



CENTRE NATIONAL D'ÉTUDES SPATIALES



The Vega launcher

Operational Control Centre

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Vega Launcher is part of ESA family of launcher (i.e. Ariane 5 G, A5 ECA and Soyouz) targeted at preserving the Europe objectives of guaranteed access to space.

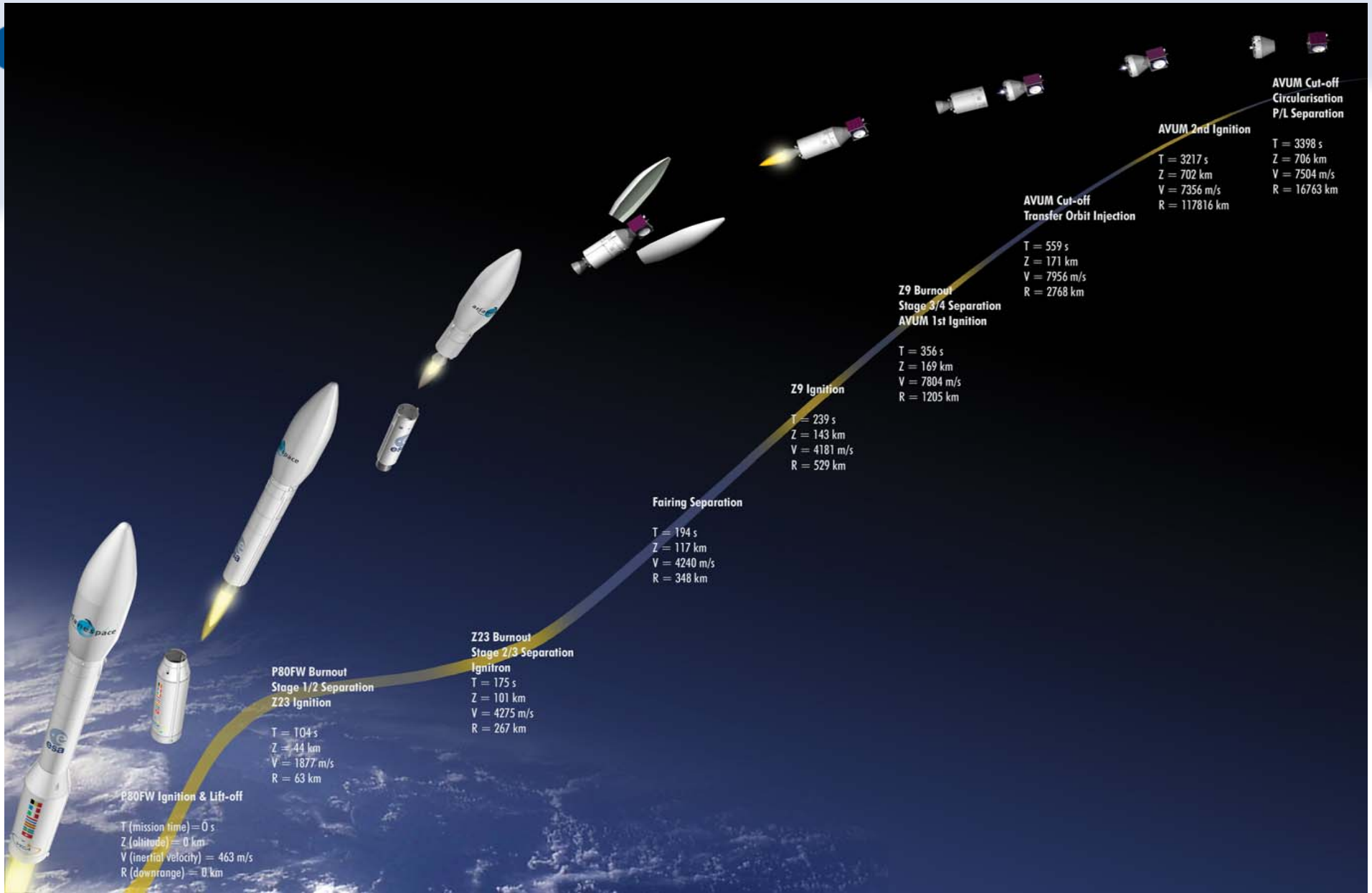
VEGA is a 3 solid stages + 1 liquid stage launcher designed to allow a wide range of LEO/SSO missions from equatorial to polar.

Total Payload mass: 1500 kg at 700km (max 2500kg) ⇔ Ariane G (6.6 T), Ariane ECA (10 T), Soyouz (3 T).

The Italian Space Agency (ASI) started pre-development work in early 1990's. Vega became officially an ESA Programme in June 1998.

ESA is the responsible of the programme (LV, P80 and GS) though an Integrated Programme Team (ESA, ASI, CNES) located in ESRIN (Frascati, Italy).





The Vega Ground Segment

The Vega GS will provide infrastructures, systems and means for assemblies transportation, storage, integration and verification, countdown operations, in-flight follow-up, post-flight analysis, revalidation, maintenance and off-campaign operations.

The infrastructures are located in the European Spaceport , Kourou, in French Guyana. This French Department is close to equator on the Atlantic coast of South America (latitude: 2° to 6° North / longitude: 50° West).

The Vega GS is re-using at maximum means, infrastructures, studies of Ariane. It is a low cost program. It represents ¼ of the total Vega investment. It includes state-of-the-art systems such as CCV, MI and FGSE.

The Vega GS is developed by ESA with an Italian Prime contractor (VCS) with a set of European subcontractors (I, S, B, Ne, F) and with the technical support of CNES.

The Vega GS will be ready by 2008

The VEGA GS MEANS

The mission shall be performed in safety conditions and high availability (0.89 at H0)



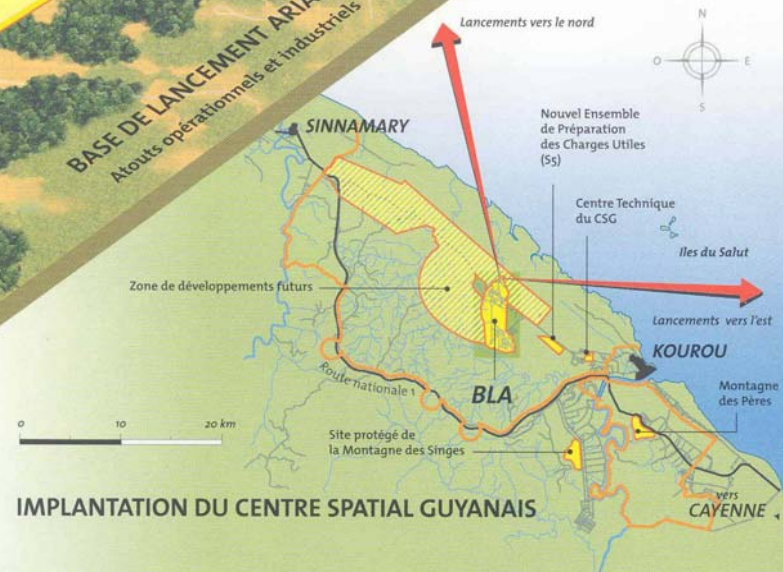


Atouts géographiques :

Une très large ouverture (-10,5°, 93,5°) sur l'océan Atlantique rend possible toutes les missions spatiales, des lancements aussi bien vers l'est (pour l'orbite géostationnaire) que vers le nord (pour l'orbite polaire) avec un minimum de risque pour la population et les biens alentours.

- La proximité avec l'équateur (5,3° nord) permet de bénéficier au maximum de l'effet de fronde.
- La faible densité de population, 170 000 habitants sur 91 000 km², fortement concentrée sur la bande côtière, permet une sécurité accrue des personnes et des biens. 95% de la superficie est occupée par la forêt amazonienne.
- L'absence de cyclone : Située entre les anticyclones subtropicaux des Açores et de Sainte-Hélène, la Guyane subit des vents modérés est/ouest atteignant rarement 15 à 20m/s.
- L'absence de tremblement de terre grâce à un plateau précambrien très fortement granitique met la Guyane à l'abri de mouvements sismiques.
- L'installation sur les collines environnantes de moyens de poursuite : radar et antennes de télémétrie qui permettent de suivre la trajectoire des lanceurs.

Le gouvernement français garde la responsabilité du CSG à travers le CNES et accorde à l'ESA un droit de contrôle sur la gestion technique et financière de la base. L'Agence Spatiale Européenne réalise et finance intégralement les installations nécessaires à la mise en œuvre des systèmes de lancement Ariane et les met à la disposition des industriels pour exploitation.







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Control Center VEGA

Control center Vega, located in French Guiana, is dedicated for :

- Stage's integration on the launch pad
- Launcher final assembly
- Final countdown till lift off





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Control Center VEGA

In order to do so the CVV should managed :

- the ground process
- the launcher.

Most of the operations done in Kourou on CVV are automatic. Human operators launch automatic procedures.





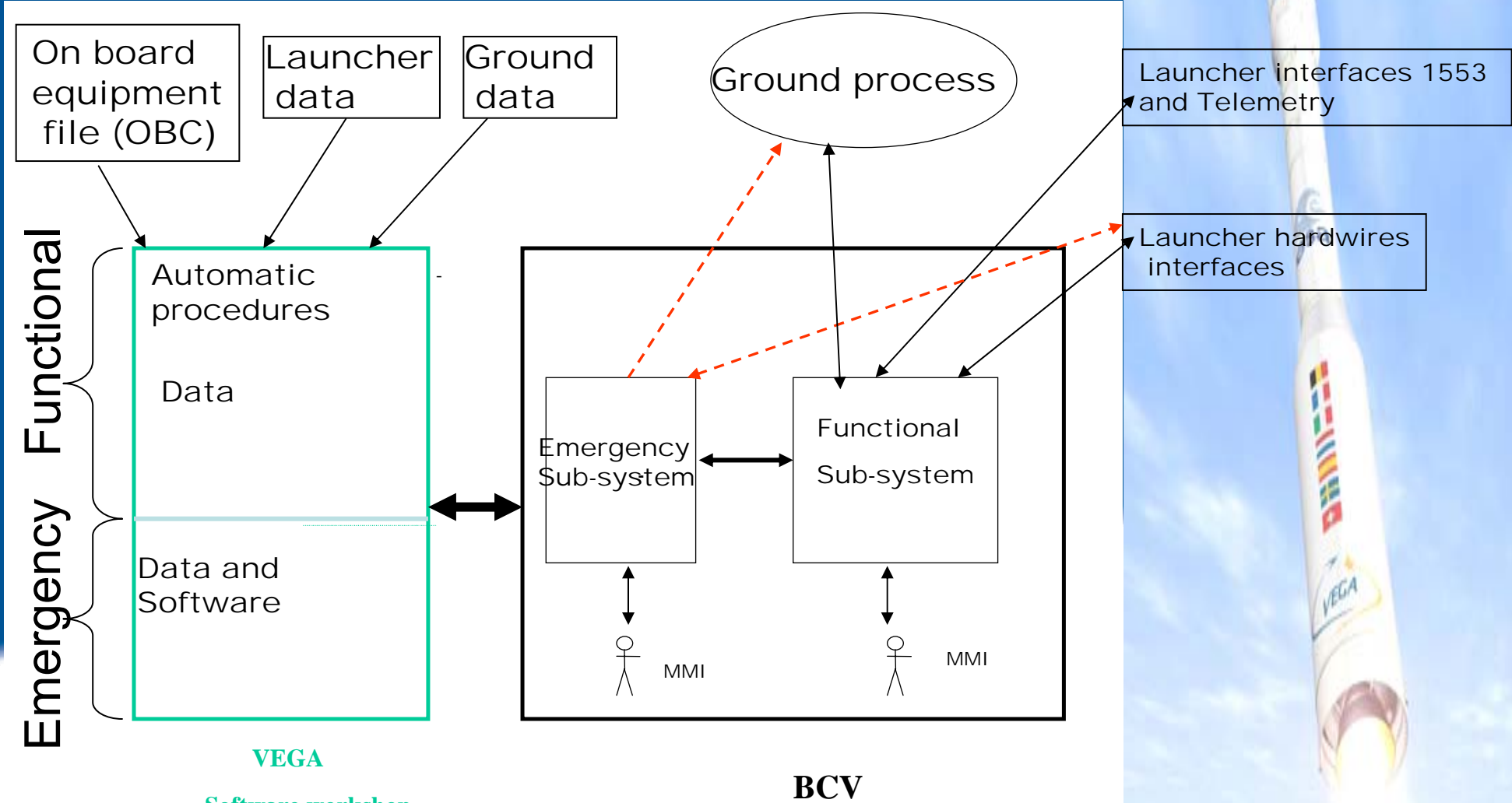
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The CVV is composed by three main sub-systems :

- Software work shop
- Functional control bench
- Emergency control bench





Launcher interfaces 1553 and Telemetry

Launcher hardwires interfaces



VEGA

Software workshop

BCV



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The software workshop is used for :

- Gathering the data coming from ground and launcher processes
- Specifying the automatic procedures in accordance with user manuals provided by the launcher and ground industrials
- Specifying mimics
- Coding of the automatic procedures
- Building the operational configurations
- Checking the coherency between each elements inside the operational configuration





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The functional sub-system is used for :

- **running the automatic procedures :**
 - » monitoring data
 - » links small operation procedures
 - » managed specified degraded mode

- **displaying mimics**
- **archiving data**
- **eventually sending manual commands**
- **post processing**





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Control Center VEGA

1553
Interface

Telemetry
interface

Ground and launcher
hardwires
inputs/outputs

On board
power supplies

Universal time
Countdown time

Supervision

Automatic
procedures

Project room
interfaces

Archiving

Post
Processing





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The emergency sub-system is used for :

- putting back in security :
 - » the ground process
 - » launcher

It is activated when the functional sub-system has self detected its own failure.

It is completely automatic.



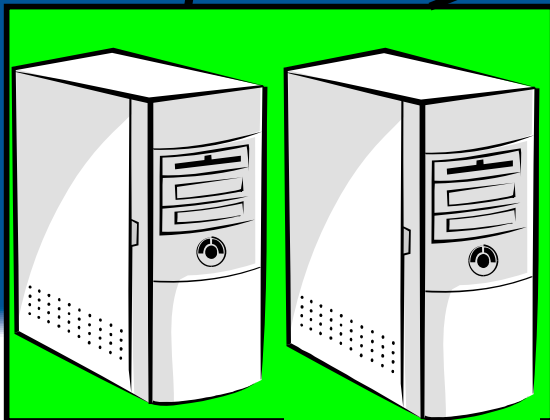


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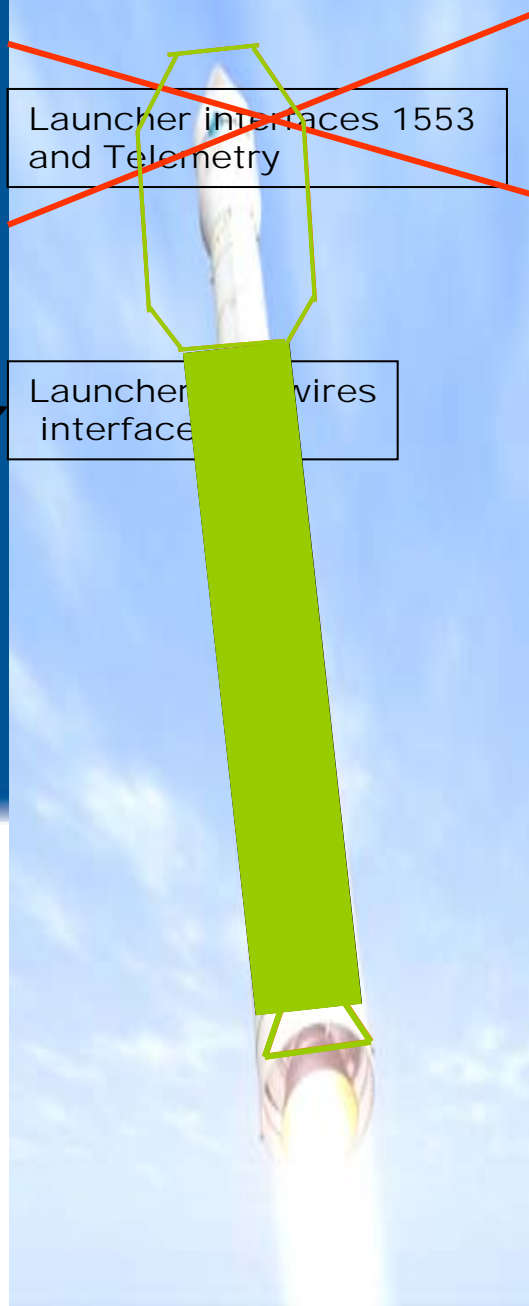
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Functional sub system



Emergency sub-system



Launcher interfaces 1553 and Telemetry

Launcher wires interface



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