

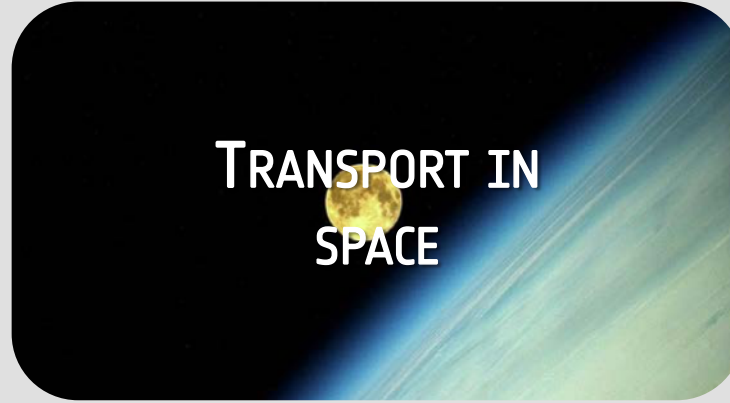


Space transportation

Φ-WEEK

ESRIN, 12 November 2018





Motto for *Space19+*:

Further cost reduction

in enabling affordable **autonomous Access to Space for Europe**

and more innovation

in enabling **Research & Technology** regarding the preparation for the future
in **new space transportation services**

Latest Earth Observation missions:

- **VS19 MetOp-C**, 6 November 2018
- **VV12 Aeolus**, 22 August 2018
- **VV09 Sentinel-2B**, 07 March 2017
- **VS14 Sentinel-1B**, 25 April 2016
- **VA224 MSG-4**, 15 July 2015
- **VV05 Sentinel-2A**, 23 June 2015
- **VS07 Sentinel-1A**, 03 April 2014
- **VV02 Proba-V**, 07 May 2013
- **VA207 MSG-3**, 05 July 2012
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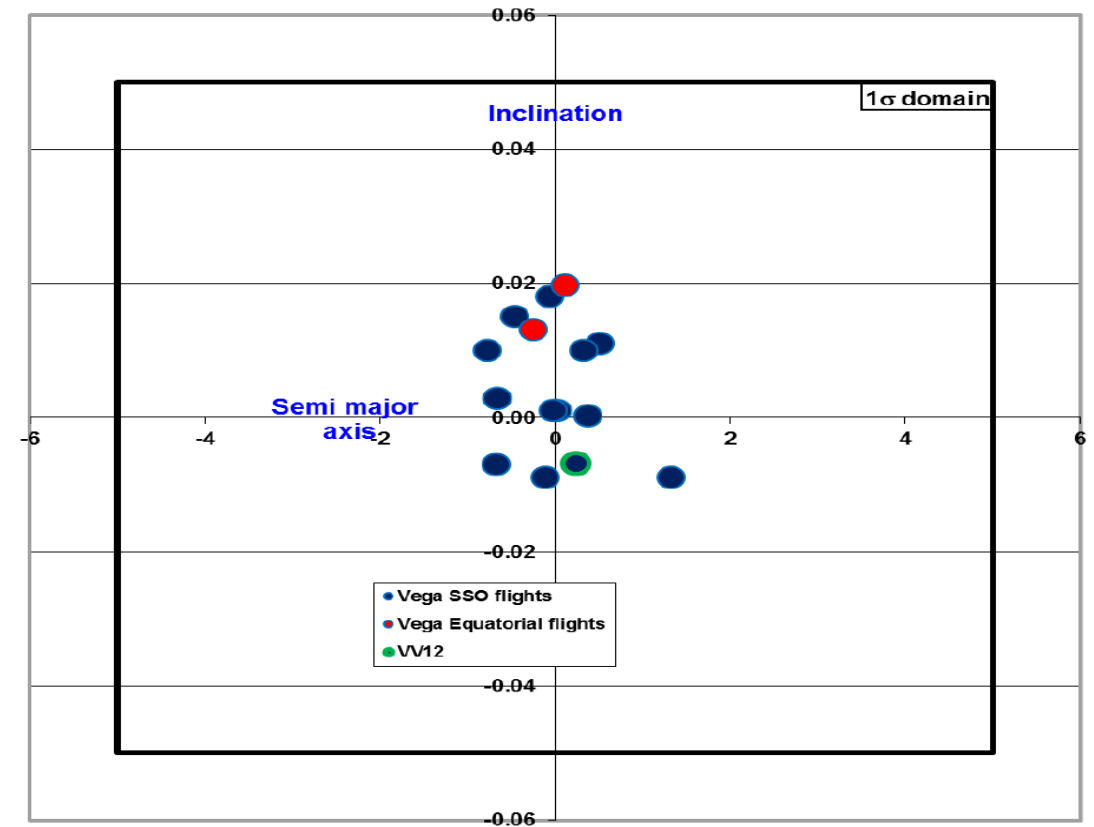
VV12 Aeolus, 22 August 2018

Parameters	Predicted	Customer Ranging (*)	Delta
Semi-major axis a (km)	6694.01	6694.26	0.252
Eccentricity	0.00085	0.00070	-0.00015
Inclination i (deg)	96.729	96.722	-0.007
PSO (deg)	207.254	207.386	0.132
RAAN (deg) <small>(wrt KRU mrd)</small>	2.789	2.778	-0.011

(*) Customer ranging backwards to 22:15:06 UTC separation time.

AEOLUS Parameters	Delta (Customer ranging-prediction)
Semi-major axis a	+0.05 σ
Eccentricity e	-0.38 σ
Inclination i	-0.14 σ

Vega injection accuracy



The **L**ight-sat **L**ow-cost **L**aunch opportunities Initiative's scope encompasses a set of activities required to define, develop and qualify the products, processes and organisations necessary to provide **timely, low-cost, standardised launch service solutions, based on Ariane 6 and Vega/Vega C launches, which are suited to the needs of satellites below 500 kg of mass.**

Main Activities

- Definition of a European standardised launch service for Light-Sats in full coordination between Ariane 6 and Vega/Vega
- Dedicated **“Proof-of-concept” flights** performed to demonstrate and validate standardised innovative processes and services



Year	Launch Opportunity
2019	• Vega SSMS PoC Flight (Rideshare)
2020	• Vega C SSMS PoC Flight (Rideshare)
2021	• Vega C SSMS Yearly Flight (Rideshare) • Vega C commercial flight with Spare capacity (Piggy back) • Ariane 6 MLS PoC Flight (Piggy back)
2022	• Vega C SSMS Yearly Flight (Rideshare) • Vega C commercial flight with Spare capacity (Piggy back) • Ariane 6 MLS (Piggy back)





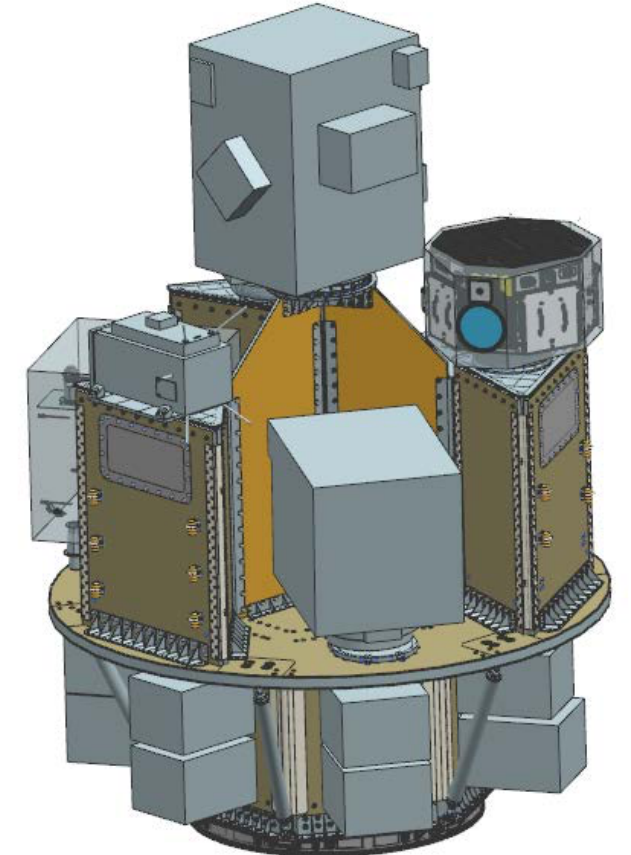
The first Proof of Concept flight in the frame of the L3 initiative is planned for **Mid 2019**.

The dedicated SSMS (Standardised Small Mission Service) adapter, integrated with an aggregate of small payloads, will be put on top of a Vega launcher.

The selection of payloads on this first flight started with a joint ESA EC AE Announcement of Opportunity issued in 2017, and was then finalized by the Vega Launch Service Provider Arianespace. It includes both Institutional and commercial customers.

The final payloads aggregate consists of:

- 7 nano-microsatellites (including 3 Institutional) +
- up to 12 deployers integrated in the Hexagonal Lower Module (HEXA) containing up to 42 CubeSats (among them 7 Institutional).



P120 C motor static firing test

Development model
successful test on July 16th

Qualification model
campaign ongoing
QM1 for Vega
QM2 for Ariane 6



Space Rider exploitation

Selection process of the mission customer(s)

- Qualification Flight
- Demonstrations missions:
 - ESA flight such as for microgravity
 - EC flight such as for In-Orbit Validation /In-Orbit Demonstration
 - Commercial flight such as pharmaceutical
 - Security/defense flight for third party such as testing of recon. instruments

Test different operators with regard to established High level principles

Space Rider Service Provider selection at CM'22



Enable the 4th dimension of Transportation



- Pillar of any **modern economy**
- Guarantee of **sovereignty**
- Opportunity for **new markets**



Thank you for your attention !

More info:

www.esa.int/Our_Activities/Space_Transportation

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