1. How long does it take to enter and retrieve destinations using the Ali-Scout?
2. How does the Ali-Scout compare with other navigation systems?
3. How does performance vary as a function of driver age and sex, ambient illumination (dusk vs. night), and interface type (real vs. simulated)?
4. What kinds of problems do drivers encounter and how can they be corrected?
5. How accurate are subjects in looking up coordinates in the manual?

2. METHOD

<table>
<thead>
<tr>
<th># of Subjects</th>
<th># of Trials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task</td>
<td>Real Ali-Scout</td>
</tr>
<tr>
<td>Retrieve destination from unit's memory</td>
<td>Dusk</td>
</tr>
<tr>
<td>Enter new destination</td>
<td>5</td>
</tr>
</tbody>
</table>

**Task #1**

Retrieve destination from memory

- Retrieve "MAIN THEATER"

Scroll through list

Type characters

\[ \begin{array}{cccc}
    \text{A1} & \text{B2} & \text{C3} & \text{D4} \\
    \text{L} & \text{M} & \text{N} & \text{O} \\
\end{array} \]

\[ \text{MA...........} \]

(Subject has begun typing "MAIN")

\[ \text{MAIN THEATER?} \]

(Once the "I" is typed, the rest of the name appears)

**Task #2**

Enter new destination into memory

- Enter "KROGERS" with coordinates (0832250W, 422908N)

Type characters

\[ \begin{array}{cccc}
    \text{A1} & \text{B2} & \text{C3} & \text{D4} \\
    \text{L} & \text{M} & \text{N} & \text{O} \\
\end{array} \]

\[ \text{KROGERS......} \]

(Subject has typed the destination name)

\[ \text{KROGERS 0832250W 422908N} \]

(Subject has typed the coordinates)
3 RESULTS

Distribution of trial times for each of the two tasks

- **Destination Retrieval**
  - Median = 6.23 s
  - Mean = 10.48 s

- **Destination Entry**
  - Median = 51.48 s
  - Mean = 64.68 s

Effect of Age and Sex on Performance

- **Destination Retrieval**
  - Young
  - Middle
  - Older
  - Men
  - Women
  - p(Age)<.0001
  - p(Sex)=.0055
  - p(AxS)=.0388

- **Destination Entry**
  - Young
  - Middle
  - Older
  - Men
  - Women
  - p(Age)<.0001
  - p(Sex)<.0001
  - p(AxS)=.0948

Effect of Condition (Night/Dusk/Simulated) on Performance

- **Destination Retrieval**
  - Night
  - Dusk
  - Sim
  - p(Dsk/Nt)=.3917
  - p(Dsk/Sim)<.0001
  - p(Nt/Sim)=.0087

- **Destination Entry**
  - Night
  - Dusk
  - Sim
  - p(Age)<.0001
  - p(Dsk/Sim)<.0001
  - p(Nt/Sim)=.0316

4 CONCLUSIONS

- Destination entry typically took subjects almost 60 s excluding coordinate lookup time (30 to over 60 s), while retrieval typically took under 10 s.

- Entry and retrieval times were significantly longer for older vs. younger subjects and women vs. men.

- Entry and retrieval times were significantly longer for night-condition vs. dusk-condition trials and simulated-interface vs. real-interface trials.

- The Ali-Scout keys are too small, too close together, and do not provide enough positive feedback when pressed. Some labels should be improved.

- The shifting and spacing functions are confusing.

- The results raise major concerns regarding the usability of any on-road navigation system that relies upon longitude and latitude for destination ID.