



Leids Universitair
Medisch Centrum

Market consultation

Request for information

“Transmission Electron Microscope”

Reference L-EU-23-11

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1. Introduction

This is the market consultation concerning a Transmission Electron Microscope on behalf of the Leiden University Medical Center (hereafter LUMC). LUMC has the intention to publish a tender to acquire an transmission electron microscope in Q1 of 2024. This Market Consultation is published with the purpose to collect information about specifications and capabilities of Transmission Electron Microscopes available on the market.

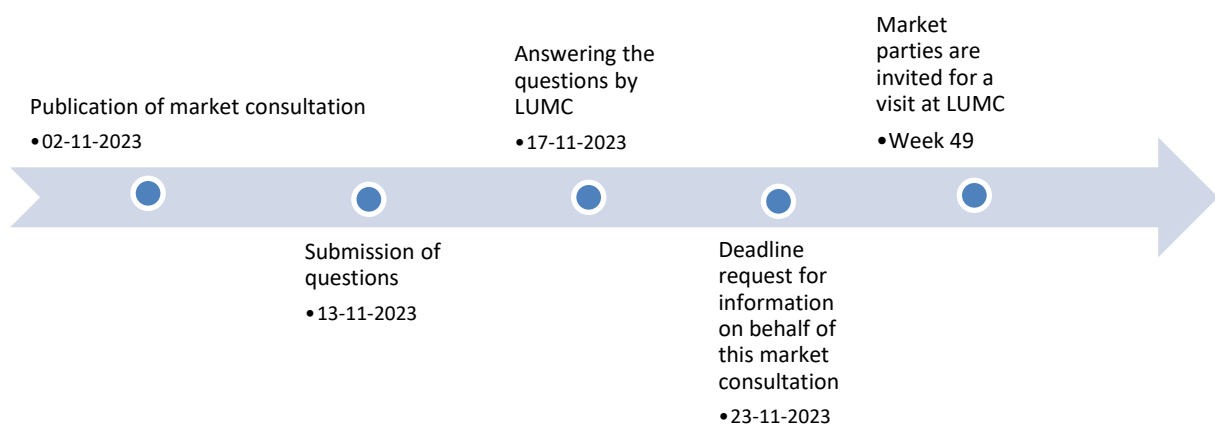
2. Goal & Purpose

The goal of this market consultation is threefold:

1. To receive information directly from suppliers to gain insight in the available type of microscopes;
2. To offer suppliers the possibilities to present LUMC relevant information which can be used for an exact and more precise Request for Proposal;
3. To share information on LUMC requirements with the market and the relevant suppliers in order to contribute and establish a level playing field for all interested parties that facilitates a successful commercial proposal from as many suppliers as possible.

2.1 Planning of the market consultation

We foresee the following planning, which is provisional and LUMC has the right to alter the dates and times at all time.



This Market Consultation is published on November 2nd, 2023 and will be open until November 23th, 2023 at 14:00 CEST.

2.2 Contact

Single point of contact:

Please submit reactions to this Market Consultation by email to Pieter van den Berg at aanbestedingen@lumc.nl.

3. Conditions

Participation is non-committal for any party concerned, including LUMC. Participation has no effect nor any consequence for an eventual (European) Tender. No party can claim any rights following the participation in this market consultation nor following the documents shared in this market consultation.

4. Procedure

The procedure will be as follows:

- This market consultation document is published on Ted, Tendered;
- The market parties will have the opportunity to ask questions about this market consultation document using the question & answer module on Ted, Tendered;
- The market parties formulate their answers to the questions from LUMC;
- The LUMC may request further information from (one of) the market parties if certain answers are not clear;
- The market parties that meet the needs and requirements described in this document are invited for a visit at LUMC for a further explanation of their product/solution. The meetings are planned in week 49;
- Any given information shall be dealt with in complete confidentiality. If information will be used in the final draft of the Request for Proposal this will be done anonymously with no reference to any specific supplier, brand or product. Parts of the information can thus be made public, a.o. via Ted, Tendered. In case this is undesirable kindly state specifically in your documents the specific passages concerned. LUMC shall not honor any claim concerning the usage of information or the matter of confidentiality;
- The participating parties will not receive any reimbursement for costs incurred. Participation in this market consultation is entirely without obligation. The participating parties may not claim preferential treatment in the tender procedure either.

5. Background

About the LUMC

The LUMC is a modern university medical center for research, education and patient care with an excellent quality profile and a strong scientific focus. With a unique research profile ranging from fundamental medical oriented research to applied clinical research, the LUMC is a global player in its field. The LUMC can hence also offer patient care and education based on the latest international insights and standards - and contribute to improving medicine and health care at its own institution and outside of it. The LUMC also acts as a knowledge center for social issues regarding public health, plays a regional guiding role and is a center for training and continued education for medical

professionals. The triangle formed with the University of Leiden and the Leiden Bio Science Park creates unique environment for medical innovation in and around Leiden.

About the Department of Cell and Chemical Biology

The department Cell and Chemical Biology (CCB) is part of Division 4 of the LUMC, which is focused on clinical and basic research. The mission of the department Cell and Chemical Biology (<https://ccb.lumc.nl/>) is to unravel the molecular details of the working of cells in their normal function and the perturbed functioning in diseased cells. We help translate our knowledge and technologies to clinical practice. Research and Development (R&D) of advanced technologies in microscopy, chemical biology, iPS cell biology and DNA editing are crucial elements of cell biological research.

About the Electron Microscopy Facility

The Electron Microscopy Facility is part of the department of Cell and Chemical Biology. We work in close collaboration with the light microscopy facility, which is also part of CCB. Together with several other groups we form the LUMC research facilities, which are focused on providing state-of-the-art technical support within the LUMC and beyond. The Electron Microscopy Facility develops, modifies and applies novel electron microscopy methods that allow zooming into the cellular architecture and visualizing macromolecular structures at nm-scale resolution. Our mission is to contribute with state-of-the-art and new electron microscopy methods to research projects in order to obtain new information on biological systems and their cellular regulation. In addition, we provide electron microscopy services on a collaborative basis.

Reason for the tender

The reason for the European tender is the need to replace an FEI Tecnai 12 transmission electron microscope. The microscope will become the new main machine for automatic, continuous high-throughput 2D data-collection. It will also be a keystone to for new developments in an integrated image stitching and machine learning workflow. The overall setup will serve as platform for high throughput 2D data collection, where fast data collection, electron microscope control, fast image processing and high speed data storage are key ingredients. Customer programmatic control of the hardware and software(1), speed, robustness and stability of the stage (2), stability of the electron source (3), fast camera with good SNR (4) and integrability are of high importance.

Objectives of the tender

The LUMC hopes to achieve the following objectives with this tender and the Agreement stemming from it:

- a) The microscope system is equipped with a stable stage of the highest quality, that combines a high translational speed with high accuracy and high precision.

- b) The transmission electron microscope is state-of-the-art in both hardware and software, and is highly suitable to routinely and automatically perform continuous data collection 24/7.
- c) The microscope, including software and interfacing, is suitable for the development of in-house data acquisition schemes.
- d) The system is equipped with a fast, sensitive and stable electron detection device.
- e) The system has an expected lifespan of at least 15 years, including the guaranteed availability of spare parts, service and maintenance.
- f) Furthermore, the microscope has fast data storage, while the complete system is fully user controllable via API's.
- g) Purchasing professional support and proactive services;
- h) Get a high quality of service and maintenance;
- i) Concluding a legitimate agreement;

The LUMC translated these objectives into the demarcations of the Contract, the requirements placed on the execution of the Contract, the requirements placed on the Tenderers in order to be eligible for the Contract and the manner in which the most economically advantageous Tender will be chosen.

Current Situation

The intended system will replace the current 16-years old 120kV microscope that was installed in 2006. The availability and functionality of that electron microscope has been greatly reduced over the last couple of years making it ineffective. Besides this it is expected that the system will only have limited service support in the near future effectively making it both an economic and technical write-off.

Desired situation

The intended system should be a 120 kV TEM suitable for high-through-put high-intensity automated imaging of stained 100-nm thin sections of plastic embedded biological specimens. Therefore it should be equipped with a stable stage, electron source vacuum system and electron detector.

As software developments are key for the intended applications, public API's (Application Programming Interface) to the microscope controls should be available, as well unrestricted permission to share with the scientific community developed tools using these public API interfaces.

To make optimal use of the microscope during developments, a microscope software simulator should be made available for testing new software before installing it on the microscope system.

Tenderers can here themselves, under penalty of exclusion, unconditionally conform to it by submitting a Tender.

Type of Contract

There is a one-off delivery and purchase of the Transmission Electron Microscope. The purchase, delivery, installation, installation and commissioning are laid down in a single purchase agreement. There will be one purchase agreement.

In addition, the LUMC concludes a service agreement with an initial term of ten (10) years for preventive and corrective maintenance (including spare parts) of the Transmission Electron Microscope. There will be one maintenance agreement for preventive and corrective maintenance. The total amount is divided by ten years and each year the supplier may charge one year for maintenance.

Criteria

- Price
- Functionality of API
- Quality of stage
- Stability of electron source
- Camera quality
- Support
- Practical test

5.1 Functional Specification

Program of requirements

Requirement 1:

The microscope is highly suitable for automated transmission electron microscopy. Specify model, type and series of microscope.

Requirement 2:

The microscope operates at 120 kV.

Requirement 3:

The microscope has an LaB₆ electron source.

Requirement 4:

The complete system is safe, i.e. not harmful for users, safety points include but are not limited to X-ray, electronic and chemical safety.

Requirement 5:

The microscope is equipped with an automated and software controllable multi grid holder. This holder should return to a selected grid position within in 20 micron after switching grids. It offers at

least 3 sample positions. Combined switching and stabilisation should take less than half an hour. If no such holder can be offered, a (non-automated) Gatan 677 holder is acceptable. Please specify system and describe.

Requirement 6:

The stage should have excellent movement (fast), drift (low), accuracy (high) and stability (high) characteristics. Please,

- specify relocation accuracy and precision and protocol to measure
- specify speed
- specify drift characteristics
- specify type of stage, polar or cartesian stage, describe construction
- specify what efforts will be made to ensure the highest quality
-

Requirement 7:

System has a remote control to operate the microscope, i.e. on a desk with hand panels, computer screens and controls. This desk can be positioned freely in microscope room with respect to the microscope, cabling is included which allows this setup.

Requirement 8:

Microscope computer graphics card should be able to easily drive a 3 screen multi monitor setup. Microscope is delivered with 4 high quality identical screens of at least 1900x1080 resolution.

Requirement 9:

The microscope is equipped with a bottom mounted electron detection camera, with frame dimensions of at least 4k x 4k pixels and a frame rate of at least 20 fps at full resolution. The camera should allow to work from a remote computer without additional lag. Specify brand, type etc.

- Specify the time needed from the start of acquisition of a single full frame image, to store it to disk and the start the acquisition of the next single image, this through a python3 controllable API (this test is part of the demo and value is highly rated). Please also specify estimated standard deviation of this value.
- Characteristics of the camera (stability, read-out, dead pixels, distortion, etc.) is of highest quality. Please specify characteristics and what efforts will be made to ensure the highest quality.

Requirement 10:

Generic API interfaces are provided for all user controllable parts of the microscope, e.g. but not limited to camera, automated sample holder (if offered) and lenses. High-quality documentation should be available and submitted on tender submission.

Requirement 11:

Maintenance offers are included for all parts of the system including camera and one without camera.

Requirement 12:

Offer is included for possible trade in of old microscope.

Requirement 13:

Pre-installation manuals should be made available for all equipment at tender submission.

Requirement 14:

In column LN₂ cold trap system should be available that can be used continuous without user intervention for at least 72 hours. If additional items are required to use this system, like e.g. Dewars, drippers, hoses they should be included in the offer. The system should be able to continuously run for at least 7 days, i.e. with a possible user intervention each 72 hours. The vacuum system has a decontamination / cleaning cycle.

- Describe cold trap and refilling system
- Describe the workflow for a decontamination-cycle and the actions needed and time required.

Requirement 15:

The system has software controllable deflectors, lenses, vacuum valves, stage, electron source apertures (condenser, objective and SA apertures) and camera.

Requirements 16:

System has an oil free vacuum system.

Requirement 17:

Client can install third party software packages on all computers including e.g. python3, Matlab, up-to-date web browser, data storage, debugging software, login scripts and thirds party packages for e.g. but not limited to data acquisition. This to allow integration of the system in the local environment, scientific developments and use of third party packages. This all without affecting warranty or maintenances and support. Conditions will be defined and agreed upon with mutual consent.

Requirement 18:

Standalone simulators for the camera's and microscope API's are made available to test in-house developed software, including relevant licenses. Please describe simulator, e.g. but not limited to OS version, requirements, camera support, specify limitations if any as well. On request, updates are made available without additional cost when software versions deviate significantly from the

microscope versions, i.e. when functionality in the development system does not match with the microscope.

Requirement 19:

All accessory third party software like e.g. but not limited to virus scanners, backup software, cloning software, disk mapping software is included with proper licenses and offline activation.

Requirement 20:

For external communication the following dedicated network cards/ports are present which are exclusively to be used for communication with the clients ICT environment, i.e. not for internal system communications: Computers with detectors and or significant data storage: at least 1 x 10Gbit/s network port for data transfer. All computers: at least 1x 10/100/1000 Mbit/s network port, for communication with inhouse services and remote service (This can mean that for e.g. a camera controlling computer two interfaces should be available to connect to the clients network).

Requirement 21:

The internal microscope network layout is specified by the manufacturer at least a month before delivery. A concise document describing the network diagram is made available electronically for all components with an exposed network interface including all IP addresses used. The external network will be setup by the client to not conflict with the given information.

Requirement 22:

All upgrades to hardware and software are included and will be installed to bring the versions of the operating systems to versions which have at least 5 years full support by the operating system supplier this from the date of system acceptance.

Requirement 23:

The LUMC requires an warranty of 2 years. This includes service as offered in the service, maintenance and support contract.

Requirement 24:

Supply a separate concept agreement with prices (including VAT) for a full maintenance, service and support contract.

Requirement 25:

Image-beam shift allows imaging of a larger area without moving the stage. Specify the maximum imaging area at the specimen level for the magnification range between 5k and 15k times. A minimum of 3x3 non overlapping images should be possible.

Requirement 26:

A customer witnessed acceptance test is offered for the complete system in the factory before the system is to be shipped, including travel and stay for 2 persons. This test includes the following, but not limited to, factory results, information limit and Thon rings on carbon, stage performance, alignment procedures, loading samples, inspection of samples, setup and data collection by scripts as required in demo.

Requirement 27:

A customer witnessed demo is part of the tender and is intended to have a practical view of the most important requirements and supplied information.

Requirement 28:

Supplier has option for site inspection before tender submission. The inspection is limited to a day. Supplier shares findings with LUMC.

Requirement 29:

Supplier is responsible for transport to installation location and installation of complete system including unforeseen additional costs.

Requirement 30:

All electronic equipment not fitted in an enclosure should be fitted in a computer rack. Wires, tubes and cables should be tidy and protected by covers outside enclosures. A 24-U rack is available, if not apt a rack should be included in the offer.

6. Questions and Answers

In case your company markets a Transmission Electron Microscope that meet the needs and requirements described above, you are invited to provide answers to the following questions:

* Please provide data/proof, where possible.

1. Can you meet the attached program of technical requirements?
2. If you cannot meet the requirements, kindly specify and motivate the requirements you cannot meet.
3. Are the requirements clearly formulated? Please, motivate what is not clear.
4. Please provide a budget quotation for the complete system.
5. Please specify the time of delivery after contract signing.