Group 7: Small satellites
launch systems and
services: needs,
availability, development
trends

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The “New Space’ business - a few examples of recent ventures from non-governmental players

Audi’s quatro Moon Rover 2015

Planet Labs EO 2013

"Rise in space junk could provoke armed conflict“, 2016

"Luxembourg, serious about mining asteroids, seeks investors“, 2017

"Croatia and "Swiss Space systems are to build a space port", 2015
(Croatia is a 4 Million people EU country)

Astrobotic’s Moon Lander project 2017

$1.2M per kilo to the Moon

space debris detection project by SSTL and CASTRA

#Laugh -- a 3D sculpture fabricated from a sound simulation of crowd-sourced laughter, to be set in space, Eyal Gever & NASA 2016
NANO AND MICROSATELLITE MARKET SIZE, BY APPLICATIONS, 2014-2019 ($MILLION)

<table>
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</thead>
<tbody>
<tr>
<td>Communication</td>
<td>100.2</td>
<td>127.7</td>
<td>155.5</td>
<td>177.8</td>
<td>193.8</td>
<td>206.8</td>
<td>15.6%</td>
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<tr>
<td>Earth Observation and Remote Sensing</td>
<td>81.1</td>
<td>132.3</td>
<td>206.6</td>
<td>301.5</td>
<td>422.7</td>
<td>555.8</td>
<td>47.0%</td>
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<tr>
<td>Scientific Research</td>
<td>202.7</td>
<td>261.0</td>
<td>323.3</td>
<td>379.2</td>
<td>425.2</td>
<td>455.2</td>
<td>17.6%</td>
</tr>
<tr>
<td>Biological Experiments</td>
<td>27.3</td>
<td>40.9</td>
<td>55.5</td>
<td>69.2</td>
<td>76.7</td>
<td>84.1</td>
<td>25.2%</td>
</tr>
<tr>
<td>Technology demonstration and verification</td>
<td>228.6</td>
<td>274.8</td>
<td>320.5</td>
<td>357.0</td>
<td>384.0</td>
<td>402.3</td>
<td>12.0%</td>
</tr>
<tr>
<td>Academic Training</td>
<td>31.9</td>
<td>44.8</td>
<td>60.7</td>
<td>78.5</td>
<td>96.1</td>
<td>106.1</td>
<td>27.2%</td>
</tr>
<tr>
<td>Reconnaissance</td>
<td>30.7</td>
<td>39.2</td>
<td>48.5</td>
<td>58.8</td>
<td>68.9</td>
<td>76.9</td>
<td>20.2%</td>
</tr>
<tr>
<td>Total</td>
<td>702.4</td>
<td>920.8</td>
<td>1170.7</td>
<td>1421.9</td>
<td>1667.4</td>
<td>1887.1</td>
<td>21.9%</td>
</tr>
</tbody>
</table>
Launch delays continued to reduce market potential and added to a growing backlog of satellites awaiting launch. Over 100 small satellites were impacted by 2016 launch delays. SpaceX’s Falcon 9 family delivered zero small satellites in 2016, SpaceWorks Enterprises Inc.
Fig 1  

(a) GO Launcher 2 Project [3];  
(b) Schematic trajectories;  
(c) 45-kg payload in the rocket head
Key elements of the MicroLaunch Vehicle,
Thales Alenia Space UK Ltd
The EU Framework Programme for Research and Innovation

HORIZON 2020

H2020 Programme

Rules of Contest

for the European Low-Cost Space Launch Prize
OBJECTIVES of the discussion

• Bring together people interested in new launcher systems
• Discuss the experience and needs for micro-nano-pico satellite launch services
• Outline a list of existing cube-sat launch service providers and share experience
• Form a possible network of people interested in launch system studies and development using state-of-the art technologies
• Discuss possible interest and capacity to cooperate towards the EU H2020 small launcher program prize competition
A journey of a thousand miles begins with a single step

千里之行，始于足下

(let us do it together)
OUTCOME of the discussion

• Participated: representatives of Argentina, Bulgaria, Costa Rica, Denmark, Italy, Lithuania, USA

• All agreed and shared opinion that having dedicated small satellite launcher systems is to be of high value and importance to the small-sat community, including commercialization

• There is a number of small sat launcher developments in different countries, still there is yet no much of actual service offering (TRL to low still)

• Among the most important needs for SSL are: time to flight, custom orbit selection, cost
OUTCOME of the discussion-2

Next steps:
- exchange additional information on the development status of the SSL initiatives worldwide and the possibilities to do some further feasibility studies on the topic, and even form a consortia for participation in the H2020 prize initiative
- create an informal network (e.g. on LinkedIn) to further collaborate and network on the topic, with the goal to establish a more long term interaction within the UNISEC framework

Anyone interested is welcome!