

CULTURAL HERITAGE: FROM ITALY SMART CONSERVATION AND PROTECTION FROM FIRE, BACTERIA, WATER

CLIMATE PHENOMENA REQUIRE THE USE OF THE MOST ADVANCED TECHNOLOGY

By Camilla Ghedini



Fig. 1 - Max Planck Institute. History of Art Institute of Florence.

Makros founded in 2018, is based in Ferrara, Emilia Romagna. its organization includes a technical scientific committee of biologists, mathematicians, physicists, computer technicians and scientists, architects, who direct research and development, to which about half of the profits are allocated. Makros owns six patents, which can be combined together. Clients are public, private and even religious authorities and institutions.

The floods that in recent years have been hitting Italy and Europe, strongly test the ability to protect and conserve the archival, artistic, cultural heritage of institutions, private individuals who own important collections and companies that have historical archives. Water, like fire, causes irreversible damages and losses, forcing to select which operations can be done to restore. The collective memory and identity of countries, territories and communi-

ties are affected. This is what Massimo Luise, founder of Makros srl, thought about when, in 2011 patented Blockfire, an archival fire protection system now combined with protection from bacteria and water. A fire is an occasional event, fungal proliferation and floods are directly connected to ongoing climate change and require Art managers to activate technological processes. It is no coincidence that the company, which is based in Ferrara, Emilia Ro-

magna, a region with constant hydrogeological risk, was recognized in 2023 by Fassa Bortolo and Fondazione Symbola - the Foundation for Italian qualities - among the one hundred excellent companies in the Fourth Report Italian Cultural Spaces Stories. What does Makros produces? Archival systems with the appearance of real design libraries that open and close, allowing access and consultation (see the various types in products, on www.blockfire.it,

English version). These libraries are micro ventilated, to let the contents breathe, they are equipped with a control unit that controls the closure in case of heat and flames and a system to monitor the internal environmental conditions. Makros' installations protect without external fire-extinguishing systems, which not only compromise the heritage but can harm humans. Compactable, they can reach a height of 6 meters and store several linear meters if not kilometers of documents and books. In Rami Barrack, the largest book center in Istanbul and the second largest in Turkey, Makros installations - designed to host 2 million books - are 27 kilometers long and 12 meters deep. A true three level citadel, the underground level built under the lake of the immense public park. At the Kunsthistorisches Institut in Florenz - Max Planck, the recently renovated and inaugurated institute of history of art in Florence, Makros has created systems to safeguard over two kilometers of documents, some inside the Palace, some in a basement, beneath an internal garden. The installations, in Italy, Europe and Asia, are countless: from Brera Institute of Science to Bordeaux International Art Museum, from Ankara Art & Sculpture Museum to Vatican Palaces. Then there is the Laboratory for the Restoration of Ancient Books, important Universities - Rome 3, Genoa, Ferrara, Milan Polytechnic, Turin - the Military School of Cecchignola (Rome), the Bank of Italy, Leonardo Aerospace. Without neglecting the Courts, health facilities,



ties, the Courts, health facilities, ethnographic institutes. Makros' clients are public and private. The need to protect and conserve - this is Makros' challenge - is everywhere. Just

think that 85 percent of the artistic heritage of museums and foundations is not exhibited. It is stored and often piled up in improvised exposed to air, infiltrations and dangers contain-



ers despite the existence of ministerial guidelines for their preparation and storage, with specific requirements in terms of safety of the systems and microclimatic parameters. If exhibited works are, in Italy alone 480 thousand, there are 4 and a half million in storage, theoretically they should be kept in good conditions in order to be consulted or exhibited in temporary exhibitions. Not counting the archaeological material and other materials known only to insiders.

The Makros system is certified by 6 patents, nationalized in Europe, as well as in the United States, Canada, China, Russia, Turkey. The work of the technical scientific committee made up of physicists, biologists, mathematicians, computer scientists never stops. For Makros, continuous research is es-

sential. It supports research in collaboration with important and prestigious partners - for example CNR in Florence- some of which have been published in important specialized magazines. Makros also uses the skills and spaces of the nearby University Technology Park (University of Ferrara) to carry on experiments. Each installation requires the study of internal and external environment and the material to be contained: from the canvases of the paintings to the paper of the codes, as well as fabrics, leather, furnishing. The key word is suitability, which presupposes constant technological advancement, skill refinement, continuous software improvement and updating. Special increased power sensors have been developed to detect environmental data, they have been placed inside the archive systems and they can export data even if they are in insulated structures. This way they feed data to the fungal proliferation prediction software. In case of detection of non-optimal conservation conditions, the software issues warnings to intervene and activate remedies which can also be automatic according to the parameters set by the Makros' technical scientific committee. The remedies include solutions for ventilation, dehumidification or humidification, solid support inhibition of fungal growth. Warning and remedies are remotely reported on devices. Each system is equipped with emergency batteries so that data are never lost. Makros uses non-carcinogenic materials, starting with paints and

insulation material. Luise's idea of Blockfire started from fire. Working with museums and archives, he asked himself: what is missing? Looking around he realized that a protection system was missing. There were fire extinguishers or automatic extinguishing systems but they were not enough. They solved only half of the problems. Putting out the flames didn't mean saving Art. So he started to do research. He wanted something that did not exist. After two years of study and comparisons with other systems he made it, he filed the first patent, Blockfire precisely, the result of a test at Giordano Institute, which certified that even with a thousand degrees outside temperature, his 'containers' remained structurally intact and offered a passive protection barrier against fire. From fire he also thought about water and bacteria, from protection to conservation, which must be a daily routine. His first, great intuition was understanding that, regarding flames, the so-called active protection systems had to be eliminated. The second, that proceeding by sectors did not make sense. "There were those who cared about fire, those about deterioration, those about water. A global vision was missing", he summarizes. In Italy he broke consolidated patterns, with the recognition of this protection technology by the Fire Brigade. For this reason, he says, it would be important to have a unique European legislation, thus overcoming the current fragmentation. And for this reason it is important to train the staff who will deal



with it. "There is nothing difficult - Luise begins - but knowing how to read the data is fundamental". Does protecting heritage cost money? "It also costs money to recover it. Nothing can be saved from fire and what is not damaged by the flames is damaged by the heat and subsequent extinguishing methods. What is saved from water must be frozen, then defrozed without passing through the liquid state, with very high costs. In both cases, restoration work is needed. Bacteria cause 'holes' in paper, in the wooden frames of paintings, etc. The cost is a false problem, because the risk is the irreversibility of the loss". And Luise cites the flood in Florence in 1966, with damaged works of art and millions of books submerged. The water and mud reached the Uffizi, the Baptistery, the Archaeological Museum, the National Library. Then the flood of Emilia Romagna, in 2023, with over 30 archives and libraries ending up under water and thousands of books that, taken to the cold storage rooms of food compa-

nies, are still waiting to be restored. Or the fire at the National Museum of Brazil, in Rio de Janeiro, in 2018, which marked the loss of 20 thousand objects but above all 200 years (opened in 1818, ed.) of knowledge and research. Or the recent one at Somerset House in London, a noble house transformed into a museum with paintings by Cezanne, Monet, Van Gogh and other artists saved by firefighters. Not less important the works of art attacked by biological agents, such as fungi, insects, bacteria, which presence is linked to humidity, therefore to poor conservation conditions, with consequent degradation. Luise, is organizing an international event in Ferrara, the city of the Este family, where the company's creative headquarters are located, the date will be Spring 2025. In the meantime, he monitors climate and meteorological changes, «which require us to accelerate the protection and conservation of the archival and cultural heritage, of which we consider ourselves defenders. The world

around us is changing rapidly. For Makros trusting science is an essential tool for Culture. "We want beauty all around us".

ABSTRACT

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KEYWORDS

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Orthomosaic of
Insula IV, Tindari
Archaeological
Park (UAV survey
and processing
by Andrea Di
Santo).

