

Using Innovative Imaging Technologies to Preserve the World's Cultural Heritage



Fusuma panels from the Ninnaji Shinden hall painted by Zaisen Hara (1849–1916). From left to right: Cherry Blossoms (*sakura*), Peonies (*botan*), Wisteria (*fuji*), Falconry outing (*takagari*).

Located in Kyoto, a city of culture, art and technology, the Ide Laboratory of the Graduate School of Engineering is central in developing state-of-the-art imaging technologies to digitally record and archive cultural properties in Kyoto and around the globe.

Our new high precision scanner system for cultural assets digitizes large artworks such as those on sliding doors (*fusuma*) and wall paintings, as well as documents such as antique architectural plans for important historical buildings. The scanner has an extremely high dimensional and color reproduction accuracy. The digitization process has been carefully developed to minimize its intrusive effects by developing appropriate light sources and by reducing the physical bulk of the scanner itself (the lightest machine is less than 30kg). We have also been successful in adding analytical imaging features which enables non-destructive and non-invasive analysis of material composition and color.

In 2011, we collaborated with Ninnaji Temple, a UNESCO-designated World Heritage site and an Important Cultural Property, to digitize on-site and record on a microscopic level, the contents of a building from the early Edo Period with wall paintings and sculptures. The world's most advanced analytical imaging technologies were utilized for the recording and preserving of the heritage assets. The database of pigments and colorants from this project are expected to significantly contribute to our gaining a better understanding of the art and technologies of the early Edo period.

In developing the hardware and software for this integrated scanner system, we have strived to attain greater two- and three-dimensional scientific data from higher resolution images, and to utilize this new knowledge in education and research, ultimately contributing to the appreciation and conservation of our culture.

We are currently working in China (Beijing, Xian), the UK (London, Belfast), Korea (Seoul) and Egypt (Giza, Cairo) as well as over 10 locations throughout Japan, to establish a global network of collaboration to preserve, utilize and pass down to the next generation the world's cultural resources. We hope that this technology from Kyoto will act as a catalyst in encouraging global interest in and renewing discussions on cultural heritage.



Each panel is scanned at a resolution of over 1.8 billion pixels.



Above: 18.7m high Nio-mon Gate (Important Cultural Property)

Below: The Shinden used for ceremonial purposes was first built in the 17th century, but was rebuilt in 1914 after fires being damaged by fire in 1887.



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