5.0 ABSENTEE/MAIL BALLOT VOTING PROVISIONAL BALLOT

5.1 Requirement

The system shall provide an absentee/mail/provisional ballot/provision ballot component from which paper ballots can be generated through a ballot layout system and a means by which such ballots can be tabulated. This system shall meet, at a minimum, the following:

a. It shall be integrated with the entire voting system provided.

Hart InterCivic Response

Ballot Now, the eSlate System's paper Ballot (Absentee/Mail/Provisional) application is a unique software solution for *on-demand, in-house or commercial printing* of paper ballots for absentee/mail voting, provisional voters, or other special situations requiring paper ballots.

Ballot Now scans and digitally images the voted ballots, resolving unclear ballots through an innovative on-screen resolution process; capturing Cast Vote Records, and creating a comprehensive audit trail.

Ballot Now is fully integrated within the eSlate System.

- Data imported into eSlate's Ballot Origination Software System is used to generate both DRE and absentee/mail ballots.
- Ballot styles for both are written on Mobile Ballot Box PC cards.
- As votes are cast, Cast Vote Records are created that have identical formats for both DRE and absentee/mail.
- All Cast Vote Records are tabulated by Tally, eSlate's tabulation and reporting application.

- Standard reports routinely present consolidated totals for absentee/mail and DRE.

b. The component that generates and tallies the absentee ballots shall be programmed from the same database and election definition that is used to program the precinct voting devices.

Hart InterCivic Response

Ballot Now ballots are formatted and generated through the eSlate System's Ballot Origination Software System (BOSS), at the same time, and from the same data, as the ballots to be presented on the DRE screen.

Using the BOSS import wizard, data is imported from Integrity into BOSS. Formatting choices for the paper/absentee/mail ballots are made in BOSS (columns, paper size, etc.), and a Mobile Ballot Box is written that carries Ballot Now ballot data.

As paper ballot votes are recorded, Cast Vote Records are created that are structured the same as Cast Vote Records from DRE ballots. All Cast Vote Records, whether originating from paper ballots or the DRE, are stored on a Mobile Ballot Box (MBB) and tabulated through Tally, eSlate's tabulation and reporting application.

c. The output of the absentee/mail/provisional ballot/provisional ballot layout system shall be subject to edits, if necessary, by an editing component within the system. That is, contests shall be able to be moved if necessary by column breaks, page breaks, cut and paste processes, etc.

Hart InterCivic Response

As noted, Ballot Now ballots are generated through BOSS. Using BOSS, users can specify column breaks, page breaks, or make other formatting choices in order to edit the absentee/mail layout.

d. The output of the absentee/mail/provisional ballot/provisional ballot layout component shall be readily exportable so that a commercial printer can generate the ballots necessary for any election held within the County.

Hart InterCivic Response

Ballot Now produces formatted ballots in electronic images (print files) that may be exported and printed by commercial printers. Ballot Now can also print ballots "on-demand" using commercial, off-the-shelf printers.

Ballot Now printing options include printing ballots with or without ballot stubs, and with or without serial numbers. In addition, Ballot Now provides paper

ballots in a variety of templates that use paper sizes of 8 ½" x 11", 8 ½" x 14", and 11" x 17"; simplex and duplex ballots are supported, as well as multi-page ballots. All of these different sizes of ballots, however, may be folded into the same size standard ballot envelope.

e. It shall be reliable, accurate, and operate at a speed that accommodates a timely tally of the votes generated by it.

Hart InterCivic Response

Ballot Now performs with 100% accuracy and offers several features designed to ensure accuracy and reliability.

Unlike optical scanning systems, there is no requirement for precise registration marks in printed ballots, thus reducing the margin for error in ballot production. The system automatically adjusts for skewed or damaged ballots, and identifies all marks within the target zone.

Ballot Now uses commercial off-the-shelf scanners and printers, and operates at the full rated speed of each. Ballot Now does not stop scanning due to ballot mismarks or write-ins, instead creating a digital image of the ballot for later resolution by election officials. Ballot Now also includes efficiency features that increase productivity throughout the process. For example, each Ballot Now ballot includes a bar code that identifies the precinct or ballot style. This eliminates the need to sort ballots before scanning, which eases the workload for the Elections Staff and speeds ballot processing.

For the Boulder County installation, Hart is pleased to propose Kodak's High Speed Series i830 Document Scanners. The i830 handles an unsurpassed range of document sizes, thickness, and surface quality to minimize stoppages and the need for rescans. The feeder, exit hopper, and controls are positioned conveniently to help operators work efficiently. Features like easy operator calibration and multi-feed detection based on length and thickness help any imaging application meet its quality control needs.

We are proposing three Ballot Now systems for Boulder County. The proposed configuration will support imaging of 200,000 ballots in 12 hours.

f. Absentee results shall be easily integrated with Election Day and early voting results.

Hart InterCivic Response

Since Ballot Now is a fully integrated component of the eSlate System, absentee results and Election Day results are seamlessly integrated. Both components capture votes as Cast Vote Records (CVRs), CVRs are saved on the MBB (among other redundant storage), and the MBBs supply data to Tally for tabulation and reporting.

A significant technical advantage that Ballot Now offers is the fact that the Cast Vote Records are not tabulated when the ballots are processed. This technical advantage translates into a tremendous operational advantage since processing of Ballot Now ballots can begin up to 10 days before Election Day as defined in the Colorado Election Code.

Section 1-8-302 of the Colorado Election Code specifically allows ballots to be processed beginning 10 days prior to Election Day, although under no circumstances are results to be released. *Ballot Now can process all by-mail ballots in accordance with state law so that the electronic Cast Vote Records can be read in a matter of seconds on Election Day. There is no risk of exposing returns prematurely.*

g. It shall be subject to a full audit and generate reports and logs that would facilitate such an audit.

Hart InterCivic Response

Like all eSlate components, Ballot Now maintains a complete audit log. Audit Log reports are available from the system. Ballot Now also creates an electronic image of each ballot that is securely and safely stored to create a permanent record of the election. The paper ballot is maintained in its original format, unlike older generation optical scan systems that require election officials to physically alter the paper ballot so it may be re-scanned.

h. It shall allow for the tabulation of provisional ballots that are verified after Election Day.

Hart InterCivic Response

Cast Vote Records for provisional ballots may be accepted or rejected, as appropriate, until the tabulation database for the specific election is closed.

i. It shall support the generation and tally of optical scan type ballots if required.

Hart InterCivic Response

Ballot Now does produce optical scan-type ballots, but with several advantages over older generation optical scan systems. *Exhibit IV-4* provides a description of some of the differences.

Comparison of Ballot Now and Traditional Optical Scanning		
Optical Scanning System	**Ballot Now**	**Ballot Now Benefit**
Requires voting response areas to be located on a specific grid limiting flexibility of the ballot design.	No grid required so that as ballot design evolves, there is no limitation on the placement of information.	Flexibility in Ballot Design
The reading or scanning mechanisms (read head) for optical scan systems are known as "contact image sensors" and are made up of a series of individual, discrete emitter-detector pairs. The response of the individual emitter-detector pairs is different so that one pair may recognize a mark while another pair may ignore the same mark. Calibration methods do not allow for the individual pairs to be adjusted; only the entire set of emitter-detector pairs to be averaged.	The imaging component used by Ballot Now is a Charge-Coupled Device (CCD), a highly integrated semi-conductor "array" that maintains a flat response across the component for consistent performance.	Accuracy and consistency
Relies on dimensional stability of the ballot stock and the accuracy of the printing process. A 10% increase in relative humidity can cause a piece of paper to expand as much as 1%. The dimensional relationships between the voter response areas and position of the emitter-detector pairs are on the order of 0.25 inches. A 1% change for an 11-inch piece of paper is 0.11 inches, almost half the distance of the voter response and sensor relationship.	Ballot Now eliminates the need for dimensional stability and printing accuracy by imaging the complete document. By intelligently analyzing the image in computer memory, these artifacts have no impact on accuracy.	Ensures scanning accuracy
When ballots are read by the optical scan system, the ballot must be perfectly aligned with the read mechanism or the ballot will not be properly read. If the ballot is fed into the system off axis the voter response areas will not align with the emitter-detector pairs in the read head.	Ballot Now eliminates the need for the ballot to be perfectly aligned when fed into the system. By intelligently analyzing the image in computer memory, this condition has no impact on accuracy. If there are gross alignment issues, Ballot Now will alert the user.	Accuracy
Requires a sensing track along the edge of the ballot that is made up of individual sense marks. The sense marks line up with the voter response areas across the ballot and "trigger" the read head to scan a line on the ballot. The optical scan system never identifies the voter response area; the system assumes the response area is in the proper location and blindly takes a reading. The assumption that the voter response area is in exactly the correct position is based on the element identified	Ballot Now actually locates the voter response area for each contest and then analyzes the interior area for voter marks. No assumptions are made about the location of the voter response area, every option of every contest is positively located and the interior analyzed.	Accuracy and reliability

Comparison of Ballot Now and Traditional Optical Scanning		
Optical Scanning System	**Ballot Now**	**Ballot Now Benefit**
above.		
Uses proprietary hardware that has not significantly improved the performance and accuracy of optical scan systems since the release of the system in the 1960s and early 70's.	Ballot Now relies on commercial off-the-shelf digital imaging scanners that are developed and manufactured by some of the largest information technology providers.	Scalability and continual improvement

Exhibit IV-4: Comparison of Ballot with Traditional Optical Scanning Solutions. Ballot Now's unique digital imaging process and ballot-on-demand capability provides important advantages to Boulder County in terms of accuracy, reliability, convenience, and flexibility.

5.2 Proposer's Response

a. Will you meet these requirements?	**Yes X**	**No**

b. How do you propose to meet this requirement? Make sure to include item(s) listed below:

(1) Give a comprehensive description of the absentee/mail/provisional ballot component of your system.

Hart InterCivic Response

Ballot Now, eSlate's digital absentee balloting application, is a paper balloting system that is fully integrated with the eSlate Electronic Voting System. Ballot Now manages the printing, scanning, and resolution of paper ballots for absentee or provisional voting. Ballot Now also records voted ballots as electronic Cast Vote Records (CVRs) for tabulation through the eSlate Tally tabulation and reporting system.

Ballot Now retrieves ballot information from the Mobile Ballot Box (MBB) written by the eSlate's Ballot Origination Software System (BOSS), using the same process as that used to define ballots for the eSlate Precinct Voting System. As a result, Ballot Now provides Boulder County Elections Officials with a highly scalable absentee/mail/provisional solution, fully integrated with the eSlate System.

Ballot Now ballots can be produced in an electronic file and provided to commercial printers for volume ballot production, or printed on demand by commercial, off-the-shelf printers.

Competitors' "on-demand" systems require ballots to be preprinted for specific precincts or ballot styles. This means that Boulder County election officials must forecast and manage the inventory of ballots for requirements that are difficult to

anticipate. Other ballot on demand systems require special stock with preprinted "ovals" or other target marks that may or may not conform to particular ballot requirements. Ballot Now ballots require no preformatting.

Ballot Now ballots include a bar code that identifies the precinct or ballot style. This eliminates the need to sort ballots before scanning, which eases the workload for the Elections staff and speeds ballot processing. Bar codes prevent duplicate scanning, which is the most frequent error in centrally processing optical scan ballots, and fraudulent ballots.

Ballot Now also includes a unique on-screen feature that increases the efficiency and accuracy of ballot resolution and avoids the need to alter the original paper ballot in any way. Ballot Now identifies ballots requiring resolution, based on local procedures and State law. The ballot resolution process allows Election Officials to review the digital image of the ballot on the computer screen to record write-in votes or resolve questions of voter intent. As issues are resolved, Elections Officials use a simple menu-driven interface to make and record decisions; Ballot Now also includes an auto-resolve feature that can be used if determination of voter intent is not required.

Processing write-in votes is particularly streamlined. Prior to scanning the ballots, the Elections Staff enters into Ballot Now the names and acceptable aliases for certified write-in candidates. Part of the ballot resolution process is then to accept or reject the voter's write-in choice according the list of certified candidates. With this method, all selections, including write-ins, are recorded electronically in Ballot Now.

Since all resolution issues are accomplished on-screen, there is no need to alter or handle the paper ballots. All ballots are preserved in their original forms requiring no alterations, in the event re-evaluation of the voter's intent is required. All actions taken related to the ballot resolution are recorded with descriptive detail in the Ballot Now audit log to provide a traceable record of events all the way back to the individual ballot (but not the voter).

(2) Describe the speed and accuracy of your absentee/mail/provisional ballot generation and tally features.

Hart InterCivic Response

Ballot processing is fast and 100% accurate.

Unlike optical scanning systems, there is no requirement for precise registration marks in printed ballots, reducing the complexity and margin for error in ballot production. The system automatically adjusts for skewed or damaged ballots, and identifies all marks within the target zone.

The innovative design of the Ballot Now system allows scanning equipment to work continuously at rated scanner speed, since image processing is accomplished separately but parallel with scanning operations. The scanner feeds continuously and does not stop for ballot resolution issues (namely undervotes, mismarks, overvotes). Digital images of questionable ballots are stored electronically, and retrieved for resolution at an appropriate time determined by local practice.

Also, multiple Ballot Now stations (scanners) may be operated simultaneously to achieve complete processing in any given period of time. The means the system is highly scalable.

To support the process of scanning voted Ballots, Hart InterCivic is recommending the Kodak i830 Scanner with High-Volume Capture Software, which has a rated speed of 160 pages per minute (8½ x 11, landscape).

(3) Describe the reliability of your absentee/mail/provisional/provisional ballot features.

Hart InterCivic Response

Through testing by the Independent Testing Authority and independent tests performed as part of Hart InterCivic's ISO 9001 registered quality management system, Ballot Now has consistently demonstrated its reliability and performance. In addition, since the configuration proposed for Boulder County include three Ballot Now stations that can operate concurrently, the County will have a redundant system in unlikely event one of the stations is out of service.

(4) Describe the process to audit your absentee/mail/provisional ballot processes.

Hart InterCivic Response

Like all components of the eSlate System, Ballot Now creates a complete audit trail of all actions affecting the operation of the absentee/mail system. The audit trail is documented in the Ballot Now Audit Trail Report. The Audit Trail report lists the transactions users performed in Ballot Now.

Transactions that result in changes to the data stored in the database, and that are listed in the Audit Trail report include:

- transaction record number
- username of the user logged in to Ballot Now when transaction occurred
- date transaction occurred
- time of day transaction occurred
- code for the transaction

- description of the transaction, and
- details of the transaction

(5) Describe the error detection capabilities for your absentee/mail/ provisional ballot features.

Hart InterCivic Response

Ballot Now includes several safeguards designed to detect errors in ballot processing or in marked ballots after voters return them. For example, when voted ballots are scanned, Ballot Now produces a Scanned Ballots Report. The Scanned Ballots Report lists the number of ballots processed by the system for an Election, sorted by Batch ID, and identifies ballots with marked areas that are unable to be processed or violate any voting logic (for example overvotes, write-ins, etc.).

This report is updated every time a batch of returned ballots is scanned. After first scanning ballots, there may be a number of unresolved ballots, and the report reflects these. However, after all ballots are resolved, the report does not show any unresolved ballots.

For each scan batch, the Scanned Ballots By Batch report shows:

- batch ID
- username of the user logged in to Ballot Now when ballots were scanned
- date ballots were scanned
- time of day ballots were scanned
- precinct name
- number of ballots scanned in each precinct
- number of unresolved ballots in each precinct
- number of resolved ballots in each precinct
- number of resolved ballots in each precinct that have been written to the MBB, and
- number of ballots in each precinct that are not yet processed

For ballots with unreadable marks, Ballot Now offers an innovative option to Elections Officials faced with the challenge of interpreting voter intent. When Elections Officials are ready to resolve questionable ballots, resolution problems are completed using Ballot Now's unique ***on-screen*** resolution feature. Ballot Now identifies ballots requiring resolution, according to parameters set by the Elections Official. The ballot resolution process is accomplished by reviewing the digital image of the ballot on the computer screen to record write-in votes or

resolve questions of voter intent. As issues are resolved, Elections Officials use a simple menu-driven interface to make and record decisions.

Since all resolution is accomplished on-screen there is no need to alter or handle the paper ballots. Therefore all ballots are preserved in original form, without alteration, in the event re-evaluation of the voter's intent is required. All actions taken during the ballot resolution activity are descriptively added to the audit log.

A tremendous advantage provided by Ballot Now is that it uses off-the-shelf digital high speed scanners. This means that advances to scanning technology are brought to the election industry by Ballot Now. The digital imaging industry is growing with millions of dollars a year spent on research and development to advance the technology. Hart has teamed with Kodak, an industry-leading manufacturer of digital scanners and is committed to continuous improvement of the technology.

The proposed i830 Document Scanner scans up to 160 pages per minute (A4 letter, landscape mode, 200 dpi). It handles an unsurpassed range of document sizes, thickness, and surface quality to minimize stoppages and the need for rescans.

(6) Describe the report generation faculty of your absentee/mail/provisional ballot component.

Hart InterCivic Response

Ballot Now produces a series of standard reports designed to provide complete management control of the application and ballot production and processing. The reports include:

- Election Report
- Scan Batch Report
- Scanned Ballots By Precinct Report
- Scanned Ballots By Batch Report
- Unresolved Ballots Report
- Printed Ballots By Precinct Report
- Certified Write-ins Report
- Audit Trail Report

In addition to the standard reports, ad-hoc reports designed per customer specification may be delivered using Crystal Reports, the leading database reporting tool, which is included in Hart InterCivic's proposal.

We provide a complete list of the reports printed from the eSlate Voting System in *Attachment 2: eSlate System Reports.*

(7) Provide a description of your experience in generating absentee/mail/ provisional ballot processes in live elections.

Hart InterCivic Response

Ballot Now has been used to process nearly a quarter of a million ballots for live elections.

Harris County (Houston), Texas, uses Ballot Now to provide absentee by-mail capabilities as part of the overall eSlate Electronic Voting System implementation. Ballot Now was successfully used for absentee/mail voting in the March 2002 primary and runoff. Both Travis County (Austin), Texas, and the City of Philadelphia used Ballot Now for absentee/mail voting for the first time in their November 2002 Election.

Using Ballot Now, Hart InterCivic also successfully completed the recent election for the State Bar of Texas and Texas Young Lawyers Association, including:

- formatting and printing of ballots,
- overseeing the mail house operation for ballot packet assembly and mailing,
- daily reporting of return rates,
- ballot scanning and resolution, and
- tabulating and reporting of results.

During the 2003 election cycle, members were provided ballots using 64 different ballot styles. Of the 71,190 ballots distributed, 20,865 ballots were returned to Hart for processing and tabulation. This was the third year Ballot Now was used by the State Bar of Texas for this Election.

Arapahoe County, Colorado, recently concluded a successful election, including the use of Ballot Now to process approximately 28,000 ballots. Arapahoe County also employed a technique of projecting Ballot Now's resolution screen for discussion by the Resolution Board.

In December 2002, Hart InterCivic provided services for the City of Longmont Special Municipal election, which was a mail election. This was a complete election services contract, with Hart InterCivic performing all ballot related activities including coordinating mail house vendor participation. A total of 48, 769 ballots were mailed out, with 7,673 returned. Results were available just over one hour after the polls closed.

(8) Include actual samples of absentee/mail/provisional ballots generated from your system. These samples should include ballots of various sizes and colors.

Hart InterCivic Response

We present samples of ballots printed by Ballot Now as *Attachment 3: Ballot Now Ballot Samples.*

(9) Describe all options for printing ballots generated by your system. Can they be generated by third party vendors, printed "on-demand", printed on-site, etc.?

Hart InterCivic Response

Ballots are printed on demand or sent in electronic format to commercial printers and mailed to voters in standard sized envelopes according to the requirements of the voting jurisdiction. Ballot Now can print on-demand, on-site, using commercial, off-the-shelf printers. A key advantage of the Ballot Now application, however, is that ballots do not have to have the precise registration typical of older generation optical scanning systems. Therefore, there is no need to employ costly pre-printed ballot templates.

The competitors' "on-demand" systems require ballots to be preprinted for specific precincts or ballot styles. This means that County election officials must forecast and manage the inventory of ballots for requirements that are difficult to anticipate. Other ballot on-demand systems require special stock with preprinted "ovals" or other target marks which may or may not conform to particular ballot requirements; this is typical of traditional optical scan systems. Ballot Now ballots require no pre-formatting, and can be printed directly on blank Colorado certified ballot stock.

Ballot Now can also export .PDF files for delivery to commercial printers for volume printing. Returned mailed ballots are processed using commercially available scanners. For Boulder County, we are recommending Kodaks i380 high-speed document scanner. Processing includes scanning of the ballots, extraction of cast vote data, and delivery of Cast Vote Records (CVRs) on the same elections MBBs to the Tally application for tallying.

(10) Describe how the optical scan type ballot system would be integrated if its use were to become necessary.

Hart InterCivic Response

Ballot Now ballots can be distributed by mail or at a polling place. When a voter finishes casting his/her vote, the ballots are returned and processed. As described

previously, the cast votes are then tabulated in a process that is fully integrated with votes cast on the eSlate DRE System.

If the question is asking how an optical scan system from another vendor will be integrated in the event that becomes necessary, the eSlate System can also accommodate this possibility. Integration with a third party optical scan system, if necessary, would occur at the point cast votes are tabulated and reported. Hart would work with the vendor to establish a standard output file format from their system and then use it to import the data into a consolidated, comprehensive report. The eSlate System's Fusion utility was designed to facilitate this kind of integration.

Hart InterCivic has substantial experience in such integration. This expertise has been demonstrated in several recent applications:

- In Harris County (Houston), Texas, the Hart InterCivic team installed a completely new PC based network election management system using Citrix metaframe driving thin-clients, fully integrated with the eSlate Electronic Voting System, to provide county election officials with a seamless process for early voting in-person. The team also integrated cast vote data from the County's existing ES&S punch card system with the electronic totals from eSlate, and provided tabulation and reporting through eSlate's Tally software.
- In Tarrant County (Fort Worth), Texas, the Hart InterCivic team integrated the eSlate System with a county-developed, mainframe voter registration system, and provided consolidated cumulative and final reports integrating results from the County's (ES&S) Optech Eagle Optical Scan system used on Election Day with Early Voting results cast on eSlate.
- In Travis County (Austin), Texas, election results from two different election vendors (Global's AccuVote touch screen system and ES&S' optical scan system) were merged by Hart InterCivic's technical team into eSlate's Tally tabulation and reporting software to provide consolidated totals.