

4<sup>TH</sup> IAA CONFERENCE ON UNIVERSITY SATELLITE MISSIONS AND CUBESAT WORKSHOP ROME, 4-7 DIC 2017

# THE UNISAT PLATFORM AND **GAUSS** TECHNOLOGY FOR YOUR CUBESAT

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- Early 1990: G.A.U.S.S. (Gruppo di Astrodinamica dell'Università degli studi La Sapienza) was established as a Laboratory of the School of Aerospace Engineering in La Sapienza Rome University. The purpose was to involve directly the students in the design and the manufacturing of University Microsatellites.
- Up to 2012: Six microsatellites have been developed and launched into orbit with Dnepr and Vega launch vehicles.
- 2012: Starting from the experience and the enthusiasm grown at the School of Aerospace Engineering, some professors, researchers and students decided to continue the tradition of the school in the private sector. The Italian limited liability company G.A.U.S.S. SrI (Group of Astrodynamics for the Use of Space Systems) was founded.
- 2013-2014: GAUSS Srl realized the innovated idea of an autonomous micro-platform able to launch nanosatellites as CubeSats. Since then, two micro-platforms, UniSat-5 and UniSat-6, have carried into space 12 nanosatellites.
- 2016 onwards: UniSat-7 micro-platform, with several CubeSats onboard, is under development.







# CubeSats and PocketQubes carried into Space by UniSat Missions



In less than two years UniSat-5 (2013) and UniSat-6 (2014) have carried into space 12 small satellites



PUCP-Sat (1U) iCube (1U) HumSat-D (1U)



QBScout (2,5P)







Eagle-1 (2,5P)



AntelSat (2U)



Lemur-1 (3U)



TigriSat (3U)



Wren (1P)

AeroCube-6 (two 1/2U)





#### GAUSS developed one of the first TubeSats ever launched



Tetonsys Innovative Designs









#### TuPOD Deployment from ISS on on January 16, 2017, at 10:50GMT



















- Several universities and research centers around the world have launched their satellites through the company's UniSat launching platforms, thus letting GAUSS being a small satellites launch provider.
- GAUSS as a launch broker can help you launch any kind of satellite, up to 40kg, using its releasing platform (UniSat) or deployers fixed to a launcher
- GAUSS products business is mainly related to the design and realization of micro-satellites, which are also intended as CubeSat, PocketQube and UniSat releasing platforms, and their subsystems.









We are the **only launch company** in the space industry that can provide services in the LEO orbits for **ANY** kind of **micro-**, **pico-satellites** and **nano-satellites** standards.







GAUSS can launch your satellite using:

- The ISS, via the KIBO module operated by JAMSS (Japan Manned Space Systems Corporation)
- Several launch vehicles reaching LEO orbits with two available configuration:
  - into GPOD Deployers fixed to the launcher
  - into UniSat Release Platform

## What's new?

# A Satellite as Launch Platform!!!

# Advantages of Using UniSats as Launch Platform



- Payloads (satellites) are no longer tied to the scheduled mission of the launch vehicle
- It is possible to be far from the clouds of satellites at the separation time
- It is possible to release the Payloads far from each other
- It is easier to recognize a CubeSat following the TLEs of UniSat
- More satellites of a constellation can be launched on the same cluster launch, but released at different times
- **Future goals for GAUSS:** to provide next UniSats with **propulsion** and **AOCS**

# Fixed payloads that have flown

You may fly your own experiment onboard the **UniSat** Platform!

## **UniSat Platform as IOD/IOV**

- Deorbiting devices
- Solar panels
- COTS cameras
- GAUSS' products







## UniSat-6: Satellite and Release Platform

- Cubic shape of 40cm side by side with a weight of 26 Kg including all payloads
- Structure: aluminium/carbon fiber panels and reinforcing bars





Several redundant electronic devices to guarantee the release of the CubeSats





UniSat-6: Mission Results as Launch Platform

- Used deployers: 2 PPODs from Tyvak and 1 GPOD from GAUSS
- Confirmation of the deployment 15 minutes after the release receiving the telemetry of UniSat-6 over Italy
- CubeSats were received around the world confirming their good health



Accelerometers:









UniSat-6: Mission Results as a Standalone Sat



UniSat-6 continued its mission testing

pictures and providing flight heritage

payloads, collecting data, taking

for GAUSS's products









It will be equipped with:

Deployer Systems (to be activated after 25 hours from the launch)

- 4 MRFODs (for PocketQubes release)
- 4 GPODs (total mass:12U CubeSats, compatible with 3U+)

#### **Optical Payloads**

- Wide angle camera
- Narrow angle camera (50m Res.)

#### Telecommunications

- S-Band 2.4GHz
- GAUSS newly-developed UHF Radios







Prices for **CubeSats**:



Only a few slots left!

Orbit:

launch@gaussteam.com

- SSO
- 500-600 km altitude (i=97°)
- LTAN 11 AM





**GAUSS** Products for Launch Services

- The GPOD, for CubeSats release (customizable on request)
- The **TuPOD**, for **TubeSats** Release
- The **MRFOD**, for **PocketQubes** Release



The **MRFOD** Deployer



## **GAUSS** Products for nano-satellites

- On Board Computer (OBC) : ABACUS and HERCULES
- Electrical Power Subsystem (EPS): **VOLTA**
- UHF Radios: GAUSS Radio UHF 2W and 5W, Dual **Radio configuration**
- UHF Radio for EGSE: Mini Ground Dongle UHF
- **Complete structures** for **nano-satellites**
- Automated Groundstations





















### What can GAUSS do for you?

### <u>Realization of a constellation of small satellites</u>

- Manufacturing & Rapid deployment into space of clusters of small satellites
- Provide services that were possible only with bigger sats
  - Territory monitoring (Agricolture, Environment, Fires, Natural Resources etc.)
  - Data Collection over large areas
  - **Critical Networks Monitoring** (Powerlines, TLC lines etc.)
  - Security



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