

ANNEX "D"

TECHNICAL SPECIFICATIONS

For the negotiated procedure tender by fiduciary, according to article n. 125 of the Italian Legislative Decree 163/2006 dated 12/04/2006, for the supply of "**System for THz Time Domain Spectroscopy (THz-TDS) equipped with femtosecond laser source and fiber-coupled emitter and receiver**", to be delivered to the Italian National Research Council - Institute for Complex Systems (CNR-ISC), based at UOS Sapienza, Dept. of Physics, University of Rome "Sapienza", Piazzale Aldo Moro 2, 00185 Rome (Italy).

CIG. 60711718CB

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Art. 1 – INTRODUCTION, OBJECT, AND REGULATORY FRAMEWORK

The purpose of the Technical Specification document is to regulate, for the technical and administrative aspects, the award of the supply of a "**System for THz Time Domain Spectroscopy (THz-TDS) equipped with femtosecond laser source and fiber-coupled emitter and receiver**", to be delivered to the Italian National Research Council - Institute for Complex Systems (CNR-ISC), based at UOS Sapienza, Dept. of Physics, University of Rome "Sapienza", Piazzale Aldo Moro 2, 00185 Rome (Italy).

This tender is banned under the rules of art. 125 of Legislative Decree no. 12 April 2006, n. 163 "Code of public contracts for works, services and supplies - in implementation of Directives 2004/17 / EC and 2004/18 / EC."

Art. 2 – TECHNICAL SPECIFICATIONS

This tender is for the supply and installation "turnkey" of a "**System for THz Time Domain Spectroscopy (THz-TDS) equipped with femtosecond laser source and fiber-coupled emitter and receiver**", as explained later in this Technical Specification, to be delivered to the Italian National Research Council - Institute for Complex Systems (CNR-ISC), based at UOS Sapienza,

Dept. of Physics, University of Rome "La Sapienza", Piazzale Aldo Moro 2, 00185 Rome (Italy), according to the requirements set out in Art. 4 and 5.

Art. 2.2 – TECHNICAL SPECIFICATIONS OF THE SYSTEM FOR THz TIME DOMAIN SPECTROSCOPY

General description

The system must have compact configuration, minimal alignment needs, agile switching between reflection and transmission geometry and optional extension unit for x-y sample scanning.

The system must include:

- the femtosecond fiber-coupled laser
- fiber-coupled THz emitter and detector antenna modules
- opto-mechanical light path with delay line
- free space THz beam path
- personal computer with software package for measurement and data analysis.

Software package must include:

- measurement and automation software
- software for spectral data analysis and calculation of material parameters (absorption coefficient and refractive index)
- availability of libraries or native codes for research needs

Performances

- Spectral range > 0.2-3.5 THz, defined as the minimum spectral range in which the signal is discernible from the noise, in the test conditions.
- Dynamic range > 75 dB, defined as the magnitude with respect to the background of the maximum of the spectral energy density, in the test conditions.

Test conditions. The spectral range and the specified dynamic range (or better) must be obtained in the following conditions (or better):

- Scan range 100 ps with time resolution of 40 fs
 - Scan rate (i.e. number of waveform acquisition per second) = 10 Hz
 - Signal averaging over all the scans for a time less than 60s (maximum 600 scans)
 - Measurement in air with propagation length equal or greater than 10 cm
- Specifications provided have a tolerance of 10% (3 dB for the signal to noise ratio)
- Spectral range > 0.2-4 THz obtainable with other instrument settings.
 - Scan range (adjustable) maximum > 800 ps
 - Ability to perform a quick scan as a preview of the spectrum.
 - Certification that all specifications are supported with test data acquired on the proposed experimental set-up with a detailed description of the experimental conditions in which the data were acquired.

Laser specifications

- Femtosecond fiber-coupled laser
- Wavelength 1560 nm
- Total average output power > 60 mW
- Repetition frequency > 90 MHz
- Pulse duration at the antenna < 90 fs
- Fiber length > 2 meters
- Fiber coupled THz antennas included in the system

System components

Optical Breadboard with THz TPX polymer lenses

Weight

Optomechanical setup < 50 kg

Warranty

The warranty must be 12 (twelve) months with telephonic and online support included

Art. 3 – “CE” COMPLIANCE

The supply must be provided by the marking "CE" for the components that require it, as required by current legislation in Italy on safety and accident prevention, pursuant Legislative Decree no. 27 January 2010 n. 17 (Implementation of the EU Directive 2006/42 / EC 2004/108 / EC), as amended and supplemented.

The products must comply with EC regulations in force for the class of membership with particular reference to the standards of good manufacturing practice during the entire production cycle. The products and their packaging, labels, leaflets, must comply, where applicable, to the requirements of the EU laws and regulations in force at the time of delivery and must be provided with "CE".

Art. 4 - DELIVERY AND INSTALLATION

The supply must be delivered and installed at the place set forth in Art. 5 of this Tender, **within seventy (70) calendar days** from the day following the conclusion of the contract.

Art. 5 - PLACE OF DELIVERY AND INSTALLATION

National Research Council - Institute for Complex Systems (CNR-ISC), based at UOS Sapienza, Dept. of Physics, University of Rome "Sapienza", Piazzale Aldo Moro 2, 00185 Rome (Italy).

Unless otherwise indicated, the successful bidder will be allowed to access in the manner and on the terms agreed. Any costs that the successful bidder will meet to comply with any limitation of access or any security procedure defined in the contract will be deemed to be included in the price of the contract

Art. 6 - RETURN MODE, RISK AND PROPERTY

For Italian economic operators or foreign residents in Italy

The yield is "free destination" and it means that are included in the tender contract price, in addition to supply, even the packaging, transport, insurance, transport to delivery, loading and unloading, as well as the installation. The properties of the supply will go to the CNR on the date of delivery of the supply in the place described in Art. 5 of this Technical Specification.

For foreign economic operators belonging to EU Member States

It applies the rule Incoterms 2010 - DAP (Delivered At Place) at the National Research Council - Institute of Complex Systems (CNR ISC) based UOS Sapienza, c / o Dip.to Physics Univ.tà Sapienza, Piazzale Aldo Moro 5, 00185 Rome (Italy). The economic operator is also obliged: 1) to enter into an insurance contract for the transport under its responsibility; 2) to the discharge of the goods; 3) to the installation of supply. The properties of the supply will go to the CNR on the date of delivery of the supply in the place described in Art. 5 of this Technical Specification.

For foreign economic operators not belonging to EU Member States

It applies the rule Incoterms 2010 - DDP (Delivered Duty Paid) at the National Research Council - Institute of Complex Systems (CNR ISC) based UOS Sapienza, c / o Dip.to Physics Univ.tà Sapienza, Piazzale Aldo Moro 5, 00185 Rome (Italy). The economic operator is also obliged: 1) to enter into an insurance contract for the transport under its responsibility; 2) to the discharge of the goods; 3) to the installation of supply. The properties of the supply will go to the CNR on the date of delivery of the supply in place of Art. 5 of this Technical Specification.

Art. 7 – BASIS OF AWARD

The basis of award is **€ 65.000/00 (Euro sixty five thousand/00)** net of Value Added Tax. No offer shall be allowed beyond that basis.

The offered price must be understood as being:

1. inclusive of all charges and/or expenses, direct or related, except the tax burden, necessary for the execution of the supply in question;
2. fixed and non-variable for the entire duration of the contract.

Art. 8 CHECKING THE COMPLIANCE OF THE SUPPLY

All deliveries of goods shall be accompanied by a delivery note referencing the contract, items and quantities delivered. All goods are subject to inspection to check their compliance with the present contract, to be held by C.N.R.- ISC not later than 30 (thirty) running days from installation, ending with the acceptance certificate.

In case of failure of compliance check, it is notified at the right time to the successful bidder with the reasons. Within the maximum time limit for the installation the successful bidder will be required to eliminate the causes of the failure of the compliance check, otherwise the penalties referred into the art.13 of the present tender will be imposed.

Art. 9 OBLIGATIONS OF THE SUCCESSFUL BIDDER

Included in the contract price, when the goods are delivered to the consignee, the successful bidder will be required:

1. to issue the delivery notes of all the delivered goods;
2. to consign "CE" type-approval certificates for the equipment which requires them in compliance with the "Machinery Directive";
3. to consign the technical sheets and illustrative brochures of the single consigned equipment;
4. to consign the instruction manuals for the single consigned equipment, in English and/or in Italian.

Art. 10 - FINANCIAL TRACKING OBLIGATIONS

The successful bidder hereby acknowledges the provisions of article 3 of Law August.13, 2010, no.136, and subsequent amendments, pertaining to the mandatory traceability of financial flows. Failure to use bank or postal transfers or other systems allowing for full traceability of the operations, shall lead to termination of this Contract by law.

Art. 11 - PAYMENT METHOD

The payment of the contractual amount will be effected within **30 (thirty) calendar days** behind the presentation of a report of regular execution of the supply and after invoicing.

The payment of the invoice will be made by bank transfer and will be subject to checking of compliance by the successful bidder, with all the contractual conditions, with the law (eg. DURC) as well as, together with the invoice, on presentation of the traceability statement of cash flows.

If not, the payment deadline is suspended until fulfillment of deliverables, unless and reserved all other measures by the C.N.R.ISC.

Expenses for the application of any penalties for late execution will be recovered during the payment of invoices.

Art. 11.1 - INVOICE ISSUANCE

The successful bidder shall submit itemized invoice showing:

1. header:

**CNR – ISC Istituto dei Sistemi Complessi
Sede di Roma
Via dei Taurini 19, 00185 Roma
VAT 02118311006
C.F. (Fiscal Code) 80054330586**

2. the CIG (Race Identification Code): **60711718CB**;
3. the CUP (Unique Code Project): **B52112000270005**;
4. the CUU (Unique Code Office): **TVEC3J**;

5. the reference to the contract (Prot. N. and date);
6. the object of the supply;
7. the rate of VAT as required by law (for established entities and/or identified for VAT in Italy);
8. banking coordinates dedicated for the payment of the contract with "IBAN" code
9. for the foreign suppliers the "Commodity Code"

Art. 12 - GUARANTEE

The successful bidder warrants that, during the warranty period, each Service and Product will conform with the ruling law and by the relevant legal provisions, with effect from the date of issue of the acceptance certificate.

The warranty period is 24 (twenty-four) calendar months, starting as from the issuance of positive test certificate.

Art. 13 - PENALTIES

In the case of delayed delivery/installation, set out in Article 4 of this contract, the successful bidder shall pay to the C.N.R. ISC for every running day of delay a penalty amounting to **1 ‰ (one per thousand)** of the total value of the contract, net of fiscal charges, without prejudice to any further damages and costs resulting from the delay.

The C.N.R. ISC may offset claims arising from the application of penalties, with the amount due to successful bidder for any reason without warning, further investigation or prosecution.

The total amount of penalty shall not exceed **10% (ten percent)** of the total net value of the contract set out in Art.3 of this contract, excluding VAT; in any case the CNR ISC maintains the faculty to proceed with the termination of the contract, after giving formal notice to comply, without the successful bidder having any right to claim whatsoever.

Art. 14 - RESPONSABILITY

The successful bidder agrees, as of now, to compliance with all applicable laws on health and safety at work, with particular reference to the Legislative Decree April 9, 2008, n. 81, "Testo unico Sicurezza Lavoro" ("Consolidated Security Work") and subsequent amendments.

In view of the above, the successful bidder:

a) will be responsible for the work of the staff reporting to it, as well as for all damages to persons and property that the same staff may cause to the Contracting Authority, to its employees, and also to the same successful bidder, and it is liable to pay the same. The Contracting Authority and all its staff will be considered exempt from any liability relating to the performance of the supply.

b) is committed, since now, to raise the Contracting Authority and its staff from any harassment or action, with no exclusions or exceptions, which possibly could be moved against them; in particular undertakes to set off the Contracting Authority itself and its staff of what may be required to reimburse to third parties for facts related to the provision of the service supplied.

c) claims to be in possession of an insurance policy to cover the risks of third-party liability and towards workers employed, valid for the entire contract period

Art. 15 - COMPLIANCE WITH ALL PROVISION OF COLLECTIVE BARGAINING AGREEMENT (CBA)

In executing the supply, the successful bidder is obligated to fully implement all the provisions contained in the National and Local Collective Bargaining Agreement (CBA) for employees operating in the sector object of this tender and in force for the time and in the place where the supply is provided. The successful bidder must pay, in respect of its employees, all the social security contributions and insurance which belong to the employer, raising the Contracting Authority from any liability.

Art. 16 - TERMINATION OF THE CONTRACT

The successful bidder recognizes the right of the C.N.R. ISC, whether it may occurs even one of the cases listed below, to terminate "ipso iure" the contract, pursuant to Article 1456 of the Italian Civil Code, by sending notice by registered letter with an acknowledgement of receipt to the

addresses elected by the successful bidder, without prior formal notice, and the intervention of the competent judicial authorities, and also the right to award the contract to a third party in damage to the supplier, and without prejudice to the application of penalties, in one of the following assumptions:

- a) if the successful bidder suspends or discontinues unilaterally, and without valid justification, the execution of the supply;
- b) fraud in the performance of contractual obligations;
- c) if the successful bidder transfers the contract and/or subcontracts its obligations;
- d) if the successful bidder is the subject of proceedings for an arrangement with creditors, for an *order for compulsory winding-up* or administration by the court, or for a declaration of bankruptcy, or of any other similar proceedings under national laws or regulations
- e) breach of "anti-mafia" law;
- f) state of non-compliance of the supplier with regard to all debts incurred during the exercise of his business and the performance of the contract;
- g) revocation, forfeiture, cancellation of any licenses or permits required by rule of special and general laws;
- h) execution of the contract with staff not regularly employed or under contract;
- i) verified non-compliance with the law on the prevention of work accidents, workplace safety and employees' obligatory insurance, and also compliance with collective bargaining agreements.

For any reason the contract is cancelled, the successful bidder will be required to pay compensation for all direct and indirect damages and higher costs borne by the C.N.R. ISC for the remaining period.

In the event of early termination of the contract C.N.R. ISC reserves the right, in the course of delivery, to replace the successful bidder with the Company classified as second on the final list of the tender. The successful bidder will have to bear the burden of the higher price paid by C.N.R. ISC, resulting in the difference between the contract price and the price offered by the Company with which the contract is continued.

Art. 17 - COMPLIANCE WITH LAWS, DECREES, REGULATIONS

In addition to the full and exact compliance with the national and European Union legislation in force, the successful bidder, except as already expressly regulated in these specifications, is bound to the strict observance of:

1. the Accounting Regulations of the Italian State, approved by Royal Decree of May 23, 1924, n.827;
2. the Decree of the President of the National Research Council, May 4, 2005, n. 0025034, published in the Official Gazette of the Italian Republic on May 30, 2005 n. 124, "Regulations for the Administration, accounting and Finance of the National Research Council" (in Italian: "Regolamento di Amministrazione, Contabilità e Finanza del Consiglio Nazionale delle Ricerche");
3. Legislative Decree April 12, 2006, n. 163 and subsequent amendments "Code of public contracts for works, services and supplies in implementation of Directives 2004/17/EC and 2004/18/EC;
4. Law of August 13, 2010, n. 136 and subsequent amendments "Extraordinary plan against the mafia";
5. Presidential Decree October 5, 2010, n. 207, "Regulations of execution and implementation of the legislative decree April 12, 2006, n. 163 on "Code of public contracts for works, services and supplies";
6. the Decree of the President of the National Research Council, May 23, 2013, n. 00042, published in the Official Gazette of the Italian Republic – general series -on June 8, 2013 n. 133, "By-laws of the National Research Council concerning the purchase of low-value contracts below the thresholds of the EU Directives" (in Italian: Regolamento per le acquisizioni in economia di beni e servizi del Consiglio Nazionale delle Ricerche").

Moreover the successful bidder is required to prove at any time the conformity of his furniture and activities with the following requirements which accordingly undertakes to respect during the duration of the contract:

1. Law of December 7, 1984, n. 818 "Provisional authorization for the activities subject to fire prevention";
2. The Ministerial Decree January 22, 2008, n. 3 "Rules on the safety of installations";
3. Presidential Decree December 6, 1991, n.47 "Regulations of execution of the Law March 5, 1990, n.46;
4. Presidential Decree May 23, 1992, n.314 "Regulations of execution of the Law March 28, 1991, n.109;
5. Legislative Decree April 9, 2008, n.81 on workplace safety and health.

The tender is governed, besides the above provisions, by the rules of the Civil Code as applicable, by those contained in the Letter of invitation, by those contained in the "Technical Specifications" (Annex D) as well as by the "Contract Outline" (Annex E), whose contents the tenderers accept, as of now, without reservations and/or exceptions

Art. 18 - PRIVACY POLICY

Under the terms and for the purposes of articles 7 and 13 of Legislative Decree no. 30 June 2003, n. 196 "Code concerning the protection of personal data", the Contracting Authority will collect, record, re-ordering, storage and use personal data, whether by electronic means or not, for the purposes of carrying out the institutional activities of the Contracting Authority, including participation in the procedure of this tender, and the possible signature and management of the contract, and for legal obligations in respect of which the contribution is required. For these purposes such personal data may be disclosed to third parties. The holder of the processing of personal data is the Contracting Authority.

ART. 19 – DISPUTE SETTLEMENT AND COMPETENT COURT

Any dispute that may arise during the course of the contract will be entrusted to the ordinary Courts. Competent Court will be located in Rome.

The Responsible in charge of the procedure
(Dr. Mauro Missori)

The Director
(Prof. Claudio Conti)
