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ACCÈS SCIENTIFIQUE À LA  
TOMOGRAPHIE À RAYONS X



## The MNHN's X-ray Tomography Imagery Platform Presentation and Operating Procedure

### Objectives

The "AST-RX" platform's main objective is to allow the microtomography and nanotomography scanning of natural science specimens aiming to value and preserve MNHN collections. The platform is open to MNHN staff, as well as external scientists and curators, wishing to perform tomographic analyses on MNHN collections specimens for scientific research, conservation, expertise, training or knowledge dissemination. Specimens that are not part of the MNHN collections may be scanned under certain conditions. The equipment's technical capabilities allow the tomographic analysis of specimens of varying sizes (from sub-millimeters to dozens of centimeters) and of different densities (organs, insects, amber, present/fossilised tooth and bone, minerals, meteorites...) allowing a wide range of applications.

### Presentation

The "Scientific Access to the X-Ray Tomography" platform (AST-RX *in french*), is attached to the UMS CNRS/MNHN 2700 "Outils et méthodes de la systématique intégrative" (Tools and methods for the integrative systematic approach) led by Uctej "Uco cfk This platform has two scientific directors, Antoine BALZEAU and Kcdgmg" TQW GV and a technical manager Mc14' "CF CO. Its operating is coordinated by a technical and operation committee. The platform equipment includes a computed tomograph (CT) for microfocus and nanofocus analyses. The «v|tome|x L 240-180» model from GE Sensing & Inspection Technologies phoenix x|ray. The X-Ray Tomograph is located in Building 140, îlot Poliveau - 43 rue Buffon, 75 005 P aris. The main features of the « v|tome|x L 240-180»: two interchangeable tubes: (240 kV/320 W microfocus tube X-ray detectability reaching 1 µm and 180 kV/15 W nanofocus tube X-ray detectability reaching 500 nm), 400 × 400 mm detector 2024<sup>2</sup> pixel matrix (pixel size: 200x200 µm).

### Operating Procedure

Access to the X-Ray Tomograph is allowed after a "downstream" project evaluation by the technical and operation committee. The application submission is done electronically.

## **Application form Composition**

(Fill it in at <http://formulaires.mnhn.fr/en/ast-rx/numerisation>)

1. Project title,
2. List of participants (a proponent and collaborators). The tomographic acquisition proponent must also be the project manager for the museum or science project requiring these acquisitions,
3. A summary (selected projects may be posted on the platform's website and in the dissemination documents produced by the platform),
4. Method contributions. Details of the tomographic analysis interest (what is the contribution of CT to your project? What structures do you wish to highlight? What sort of post-treatment analysis will be used? etc.),
5. Project Frame. Explanations concerning frame context of the project. Master, PhD, funded research program (ANR, ERC, PICS, etc.), preventive conservation, exhibition, restoration, etc.,
6. Material and methods: details on the material to be scanned and technical requirements (number of specimens, sizes and photographs, known acquisition parameters). Inventory numbers for specimens from the MNHN. Desired period for scanning (and possibly downtime),
7. Administrative information.

## **Evaluation methods**

File completion and submission procedure follow-up are criteria for application admissibility. For example for a project concerning MNHN specimens: the collection curator concerned, and hence the directors of the MNHN collections, MUST be consulted before filing the application form via the Colhelper interface (<http://colhelper.mnhn.fr/>). Inventory numbers for specimens from the MNHN are mandatory. The application evaluation is performed by a technical and operation committee to ensure their feasibility (technical adequacy of demand with acquisition equipment).

A timetable is continuously generated over a period of weeks to perform scans in a short time while having enough flexibility for the platform to organize different sessions. A waiting list is put up in preparation for possible cancellations. If the schedule is busy, priority will be given to requests 1) for Master students and PhD students 2) MNHN staff and 3) outsiders. The call for proposals will close if the number of successful applications exceeds the platform's scanning capacity over the given period.

## **Technical and Operation Committee Composition**

The role of the platform's technical and operation committee is to assess the feasibility and relevance of projects and to organize the order of priority. The composition of its members is adapted to the specific scientific and technical needs.

It includes:

The platform scientific directors and operators, the collection curators concerned by each application form, as well as those internal or external to the MNHN chosen for their

expertise in the imagery field or in a specific scientific field linked to the projects submitted to evaluation.

### **Operating Committee composition**

The role of the platform's operating committee is to follow up and to propose advises concerning the general scientific, administrative and financial politics of the platform. It includes:

The scientific and technical responsables of the platform, the director of the UMS 2700, a member of the « direction des collections », a memeber of the « Direction de la Recherche, de l'Expertise et de la Valorisation » and people from the MNHN and from other institutions selected for the skills in the field of imaging methodologies.

### **Pricing**

It is important to remember that the project manager must be the one that does the data analysis and linked research work (or the operating museoraphy). An estimate is made based on the number of specimens to scan (or estimated time of analysis), whether or not specimens belong to the MNHN collections, and the institution responsible for credit:

<b>Project Manager</b>	<b>Specimen(s)</b>		<b>Pricing Code</b>	<b>Price</b>
	<b>MNHN Collection</b>	<b>External</b>		
MNHN staff	X		A	125 euros/half a day or 250 euros/day
		X	B	300 euros/acquisition
Outsiders	X		B	300 euros/ acquisition
		X	C	600 euros/ acquisition

Thus, a MNHN staff member<sup>1</sup> working on specimens from the MNHN collections must pay a fee (pricing A, 125 euros for half a day and 250 euros for a day) regardless of the number of specimens scanned during this period.

MNHN staff wanting to scan a specimen which does not belong to the MNHN collections will be charged the B fee (300 euros per scan). An external person trying to scan a specimen of the MNHN collections will also pay the B fee.

An external person wishing to scan a specimen of the MNHN collection will pay the C fee (600 euros per scan). Exceptions may be envisaged in this case, also, if a member of the MNHN staff wishes to scan external specimens (in particular for the acquisition of a comparison series) if the project manager and collection curator external to the MNHN undertake to make the produced digital data available without restriction to the scientific community. Finally, a Synthesys visitor can benefit from the A fee. A 10% reduction may be granted beyond 10 acquisitions.

NB: A VAT of 20% applies to payments, except for internal transfers inside the MNHN.

### **Becoming established imagery data**

For specimens from the MNHN collections: the digital data produced is always transferred from the platform exclusively to the managing data service of the Collections Bureau. This service will then transfer the data to the project manager who has obtained slots on the acquisition platform.

For specimens that aren't from the MNHN collections: the digital data produced is transferred from the platform to the project manager who has obtained slots on the acquisition platform and to the curator in charge of the specimen(s).

Images from the scans realized on specimens from the MNHN collections are the property of the MNHN. The right to use of these images is given for single use, and for the purpose defined in the original request for use authorization. Upon reasoned request, a period of exclusive use of the scanned data for 1 year (renewable once) can be considered. It can only be seen with the approval of the MNHN Collection Bureau, the concerned collection curator concerned and the technical and operation committee. Any new use of part or all of the images is subject to authorization from the MNHN Collections Bureau. The borrower agrees to surrender all his rights relating to the dissemination and reproduction of images. The borrower is in no way authorized to distribute scanned data to other institutions or research laboratories. The use of this scanned data for profit (selling images, 3D modeling, 3D replicas, etc.) is strictly prohibited.

### **Dissemination of scientific results**

The scientific directors and the operator, as well as other technical and operating committee members, shall respect the confidentiality of the work presented in all applications submitted for evaluation. They cannot be co-authors of any work based solely on their role within the platform and for which they wouldn't have made a real scientific and consistent contribution.

Publications resulting from work done within the platform must be at least mention the UMS 2700 in the acknowledgments, under the terms « **AST-RX, Plateau technique d'accès scientifique à la tomographie à rayons X du MNHN** » and « **UMS 2700 outils et méthodes de la systématique intégrative CNRS-MNHN** ». A publication copy of which all or part of the work was done on the AST-RX platform must be sent when published to the scientific directors or technical managers responsible for the platform, as TAP or PDF files.

Each project manager selected for scanning on the platform must send at the end of the year an exhaustive list of his works (publications and conference papers) to scientific directors or the platform operator.

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<sup>i</sup> The " MNHN staff" category includes all staff assigned to the museum or attached to a research unit under the supervision of the museum. Any other applicant will be considered "external".