The AGILE mission development and operations: lesson learnt after 8 years in orbit

Paolo Sabatini – Heads of Projects
Content

- AGILE industrial team
- AGILE development
- AGILE key performances
- Lesson learnt
AGILE industrial team

RTI AGILE
Mission & System
Launch service
Integration & test
Operations

Payload

Satellite Platform

Structure & Thermal
Solar Panel
Launcher I/F

Former RHI

Ground Segment
Operations

Full Italian development
Large involvement of Small and Medium Enterprises
CGS role in AGILE

- Contractual Interface with ASI for the implementation phase (including launch services & operations)
- Mission system engineering and coordinator of the industrial team
- Design, development & integration of the satellite platform
- Integration, test and launch of the complete system, including the environmental test, functional test and launch campaign
- In orbit maintenance of the system and coordinator of the command and control operations of the satellite
The AGILE development

- Contract signature with ASI for the C/D phase of the mission in the year 2003
- Contribution of the Italian Scientific Institutes as part of the overall contract for the delivery of the instruments FMs.
- Contract based on the in-orbit delivery of the satellite
- Contractual lifetime: 2 years (!)
System characteristics

- Orbit: LEO, equatorial, 550km BoL
- Mass at launch: 350 kg
- Satellite dimensions: 1.7 x 2 x 0.8 m³
- Electrical Power: 200 W (average)
- Sun pointing, fixed solar panel
- Attitude knowledge: 1 arcmin
- On board autonomy of 3 days without contacts
- Gamma Ray Burst alert channel
- Ground Station in Malindi -> satellite visibility every orbit
- Quick scientific processing time
AGILE mission status

- Up to now, AGILE has performed more than 41,700 passages over the Malindi station.

- In the 8+ years of mission AGILE has delivered scientific data for more than 97% of the available mission time.

- The platform redundancies are still available so the system is still able to react to anomalies.

- The natural orbit decay and the behaviour of the satellite on-board systems show that the satellite can remain operative for at least another 1-2 years.
Fine sun pointing mode

Sun Angle and Payload Angle

<table>
<thead>
<tr>
<th>Time</th>
<th>P/L angle [°]</th>
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<tbody>
<tr>
<td>Media</td>
<td>0.32</td>
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<tr>
<td>Dev.Standard</td>
<td>0.2</td>
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Angular velocities body frame

Fine sun pointing mode

Angular velocity X
Angular velocity Y
Angular velocity Z

Time range: 4/3/2009 0:00:00.00 to 5/3/2009 0:00:00.00

Angular velocities in [deg/s]
Spinning mode

Nuovi guadagni - velocità di spinning 0.8 °/s
Conclusion - lesson learnt

- The AGILE mission is considered a big success for ASI and the Scientific Community.

- AGILE demonstrated the full feasibility of a scientific mission with limited budget (50 M€ including launch) and short development time.

- ESA has issued for the first time in 2012 the “Call for a Small Mission opportunity in ESA’s Science Programme” where the CHEOPS mission has been selected. This shows the growing interest of the European community to this kind of mission.

- The key factor of the AGILE success was the strong and proactive cooperation among all the involved actors (Agency, Industry, Scientific teams).

- The AGILE project has created many groups of specialists in different disciplines that represent a key asset for future missions.

- The success of VEGA facilitate the access to space for small missions.
Thank you for your attention!

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