

Platform Plemo 3D

Established in 2015 within the Faculty of Arts at Sorbonne University, the PLEMO 3D platform provides the latest technical innovations for research and heritage preservation.

The platform was co-founded by [Dany SANDRON](#) and Eduard ANTALUCA (MCF, UTC) in partnership with CNRS and the MNHN (National Museum of Natural History). PLEMO 3D offers a range of services covering different phases from digitization to valorization. The equipment acquired since 2015 enables digital acquisitions of heritage objects from microscopic scale to urban scale. The equipment is easily transportable for field use (archaeological sites, architectural surveys, urban and landscape research, museum collections), both in France and abroad, with recent interventions in England, Belgium, the Czech Republic, Italy, Greece, Switzerland, Morocco, Tunisia, Bolivia, Chile, and Japan. Two engineers, specialized in art history and archaeology, ensure the scientific rigor necessary for project implementation and are responsive to the needs of their partners.

The sustainability, preservation, and archiving of digital data are ensured by the SACADO service unit (Sorbonne University) and the 3D consortium of the Huma-Num infrastructure (CNRS).

Mediation and valorization of research projects are also priorities for PLEMO 3D. Thus, media obtained after processing (3D images, models, animations, videos, etc.) can be used for communication and valorization operations, ensuring wide dissemination of the work. Interactive 360° virtual tours are also offered using HDR (high dynamic range) photography. The platform is part of the Pamir DIM (Domain of Major Interest) and has benefited from funding from the STCN DIM for the purchase of numerous equipment. The services offered include:

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[Platform website](#)

Services offered

- Laser scanning: PLEMO 3D's various laser scanners allow for the digitization of small objects (2/3 cm) up to monumental buildings or urban sites with high speed and millimetric precision. Laser scanner acquisitions provide a 3D model composed of a point cloud, a virtual model that can be colorized.
- Photogrammetry: This 3D digitization technique relies on a substantial set of photographic shots with high overlap, resulting in a 3D model with accurate colors and textures of the scanned objects. Two types of techniques are used: aerial photogrammetry by drone and terrestrial photogrammetry with a tripod.
- Digital microscopy: The platform's two 3D microscopes and their HD screens offer immediate visualization of studied objects, and a photogrammetric scanning system is integrated into the microscopes.
- 3D modeling: For 3D reconstructions mainly related to research in architectural history and archaeology, 3D computer graphics techniques provide a powerful design tool. Two software, SketchUP Pro and Blender, are mainly used for 3D modeling by the platform's engineers.
- Virtual tours: Interactive virtual tours are created from HDR shots, where illustrations, videos, audio comments can be inserted throughout the tour. Files integrate seamlessly with any type of website and social networks for global dissemination.

Trainings

Since 2016, around a hundred training sessions and workshops on new technologies have been offered to students and faculty at Sorbonne University. In 2021-2022, around twenty training sessions were conducted by our research engineer, [Camilla Cannoni](#). Since October 2022, doctoral and monthly continuing education courses have been scheduled:

- Photogrammetry: handling and data processing
- Laser scanning: handling and data processing
- GIS: QGIS software
- CAD: mastering graphics software (Adobe suite)
- Database: Heurist

Equipment

- 2 Faro Focus 360° laser scanners for monument, indoor and outdoor building digitization, and urban scale sites with centimeter precision.
- 3 DJI drones including a Phantom 4 Pro with RTK station for 3D photogrammetry digitization of buildings, indoor and outdoor, and urban scale sites.
- 1 Artec Spider scanner for manual scanning of medium-sized objects (museum collections, decorative objects, etc.) with 2 mm precision.
- 1 Artec LEO scanner for manual scanning of large objects (sculpture, architectural ornamentation, etc.) with 2 mm precision.
- 1 Faro Edge surface scanner for medium-sized object digitization with 50-micron precision.
- 1 complete 3D photogrammetry studio for digitization of small and large objects.
- 1 Hirox 3D microscope for microscopic digitization by vertical photogrammetry.
- 1 photographic studio for creating interactive virtual tours (on website).
- 3 dedicated graphic workstations for data processing and valorization (images, plans, sections, 3D animations, video editing, etc.).

Operations carried out between 2019 and 2023 by members of the Centre André-Chastel

Support for research projects

- Numérisation de la forteresse haute du site de Mistra (Grèce), [Élisabeth Yota](#), 2019-2022
- Numérisations des vestiges du Château-Neuf de Saint-Germain-en-Laye, [Emmanuel Lurin](#), 2021-2022
- Numérisation du Château d'Ainay le Veil, [Denis Hayot](#), 2019
- Numérisations et formations sur le Chantier école du prieuré de Mevres, [Sylvie Balcon-Berry](#), 2019-2020
- Numérisation de la chapelle décorée par Delacroix à Saint-Denys du Sacrement (Paris), [Barthélémy Jobert](#), 2019
- Numérisation de la chapelle décorée par Delacroix à Saint-Sulpice (Paris), [Barthélémy Jobert](#), 2019
- Numérisation du salon du roi et de la bibliothèque décorée par Delacroix à l'Assemblée nationale (Paris), [Barthélémy Jobert](#), 2020
- Numérisation de l'église Saint-Pierre (Chartres), [Quentin Favré](#) (doctorant), 2020
- Numérisation d'un bloc antique, Musée d'Étampes, [Nathalie Ginoux](#), 2020
- Numérisation et Visite virtuelle de la chapelle Sassetti dans l'église Santa Trinita (Florence), [Stéphane Toussaint](#), 2021 [Voir ici](#)
- Numérisations d'objets archéologiques (Perse), Musée du Louvre, Marjan Khodaei (doctorante), 2021
- Numérisations du pavillon de thé (Musée Guimet – Paris), [Jean-Sébastien Cluzel](#), 2021
- Numérisations des pavillons japonais restaurés du jardin Albert Kahn (Boulogne), [Jean-Sébastien Cluzel](#), 2021
- Numérisations des vestiges de l'ancienne abbaye Sainte-Geneviève (Lycée Henri IV-Paris), [Dany Sandron](#), 2021
- Numérisations de la forteresse basse et de diverses églises du site de Mistra (Grèce), [Élisabeth Yota](#), 2022
- Numérisation des éléments de temple japonais au Musée Cernuschi (Paris), [Jean-Sébastien Cluzel](#), 2022
- Numérisation de gravures rupestres préhistoriques (Fontainebleau), 2022
- Numérisations de statues des portails de Notre-Dame, musée national du Moyen âge, Thermes de Cluny, [Dany Sandron](#), 2022
- Numérisation du Pavillon de Thé, Musée Albert Kahn (Boulogne), [Céleste Gatier](#) (doctorante), 2023
- Numérisation de la basilique de Longpont-sur-Orge, Iliana Kasarska, 2022
- Visite virtuelle des chapelles Majeure et Strozzi de la Basilique Santa-Maria Novella à Florence (Centre André-Chastel), 2023.
- Numérisation des caves médiévales de la ville de Colmar (Centre André-Chastel), [Grégory Chaumet](#), 2023.
- 2 campagnes de numérisations de la basse-cour (forteresse) et de 3 églises du site de Mistra (Grèce) avec création de visites virtuelles, [Élisabeth Yota](#), 2023
- Depuis 2021, Numérisations hebdomadaires des décors de Notre-Dame de Paris, [Dany Sandron](#)

Communications and promotion

- Participation aux journées des plateformes Sorbonne Université, 2021-2022

- Journées Européennes du Patrimoine, septembre 2023, Parvis de Notre-Dame
- Participation à la fête de la Science, depuis 2016.
- Colloque sur le plan maquette de Charleville aux Archives nationales, 2023
- Conférence « l'apport de l'étude des caves pour la connaissance de l'habitat et l'espace urbain à Paris sur la rive droite (XIIe-XVIe siècles) » (Archives de Paris), 2023
- Participation au Séminaire Richelieu, histoire du quartier (INHA)

Documentaires

- Participation au documentaire « Paris, le mystère du palais disparu », série : Science grand format, France 5, 2023.
- « Le Louvre sous Philippe Auguste », Denis Hayot, https://www.youtube.com/watch?v=Jrlh3L3rACU&list=PLgaiRyhsaWKVm4MaNI4U3_vScq7_ExlwA

Chaîne [Youtube de la plateforme](#)