-EVMs with machines used elsewhere is misplaced.

## APPENDIX – 1

| Name of State/UT  | Elections in which EVMs used |      |      |      |      |
|-------------------|------------------------------|------|------|------|------|
|                   | Year                         | Year | Year | Year | Year |
| Andhra Pradesh    | 2004                         | 2009 | 2014 | 2019 | --   |
| Arunachal Pradesh | 2004                         | 2009 | 2014 | 2019 | --   |
| Assam             | 2001                         | 2006 | 2011 | 2016 | 2021 |
| Bihar             | 2000                         | 2005 | 2010 | 2015 | 2020 |
| Chhattisgarh      | 2000                         | 2003 | 2008 | 2013 | 2018 |
| Goa               | 2002                         | 2007 | 2012 | 2017 | --   |
| Gujarat           | 2002                         | 2007 | 2012 | 2017 | --   |
| Haryana           | 2000                         | 2005 | 2009 | 2014 | 2019 |
| Himachal Pradesh  | 2003                         | 2007 | 2012 | 2017 | --   |
| Jammu & Kashmir*  | 2000                         | 2004 | 2009 | 2014 | --   |
| Jharkhand         | 2000                         | 2005 | 2010 | 2014 | 2019 |
| Karnataka         | 2004                         | 2008 | 2013 | 2018 | --   |
| Kerala            | 2001                         | 2006 | 2011 | 2016 | 2021 |
| Madhya Pradesh    | 2003                         | 2003 | 2013 | 2018 | --   |
| Maharashtra       | 2004                         | 2009 | 2014 | 2019 | --   |
| Manipur           | 2002                         | 2007 | 2012 | 2017 | --   |
| Meghalaya         | 2007                         | 2008 | 2013 | 2018 | --   |
| Mizoram           | 2003                         | 2008 | 2013 | 2018 | --   |
| Nagaland          | 2003                         | 2008 | 2013 | 2018 | --   |
| Orissa            | 2000                         | 2004 | 2009 | 2014 | 2019 |
| Punjab            | 2002                         | 2007 | 2012 | 2017 | --   |



|               |      |      |      |      |      |
|---------------|------|------|------|------|------|
| Rajasthan     | 2003 | 2008 | 2013 | 2018 | --   |
| Sikkim        | 2004 | 2009 | 2014 | 2019 | --   |
| Tamil Nadu    | 2001 | 2006 | 2011 | 2016 | 2021 |
| Telangana     | --   | --   | --   | 2018 | --   |
| Tripura       | 2003 | 2008 | 2013 | 2018 | --   |
| Uttar Pradesh | 2002 | 2007 | 2012 | 2017 | --   |
| Uttarakhand   | 2002 | 2007 | 2012 | 2017 | --   |
| West Bengal   | 2001 | 2006 | 2011 | 2017 | 2021 |
| Delhi         | 2003 | 2008 | 2013 | 2015 | 2020 |
| Puducherry    | 2001 | 2006 | 2011 | 2016 | 2021 |

**TOTAL: 132 State Legislative Assembly Elections**

**EVMs were also used in all constituencies in General Elections to Lok Sabha in 2004, 2009, 2014 and 2019.**

## APPENDIX – 2

| PARTY WITH MAXIMUM NUMBER OF SEATS IN LEGISLATIVE ASSEMBLY ELECTION |                |                   |                |                |               |                |                |                |               |
|---|----------------|-------------------|----------------|----------------|---------------|----------------|----------------|----------------|---------------|
| Andhra Pradesh  | 2004<br>INC    | 2009<br>INC       | 2014<br>TDP    | 2019<br>YSRCP  | Meghalaya     | 2008<br>INC    | 2013<br>INC    | 2018<br>INC    |               |
| Arunachal Pradesh   | 2004<br>INC    | 2009<br>INC       | 2014<br>INC    | 2019<br>BJP    | Mizoram       | 2008<br>INC    | 2013<br>INC    | 2018<br>MNF    |               |
| Assam   | 2006<br>INC    | 2011<br>INC       | 2016<br>BJP    | 2021<br>BJP    | Nagaland      | 2008<br>NPF    | 2013<br>NPF    | 2018<br>NPF    |               |
| Bihar   | 2005<br>RJD    | 2010<br>JD(U)     | 2015<br>RJD    | 2020<br>RJD    | Odisha        | 2004<br>BJD    | 2009<br>BJD    | 2014<br>BJD    | 2019<br>BJD   |
| Chhattisgarh  | 2008<br>BJP    | 2013<br>BJP       | 2018<br>INC    |                | Punjab        | 2007<br>SAD    | 2012<br>SAD    | 2017<br>INC    |               |
| Goa   | 2007<br>INC    | 2012<br>BJP       | 2017<br>INC    |                | Rajasthan     | 2008<br>INC    | 2013<br>BJP    | 2018<br>INC    |               |
| Gujarat   | 2007<br>BJP    | 2012<br>BJP       | 2017<br>BJP    |                | Sikkim        | 2004<br>SDF    | 2009<br>SDF    | 2014<br>SDF    | 2019<br>SKM   |
| Haryana   | 2005<br>INC    | 2009<br>INC       | 2014<br>BJP    | 2019<br>BJP    | Tamil Nadu    | 2006<br>DMK    | 2011<br>AIADMK | 2016<br>AIADMK | 2021<br>DMK   |
| Himachal Pradesh  | 2007<br>BJP    | 2012<br>INC       | 2017<br>BJP    |                | Telangana     | 2014<br>TRS    | 2019<br>TRS    |                |               |
| Jammu & Kashmir   | 2008<br>JKNC   | 2014<br>JKPDP     |                |                | Tripura       | 2008<br>CIP(M) | 2013<br>CPI(M) | 2018<br>BJP    |               |
| Jharkhand   | 2005<br>BJP    | 2009<br>BJP & JMM | 2014<br>BJP    | 2019<br>JMM    | Uttarakhand   | 2007<br>BJP    | 2012<br>INC    | 2017<br>BJP    |               |
| Karnataka   | 2004<br>BJP    | 2008<br>BJP       | 2013<br>INC    | 2018<br>BJP    | Uttar Pradesh | 2007<br>BSP    | 2012<br>SP     | 2017<br>BJP    |               |
| Kerala  | 2006<br>CPI(M) | 2011<br>CPI(M)    | 2016<br>CPI(M) | 2021<br>CPI(M) | West Bengal   | 2006<br>CPI(M) | 2011<br>AITC   | 2016<br>AITC   | 2021<br>AITC  |
| Madhya Pradesh  | 2008<br>BJP    | 2013<br>BJP       | 2018<br>INC    |                | NCT of Delhi  | 2008<br>INC    | 2013<br>BJP    | 2015<br>AAP    | 2020<br>AAP   |
| Maharashtra   | 2004<br>NCP    | 2009<br>INC       | 2014<br>BJP    | 2019<br>BJP    | Puducherry    | 2006<br>INC    | 2011<br>AINRC  | 2016<br>INC    | 2021<br>AINRC |
| Manipur   | 2007<br>INC    | 2012<br>INC       | 2017<br>INC    |                |               |                |                |                |               |
| PARTY WITH MAXIMUM NUMBER OF SEATS IN LOK SABHA ELECTIONS           |                |                   |                |                |               |                |                |                |               |
|   | 2004           | 2009              | 2014           | 2019           |               |                |                |                |               |
| Max. Seats  | INC<br>145     | INC<br>206        | BJP<br>282     | BJP<br>303     |               |                |                |                |               |
| 2 <sup>nd</sup> Max. Seats  | BJP<br>138     | BJP<br>116        | INC<br>44      | INC<br>52      |               |                |                |                |               |

### **APPENDIX – 3**

#### **EVM/VVPAT in Indian Elections: Chronology**

| <b>Date</b>                     | <b>Chronology of Events</b>   |
|---------------------------------|---|
| 1977                            | ECI mooted the idea of EVM  |
| 1979                            | A proto-type was developed  |
| 6 <sup>th</sup> August, 1980    | Demonstration by ECI before the representatives of political parties  |
| January 1981                    | BEL approached ECI for manufacturing EVMs   |
| 29 <sup>th</sup> July, 1981,    | ECI held a meeting with the representatives of BEL, ECIL, the Ministry of Law and Chief Electoral Officers of some State  |
| 19 <sup>th</sup> May, 1982      | EVMs first used in 70-Parur AC in Kerala  |
| 1982-83                         | EVMs used in 10 Bye-elections in different parts of the Country   |
| 5 <sup>th</sup> March, 1984     | Supreme Court of India held that EVMs cannot be used in elections   |
| December 1988                   | A new Section 61A was included in the Representation of the People Act 1951 (The Supreme Court upheld the validity of section 61A in 2001)                                    |
| 15 <sup>th</sup> March, 1989    | The amendment came into force   |
| January 1990                    | Electoral Reforms Committee (ERC) formed by Government of India   |
| April 1990                      | Technical Experts Committee recommended the use of EVMs   |
| 24 <sup>th</sup> March, 1992    | Necessary amendments to the Conduct of Elections Rules 1961 were notified by the Government   |
| 1998                            | A general consensus was reached on the use of EVMs for conducting Indian elections.   |
| 1999-2004                       | EVMs used in different state assembly elections   |
| 2004 - 2014                     | EVMs used in three consecutive elections to the Lok Sabha   |
| 4 <sup>th</sup> Oct 2010        | An all-party meeting held. Agreement on incorporation of VVPATs along with EVMs.  |
| July 2011                       | Field trial conducted after the prototype was manufactured, in Thiruvananthapuram (Kerala), Delhi, Cherrapunjee (Meghalaya), Jaisalmer (Rajasthan) and Leh (Jammu & Kashmir). |
| July-Aug 2012                   | A second field trial was conducted  |
| 19 <sup>th</sup> Feb 2013       | Final model was approved by TEC   |
| 10 <sup>th</sup> May 2013       | The Model was demonstrated to all political parties   |
| 14 <sup>th</sup> August, 2013   | The Conduct of Elections Rules 1961 were further amended and notified to provide for VVPATs   |
| 4 <sup>th</sup> September, 2013 | VVPAT was first used in a bye-election for 51-Noksen AC in Nagaland   |

|                               |   |
|-------------------------------|---|
| 8 <sup>th</sup> October, 2013 | Honourable Supreme Court directed the ECI to introduce the VVPAT system in a phased manner  |
| 2013 –March 2017              | Limited number of VVPATs introduced in phases by ECI except all 40 Assembly Constituencies of Goa.  |
| 12 <sup>th</sup> May 2017     | All Political Parties Meeting held. The Commission decided to use 100% VVPATs at every polling station in all future elections to Parliamentary and Assembly constituencies.  |
| Since May 2017                | VVPATs being used in all General/Bye-elections to Parliamentary and Assembly Constituencies   |
| 11 <sup>th</sup> Oct, 2017    | The Commission decided to conduct mandatory verification of VVPAT slips of randomly selected 01 Polling Station per AC. Subsequently, mandatory verification of VVPAT slips has been further extended to 01 randomly selected Polling Station of each Assembly segment of Parliamentary Constituency also.                                      |
| 15 <sup>th</sup> April, 2019  | In pursuance of the Honourable Supreme Court of India's order of 8 <sup>th</sup> April 2019, the Commission decided to conduct mandatory verification of VVPAT slips of randomly selected 05 Polling Stations per AC and each Assembly segment of Parliamentary Constituency in all elections to the Parliamentary and Assembly Constituencies. |





“NO VOTER TO BE LEFT BEHIND”



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