Young Innovators Challenge

Smart Tire

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Mission Statement

- To create a next generation tire that can gather and interpret real time information, in order to create safer roadways.
## Concept Selection Matrix

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Design Concept Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weights</td>
</tr>
<tr>
<td>1 Energy Efficient</td>
<td>8</td>
</tr>
<tr>
<td>2 Low Cost</td>
<td>9</td>
</tr>
<tr>
<td>3 Safer Travel</td>
<td>10</td>
</tr>
<tr>
<td>4 Easily Operable</td>
<td>8</td>
</tr>
<tr>
<td>5 Weather Reliable</td>
<td>7</td>
</tr>
<tr>
<td>6 Appeals to Driver</td>
<td>9</td>
</tr>
<tr>
<td>7 Operable by Everybody</td>
<td>6</td>
</tr>
</tbody>
</table>

### Total Score

<table>
<thead>
<tr>
<th>Ranking</th>
<th>FIRST</th>
<th>SECOND</th>
<th>THIRD</th>
<th>FOURTH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>y=yes</td>
<td>0 means neutral</td>
<td>n=no</td>
<td></td>
</tr>
</tbody>
</table>

### Weight Scale (1-10, 10 = most important)

- **Design Concept Number:**
  - 1: SmartTire
  - 2: Solar Car
  - 3: Speed Limit Restrictor
  - 4: Pedal Power Car
After reviewing the design process, we came to the conclusion that the Smart Tire would be the best out of our 4 ideas to meet the customers needs as well as the steps of the design process.
Benchmarking

- Sunpro Universal TPMS Kit
  - External Monitor
  - 7 year battery life
  - Transmit every 30 seconds
  - ±1 PSI
  - $201.26
  - Need to install yourself

- CycleAT
  - For bicycles and motorcycles
  - Bluetooth enabled
  - Outside the tire (prone to damage)
Sustainability Statistics

- 20% under-inflation can reduce tire life by 30%
- 20% under-inflation can increase tire wear by 25%
- 20% under-inflation can reduce fuel economy by 3%
Customer Need’s

- An affordable/long-lasting tire.
- The tire is reliable in all weather conditions.
- To know the condition of the tires as well as the road conditions at all times.
  - Effectively making the car safer.
Target Specifications

- Read and relay real time data from the road to your smart phone.
- Conditions that will be measured:
  - Low tire pressure (as well as other tire problems)
  - Road temperature
  - Lane swerving
  - Tire life (how worn the tread is)
House of Quality

A- Sunpro Universal TPMS Kit
B- CycleAT
Solid Works Rendering
Life Cycle Assessment

- **Input:** Energy
- **Output:**
  - Material Recovery: -6%
  - Energy Recovery: -5%

- **Tire/ Sensor Distribution:** 1%
- **Material Production:** 15%
- **End-of-Life Tire Collection:** 1%
- **Tire/ Sensor Use:** 94%
Work Cited

- www.smarttire.com/products
- www.michelinman.com