

Appendix 1 - Buyer's requirement specification

1 Purpose of the procurement

The Advanced Microscopy Core Facility (AMCF) at UiT is calling for offers for a high-end spinning disk microscope and image analysis solution. Our goal is to perform non-toxic, high-speed, high-resolution imaging over several days under optimal culture conditions, while also facilitating throughput and automation. The image analysis solution should enable standardized analyses of dynamic cellular processes such as growth, movement, and morphology.

2 The scope and content of the procurement

The total budget of the procurement is NOK 9 000 000 (including taxes). Any offers exceeding the budget will be rejected.

2.1 Intended use of the microscope and image analysis solution

Cell biology, cancer research, and studies on metabolic and cardiovascular diseases all depend on advanced live-cell imaging. Many critical cellular processes occur at very different timescales: Some, such as phagophore formation in canonical autophagy, take place within seconds and involve sub-organelle structures that cannot be resolved by conventional light microscopy. Thus, they require extremely fast, high-resolution imaging to be studied, including super-resolution techniques and image processing methods such as deconvolution. Other processes, such as cancer cell migration, unfold over several days and demand long-term stable imaging of the same living cells while maintaining stable culture conditions, often in an extended field of view and with gentle imaging conditions to avoid phototoxicity and fluorochrome bleaching. In addition, analysis of large sample sets is required to generate data with statistical significance. High-throughput imaging allows systematic measurement of key cellular parameters such as cell division, apoptosis, migration, immune responses, and metabolic changes.

Researchers increasingly use endogenously tagged genes in imaging rather than overexpressed reporters. These tags better reflect physiology but are expressed at low levels, making imaging technically demanding. Sensitive instrumentation is therefore essential, and phototoxicity and bleaching remain major challenges.

Beyond live imaging, both basic and especially translational research such as drug screens, rely on automated high-throughput imaging that combines sensitivity, volumetric capability, spectral flexibility, and high resolution. Further, core facilities need to accommodate a large variety of sample types, often with highly differing characteristics (e.g., bulky samples, different vessel types, coverslips, labelling schemes, label-free, etc.). This calls for a versatile instrument that can adapt to different imaging situations.

2.2 Current instrumentation at AMCF and operating landscape for the new system

AMCF currently operates several point-scanning confocal microscopes and widefield microscopes, as well as an older model Yokogawa CSU-X1 spinning disk system. **The new system is intended to replace the functionality of the CSU-X1 and should additionally supplement the functionality of our point scanning and widefield systems.**

For image analysis, our users currently rely mostly on academic software such as Fiji/ImageJ, CellProfiler and QuPath on PC workstations in our computer lab. While these programs are very powerful, their complexity sometimes poses a significant hurdle to non-expert users. **The new system must include accompanying analysis software to enable efficient workflows for quantitative measurements and data visualization.**

Currently, transfer of data from microscopes to analysis workstations happens via sFTP. This has become a major bottleneck in image analysis, especially for large data files. Our goal is to provide our users with efficient image analysis options with minimal need for time-consuming data transfers. **For the new system we will strongly value the inclusion of a dedicated high-end storage and analysis solution.** Ideally, this solution should have remote desktop functionality so users can log in from anywhere using their own PCs, thus removing the need for a computer lab with physical workstations.

In summary, the build, configuration, and technical quality of the microscope and image analysis solution offered should consider all aspects mentioned above.

5 Table of requirements

The requirements in the table of requirements form the basis for the Supplier's description of its solution specification, cf. Appendix 2. The Supplier must give an extensive description of all requirements so that the Parties will have a common understanding of what is to be delivered, or which can give the Buyer alternative perspectives to the requirements expressed in the Buyer's requirements specification.

The different requirements have different priority.

Priority A = Absolute requirements that must be fulfilled. Tenders that do not fulfil all the absolute requirements will be rejected.

Priority B = Important requirements that should be fulfilled, but it is not an absolute requirement. Answers will be of great importance for the evaluation of the tender. The requirements are weighted higher than C-requirements.

No.	Priority	Description
1		Microscope and accessories
1.1	A	The offer includes a fully motorized and encoded research-grade inverted microscope.
1.2	A	The offer includes an anti-vibration table.
1.3	A	The microscope is equipped for eyepiece observation.
1.4	A	DIC is possible with at least one high-magnification lens.
1.5	A	The microscope is equipped with an LED light source for eyepiece observation, suitable for excitation of DAPI, EGFP, and mCherry.
1.6	A	DAPI, EGFP, and mCherry can be viewed individually or together by switching only the excitation wavelength.
1.7	A	The microscope is equipped with a motorized xy scanning stage, controllable via both joystick and software.
1.8	A	The stage has inserts to accommodate slides (75 x 25 mm), LabTek-type chambered coverglass, 35 mm and 60 mm Petri dishes, and multi-well plates (127 x 85 mm).
1.9	A	The microscope is equipped with a z-piezo stage.
1.10	A	The microscope is equipped with a focus stabilization mechanism to correct for focus drift.
2		Environment control
2.1	A	The microscope is equipped with incubation equipment to produce a humidified atmosphere of 5% CO ₂ and ≤ 1% O ₂ with all stage inserts provided.
3		Imaging
3.1	A	The microscope is equipped with a spinning disk confocal unit.

3.2	A	The spinning disk has pinhole patterns suitable for imaging of cell monolayers, 3D organoids, and small model organisms.
3.3	A	The following laser lines (or equivalent) are included: 405 nm, 488 nm, 555 nm, 640 nm.
3.4	A	A near infrared laser line (735 nm or equivalent) is included.
3.5	A	The system is equipped with all optical elements necessary to excite, detect, and reliably separate fluorochromes in blue, green, orange, red, and infrared.
3.6	A	The microscope can acquire and overlay brightfield images with fluorescence images.
3.7	A	The microscope is equipped with two high-end monochrome cameras.
3.8	A	The microscope is equipped with a color camera.
4		Objectives
4.1	A	A low-magnification lens (for overview images) is included.
4.2	A	A 10x plan apochromat lens is included.
4.3	A	A 20x plan apochromat lens is included.
4.4	A	A 20x lens suitable for thick plastic bottom plates is included.
4.5	A	A 20x plan-apochromat water immersion lens with large working distance is included.
4.6	A	A 40x plan apochromat water immersion lens with large working distance is included.
4.7	A	A 60x plan apochromat oil immersion objective is included.
4.8	A	A 100x plan apochromat oil immersion objective is included.
5		System PC and software
5.1	A	The system is equipped with a PC and monitor(s).
5.2	A	The PC has acquisition software installed to control the microscope, with functionality (modules and extensions) to perform imaging as described above (see section 2.1 “Intended use of the microscope and image analysis solution”)

6		Data storage and analysis solution
6.1	A	The system is delivered with a data storage and analysis solution, consisting of a powerful PC workstation or (preferably) a dedicated high-end storage and analysis solution with remote desktop functionality.
6.2	A	The data analysis solution provided includes software with functionality (modules and extensions) to perform image analysis as described above. (see section 2.1 “Intended use of the microscope and image analysis solution”)
7		Warranty, service, and training
7.1	A	The offer includes a maintenance visit and full system check and alignment immediately before (<1 month) the warranty period ends.
7.2	A	The offer includes a detailed plan for super user training on the microscope for at least two core facility staff members.
7.3	A	The offer includes a detailed plan for a course in image analysis for core facility users.