SPECIAL TECHNICAL SPECIFICATIONS

SUPPLY OF TRANSPORTABLE AND COMPACT WIND LIDAR, AND ASSOCIATED SERVICES

	Name and Acronym	Date and Signature
Written by	**Constance PAQUET** DOA/BL/OB	24/01/2024 
Accepted by	**Laurent TESSARIOL** DOA/BL/OB	24/01/2024 
Application Authorised by	**Stéphane LOUVEL** DOA/BL	07/03/2024 

Applicability to Aerostatic Systems (check the relevant systems):

BSO	BPS	BLD	MIR	BLPB	AEC	TETHERED
X	**X**				**X**	**X**

Applicability to Projects (check the relevant projects):

NOSYCA	FIRBL	PILOT	EUSOBALLON	G3D	CIASI	BAMED	ATT	STR2	CHARMEX

Document managed in configuration: no	by:	starting from:

KEYWORDS:

LiDAR, meteorology, wind

CHANGES

Version	Date	Purpose
1	08/09/23	Original version
2	20/01/24	Update throughout the entire document
3	09/04/24	Addition of CSR standards

CONTENTS

1. PURPOSE

This document constitutes the Special Technical Specifications (CCTP) of the CNES contract for the supply of a wind LiDAR.

For its operational requirements, particularly during the countdown for a flight with a maximum duration of 6 hrs, CNES wishes to purchase a LiDAR type wind measuring instrument (force and direction), in addition to the tethered balloon currently used during each launch (fish-shaped) and the measurement tower (anemometer).
During this countdown and during the balloon release, CNES operational staff need to know, in near real time, the wind (force and direction) for altitudes between **0 and 500 m minimum, with at least one point every 5 m**.

The LiDAR is intended to be used operationally in France, but especially abroad (CANADA, SWEDEN, BRAZIL, SEYCHELLES, AUSTRALIA, etc.) at temperate, tropical, polar and equatorial latitudes during CNES balloon campaigns.

These campaigns last from 1 to 3 months on average. We conduct one campaign per year, but in some years, we can have two campaigns in the year in distant countries, for example in August in Canada then from October to December in the Seychelles.

The complete delivery must occur before the end of 2024, or in the first quarter of 2025 at the latest.

2. EXPLANATION OF TECHNICAL SPECIFICATIONS

Each specification is presented in a table.

The first cell in the line is the reference number for the specification, for example “5.1.1”

The second cell in the line indicates whether the specification is a requirement, **imperative (“IMP”)** or a specification, **desirable (empty cell)**:

- Requirement, imperative (“IMP”): The Supplier shall guarantee strict compliance with an imperative requirement. Failure to comply with an imperative requirement results in the tender being excluded from the rest of the assessment.
- Specification, desirable (empty cell): For a desirable specification, the indicated compliance value should be considered only the expected nominal value. A value below that desired by CNES results in a lower technical assessment level, but does not result in the tender being excluded. A tender may also exceed the expected nominal value and receive a higher technical assessment level.

The third cell gives a detailed description of the different specifications.

For all of the specifications, if a value or a technical explanation is specifically required in the tender, the fourth and final cell in the line is coloured yellow and must be completed by the candidate. The candidate shall directly edit the original modifiable French or English version of this document (.docx), and fill in the required information in French or in English. The edited document is submitted in their tender.

The information entered in the yellow cells is taken into consideration in the technical assessment of the tender.
If the response is too long to easily fit into the cell in the table, it is permissible to attach an additional document to the tender, and to refer to this in the cell in the table.

3. ABBREVIATIONS AND LIST OF TBC/TBD

Acronym	Definition
LiDAR	LIGHT DETECTION AND RANGING

4. USER AND DELIVERY SITES

The sites where the LiDAR will be installed and used are, approximately, the following:

- Kiruna/Esrange in Sweden, coordinates 67°53'38" North 21°06'25" East
- Mahé in the Seychelles, 4°40' South 55°28' East
- Palmas de Tocantins in Brazil, 10°11' South 48°20' West
- Alice Springs in Australia, 23°42' South 133°52' East
- Timmins (Ontario), in Canada, 48°28' North 81°19' West
- Aire-sur-l'Adour in France, 43°70' North 0°25' West.

This list is not exhaustive, and may change depending on requirements.

4.1		**General information**	
4.1.1	**IMP**	The procurement report shall be made in July 2024.	
4.1.2	**IMP**	Factory acceptance shall take place in July 2024, by 30 August 2024 at the latest.	
4.1.3	**IMP**	**On-site delivery** The location for delivery of the LiDAR and all equipment is on the CNES site in Aire-sur-l'Adour in the Landes department. The Supplier assumes responsibility for transport to the CNES site in Aire-sur-l'Adour in the Landes department	
4.1.4	**IMP**	**August 2024 site delivery deadline date** The radar and all equipment ordered shall be delivered on site in August 2024 at the latest	

5. EXTENT OF THE SUPPLIES

5.1		**List of contract items**	

	IMP	The items that can be ordered within the framework of this contract are the following: **Supply of a wind LiDAR** Supply of a **transportable** LiDAR **Associated services** Supply of suitable software Supply of a suitable transport crate (boat, aircraft, lorry) Training in the plant or on CNES site for multiple people (max 4) Maintenance package for the first year of use	
5.2		**Extent of the supplies**	
	IMP	The supply of a wind LiDAR shall include: a – Functional wind LiDAR b – Manufacturer's software: control, supervision and analysis c – On-site delivery in mainland France (Aire-sur-l'Adour) d – 1-year warranty, extended to minimum 2 years e – Technical documentation f – Set of first level spare parts g – Tool kit	

6. LIDAR: SPECIFICATIONS

6.1. GENERAL SPECIFICATIONS

6.1		**General specifications**	
6.1.1	**IMP**	Area of use in all latitudes and periods The equipment is intended to be used in temperate, polar, tropical and equatorial latitudes	
6.1.2	**IMP**	The system is used and usable abroad (at least in the countries referred to in paragraph 4 of this document) The system complies with all French and European, Canadian, Seychelles, Australian and Brazilian regulations.	
6.1.3	**IMP**	The assembly is designed to withstand a salt or saturated atmosphere (100% relative humidity)	
6.1.4	**IMP**	The assembly is designed to withstand outside temperatures from -50°C to +50°C	

6.1.5	**IMP**	The assembly can be installed at altitudes from 0 to 2000 m	
6.1.6	**IMP**	The assembly must be compact and transportable by sea and by air Provision must be made for crates to transport and protect the equipment during transport. Transport is generally by sea in containers, but in some years if there are two campaigns close together in time, transport may be by air	
6.1.7	**IMP**	The assembly shall comply with INTERNATIONAL standards relating to safety and transportation of dangerous goods in force for TRANSPORT BY SEA AND AIR	
6.1.8	**IMP**	The vertical range of the LiDAR shall be at least 500 m. As a result, perfect knowledge of the winds (force and direction from 0 m to 500 m)	
6.1.9	**IMP**	The vertical resolution shall be at least 1 measuring point every 5 m.	
06/01/2010	**IMP**	**Wind measurement** The wind speed must be expressed in m/s and have a precision <0.5 m/s. The wind direction must be expressed in degrees (0° to 360°) and have a precision <5°	

6.2. CONNECTIONS, TRANSMISSION

6.2		**General specifications**	
6.2.1	**IMP**	A wired **and** 4/5G or Wi-Fi solution shall be proposed for distribution of data to the display PC The distance between the workstation for displaying the processed images and the LiDAR will be from tens of metres to several kilometres.	
6.2.2	**IMP**	Electrical power supply and uninterruptible power supply suited to the LiDAR	

6.3. SOFTWARE AND COMPUTERS

6.3		**Control, supervision and display software**	
6.3.1	**IMP**	Software updates: For each LiDAR, the supply includes updating of the LiDAR software and firmware throughout the warranty period. This specification covers all of the software and firmware that may be updated on the LiDAR: manufacturer's supervision and control software, signal processor software, etc.	
6.3.2	**IMP**	**Manufacturer's control and supervision software: definition** This software makes it possible to: • Supervise the status of the LiDAR: orientation of the laser beams, transmission status, alarms and errors, etc. • Control the LiDAR: - adjustment of the position/orientation of the laser beams - start/stop transmission - adjustment of the transmission mode	

6.3.3	**IMP**	**Site computer** Supply of one or two computers on the site, running the manufacturer's control and supervision software, and a second if necessary for displaying and using the final images. The supply includes the corresponding licence. The computer is equipped with a screen and a keyboard/mouse, and can be used directly by the end user. If the architecture requires the use of a server and an independent client, the two computers are part of the supply, such that the system can be used directly by the end user. A desktop computer, a laptop computer or a server installed in an electrical rack equipped with a screen/keyboard are all acceptable.	

6.4. ELECTRICAL RACKS

6.4		Electrical racks	
6.4.1	**IMP**	Electrical power supply The LiDAR is powered by an electrical power supply compatible with the countries mentioned above, in particular the Seychelles and Sweden (far from CNES electrical facilities) and 230V/50Hz (CNES power enclosure)	
6.4.2		**Remotely controllable electrical switch** The electrical racks include a remotely controllable electrical switch, which allows remote electrical restarts of the entire LiDAR assembly or of some of its components. CNES intends to use this remotely controllable electrical switch only when the LiDAR does not respond to software commands, as a final attempt to return it to service remotely.	Remotely controllable electrical switch (yes/no): Devices that can be powered on/off individually Available command interfaces (web interface, cellular network):
6.4.3	**IMP**	**General emergency stop button** A general emergency stop button is available on the electrical racks, or in their immediate vicinity. It powers off the entire system: transmitter, receiver, signal processor, etc.	
6.4.4	**IMP**	**Earthing** The electrical racks are equipped with earthing connectors.	

6.5. WARRANTY

6.5		Warranty for the LiDAR	
6.5.1	**IMP**	Extent of the 2-year warranty The initial warranty is 1 year minimum	Specify the maximum possible warranty

6.6. TECHNICAL DOCUMENTATION

6.6		Technical documentation for the LiDAR	
6.6.1	**IMP**	**Language:** Technical documentation is provided in two languages: French and English Documentation provided only in English is only acceptable for very specific and in-depth subjects	
6.6.2	**IMP**	**Number of copies:** 2 paper copies are provided 1 digital copy is provided	

6.7. FIRST LEVEL SPARE PARTS

6.7		General specifications	
6.7.1	**IMP**	**Contents of the set of first level spare parts** The set of first level spare parts includes all consumables and small spare parts that may be required in the LiDAR's first two years of operation, for first level maintenance	

6.8. TOOL KIT

6.8		General specifications	
6.8.1	**IMP**	Contents of tool kit: maintenance The tool kit includes all the standard and specific tools, as well as accessories, required for maintenance of the LiDAR: • Screwdrivers and spanners suited to all screw heads used on the LiDAR • etc.	
6.8.2	**IMP**	Contents of tool kit: installation The tool kit includes all the specific additional tools, and accessories, required for installation of the LiDAR: • Levelling of support feet, etc.	

6.9. TRAINING

6.9		Basic training on CNES site or supplier's site	
6.9.1	**IMP**	**Language** Training is given in French Written documentation is in French	
6.9.2	**IMP**	**Number of trainees** 2 to 4 trainees take part in the training	
6.9.3	**IMP**	**Duration** The training shall last the time required for CNES agents to master the operation of the LiDAR.	
6.9.4	**IMP**	**Material organisation** The training is organised on the supplier's site or CNES site. The instructor is physically in attendance with the trainees. Training by video conferencing is not acceptable. The documentation is provided. CNES covers any expenses for travel, accommodation and meals for CNES agents being trained on the supplier's site. If the training takes place on a CNES site, CNES does not cover expenses for travel, accommodation and meals for the supplier's engineers or technicians.	

6.10. MAINTENANCE OF THE LIDAR

6.10		General specifications	
6.10.1	**IMP**	**LiDAR data availability rate** The availability rate for data output from the LiDAR shall be • at least 95% annually	
6.10.2	**IMP**	**Period of availability of spare parts** All spare parts required for the operation of the system are available for at least 10 years after final admission of the system	
6.10.3	**IMP**	**Maintenance package for one year for a LiDAR** The supplier provides a proposal for a maintenance package for a LiDAR, for a desired annual availability of 95%, as specified in 6.9.1, and indicates the response time (2 days is desired). This maintenance package includes in particular: - Transport and accommodation for the supplier's operators - Access to the supplier's stock of spare parts to guarantee the level of availability - The operations and maintenance plan carried out by the supplier	
6.10.4	**IMP**	**Annual maintenance total** The supplier indicates the total sum for a maintenance package, annual or otherwise, to be specified according to the CNES use specified in "Purpose" after the first year	Annual maintenance total excluding first year

6.11. CSR STANDARDS: CORPORATE SOCIAL RESPONSIBILITY

The supplier shall provide a detailed statement showing its compliance with environmental and social standards throughout the life cycle of the product, during the manufacture, use and end of life of the wind LiDAR. This statement shall include information about the materials used, the manufacturing processes, the waste management practices, and the measures adopted to reduce the environmental impact of the product.

Moreover, the supplier undertakes to implement responsible waste management practices, promoting recycling and minimising the use of materials that cannot be recycled. The supplier shall also provide information about its initiatives aiming to reduce energy consumption while the product is in use.

As regards social aspects, the supplier shall demonstrate its commitment to respecting labour rights in accordance with international labour conventions, including with reference to working conditions, fair wages, and no child labour or forced labour of any kind.
The supplier will be encouraged to favour local employment and to support the local communities in which it operates, by means of economic development and professional training programmes, or other social initiatives.

This CSR clause will be considered an essential component of the contract, and any failure by the supplier to comply with these commitments may result in corrective measures or termination of the contract.

DISTRIBUTION

NAME	ACRONYM/COMPANY	NBR	NAME	ACRONYM/COMPANY	NBR
DUBOURG Vincent	**BL/D**	1	**TESSARIOL Laurent**	**BL/OB**	1
BEZ Pascale	BL	1	JOUHANNET Nathalie	BL/OB	1
LOUVEL Stéphane	BL/DA	1	BATAILLE Thierry	BL/OB	
VACHER François	BL		BELLANGER Brice	BL/OB	
VENEL Stéphanie	BL		BLON Frédéric	BL/OB	
SOSA-SESMA Sergio	BL		BOTTIER Grégory	BL/OB	
ZENONE Isabelle	BL		CAZALET Mathieu	BL/OB	
MIRC Frédéric	**BL/NB**		CLEMENT Grégory	BL/OB	
NICOLLE Eliane	BL/NB	1	CRUZEL Serge	BL/OB	
ALIAS Grégoire	BL/NB		DOULIEZ Alain	BL/OB	
BAUSCH Denis	BL/NB		JURQUET Bastien	BL/OB	
BRAY Nicolas	BL/NB		JUSTE Thibault	BL/OB	
CHARLOT Valérie	BL/NB		LABROUQUAIRE Fabien	BL/OB	
COGHE Thomas	BL/NB		LACOURTY Michel	BL/OB	
GUILBON René	BL/NB		LAVIGNE Gauthier	BL/OB	
HARMAND Fabien	BL/NB		LOPEZ Jean-Marc	BL/OB	
NICOT Jean-Marc	BL/NB		PAQUET Constance	BL/OB	1
PEUS Alain	BL/NB		SABLON Igor	BL/OB	
REGNIER Bruno	BL/NB		THOUMIEUX Frédéric	BL/OB	1
RICHARD Julie	BL/NB		VERGNAUD Antoine	BL/OB	
SELLE Arnaud	BL/NB		**QUEVAREC Erwan**	**BL/VP**	
VALDIVIA Jean-Noël	BL/NB		NICOLLE Eliane	BL/VP	1
VALERO Colette	BL/NB		BEHAR Jean-Baptiste	BL/VP	
ESTAQUE Philippe	DOA/SME/LOS		CLAVERY Mathieu	BL/VP	
POREZ-NADAL Florence	DTN/QE/BA		CONESSA Huguette	BL/VP	
MARTINEZ Béatrice	SCALIAN for DTN/QE/BA		COUSINET Rémi	BL/VP	
DAUBAN Gilles	SCALIAN for DTN/QE/BA		ETCHEVERRY Christophe	BL/VP	
DUPUY Christel	SCALIAN for DTN/QE/NEO		GEVAUX Laure	BL/VP	
BES Arnaud	AKKA for DTN/QE/IM		LE MEITOUR Hugo	BL/VP	
			LECTEZ Anne-Sophie	BL/VP	
			LOSTAO Marta	BL/VP	