L.A. COUNTY + IDEO

Deliverable 5.1.4
In-process Hardware Prototypes
VOTING PRINCIPLES

Relevant for Hardware Prototype 5.1.4

3 The voting system must be flexible.

• The BMD should be suitable for deployment in a variety of venues, including both precinct polling places and larger vote centers.
• The BMD should use modular subassemblies that can be replaced or upgraded without large system changes.

9 The voting system should be easy and reliable for election workers to use, set-up, breakdown, and explain.

• BMD set-up and breakdown should be fast, reliable and feasible for the crew that will perform the tasks.
• The BMD should make pollworkers confident so that they may readily guide voters or explain the system to them.

10 The voting system must be portable.

• The BMD should be small and light enough to be transported from EOC to the polling place and back.
• The BMD should be light enough for pollworkers to set it up.
• The BMD should be compact for efficient storage.
• Hand grips, handles, straps and wheels should be incorporated to assist in maneuvering the packed BMD.

11 The voting system must include features for safe and secure storage.

• Appropriate locks and security seals should protect the BMD and ballots through all the various states of custody.
GOALS

Goals for Hardware Prototype 5.1.4 in User Evaluation Session

1. Identify a preference for one of two candidate approaches to BMD set-up: (1) a more all-in-one stored unit that is larger and heavier to transport but has fewer separate pieces to assemble versus (2) a more separable design that breaks into multiple smaller pieces for convenient transport at the expense of set-up complexity. Two prototypes were fabricated to test the tension between conflicting requirements: ease of transport in a passenger car versus simplicity of set-up.

2. Understand the desired access to critical components at EOC, such as the ethernet and power jacks, the display and the paper path. Clarify when and how these points are to be accessed.

3. Gain insight into what motivates pollworkers, and into what design attributes make them confident in managing and explaining the system.

4. Observe the varied storage, transport and polling environments in which the BMD will need to be robust and functional.

5. Collect stories and advice from operational experts: EOC staff, pollworkers, and trainers.
**CHANGES FROM PROTOTYPE 5.1.3**

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<table>
<thead>
<tr>
<th>Prototype</th>
<th>5.1.3</th>
<th>5.1.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper Path</td>
<td>Sidecar approach, with two variations</td>
<td>Single variation of the sidecar approach</td>
</tr>
<tr>
<td>Tactile Controller</td>
<td>Hangs on the privacy shroud</td>
<td>Two variations: one hangs on privacy shield and the other is held to the &quot;crossbar&quot; with velcro</td>
</tr>
<tr>
<td>Privacy Shroud</td>
<td>Tall vertical left, back, and right side walls</td>
<td>Two variations: one with short vertical fabric walls on the sides and back, the other with larger felt panels on the sides and top</td>
</tr>
<tr>
<td>Packed Configuration</td>
<td>Not yet designed</td>
<td>Two variations: one with an all-in-one package and the other split into three smaller/lighter pieces for transport</td>
</tr>
<tr>
<td>Set-up Method</td>
<td>Not yet designed</td>
<td>Two variations: a simpler method (with larger/heavier package) and a more complex method (with more, smaller packages)</td>
</tr>
<tr>
<td>Appearance</td>
<td>Privacy shroud and stand not yet designed</td>
<td>Two variations: light an minimal partition on a &quot;sawhorse&quot; and a more substantial iconic &quot;speaker&quot; form</td>
</tr>
</tbody>
</table>
BMD PROTOTYPES

Overview of Prototypes

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“SAWHORSE” PROTOTYPE
Overview of features

1. 15.6” hinged display mockup
2. Keypad controller and headphones hang on crossbar
3. Ballot insertion slot with runway to guide paper in
4. Privacy Screen
5. User-facing I/O jacks
6. Power and ethernet jacks
7. Legs
8. Crossbar (stores legs, end bars and privacy screen when not in use)
9. End bars (protect unit if toppled)
10. Integrated ballot box
BMD packs into three pieces: crossbar tube (legs, end bars, and privacy screen inside), ballot box, and suitcase. Suitcase contains main electronics unit, headphones, keypad, and power supply. Power and ethernet ports are accessible through a cutout in the suitcase.
“SAWHORSE” PROTOTYPE

Views with Voter

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“SAWHORSE” PROTOTYPE

Preliminary Rendering

Los Angeles County +IDEO April 29, 2015
“SAWHORSE” PROTOTYPE

Draft Set-Up Instructions

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“SPEAKER” PROTOTYPE

Overview of features

1. 15.6” hinged display mockup
2. Keypad controller and headphones hang in holster from privacy screen
3. Ballot insertion slot with runway to guide paper in
4. Privacy Screen
5. User-facing I/O jacks
6. Power and ethernet jacks
7. Folding legs
8. Structural “bucket” holds core electronics (different positions for voting and storage) and positions privacy screen
9. Integrated ballot box
All components of the BMD pack into a single container. The main electronics unit comes out of the bucket and is placed back in a different orientation.

There is only one package to transport per BMD, but it is bigger and heavier than the components that make up the Sawhorse concept.
“SPEAKER” PROTOTYPE
Views with Voter
Los Angeles County +IDEO April 29, 2015
“SPEAKER” PROTOTYPE

Preliminary Rendering

Los Angeles County +IDEO April 29, 2015
“SPEAKER” PROTOTYPE

Draft Set-Up Instructions

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NEXT STEPS

• High level conclusions from the research sessions with EOC staff, pollworkers and trainers are communicated in separate research report documents.
• Based on the unanimous feedback during the sessions, proceed with a design that is more “all in one” like the Speaker concept rather than multi-part like the Sawhorse concept, even if doing so makes the stored and transported unit larger and heavier than might be possible with more separate pieces.
• Where possible, pursue opportunities to make the stored BMD lighter for the benefit of pollworkers who will be setting up the device. However, do not constrain the design to pack multiple units into the trunk of a passenger car as the BMD is unlikely to be delivered by inspectors in the future.
• In the next iteration of a Speaker-like unit, ensure that the power and ethernet ports as well as the display and paper path are readily accessed on the (future) racks at EOC.
• Implement a method of communicating status while on the racks at EOC (e.g. loading, on, off, error) using, perhaps, a series of multi-color LEDs.
• Add handles, wheels and carry straps to make the units easier to transport.
• Make units stack and nest well when they are packed in a case.
• Consider the palletization strategy.