Figure 1: Reaction Sphere concept

Figure 2: Schematic representation of 8-pole rotor (left) and a 20 pole stator (right)

Figure 3: Laboratory prototype of a Reaction Sphere realized with a plastic stator (diameter 20 cm).
<table>
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<tr>
<th>Mission</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
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<tr>
<td>Telecom</td>
<td>Largest market</td>
<td>High entry barrier</td>
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<td>Not demanding the highest requirements</td>
<td>Lifetime</td>
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<td>Well-proven technologies</td>
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<td>Momentum bias as a control option</td>
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<td>EO</td>
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<td>Low microvibration</td>
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<tr>
<td>Science</td>
<td>Specific applications with adaptation of the requirements to the mission needs.</td>
<td>Extremely high performance</td>
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<td>Navigation</td>
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<td>Small satellites</td>
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<td>“Simple” AOCs</td>
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<td>In development</td>
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</tbody>
</table>

Figure 4: Mission trade-off

Figure 5. Computer view of the developed spherical rotor. The top part of the rotor is shown without covering shell for illustrative purposes.

Figure 6. Computer view of the bottom stator.
Figure 7: Reaction sphere actuator: on left schematic representation, on right magnetization pattern of the rotor

Figure 8: Rotor optimization, evolution of the d parameter

Figure 9: Control algorithm architecture
Figure 10: Test bench
Figure 11: Measured velocity profile

Figure 12: Rotor position
Figure 13: Rotation axis evolution