

# Voting System Event Log Contents and Semantics

Paul T. Cotton, Andrea L. Mascher, and Douglas W. Jones



Department of Computer Science  
The University of Iowa



NIST Workshop on a Common Data Format for Electronic Voting Systems  
October 2009 - Gaithersburg, Maryland, USA

# Outline

- Scope?
- Purpose?
- Research
- Q & A

# What's the scope?

- No secret ballot rights in UK
- Election administration varies amongst states and sometimes by local jurisdictions
- What should be the “default”: the most liberal or most conservative standards?

# What's the purpose?

- A record of system events? (deployed systems)
- A digital analog to paper ballot hand recount? (Cordero & Wagner, 2008)
- A post-election forensic tool? (security researchers)

# Problem: Sarasota CD 13 (2006)

- 14% undervote rate, still no conclusive explanations
- Compliance with VVSG event log standards is insufficient.

U.S. REPRESENTATIVE IN CONGRESS 13TH CONGRESSIONAL DISTRICT (Vote for One)		
Vern Buchanan	REP	<input type="checkbox"/>
Christine Jennings	DEM	<input type="checkbox"/>
STATE GOVERNOR AND LIEUTENANT GOVERNOR (Vote for One)		
Charlie Crist	REP	<input type="checkbox"/>
Jeff Kottkamp		
Jim Davis	DEM	<input type="checkbox"/>
Baryl L. Jones		
Max Linn	REP	<input type="checkbox"/>
Tom Macklin		<input type="checkbox"/>
Richard Paul Dembinsky	NPA	<input type="checkbox"/>
Dr. Joe Smith		<input type="checkbox"/>
John Wayne Smith	NPA	<input type="checkbox"/>
James J. Kearney		<input type="checkbox"/>
Karl C.C. Behn	NPA	<input type="checkbox"/>
Carol Castagnero		<input type="checkbox"/>
Write-In		<input type="checkbox"/>

Previous Page	Page 2 of 21 Public Count: 0	Next Page
---------------	---------------------------------	-----------

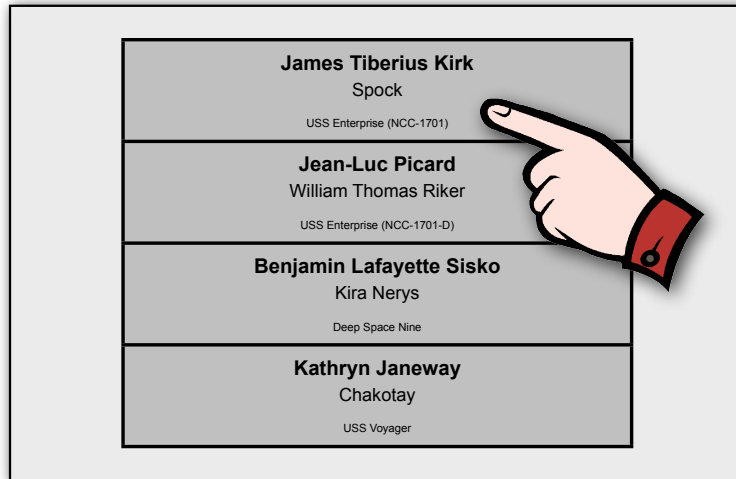
# Researching a Solution

- Improving Voting System Event Logs (Mascher, et al. 2009)
  - Investigated what user interaction events can be logged while preserving anonymity
  - Simulated common user interface problems
  - User study in progress

# Relative Touch Coordinates

- Relative to upper left of selected button
- Button ID not recorded
  - Preserves voter anonymity
- Conforms to VVSG
- Assists in forensic auditing

## VOTER A

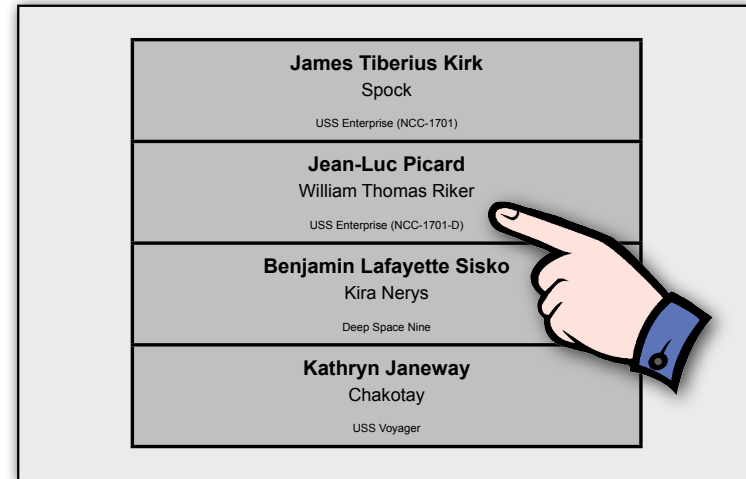


```
<INITIALIZE>  
<STYLE> United Federation of Planets </STYLE>  
</INITIALIZE>
```

```
<UPDATE> 00:00:00.1337 </UPDATE>
```

```
<MOUSE-DOWN>  
<TIME> 00:00:09.7678 </TIME>  
<X-COORD> 257 </X-COORD>  
<Y-COORD> 049 </Y-COORD>  
</MOUSE-DOWN>
```

## VOTER B



```
<INITIALIZE>  
<STYLE> United Federation of Planets </STYLE>  
</INITIALIZE>
```

```
<UPDATE> 00:00:00.1337 </UPDATE>
```

```
<MOUSE-DOWN>  
<TIME> 00:00:09.7678 </TIME>  
<X-COORD> 257 </X-COORD>  
<Y-COORD> 049 </Y-COORD>  
</MOUSE-DOWN>
```



# Results

- Predicts direction and magnitude of miscalibration
- Potential uses:
  - Real-time diagnostic tool
  - Post-election investigation evidence

# Conclusion

Further discussion and work is required to make a common data format an implementable reality

# Acknowledgments

This work was supported, in part, by NSF Grant no. CNS- 05243: A Center for Correct, Usable, Reliable, Auditable, and Transparent Elections (ACCURATE)

# Thank you!

Questions?