Group Discussion

Requirements for Attitude Determination and Control System of university satellites

October 22th 2016,
The 4th UNISEC–Global Meeting, Varna, Bulgaria
University satellites

- Mostly built by students
- Educational process is important as spacecraft’s mission
- Usually represented by pico-, nano- and micro-satellites
- Low cost satellites
- Success of a satellite is measured by all functional subsystems (not only main missions)
Statistics related to university satellites

[Chart created on Wed Aug 10 2016 using data from M. Swartwout]

Source: Swartwout SSC16-XIII-1
Statistics related to university satellites

<table>
<thead>
<tr>
<th>Type of school</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>128</td>
</tr>
<tr>
<td>Flagships</td>
<td>38</td>
</tr>
<tr>
<td>Prolific independent</td>
<td>9</td>
</tr>
<tr>
<td>Other independent</td>
<td>81</td>
</tr>
</tbody>
</table>

74 of 128 schools produced only one mission

<table>
<thead>
<tr>
<th>Type of school</th>
<th>Failure rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flagships</td>
<td>25%</td>
</tr>
<tr>
<td>Prolific independent</td>
<td>40%</td>
</tr>
<tr>
<td>Other independent</td>
<td>65%</td>
</tr>
</tbody>
</table>

Source: Swartwout SSC16-XIII-1
Will be discussed

- Sensors for attitude determination
- Active/passive attitude control
- Configuration of ADCS and its accuracy for different mission types
- Flexibility of ADCS for onboard reprogramming and sensors calibration
- The place for self-developed ADCS for such kind of projects
- The possible role of UNISEC and its network for increasing efficiency of university satellite design
Expectations from the discussion

- Defining configurations of ADCS for different types of missions
- Ways of decreasing satellites failure rates for future satellites which are either going to be built by new teams or teams with limited experience (using ADCS example)