



CITY OF CAMBRIDGE

362 GREEN STREET, CAMBRIDGE, MASSACHUSETTS 02139-3395 • TEL. (617) 349-4361

FAX (617) 349-4366

BOARD OF ELECTION COMMISSIONERS

ARTIS B. SPEARS

DARLEEN G. BONISLAWSKI

LYNNE ALEXIS MOLNAR

WAYNE A. DRUGAN, JR.

Commissioners

TERESA S. NEIGHBOR

Executive Director

To: Robert W. Healy, City Manager
From: Board of Election Commissioners
Date: December 4, 1996
Subject: Response to Council Order #022, Council Order #003, and Council Order #018 Re: Use of Accu-Vote ES-2000 Marksense Voting System in Fall, 1996, Elections; Projected Use in "PR" Election in 1997; and Ballot Privacy Issues.

Summary

The Board of Election Commissioners is pleased to have this opportunity to report to the Council on the successful implementation of the Marksense system in the September and November 1996 elections in Cambridge. Marksense fulfilled all the criteria set by the Commission for election systems. It met or exceeded standards set for measuring its performance in both elections.

Our election-day experience and later analysis show that Cambridge voters readily and easily adjusted to the Marksense system, and found Marksense to be voter-friendly.

The timing of the recount for Middlesex County Commissioner, coming immediately after our first use of the Marksense system, demonstrated that Marksense fulfilled the basic requirement of any voting system: ballots were counted properly and accurately. Public and professional confidence in the accuracy of Marksense tallies greatly surpasses those for the punchcard system. Because the recount involved visual inspection of each and every ballot cast in the primary, it gave Commissioners the assurance that voters had no difficulty understanding the ballot and marking it according to instructions.

Marksense more than fulfilled its promise of providing citywide results in a timely fashion. Cambridge's final figures were recorded in the next day's morning editions of the Boston Globe and

the Boston Herald. Both the primary and general elections had close local races whose outcomes were definitively known before 11 p.m.

The successful introduction of Marksense in the last two elections provides a solid foundation for its use in the next municipal election. The Commission will continue to refine the system to address problems and concerns discovered in September and November. In particular, as discussed below, the Commission will insure that every voter receives a privacy sleeve at the same time s/he is given a ballot. The Commission has adopted a comprehensive and specific schedule for adapting Marksense to the requirements of Proportional Representation in the municipal election, as detailed below.

I. Cambridge Adopts Marksense: A Concise History

In January of 1995 the Cambridge Board of Election Commissioners established the Technical Working Committee for Computerization of Cambridge Elections (TWCC) to examine alternatives for computerizing state, federal, and municipal elections and to make recommendations to the Commission. The twelve Cambridge citizens on the TWCC, a group with diverse expertise and experience in election administration and computer technology, met twenty times between March and December, 1995.

During that period of time they developed a five-part process to: 1) establish criteria for evaluating voting systems; 2) solicit RFP's from approved vendors; 3) collect information about various systems and conduct a comparative evaluation of their costs, strengths, and weaknesses; 4) measure the alternatives against criteria established; and 5) make recommendations based upon performance and cost-benefit analysis.

They recommended and the Election Commission approved a precinct-based optical scanning Marksense system because it would work for state, federal, and municipal elections with a software adaptation.

On March 25, 1996, the City Council voted to "authorize adoption of a precinct-based optical scanning system using Marksense paper ballots for all state, federal, and municipal elections...." On May 20, 1996, the Council further voted to "approve the selection of the Accuvote ES-2000 (a precinct-based optical scanning system) for the September, 1996 State Primary Election..."

II. Marksense Meets and Exceeds Standards in September and November Elections

The precinct-based optical scanning system, using Marksense paper ballots, enjoyed enormous success in the two state elections held this past fall. The Presidential election consistently produces the highest turnout of any of the seven elections held in each four-year election cycle. On November 5, 1996, Cambridge voters turned

out a remarkable eighty-five (85%) percent, compared to seventy-four (74%) statewide, and under fifty (50%) nationwide.¹

A. Cambridge Voters Find Marksense Voter-Friendly

Voter notification was conducted through press releases and ballot instructions posted on Listing Boards throughout the City. An open house was also held for the general public with sample ballots and a demonstration voting machine on September 11th. Organizations were encouraged to contact the Election Commission for information sessions for their members. Signs instructing voters how to fill in the ovals were posted outside the polling area and inside each polling booth on Election Day, and poll workers were trained to instruct voters on the proper procedure as well.

In the September and November elections combined, over fifty thousand (50,000) people successfully used the system. Overall voter feedback was positive and enthusiastic; the great majority of voters expressed pleasure at how easy the system was to use compared with the old punchcard system. To ascertain whether or not this could be shown objectively, the Election Commission compared the number of spoiled ballots from the 1992 Presidential Election with that of the 1996 November Election:

- * in 1992 the spoiled ballots numbered 402 out of 42,130 ballots cast, a ratio of one percent (.01%);
- * in 1996 the total was 198 out of 38,474, for a ratio of one-half of one percent (.005%), a fifty percent decrease.

This is particularly striking in view of the fact that punchcards had been used in nine elections prior to the one in November, 1992, giving voters ample opportunity to become familiar with the system. (The first time the Accuvote was used on September, 17th, the spoiled ballot rate was also one-half of one percent, indicating that voters had adapted readily and successfully to the new system.)

B. Recount Demonstrates Accuracy of Marksense System

The Cambridge Board of Election Commissioners welcomed the opportunity afforded by the recount of the primary race for Middlesex County Commissioner to test the accuracy of the Marksense system. This recount enabled election workers and Commissioners to inspect visually all 11,780 ballots cast in the September Primary. We saw firsthand how successfully Cambridge voters adapted to the Marksense system and how clearly scanned ballots recorded the

¹The September, 1996, Primary turnout was 12,278 out of 42,185 voters; in November, 1996, it was 38,474 out of 45,331 voters; the turnout in November, 1992, was 42,232 out of 50,276 voters.

intent of voters.

Most importantly, the recount enabled the Commission to verify that the Marksense system's reputation for an extremely high degree of accuracy is well-founded. The overall rate of variance between the first count (through Marksense) and the manual recount was less than one-thousandth of one percent. Of the eight ballots protested by representatives of the various candidates for County Commissioner, the Board ruled unanimously on seven that they had been properly counted and did not find the protests to be substantive.

C. Marksense Fulfills Promise of Timely Results

In addition to the great advantage of having a unified voting system for state, federal, and municipal elections, two criteria that weighed heavily in the recommendation of the new system for Cambridge were the speed and accuracy of obtaining election results. Since the Office of Information Technology at Harvard University had ceased to provide computer support after the 1992 elections, vote tabulation had become dismally slow. Election night results in September and November, 1994, stretched well past midnight, and Cambridge vote tallies lagged well behind other communities; newspaper accounts of election results the next morning did not include Cambridge.

With the Marksense system election results are available and posted at the precinct level within minutes of the polls closing. By having observers at the polls telephoning their publicly posted tallies into campaign headquarters, candidates in contested races in the Primary knew the unofficial results before 9 p.m.

In November, in anticipation of a large voter turnout and great interest in several of the races, the Board decided to transmit election results from the polls to the Election Office by modem. Within an hour of the polls closing, seventy-five percent of the results had been transmitted and tallied. Final results were available by 10:21 p.m. for the entire city, in sharp contrast to the 3 a.m. ending time in November, 1994. The early edition of the Boston Globe the next morning published election results which included Cambridge. It demonstrated that completion of tabulation was achieved at a much higher rate than cities of comparable size. (See attached Boston Globe article.)

III. Commission Adopts New Policy for Availability of "Privacy Sleeves"

Technical problems associated with implementing the Marksense system were minimal during both elections. Five three-hour hands-on training sessions for small groups of Election Day wardens and clerks were substituted for the traditional two-hour Sunday training session for everyone. In addition Election Day Manuals

were revised to include detailed step-by-step instructions on how to use the new equipment; this additional attention and experience contributed to a feeling of confidence on the part of wardens and clerks. Each warden and clerk also had an opportunity to work with the ballot box and scanner in a training session under careful guidance. These additional efforts were well-rewarded on election day.

Jammed Ballots

There was some jamming of ballots during the Primary due to dampness because of the heavy rains. This was promptly and successfully handled by the technicians provided by the vendor to oversee election day operations. Sufficient back-up machines had been made available in the event of a breakdown, and will continue to be as part of the agreement with LHS. Each ballot box is equipped with an auxiliary compartment for storing ballots which cannot go through the scanner until they can be appropriately processed.

Training for the wardens and clerks for the November election included increased emphasis on handling problems such as jamming of ballots.

Privacy Sleeves

There were several complaints after the Primary election about the placement of privacy sleeves at the check-out tables. Some voters didn't realize they were available. To increase awareness of the availability of privacy sleeves, the poll workers were instructed to offer privacy sleeves to voters at the check-in table in the November election. The Commission does not believe that this completely resolved this privacy issue.

The Board has established as a policy, therefore, that for all future elections voters will be uniformly handed a privacy sleeve with their ballots at the check-in table. The Commission, therefore, doubled the number of sleeves for the next election.

Training for election workers will strongly emphasize the necessity for insuring voter privacy by distributing these sleeves with the ballot.

IV. Marksense Enters New Phase: Use in Proportional Representation Elections

The Board of Commissioners recommended and the City Council approved adoption of a Marksense system for Cambridge elections because it is a voting system that works for all state, federal, and municipal elections. The singular feature which enables it to be adapted for elections by Proportional Representation is a scanner technology, which has thirty-two horizontal and thirty-two

vertical "read-heads." These "read-heads" permit the system to process ballots on which votes are cast for multiple candidates for an office, ranked in order of preference.

Development of "Read-Heads"

Development of an E-Prom Chip for "PR" elections will adapt the ballot scanner to read and record every vote cast on every ballot, and transmit the results to a software program specially adapted to the unique requirements of Cambridge municipal elections, which will then tabulate the results. At the time of the purchase of the voting machines, the agreement with LHS Associates, Inc., providers of the Marksense voting system, specified that this hardware modification will be developed by March, 1997.

Ballot Design

Design of the ballot is narrowly tailored to the structure of the scanner and its thirty-two "read heads." LHS is scheduled to submit a prototype at the end of January, 1997. At that time the Election Commission will commence field-testing. We will also engage in extensive consultation with the City Council, focus groups, and community organizations. Design options are confined to color of ink, type style and size, and shading of columns for ease of readability.

The Marksense ovals will be similar to those on the ballots used in the two fall elections, with the exception that each oval will be numbered to permit the voter to rank his/her choice in order of preference.

Municipal ballots questions will continue to offer a "yes" or "no" response, as in plurality elections.

Software Development

Tabulation software called "PR Master" was developed by Jerel Software Company and used to computerize results for the 1991 City Council election. Refinement of the Marksense system for a proportional representation election and adaptation of the "PR Master" tabulation software to output of the Accu-Vote ES-2000 will be completed in time to test the system in April, 1997. The software will exactly reproduce the "Cincinnati Rules."

Testing and Certification

Following Election Commission approval of the system, the Elections Division of the Office of the Secretary of the Commonwealth will conduct statutorily required tests in early April, 1997, prior to granting approval for use in the November election. These tests will simulate a "PR" Count in which 5,000 ballots will be prepared and tabulated manually; the results will then be compared to the computerized results for accuracy.

Educational Component

The schedule for computerization of the "PR" Count has been established to permit ample time and opportunity to prepare for the

1997 municipal election in the following areas:

- * development and testing of the hardware scanning modification and tabulation software by the Election Commission and by the Secretary of State;
- * public review of the ballot design for ease of readability and use; and
- * election day instruction;
- * voter education and outreach.

Depending on the availability of funding, the components of the outreach and education efforts include a citywide mailing to every voting household in October, 1997, consisting of:

- * a brochure describing how proportional representation voting works and how each voter has an opportunity to vote for as many candidates as s/he chooses according to preference; and
- * a sample ballot with clear instructions on how to vote for each candidate by filling in the numbered oval next to the candidate's name according to preference;
- * a media campaign to familiarize the public with the new ballot, including press and cable releases, notification to community groups, particularly senior citizens' groups;
- * postings of sample ballots on Listing Boards, at voter registration sites, and at the polls.

Election Night

The Board of Election Commissioners is considering two options for election night and will be pleased to receive feedback from the Council and from the community before making a decision.

a. Option 1 - Election Night Results

Computerization affords the possibility of having results of a "PR"

Count on election night. The advantage of this is that the timeliness would be in keeping with the standard protocol for all other elections. On the negative side, final tabulation requires that every write-in and auxiliary ballot be entered manually, and results would be delayed until the last precinct submits its results. Based on previous elections, that may be as late as 11 p.m. on election evening. An unofficial first count could, however, be derived the same evening, leaving the final tabulation until the next day.

b. Option 2 - Next Day Results

The advantage to this is that preparations could be completed the night before so that, on the following day, an orderly and planned simulated "PR" Count could be conducted for candidates and for the community. This would include an illustrative and educational process which "stops" the count between each transfer and as each candidate is "elected," much as it occurred in the past at the Longfellow School.

Conclusion

The Election Commission wishes to acknowledge the support of the City Council and the City Manager in acquiring the new voting system implemented this year. This support is even more meaningful following the recent negative public attention focused on the problems with punchcard ballots.

Based upon our success in two elections, the Board of Election Commissioners feels strongly that all aspects of the municipal election with the Marksense system will go well. We have built a timetable for developing software for the municipal election with ample time to make corrections. As planned, the entire system will be tested in April of 1997, seven full months prior to its use in November of 1997.

The Election Commission will be able to devote the seven months between April when system development will be completed and the November election to refinements to the system and education to the voter on PR and voting with the new system.

analyses and complete results
plus today's live political chat
schedule is available on **Globe
Online** at
<http://www.boston.com>; the
keyword is **vote**.

Virginia	54%	0	13	0	523,599	48%	337,144	47%	74,907	07%
Washington	0%	0	0	0		0	00%	0	00%	0
West Virginia	19%	W5	0	0	50,850	57%	27,720	31%	10,130	11%
Wisconsin	4%	W11	0	0	60,964	51%	49,047	41%	10,289	09%
Wyoming	0%	0	1	3	29	34%	48	56%	9	10%
Totals		310	110	0	9,134,479	48%	8,313,901	44%	1,525,142	08%

SOURCE: Data from the Associated Press

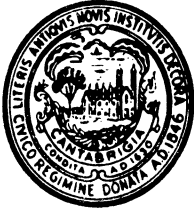
Globe staff chart

Vote for president in selected Massachusetts cities and towns

CITY/Town	Precincts reporting	Bill Clinton	Bob Dole	Ross Perot	Others	CITY/Town	Precincts reporting	Bill Clinton	Bob Dole	Ross Perot	Others
AGAWAM	0 of 7	0	0	0	0	METHUEN	1 of 12	253	106	36	3
Amherst	1 of 10	496	88	34	12	Milford	Complete	6,756	2,641	953	96
Andover	Complete	7,830	6,550	1,078	178	Milton	5 of 11	3,797	2,352	427	59
Arlington	7 of 21	5,265	2,202	493	141	Natick	Complete	9,875	4,640	1,035	179
ATTLEBORO	Complete	7,953	4,254	1,863	112	Needham	Complete	9,541	5,589	790	157
Barnstable	9 of 11	9,328	6,439	1,698	150	NEW BEDFORD	Complete	23,604	4,148	2,547	197
Belmont	1 of 8	892	360	80	32	NEWBURYPORT	Complete	5,604	2,440	660	128
BEVERLY	5 of 12	4,039	1,725	679	81	NEWTON	16 of 31	15,043	4,319	953	65
Billerica	Complete	9,347	5,318	1,917	187	NORTH ADAMS	1 of 5	591	144	83	5
BOSTON	24 of 254	11,355	3,714	1,062	323	NORTHAMPTON	Complete	10,064	2,257	1,051	218
Braintree	0 of 12	0	0	0	0	North Andover	Complete	5,773	4,609	891	133
BROCKTON	14 of 28	6,730	2,839	1,186	124	North Attleborough	0 of 7	0	0	0	0
Brookline	1 of 16	1,071	301	44	31	Norwood	Complete	8,225	4,202	1,008	135
Burlington	Complete	6,608	3,504	979	106	PEABODY	16 of 18	14,261	5,310	2,064	189
CAMBRIDGE	36 of 42	25,869	4,173	1,212	627	PITTSFIELD	Complete	1,091	343	283	17
Chelmsford	8 of 9	8,958	5,753	1,624	172	Plymouth	9 of 13	7,401	4,213	1,517	109
CHELSEA	2 of 10	817	156	77	0	QUINCY	Complete	23,172	9,819	3,064	322
CHICOPEE	Complete	14,203	5,188	2,495	154	Randolph	0 of 8	0	0	0	0
Danvers	6 of 8	4,867	3,080	911	96	Reading	Complete	6,748	4,060	932	132
Dartmouth	Complete	7,818	1,997	1,241	122	REVERE	4 of 19	2,189	777	287	16
Dedham	1 of 7	877	836	108	30	SALEM	5 of 14	3,170	1,031	456	73
Dracut	0 of 7	0	0	0	0	Saugus	2 of 10	1,395	554	259	28
EVERETT	16 of 18	8,280	2,481	1,015	99	Shrewsbury	Complete	7,680	4,891	1,150	119
FALL RIVER	0 of 30	0	0	0	0	SOMERVILLE	0 of 21	0	0	0	0
Falmouth	Complete	9,354	4,968	1,311	126	Springfield	Complete	31,235	9,107	3,403	289
FITCHBURG	8 of 12	4,604	1,865	725	105	Stoneham	Complete	6,387	3,111	868	89
Framingham	Complete	16,630	6,594	1,685	256	Stoughton	5 of 8	4,743	2,092	665	17
GARDNER	0 of 10	0	0	0	0	TAUNTON	2 of 16	1,189	300	200	14
GLOUCESTER	2 of 10	1,646	645	257	37	Tewksbury	0 of 7	0	0	0	0
Greenfield	Complete	4,683	1,882	899	77	Wakefield	3 of 7	3,328	1,771	482	67
HAVERHILL	2 of 21	1,204	442	175	15	WALTHAM	11 of 18	7,587	3,219	918	91
Hingham	0 of 5	0	0	0	0	Watertown	0 of 12	0	0	0	0
HOLYOKE	Complete	9,735	2,975	1,142	102	Wellesley	1 of 7	791	656	61	19
LAWRENCE	12 of 24	3,942	1,279	501	55	WESTFIELD	0 of 11	0	0	0	0
LEOMINSTER	1 of 10	764	339	131	13	West Springfield	6 of 8	4,438	2,527	841	68
Lexington	0 of 9	0	0	0	0	Weymouth	0 of 18	0	0	0	0
LOWELL	0 of 33	0	0	0	0	Winchester	6 of 8	4,699	3,431	548	103
LYNN	9 of 28	4,631	1,108	537	82	Winthrop	1 of 6	861	378	128	13
MALDEN	Complete	14,040	4,014	1,648	195	WOBURN	0 of 14	0	0	0	0
Marblehead	Complete	6,497	4,233	726	157	WORCESTER	21 of 50	12,389	4,201	1,422	190
MARLBOROUGH	0 of 14	0	0	0	0	Yarmouth	0 of 6	0	0	0	0
Marshfield	2 of 6	2,186	1,470	405	42	Other	167 of 639	137,752	80,944	23,803	2,657
MEDFORD	13 of 16	13,384	4,801	1,427	190	Totals	852 of 2,106		623,691	280,880	85,941
MELROSE	10 of 14	6,156	3,125	791	96		10,322				

SOURCE: Data from the Associated Press

Globe staff chart



CITY OF CAMBRIDGE
CAMBRIDGE, MASSACHUSETTS 02139

TEL. 349-4300
FAX. 349-4307



20.

EXECUTIVE DEPARTMENT
ROBERT W. HEALY
City Manager

RICHARD C. ROSSI
Deputy City Manager

December 16, 1996

To The Honorable, The City Council:

Please find attached a response to Awaiting Report Item No. 17, regarding a report on a review of the operations of the new marksense voting system and Awaiting Report Item No. 20, regarding a report outlining procedures to be used for a PR" election utilizing the new marksense voting system, received from the Board of Election Commissioners.

Very truly yours,

Robert W. Healy
City Manager

RWH/mec
attachment

Consent Agenda #20

S-619

Regarding the operations of the new
marksense voting system and outlining
procedures to be used for a "PR"
election utilizing the new marksense
voting system.

In City Council December 16, 1996

PLACED ON FILE