

LAAS-CNRS micro and nanotechnology platform user guide



Operating instruction

All the documents/links mentioned in this booklet as an hyperlink are downloadable/accessible on the intranet.

My informations

Name:

First name:

Department:

Scientific team:

Scratching non relevant information:

> IT/BIATSS

> PhD

> Researcher/Professor

> Intership

> Non academic

> LAAS-CNRS member

> External to LAAS-CNRS

My projects in cleanroom (ask your manager)

Name:

Renatech Reference (type P-14-00215):

Technical coordinator:

Name:

Renatech Reference (type P-14-00215):

Technical coordinator:

Name:

Renatech Reference (type P-14-00215):

Technical coordinator:

Summary

The platform and TEAM technical staff 4

- ▶ Welcome to the micro and nanotechnology platform
- ▶ A long expertise in micro and nano manufacturing
- ▶ Renatech network member
- ▶ TEAM organization
- ▶ Comteam (activities reporting commission)
- ▶ Applying for a new project

Health, safety, working conditions 10

- ▶ Safety rules
- ▶ Introduction of products and equipment
- ▶ Contribution to clean room security (sunny hour)

Access to the clean room and formation 12

- ▶ Access to the technology platform
- ▶ New users practical training
- ▶ Technology training

Working in the platform 15

- ▶ Equipment (list and booking)
- ▶ Process files and billing
- ▶ Applying for a new project
- ▶ Getting supplies
- ▶ Asking for photolithography masks
- ▶ Visiting the cleanroom

Leaving the platform 18

- ▶ Anticipate your departure

Welcome to the micro and nano technology platform!

Having this booklet into the hands indicates that your work at LAAS-CNRS drives you in the micro and nanotechnologies platform. It concentrates a shared set of resources, scientific and technical expertise to provide the best possible environment. All users, wherever they come from, have the same rights and duties. Enjoy your presence to drive technological developments and store knowledge on techniques and procedures, participate in community life.

At first the platform presents many aspects that can seem complex.

- > Infrastructure requires strict procedures for optimal operation in terms of safety of people and materials and of process success.
- > The multiplicity of developed areas of expertise even though they are not always compatible results in a necessary attention at all times to avoid difficulty to identify cross-contamination and sources of disappointing final results.
- > Users with various micro and nano production experience and also very various and scientific origins must interact with the goal of their own projects but considering the impact their actions can have on the projects of others.
- > The multiplicity of projects with the goal of identical quality of treatment for all.
- > The management of activities, administrative procedures related to security which apply to everyone and "a fortiori" in a structure with so many resources, people and including running cost as a heavy burden.

This led to develop procedures that may appear restrictive, but whose only purpose is to respond to these complexities, while leaving a maximum of flexibility to users. With a little experience, common sense, good will and a strong collective mindset, you will quickly understand these operating mechanisms.

Your opinions and suggestions are welcome to help us continue to improve collectively our ways of working together.

Keep this guide at hand; it is a concentrate of essential information.

The first part allows discovering the context surrounding the cleanroom, the Organization of the TEAM service in charge of its operation, the role of Comteam.

The following part deals with health and safety specificities.

Then come all the information on the procedure that allows to independently access the means of the platform. You must carefully follow all of the steps to especially meet the legal obligations in terms of security. Once access validated,

derogate from the rules you acknowledge reading and understanding can engage your responsibility.

You will also find practical information on the training that will be provide or offer throughout your stay.

The fourth part deals with daily activities in the clean room. How to book facilities, write all your operations (process data sheets) and their billing, the declaration of a new project, getting supplies, and arrange a visit.

Finally **the last part** allows you to prepare your departure. This step is essential to allow us to ensure the sustainability of the work that you have driven, manage material contingencies, but it is also an opportunity to edit a certificate summarizing your activities and that could be useful in your future professional activities.

Have a nice stay!

TEAM staff

A long expertise in micro and nano manufacturing

Born in 1968, LAAS is positioned in the areas that are still his, **microelectronic, automatic, computing and robotic**. To support research, the technical means are share. First distributed in various rooms, they were during the time join in what are today the platforms.

In the early 1970s, microelectronics activities were supported by means of characterization and a few prototypes manufacturing equipment.



Microelectronics room
in the early 1970s



Photolithography area
(1976-2005)

The micro manufacturing activities growing, the first microelectronics cleanroom opened in 1976 on a surface of some 450 m² spread over several buildings. It is in this environment that new skills in Photonics and Microsystems are developed .

The number of projects, users, the diversity of the topics and equipment, technical skills continue to grow over time. This dynamic helps LAAS to be identify as one of the sites of Renatech network, emerging in the early 2000s. With a plan of national funding and the support of its partners, the laboratory built in 2005 and 2006 the micro and nanotechnologies platform which today covers 1600 m² dedicated to micro and nano fabrication.

6

35M€ equipments
180+ users/year
150+ projects/year



Views of the technology platform

Areas of technological know-how

- > Micro and nano electronic
- > Photonic/optic
- > Microsystems
- > Biosystems, biophysical, bioelectronic



A member of Renatech network

LAAS-CNRS platform is a part of advanced micro and nanotechnologies equipment french academic network driven by CNRS. <https://www.renatech.org/en/>
The goal is to develop, maintain, and provide a competitive infrastructure for research and R&D in micro and nanofabrication, working with academic or industrial customers.

The platforms are distributed throughout the french territory to ensure the necessary proximity to the realization of the projects.

With this network, applicants have access to an ecosystem rich in skills and innovative and benefit from services designed to support them throughout their projects.

All support applications on <https://www.renatech.org/projet/>



The visibility of the network is essential to its sustainability. For this purpose, all users undertake to include systematically the following sentence in their communications (journals, poster, and reports)

This work was supported by LAAS-CNRS micro and nanotechnologies platform member of the French RENATECH network.

TEAM Organization

TEAM (Techniques and Equipment Applied to Micro and nanotechnology) provides technological support to research activities for the prototyping of micro and nano components.

It is in charge of the operation and the development of the micro and nanotechnologies, which pools in the clean room all the laboratory means for fabrication in the field. This cleanroom is a component of the national [Renatech](#) network of large technological cleanrooms.

[Functional organization](#) is on the intranet.

All members of the staff have expertise in specific areas in which they ensure the management, development, foresight of the equipment and processes; training and coaching of users. This activity allows them to have a global vision of whole the projects supported.

In addition, staff is more particularly involved in scientific projects, as technical coordinator and/or Director. This activity allows them to provide support on an issue related to their expertise.

This double competency (in the areas and on the projects) allows extending the scope of their competencies and avoiding compartmentalization.

Annually the service activity is reviewed by a commission (ComTEAM), chaired by the Director of the laboratory.

Contacts

Hugues Granier
granier@laas.fr

Service: ita-team@laas.fr

Comteam (activities reporting commission)

If the interactions between all the actors involved are daily, a commission (ComTEAM) chaired by the Director of LAAS-CNRS takes regularly place. It is composed of the Director, the Manager of TEAM staff and his deputies, representatives of the 4 departments (2 permanent and a PhD student per Department) concerned by the platform activities.

This commission can:

- > present the results of the activities carried out;
- > draw perspectives on structuring actions (investment, personnel, security);
- > exchange on current procedures and the relevance in developing/adapting news;
- > address the daily non-solved problems.

Through reports and documents of record, all members of the lab have access to the commission work content. They can contribute through their representatives.

It is therefore essential for the collective answering promptly the requests as well as reading the decisions of this commission.

Applying for a new project

Any activity in the cleanroom is connected to an identified project.

You must register and apply for your project on the site <https://www.renatech.org/projet/>

With the procedure [new procedure application RENATECH](#)

If you are a LAAS member attach your application the comTEAM completed request form with the information available to you.

Safety rules

The micro and nanotechnologies platform is subject to the same rules as all the laboratory <https://www.laas.fr/prive/intranet/hygiene-et-securite#english>

Nevertheless, micro and nanotechnologies platform specific rules are presented during the training to allow its access.

You must take knowledge of Micro and nanotechnologies platform specific prevention plan.

Do not hesitate to address any question, comment, proposal granier@laas.fr

Respect of organization

The Micro and nanotechnologies platform is an open structure hosting very various projects from people with skills and objectives all also various. It is everyone responsibility to comply with the Organization, and to propose changes.

It was held at the ComTEAM of June 28, 2017, the possibility of sanctions against those who do not respect the collective mind («Sunny hours», risk behaviours, equipment failure, etc.). These incremental sanctions will be apply if the consultation has not solved the situation.

- > **First observation:** interactions with the TEAM manager to identify the cause of the situation and bring possible patches
- > **Recidivism 1:** explanations in presence of the Director of the LAAS-CNRS
- > **Recidivism 2:** definitive expulsion of the Micro and nanotechnologies platform

Introduction of products and equipment

1. Introduction of chemical product

Application submitted for validation: <https://sysadmin.laas.fr/securise/RICH/Pages/index.php>

[RICH application manual](#)

2. Introduction of new equipment

Application submitted for validation: demandesupportteam@laas.fr

The service is responsible to organize and perform the installation according to the safety rules and the constraints of service.

Contribution to safety in Micro and nanotechnologies platform (sunny hours)

Every cleanroom user is requested 2 - 3 times a year to help friday from 15:30 to 16:30 at the storage, supply, calibration and inspection of chemistry, Photolithography and characterization areas and equipment.

To help you organize yourself

- > a quarterly planning is released by mail;
- > you are revive the week before your intervention.

If unavailable, you must seek a person who will replace you in your entourage or last spring indicate your vacancy. If one of these situation please supply information to soutienteam@laas.fr.

We will analyze together the causes of any unanticipated absence.

Access to the Micro and nanotechnologies platform

Working in the Technology platform opens up your rights but also commits your responsibility.

It is necessary to follow a specific procedure to access it in autonomy.

Your only initial action is to fill in online all the items requested in the [Platform Access request form](#).

Get help from your manager.

From this information

1. We will tell you your application IDs in

- > Online reservation of equipment: <https://lims.laas.fr/default.aspx>
- How to use: [LIMS LAAS Manage your user account](#)
- > Project management in the Renatech network: <https://www.renatech.org/projet/>

2. We will register you

- > In the « clean room user » alias
<https://sympa.laas.fr/sympa/subscribe/utilisateurssalleblanche>
- > At the [Moodle de l'Université Paul Sabatier](#) to follow the course modules in mandatory lines before the practical training

3. We will propose your training dates

The date of your full and complete access in the platform will depend on the speed of your responses to solicitations.

For any question formationteam@laas.fr

Practical training for news users

Everyone who request access the platform must receive training. It is only after all of these sessions the access badge is active.

1. General training

All sessions are held at 2 pm in supervision room. [Calendrier formations générales](#)

To prepare see: [Introduction au travail en salle blanche](#)

2. Technical training

They familiarize themselves with the working procedures of self-service areas. [Calendar 2017/2018](#)

> Chemistry:

- « The chemical risk in Cleanroom: spot it, to protect themselves, treat a possible difficulty. »
- « The chemistry area: functioning and practical use »

> Photolithography:

- Presentation of the functioning of the area and safety procedures;
- Realization of a manual photolithography process: HMDS, spin coater, hotplates, MA 6, development.

> O2 Plasma:

- Presentation and use of 2 O2 plasma equipment.

> Characterization:

- Overview of the equipment to image and measure the components.
- Practical training on the mechanical profilometer

Contact:
[formationteam@
laas.fr](mailto:formationteam@laas.fr)

Technological training

They provide the necessary elements to understand the aspects involved in the realization of the components.

They take place in several phases: [learn more](#)

Calendar

Calendar and content Phases 1 and 2 (mandatory):

<https://www.laas.fr/plateformes/centrale-micro-nano/en/technological-training>

Phase 3 (optional) : registration for the various modules during the first quarter of the year by replying to an e-mail.

Equipment (list and reservation)

Information in relation to the equipment are available on the booking/logging application: <https://lims.laas.fr/default.aspx>

1. List

In the **Tools** menu / **All tools**, you can search using the filters available at top of page.

2. Booking

To make best use of this application and especially make bookings download « [Features of lims application for users](#) ».

Process forms and billing

Funding of activities in the platform relies on process form that allow to note the details of operations carried out like in a laboratory notebook. Therefore, it is imperative to have a process form.

- > To obtain a process form complete the online form : [Request for a Process Form](#).
- > The use of these forms obeys the rules recalled here: [How to rate the operations on the process forms](#)

The application of these procedures allows then to begin the process of billing at the request of one of the following actors:

- > TEAM service
- > Form holder
- > Project manager

Getting supplies

> General supplies (notebooks, pliers, glass, boxes, ...)

To stock up on supplies compatible «white room» prepare your request by consulting the catalog of referenced supplies (use the shortcut «ctrl + F» to facilitate the search for the supplies you are interested in).

Make your request using the [online form](#)

As soon as the supplies are ready you will be notified by email and they will be available to your name in the platform entrance.

For specific supplies, contact **V. Luque** (Office F26) during the morning.

NB : you should note these supplies on your listing process under the F-FRAI code at a zero cost.

> Substrates

For substrates ask to Photolithography area members.

(photolithographie@laas.fr).

NB : you should note these substrates on your process form under the code FOURNITURE at the cost advertised by the person who gave you the substrate.

> Specific technical supplies (produits chimiques, materials, ...)

Contact TEAM personnel in charge of the area affected by the requested provision. They will manage the entire procurement process.

NB : you should note these substrates on your process form under the code FOURNITURE at the cost advertised by the person who gave you the supply.

Asking for photolithography masks

For the realization of your masks we recommend using the CleWin drawing software and request a training for the good uses of the software to [Pierre-François Calmon](#).

To design your masks, you will need to add some [mires d'alignement](#) and [motifs de résolution](#).

To complete your request, you must complete the [fichier de demande des masques](#).

Then send it or get help from: [Pierre-François Calmon](#) or [David Colin](#).

Visiting the clean room

Due to security and service reasons any request must be made at least 24 hours before a visit.

Ask TEAM manager: granier@laas.fr indicating the calendar, the number and the origin of the people as well as the reason for this visit.

External visitors must first report on the application <https://www.laas.fr/visiteurs/>.

Leaving the platform

The month before your departure, indicate it to soutienteam@laas.fr

It will be possible at the time of your departure to:

- > disable your accounts and badges;
- > invoice your process form;
- > get your outfit;
- > store your supplies and samples;
- > edit on request a certificate summarizing your activities and will help you in your course or job search.

Notes

■ Le LAAS est un laboratoire de recherche du CNRS birattaché à l'institut des sciences de l'information et de leurs interactions (INS2I) et à l'institut des sciences de l'ingénierie et des systèmes (INSIS). Il est associé à cinq établissements d'enseignement supérieur de l'Université Fédérale Toulouse Midi-Pyrénées : l'Université Toulouse 3 - Paul Sabatier, l'Institut national des sciences appliquées, l'Institut national polytechnique de Toulouse, l'Université Toulouse 1 Capitole et l'Université Toulouse 2 Jean Jaurès.

Il regroupe environ 700 personnes (chercheurs, enseignants-chercheurs, doctorants, post-doctorants et ingénieurs, techniciens et personnels administratifs).

Ses recherches sont menées au sein de 26 équipes réparties en 8 départements scientifiques dans 4 champs disciplinaires :

- > Informatique ;
- > Robotique ;
- > Automatique ;
- > Micro et nano systèmes.

■ LAAS is a laboratory of the French National Center for Scientific Research (CNRS), within the INS2I and INSIS Institutes. It is associated to the French University Midi-Pyrénées of Toulouse.

It hosts more than 700 people (research scientists and faculty members, PhDs, postdocs and engineers, technicians and administrative staff).

The topics cover the following areas:

- > Computer science;
- > Robotics;
- > Automatic control;
- > Micro and nanosystems.