

# **GIS in Thailand: Current Uses and Some Suggestions for Art Historical Research Potential**

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The title of this talk is a little bit misleading, because this is not a comprehensive vision of either GIS as currently employed in Thailand nor its potential. Probably most of you in the audience know far more about Geographic Information Systems than I do. My interest is in art history, and the possibilities I am interested in all pertain to this area. It is a wish list rather than a report on what is now being done utilizing GIS in the service of art history. Prior to the wish list I would like to say a few words about some of the current priorities in Thailand for which GIS is being found useful.

I am starting with this picture, taken roughly a century ago, of a Siamese royal entourage lolling about the ruins of an ancient wat, or temple, because beyond the image is suggested more than privileged indulgence.

This is roughly the era, a bit late in it, in fact, when Thailand's governmental structure was changing from the premodern model of diffused aristocratic authority to a centralized, bureaucratized model directly under the royal family, a model akin to that of Siam's neighbors under the authority of various colonial metropolises. Among the redefinitions of the era was thinking about Siamese space differently. Under the authority of the Royal Survey, the land itself was being measured, mapped, documented, indexed, much as neighboring colonial surveys had proceeded to do, defining by default the measure of Siam's territory. In this regard I might refer those interested in this issue to Thongchai Winichakul's provocative "Siam Mapped."

Along with the colonial surveyors had come to Southeast Asia the amateur archaeologists, individuals whose local power and extensive leisure enabled the virtually unimpeded exploration and examination of the creative legacies of the past. In the Siamese case, it was the Siamese elite themselves who assumed, arguably from early in the nineteenth century, the roles of antiquarian explorers. With the creation of the Fine Arts Department and the Royal Survey, Siam put in place the institutions to define its space and its past.

Roughly a century later, we find a new variant in the possibilities for taking the measure of the land. The Royal Survey is increasingly contracting firms employing Geographic Information Systems in support of mapping activities supporting environmental and infrastructure activity. Maps of the entire country at a 1-50,000 ratio have been made; of

the 830 300 are available outside the government. The Bangkok metropolitan area is being mapped in much greater detail, with about a third of its 3,000 square kilometers already done, in detail as close as 1-4,000. But for the inopportune explosion of a satellite a couple of years back, maps for the entire country in greater detail would now be complete. Initially, GIS was used by private firms in land development, but increasingly over the last decade major contracts have been awarded by the government to consulting firms employing GIS.

The Communications Authority of Thailand has been one of the major beneficiaries of enabling GIS technology. It used to take 7-10 years to get a private phone, and when cellularity first became generally available in the 1980s the cost could be up to 100,000 baht. But now most Thais can afford the 10,000 B for a cellular (even considering this can be a months salary for, for example, a clerical worker). Metropolitan Electric of Thailand has been using GIS to locate assets, identify problems in terms of location and fastest route to the problem, and part numbers. It also uses Global Positioning Systems for locating and marking utility poles along roadways: a GPS van takes a photo every 10-12 meters, and the utility poles can be identified for frequency and location as well as location of transformers. The Highway department has used GPS similarly to inventory highway features, and is about to use it to monitor traffic patterns using a camera linked to GIS, a 500 million baht project of which about 33 million is for GIS. A smaller new project involves Thailand's National Parks, in which GPS is used in a study of Thailand's endangered animals: to mark sightings of wild animals and spots where tracks have been located.

This is an example of a project mapping the province of Choburi, near Bangkok. Some 40 aerial photos were taken, their edges digitally corrected for blurring, and combined for this overview. The scale is 1 to 50,000. Each photograph needs at least four ground control points, with a 10 centimeter margin in the x-y coordinates and 20 centimeters in height. From the photograph, the contour lines could be extracted. The contour lines could then be superimposed over the original photograph to highlight patterns of land use.

One reason for the current high cost may be the limited number of trained professionals in the field of GIS. Training programs in GIS are not yet widespread, though current evidence suggests that this is a priority for the future. Srinakarinwirot, for example, is currently in the process of establishing GIS faculty under its School of Environment and Natural Resources, as well as being currently engaged in water pollution and factory noise level studies using GIS. At Chulalongkorn University, Remote Sensing is offered in the Engineering School, as well as major concentrations in the Geography Department in both RS and GIS. The most extensive training in GIS is at the Asian Institute of Technology, a private, technically-oriented school where the language of instruction is English and a

school which maintains strong research ties to research institutes abroad. At AIT the GIS Application Center, housed in the School of Environmental Resources and Development, is the most extensive GIS training currently available in Thailand. The GAC is involved in case studies involving GIS, RS, and GPS, and maintains a cooperative relationship with another group under the School of Environmental Resources and Development, called STAR, or Space Technology Application and Research.

When it comes to the use of GIS in the service of art and archaeology, current initiatives are about as scarce as the possibilities are limitless. If anyone here knows otherwise, I will be a very happy person if you will disabuse me of my ignorance. I am going to suggest several possible areas--and note this is only scratching the surface of possibilities--which invite application of GIS in enhancing possibilities for display and overlaying information.

Starting with perhaps the most obvious from the art historical context: Buddhist images, as these have been designated as perhaps the most significant measure of Thailand's art historical legacy. Few important Buddha images remain in situ; many have been brought to the National Museum in Bangkok or to its many provincial branches. Nor were modern antiquarians the only ones to pilfer from the past. For example, with the establishment of Bangkok as the capital at the end of the eighteenth century, the ruins of the earlier capital at Ayudhya were sifted for, among other things, images to be rescued and reinstalled in honor in the new capital.

Detail in the records of the museums of original provenance are uneven and in temples nonexistent, but in most cases at least an educated guess may be made regarding time and place of origin. For those few images for which chronicles have survived, these could be linked as well. Linking founding inscriptions to individual images would, I suspect, prove too frustrating to be practical, as inscription, less desirable as archaeological or religious finds, were usually left undisturbed when images were carried off and rarely, if ever, kept together with the image to which they referred.

Thus, for example, the sculpture halls of the National Museum in Bangkok could provide the beginning of a sculptural map of the country, as the administration of the Fine Arts Department has attempted to garner the cream of every period for its flagship institution, and indeed part of its mission of presenting Thailand's identity seems bound up with the inclusiveness of its vision.

Another collection of the national museum presents a very different opportunity. While the high art of Buddhist sculpture garners the lion's share of art historian's attention, the

museum possesses an extensive collection of textiles from all over the country. A bit more hidden away, this collection is nonetheless at least as comprehensive. The subtle variations in weave and pattern in different parts of the country invite a form of presentation that conveys the geographic range as well as the design range represented. Further, this could be an entrée connected into a network of very different kinds of information: rather than the religious life and history, textiles would invite consideration of life in villages and countrysides, and specifically of women, who are often the primary weavers. Aside from being beautiful works, these textiles give voice to a way of life.

What the museum does not possess in as rich an array are the textiles of the so-called "hill tribes," ethnic minorities on the borders of the country, some relatively recent immigrants to Thailand's mountainous boundaries. While the pressures of the late twentieth century have exacted a toll on many of these groups, their textiles were traditionally the major visible mark of identity, and thus the distinctive styles of the Karen, Lisu, Akha, Hmong, and Mien were not only beautiful but emblems of status, gender, age, artistic ability and accomplishment and group affiliation. Here GIS information can be particularly helpful, as the so-called hill tribes are established in patterns not so much of a circumscribed area but their terrains are rather divided along altitude and concomitant ecosystem lines.

Ceramics present a different set of problems. In the case of textiles, their sheer perishability limits the temporal lifespan of textiles, but ceramics are among the earliest artefacts of civilization in Thailand, and still among the finest. Ban Chiang sites have been extensively studied, as have the major kiln areas of Sukhothai-Si Sachanalai, but many other sites of more recent vintage have been incompletely studied, for example the many kilns in the north. Work on recent finds in burial sites on the Thai-Burmese border have been hindered by access, war, and theft, but remote sensing and GPS systems could aid in these efforts.

As trade items, ceramics also invite linkages to trade routes, both overland and sea lanes. The extensive trade within Southeast Asia and the rise and fall of successive trading empires with which Thailand was commercially involved could be displayed, and linked not only to trading sites and recovered artefacts but also to the accounts of travellers which have come down to us.

Not all traveller tales were of profiteers and adventurers coming to Thailand. The cosmopolitan King Narai sent an embassy to Versailles to the court of the Sun King, and a record of their journey survives. Their tale could be linked to Lopburi, where Narai had his palace, along with other information about the international sophistication of the capital in this period. More recently, nineteenth century records remain of the embassies sent by

early monarchs of the present dynasty on diplomatic missions. In addition to surviving texts, this period enters the era of photography, and there are rich photographic archives in Thailand from the latter half of the nineteenth century; heavy on the royal family, to be sure, but also including a rich record of the cities and villages, ritual and festival of the era.

An urgent case for GIS in the service of preservation is presented in Thai mural painting. The ancient Thai painting, work which is disappearing fast with the deprivations of climate, pollution, and wear, reveals the many episodes of narrative juxtaposed to one another, inviting leisured consideration and the expansive commentary of the local monks. The life of the Buddha, and jataka tales of his previous lives, could be successively photographed not only as narrative but as another effort to preserve a rapidly deteriorating art. Alternatively, the extensive photography already accomplished of Thai temple murals could be coded and linked to respective sites.

I would like to close with two examples of sites, one of which could be effectively presented as changing culture over time, the other as it existed in space during its era of glory. Nakhon Pathom is an example of a site evolving though through time. The huge golden stupa at Nakhon Pathom is but the most recent manifestation of an intense concentration of religious feeling over time. Additions were made as recently as the current ruling Chakri dynasty. But the stupa has gone through several evolutions, as the scholar Piriya demonstrated in his thesis, back to a very early importance as a sacred site.

One of the earliest incarnations of Nakhon Pathom chedi was the Dvaravati era, that tangible yet elusive era in the first fresh and dynamic flush of the newly imported Buddhist religion. In addition to the rich archaeological evidence for Dvaravati is in this area, centuries later there are recurrent eruptions of Dvaravati culture as widely distributed as Haripunchai in the north and the striking overside sema stones in Muang Fa Daed in the northeast.

To take an example of a site which could be enriched by interconnection in space one might look at the 13-14<sup>th</sup> century site of Sukhothai. Now looked upon widely by Thais as an age of glory and even spiritual origin, for reasons I won't stop to go into here, and the significance attached to this one of many city-states in the area now known as Thailand is difficult to overestimate. The actual site of the city, its walls, temples, and palace ruins, have been turned into what is called a tourist park; photographs of the city prior to its restoration exist, for example the Griswold photographic archive at Cornell University. Sites in the area of the city-state could be linked both to images of the current state of restoration and the archival photography prior to the work of the Fine Arts Department. In

addition, the site could be linked to sites where there are Sukhothai Buddhist images, as only the largest remain in situ, particularly the distinctive walking images. Now disbursed to museums in the city of Sukhothai, in Bangkok, and in temples including Wat Benjambophit in Bangkok.

The production and trade in ceramics in both Sukhothai area connected it to regional trade routes; examples of these wares were traded as far off as Japan, where examples turned up in the collections of tea masters, as Louise Cort has shown us. Finally, inscriptions, found in relative profusion at this site, including Thailand's most famous inscription, that of King Ramkamhaeng.

These are just a few varied suggestions for ways in which GIS might be employed in the service of Thailand's rich art history. As elsewhere, financial priorities in Thailand are such that the teaching of art history must remain a secondary discipline, and resources are rarely plentiful to aid instruction. However, the hunger for computer technology and access opens new possibilities for training in art along with all else carried on the waves of the web. On the other hand, elsewhere in the world, where for different reasons Southeast Asian art is rarely taught in academic settings, the same sources can make visible objects and their connectedness in local, national, and regional perspectives.