UNLIKELY PARTNERSHIP REVITALIZES OUTDOOR SCULPTURES

At first glance, the worlds of the military and of art conservation could not seem further apart. However, from the conservation professional's perspective, unusual partnerships, as well as technology transfers, are an important part of the conservator's tool kit.

For example, several years ago the Getty Conservation Institute (GCI) looked to a technique in medical research that uses antibodies for detection assays, which determine the ingredients and quality of a substance. Hospital and research laboratories have used Enzyme-linked Immunosorbent Assay (ELISA) successfully to identify disease in tissue samples. GCI scientists modified and applied this well-established technique to identify proteins in paint binding media, such as animal glue, egg, and milk, as well as polysaccharides in plant gums. In another instance, scientists at the GCI adapted technology used in the NASA–designed Mars Science Laboratory Rover (which helps scientists probe the surface of Mars) to analyze antiquities, outdoor sculpture, and manuscripts at the Getty, as well as to examine excavated wall paintings at the Roman ruins of Herculaneum in Italy, for the purpose of evaluating the paintings' pigments, salts, and deterioration.

Above, left: *Source*, 1967, Tony Smith. Painted steel. Tony Smith Estate, Courtesy of Matthew Marks Gallery. Storm King Art Center, Mountainville, New York. Photo: Abigail Mack. © 2016 Estate of Tony Smith/Artists Rights Society (ARS), New York

Opposite top: Blackhawk helicopter. Photo: Sgt. Travis Zielinski

In 2001, efforts at the National Gallery of Art in Washington, DC, to identify durable high-performance matte coatings designed for outdoor sculptures led to an unlikely alliance between the US Army Research Laboratory (ARL) and art conservation professionals. For the military, concealment and camouflage require matte coatings, while in the art world appearance is dictated by the artist's choice. As a result of this collaboration, existing military camouflage paint formulations were adapted for outdoor sculpture by Alexander Calder and Tony Smith.

"When these artworks were being made artists had to choose coatings from what was commercially available, often from their local hardware store," said Abigail Mack, a conservator in private practice and a consultant for the GCI's Outdoor Painted Sculpture project. "Historically these paints had very poor durability plus dismal color and gloss longevity. Though other, more durable materials now exist in the marketplace, the choice is still limited by what the paint companies provide with very few options in the matte range. The idea behind adapting more durable chemistries is to have the appearance originally intended by the artist be preserved for a longer time."

Conserving painted outdoor sculpture presents many challenges, and matte (or low gloss) coatings are the most problematic in terms of durability. They are, however, ubiquitous, especially with sculptures from the 1960s, 1970s, and 1980s, when many artists favored a low-gloss aesthetic. The poor durability of matte commercial coatings in outdoor settings is well known. They are unavoidably overloaded with pigments and flattening agents, and they contain a minimal amount of resin. These factors, often exacerbated by poor choices of these pigments and flattening agents, typically lead to fading, streaking, marring, and degrading with each passing season until sculpture surfaces no longer resemble the original unexposed coating and fall far from the artist's intended look. In some climates, severe weathering and subsequent disfiguration have been documented to occur in less than three years.

For the last thirty to fifty years, these sculptures have been on a continuous cycle of painting and repainting, both for preservation and in an attempt to maintain their intended appearance. Treatments often are massive logistical and financial endeavors that strain collectors and institutions. Additional factors, including economic changes and shifting priorities, meant that visitors to cityscapes and

sculpture gardens have often only briefly witnessed newly painted objects as intended. As paint formulations changed and companies closed or transferred ownership, replacement paints were then chosen to best replicate the intended look of the object without established methods of ensuring aesthetic continuity. Moreover, it has often been the practice to choose a glossier paint than the original gloss level, with the expectation that it would then fade and chalk with weathering to the accepted level.

While the results of the National Gallery of Art's work with ARL in adapting camouflage paint formulations for outdoor sculpture were extremely promising, problems with the application properties of the paint were reported, arising in part from different working methods used by the Army and by conservators and local paint applicators. Recent coatings technology requires the implementation of sophisticated pretreatment steps and stringent industry surface preparation standards. The art conservation community is often still unaware of the additional steps used in industry or is generally reluctant to prepare sculpture surfaces to industry standards (using methods such as abrasive blasting) that have been proven to be necessary for good adhesion. Some of these methods simply cannot be employed to the same degree with works of art, and this may have been the cause of some premature failures. These problems highlight the need for further inter-professional collaboration.

In 2012, the GCI launched its own project focused on the preservation of outdoor painted sculpture. One of the important components of this effort has been to partner with the ARL coating team. Critical to this partnership was the participation of ARL chemist John Escarsega, a 2014–2015 Conservation Guest Scholar at the GCI. Escarsega was strongly supported in this by ARL's open campus initiative, which fosters these types of interaction and collaborations. The residency enabled a singular focus on the formulation of a new generation of outdoor coatings with enhanced performance, the Marathon Series, which captures key properties sought by both ARL and the Getty. Joining the GCI and ARL in this work is Mack, who works extensively with Calder's outdoor sculptures, and Niles Protective Coatings, the company manufacturing the paints formulated by the Army.

"It is an honor to be able to support and direct one's efforts to the men and women who serve our country with our military coatings, yet to also know that these similar coatings systems may also protect our cultural heritage and national treasures is a true joy and honor as well," said Escarsega.

The new paints were formulated by the ARL with the express goal of increasing their durability and ease of application. The formulations include two critical innovations: one is the use of lower molecular weight resin systems, which decreases the amount of solvent needed and lowers viscosity, thus resulting in enhanced application properties. The other is the use of Low Solar Absorbing (LSA) pigments, which contributes to effectively reducing solar loading—i.e., reflecting the sun's thermal energy and photons—not only reducing the heating of the coating and the underlying substrate, but also protecting the resin from harmful degradation of the coatings that occurs through ultraviolet exposure.

Above: On site application of high-performance coating for *Gracehoper*, 1961, Tony Smith. Welded steel and paint. Founders Society Purchase. Detroit Institute of Arts. Photo: Abigail Mack. © 2016 Estate of Tony Smith/Artists Rights Society (ARS), New York

Opposite: Application of Calder Red paint onto a section of *Jerusalem Stabile*, 1976, Alexander Calder. Sheet metal, bolts, and paint. Calder Foundation, New York; gift of the Philip and Muriel Berman Foundation to the Calder Foundation, 2005. Photo: Abigail Mack. © 2016 Calder Foundation, New York / Artists Rights Society (ARS), New York

Currently, because of the limited color choices of LSA pigments, the new paints have been formulated only in black, and a variety of different gloss levels are being explored to fit the different aesthetic requirements of artists, including Louise Nevelson, Tony Smith, and Alexander Calder. An essential aspect of the project is to work with artists, artists' estates, and foundations to replicate the approved appearance of their artists' sculptures using this novel coating technology. Having their input, as well as that from conservators and paint applicators, in the early stages while paint formulation is being developed is a unique opportunity. It means not only that appearances can be tailored, but also that other properties, such as viscosity and drying time, can be adjusted. The next step will be large-scale tests for paint applicators, followed by pilot applications to select sculptures, in collaboration with the relevant foundations and estates.

The commercial availability of these paints will be ensured through partnerships among the GCI, the ARL, and commercial paint manufacturers with a long history of collaboration with the ARL. In the long term, the goal is to expand the color and gloss palette available to fit the requirements of other artists.

"Our goal will be achieved by introducing different pigment packages into the new resin system so we'll have a much larger color palette but also, crucially, by working with an increasing number of artists' estates, foundations, and studios so they provide feedback as the paints are being individually formulated to match the specified appearance for their artist," said Rachel Rivenc, the GCI associate scientist leading the Outdoor Sculpture project. "It is our hope that more durable coatings will help sculptures maintain their appearance longer and ensure that the dialogue between the sculpture and the spectator continues."