Italian National Agency for New Technologies,
Energy and Sustainable Economic Development

ANNEX A

TECHNICAL ATTACHMENT

AND EVALUATION CRITERIA OF THE OFFER

February 2020

REV 1 - 11 June 2020

Note homogenization/specification of measure units and correction of the equation for the evaluation of the scores (avoiding negative scores) this review integrate the original with the following modification:

(1) Pag 6 • Detector Panel Dimensions in **L "mm" x H "mm"**: PP(DP)= 10 Points;
Please write both the dimensions: Wide "L" and Height "H" in "mm"; the score will he evaluate considering the overall area;

(2) Pag 6 • Minimum delivery time expressed in ~~months~~ **consecutive solar days** : PP(T) = **10 Points; please indicate the delivery time in terms of consecutive solar days as requested at pag 4.**

(3) Pag 7: exemplification of the equation for assign the scores in the case of best score awarded to the lowest value of the parameter (PP(GF) e PP(T)) change of the equation to avoid negative scores:

~~**PP (x) i = PP (x) * (1- (P (x)i – P(x) imin)/ P(x) imin))**~~ **READ:**

PP (x) i = PP (x) * P(x) imin/ P(x) i

Commitment for the provision of a X-ray Computed Tomography (CT) system

Essential requirements of the equipment	The requested equipment must be able to perform computed axial tomography with at least 4 degrees of freedom. The essential requirements that the equipment must respect are in the list below:

SOURCE:

Operating voltage	>= 450kV
Beam current	>=1 mA
Power rating	>=450W
Minimum focal spot	<=400 micron

2D DETECTOR

Active area	>= 400 x 400 mm
Active pixels	>= 2000 x 2000 pixels
Detector bit depth	>= 16 bits

LINEAR DIODE ARRAY

Number of diodes	>=1000 pixels
Distance between pixels	<=400 micron

MANIPULATOR

Minimum axis displacements travel	>= 400mm (X); 600mm (Y); 600mm (Z)
Turntable diameter	>=300 mm
Turntable maximum load	>= 50kg
Largest sample size for Direct Radiography	>= 600mm (width); 700mm (height)
Largest sample size for Computed Tomography	>= 300mm

CONTROL CONSOLE

Full control of X-ray tube and manipulator, real time radiography with multi display elaboration of parameters and image

WORKSTATION FOR RECONSTRUCTION WITH MONITOR 4K

Processor: 2x Intel Xeon Tetradeca-core (14) CPU **or higher**

RAM: >=256 GB **or higher**

HDD: >= 16TB RAID 10 HDD (8TB usable) **or higher**

SDD: >= 1.6TB RAID 0 SSD or higher

VIDEO card: 2 x Market leading Nvidia graphics card **or higher**

SOFTWARE FOR RECONSTRUCTION:

VGSTUDIO MAX 3.3 or updated release

X-RAY CABINET

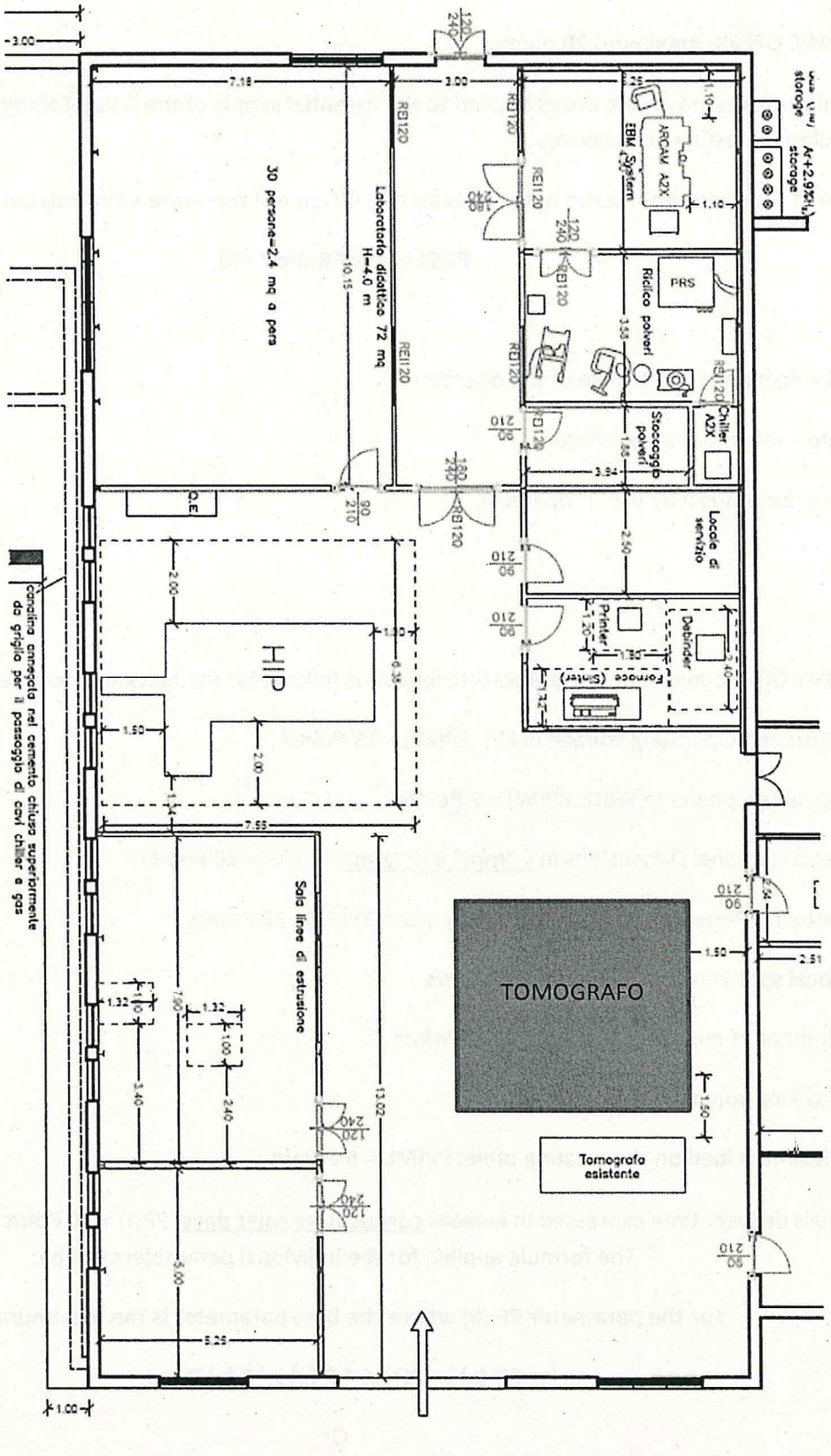
The cabinet for X-Rays must be fully in compliance with the International Ionising Radiations Regulations (IRR99 protection, for a radiation dose rate not exceeding 1µSv / h (0,25mR / h)).

The Cabinet **must have a remote internal visual system** with at least a TVCC color system in the cabinet with external monitor.

Check of qualification	**<u>All the sent data must be deduced from brochures of standard products and real measures.</u>** **Pay Attention!!!** **<u>A test report on a steel sample having different thicknesses is requested, under penalty of exclusion. The report must show the results of tests using the standard ASTM E1025 penetrameters for each thickness, so that the quality of radiographic and tomographic images can be evaluated.</u>** - The standard sample must be a steel wedge with 4 steps (thickness of steps: 5-10-15-20 mm respectively), width and length of 10 mm and 40 mm respectively, and overlapping penetrameter with equivalent thickness having 3 through holes 2 T, T and 4 T. - The report must show the test parameters, images and images analysis with evaluation of the holes dimensions. - The attached document, in case of awarding, will be used as a criterion for comparison for the final test of the equipment.
Essential accompanying furniture	- **Cooling system:** the equipment must include as essential requisite the furniture and installation of a cooling system adequate to the continuum and stable operation of the tomography (7/7 - 24/24). - **Starter KIT**: eventual consumables (as a non exhaustive example: seals, filaments, high voltage consumables, etc.) in order to permit a correct operation for the first 1000 tomographic cycles. - **All what is necessary, even if not here explicit, for the installation, final test, correct operation and use of the equipment (as a non exhaustive example: pipes and connecting cables from the principal machine to ancillary; fluids that are essential for the installation (de-ionized water, additives, oils, etc.), eventual blocks for calibration and penetrameters).**
Training	- A complete training on the procedures for the correct use of the equipment is requested, to be completed during final test and subsequent start phases. - The Course must be structured so that at the end of the trainjng the staff members are fully able to operate with the equipment, modify the packages of standard parameters in order to go further with research on parameters optimization, and check new materials. - It is also requested that those who will be trained could in turn become trainers for other users.
Warranty	- **Full, 24 months** from the date of memorandum of correct installation.

Payments	Payments will be made no later than 30 days after receipt of the invoices issued, as follows: - **20%** of the contract value at the time of signing the contract; payment of the advance is subject to the provision of a bank or insurance guarantee for an amount equal to the advance, as established by art. 35 paragraph 18 of Legislative Decree no. 50/2016; the delivery time of the equipment starts from receipt of the advance payment; - **60%** of the contract value upon delivery of the complete equipment at the destination and assembly site (ENEA Casaccia Research Center, Rome), subject to verification of the integrity of the goods by the Process Manager; - **20%** of the contract value after installation and testing of the equipment and verification of conformity by the Procedure Manager
Conditions on the furniture	**The equipment must be new from factory and not repaired**. It must be delivered and installed at ENEA CR CASACCIA (ROME), with concomitant check of the proper operation.
Delivery times	- Starting from the date of the order, the equipment must be delivered, installed and tested for its operation in ENEA CR CASACCIA, no later **than 150 consecutive solar days.** - **Attention!** The term for the delivery is mandatory and no extension for any reason will be conceded. In case of a delay in the delivery, with respect to the delivery time declared in the documents for the public bid and starting from the date of reception of the supply order, a penalty will be applied to the supplier, equal to the 1 ‰ (one over thousand) of the total cost of the equipment for each (solar) day of delay, to be calculated till the day of positive check/test of compliance of the supply.
Penalties	In the event of partial or total non-fulfillment of contractual obligations and / or delay in delivery, with respect to the delivery time declared by the supplier in the tender documents (starting from the date of payment of the contractual advance), a penalty is charged to the supplier, equal to **1 ‰ (one per thousand)** of the total supply amount for each day (SOLAR) of delay, to be calculated up to the day of positive testing / verification of conformity of the supply. Penalties for delays not due to the supplier's liability are excluded. The fixing of the penalties does not exclude the fair compensation for any other damage occurred, or the termination of the contract if the total amount of penalties exceeds the guarantee provided by the contractor.

Final placement in the laboratory - Layout	- The equipment will be placed in a laboratory having a dedicated free space of 4 x 4 m and height of 5 m. The lab is equipped with a crane with 10 ton of payload and an entrance door of 3.8 x 3.8 m.



EVALUATION CRITERIA OF THE ECONOMICALLY MOST BENEFIT OFFER

The evaluation of the offers and the awarding of the supply will take place at the discretion of a Selection Committee, specifically appointed by ENEA after the deadline for sending the offers, by assigning to each offer scores according to the evaluation criteria and the calculation methods described below.

➢ ECONOMIC OFFER: **maximum 20 points**

- 20 points assessed on the prices applied to the essential supply of the X-Ray Tomography system, including installation, testing and training.

The overall economic offer score of the operator "i" (POEi) will therefore be calculated as follows:

POEi = 20 x PRmin / PRi

where:

- **POEi** = Economic Offer score of the operator "i"
- **PRmin** = minimum price offered
- **PRi** = price offered by the "i" operator

➢ TECHNICAL OFFER: **maximum 80 points** distributed as follows for the following parameters:

- Maximum Operating voltage in kV: PP(kV) = **15 Points**
- Maximum power in Watt: PP(W) = **5 Points**
- Detector Panel Dimensions in **L "mm" x H "mm"**: PP(DP)= **10 Points**
- Detector Panel resolution number of pixels: PP(PX) =**10 Points**
- Focal spot in micron: PP(GF) = **10 Points**
- Number of motor Axes: PP(DG) = **10 Points**
- Working volume: PP(V) = **5 points**
- Maximum load on the rotating table: PP(ML)= **5 Points**
- Minimum delivery time expressed in ~~months~~ **consecutive solar days**: PP(t) = **10 Point**

The formula applied for the individual parameters will be:

For the parameter PP (x) where the best parameter is the maximum one:

PP (x) i = PP (x) * P (x) i / P (x) iMax

Or

For the parameter PP (x) where the best parameter is the minimum one:

~~PP (x) i = PP (x) * (1- (P (x)i – P(x) imin)/ P(x) imin))~~ **READ:**

PP (x) i = PP (x) * P(x) imin/ P(x) i

Where "**x**" is the specific parameter (Maximum Operating voltage "KV"; Maximum power "W ....; t= delivery time) "**i**" the specific operator

PP(x)i= score Parameter "x" of the Operator "i"

P(x)i= value of Parameter "x" of the offerer "i"

P(x)iMax= value of the parameter "x" higher than those offered

P(x) imin= value of the parameter "x" lower than those offered

The overall technical score for the bidder "i" will be:

$$PTTi=\sum PP(x)i$$

Where **PTTi** is the Total Technical Score of the operator **"i"** obtained as a summation in "x" of the individual technical scores on the various parameters of the operator **"i"**

TOTAL SCORE of the operator "i" given by the sum of the Economic Score + the Technical Score will be:

POEi+PTTi