

iconem
EXPLORE HUMAN HERITAGE



A RACE TO SAFEGUARD THREATENED CULTURAL HERITAGE

Our world's cultural heritage is threatened. Looting, urbanisation, mass tourism, armed conflict, and climate change damage and destroy irreplaceable sites where cultures emerged, languages developed, civilisations thrived. These imperilled heritage sites embody humanity's cultural diversity. It is crucial that we

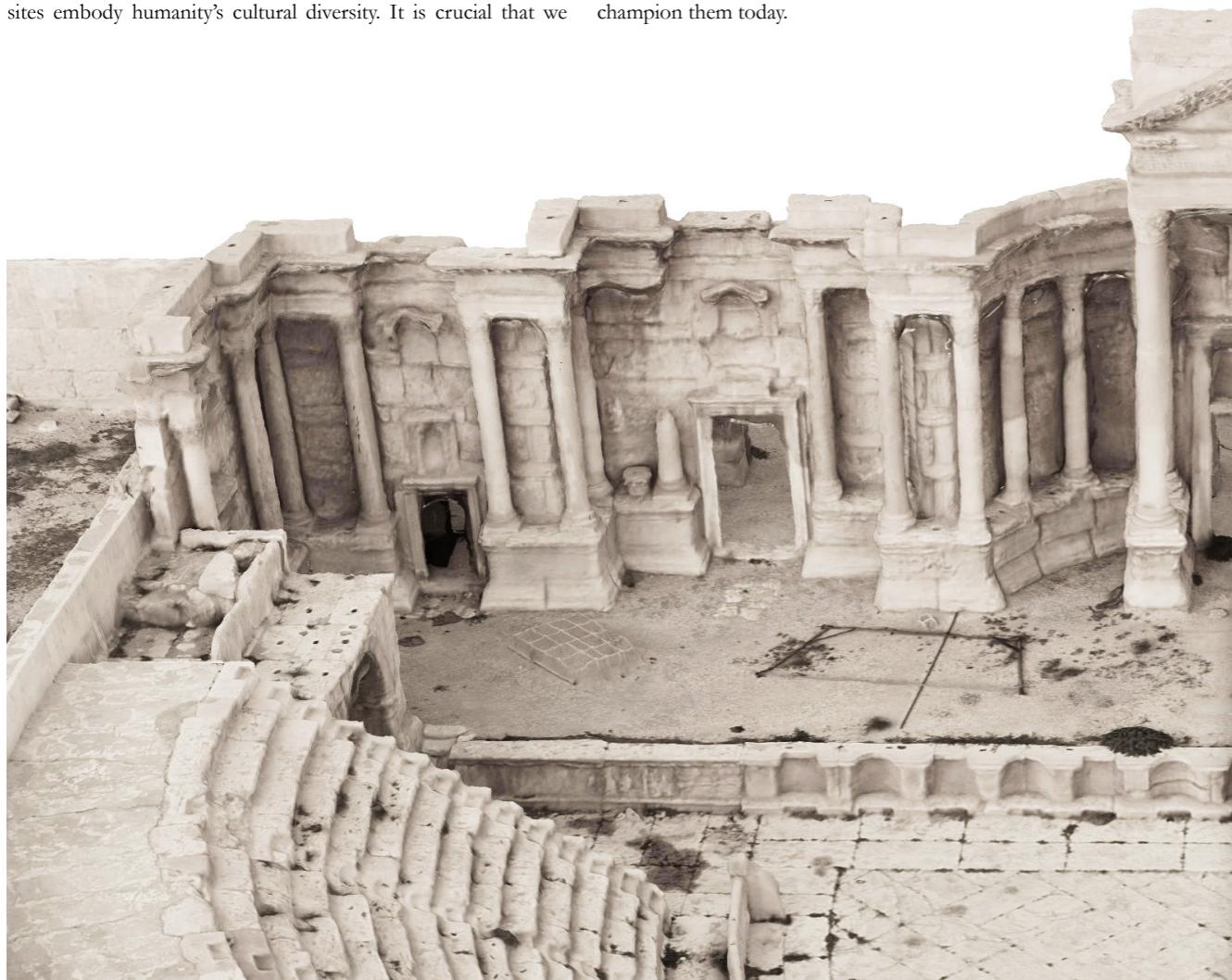
document and preserve them now. Iconem's expert team travels the globe, combining the large-scale scanning capacity of drones and the photorealistic quality of 3D to create digital replicas of our most treasured places, record them for future generations, and champion them today.

"The images produced by Iconem allow for a renewal of the site's interpretation."

– Irina Bokova, Former Director-General, UNESCO

"Iconem's technology allows very precise site surveys to be obtained in a short amount of time. With 3D reconstruction, it is possible to distinguish details of large sites that cannot be seen on the ground."

– Sébastien Gondet, Archaeologist and Researcher, CNRS



3D model of the Theatre of Palmyra before (left) and after (right) its destruction by the Islamic State.



NEW TECHNOLOGY MAKES IT POSSIBLE

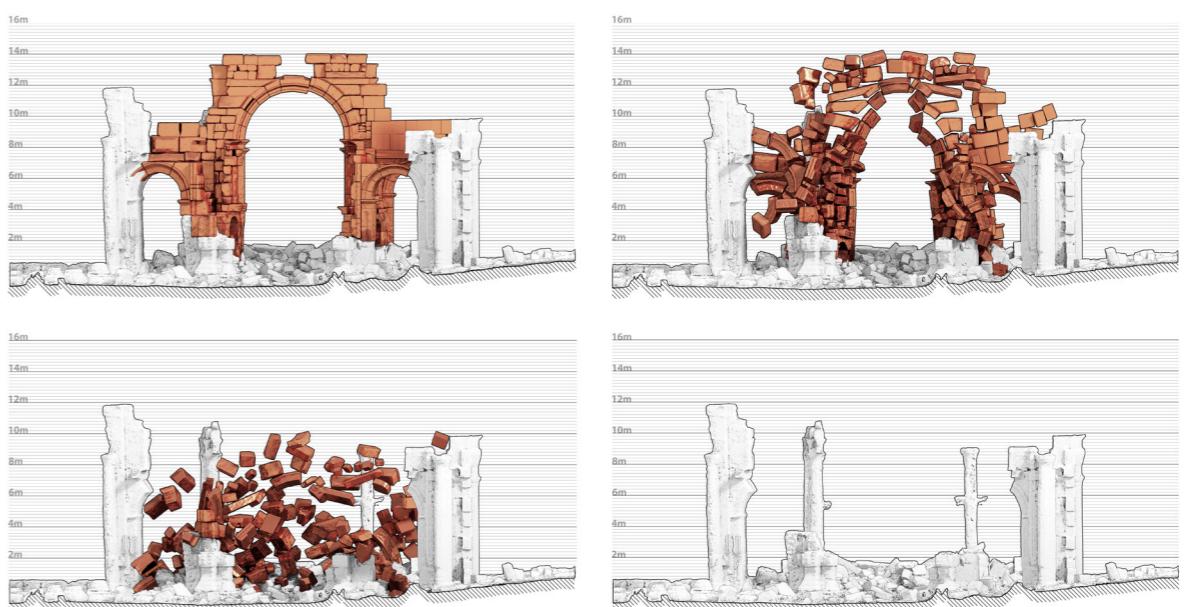
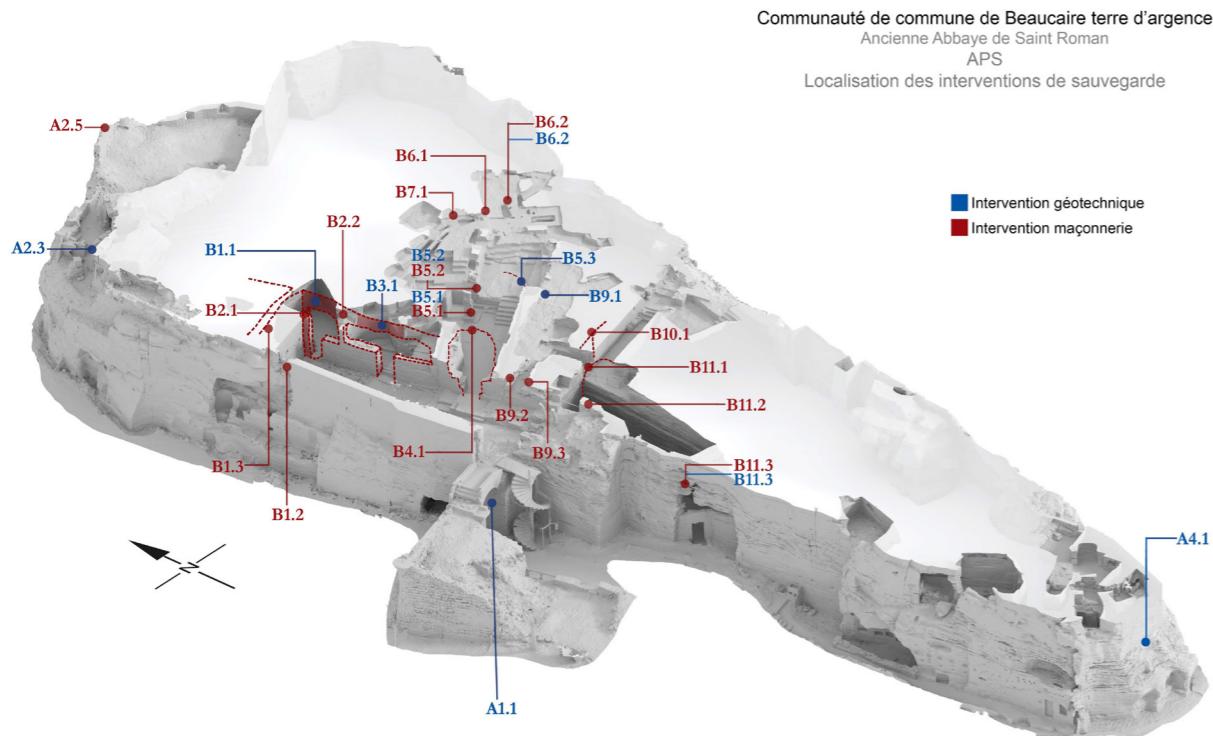
Today's technologies are transforming how we conserve and experience our heritage. Accelerated documentation and exploration of lifelike digital sites would have been unthinkable a few years ago. These technologies continue to advance. Iconem is at the centre of this digital heritage revolution. The result of our partnerships with INRIA and Microsoft Research, our AI-based technology and computer vision algorithms have enabled us to become the leader in the 3D digitisation of cultural heritage sites. Our innovative processing method was developed exclusively for recording threatened sites. When combined with rapid drone data acquisition, this ground-breaking process produces the highest quality images and 3D models. We serve cultural heritage experts and the general public.

The scientific community leverages our extremely precise images for:

- archaeological assessment,
- preventative conservation,
- damage assessment, and
- restoration preparation.

Our photorealistic images bring sites to life for the general public through:

- digital immersive exhibitions,
- Virtual Reality experiences, and
- educational tools for primary through higher education.



Palmyra's Monumental Arch rebuilt in digital 3D.

DIGITAL HERITAGE LIKE NEVER BEFORE

Bringing Heritage to Life

Today, humanity's most astonishing heritage sites can be digitally recreated with incredible precision anywhere in the world. Experiential innovations make it possible to stand at the foot of a soaring minaret in a remote Afghan valley or wander through an ancient citadel. In 2016, the digital exhibition *Sites Eternels*, curated by the Réunion des Musées Nationaux and the Louvre, featured Iconem's immersive images. This 360° experience transported visitors to sites to raise awareness of heritage endangered or destroyed by armed conflict.



The exhibition *Sites Eternels* featured Iconem's immersive images of Khorsabad in Iraq, the Great Mosque of the Umayyads of Damascus, Palmyra, and the Crac des Chevaliers in Syria.

Creating New Immersive Experiences

Virtual reality and multisensory exhibitions plunge visitors into the vibrant colours, grand dimensions, minute details, and soundscapes that define our treasured heritage. Widely popular with visitors, this new generation of digital exhibitions is expanding worldwide. Iconem curates its photorealistic 3D images and models for VR experiences and exhibitions, immersing the public in distant cultural heritage sites and cities around the world.



Divided in four "symphonic" sections, the Aga Khan Museum's exhibition *Syrian Symphony* in Toronto combined music, paintings, and media arts to explore art's role during times of conflict. Iconem's 3D videos on a multi-screen, immersive display explored Syrian archaeological sites.

BUILDING A GLOBAL ENCYCLOPAEDIA OF KNOWLEDGE

Iconem is amassing the largest digital index of humanity's greatest cultural heritage sites. We are developing the first public database for massive 3D heritage site models: the World Heritage Database. This platform will revolutionise how experts and the general public study and experience endangered heritage. Our digital online atlas is a technological breakthrough and will make our photorealistic 3D models accessible to everyone.

Users will be able to freely explore, from anywhere in the world, 3D digital copies of stunning registered historical sites and hidden cultural heritage gems via the World Heritage Database. This priceless tool for archaeologists, architects, and cultural heritage experts will enable them to analyse sites from a distance, effortlessly compare them, and create architectural surveys critical to restoration.

Phase one, started in 2013, was completed in 2018. In phase two, we will digitise an additional 300 heritage sites over four years, creating a critical-mass of 3D digital models and knowledge freely accessible to everyone.



Some of our 3D models of monuments and sites.



3D models of the Yangon High Court Building in Myanmar (left) and the Saint-Jacques Tower in Paris (right).

A WORLD HERITAGE DATABASE

Iconem is quickly expanding its geographical reach. While it operated in twelve countries in 2016, the company is now present in over twenty countries. Iconem has produced over 100 digital replicas of sites, including the Bamiyan Buddhas in Afghanistan, Palmyra in Syria, Pompeii in Italy, and Angkor in Cambodia. Models financed by Iconem will be available on our public platform. Clients will determine whether or not, and if so how, they would like their models to be uploaded to the platform. A select list of our 3D models is below. On the following pages, discover some of the sites we had the privilege of scanning and digitising.

Afghanistan	Iran	Pakistan	
Balkh	Balu Hisar	Alamut	Sindh
Balkh	Hajji Piyada	Lambasr	Fortified town of Barbhore
Bamiyan Province	Bamiyan Buddhas	Pasargade	
Bamiyan Province	Kakrak		Spain
Bamiyan Province	Shahre-i Ghulghulah		Algeciras
Dara	Top Dara	Akre (KU)	Baelo Claudia
Herat	Musalla Complex	Alqosh (KU)	
Kabul	Tepe Narenj	Amediya (KU)	Citadel of Aleppo
Logar Province	Mes Aynak	Baghdad	Great Umayyad
Shahruk District	Minaret of Jam	Baghdad	Mosque of Aleppo
	Baghdad	Al-Bab Al-Wastani	Old city
		Al-Madrassa Al-	Souk
		Mustansiriya	Arwad
		Arwad	Crac des Chevaliers
Albania	Lissos	Baghdad Province	Ancient villas of
		Bakhidida	Damascus
Cambodia	Bantey Thom Temple	Barzan Village (KU)	Azem Palace
	Baphuon Temple	Bulbul-Shashk (KU)	Citadel of Damascus
	Buddha Gate &	Deweew (KU)	Great Mosque of
	Victory Gate	Erbil (KU)	the Umayyads of
Angkor	Chau Srei Vibol	Erbil (KU)	Damascus
	Temple	Governorate of Nineveh	Nimrud
	East Mebon Temple	Grdy Bngrd Muani (KU)	Grdy Bngrd Muani
Angkor	Preah Khan Temple	Jerwan (KU)	Damascus
	Preah Palilay Temple	Khinis (KU)	Aqueduct ruins
			Khinis cliffs &
		Khorsabad	aqueduct
France	Beaucaire Castle	Kongra Serchia (KU)	Khorsabad
	Beaucaire	Mosul	Kongra Serchia
	Saint-Roman Abbey	Mosul	City centre
Never	Never Ramparts	Mosul	Nabi Yunus tunnels
Paris	Lamassi in the Louvre	Qasr Shamamok (KU)	Nineveh, aerial view
Paris	Saint-Jacques Tower	Rawanduz (KU)	Qasr Shamamok
Paris	Saint Trinity Church		Rawanduz
Great Britain		Italy	
London	Nereid Monument in	Naples	Pompeii
	the British Museum	Naples	Villa of Diomedes
Greece	Island of Delos		
	Island of Delos	Leptis Magna	Arch of Septimius
			Severus
Haiti			Turkey
Milot	Citadel Henri	Yangon	High Court Building
	Christophe		
Milot	Sans-Souci Palace	Oman	Manisa Province
		Al-Ayn	
India		Al-Khutm	Aigai
		Ash Agar	
Hyderabad	Qutb Shahi Heritage	Bat	Uzbekistan
	Park	Qalhat	Bukhara Oasis



PALMYRA

Syria

Context

Palmyra is a crossroads of cultures, melding Greco-Roman and Persian architectural styles. Iconem conducted the first drone survey of the ancient city with the Syrian Directorate-General of Antiquities and Museums after ISIS's departure in 2016 and built 3D models of the damaged monuments.

Damage and Threats

Symbol of humanity's great cultural diversity, the awe-inspiring archaeological site Palmyra in Syria was desecrated by the Islamic State in 2016. The Temple of Bel, the Monumental Arch, the Temple of Baalshamin, and other monuments were reduced to rubble by ISIS's mortars and explosives.



The Temple of Bel in Palmyra.

NINEVEH

Iraq

Context

An ancient archaeological site in Northern Iraq, Nineveh was an Assyrian capital and an important site in the development of human civilisation. The Nabi Yunus tunnels crisscross Nineveh, making hidden Assyrian treasures accessible. In 2017, Iconem scanned and created a 3D model of the extensive tunnels as technical service provider for UNESCO.

Damage and Threats

Nineveh is located on the edge of Mosul, which witnessed rapid expansion in the early 2000s. The city's urbanisation as well as ISIS's destruction and tunnel digging endangered the unique site. While the city's restoration is underway, its future growth could threaten the site again.



Nineveh on the outskirts of Mosul. © UNESCO

BAMIYAN BUDDHAS

Afghanistan

Context

Traces of the Buddhas carved into Afghanistan's Bamiyan cliffs are emblematic of extremist groups' destruction of our world's precious heritage. Iconem digitised the cliffs and the Buddhas' remains in 3D as part of a 2015 project with French artist Pascal Convert.

Damage and Threats

On 11 March 2001, the Taliban set off hundreds of mines, erasing the two majestic Buddhas from the Bamiyan cliffs. This was in response to Mullah Omar's fatwa condemning idols. Extremist groups continue to demolish our world's precious heritage, which is why it is critical that it be digitised today.



Caves in the Bamiyan cliffs.

LEPTIS MAGNA

Libya

Context

Leptis Magna in current day Libya was one of the Roman Empire's most impressive cities. In spring 2018, Iconem digitised the ancient metropolis, including the Arch of Septimius Severus, in partnership with the DOA, the Mission archéologique française en Libye, and the Iconem Fund for Endangered Heritage. Local archaeologists were trained in photogrammetry.

Damage and Threats

Leptis Magna overlooks the Mediterranean Sea. The site and its harbour were ideally located for trade but its idyllic location now places it in danger. Climate change and resulting rising sea-levels threaten the beautiful monuments of this once powerful Roman city.



Roman ruins at Leptis Magna.

MOSUL

Iraq

Context

In February 2018, Iconem scanned Mosul by drone for UNESCO as its technical service provider. This emergency documentation is part of an ambitious project launched by UNESCO to revive and restore the city. Iconem's survey of Mosul is key to studying and preparing for its reconstruction.

Damage and Threats

In 2017, Iraqi forces liberated Mosul from ISIS. During the previous nine months, airstrikes had rained down on the city rich with architectural and cultural jewels. The city's greatest monuments had already been intentionally destroyed by the Islamic State, including the 700-year-old Al-Nuri Mosque.



Extensive damage in Mosul's old city. © UNESCO

ALEPPO

Syria

Context

Iconem worked with the Syrian Directorate-General of Antiquities and Museums in 2017 to digitise Aleppo's severely damaged citadel, souk, and Great Umayyad Mosque. Our team scanned the old city with drones and used this data to build city-wide and monument-specific 3D models.

Damage and Threats

Aleppo has been the site of major fighting. Armed conflict has threatened and destroyed some of the city's UNESCO World Heritage monuments. The citadel overlooking the city and the vast souk suffered heavy damage. The 12th-century Great Umayyad Mosque's soaring minaret was toppled.



Aleppo's citadel in the old city.

ANGKOR

Cambodia

Context

Angkor's spectacular temples and sculptures dot 400 square kilometres in northern Cambodia. Iconem scanned the Khmer Empire's iconic temples, sculptures, and gates for the French Embassy of Cambodia, the CIC-Angkor, and the APSARA in 2017. Data was collected by high and low altitude drone scans.



Preah Khan Temple in Angkor.

Damage and Threats

One of the world's most popular tourist destinations is threatened by mass tourism. Five million visitors climbed the steps of Angkor's temples in 2017, wearing down the stone. The temples are also green with overgrown vegetation that erodes the massive stone structures.

QUTB SHAHI HERITAGE PARK

India

Context

The Qutb Shahi Heritage Park in India is a vast necropolis. For a 2017 Aga Khan Trust for Culture project, Iconem recorded by drone the park's tombs and a "bird's eye view" of the complex. Our engineers constructed digital 3D high-resolution individual mausoleum models and a compound-wide model.



Qutb Shahi dynasty tombs in Hyderabad.

Damage and Threats

Urbanisation and its affects threaten the integrity of the Qutb Shahi dynasty's heritage. This vast ensemble of 16th and 17th century mausoleums is in the east of bustling Hyderabad, home to more than 6.7 million people. Pollution degrades the tombs' exteriors and the city encroaches on the park.

POMPEII

Italy

Context

Buried by the eruption of Vesuvius in 79 A.D. and rediscovered in the 17th century, Pompeii is a unique illustration of urban Roman architecture. In 2014, in partnership with ENS, Microsoft Research, and INRIA, Iconem carried out the first complete scan and 3D model of the famous site.

Damage and Threats

With over three million visitors every year, Pompeii is one of Italy's most visited tourist destinations. But this popularity comes at a cost. The footsteps of millions of visitors erode the ancient site's stone streets and monuments. This mass tourism and erosion threaten the site's integrity.



The centre of the Roman ruins at Pompeii.

DELOS

Greece

Context

A UNESCO World Heritage site, Delos is one of Greece's most ancient heritage sites. In 2016, Iconem digitised in 3D the island's extensive ruins for the Ecole française d'Athènes. Iconem's team used small drone-planes and ground level photography to scan the theatre, agora, and ancient villas.

Damage and Threats

The mythological birthplace of Apollo and Artemis is threatened by climate change. Delos's archaeological site is made fragile by its proximity to the sea. It was critical that these incredible ruins of the Mediterranean's ancient capital of trade be digitised before they are swept away by the tides.



Island-wide remains of the ancient Greek settlement on Delos.

SAMARRA

Iraq

Context

The elegant spiral Al-Malwiya minaret of Samarra's Great Mosque dominates the horizon north of Baghdad. Capital of the Abbasid Caliphate, Samarra's 9th century mosaics and architecture represent the empire at its height. In 2016, Iconem scanned the iconic minaret and the mosque as technical service provider for UNESCO.

Damage and Threats

Armed conflict has threatened Samarra's monuments since the start of the Iraq War in 2003. In March 2015, ISIS used the city's ancient walls as cover during a confrontation with the Iraqi army. The Islamic State's rockets slammed into the Sūr Ashnās, severely damaging the ancient wall.



Samarra's iconic Al-Malwiya minaret. © UNESCO

PYRAMIDS OF MEROE

Sudan

Damage and Threats

Meroe's semi-desert landscape is drying up. Climate change is accelerating desertification. Sand batters the pyramids, eroding the intricate carvings and reliefs that cover the steep sides of the tombs. These traces of a once powerful empire will vanish unless action is taken to counteract erosion.

Context

The ruins of the ancient capital Meroe are nestled between the Nile and Atbara rivers in Sudan. Towering Nubian style pyramids dot the Island of Meroe, which was once the heart of the Kingdom of Kush. Iconem, in partnership with the Section française de la direction des antiquités du Soudan, used drones to scan the vast necropolis in 2017.



The Kushite era pyramids of Meroe.

WHO WE ARE

Iconem's team includes data scientists, computer engineers, architects, archaeologists, 3D specialists, and photogrammetry experts.



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PAUL
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VINCENT
TOURNADRE

We warmly thank all our partners that make our work possible!

REFERENCES

MUSEUMS



UNIVERSITIES



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