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## RFI: Request For Information

### NESS+ Launch Service Requirements

	CNES Name, position, date, signature
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Confidentiality status	CNES confidential	Release restricted to:	public
			X

## RELEASE LIST

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## CHANGE RECORDS

Version	date	Justification of the update
1/0	03/04/2025	Initial release

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## 1. INTRODUCTION

This document defines the main requirements for the launch(es) of the two NESS+ 3U cubesats. The purpose is to collect information on the capabilities of various suppliers.

It comprises the main following activities:

- Launch services for the two NESS+ 3U cubesats
- Option for battery charging activity on the launch site

## 2. NESS+ OVERVIEW

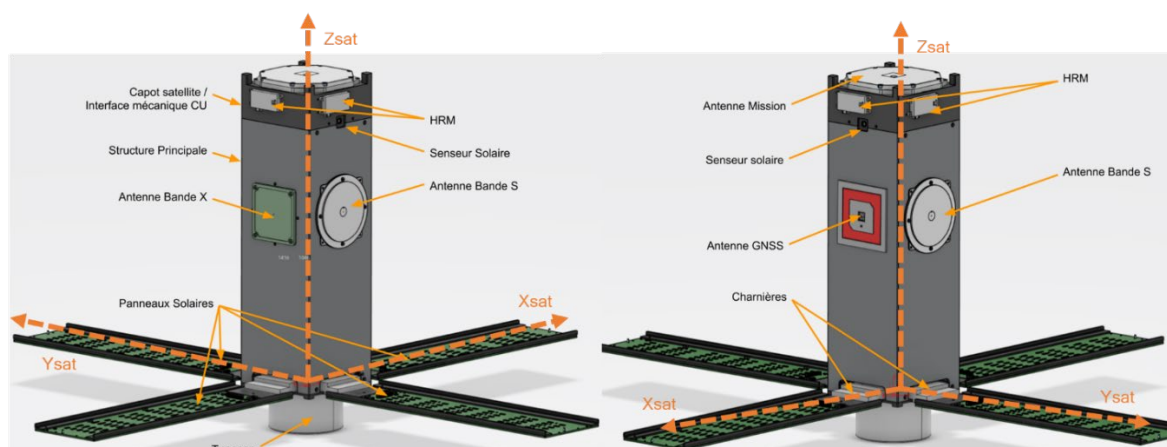
Beginning 2019, CNES decided to start the NESS (Nanosat 3U pour la Surveillance du Spectre civil) project with the goal to design and develop a demonstration system for monitoring radio-frequency civil spectrum use. The major challenges were the short planning and limited budget. The flight segment was based on a nanosat 3U with strong heritage from the EyE-Sat platform launched by Arianespace in December 2019 with the VS23 and a miniaturised prototype payload.

NESS was launched in October 2023 on the VV23 mission.

As for NESS, CNES is responsible for the NESS+ system and satellite development and launch contract. CNES is also in charge of flight operations.

U-Space is the prime contractor for the platform development and the satellite AIT/AIV.

The NESS+ cubesats will continue the technology demonstration to analyse interfering emissions observed from orbit and to evaluate measurement technologies enabling the detection and localization of transmitters in the L and S bands.



*NESS+ overview*

### 3. NESS+ DEVELOPMENT

<i>Milestone</i>	<i>Target date</i>	<i>Achievement</i>
KO	September 2024	
NESS+ PDR	May 2025	
NESS+ CDR	Sept 2025	
NESS+ AIT start	April 2026	
NESS+ ready for launch	1 <sup>st</sup> semester 2027	

### 4. CUBESAT DEPLOYER

For technical reasons, the NESS+ project has selected the Astrofein PSL-P 12U cubesat deployer.

The Launch Services provider will procure an Astrofein PSL-P 12U flight deployer of which one or two seats per launch (depending of the launch service definition) will be dedicated for the launch of the NESS 3U cubesats.

### 5. NESS+ SATELLITE TECHNICAL CHARACTERISTICS

The main technical characteristics of the identical NESS+ cubesats are provided in the following table.

Item	Specification
Name	NESS+
Country of operator/owner	FRANCE
Planned launch(es) date	1 <sup>st</sup> semester 2027
Satellite Platform	3U cubesat – 2 identical satellites
Launch window	No constraints
Flight lifetime	1 year
Attitude control	3 axis
Satellite - launcher interfaces	Astrofein PSL-P 12U deployer
Orbit	SSO or with an inclination close to 90 deg
Official orbit delivery to customer	The final definition of the orbit should be delivered to CNES 1 month before satellites shipment to launch supplier
Altitude [km]	$550 \text{ km} \leq Z \leq 700 \text{ km}$
Inclination [degree]	SSO (associated with altitude)
Argument of Perigee [degree]	No constraints
Eccentricity	$\leq 0.0015$
Launch Mass [Kg]	$SC \leq 6 \text{ kg}$ (without deployer)
Longitudinal modes frequencies	$F \geq 115 \text{ Hz}$
Lateral modes frequencies	$F \geq 115 \text{ Hz}$
Max. angular rate and delta velocity range	After separation $\leq 10^\circ/\text{s}$
Satellite status during launch	OFF, a separation detection circuit will switch on the satellite once separated
Temperature limits [°C]	$-10^\circ\text{C} \leq T \leq +40^\circ\text{C}$ on the launcher and up to separation time Same temperature range during satellite transportation / ground operations
On ground operation before launch	Battery charging Cleanliness : ISO8 class
Battery charging constraints	The delay between last charging battery on ground and satellite injection should be less than 8 weeks (TBC)
RF interface requirements	<p>Satellite RF frequencies :</p> <ul style="list-style-type: none"> <li>• S-band emitter / receiver</li> <li>• X-band emitter</li> <li>• GPS receiver</li> </ul> <p>Emitter &amp; receiver OFF on launch vehicle. S-Band emission will start with a programmable delay after separation between 0 and 60 minutes. X-band emission will be switched on during payload IOT (several hours after separation).</p>
Propellant [Y/N]	No
Power	<p>Battery: 6 COTS cells 18650</p> <p>Solar array: 4 deployable panels fixed on the structure and released after separation via thermal cutters.</p>

## 6. SCOPE AND PERIMETER

### 6.1. PERIMETER

The main tasks to be performed by the launch service provider will consist of:

- Standard launch services
- 2 launches or 1 launch with 2 different inclinations and/or LTANs
- Procurement of the Astrofein PSL-P 12U flight deployer(s): test and flight models
- Support to CNES for the final preparation of the NESS+ cubesats
- Support to CNES for the final mating of the NESS+ satellites into the flight deployer(s)
- Integration of the composite NESS+ cubesats + deployer(s) on the launch vehicle(s)
- Launch campaign management
- Optional launch services

These tasks are detailed in the following paragraphs.

### 6.2. LIST OF THE REQUESTED ACTIVITIES

The perimeter of the required activities includes:

- Standard launch services for one launch or two launches including the procurement of two 3U seats in an Astrofein PSL-P 12U deployer
- Coordination of the launch slot on-board the launch vehicle(s): launch opportunity determination, launcher configuration, launch period, ...
- Launch campaign planning and schedule management: report on the progress of the launch campaign activities, launch campaign schedule, launch date monitoring, ...
- Coordination of the schedule of the launcher interface activities (meetings, reviews, documentation, ...),
- Mission analysis and technical interface management, including flight environment specifications,
- Management of the compatibility analysis (mechanical, electrical, thermal, safety, ...) up to their final approval and delivery of the mission analysis reports issued in the frame of the PMAR and FMAR reviews (trajectory, separation, CLA, thermal, EMC),
- Management of the satellites and launch vehicles interfaces (IRD, ICD) up to their final approval,
- Logistic support for the satellites (and associated GSEs) and the NESS+ project personnel for travel/transportation to the NESS+ satellites to LV integration facilities,
- Fitchek between the NESS+ satellites and the deployer,
- Integration of the satellites inside the flight deployer(s) and of the satellite-deployer composite on the launch vehicle,
- Arrangement of security clearance of staff for integration facilities or other secured facilities used for the NESS+ satellites integration into the flight deployer(s),
- Organization and support of launch site activities: final deployer(s) checkout and flight preparation, integration of the deployer(s) containing the NESS+ cubesats onto the launch vehicle(s),
- Pre and Post-launch support related to the satellite tracking and orbital element identification,
- Return shipment of customer's GSE back from the launch site(s) (if needed).

### 6.3. OPTION: CUSTOMER ACTIVITIES ON LAUNCH SITE(S)

As an option, the launch services provider will offer the possibility to perform last preparation activities of the satellites on the launch site(s). These activities consist of:

- Verifications of the NESS+ cubesats status after transportation to the launch site(s)
- Last battery charging
- RBF removal

The associated requested tasks to the launch services provider are the following ones:

- Logistics support for travel, boarding and lodging of the customer team at the launch site
- Disposal of all facilities and means to execute the satellite operations from arrival to the launch site up to the launch vehicle combined operations (satellite and ground support equipment reception, satellite inspection, battery charging, final setting of launch configuration, ...)
- Organization and support during all phases of the launch campaign

### 6.4. DELIVERABLES

The technical part of the response and offer shall include at least:

- A description of the proposed services, launch site(s), describing the tasks included / excluded,
- Planning of the launch services activities (main milestones),
- Development plans of launcher(s), vehicle(s) and facilities,
- Applicable regulations to deorbit the satellites (if any), re-entry duration, ...
- The launch configuration(s), injection orbital parameters and proposed launch period(s),
- The technical information needed to assess the compliance to the NESS+ project needs:
  - Launch mission (mission analysis, orbital parameters, separation...)
  - Launcher or vehicles interface definitions (separation system, ground operations plan...)
  - Mechanical, thermal environment specifications, RF requirements, and other constraints,
  - Technical documentation (ICD, IRD),
  - Launchers or vehicles applicable user manuals

The financial part of the offer shall include the cost estimation for the whole launch services, with the details of:

- Standard launch services
- Specific services



## 7. SCHEDULE AND PROCEDURE

The response shall be sent by email, before April 25<sup>th</sup> 2025, to the following points of contact:

- Launcher Interface Manager : Gireg RANNOU, [gireg.rannou@cnes.fr](mailto:gireg.rannou@cnes.fr)
- Satellite Manager : Nicolas DOUMAS, [nicolas.doumas@cnes.fr](mailto:nicolas.doumas@cnes.fr)
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