RISING FROM DESTRUCTION

THE CAMPAIGN

Proceedings of the Conference DOCUMENTING OUR HERITAGE AT RISK 19-20 May 2017, Rome





Proceedings after the Conference "Documenting our Heritage at Risk" by *Elena Giacomin and Sara Sow*

Graphic Design *Riccardo Bizziccari*

Photos of the conference Gabriel Stabinger

The International Conference "Documenting our Heritage at Risk" took place in Rome at Palazzo Poli (Trevi Fountain) and at the Baths of Diocletian (Ex Planetario) on the 19th and 20th of May, 2017

with the support of





In view of the European Year of the Cultural Heritage (2018), the IED promotes this publication that aims to raise national and international awareness on the importance of supporting Cultural Heritage Protection.



Institute of European Democrats Rue de l'Industrie, 4 - B - 1000 Bruxelles **www.iedonline.eu**

This publication has been realized with the financial support of the European Parliament.

INTERNATIONAL
CONFERENCE
"DOCUMENTING OU
HERITAGE AT RISK"

Introductory remarks

5

8	<i>Francesco Rutelli</i> President Associazione Incontro di Civiltà and Associazione Priorità Cultura	109 4
18	Emmanuele Francesco Maria Emanuele Chairman Fondazione Terzo Pilastro - Italia e Mediterraneo	117
22	Paolo Matthiae President Scientific Committee Associazione Incontro di Civiltà	130
26	<i>Stefano De Caro</i> Director-General ICCROM	:]
	Session 1	10.0
30	PRINCIPLES: ANALYSIS OF CURRENT SITUATIONS REGARDING THE DOCUMENTATION OF THE CONSERVATION AND THE MANAGEMENT OF SITES	136
31	Samir Abdulac Secretary General ICOMOS France and Chair ICOMOS Working Group on the Safeguarding of Cultural Heritage in Syria and Iraq	137
42	<i>Elena Calandra</i> Director ICA (Istituto Centrale per l'Archeologia)	139] [
47	<i>Tomasz Orlowski</i> Ambassador Republic of Poland in Rome	143
56	<i>Cameron Rashti</i> Director Historic Cities, Aga Khan Trust for Culture	152 .
72	<i>Bijan Rouhani</i> Vice President of ICOMOS-ICORP, Member of the International Board of Blue Shield	157
	Session 2	176
78	METHODS AND PROBLEMS IN THE MANAGEMENT OF THE DOCUMENTATION OF BOTH PUBLIC AND PRIVATE SITES (NORMS AND PROFESSIONS)	(
79	<i>Stefano Baia Curioni</i> Associate Professor, Bocconi University	182
84	<i>Laura Baratin</i> Dean of the School of Conservation and Restoration of the University of Urbino	190
93	Mounir Bouchenaki	

Special Advisor to UNESCO Director General for Cultural Heritage 100 *Gisella Capponi* Director ISCR (Istituto Superiore per la Conservazione e il Restauro)

104 *Livio De Luca* Research Director CNRS (The French National Center for Scientific Research) and Head of the MAP laboratory

> Anthony Sattin Journalist and Senior Heritage Stewardship Adviser at the mCubed Initiative

Yves Ubelmann Founder and CEO ICONEM

Livio Zerbini Professor at the University of Ferrara and Director of the L.A.D. (The Study and Research Centre on Ancient Danubian Provinces)

Session 3 Technologies in the documentation, management and development policies: between local development and international cooperation

Chance Coughenour Program Manager - Preservation, Google Arts & Culture

Pierre Grussenmeyer Professor at the INSA Graduate School of Science and Technology

Annamaria Mauro Architect Parco Archeologico di Pompei

James Shulman Founder of Artstor and Senior Fellow at The Andrew W. Mellon Foundation

Vincenzo Sommella CEO ES s.r.l. Progetti e Sistemi

Efstratios Stylianidis Assistant professor at the School of Spatial planning and Development at the Aristotle University of Thessaloniki, Greece

Ulrike Wulf-Rheidt Head of Architectural Department at the German Archaeological Institute

THE ROME AGREEMENT ON DOCUMENTATION OF ENDEANGERED CULTURAL HERITAGE

The International Conference "Documenting our Heritage at Risk", organized by the Incontro di Civiltà Association and ICCROM (International Centre for the Study of the Preservation and Restoration of Cultural Property) took place in Rome at Palazzo Poli (Trevi Fountain) and at the Baths of Diocletian on 19th and 20th May 2017, with the support of the Fondazione Terzo Pilastro – Italia e Mediterraneo and Fouad Alghanim & Sons Group of Companies. The conference received the High Patronage of the Presidency of the Republic and the patronage of UNESCO and the cooperation of Associazione Priorità Cultura.

The deliberate destruction of cultural heritage has become a core feature of modern conflicts and a tactic of war and hegemony. In this scenario, safeguarding the world's cultural heritage is becoming increasingly urgent and imperative. At stake is people's very identity – their sense of being, their culture, history, collective memory and future legacy. When heritage is at risk of being erased from memory, documentation plays a fundamental role. It provides a testament of those sites and objects of major significance to a community, and also guides any future actions on that heritage.

Representatives of Governments, Foundations, Associations, personalities from the international cultural scene, heritage professionals and technology experts shared experiences and views on the current state and future prospects of documentation for heritage in crisis zones. Participants also explored the question of how the international community can create a viable system to standardize documentation and tracking of cultural heritage under threat.

The conference aimed to open a debate on the theme of documentation and to investigate whether the creation of a standardized documentation system represents a viable option for the international community to be followed. Such a platform could help states as well as private and international bodies to coordinate their efforts towards the securing of the world's cultural heritage.

The conference



Italian Prime Minister Paolo Gentiloni met the promoters and the speakers of the conference at Palazzo Chigi

The discussion revolved around three priority areas:

- Areas ravaged by armed conflicts. 1.
- 2. Areas subject to natural catastrophes (for instance the Italian regions that were hit by recent earthquakes).
- Coastal areas or islands where the sea level is supposed to rise in the 3. coming decades as an effect of climate change.

The three main topics were:

- Principles: analysis of current situations regarding the documentation 1) of the conservation and the management of sites.
- 2) Methods and problems in the management of the documentation of both public and private sites (norms and professions).
- Technologies in the documentation, management and development 3) policies: between local development and international cooperation.

A delegation payed an official visit to Quirinale with President Sergio Mattarella.

The panelists met the Italian Prime Minister, Paolo Gentiloni, at his residence in Palazzo Chigi. They delivered the text of the international call for commitments, the Rome Agreement on Documentation of Endangered Cultural Heritage to be proposed at the conclusions of the Conference: uniting the international community around a project of universal cataloguing for artistic and archaeological heritage; facilitating the classification of cultural heritage at risk.

Francesco Rutelli

President Associazione Incontro di Civiltà Associazione Priorità Cultura

I am delighted to express my warmest greetings to Minister Franceschini, to the Authorities and to all the participants attending this prestigious twoday conference organized jointly by the Associazione Incontro di Civiltà and ICCROM - the International Centre for the Study of the Preservation and Restoration of Cultural Property, which is an important intergovernmental organization dedicated to the preservation of cultural heritage worldwide under the leadership of Stefano De Caro.

This initiative is part of a campaign that we started three years ago prompted by the desire to raise people's awareness about iconoclasm, the intentional and vicious destruction of cultural heritage. The protection of cultural heritage is of crucial importance for the history of mankind and any action that contemptuously destroys the vestiges of the past is again a contemporary disaster.

Actually, we thought we had put an end to this kind of behaviour with the end of World War II, after witnessing the peaks of destruction reached during that war, with Nazi plundering and looting and the bombing of Dresden and Montecassino. The international community of the time, starting with Europe and the Western World, realized that a paradigm shift was most urgent and the response was the signing of the Hague Convention for the protection of cultural heritage in conjunction with a ban on using places of culture in case of war. And then came all the UNESCO conventions, which over the decades have established a network of constraints, targets and involvement of the international community to protect cultural heritage.

During the past three years, in two areas of bloody conflict, namely Syria and Iraq, besides the fighting that has taken a heavy toll in terms of human lives, the intentional destruction of cultural heritage has been pursued with

determination in the intent of not only eliminating the enemy but of eliminating even all signs of the enemy's civilizations. And here I would like to recall that unfortunately this is not at all new in history, not even for us Christians. When Christianity was established in Rome, there were at least 20 sculptures in the city portraying emperors on horse-back. These sculptures that celebrated the successes of Roman emperors were all destroyed by the new rulers. It was felt that the icons of the old order had to be suppressed and replaced by icons celebrating the new order. The only sculpture of an emperor on horseback which was rescued and has miraculously come down to us is the statue of Marcus Aurelius. This statue was spared only because the figure on the horse was therefore mistakenly believed to represent Constantine, the first Christian emperor.

So in the struggle for power, destroying the icons of the defeated party and replacing them with the icons that identify the winning party, has its roots in the distant past, and all following clashes of civilizations, until the XXth Century.

Today, the principles and values that we treasure and uphold demand that the intentional destruction of cultural heritage be considered a crime against mankind.

I would like to mention that under the Statute of the International Criminal Court that was signed in Rome in 1998 – I had the privilege to host the ceremony on Campidoglio's hill, being the Mayor of the City -, it is now possible to pursue and sanction the culprits of the destruction of cultural heritage as is being done for the case of the attacks on Muslim mausoleums and mosques in Timbuktu, Mali, and the destruction of manuscripts of Islamic culture; indeed, for the first time, the International Criminal Court has passed a nine-year sentence on the Islamic militant who helped destroy the fabled shrines of Timbuktu. Cultural destruction is now recognized as a war crime. Given the importance of heritage sites for mankind we decided to launch an international campaign on these issues.

In conjunction with Paolo Matthiae, the archeologist who discovered the city of Ebla (whose archives containing about two thousand clay tablets are



First day of the Conference at Palazzo Poli (Trevi Fountain)

a fundamental source of knowledge about this ancient civilization that dates back to five thousand years ago) and Scientific Director of our association, we organized a major exhibition at the Colosseum, that was visited by Minister Franceschini, President Gentiloni and opened by the President of the Republic, Sergio Mattarella.

The exhibition at the Colosseum was living proof that damaged items can be reconstructed when international and Italian bodies join forces and share a scientific approach and their expertise. We reproduced in 1:1 format some items coming from Palmyra, Ebla, and Nimrud in Iraq, which had either been destroyed or severely damaged. This was made possible thanks to advanced technologies and a rigorous methodology.

A symbolic initiative was taken in cooperation with the Ministry of Cultural Heritage and the Institute for Restoration which consisted in restoring two damaged Roman busts coming from Palmyra which were then returned to the Syrian authorities, a sign that even in the tragic and horrible situation of ongoing conflict an initiative taken on grounds of pure solidarity can give a glimmer of hope and point to possible new solutions.

Now our conference is an opportunity to define a series of legal, technical, scientific and methodological criteria for cataloguing heritage sites and items at risk of being lost through conflicts and natural disasters. Suffice it to think of the cultural heritage damaged or destroyed by the earthquakes in the central regions of Italy and in Nepal a few years ago. There are disasters that are the consequence of irresponsible human actions but there are also catastrophes caused by climate change. We all know that the sea level will steadily rise and it is only a question of time before it swallows up some coastlines with all its sites, monuments and buildings of cultural interest. It is absolutely necessary to carry out a census of this heritage. We Italians perfectly know that this is a major time and energy-consuming endeavour. It takes decades to collect documents and data, and a huge amount of financial and technical resources.

Here we have the representatives of major public and private, national and international institutions who are willing to cooperate generously and share their wide scientific knowledge and special techniques for cataloguing areas

and monuments part of our universal cultural heritage. What is mostly needed is shared cataloguing. Plans will have to be drawn up envisaging a timetable of cataloguing activities that are to start where conflicts are under way, where the risk of natural disasters is looming dangerously and where climate change may cause major destruction. So the aim of the conference is to come up with a number of possible options for orchestrating a plan for cataloguing the world's heritage at risk which can accommodate the contribution that each and everyone of us can offer.

We will be hearing from the various institutions, starting with ICCROM, UNESCO, and academicians, university and scientific experts. The new opportunities offered by technology will enable us to do something which was unthinkable only a few years ago; I am referring to scanner lasers, drones, satellite pictures related to data collected on the ground.

The next step could and should be that of carrying out some reconstructions and in this connection I would like to address Professor Emmanuele Francesco Maria Emanuele who has sponsored our initiatives right from the beginning through the Fondazione Terzo Pilastro-Italia e Mediterreneo. I would like to thank him wholeheartedly for his economic support, for his leadership and for believing in this program. For all of us, working as volunteers on this campaign, Professor Emanuele has set an example and has been an extremely important cultural point of reference.

He recommended right from the beginning that this campaign produce visible results in terms of reconstruction. Just to give an example: 16 years ago in Bamiyan in Afghanistan, the giant Buddha statues along the Silk Road were destroyed and to this day the international community has been unable to find a credible scientific solution for reconstructing the statues. We can't allow the terrorists to have the final word, through their destructions!

An important point is that the reconstructions we have in mind are not at all of the Disneyland-type which are the result of improvisation, they are not substantiated by a scientific debate, and have no interaction with the local authorities not to mention the absence of any form of surveillance and oversight by international bodies.

That is not what we have in mind. We are talking about relationships with the local bodies, about developing opportunities for the local people by restoring elements of their culture and assisting them in managing their cultural heritage that has been dramatically affected. This is a fundamental objective of our endeavour.

And I would like to recall the important role played by another sponsor of this conference, Fouad Alghanim, an entrepreneur from Kuwait who attaches great importance to cultural diplomacy alongside other like-minded people from other Countries in the region who fear that a conflict fuelled by iconoclastic behaviour may turn into a clash of civilizations.

What we want is precisely the opposite. We want to foster a meeting of civilizations, we want to isolate and defeat those who preach and act for the destruction of other civilizations. In order to do this, Western countries, Islamic countries, emerging countries must come together and stand shoulder to shoulder in the pursuance of peace in our international community. Therefore we say no to every potential clashes of civilizations, no to the barbarian destructors who want civilizations to clash. Yes to the role of the institutions, yes to the role of scientific circles, of private citizens and of the organizations of civil society, which have gathered here today with the aim of promoting the reconstructions. This is a signal we are launching to the international community because we are referring to places like Iraq which are torn by the ravages of the war. Just think of the city of Nimrud, the Assyrian capital of paramount cultural importance, a city which has been exposed to unspeakable destruction, a city where the reconstruction initiative taken by the international community and by private and public participants can trigger the economic and civil recovery of the local territories. We say yes to cooperation in times when there are those who pursue isolationism and who mistrust multilateral policies. We say yes to political and scientific cooperation.

To use a Latin expression I might add that we say yes to what Cicero called Concordia ordinum: different institutions have different functions, but they can offer their individual contribution within a common framework of joint responsibility and cooperation to persuade people that culture is forever



Second day of the Conference at the Baths of Diocletian (Ex Planetario); welcome remarks by Daniela Porro, Director Museo Nazionale Romano



and that the tools to preserve it and bring it back to fruition reflect who we are in securing the continuity of human experience on this Earth.

That is why today's conference is a scientific and political conference and a delegation of promoters will be received by the President of the Republic, Sergio Mattarella, this afternoon and then by the President of the Council of Ministers, Paolo Gentiloni. This emphasizes the importance of our meeting and the attention attached to our initiative which is now authoritatively championed by Minister Franceschini.

To all of them, we will deliver our Rome Agreement on Documentation of Endangered Cultural Heritage.

Baths of Diocletian (Ex Planetario)

Emmanuele Francesco Maria Emanuele

Chairman Fondazione Terzo Pilastro - Italia e Mediterraneo

I am really glad to be here today to remember what has been done and what we are planning to do and are determined to do.

Some years ago, Francesco Rutelli told me about the project he had in mind. I have the highest consideration for Rutelli as a man, a man of culture, which is what makes the difference in life. I have almost no prejudice with regard to human issues, but I make a very strict selection between those who have a cultural background and those who do not. In the world of politics this is fundamental to me, as a matter of fact I have very few politicians among my friends, as you well know. Rutelli is one of those few, maybe by counting them with the fingers of one hand he would be number two, the index finger, because he has always combined this political sensitivity with a cultural background which makes the difference.

There is also another very important protagonist, who I profoundly admire, who is professor Matthiae; we are bound by deep esteem and great industriousness in the field where we have been involved for some time in the Deep South.

Therefore I immediately accepted the invitation to contribute with determination to all issues concerning the Third Pillar Foundation – Italy and the Mediterranean.

Let's explain what the Third Pillar – Italy and the Mediterranean is. In a country where the State does not exist anymore, I regret to say, I am really sorry that Franceschini went to the Council of Ministers meeting: he could have been here, where his efforts would have been much more useful and relevant, instead of participating in the Council of Ministers meeting, where only 1% of the GDP is assigned to the Ministry of Cultural heritage, so being or not being there would be the same.

Having said that, "Third pillar" means that, as the State is not there

anymore and the private individuals, the renowned entrepreneurs who are supposed to save Italy, the capitalists without capital, are not there anymore, what is left is only that world where those with neither power ambitions nor sense of protagonism support the Country in the fields with the worst emergency situations: healthcare, research, culture and education; the last two issues are fundamental for the population growth of a Country, because they break social as well as ethnic and religious barriers.

This third pillar, this third world, is what is making the difference in Italy, despite all impediments, as well as all over the world. The Foundation of the Mediterranean was created starting from my personal belief, because I come from the Mediterranean myself, the cradle of civilization and the origin of everything. The world as we see it today, whether we like it or not, comes from the Mediterranean, we are the protagonists of the human transformation. The place I come from, Sicily, where the great civilizations settled at the time of their exponential growth and took with them that humus that gave me the roots to be able to do what I am doing today, has shown unequivocally that the Mediterranean could still save the world around us. It is in this land between the Atlantic and Pacific transposition that, after centuries of Mediterranean influence in philosophy, arts, religions, poetry, society, the first welfare model, without mentioning Frederic II or Roger II, was created.

As a tireless traveller, as I have been during my long life, visiting the whole Maghreb, China, India, Vietnam, Cambodia, Afghanistan, Iran, la Syria, Saudi Arabia, the Emirates, Africa, the United States of America and South America, and obviously the whole Europe of today, I am convinced that the Mediterranean should contribute again, in a period of crisis of the Western world and Europe, to give us the answers we as human beings are waiting for.

Therefore we could not but being present at this event. I and the institutional bodies gave an enthusiastic reply to Rutelli's invitation. Rutelli explained very well how the Western world cannot demonize other Countries, because we in the Western world did things we should maybe remember

and regret having done. I do not want to talk of the death camps, of both political sides, I do not want to talk of the bombings against defenceless countries auch as those in Hiroshima and Nagasaki, where we destroyed entire civilizations. So we are not entitled to point fingers and demonize others. We should instead contribute very humbly to restore beauty where it was destroyed.

Regardless of our vocations to demonize people, I think we should roll up our sleeves and try and remedy to what has happened and is happening in that world Ruteli was talking about.

Thanks to our efforts, we have already rebuilt Palmyra and Nimrud virtually and we did it at the highest possible level, so the exhibition of these finds and evidence at the Colosseum has had a world echo.

Today we should move on to the next phase, to the real reconstruction of those places. We must witness the attention paid by this advanced Western world to those worlds, by saying it without controversy, without thinking of belonging to better worlds, concretely; we should not forget that we live in a city that has been destroyed over the centuries and rebuilt, even though many people would forget it, through following interventions, which brought about technological and material contributions to something that already existed.

The idea of rebuilding Palmyra should therefore not be dismissed as improbable because "Palmyra cannot be rebuilt": Palmyra can be rebuilt, Nimrud can be rebuilt, everything that was destroyed can be rebuilt, with the spirit which inspired our ancestors, who built the Forum in this wonderful city, who rebuilt the beauty of a civilization which, as we said, had been destroyed after a religious idea spread that wanted to replace the architectural beauty of another era.

We are already doing this: The Third Pillar Foundation – Italy and the Mediterranean has strongly contributed to restoring and rebuilding the Basilica of Saint Augustine of Hippo in Algiers, where the Christian religion was born. It is a temple where religions – non only the Christian religion, but also the Islamic one – come together in the same place, thus showing that faith is an individual and inner contribution. When I was young I remember that I was in Harvard and asked where I could go to pray: I was sent to a space, I came in and I did not find an altar or a cross, there was nothing but an empty space where all religions, all believers of all religions prayed together.

I have a dream, that in Agiers, as well as in other parts of the world where different faiths live together, this can happen, that we can go on building places where everyone is allowed, regardless of their faith, belonging, ethnic group, to regain their identities through the wonder of beauty and the beauty of arts. This is the main tool that unites all people as brothers and sisters and allows for a dialogue, irrespective of personal stories and events in different countries. That is the reason why I support the initiative to rebuild Palmyra, which I think is an example of such a place.

Paolo Matthiae

President Scientific Committee Associazione Incontro di Civiltà

First of all, I convey to you the greetings of the Accademia Nazionale dei Lincei in the person of its President, Mr. Alberto Quadrio Curzio. Secondly, I would like to present some general short reflections, which might be useful to promote a debate. In the past few months, the Academy was extremely interested in the loss and recovery of cultural heritage. Let me say very shortly it is true, we have suffered huge artistic and architectural heritage losses at the highest level (not to talk about low levels). We have suffered huge losses, but as many speakers have already stressed, in the latest years the situation has become harder for a number of multiple reasons that are linked to nature and culture. From the point of view of nature, we cannot deny that climate change has been affecting our heritage in the last decades, so there are new criticalities. From the point of view of culture, there is no doubt that when UNESCO was founded in November 1945, the Universal Declaration of UNESCO stated that politics and economy cause tensions between nations and culture is the basis for dialogue. I believe that this statement was profoundly true. There is no doubt that, as it was recalled, not only for the attacks of ISIS-DAESH but also for other dreadful occurrences, this idea has been denied. Why? Many times it was maintained that ISIS-DAESH fights culture and that is probably true in very simple terms, but what is true is that it is against multiculturalism, against multicultural layers and stratifications, against cultural diversity. The UNESCO's latest declaration has focused on and emphasized the diversity of cultures and the multitude of cultures that is the true cultural wealth of our planet.

Today's conference topic stems from the link between documentation and reconstruction of cultural heritage (especially arts and monuments) and sets the issue of methods and principles to move or shift from natural or artificial destructions linked to wars, and reconstruction based on a number of criteria and principles. Let me remind you that documentation (I will say obvious things for you) must correspond to and comply with the needs and requirements of reconstruction and that in the area of cultural heritage may serve the purpose of scientific interest or tourism. Actually, in this area we need specific documentation with a view to any possible or probable future reconstructions based on technologies that were not imaginable until a few decades ago. Since the documentation of cultural heritage is a key matter, let me remind you that cultural heritage in general is characterized by its universality, equality and also by its intangible nature. The UNESCO's declarations are not perfect, as, for instance they state the principle of immunity. There is an article whereby if a Division General (not a Corps General) considers it necessary for military reasons at war that a piece of cultural heritage should be bombed, this immunity principle can be abolished or done without. So, in my opinion it should not be a matter of immunity, but a matter of intangibility.

There is a famous anecdote concerning Rome. During the Roman Republic in 1848, when Garibaldi was defeated, Nino Bixio aimed a cannon towards Michelangelo's Dome and General Garibaldi – who was not among the most educated persons in Italy at that time – violently opposed this action. The power of the principle of equality is paramount for protecting cultural heritage. A Moghul miniature early in the 19th century was worth nothing and now it is valued like an Italian Renaissance picture, so cultural assets are to be considered on an equal footing, all intangible and of course universality of such heritage for UNESCO goes without saying.

Some words about reconstructions. I have to say that I am really a "partisan" of reconstructions of destroyed cultural heritage, but we must be clear on the real meaning of reconstructions. When we use the term reconstruction – and I am talking about the reconstruction of cultural heritage that has been destroyed – we need to clearly state what we mean by this term. I prefer the term recovery, restauration of monuments and ruins that need to be brought back to the same condition they had before the destruction or destroying event. Of course, we cannot imagine to bring a monument back

to its original state, because that would be impossible, so restauration must be based on the soundest scientific grounds. We need to bring works of art back to the state they were in at the time they were destroyed; they need to be recovered, not rebuilt.

I would like to invite attendance to reflect on the criteria and principles of the documentation that might be summarized in three main principles. When we have to intervene in extremely urgent situations, and when eventually huge funds are provided, we need to act in compliance with some basic principles and I could identify three of them. Let me be clear about it: in the future, should I participate in such restauration actions, I would not give up any of the three of them, these principles must all be complied with.

The first one being the sovereignty of countries where heritage is located. Is it essential to comply with these principles? Of course, any monument is temporarily located in a given area, for instance Venice was located in the Serenissima Republic in the past and now it is located in the Italian Republic. So, we need to respect the sovereignty of countries where a given piece of art or monument was located at a given time in history.

Second point: there must be a close supervision and ratification by UNESCO. UNESCO might train all committees of experts, expert groups, technical experts in the areas of cultural heritage and reconstruction. UNESCO should validate the projects that the country that "owns" specific cultural assets should follow.

Third aspect: international cooperation. Not only are recovery and reconstruction extremely expensive, but international cooperation is also required because the different methods and criteria of reconstruction should be coordinated. I know that the Western world governments, when Palmyra was freed from ISIS-DASH, were negatively impressed when Saint Petersburg Museum said proposed to intervene, doubting of its real capacities. This is one of the most important museums in the world, the second most important museum in the world after the Louvre, whereas the British Museum and the Metropolitan Museum in New York probably rank third and fourth. Anyhow, facing such huge problems as the destructions of parts of Palmyra, international cooperation is always the best way to act.

Respect for the sovereignty of the country where the object is located, strong UNESCO surveillance and international cooperation are in my opinion the three key principles on which any restauration or reconstruction action should be based.

I believe that our conference today will be the first step towards something extremely positive that countries that have fallen victims to the latest barbarianism deserve. All of us scholars, who are interested in reconstruction and preservation, want that Syria and Iraq can benefit from the reconstruction of their cultural heritage. For 47 years I worked in Syria and I know that they were absolutely fond of being the guardians, the protectors, for instance, of their churches in Syria, although they were pre-Islamic churches, being of the Byzantine age. So, we have a duty to give the stratified cultural heritage back to those countries.

Stefano De Caro

Director-General ICCROM

Allow me first of all to thank our host and my long-standing friend Maria Antonella Fusco for hosting once again in this prestigious location at the Poli Palace an event by ICCROM and of course the Ministry of Cultural Heritage, who is the general institution also in charge of this heritage. So I would like to thank Mr. Rutelli, President of the Association Incontro di Civiltà, for sharing with our organization this initiative and I am confident that it will prove fruitful. I am also grateful to Paolo Matthiae for setting up, in the light of his major experience, the general guidelines for the discussion in this debate and of course with Mr. Rutelli I thank the Emmanuele Francesco Maria Emanuele, Chairman of the Fondazione Terzo Pilastro - Italia e Mediterraneo for the support once again to an initiative which is perfectly in line with programmes that he has always developed over the years praiseworthily.

I am very happy that this meeting happens in coincidence with two important occurrences: the first one is the 60th anniversary of the foundation of ICCROM that was set up by UNESCO at its General Assembly in New Delhi in 1956 and was then made possible by the setting up of its headquarters in Rome after the signature by the Italian government of the Treaty of UNESCO in 1958. Now the attendance of Francesco Bandarin testifies the patronage given by UNESCO and of course the sharing of values and programmes between the two organizations beyond differences of size and prestige.

The good health of ICCROM, which is small in terms of staff and budget but is very wealthy in terms of its excellence, renowned in its history for its lasting programmes of training and education, and this is testified by the growing number of members that are now up to 135. I think that the hope of being able to add another ten states in the next 60-year programming cycle is a well-grounded hope. The desire of intergovernmental organizations is to have an international dimension, not just to be a collection of member states, but because in aiming at establishing a dialogue among communities and countries, no country should be left out of area.

Another occurrence is the new treaty that Italy and ICCROM have signed in a formal exchange of letters on March 17th this year, in order to update their previous agreement that UNESCO introduced in the light of the 1947 Convention on the privileges and immunities of international institutions specializing in the area of United Nations. This came into force in Italy on August 30th 1985, after ICCROM was first set up, but it had never been implemented by ICCROM, although a specific legal provision had been published in the Official Journal of the Italian Republic in May 1992.

I am grateful to meet the Ministers of Cultural Heritage, Foreign Affairs and Finance for accomplishing all the necessary steps in order to regulate this age-old problem. I hope that this treaty will be ratified soon because this traty update issue has particularly beset me as an Italian citizen. On the one hand, it overshadowed the merits that Italy had acquired by supporting multiple ICCROM programmes. Let me remind you that Italy was among of the major supporters of the Fund for the Protection of African Heritage and contributed to it for more than a half. I suppose that in the next few years this subject of Africa will come again in the frontline for the development policy and for the migration control policy as well. On the other hand, it threatened to weaken the cultural image of our country at the international level at a time when our country praiseworthily with great commitment and kindness joined the Unite for Heritage programme launched by UNESCO in order to find solutions to the very severe crisis, whereby our devastated cultural heritage has been the target of conflicts and terrorist attacks.

ICCROM, since the very beginning, joined the UNESCO campaign. The destructions I recalled have affected the heritage of some of our oldest member countries, to which our organization had devoted its efforts in terms of training of technical managers, for instance for the restauration of mosaics in countries of South and East Mediterranean shores. Over the last years, other programmes had been carried out such as first aid courses for the protection of heritage in conflict area. I wish to remind you that the first aid course was held here in Rome in 2010 thanks to the funds of the Italian Ministry of Cultural Heritage. Unfortunately

the latest events have confirmed the timeliness of this new programme that is centered on the heritage at risk. This programme has been replicated and upgraded in the following years to the different crisis scenarios by involving professionals from Egypt, Libya, Tunisia, Syria, Iraq and Yemen, thanks to the help of professional organizations that are members of the UNESCO campaign, including ICOMOS, ICCROM, UNIDROIT and many others, and also thanks to a new specific programme for the Arab region, the ATHAR programme funded by the Sharjah Emirates. With these partners, some of whom are represented today here, we participated in a number of technical meetings convened by UNESCO or by individual countries or cultural institutions to discuss the most urgent problems, including the reconstruction of the heritage in Syria. As you may know, this has formed the object of a number of recent initiatives that we have participated in, as well as a conference organized by Louvre-Lens with the cooperation of ICCROM and the very beautiful exhibition at Coliseum on Ebla, Nimrud, Palmira, that was recalled a few moments ago by Rutelli.

Now I will shift to English to discuss a specific point of the programme to protect and reconstruct the cultural heritage in crisis areas.

We believe that the documentation is the starting point of each programme, the world documentation meaning all the activities that contribute to the identification, scientific knowledge of the physical and immaterial aspects of cultural properties, including the inventorying and cataloguing that makes them eligible for national and international legal protection. Although it has long been clear that this is a preparatory activity for any activity of conservation, restauration and valorization, as it is recognized by many international documents such as the UNESCO Conventions of 1970 and 1972, the Granada and Valletta Conventions of the Council of Europe in 1985 and 1992, these activities are still largely inadequate in many countries, more attention being paid to the short-term economic exploitation of the heritage. Just think that even a famous site such as Pompeii received the first systematic documentation campaign only in the 80s of the last century. It is after a long crisis of tests and destructions that most of the monuments of the museum storerooms around the world have serious inventory and documentation problems.

We have a programme, RE-ORG, just focusing on the needs of the storerooms in the museums and the sites. Documenting and cataloguing all the materials found in preventive or rescuing archeology is still a very serious problem, even in the countries with a specific legislation. Now let's consider that not only good conservation or reconstruction operations are based on the availability and accessibility of sufficient documentation, but also the reconstruction of the cities or the construction of new settlements in emerging crisis regions needs to be sustainable and not risk to create new problems. We need a multi-layer territorial documentation of the historical, archeological, architectural, geological, environmental and even intangible assets and this can be created using the old documentary archives as well as the most modern technology. Risk maps or maps of cultural landscape such as those that have been theorized in Italy for drafting the landscape of plans even under the seas would be extended as good practice in all countries, all the more urgent in crisis areas to prevent that rebuilding without memory can cause new disasters. There are already excellent examples of international collaboration in the U.S. and Europe to build such documentation databases to prepare for the future reconstruction and sustainable development in Syria and Iraq.

As for the ICCROM's activities in this field, we have begun working to create a network of institutions from countries in North Africa and Europe to digitize and share the archeological documentation of the colonial period of Morocco, Algeria, Tunisia and Libya thanks to computer technologies. Obviously something similar is also desirable for the Egyptian or the Subsaharian African heritage. We also created a digital magazine, Fasti Archeological Conservation Online, based on Fasti Online, a platform of the International Association for Classical Archeology, to allow the digital publication of documentation of projects of conservation and archeology. Projects like these ones combine technical efficiency with the added value of international sharing and the creation of professional networks around community-based development projects. This is utterly evaluable perhaps beyond the same intrinsic value of the cultural properties. This conference might be useful to promote new partnerships and projects in order to serve heritage as a primary resource of civil life.

PRINCIPLES: ANALYSIS OF CURRENT SITUATIONS REGARDING THE DOCUMENTATION **OF THE CONSERVATION** AND THE MANAGEMENT OF SITES.

Samir Abdulac

Secretary General ICOMOS France and Chair ICOMOS Working Group on the Safeguarding of Cultural Heritage in Syria and Iraq

Documenting Heritage at Risk: General perspective, the case of Syria and Project ANQA

My own presentation will be about documentation from a pragmatic point of view and will include four aspects. A quick panorama will first present the evolution of techniques on an international level. Then about Syria, how documenting processes are undertaken externally and how (that will be the third point) the Syrian Directorate General of Antiquities and Museums is progressing itself. Finally I will present ANQA, a project led by ICOMOS together with other partners.

Progress in International documentation

Let me first introduce the case of national inventories, like in France, which has for a developed a national inventory since the 19th century, now called the Inventaire Général du Patrimoine Culturel, which has developed normalized working methods and a detailed homogeneous description vocabulary (Base "Mérimée"). It began with listed monuments and progressively extended its scope of interest to other historic buildings, to vernacular architecture and to some landscape features. It was subject to decentralization ten years ago and has also recently progressed towards providing a database with a concern for mapping (as with "Renabl" and "Gertrude" programs) but still no link to Geographic Information Systems (GIS) or 3D. I am sure that such a case may be found in many countries.

Protected sites are increasingly varied and includes numerous and large in urban and rural areas. They may together become a consistent part of the territory. A comprehensive mapping needs to keep track of their location, their perimeter and sometime of their overlapping. In France, the

A large paper plan of Aleppo souks at the DGAM inventory office - © Stefan Simon













A

0

1940

STAR

Blue Shield wants for example to combine such documents with past flood areas, for risk preparedness. GIS programs are provided commercially or not. "Arches", for example has been developed with a funding from the Getty Institute and is provided for free to Cultural Heritage actors. The use of new programs with simple tools like smartphones or screen tablets for rapid survey and photography of damaged sites was experimented in Yemen by UNESCO and GOPHCY. AMAL, a more elaborate version is being prepared by ICOMOS and its partners: ICCROM-Athar, ARC/WH, Global Heritage and Prince Claus Fund. It includes connection to standard files, databases, maps and references. My friend Bijan Rouhani will explain it to you soon.

Syria in International Documentation Activity

The best website about World Heritage site is provided by UNESCO itself, with an extremely rich documentation about more than 1,000 world heritage sites across the world, classed by country and includes not only their physical features and their history but also their management and their recent projects with texts and illustrations. Thanks to funding from the U.S. Department of State, the American The American Schools of Oriental Research (ASOR) has set up a Cultural Heritage Initiative Program funded by the Department of State, which has been able to develop a consistent documentation about war damages in Syria and Iraq. It is largely based on aerial and ground photographs that allowed evidence and comparison. Developed analyses allowed understanding the latest situation in many sites, such as bombing, looting or illegal construction. Their website includes an impressive collection of detailed weekly reports and comprehensive expert site studies. Endangered Archaeology in the Middle East and North Africa (EAMENA) based in Oxford and Durham Universities and has recently received British public funding. A database containing 150,000 records with the sites geographical coordinates was developed.

Many actors also collected photographs of sites before damage in public crowd sourcing attempts. Maps or aerial photographs of damaged areas like Aleppo and Mosul were widely published. Some maps are sometime more focused on the intensity of bombing and destruction than specifically on cultural heritage. A few foreign institutions gave a special attention to digitizing their paper documents about Syria in their home countries, like about Aleppo in Germany. This approach highlights the importance of safeguarding cadastre and property registers in urban areas.

Syrian Documentation Activities

If we begin to consider Syria and Syrian initiatives, there were quite early modest attempts by militants with sites based in Europe like the one developed by the Association for the Protection of Syrian Archeology (APSA). They provided information and images about on-going destruction with a minimal visual indication using arrows. Heritage for Peace keeps also providing information regularly. In Syria itself some limited news are provided at regional or city level.

The Directorate General of Antiquities and Museums (DGAM), owns a precious paper inventory largely inherited from the 20th century, with a treasure of documentation like about restoration works in Palmyra by architect Robert Amy, old photographs from the Azem palace before restoration works, a plan of the lost Jobar synagogue, a general plan of Aleppo burnt souks, etc. Most of its 1,000 files were digitized during the war. Some 1,500 plans were also reportedly digitized in Aleppo recently. Of course the digitization of large paper plans is rather problematic.

Main provincial museums were evacuated (like Aleppo, Deraa, Deir al Zor, Homs, etc.) and their collections brought to Damascus. Before the war the DGAM had only about 9,000 digitized photographs of museum artifacts. During the crisis about 400,000 such digital photographs were taken and 130,000 museum computer files were produced. It has presently two computer databases: one for museums and another one for monuments.

An up to date illustrated website presents ongoing archaeological findings, site surveys and information activities. The site has published the first ground photographs and comments on Aleppo destructions or Damascus fires. An interactive but not very detailed map of damaged sites in each province could also be reached. A no cost agreement with ICONEM, a French private firm allowed the DGAM to benefit from drone videos as well as from



The DGAM team undertaking a 3D survey at the Azem Palace in Damascus, February 2017 © DGAM Field training with a drone at Eshmoun Temple in Tripoli, January 2017 © CyArk Training of a DGAM 3D survey team at Beirut UNESCO office, January 2017 © CyArk Exercise by the DGAM team at the Azem Palace in Damascus, April 2017 © DGAM

Exercise by the DGAM team at the Azem Palace in Damascus, April 2017 © DGAM

0

19773

Ø

10h

Ŀ



first 3D views of some sites like the Omayyad Mosque in Damascus and the Krak des Chevaliers. Yves Ubelmann is anyway in this room and will be able to provide you with more details. This comprehensive documentation activity is therefore globally a remarkable national integrated comprehensive endeavor.

Surprisingly, the war has strongly induced the DGAM to mobilize its own resources and to improve its working techniques, not because of a sudden passion for cutting edge technology, but because computerization became a vital necessity. There are several actors in the field of cultural heritage in Syria, such as universities, local authorities, professional bodies, NGOs, the civil society, etc. We however found that the DGAM was comparatively the strongest and most dynamic actor in Syria. We therefore decided to establish a partnership with this institution.

Project ANQA in Syria

The idea leading to Project ANQA (ANQA is the phoenix in Arabic) is to begin 3D surveys of still-standing monuments in the Middle East as to be prepared for any possible future. Its starting partners were ICOMOS, CyArk, a non-profit association in California and the institute for the Safeguard of Cultural Heritage at the University of Yale. This project received the support of the Arcadia, a British fund in London. UNESCO gave us logistical support in nearby Beirut. The DGAM provides trainees and oversees the operation in Syria.

The project includes a provision of equipment (laser, camera, computer, hard disks, drone, etc.), in room and on site training for photogrammetric and laser capturing 3D data as well as learning their transformation into 3D. About Fifteen trainees received attendance certificates. A first batch of half a dozen sites in the historic city of Damascus was jointly chosen. Some views present the team undertaking a survey inside the madrassa al Jaqmaqiah and the Azem Palace. The progress of the local team is monitored and distant technical support provided. We even went with Professor Stefan Simon from Yale in Damascus in December. We met the team and were given news about their progress and needs.

CyArk will safeguard processed data in the Iron Mountain and an

open source platform is being presently designed at Yale University. Yale is establishing a database and an open source site that will be accessible to any scholar and interested person. This would include specific software, presenting 3D and video materials, plus a "story telling" aspect and extracts from existing publications.

It appears that transfers of large amounts of data from a country at war are technically difficult as electricity is often cut off and interrupts slow web transfers. Although enthusiastic and efficient, the team itself doesn't always work in the best conditions of security and comfort.

We are thusly creating a new kind of inventory through the official inventory unit and we hope this activity will be sustainable. In other neighbouring countries, it is not easy to find partners willing to commit a permanent unit to a permanent long lasting 3D inventory activity.

Of course we are also aware of possible future problems linked to language, vocabulary, methods and concepts, protection, obsolescence of hardware and software or accessibility of gathered documents, but this would be in itself a new subject of discussion.

Elena Calandra

Director ICA, Istituto Centrale per l'Archeologia

Every part of the world is potentially at risk for war, terrorism and natural disasters.

Actually, in Italy a number of antiquities were discovered by war events - the worst thing in the world sometimes became a knowledge source. The most famous example for the archaeology is maybe the Palestrina Sanctuary, not far from Rome, bombed in 1944 and better known and documented by Giorgio Gullini, who would be involved 50 years later in 3D reconstruction of the Baghdad museum. Another famous case is probably Pompeii, for example the Casa dei Gladiatori, discovered in 1916, restored and rebuilt, damaged by bombings in 1943. The wonderful grotto in the Tiberius Villa in Sperlonga, on the other side, was a weapons container (It is worth to note the demining work is regularly planned by superintendencies in some critical areas in Italy). Recently, we may remember the damages of San Giorgio in Velabro here in Rome and of the Accademia dei Georgofili in Florence.

The aim of this speech is to illustrate the documentation about cultural heritage in Italy and especially about the archaeological heritage. As it is well known, the preservation policies are under the responsibility of our state administration. In Italian the word for conservation, preservation, rescue is "tutela".

Of course, knowledge and correct data recording are the first step for every cultural policy.

The first recording system I show is SIGECweb of the ICCD (Institute for central catalogue and documentation, whose director is Laura Moro, www. iccd.beniculturali.it). The Institute belongs to the General Directorate for Education and research (general director is Francesco Scoppola).

This system, SIGECweb (in Italian: Sistema Informativo Generale del Catalogo) is the General Catalogue Information System: it is a well-known



The grotto of Tiberius Villa, Sperlonga

system of the ICCD, a database of cultural items identified, accessible with various levels of accessibility (www.sigecweb.beniculturali.it/it.iccd.sigec. axweb.Main/). The items can be monuments, both ancient and modern of course, archaeological small finds, paintings, objects, pictures... (http:// www.iccd.beniculturali.it/index.php?it/118/sistema-informativo-generale-del-catalogo-sigec) - the numbers are very high, and are expanding every day. Superintendencies and museums catalogue works of art and pieces according to the guidelines and best practices of the ICCD.

At the same time, another network was developed, and this is VIR, "Vincoli in rete" (http://vincoliinrete.beniculturali.it/VincoliInRete/vir/ utente/login; cfr. also http://www.sitap.beniculturali.it/). It was developed by the ISCR (Istituto superiore per la conservazione e il restauro, the director is Gisella Capponi: www.icr.beniculturali.it), belonging like ICCD to the General Directorate for Education and research. This tool is equally well-known, shared with ICCD, it is interfaced with and it is interoperable with the last versions, it is accessible with various levels and we call it also Carta del Rischio (www.cartadelrischio.it), risk chart.

In case of disaster recovery, lists and inventories of course are the first step for placing and reconstructing monuments and artifacts: pictures, drawings, 3D documentation are of basical value (for 2016 earthquake in Central Italy http://www.icr.beniculturali.it/pagina.cfm?usz=1&uid=439&umn=297).

All these systems, of course, have a list of data entries and pictures for every item and are based on GIS systems; the database is continuously updated, with an incremental logic, and the level is national.

For the documentation I also have to mention the wonderful photographic archives of the superintendencies, in some cases true treasures, and also the aerial photographs (in many cases they are preserved by the Fototeca Nazionale in charge of the ICCD).

Other data are available from the maps of regions, provinces, municipalities..., where they are employed as urbanistic tools. Only few regions in Italy, in effect, have the Piano Territoriale Paesaggistico Regionale (PTPR), the map for landscape planning approved by the Ministry of Culture; these maps also contain archaeological data. Other important data have been classified and mapped by universities and CNR, the National Center for Research.

On the other side, for the objects the most important task is to identify and retrieve them in order to protect against damages, thefts and so on. In this case other digital resources are available in addition to the catalogue of ICCD: the project MUSEI-D is in charge of ICCU (Institute for the Catalogue and Documentation Unique for italian libraries), which belongs to the General Directorate Libraries (general director is Rossana Rummo); the director of ICCU is Simonetta Buttò (the project started with Rossella Caffo former director of ICCU and, for the former General Directorate of Antiquities, with Stefano De Caro as general director, Jeannette Papadopoulos and me). It is operated now by Cultura Italia (www.culturaitalia.it), where single objects of a museum are offered for public consultation online.

At the moment, the data that we have are a lot and more and more data are available, but they answer different questions, so they have different options and functions. The point is that all the cartographies are born from a precise but different need. The true question is: what do we expect from a GIS or from any form of representation of the territory? The question is unavoidable in general and precisely for preventive archaeology. SIGECweb, VIR, SITAP, PTPR, CNR and Universities data and of course the traditional bibliography and documentation are the tools for planning activities, but we need some more.

At the moment I can quote two big systems for recording the interventions of preventive archaeology, RAPTOR and SITAR, operated by superintendencies, not by central institutes - of course the superintendencies are part of the Ministry of Culture (General Directorate Archaeology, fine arts and landscape; general director is Caterina Bon Valsassina).

RAPTOR is the acronyme for Ricerca Archivi e Pratiche per la Tutela Operativa Regionale (Search Archives and Files for Regional Operational Preservation), and the site is available in the former General Directorate of Antiquities site. RAPTOR is a database for the management of single interventions used by the superintendencies of Lombardy, Veneto and Friuli-Venezia Giulia, but it is offline out of these superintendencies. The other system is SITAR, Archaeological Territorial Information System of the Rome Superintendency. The project started 10 years ago, it is very widely published, this is a management like the former programme for single intervention, it is in continuous implementation and in the future it will cover the entire area of competence of Rome, not yet at the moment. In the future it will be interoperable with ICCD standards.

Another very helpful tool, the last for the moment, to retrieve and combine data, objects and territory is ARIADNE, Advanced Research Infrastructure for Archaeological Dataset Networking in Europe (www.ariadne-infrastructure.eu/) to whom the ICCU worked for the Ministry of Culture. I quote directly from the web site: "ARIADNE brings together and integrates existing archaeological research data infrastructures, so that researchers can use the various distributed datasets and new and powerful technologies as an integral component of the archaeological research methodology". Nevertheless, at the moment a national system of data from the preventive archaeology does not exist yet. We do not have a lack of data, as we have seen, but at the moment we need to work on a general system. Also for this reason, the Istituto Centrale per l'Archeologia, ICA (web-site forthcoming) was born.

The ICA, Istituto Centrale per l'Archeologia, belonging to the General Directorate Archaeology, fine arts and landscape, is working towards a global framework, a portal to connect the different systems that I was showing before. In parallel, we are planning the creation of a general database for every intervention of preventive archaeology using a data entry with ICCD standards. This plan is to recognize and classify the interventions for the past (the law about the preventive archaeology is 12 years old), to give the archaeologists the same data entry as standard for the field work and to use the same data entry for the future in order to publish the open data with different levels of accessibility.

Actually this is the core business of the ICA, but considering the international context of today, I would like to spend a couple of words about the general tasks of the new institute, that adopts every initiative in order to permit the definition and application of guidelines, standards and coordination measures to ensure the development of study and research in archaeology. In general it attempts the standardization of the documentation, as we have seen; it formulates standards of quality for archaeological publications, both online and printed; it promotes innovation and experimentation in the methodology and technology of territorial research in the applied sciences and computer technology of documentation; it promotes at international level the role of Italian archaeology and organizes workshops for the Italian archaeology; in the end it offers technical and scientific consultation and support with withwith the Ministry of Foreign Affairs and of International Cooperation.

Tomasz Orlowski

Ambassador **Republic of Poland in Rome**

In the five years of the German occupation of Poland during the Second World War, my country was struck particularly hard. Especially the capital city, Warsaw, was literally brought to the ground by the occupying forces. According to the 1945 estimates, only ten percent of historic buildings and about thirty percent of houses remained standing. At the end of the war, of 957 buildings of historical and artistic interest in Warsaw, 782 were completely destroyed.

It is very important to distinguish the two phases or rather the two causes that brought about the destruction of the city.

The first one could be called physiological and is connected to the natural devastations that are brought about by war and military operations (à la guerre comme à la guerre). We are talking about the military operations and the wild bombings of the city in the first weeks of the war between Germany and Poland, after the German invasion of 1st September 1939; about the Warsaw Ghetto Rising in 1943, when the whole district was destroyed; about the destruction of the historic city center during the Warsaw Uprising in August 1944.

The second one, instead, is of an entirely different nature. The destruction was carried out by the Germans deliberately and with wilful intent in order to annihilate the centuries-old culture of the Polish nation. This is confirmed by General Guderian, Wehrmacht Army Chief of Staff, who during the questioning admitted before the Polish prosecutor that the destruction of Warsaw "was certainly not due to military requirements". Just after the Warsaw Uprising the hardest criminal phase began: the systematic destruction of the city by the Germans, who blew up and destroyed the city methodically, palace by palace, building by building. A three-and-a-half-month period of planned destruction, only interrupted by the Soviet-led offensive in January



Old Market view of the historic center of Warsaw
 Statue of King Sigismund IIIWaza demolished, Royal Palace square
 Destruction of the Royal Palace and of the Sigismund statue

4) Royal Palace, today 5) Krakowskie Przedmieście, Canaletto. (Partial view of the Royal Castle and Aleksander John Palace) 6) Aleksander John Palace facing the Royal Castle

1945. In Warsaw three German groups were in charge of the destruction. They acted methodically, emptying the buildings and taking anything that was supposed to be useful and then burning them one by one and, finally, blowing up some of them. Anything that was useful to the city's survival was destroyed: water filters, power station, gas pipelines, railway stations, tram lines and rails which were destroyed with tanks.

The works of cultural value were destroyed with particular relentlessness: buildings, churches, monuments, museums, archives, libraries. The most significant example is the demolition of the Royal Castle, the symbol of the Polish state of the time, whose walls were blown up by the Germans in September 1944.

The destruction was documented by a special group of photographers, led by Alfred Mesenbach, and by a crew that shot footage as we could see in the film Varsovie quand même. An album with the photos of the burning city and the destroyed buildings was given as a gift for Hitler.

We cannot but compare this intentional and methodical distruction of a people's culture with what has recently happened, when in 2001 the Talebans blew up with dynamite the giant Buddhas in Bamiyan, in Afghanistan. Or with the destruction in Iraq, where the archeological finds of Niniveh Museum were demolished with a hammer drill by some bearded ISIS men.

Due to the almost complete destruction of the city, its reconstruction was very difficult, if not impossible, based on what remained of the capital city.

After the war the immediate question was either building a modern city, following the avant-garde visions and taking advantage of the empty space that had tragically been created, or recoverying the destroyed buildings of the time. A debate began between modernists and conservatives. During one of the most intense discussions one advocate of Polish modernism, Edgar Norwerth, said in a contemptuous and provocatory manner that if the conservative vision was to prevail, one could as well be inspired by Bernardo Bellotto's works.

Bellotto, also called Canaletto, was the nephew of Antonio Canale,

a Venetian painter and the main Vedutist painter in Venice. He learnt the job from his very famous uncle, at the beginning he was mainly inspired by the art and style of the latter, who particularly focused on the mathematical value of perspective and sometimes used the optical room for painting his works. Soon Bellotto's art differentiated itself from Canale's. The works of the young pupil were characterized by a more careful observation and a more accurate rendering of the architectural elements, as well as a more dynamic representation of the sky and water, together with more dramatic chiaroscuro effects. In his mature period, Bellotto's art was characterized by a sort of descriptive Verism, with an almost photographic faithful reproduction of reality.

Bellotto came to Venice in 1767 and there he became a painter at the court of King Stanislao Augusto Poniatowski. Between 1770 and 1780, on the commission of the king, Bellotto painted a cycle of 26 views of Warsaw to be exhibited in the senatorial Antechamber. That room of the Royal Castle was later called "Canaletto room". 24 views that were painted by Bellotto at that time are still preserved. 22 of these views can be admired in the Canaletto Room of the Royal Castle. Two buildings are exhibited in the National Museum of Warsaw. The two remaining views of the cycle have unfortunately disappeared¹.

^{1 22} of them are preserved in the Canaletto Room of the Royal Castle: "Krakowskie Przedmie cie Avenue (Cracow Suburb) on Krakow Gate" (1767-1768), "The Church of the Sisters of St. Bernard and the Sigismondo Column from the Descent of the Vistula" (1767-1770), "View of Warsaw with the Vistula from the suburb of Prague" (1770), "View of Warsaw with the Palace of the Majority" (1772), "Viale Krakowskie Przedmie cie (Suburb of Krakow) in the direction of the square of the Castle" (1774), "View of the Wilanów Meadows" (1775), "View of Wilanów Palace from the Driveway" (1776), "View of Wilanów Palace from the Park" (1776). "The Wilanów Palace from the Garden to the North" (1777), "The Wilanów Palace from the garden to the southwest" (1777), "The Długa Street in Warsaw" (1777), "Miodowa Street in Warsaw" (1777), "The Church of the Sisters of Santa Brigida and the Arsenal" (1778), "The Church of the Blessed Sacrament in Warsaw" (1778), "Krasi ski Square (The Palace of the Republic of Poland)" (1778), "The Church of the Holy Cross in Warsaw" (1778), "The Blue Palace in Warsaw" (1779), "View of Warsaw with the Church of the Reformed" (1779), "The Mniszech Palace" (1779), "The Iron Gate Square" (1779), "The Carmelite Church in Warsaw" (1780), "The Church of the Sisters of the Visitation in Warsaw" (1780); Two paintings are in the National Museum of Warsaw: "View of Warsaw with the terrace of the Royal Castle" (1773) and "View of Ujazdów Castle and Łazienki Garden" (1776). Two paintings of this series went lost: "Column of Sigismund III, from the descent to the river Vistula with the king visiting the burned wing of the Castle" (1771) and "The Iron Gate Square" seen from the Mirów barracks.



10

7) Nowy Świat street and the Church of Santa Croce destroyed 8) Nowy Świat and the Church of Santa Croce reconstructed 9) Krasiński Palace destroyed 10) Krasiński Palace reconstructed

11) Preserved monuments, Canaletto vs today's appearance

Therefore the conservative architects' vision won. The same point of view was supported by most inhabitants of the capital: rebuilding the city while trying to restore its former appearance as much as possible.

The rebuilt Warsaw represented the architects' and Polish people's dreams come true after the trauma of war. The inhabitants was given an ideal vision of their youth's city and at the same time the memory of the past was passed on to future generations.

I want to remind you that a city was rebuilt by restoring entire areas almost from scratch based on around twenty Bellotto's paintings which, even after 200 years, were still useful to architects. Bellotto's works were extremely useful and practical, because they were made using the dark room for precision of details. His works were considered an almost photographic reflection of the city, as it was at the time of King Poniatowski. His works, characterized by realistic details, also document the everyday life in the city.

On the one hand Bellotto distinguished himself for his precision, but on the other hand he did not lack imagination. An example can be the Royal Castle of Wilanów, which he painted by adding imaginative little fountains, which were not there before. They were made only later by an architect that was inspired by Bellotto's painting.

It should be added that when the decision to rebuild the capital was taken, the Communist authorities of the time particularly appreciated the late Baroque and Classicistic style of King Paniatowski. Therefore many *Art nouveau* buildings were not added into the reconstruction plan because they were considered as symbols of capitalism, in opposition to the Communist leaders' ideals of the time. Actually many areas of the historic center of Warshaw today are similar to those existing more than 200 years ago.

The Venetian painter's style became so widespread among the Polish architects of the time that it could be also found in new buildings and districts that Bellotto had never painted. The architects were so much inspired by Bellotto's style that many new buildings were built with similar features to those seen in paintings: buildings with steep red-tiled sloping roofs. As a result the rebuilt Warsaw became more Canaletto-style than it was at the time of Bellotto. Also nowadays the historic center of Warsaw amazes and charms its inhabitants and tourists, confirming that the traditional conservatives made the right choice. So much so that the historic center of Warsaw was enrolled by UNESCO in the list of World Heritage Sites in 1980 based on criteria II and VI of the Convention (During the Warsaw Uprising in August 1944, more than 85% of Warsaw's historic centre was destroyed by Nazi troops. After the war, a five-year reconstruction campaign by its citizens resulted in today's meticulous restoration of the Old Town, with its churches, palaces and market-place. It is an outstanding example of a near-total reconstruction of a span of history covering the 13th to the 20th century).

Cameron Rashti

Director Historic Cities, Aga Khan Trust for Culture

My presentation in Part A will straddle a number of generic issues concerning documentation as well as observations from field-based case studies and projects. In Part B three case studies are presented.

Aktc's Historic Cities Programme has been active in a wide range of countries in the world, as is evidenced by the map of our site activities. Since the programme started in 1992, a number of these same countries, their populations and cultural heritage have tragically become victims of conflict or instability. Originally, our programme focused on historic areas suffering from environmental pressures, the lack of suitable infrastructure systems and professional knowledge and methodology for conservation and restoration. The task thus has become further complicated and profound in terms of the human condition in urban areas in increasingly stressful situations.

The Aga Khan Trust for Culture has long held that meaningful restoration and conservation of historic cities should be carried out in such a way that results in tangible investments in our cultural assets. Revitalized cultural heritage can serve as an economic springboard for broader socio-economic development - and not merely as informational case studies - bringing benefits to their adjacent communities. This is because culture plays a transformative role, and successful projects are replicable, which is an extremely critical combination of beneficial forces.

The documentation of the conservation **A**. and management of sites:

Turning to the subject of this article, the Historic Cities Programme has and continues to spend substantive time documenting not only the sites in which we work but also the processes and methodologies used to conserve or restore a site, and then the results or the impact afterwards. As can be discerned, documentation is a continuous process that actually survives the end

of a project for us. Considering what are some salient aspects of this process, a number of questions and issues arise which are listed below as a proposed framework for discussion. I do not pretend that all of these questions will be answered in full and I presume that other presenters at this conference will make important contributions as well.

I approach the named topic of discussion from a particular bias stemming from an organisational experience across numerous sites over nearly a quarter of a century within the Aga Khan Historic Cities Programme. While these sites are testimonies to the long curve of history, time, ironically, is not always on our side.

The documentation task is one increasingly that is collective and technically demanding in nature: no individual professional can hope to have come across the nearly infinite number of project types and idiosyncrasies that make the conservation and management of heritage sites so complex and fascinating at the same time.

My presentation will seek to address, briefly, a number of areas of concern and relevance before shifting to a number of relevant case studies:

- Key challenges and opportunities in the documentation process in areas where the Trust has carried out project work.
- **1.1.** The question of technology and capacity in certain types of field conditions.
- **1.2.** Short-term versus long-term priorities.
- **1.3.** Equally, the issue of documention as a prelude to a series of interventions and protective measures that follow (is the documentation phase too limited a window of time?)
- Are lated issue is whether the documentation process in specific projects can become a template for more generic application.
- Further, do the guidelines for documentation of sites differ in-3. trinsically in the case of a post-conflict situation?
- What responsibility is due to ensuring that documentation meets and the set of the set4. adequate standard?
- Based on the above, what might be some areas in the near future **5**. that can make advances?

To address each of these issues briefly:

1. Key challenges and opportunities in the documentation process in areas where the Trust has carried out project work.

AKTC's Historic Cities Programme has been operational since the early nineties. In 1992, it was entrusted with the examination of the physical, social and economic pressures threatening the Historic Stone Town of Zanzibar and the historic Baltit Fort in the Northern Areas of Pakistan. Shortly thereafter, it was assigned the project of rehabilitating a barren site in a central area of Historic Cairo, with a surface area of 30 hectares, alongside the Ayyubid Wall of Old Cairo. The first and third of these sites are world heritage sites, whereas the second is a national landmark.

Over time, the Historic Cities Programme portfolio has included many projects of a similarly challenging nature. I n my allotted time, I will be able only to briefly tap certain cases to illustrate the challenges and opportunities faced. To summarise a broad subject, if I may:

- In all such types of projects that deal with historic sites containing material heritage, one must at the outset determine the extent to which the immaterial or socio-economic and community dimension needs documentation and treatment. In the above examples, even if certain sites appear to be stand-alone, they are usually part of a system of neighbourhoods and often inseparable in terms of usage, guardianship and welfare.
- The Trust's experience with its initial project portfolio led it to expand the documentation process from one that mainly captures physical and environmental data to one that includes important social and demographic information as well. Community-focused, baseline survey methodology was introduced to probe not only current problems but also ways in which conservation and good management of historic sites can have a beneficial impact on the residents of a catchment area.

- This led invariably to the consideration of what a project's "catchment area" is. An earlier geographic term, catchment areas signal the spatial relationship of a specific physical feature or site and a zone of influence. It became popularised in urban and regional planning and then by market models and location theory. Here, we are not concerned with a precise boundary but a concept of proximity and adjacency and thus influence and interaction. Thus the Trust's projects moved soon from documentation of isolated landmark sites to broader spatial urban of semi-urban assemblies which demanded documentation not only by normal physical surveying methods but also social scientific and economic methods.
- Projects such as the Stone Town, Zanzibar; Darb al Ahmar, Cairo, and towns in Northern Pakistan, led to an increasing focus on urban areas development projects centering on heritage sites. The Lahore Walled City project focused on the Shahi Guzargah processional route, which connects Delhi Gate to the Shahi Hammam, the Wazir Khan Mosque and the Akbari Gate of Lahore Fort; linkages (physical and cultural) between the Delhi Nizamuddin Basti and Humayun's Tomb and the Sunder Nursery have been explored and reinforced. In Herat and in Kabul, multiple linkages have developed in the centres of these historic cities of Afghanistan.
- To avoid conserved sites that lack animation or that would only serve as tourist venues, the Trust undertakes to develop a number of community-focused assets where possible. In Cairo, Delhi and Kabul newly built or restored parks and gardens serve as viewing platforms for the conserved sites, providing buffer space and better community access in fragile but important historic areas. In Northern Pakistan, historic forts adaptively re-utilised as heritage lodges provide critical facilities for access, leisure and discovery of local heritage.

The Trust monitors such completed sites and enters into operating trusts with the local authorities to maximise transfer of knowledge. A "Parks Information Management System" (PIMS), developed in-house, allows collection and updating of information about key performance indicators, representing in a documentation system or database, which evolves over time and allows time comparison.

1.1 The question of technology

and capacity in certain types of field conditions.

The documentation process within the Historic Cities Programme is quite detailed, and starts in the project's conceptual phase. Determination of appropriate treatment of a certain site prior to such types of analytical exercises is inconceivable. A good part of this is data collection at the outset - many of the places where we work require fresh documentation because whatever exists is historical, multi-layered and either never previously surveyed or surveyed under earlier and different conditions. We normally assume that we need to perform brand new and thorough surveys, two-dimensional and three-dimensional, especially with the advent of newer technologies today that offer much more resolution, precision and ability to visualize readily via digital files than was the case 20 years ago.

When we develop design proposals, the documentation process has to go further and, in a reverse mode, we test the documentation. We may have to go back to the site and collect more data; we may have to excavate further in some places while considering how to go about restoring, assuring or consolidating; we may realize that our information may not be adequate.

Very often, a proposed intervention needs to be initially tested via a prototype. Whether dealing with earth and architecture or mud-brick architecture or traditional techniques of stone or masonry arches, etc. the skill-set has been lost, so we have to train people on site and we have to carry out prototypes off site to illustrate that the right mix of technology, the right standards and the right materials have been selected.

1.2 Short-term versus long-term priorities:

Preliminary site documentation takes a shape and time of its own, but must be relevant to the phase that follows if conservation is to be carried out. Therefore, even "short-term" documentation is time-consuming, sequential, has to be in a format that can be shared or exchanged with multiple parties. Thus, there is no value in generating documentation today in non-exchangeable formats and we must bear in mind the important principle of reversibility.

1.3 Equally, the issue of documentation as a prelude to a series of interventions and protective measures that follow (is the documentation phase too limited a window of time?

However, documentation is not over with the completion of implementation: project monitoring and assessment. It is very rare than we can finish a project and walk away from it. It is vitally important that teams go back years after; many of these sites are fragile. It is natural to feel a moral obligation either directly or in tandem with a local authority - to go back after 10 or 15 years, to evaluate and see whether there are any problems with regard to a previous conservation or restauration technique. We are doing this right now with a monument, which is 700 years old and restored in the 1990s and in which we have seen detected local cracking because of the intensive rainfall itself as a result of climate change.

A related issue is whether the documentation 2. process in specific projects can become a template for more generic application:

To an extent, but not to a highly prescribed degree, each site is unique and deserves documentation and management accordingly and this implies professional judgment based on experience. Some of the case studies presented will illustrate the fact that the documentation process in certain specific sites (as other presenters have also mentioned) can definitely become a template and there are generic aspects that can be documented with the help of appropriate drawings and databases. On the other hand, many of the case

studies presented today stress the unique aspect of these sites, a factor that should not surprise anyone and therefore, our templates have to be flexible and not rigid. These templates can clearly be defined in terms of a certain format and level of detail in a general sense in the case of a site not endangered by war; however, during a period of conflict many other considerations touching on the very survival of cultural heritage obviously need to be taken into account.

Further, do the guidelines for documentation of sites differ 3. intrinsically in the case of a post-conflict situation?

Yes – our experience is that the zone of destruction is larger and more profound; all systems need review from the foundation up. The complexity is enormously greater.

4. What responsibility is due to ensuring that documentation meets an adequate standard?

Standards obviously have to be considered continuously. This is of huge importance; rigorous analysis backed up by carefully selected and qualified peer review are essential. The assessment period of proposals must be respected.

I am not aware of any set of universal standard that can meet all occasions, and, arguably, every organization has a duty to review and establish its own necessary standards where gaps exist and to refer to those standards that are available, be these UNESCO charters or other standards that exist.

5. Based on the above, what might be some areas in the near future that can make advances?

Undoubtedly yes, in hand with technology. Some recent citable advances are:

- Multi-layered site and urban area analytical documentation with tools for participatory contributions and extensions;
- Mobile documentation and analytical field units adjacent to areas of intervention:

- Online posting of critical materials and HR overseen by a central project oversight team; and,
- Real time monitoring of sites at risk located in conflict zones.

B. **AKTC case studies:**

With those quick points, I turn to some project works of ours in Egypt, in the historic city of Cairo, followed by the Walled City of Lahore, then lastly in Syria as case studies. As one speaker mentioned in the first session: these interventions are very time-consuming and lengthy and we should not be fooled into imagining otherwise. Instead, we should be prepared. One often imagines that certain initiatives require only a few years. The Trust, in fact, has been active in Cairo and in most other places for far longer periods because of the requirements and sequence of the work.

Cairo: Darb al Ahmar-Al Azhar Park Area **Development Project:**

Back in the 1990s, AKTC proposed a park and urban renewal project in Darb al Ahmar, a district in the historic core of Cairo, along the medieval Ayyubid city wall. For those who may not know Cairo well, the aerial photographs of the zone in question illustrate its urban intensity. The area the Trust eventually demarcated as an "area development project" consisted of space reserved for a (future) metropolitan park, a length of the medieval walls and the urban fabric, in a zone about 2 km long and 1 km wide with a living community across the wall of 70,000 people.

The green space of Al-Azhar Park was fashioned out of the derelict land adjacent to the wall as an environmental oasis in the inner city. The park project involved a significant amount of earth movement to reveal the lower stretches of the historic wall and achieve slope stability. Extensive site and soil documentation underpinned the landscape design of the Park. Today, al Azhar Park is visited by roughly 2 million people every year and has become a major destination, as a result of the enhancements and walking circuits created, bringing the public closer to a heritage previously inaccessible.

Images of the medieval Ayyubid Wall on the park's west from ancient photographs depict the starting condition; a significant upfront period was devoted to archiving and searching the archives that preexisted. Picture of the same wall in the late 19th and 20th centuries (100 years apart) reveal the result of man-made harm and damage rather than natural damage. For proper on site documentation and later restoration, an extensive system of scaffolding erected along its length in sections. Carried out in conjunction with an international team from the University of Pennsylvania and an international team of stone specialists and consultants, the 1 km long wall took 10 years to restore and conserve, working in close conjunction with the Supreme Council of Antiquities of Egypt, the authority in charge and some documentation techniques on the site.

In addition to documenting and conserving the wall, we turned our attention to the community and the need to enhance and upgrade its housing stock, critical to the historic character of this area and its urban morphology. Project work in the adjacent community included documentation of landmark buildings and mosques, many of which had sustained damage from previous earthquakes. Two examples are the Kheyrbek Mosque and Um Sultan Shaban Mosque, near the park, in which, after careful documentation the missing portion of each of their minarets was reconstructed, based on measured drawings and digitalization of its original geometry from photography of the missing pieces. Artisans trained in the process of rebuild the missing minaret top and dome and in general conservation work, added to the local stock of building conservation skills.

Urban Conservation and Area Development in the Walled City of Lahore:

The Trust has collaborated with the Punjab Government in conservation and rehabilitation in the Walled City for more than a decade, beginning with the selection of a zone of intervention defined by an ancient processional route in the Walled City—the Shahi Guzargah, comprising some 11 per cent of the area of the Walled City. The Trust has pooled its resources with those of the Government, represented by the Walled City of Lahore Authority (WCLA), and the World Bank. The Shahi Guzargah project involved development and replacement of trunk and distribution infrastructure, the rehabilitation of the urban fabric, the protection and conservation of the historic building stock, and the conservation of major monuments on the historic route, such as the Shahi Hammam, the Wazir Khan mosque, with its important historic forecourt, the Sonehri Masjid and the Maryam Zamani mosque. Most recently, the Trust has taken up the World Heritage Site of the Lahore Fort, now under management of the WCLA. In this endeavor, priority is being accorded to the famous Picture Wall of the Fort and its Summer Palace, with a state of the art new museum to be established in the latter.

The Trust has recently completed the "Master Conservation and Re-development Plan" (MCRP), mandated by the new Walled City of Lahore Act, 2012. The Plan provides guidelines for responsible municipal oversight and sensitive redevelopment. These guidelines also recommend the implementation of a series of Area Conservation and Redevelopment Schemes on the lines of the Shahi Guzargah pilot project, integrating several "zones of special value" within the larger Schemes. The MCRP provides templates for documentation, analysis and interpretation of the zones of special value, while providing policy guidelines which include procedures for re-integration of street facades and for infill housing or building replacement with reference to certain historic principles of façade geometry, fenestration and streetscape.

Old City of Aleppo, Syria:

In concluding our case studies, we turn to Syria, which, for good reasons, will come up many times in our discussions. The Trust has been involved in urban and monument conservation in Syria since 2000. It undertook conservation master planning and on site conservation of important elements of the citadels of Aleppo, Salah al-Din and Masyaf. In Aleppo, project work broadened to include planning of the public spaces around Aleppo Citadel in conjunction with the Directorate of the Old City of Aleppo. The Trust also became actively involved with the conservation and adaptive resue of three historic courtyard mansions or "beits" within the Old City of Damascus. By 2011, conservation activities had essentially come to a halt, awaiting the end of the conflict. In the case of many important historic sites in Syria, including the city of Aleppo, we can see the results today following the start of the conflict and destruction since 2011.

In many senses, we have to start our thinking all over again with the international community and with willing partners. We have some ideas in mind: within the world heritage site of Old Aleppo, we have proposed a zone of special interest around the citadel, the historic souk and the Umayyad Mosque and its destroyed minaret, for which we are compiling available documentation at present. A recent short film of the situation in Aleppo today (commissioned by AKTC and produced by Iconem) illustrates poignantly the scale of the challenge not only in terms of documentation but also in terms of reviving an ancient city and its human life.

As this conference on "Documenting Our Heritage at Risk" has well communicated, documentation of cultural heritage in a period of conflict requires even more optimism and hope than in normal times. In modest reference to some points raised at the beginning, the appropriate level of project and site documentation is an open-ended issue and calls for a continuous process of innovation and testing. While performing to our best available standards, we must keep resetting our objectives and aim higher.



Map of AKTC Areas of Engagement 2017

CASE STUDIES

Cairo images



2: Cairo Area Development Project 3: Photo of Histoirc Ayyubid Wall late 19th century 4: Ayyubid Wall photographed prior to al Azhar Park project 5: Scaffodling: Start of Documentation 6: Assessment of wall and Anayltical Drawing 7: Integrated urban conservation-redevelopment plan of a Zone along the Wall
7b: Plan of Al Azhar Park in cvontext of Ayyubid Wall and Darb al-Ahmar
8: Aerial View of completed al Azhar Park (2005)
9: Conserved Histoirc Wall and Access for Visitors
10: Documentation in the field
11A: Um Sultan Shaban Mosque: Missing Minaret Top
11B: Substructure for Minaret Dome

Lahore images

Syria images



12: Plan of the Lahore Walled City Project
13: GIS Mapping of Histoire Building Stock
14: Plan of Side Alley whoing Building Morphology
15: Lahore Walled City: Mapping "Zones of Spevial Value" (2016)
16: Lahore Walled City: Elevation of Historic Building Stock

17: Salah al-Din Citadel
18: Aleppo Citadel
19: Masyaf Citadel
20: Photograph of Old Aleppo from Citadel after Conflict
21a: Plan of Old Aleppo and Proposed Zone of Preliminary Initiative
21b: Zone of Preliminary Initiative: Categorised by Area
Bijan Rouhani

Vice President of ICOMOS-ICORP, Member of the International Board of Blue Shield

Today, the question of why heritage information and documentation is required, seems to be an easy question for cultural heritage professionals.

Chronic upheavals in the Middle East and North Africa (MENA) has reduced the capacity of national and local heritage institutions to protect, manage, and recover their cultural heritage.

The combination of a dearth of capacity and the region's instability has demonstrated the need for a comprehensive program for documentation that can support risk preparedness as well as emergency response and recovery.

In 2016 and in response to the request of the World Heritage Committee, ICOMOS, the International Council on Monuments and Sites, initiated a project to develop a specific Guidance on Post Trauma Reconstruction of World Heritage Properties.

This Guidance is now published as a working document that will be tested, revised and refined through experience and reflection.

"Documentation and recording of surviving and lost tangible and intangible attributes of Outstanding Universal Values (OUV) of an impacted cultural property, and establishing their post trauma status" is an essential element in the Framework of Actions proposed by the ICOMOS Guidance (ICOMOS 2017: 5). This should be followed by the Assessment of the impacts of events (conflict or natural disaster) on the tangible and intangible attributes of OUV.

While the existence of documentation prior to disaster is fundamental for comparison, the importance of early recording of damage and surviving elements is emphasised. The ICOMOS Guidance confirms that "image capture (such as photographs, aerial views, etc) is a first essential step. Comparatively simple technologies/techniques such as recording by mobile phones or tablets, crowd sourcing of images, and the use of drones and robots for 3D

POST-TRAUMA construction A 1-day ICOMOS colloquium CIII) 4 March 2016 ICOMOS Heariquarters. Pans - France Upper imminition moly

documentation have established their value in disaster settings." (ICOMOS 2017:8)

It is also important to assess the underlying factors that may have increased the property's vulnerability in order to allow the reconstruction framework to address them as the recovery process unfolds."

In the light of changing global circumstances all World Heritage properties entail some additional element of risk, therefore making the docu-



mentation of tangible and intangible attributes of such properties is even more important. ICOMOS encourages States Parties to review their current documentation from the perspective of its comprehensiveness (anticipating possible damage or loss), and existing provisions for storage and retrieval both in emergency situations and in the longer term. Particular attention should be paid to requirements for updating systems. (ICOMOS 2017: 12)

Currently, there are some important ongoing initiatives for documentation of endangered cultural heritage in the Middle East and North Africa, which are aligned with ICOMOS Guidance and recommendations.

EAMENA Project

Supported by the Arcadia Fund and based at the Universities of Oxford, Leicester, and Durham, Endangered Archaeology in the Middle East and North Africa (EAMENA) project was established in January 2015 to respond to the increasing threats to archaeological sites in the Middle East and North Africa. This project uses satellite imagery to rapidly record and make available information about archaeological sites and landscapes which are under threat.



EAMENA's spatial database provides the fundamental information for each site, including the level of risk and how each site relates to one another. It is accessible to all heritage professionals and institutions with an interest and passion for the protection of the cultural heritage of the region.

EAMENA works with relevant authorities on the ground to limit likely damage, share information and skills, strengthen networks and raise awareness.

EAMENA has been also funded by the British Council Cultural Protection Fund to carry out a 3-year project on Training in Endangered Archaeology Methodology. This project will train archaeologists from seven countries in the use of an open-source aerial recording methodology, designed for conflict zones and other areas where access to the ground is restricted.

Archaeologists from Egypt, Jordan, Lebanon, Syria, Libya, Occupied Palestinian Territories and Tunisia will be trained in the use of the EAMENA database, with the overall aim of enabling heritage professionals to better identify and assess threats to cultural heritage which has not yet been recorded.

AMAL in Heritage

programme

AMAL in Heritage is another program for managing disaster and conflict risks for cultural heritage in the Middle East and North Africa through a combination of tools, technologies, training, and community development.

The partners for Phase One of AMAL in Heritage are: Global Heritage Fund (GHF), ICCROM, Risk Preparedness Committee of

ICOMOS (ICOMOS-ICORP), the Arab Regional Centre for World Heritage (ARC-WH), and the Cultural Emergency Response (CER) programme at the Prince Claus Fund. The Iraqi Institute for the Conservation of Antiquities and Heritage (IICAH) in Erbil and the National Committee of ICOMOS-Tunisia joined the AMAL in Heritage programme in 2016.

Through user-friendly mobile and web applications and a participatory design process with local partners, AMAL offers extensive preparedness and emergency management capabilities for both professionals and laypeople.



The following factors are considered to be the most salient for the AMAL in Heritage programme:

- The dated techniques for recording and data gathering are too slow and expensive to be effectively used in emergency situations.
- Although the use of mobile applications for risk preparedness and emergency response has become a trend in humanitarian sector, cultural heritage has not been appreciably affected yet.
- There is not a comprehensive app and platform for disaster management in cultural heritage sector to provide training, information, and tools for preparedness, response, and recovery.

AMAL in Heritage responds to these crucial needs through:

- **1** Developing AMAL Mobile Application
- 2 Training and Capacity Building
- **3** Community Engagement

AMAL's mobile and web applications offer modules for risk and damage assessment, mapping, rapid documentation, team management tools, guidelines, and training sections about endangered heritage for local communities.

The project closely works with at-risk communities to engage them in the identification and monitoring of disaster risks as well as to reduce their vulnerabilities and enhance their capacities for protecting their heritage.

In this year, the project will organize regional and international workshops to test the Beta version of the app, train cultural heritage professionals., and also conduct case studies and surveys in in Tunisia with Oxford EAMENA Project, and in Iraq with local partners.

AMAL in Heritage will be a complementary tool for on-site condition assessment for other projects such as Oxford EAMENA.

Project Anqa

ICOMOS has been also a partner of Anqa 3D Survey Project,together with CyAr and I Yale's Institute for the Preservation of Cultural Heritage (IPCH), sponsored by Arcadia Fund. The initiative, named Project Anqa for the Arabic word for the Phoenix, intends to deploy teams of international professionals, paired with local professionals to document the at-risk sites in 3D in Syria and Iraq before they are destroyed or altered.

12 sites are nominated to begin with. The pilot phase of the programme focuses on Syria and started by training Syrian specialist who will capture 3D scans of six cultural heritage sites selected in coordination with Syria's Directorate General of Antiquities and Museums (DGAM). A second phase of Project Anqa is foreseen in order to train Iraqi heritage professionals to carry out 3D documentation of Iraqi cultural heritage.

In conclusion, and as emphasised by ICOMOS new Guidance, coordination at international and national levels is required for documentation and data management of endangered cultural heritage as many entities and projects are involved in this task.

It is also imperative that the States Parties and responsible agencies can access the necessary data, as such data is important, not only for the recovery actions and loss assessment during a specific disaster, but also provides a resource for response to other similar disasters."

References

ICOMOS, (2017). Post Trauma Recovery and Reconstruction for World Heritage Cultural Properties. Paris, ICOMOS. Available from: http://openarchive.icomos.org/1763/19/ICOMOS%20Guidance%20on%20 Post%20Trauma%20Recovery%20.pdf [accessed 20 May 2017] METHODS AND PROBLEMS IN THE MANAGEMENT OF THE DOCUMENTATION OF BOTH PUBLIC AND PRIVATE SITES (NORMS AND PROFESSIONS)

Stefano Baia Curioni

Associate Professor, Bocconi University

I am going to propose a very short intervention that could be titled: **Documenting the heritage misunderstanding**, even if a more effective title – making a quick reference to old movies memories - could have been **Untouchables** or , even more precisely, **Touchables** written with the blood on an elevators walls.



What happens today in the global heritage and what this conference is strongly and effectively stressing, is how, in spite the international efforts, the cultural heritage is more and more tragically touchable. The satellite photos of Apamea, Ur, the disaster of Damascus, Homs and many other sites in Syria are shouting a story that obvously need to be urgently taken in account.

Session 2



But my experience, serving as President Palazzo Te in Mantova, tells me that the "touchability" of the heritage, that now a day asks for a quick intervention, is not only connected to war and destruction nor to the traditional enemy represented by the rushes of speculative capitalism.

I talk about a subtle autoimmune disease affecting our society, which we should discuss and better understand.

Lets look at the back wall of one of the most important monument of Italian XVI century.



This is another way of being "touchable": students from low and middle schools have redrawn these graffiti after a number of cleaning and they stand still in spite the glory of the place.

A part from any rhetoric about subcultures, graffiti and tag's aesthetics, they suggest us to face the fact that there is something like a clear "interest gap" toward the heritage, a carelessness of the heritage. Who really cares about the heritage destiny (I am talking about the built, monumental, heritage)? Sometimes I am afraid to find a creepy answer.

Of course, this does not mean that spectacular heritage disruptions do not raise collective emotions. This is always the case, and sometime the very conception of the disruptions take its form from the willingness to release a media message that is supposed to burn into memories through emotions. However, very soon this sudden incandescence sunk in a swamp of indifference.

The last cultural consumption statistics released by the Italian Instititute of Statistics (ISTAT) reveal a progressive widening of the area of

non-cultural consumers, people that do not have access to the normal cultural supplies. Just to give an idea: in Italy from 2008 to 2016, the area of non-consumption went from 34 to 37%. This means that approximately 40% of the Italian population does not have access to any form of cultural consumption (in one year no books, no newspapers, no movie, no theatres, no concerts of any kinds, no museums etc.).

The non-consumption of cultural offers reaches 55.5% among those who have a low income and are foreign immigrants; low-income Italians reach 44.4%, traditional families in the Italian provinces 42.3%.

These are very staggering and impressive figures....They not only say that a relevant part of our population is "not" interested in museums, theatres, monumental heritage and archaeological sites, not to talk about books or newspapers. They are telling us that a relevant part of the cultural dynamics - and therefore memories and heritage formation processes - is out of our perceptions.

This is not necessarily a "negative" thing. We're not against alternative cultures. But it have to be clear that this evidence do not imply a kind of generalized passivity or lack of desires, imaginaries, needs for expression. As the walls of the XVI century palace that we saw reveal, it is almost the opposite case. There is an action there, cultural and sometime political, an action and a dramatic cleavage in terms of meanings, beliefs, visions.

A word has been given to the challenge represented by this interest gap: the audience development.

But I'm afraid that this concept is now becoming obsolete. It has been originally created in relation to the addictive patterns of cultural consumption. As the marginal utility of cultural goods is positive, once that somebody begin to consume he will most probably increase his basket of preferences. In this sense, any action directed toward the audience development is good as it initiates a potential story of omnivore consumption.

However, I suggest that now we have to face a different case: the result of a choice. I suggest that the non-consumption expresses an open and strange divorce from the past and from the dominant, institutionalized voices. It expresses a kind of atomization of needs and voices that leads to a peculiar fragmentation of the social body, a lack of access, which is paradoxical, given the amount of heritage that is part of the contemporary reality of most Italian provincial cities. The non-consumption is a choice that suggests us how difficult is the pathway of modernization, and how strong is the need for new, cultural, forms of mediation and inclusion.

I just drafted, jotted down an agenda, a list of thoughts, which I think, is of interest. I think that a community of conservation and preservation must necessarily put together, next to conservation and preservation plans, integration plans as well as mediation plans that are able to innovate the frame and the contents of the relations enhanced around the heritage.

Honestly, we have some best practices in our environment, but not so many. I think that however at least we should start for exempleby using cities and communities as basic units of analysis and reference. We need to care about the relations between cultural dissemination policies with job creation policies. We should fight the idea that heritage have an intrinsic value, we need to stick and fight in the relational areana, giving voice to the communities which are now drawing graffitis on the walls.

We need I think to surf the touchability of the heritage, making an effort of inclusion. A fundamental effort that will be important to be organized in a collective debate, but even more important to translate into action and experimentation.

Laura Baratin

Dean of the School of Conservation and Restoration of the University of Urbino

> **Conservation Digital Report: a digital system for the** documentation of Cultural Heritage in case of emergency

The "documentation", in general terms, is the need to gather information collected for a specific topic so they can be available now and in the future. Obtaining the information is a process that involves many steps: the study, the analysis and the elaboration of the information; all these processes expand and transform the common conception of the term, as not only a mere recording of a phenomenon. In this sense, the documentation becomes an operation "dynamic", as the basis for further considerations on the object analysed.

In case of disasters or emergencies, if the risk of cultural heritage loss is considered as criteria for the identification of the operational priorities, the knowledge of its distribution in the territory is useful and necessary to the development of sector policy and for interventions planning in regards to land-use, land protection and land conservation.

The most remote origin of this application can be found in the concept of "preventive restoration" elaborated by Cesare Brandi in his work "Teoria del Restauro". This concept can have a concrete feedback only in the prevention of degradation through the control of external stresses and programmed maintenance of cultural heritage.

The first attempt to implement this strategy dates to 1975 when ICR elaborated the "Pilot plan for planned conservation of cultural heritage in Umbria" under the direction of Giovanni Urbani. An experience that has allowed the development of subsequent experimental Risk Cards, but that only now has created the conditions to realize real GIS thanks to the synergies created by the evolution of technology, especially in the field of

communications networks for the transmission of information.

Although not yet in practice of public administrations, in particular when it comes to movable property, GIS are functional to the needs of conservation and maintenance of historical artistic, architectural and archaeological heritage.

The documentation of an artwork before restoration can be summarized in three sequential steps:

- Preliminary documentation to identify the problem and guide the next steps;
- systematic and comprehensive documentation, to provide both global and detail vision on the artwork;
- additional documentation, with further investigation and checks to be developed over time.

The documentation needs, therefore, the correct setup of a systematic structure of informations into a system of classification to store the acquired data, and this process depends on the correct understanding of the theme. In order to standardize the acquisition and disclosure of information, it is therefore necessary to standardize the process of documentation as a whole, from the earliest steps of collection to the presentation of results.

"Conservation Digital Report" software system allows the drafting and completion online of an actual "condition report" for many different kind of artworks, thanks to a flexible and interactive software that can be adjusted according to the different public or private requirements, creating personalized documents.

The system's potential will be illustrated through some examples both as the standardization process documentation for the conservation and restoration of different types of cultural heritage, and as management of data in case of emergency.

The entries inserted include vast records of specific technical terms for each typology of mobile artwork; these records have taken into account not only all the information contained in the paper protocols which are now

used by Italian and foreign museums but also those contained in the protocols drawn up by specialised insurance companies, the Object ID, as well as the OA, OAC, CEI cards. The system can be implemented to contain all the entries requested, in the order that is deemed appropriate by the user in charge, without altering the specific advantage of this tool: a clear and concise structure which does not damage, though, the outstanding completeness of the data which is indispensable when the survey is designed to provide documentary evidence of a restoration work, of a handling, of the conditions in the different stages of the loan, still aiming to provide well-documented and incontestable data in case of a dispute. The platform is useful also to choose the contents to be made public with reference both to the documents already specified and for the set-up of information itineraries for exhibitions ans events, thanks to a QR code created for each survey which allows the visitor to get the information chosen by the person in charge directly by smartphone or tablet. From the technical point of view the system is based on Open Source tools (php, javascript, MySQL), which ensure a wide flexibility of planning and a total compatibility with the main operating systems; moreover, the choice to publish it in Cloud modality makes it particularly suitable for all the situations where it is becessary to get information "worldwide", when more users can have access to the information at the same time irrespective of location or workplace through their own account.

Another advantage of the Cloud system is the guarantee of protection of the data: indeed, dedicated backup systems make sure that the information are always replayed, thus relieving the users from expensive and sometimes badly-implemented D.I.Y. backup systems.

From the operative point of view, two main areas are identified:

Area of management and definition of the structure of the information: • in this area the user manager can create the structure of the information by following the guidelines of standard protocols or according to specific requirements: this structure will in turn be used by the operating users (those who enter the information) and will become the index according to which the information are handled and displayed.

Operating Area: in this area the user in charge of the collection and the entry of the information (text, images, documents) will be guided by the interface of the system when entering such information following the structure defined by the manager of the previous area.

This system set-up has two great advantages: on one hand it helps, through an intuitive software interface, to create an information "sheet" based on an accurate and structured logic and on the other hand it binds the individual who operationally compiles the information to follow a strict logic, thus creating a coherent file of documents which can be shared by all the users. It is possible to define a specific structure of the information for each typology of artwork: this is to facilitate the task of the professional who will have to compile only the information related to the type of artwork they are analysing. The system offers more than 1.600 pre-set technical entries for different objects, constitutive materials and relative deterioration, and they can be combined in case of complex operations: frames, leather, paintings on canvas, gilding, plasters, installations, polimateric works, kinetic works, latex-rubbers, paper materials, wax materials, glassy and ceramic materials, plastic materials of synthesis, sculptures and wooden boards, textiles, looms, stone, mosaic, book.

The system allows to manage multiple and historicized surveys (information sheets): for each artwork it is possible to manage several information sheets, each one defined by a period of validity. This ensures the creation of an historical file for each specific artwork, with information coming from different compilers but still keeping a coherent structure: the advantage is an easier way to read and to compare the information sheets compiled by several professionals.

For each information data, the interface of the system gives the chance to work with many languages simultaneously without the need to change the page one is working on: this allows to compile and compare the information entered with the relative translations quickly and efficiently.

The Cloud structure of the system allows a "collaborative" operativity with different levels of access to the information: the manager can identify

Collaborators and Guests, the former capable of compiling and intervening on information assigned to them for the compilation, the latter only for consultation: both guests and collaborators do not need to install software on their workplaces as the whole system can be used through a web browser and an internet connection.

For each artwork it is possible to manage several "views" (images from different point of view: i.e. left side/right side, behind, Top/Bottom, etc) of the artwork with the possibility to identify the holding points of images/ photographs in detail. Besides, it is possible to draw personalised layers to graphically highlight deteriorations and/or areas of intervention.

All these operations are possible directly online without using further graphic software. These graphic "maps" can be exported in a PDF format and can contain different types of highlights, even current ones, to underline different sets of problems. The documentation can be consulted also in HTML format, and can be visualised also through mobile devices (Smartphone and Tablet) optimised in responsive mode. Besides, it is possible to produce documents in PDF format from the sheets with interactive index produced automatically.

There are so many systems, including SICaR in Italy, which was not mentioned this morning and is used by Italian General Directorates for Cultural Heritage, but it has a very hierarchical structure, it is difficult to handle and use and it is not designed in several languages, so we created another system. The CDR system can also manage 3D models and here you can see the main features: the 3D models can be analysed even by staff that are not skilled in 3D, but can view the 3D models and add any necessary information to the model.

Given the ever more popular use of 3D digital models, the functionality for the management of 3D models in OBJ format has been integrated into the system. For each artwork, it is possible to attach one or more models both to review them and also to create "views" of the artwork created starting from the model: it will be possible to make interventions on these views with further processing like the drawing of graphic layers to identify specific areas or holding points of images in detail.

A Mobile APP integrated in the system capable to carry out photographic detections and to add notes on the state of conservation of an artwork is available on smartphone or tablet, also in off-line mode. Such information can be synchronized with the system: this speeds up the process of creation of the monitoring photographic documentation remarkably as all the necessary information (text notes, holding points of the photographs and possible layers to highlight specific areas) are directly on the mobile device and do not have to be calculated again as it happens using standard photo cameras (fig. 3).

The last test that was carried out after the Italian latest earthquake was testing how this system might be used for risk management. The risk sheet designed by the Ministry of Cultural Heritage was entered into the system, so that you can choose to record a risk situation and the end report will output a sheet that is in conformity with the sheet used by the Ministry of Cultural Heritage. These are recordings on the Abruzzi earthquake, so as you can see the use of this system is collaborative, which means that there might be a team manager who can manage how the system is used by guests, by students, by professionals (figg. 4 and 5)

So this is the system that the Urbino University is testing using European Funds with six Tunisian universities where restauration schools are involved in the Training and Education Department of the Ministry of Education and Scientific Research in Tunisia. Therefore this has become a project in which Tunisia is the first country where there are restauration schools that train and educate their own restauration professionals. So we are testing this system to understand whether it is flexible enough to be used, also to record problems that exist in each individual country in terms of vocabulary, terminology, types of objects and artworks. This project involves an IT company and also a company of restauration professionals who are the same restorers that in Tunisia are dealing with the descriptive part related to how you can describe the type of art object that you want to record or register.

The information for the conservation of an artwork can be presented in many different ways, always trying to offer a clear interpretation; the selec-









tion of the elements to combine is based on the functions of the presentation; in the same way, the graphic symbols and the colours are not standardised but are chosen to facilitate readability and to reinforce the message.

It would be necessary to have a "protocol" or "specification" which defines the guidelines of the graphic documentation as well as a proper method of detection, just like the conservation sheet defines the documentation of the descriptive data.

Various attempts have been made in this direction, taking inspiration from normative processes of building and cartographic activities, but within the field of the documentation related to restoration this is still an open sector. The results can be diversified according to the requirements and the methods employed, but the objective today must be to provide a "digital sheet of the artwork" inserted in its context and able to develop, within the restoration work, the different contents from the check to the monitoring of the transformations the artwork is subjected to through time, to the simulation of the interventions based on tridimensional models and, if necessary, on possible virtual reconstructions.

Mounir Bouchenaki

Special Advisor to UNESCO Director General for Cultural Heritage

I would like to start my brief presentation by mentionning the latest development at the political level concerning this issue with the first ministerial meeting of the G7 Countries held in Florence only few weeks ago.

At this Florence gathering held on the 30th and 31st of March 2017, on the theme « Culture as Dialogue », the joint declaration by the G7 Ministers of Culture proclaimed:

«We express our deep concern at the ever-increasing risk, arising not only from terrorist attacks, armed conflicts and natural disasters but also from raids, looting and other crimes committed on a global scale, to cultural heritage and all related institutions and properties, such as museums, monuments, archaeological sites, archives and libraries;

«We express our deep concern about the destruction of cultural heritage sites, as such actions obliterates irreplaceable patrimony, extinguish the identity of targeted of targeted communities and erase any evidence of past diversity or religious pluralism; ...

«We further call upon all States to take steps to increase their safeguarding and preservation of cultural heritage, including the heritage of religious and ethnic minorities, as well as to identify and share appropriate best practices for fighting every form of illegal activity in this field, including those concerning the protection of endangered culltural heritage in conflict zones;

«We also affirm that effective international cooperation facilitate widely accepted solutions for assuring the protection and promotion of cultural heritage and cultural diversity».

As you can notice these four paragraphs are totally in line with the objectives assigned to this Conference, and this is why I wanted to start by recalling this important political declaration which concluded a meeting

which I considered as a «historic one», because for the first time in their history, representatives of the 7 richest countries in the World discussed at the Ministerial level cultural issues that are in the core subject of the Agenda of this Conference.

With my colleagues from UNESCO and ICCROM I was honored to participate to the technical round - tables, organized in parallel to the ministerial encountern, and chaired by high officials from the Italian Ministry of Culture (Ministero dei Beni Culturali e delle Attività) and from the Commando dei Carabinieri per la tutela del patrimonio culturale.

If you allow me to speak of the experience gained by UNESCO during the last 30 years, since the shelling of the historic city of Dubrovnik in December 1991 and the Ex- Yougoslavia crisis up to the latest internal wars in Afghanistan, Cambodia, Iraq, Libya, Mali, Syria and Yemen, the response of the international community was always based on the preparation of a Strategic Action Plan, with all parties concerned, with specific adaptations to each crisis situation affecting cultural heritage, but with a permanent and indispensable attention to documentation, inventory, mapping and assessment prior to any concrete emergency action.

The nature of violent conflicts in the world has changed dramatically in recent decades in terms of their causes, targets of violence and consequences not only for the population with the civilian dramatic consequences, but also and more and more for the cultural heritage which became a target on the basis of an extremist ideology . As it has been said in various fora « Internal conflicts not only destroy buildings, bridges, monuments and sites and museums, but also deliberately victimize civilians.

«Helping to rebuild war-torn societies has become one of the priorities of international development and humanitarian agencies » said InterWorks that I quote. Within the past decade, the international community has learned that we must be mindful of the particular challenges of the need to implement specific methods in our transition-related aid. A speedy commencement of assistance, involving a carefully established strategy is necessary in transition situations. Transition assistance must be programmed in a manner which is

sensitive to the root causes of conflict. It should aim to ensure human security by reaching victims promptly. This assistance should also serve to enhance the capacities of legitimate governing structures to help their own citizens recover and be benefitting from the rehabilitation and restoration of their cultural heritage.

As a recent example on how documentation was one of the first action undertaken as an emergency measure, we can mention Mali: « In response to the conflict taking place in the northern regions of Mali since April 2012, UNESCO, in collaboration with the National Directorate of Cultural Heritage in Mali and the International Centre for Earthen Architecture (CRAterre), has produced two publications on the cultural heritage of Timbuktu, Gao and Kidal. The first is an illustrated map with detailed texts in two formats (A3-double sided and poster versions). The second publication is a brochure entitled "Passeport pour le patrimoine" (Heritage Passport). Available in French, they provide detailed information on the location and the importance of cultural sites in the northern region of Mali. They were developed to raise awareness among the armed forces, NGOs, the international community and local communities about the importance of safeguarding these heritage site». From their side, The European Commission, the United Nations

Development Group and the World Bank have issued a joint declaration seeking «to mobilize institutions and resources to harmonise and coordinate post-crisis response frameworks to enhance country resilience to crises, by answering recovery needs of vulnerable populations and strengthening the capacity of national institutions for effective prevention, response and recovery».

In a common plateform for action, they recommend to - «Participate in the relevant in-country planning processes and support

the development and use of shared benchmarks/results frameworks and joint processes for monitoring and review;

- «Support the development and use of the common methodologies for post-conflict needs assessments, and a common approach to post-disaster needs assessments and recovery planning».

Although the terminology may differ from one Agency to another we can



see that the key words are having the same objective in the initial stages of identification and documentation of impacts. The existence of a documentation before the crisis is guite fundamental for any comparative study, but it remains essential that priority should be given to the registration of all damages as well as the mapping of was remained after destruction.

It is well known that ICOMOS prepared an orientation document for the development of a post-conflict strategy for reconstruction and or rehabilitation of damaged cultural heritage, entitled :« ICOMOS Guidance on Post trauma recovery and reconstruction for World Heritage Cultural Properties. (Working Paper. ICOMOS) » for the next session of the World Heritage Committee which will be held in Krakrow in early July this year.

In this document the Framework for Actionin its summary is dedicated to documentation ans assessment as we can read in para b) c) and d) :

«b - Documentation and recording of surviving and lost tangible and intangible attributes of OUV, establishing their post trauma status and identifying potential new attributes that support OUV»

«c - Assessment of the impacts of events on the tangible and intangible attributes of OUV, incorporating the input of affected local, national and international stakeholders.

«d - Development of a Statement of Impacts and Identification of Options for recovery of attributes with an assessment of the heritage impacts of actions under each option, leading to the identification of the preferred option».

We are all aware, on the other side, that many initiatives have already started in some of these conflicts areas in Afghanistan, in Iraq and in Syria, using the very sophisticated and very precise tool of photographing and mapping with the drones which are producing a high level resolution of 3D images and maps that have been exhibited in many European cities, including Rome.

We can read on internet that « French startup Iconem uses photogrammetry, drones, and 3D modeling to help to restore Palmyra monuments ».

I know personally Architect Yves Ubelmann who is the initiator and

creator of this «start up» and who has been several times on mission to Afghanistan, Iraq and Svria in the recent few months, in Mes Avnak, Mossoul, Nimrud, Krak des Chevaliers, to name a few, and who is providing an exceptional documentation on major sites having been damaged of destroyed by terrorists groups. I am pleased to note that he is one of the speakers of this important gathering.

He is working in close cooperation with UNESCO and the Departments of Heritage of the countries concerned. He explained to me that he was recently in Mossoul and was able to take photos in the tunnel abandonned by Daech where there are sculptures belonging to an Assyrian palace, probably belonging to Sennacherib King of Assyria, according to Iraqi experts. These tunnels are below the Jonas Mausoleum and the Mosque destroyed by Daech.

«Using a number of techniques and processes, including photogrammetry, drone 3d scanning, and image comparisons, Iconem is working on reconstructing 3D models of the monuments, from both before and after the violent damage, which will allow the restoration efforts to see where exactly damage occurred, even down to the millimeter» (Quote from Internet site).

Another french company named «Arts Graphiques et Patrimoine» having mainly worked in the digital survey and mapping of French monuments is also interested to contribute to this huge effort of documentation. And I am sure that in many other countriessuch as Italy, Germany and UK, to name only a few, there are potential for experts ready to assist in 3D photography and photogrammetry of sites and monuments in the Middle East countries.

As stressed by ICOMOS, «It is recognised that responses depend on the national visions and strategies as well as the capacities of States Parties, their institutions and agencies and those of the local population, and as supported by many types of international organisations».

It is therefore obvious that in view of avoiding duplication of efforts international cooperation should be coordinated in the same way it is successfully done, since 1993, in Cambodia, with the International Coordination Committee for the Safeguarding and Developement of the Site of Angkor.

Gisella Capponi

Director ISCR (Istituto Superiore per la Conservazione e il Restauro)

The issue I wanted to submit to you is an ancient issue which recently has experienced important updates connected to the use of this system that was possible on the occasion of the recent earthquakes which have affected four regions in our country. The theme I would like to talk about is that of the risk map of cultural heritage, which contains and has recently exceeded 200,000 assets, more than 2 million of assets.

The risk map is a kind of ancient project that started in 1990 with a special law which wanted to carry out a system which would enable to check the condition of the Italian cultural heritage on the basis of the risks that the heritage was subject to because of the many damages caused by the risk connected to the territory. This is an issue which has been present in the Central Institute of Restauration since the 1970s, when Giovanni Urbani proposed a pilot project for the knowledge of the heritage in Umbria, but we have to say that this is an issue which is even more ancient because it is connected to the principle of preventive restauration by Cesare Brandi. The risk is that an undesired event can cause damage to something which has the value of cultural heritage, so the risk is based on two elements: the vulnerability of the asset and the level of danger in the environment. So here we have additional clarifications, what is the risk and what was the aim of this system. It is therefore necessary to know the type of risk which is present in the heritage to be able to guide both the interventions and the levels of knowledge. It is necessary to know the vulnerability of the assets by reporting the level of conservation, so something which makes it possible for us to know the condition of the assets.

Here we have an overview of ancient images of the time when this system was based on the boundaries of municipal areas; it shows the presence of the heritage and the danger level due to the risk linked to the presence of human beings and connected to pollution together with the level of danger connected to the static structural problems of the territory. I have to be quick, I think I had more time. This led to the identification of the municipalities which had a very high risk level, but the change in this system took place when the assets were geographically referred to the territory. So at this point the system allows to have an update of the vulnerability phenomena of the preservation state, hence the first 3,152 buildings which had been indicated in the inventory. Where were these in the inventory? In the highest risk areas, so we are in the region of Calabria and Sicily, therefore this makes it possible to identify risk situations connected to the various types of assets.

Again, there are possibilities to thoroughly analyze the issues in connection to water danger or the danger caused by water, landslide or events connected to the erosion calcareous materials are subject to. This clearly stems from the interaction which was possible to achieve with other research institutes like the research institute of the Ministry of the Environment. Erosion phenomena in the Roman area were calculated and in 2009, when the Abruzzi earthquake stroke very quickly, it was possible to draw a radius to see which was the distance covered by the earthquake and which objects in that area might have been affected, so that a plan of emergency measures could be drafted accordingly. The system also enabled us to record all movable property in the Celano Museum or the movable objects that were collected for restauration purposes after the earthquake and gathered in the museum warehouses; you can also see all the built-up objects and all the emergency actions performed on the artworks. The system also collects all the different recordings of the actions performed on each object. As in a sort of first-aid department, we established a priority of emergencies.

Another important quality leap was made when the Ministry of Cultural Heritage decided to combine all the cataloguing systems to create an interoperability system between General Directorates, the Catalogue Institution and the Central Institute of Restauration. Thanks to interoperability, joint databases were set up and those databases became the basis for a number of institutions including the Carabinieri stations, the Ministry of the Environment and universities, to name just a few. Here you have the geo-

graphical distribution of our heritage based on all the databases combined, here you can see some quantitative data and the moment when the system was updated. These dreadful images are those of the Umbria and Latium earthquake; you can see also the Church of San Salvatore, which had a rich set of decorations and now this is how it is destroyed. So this system started collecting all of the very important data of the first sites aimed at collecting knowledge and information in the most tragic conditions. You can see also San Benedetto and how within the system all the rubbles have been subject to cataloguing and inventory for reconstructions. Here you can see the identification of the crater and how the system could generate lists with documentations of the goods and assets. This has become the working basis for those teams which dealt with the surveying. It was possible to know what was present within the buildings which had been destroyed and it was also possible to develop indexes and lists of the various movable and tangible assets here. Here we can see the location of assets which could be recovered. These are all images coming from the system and these are the catalogues, which in order to speed up the search for materials, have been developed for the people who are in charge with the cataloguing and writing the reports. These are the very precious images of the frescoes which are now transformed into tiny pieces and fragments. Again the other parts: here you see also the view on the same cartography, the view of the real estate assets and the assets inside. This system can produce the cards and reports containing the information which have been filled in by the people in charge with them. The system can also develop statistics of the situation inside the crater. You see the size of the various assets in the different regions. Again, the system in thorough detail can provide overlapping with other dangers, so landslide and hydro-geological problems, which in this case added on the danger situation of these places.

I just wanted to mention very quickly the designing aspects the system can intervene on. I am referring to the checks which are being made along the layout of Via Appia to identify what can be the perimeter which should be given to a proposal on the area subject to UNESCO constraint. This is what makes it possible stretch by stretch to check and verify the assets and goods which can be included in the perimeter, making it possible to carry out the proper evaluation. The initial ones are giving us an idea of what the situation can be and then we can get down to the final parts. A very last hint at how much this system could improve the preliminary evaluation of the impact of infrastructure, because it is possible to check and verify the existence of the assets but also the dangers which might already be in the area. Here we have a post-intervention check of the impact of a wind system, so this can already help identify what it means to implement a system which can be good for certain things but not necessarily for others.

Livio De Luca

Research Director CNRS and Head of the MAP laboratory

> A roadmap for the digital documentation of our heritage at risk: a cross-disciplinary challenge, between technological progress and methodological renewal

The introduction of digital technologies into the practices of documentation, analysis and dissemination of cultural heritage is today an issue not only in the sphere of computer science, but also in the humanities and social sciences as well as in conservation sciences. The approaches developed by the CNRS-MAP laboratory focus on the construction of knowledge hybridisation paths to address the design of innovative systems for analysing the state of conservation of heritage artefacts, studying their temporal transformations, discovering their morphological similarity with other artefacts far in space and in time. At a time when significant technological and methodological advances are renewing the possibilities, how can we make concrete use of these advances to observe, analyse, preserve, disseminate and reinvest our heritage at risk in a more rational, open, economical and sustainable way? In this talk, I'll try to put this challenge at the crossroads of a few trends that shape the contemporary landscape of digital humanities: the democratisation of digitisation means, the emergence of new approaches for the massive cross-analysis of digitised content, the on-going harmonisation of heritage information systems through the formalisation of multidisciplinary knowledge.

I would like to start and focus my talk on the first sentence of the concept note I received for my invitation : "The documentation plays a critical role in the managing of cultural heritage". I am obviously convinced that this is true, especially concerning the heritage at risk. Indeed what we are observing today is always a transitory state of the life of cultural heritage

objects which are constantly made, unmade and remade over the historical events that cross them. The documentation is probably the unique stable denominator able to cross all those temporalities. Beyond the physical objects, documentation represents our choice of transmission that we make to the next generation. In this sense one can also consider the documentation as an heritage in itself (you can think of the history of methods and techniques developed by humans for observing, analyzing and managing the cultural heritage). Even the methods of transmission of the results of a documentation vary in time because they represent our societies that are always in the making.

Today we are in the digital age and it is in this daily life that we have to make the choice of transmission to the next generation. This is the first issue, in my opinion. Are we really able to transfer the results of our documentation produced in the digital era to the next generation? Digital technologies are changing the practice of documentation. Since several years my laboratory in France, the CNRS-MAP¹ has been involved in several projects for designing the next generation of tools and information systems for analyzing the state of conservation, studying the temporal transformations, extracting morphological features, correlating heterogeneous data coming from different disciplines. To be honest, after years of research I believe that even if our collective technological enthusiasm is certainly opening new opportunities and unexpected results today, we are probably putting our documentation methods at risk. That's it. We are talking today about documentation of cultural heritage at risk and our documentation methods are probably also at risk.

We can easily say that the impressive and fast evolution of digital technologies in the last years has produced unbelievable results on data acquisition, data processing, data visualization, data storing. But if Computer Science and Engineering are running very fast today for producing fabulous tools, sometimes using cultural heritage as a playground, what can we say about the integration of these tools within the everyday production of knowl-

1 CNRS-MAP Laboratory. Further information on: www.map.cnrs.fr

edge on cultural heritage? I underline the production and the transmission of knowledge that is an essential tool, the essential tool we have for preserving cultural heritage. For example if you look at the history of architectural representation, you can easily note that a representation always embeds human knowledge. As we are automatising data acquisition and processing, we are certainly improving accuracy and proficiency of tools, but at the same time we are losing the intelligibility, we are losing the ability to embed our knowledge in those representations. We will be probably able to transfer data to the next generation, at least I hope so, but in my opinion it is difficult to affirm today, with the state of the art of scientific research in this field, that we are really able to transfer data and knowledge to the next generation. This is a big risk and especially in the cultural heritage field where knowledge is always the result of a combination of complementary disciplines and sensibilities.

From a scientific and technological point of view, there are a lot of gaps. The first is a semantic gap: the digitalization and data structuring approaches are today file-oriented. We are describing and storing images, videos, audio and 3D. Files + metadata, while the documentation of a cultural heritage object is always object-centered, it is devoted to the CH object description. There are few solutions for the semantic enrichment. We have a lot of tools for the generic digitalization but very few tools for the ad hoc analysis and interpretation. Second : a communication gap. We need concrete solutions for collecting, storing, sharing and gathering data and the extracted information for the reuse, not only for showing digital ressources on the web. At the same time, it is very difficult to bring together physically but also digitally the actors of a documentation process. Third: an interoperability gap. Current information systems are based on a relational link between heterogeneous data. We are all building new and more generic information systems, but by using not sufficiently stable anchors. I mean that the data formats, language, terminology and conceptual models are not stable elements.

My lab has been working for several years on this topic by experimenting a cross-disciplinary framework between human and computer science for embedding the development of ad hoc technologies within a reflection

of methodological renewal on the documentation practice. So we are trying to put this challenge at the crossroads of few trends that shape the contemporary landscape of the digital humanities today. The first challenge is to democratize the digitalization tools and methods. We are trying to merge the data acquisition and visualization technologies with data analysis and interpretation methodologies. Our objective is trying to produce masses of semantic-aware digital contents instead of masses of raw data. Within this perspective, exploring the crowd sourcing scenarios is an essential key today, but if we are also able to take into account the quality issues. The second challenge consists of building new approaches for the large-scale cross-analysis of cultural heritage by using computational support, but in human-driven annotation and classification, as well as by exploring new ways for linking cultural artefacts far in space but close in features. The purpose is to look at the cultural heritage beyond geographical, political, social and cultural borders. The last challenge consists of building a digital ecosystem for fostering the multi-disciplinary studies and we intend to explore the semantic overlapping of multiple points of view in order to observe cultural heritage once again beyond the disciplinary borders. For that we really need to merge the communities: scientists, professionals, teachers, ...

This tentative road map we have started to follow in the last year drives the development of a digital platform that we have just launched yesterday in France within the CNRS innovation days and that I am very honored to announce here today. Our starting point is that archeologists, architects, engineers, material specialists, curators, restorers, teachers, students and tourists all produce various observations regarding the heritage object. Faced with this heterogeneity of data, we need to identify a stable common denominator and this is the challenge we are addressing with this platform we called Aïoli (this name indicates a regional recipe from the South of France). Aïoli²

² Aïoli, a reality-based 3D annotation cloud service for the collaborative documentation of cultural heritage artefacts. Further information on: www.aioli.cloud

is a cloud computing platform that puts the heritage object, not the conceptual but the physical one, at the heart of the documentation process. From simple photographs, the application generates a 3D representation that is used as a morphological scaffolding for structuring and correlating heterogeneous data. Each sample image, every kind of image, can be directly annotated with custom attributes (also using controlled vocabularies, ontologies, etc.) or additional resources related to the objects, such as a text, images, videos, audio comments etc. Our approach introduces a sort of bridge between the real object and the information produced by a given community, by creating a kind of digital skin able to register all semantic annotations. This cloud service is based on two major technological elements. First : the implementation of a state-of-the-art photogrammetry pipeline within a remote high-performance computing appliance which makes it possible to compute automatically 3D models by correlating sample images coming from digital cameras, tablets, smartphones and also directly on site. Second: the potential offered by the cloud computing technologies for gathering, producing and sharing data at a very large scale.

To this computing power a specific innovation is added (and this is our regional recipe), consisting in a method for the spatial and temporal spreading and correlation of semantic annotations. The annotations coming from different actors can be automatically reprojected on all the 2D and 3D views of the object, so we can reunify the past, present and future observations of an object within a common information system. This plateforme is an essential brick for the first step of our road map: to start collecting masses of semantic annotations because semantic annotations are vehicles of knowledge for the next generation. This prototyped platform is ready to use for the first experimentations today, we are now extending our server appliance for testing its large-scale use. On behalf of the CNRS-MAP, I am very honored to offer it as a first concrete contribution to this important joint initiative.

Anthony Sattin

Journalist and Senior Heritage Stewardship Adviser at the mCubed Initiative

I will start by saying a few words about The mCubed Initiative, of which I am a partner.

We are new but we are not novices. I am a writer and a broadcaster. I have spent more than 30 years travelling around and living in the Middle East and North Africa and I have written many books and a lot of journalism about the culture of North Africa, Egypt in particular. My partner in the initiative, Nicholas Mellor, comes with many years of experience in the humanitarian field. He was the founder of a large organization called Merlin (Medical Emergency Relief International), now part of Save the Children, and has great experience working on humanitarian issues in Afghanistan, Yugoslavia and many other places. We came together to push forward The mCubed Initiative as a response to having sat around – like so many others - feeling angry and frustrated by the loss of monuments, such as the Temple of Bel in Palmyra and the tombs in Timbuktu. We thought there must be something we can do. Obviously the problem is huge and there are some very large organizations at work to try to document and protect monuments at risk and other endangered cultural heritage. But we decided that there is a space and a need for a small and very agile organization that can go in and deal with situations that some of the larger organizations either cannot move quickly enough to deal with or in which they would have health and safety problems, situations where they could not send in their personnel.

We chose Djenné in Mali for our pilot project. In 2012, there was a jihadist takeover in Northern Mali and when government forces ran away, Timbuktu was overrun. Many of the city's medieval structures were destroyed. Djenné, which is about half way between Timbuktu and the capital Bamako became part of the red zone, a no-go area, not because it was overtaken by the Jihadists. Instead, it faced another problem, which is in a way part of a much



Aerial view of the UNESCO World Heritage site of Djenné and the Bani River

larger problem than that posed by jihadis and that is the problem of neglect.

Djenné is one of the best-preserved mudbrick towns in the Sahel and has one of the greatest mud brick buildings in the world, the Grand Mosque of Djenné. The mosque had not been properly documented, by which I mean that you could not build a 3D model, until we went.

Because of the travel ban from foreign countries, no foreigners were going to Djenné and pertly because of that, the local community was not interested in keeping up the mosque, which was one of the icon's of Mali's pre-conflict tourism industry. Most people in Djenné would go to a new mosque outside of town.

After the defeat of the jihadis, reconstruction efforts in Mali were focused on Timbuktu: a huge amount of expertise and money went there. So when we decided to go to Mali, we chose to go to Djenné in part because we recognized there was a problem there but also because we had a very strong local partner.

We went to see three ministers in the capital Bamako: the Minister of Culture, who understood the importance of this documentation work, said: "Heaven has sent you, because everybody who comes to talk to me about getting involved in Mali wants to go to Timbuktu". When we went to see the Minister of Tourism, she also understood the importance of what we could create for her department in terms of producing images and data that would help keep the image of Mali out there, where tourists were not able to go and also as a promotional tool when tourists do start going back. When we went to see the Minister of Higher Education – all three of these were women, by the way - she also understood the importance of exploring this sort of technology for people in the community.

Djenné is not safe, the problems we faced were firstly the risk of kidnap and this was a real one. We were advised not spend more than 48 hours there. We also took out insurance. And someone was kidnappedin the Djenné area just after we left. There was a legal issue, a concern about the flying of drones or UAVs: there is a growing suspicion everywhere in the world now concerning the uses of UAVs. And there were heat and humidity problems as well: Djenné has a very humid environment, so if you fly high over the top of



Aerial view of the UNESCO World Heritage archaeological site of Djenne Djenno.

The image shows how the data collected using photogrammetry can be used to create a detailed topographical map, with the deep blues being the lowest levels (most susceptible to flooding) and reds the highest points. This can be used to identify both flood risk and the threat of gullving due to erosion. The thin blue veins at the edge of the site highlight current gullying. The black dots are vegetation such as trees. The image shows how the original settlement was built on a high point in the flood plain.





PointCloudRender: 3D model of the Grand Mosque, Djenné

The image shows the how the digital imaging can be further analysed to look at stress in the vegetation. The deep red is the least fertile soil and highlights the foundations of the original city walls. This approach to spectral analysis is called normalized difference vegetation index (NDVI) and is a non-intrusive way of gaining more data on the site, which can provide subsurface insights into an archaeological site.

The image is a high resolution image of the site of Djenne Djenno, a UNESCO world heritage site. It provides a much greater resolution than traditional satellite imaging and can provide a 3D model as well. Why is this so important in the documentation and monitoring of Djenne Djenno? The World Monuments Fund put the site on their watch list because of 'looters in search of antiquities who dug massive trenches, which led to flooding' and erosion'. Flooding and looting are critical issues in considering how best to preserve this site, and as such it is important to have an accurate topographic map of the site.







the site you tend to get a lot of visual distortion.

But the outcome of all this – and we did it, as I said, very quickly – was that we were able to document the two sites of Djenné. The first, Djenné Djenno, is one of the oldest archeological sites south of the Sahara and it dates back to the 3rd century BC. Among the archeologist who worked there was professor Susan McIntosh of Rice University in the United States. But Professor Rice cannot go there now - her university will not allow her to go there. We were able to connect her with the place and with some people in Djenné and by showing this film to her, she was able to see not just the state of preservation, but also whether there had been looting at that site. This was one of the big outcomes – and it is something that we always want to be doing, linking with academic institutions. For instance, Professor Kevin Mc-Donald of the University College in London's archaeology department, who is one of the great experts in Malian archeology, is also not allowed to go there now, so he was also very interested in this work.

We also introduced the use of UAVs to several young people in Djenné. This was a big step forward for these three people, who had never held a UAV but who were able to fly them thanks to the short training course we offered. But I think most important outcome of all is that we showed people in Djenné that their culture, their built heritage, has a value beyond their local community. And by valuing it, we provide them with another reason to make efforts to maintain it, even though nobody foreigners are going there at the moment. I think that is a very important outcome and one to think further about.

As to our next steps: we are going to Zanzibar next month to discuss work in East Africa. In the autumn we hoe to have a project in Siwa, in Egypt, an oasis town very similar to Djenné that is facing exactly the same issues. It is right next the Libyan border and although it is not directly threatened by conflict, it is threatened by consequences of the nearby conflict, particularly from neglect and encroachment. After Siwa, we hope to do more elsewhere our aim is for this work to increase exponentially because if we do not record these monuments now, then they are going to disappear very quickly, as they have already from Syria, Iraq, Libya, Mali and from so many other places.

Yves Ubelmann

Founder and CEO ICONEM

BRIDGING THE GAP BETWEEN "HARD AND SOFT" SCIENCES: ICONEM INITIATIVES TO PRESERVE **HERITAGE SITES IN THE 21ST CENTURY**

J. Chemla^{a, *}, L. Abdulkarim^a, P. Aubineau a, I. Karmardine^a, G. Labousse ^{a,} R. Rouffet ^{a,} V. Tournadre ^{a,} Y. Ubelmann ^a ^a ICONEM, 75006 Paris, France - (jc, la, pa, ik, gl, rr, vt, yu)@iconem.com

KEY WORDS: Cultural heritage, archaeology, endangered sites, multi-scale, multi-temporal, collaborative **ABSTRACT:**

While local archaeological teams consistently have the best understanding of a site, they might lack technical expertise with regard to some of the most recent technological developments. By bringing together the knowledge and know-how of researchers, architects and engineers, and combining photogrammetry with recent drone technology and an important understanding of the terrain problematics, Iconem can provide innovative solutions to problems faced by teams on the field. With partners such as UNESCO, the World Bank, or Ministries of Culture and archaeological teams, Iconem has acquired a unique experience in the documentation of endangered heritage sites.

Although the production of a 3D model through photogrammetry is not a problem in most cases, it can be problematic to create a thorough digital copy of a vast site that will disappear in a few years, to assess the condition of a site that is in a war zone, to give a scientific analysis of the evolution of a site when few datas are available, or to get the most out of public and imperfect data. Through some of the most iconic field experiments led by Iconem, the article presents how to answer each of these questions.

^{*} Corresponding author

1. INTRODUCTION

Recent developments in the image processing field have marked a reborn interest for photogrammetry. While photogrammetry has always been considered as an interesting asset in archaeological mission (Reeves, 1936), the method has remained hardly accessible until recently. Archaeologists seem to have a growing interest for the technique since the arrival of automatic approaches, popularised by a growing amount of softwares whose features evolves rapidly (Yastikli, 2007, Yilmaz et al., 2007, Sansoni et al., 2009, Stanco et al., 2011).

While most of the interventions requiring human interactions have found algorithmic solutions in the last decades (Lowe, 2004, Heipke, 1997, Roy & Cox, 1998), dealing with computer science concepts can be problematic for some human sciences specialists. Iconem intends to leverage its expertise in the creation of 3D digital copies and to collaborate with research teams to keep an archive of the most important heritage sites around the world. After some early experiments in 2010 in the Middle East and Central Asia, Iconem has turned into a company in 2013. Since then, it has been operating in 15 countries, training local operators, treating images a hundred years old, images found on the web, images taken with a macro lense or from a satellite's push-broom sensor. The article presents some applications that have been led in the recent years.

2. METHODOLOGIES OF DOCUMENTATION

This section is going to present some methodologies meant to enhance the works of research and archaeological local teams and to explain how Iconem's work fits with respect to the old science of representation. Using new technologies, Iconem elaborates tools to help archaeologists document and understand the occupation of a site and its monuments and predict its evolution. The fundamentals of our approach, large scale photogrammetry, was designed and implemented from the work of Furukawa et Ponce, 2010. In a first part, the article focuses on the use of a multi-scale 3D documentation methodology, and then extends these documentation works to a remote assessment approach used to conduct salvage archaeology from a distance.

2.1 Multi-scale approach: Mes Aynak

The site of Mes Aynak is a Buddhist site located 30km south of Kabul, in the Logar province, on what is known as the 2nd largest copper mine in the world soon to be exploited (Khairzada, 2013). The site exposes several archaeological remains from the Kouchan period – monasteries, homes, and markets including terra-cotta stuppas and statues. Every remain that lies inside what is called the red zone (Figure 1b) is going to be destroyed by the exploitation of the mine, and most of them cannot be transported because they are made of brittle material. Iconem's team was asked to build a digital 3D copy of the site, both for research purposes, and for the diffusion to the public and future generations of the site itself. This was the first project led by the company in 2010. Returning to the site year after year, it was possible to continue the documentation effort before the exploitation of the mine.

High altitude drones were used to cover a large area – about 2km by 1km – to record the natural landscape at 5cm resolution, while lower altitudes drones, ground photographs and laser scanners were taken to record the finer grain of the architecture at a 200 microns' resolution on every architectural remains, as shown on Figure 1. The first years of the project, the 3D models were used to try to detect areas in the landscape that could not be explained otherwise than by



man constructions lying underneath, and archaeologists used the first model to determine which zone to excavate first. The state of the site was then surveyed year after year, until the last scan in 2015.

Such a high resolution is not needed on the whole landscape, but needs to be cleverly merged into the middle resolution scan in order to be exploitable both by scientist teams and by the public in museums.

To conclude this sub-section, the first use of the 3D digital model is that of scientific research by helping every scientist on earth understand sites – even if they are hard to access because of their natural situation or due to security reasons, or because their state has changed because of degradations or archaeological excavations. It is also useful to let people rediscover places they cannot go to or that disappeared, and understand and reclaim their common heritage.

2.2 Remote assessment: Khorsabad and Nimrud

The documentation work that was presented in the previous section can today – thanks to new drone technologies – be performed from a distance, on sites unreachable for terrain teams. During a documentation project on several sites of the Kurdish heritage, Iconem introduced to the Kurdish government the idea to pilot long range drones to fly over ISIS controlled archaeological sites. The project was accepted in November 2015 and Kurdish forces led an Iconem's field team close enough to the battlefront to launch a drone which flew about 15kms from the take-off place, did the photogrammetric capture, and flew back to the base station. Once processed, these photographs resulted in a 5cm precision 3D model of the site of the palace of Dur-Sharrukin recording the state of the site and was then used to assess looting.

Once analysed in partnership with experts and researchers that have worked on the site in the past, it was possible to determine new evidence of looting on the site illustrated in Figure 2 – mostly tunnel entrances as well as newly visible dressed stones. By super-imposing the plan of the citadel dating back from the excavations led by Paul Emile Botta in 1843 (Bonomi & Botta, 1952), it was then possible to see on which areas the looters focused



Figure 2: Khresabad – nomine assuments of loosing – by manipulating the 3D models, parts of the architecture lying under the tell can be seen, as well as doosed more during from previous escenations, tubect estimates and newly built defensive buildings.

 mostly on zones that were not previously documented and excavated, and which, as a result, probably still hold archaeological remains.

The same analysis was conducted, more recently, on the sites of Nineveh – inside Mosul – and Nimrud. By comparing imagery extracted from the 3D model, that was computed using photographs shot using a longrange drone flying over hostile territory in the end of June 2016, with older satellite imagery, it was possible to precisely evaluate the damages the site has suffered.

This survey showed particularly serious destructions in Nimrud, where 53% of the North West Palace, and 50% of the Ishtar temple were destroyed. It also highlighted traces in the Nabu temple, which indicate that vehicles entered the temple after its explosion, as shown on Figure 3.

As a summary of this sub-section, new methodological tools combining photogrammetric surveys with long range drones make it possible to remotely assess the amount of looting on a site, as well as to identify which zones are the most impacted – therefore giving clues on archaeological remains to look for on the black market for example – and evaluate the amount of destruction a site has suffered, with a much higher accuracy than accessible through satellite imagery, and a 3D aspect that hints at things not visible from 2D ortho-imagery.



This section will illustrate with different examples from the Middle East how new technologies implemented at Iconem, once correctly set up, let scientists understand the evolution of a site over time, and what decisions this documentation can lead to. The 3D environment of the scanned numeric copy can indeed serve as a spatial database of multiple typologies of documentation taken at different instants in time, and evaluation of the evolution of a site can be done by comparing these heterogeneous data. The illustration of the multi-temporal analyses will be conducted using the Shahr-e Gholghola site and the more recent Palmyra example. To illustrate the collaborative approach, we will use the case of the Crac des Chevaliers, where the broad diffusion of camera devices allowed for an effective crowdsourcing.

3.1 Multi-temporal analyses: Shahr-e Gholghola and Palmyra

By using the 3D environment as a single workspace for numerous documentation, from engravings, paintings and old photographs to more recent photographs and 3D models, it is possible to store in a unique workspace



several states of a site which evolved through time and superimpose several layers of documentation and analyses. The first example of this multi-layered approach conducted by Iconem concerns the site of Shahr-e Gholghola, a city in Bamiyan dating back from the 13th century and conquered by Gengis Khan (Kelly, 2014). The site was 3D-scanned by Iconem in 2012, which made possible to locate the position, orientation and focal of an old photograph shot in 1910. By backprojecting the information contained in this photograph onto a restitution Iconem made of the architecture at the time of its construction in 1210, it was possible to determine the amount of construction that was present in 1910, compared to the 100% of masonry in 1210. This led to a precise analysis of the state of conservation of the built structures, and the pace of the degradation of the monument vulnerable to erosion, as shown in Figure 4.

This documentation gathering was done at a greater extent on the site of Palmyra. Just a few days after ISIS left Palmyra, Iconem visited the devastated ancient city and its museum to carry out the first 3D survey of the damages, accompanying the first group of Syrian scientists to arrive on site on April, 5th. Drones were useful to acquire all the data necessary to the documentation of the temples of Bel and Baalshamin, the monumental arch, as well as the tower tombs while the site was not completely cleared of landmines, and during very short time frames – only 4 days on site with only 5 hours per day for security reasons. 3D models and analyses were produced, accurately determining the extent of damages caused by the terrorist group, and engaged developments to let everyone from the scientific community consult this documentation in order to analyse the damages and consider possible restorations.

The 3D environment can therefore be used to serve as a basis for all documentation existing on a site, gathered in one place and easy to access. The 3D model of Palmyra was used as a spatial database for previously acquired documentation, especially photographs from the excavations in the 1930s, stone by stone drawings (Amy, 1933), as well as photographs taken by tourists before the conflict. This led to the restitution of the state of the temple of Bel in 1930 and the triumphal arch in 2010, as shown on Figure 5. Both these documents were used by Syrian archaeologists from the Directorate General of Antiquities and Museums to understand the destruction, evaluate the state of the stones of the temple of Bel and eventually find back their original position in the architecture. To that end, the blast of the triumphal arch was simulated to help archaeologists find back the original positions of the stones thanks to the simulated kinematics of the deflagration.

To conclude this sub-section; the 3D model also serves as a database of heterogeneous documentation, taken at different instants in time, and helps trace back the different states of a site to understand its evolution, its degradation and eventually help authorities take the required decisions on the restorations.

3.2 Collaborative approach: Crac des Chevaliers

Following the dramatic conflict in Syria, and the consequences on heritage (Ali, 2013), Iconem took the initiative to help Syrian archaeologists



Uniformized and the domain states of the XD metricus. Distance improves the AD metricus print + planning of the limit is marked being the AD of the AD of the AD of the SD of t



(i) Exclusion of the state of the Books and Science Some external and characteristic interval are easy to identify, but they have instantial governments.
Figure 5: Palatyper: Using the 3D one incoment as a spotial database for betweegeneous documentation.

documenting the damages suffered by several sites of the Syrian heritage. By focusing on the Crac des Chevaliers, not accessible by foreign teams at that time, Iconem took the initiative to retrieve all possible public images of the citadel, a crusaders castle between Homs and Tartus that suffered several damages while it was occupied as a stronghold by the rebels and the Syrian army during the conflict. From these, it was possible to produce a pre-conflict model of the Crac – which was at the time incomplete because tourists often take very similar photographs or shoot the same parts of the architecture. After releasing documentation and tutorials for photogrammetric survey with a mere camera for people in Syria, local archaeologists took pictures on the field and sent them on Iconem's platform for a 3D photogrammetric reconstruction. An iterative post conflict model of the Crac has been produced,



becoming more and more complete over time. An accurate diagnosis and expertise was then done on the monument, overlapping the models before and after the conflict. This approach is very complementary to that of (Fangi et al., 2013), which designed a panoramic acquisition technique which let the authors document a large number of heritage sites in Syria back in 2010, and manually reproduce them in 3D.

Highlighting several zones of the citadel that have suffered superficial and structural damages, as shown on Figure 7, was helpful for the restoration



Figure 6: Simulation of the block of the explosion of the trianghal and; helps to find back the original position of the blocks of the minimum at 20 model of the state in April 2006 appears in white, while the original position is a state by same position of the auto factor photographic from 2010, used for the introduction.





In terrelated and measured damages togetighted to and by comparing partered to a local damage series of particular terrelation and a state of the damage series of the latence interval and a state much series damage series and a state of the damage series of the latence interval and a state of the damage series of the latence interval and a state of the damage series of the latence interval and a state of the damage series of the latence interval and a state of the damage series of the latence interval and a state of the damage series of the damage s

Figure 7: Collidentative and incontive 3D model of the Krish des Orsyaliuts and analysis of the structural class ages rational during the Hyrkin conflict works which eventually took place and focused on the most impacted parts of the monument. This collaborative approach lead to new opportunities. If it is often hard to produce a complete model from crowd-sourced documentation – because people do not cover a monument from a wide enough variety of angles for example – it is however possible to build an iterative model and request data and photographs to be taken from specific angles and positions. Using this methodology, the 3D model can be enhanced iteratively, and then become a high-resolution model of a monument.

This 3D model, as depicted earlier in the paper, serves as an observation of the condition of the site at one point in time.

4. CONCLUSION

To summarize, Iconem's team developed and applied, in partnership with local archaeological teams and researchers, tools to help quickly document sites under various situations – either hard or impossible to reach sites, during very short time frames – and answer problems faced by archaeological teams – summarized as multi-scale, multi-temporal, collaborative and remote assessment approaches.

However, the documentation produced is of no use if it is not analysed, so Iconem always looks forward to help research teams produce the layers of documentation they state relevant to understand the occupation of a site – and this involves help them apprehending the use of the 3D model and training them for the acquisition protocol. Iconem is following the footsteps of generations of archaeologists who carefully drew the visual aspect of monuments, using digital technologies. The survey produced are exact copies of the visual aspect of a site, and once the documentation is produced, Iconem helps archaeologists manipulate the 3D models and produce these layers of analyses which help us understand our past.

As a final note, one can emphasize the importance of the diffusion of heritage sites for countries in the Middle East, which acts as a reminder of the multiplicity of origins of the population and raise a message for peace. The value of the work carried out with scientists also lies in the potential to do exhibitions to bring people closer to our common heritage and in the enhancement of a country cultural heritage. The diffusion is finally an effective mean of conservation of the memory and of preservation and transmission to future generations.

ACKNOWLEDGEMENTS

Authors would like to thank members of the scientific community which supported our work from the very early days, and especially Prof J. Ponce (Willow, ENS-INRIA-CNRS) for its support and discussions on the algorithmic of 3D reconstruction and Pierre-Louis Xech from Microsoft Research France. The first projects and demonstration, carried out in Afghanistan, would not have been possible without members of the DAFA, in particular Julio Bendezu-Sarmiento (CNRS UMR 7041) and Rafa Sequeira. More recently, our work was carried out in Syria thanks to the support of the DGAM, and our thanks go to Maamoun Abdulkarim and Houmam Saad, and documentation efforts on kurdish sites was possible thanks to Hoshmand Othman. Recent projects in Greece, Iran, Iraq and India would not have been possible without the trust of archaeologists in the quality of our work and financial support from local offices of UNESCO in Iraq, Beirut and Afghanistan, and the Aga Khan Trust for Culture.

REFERENCES

Ali, C. (2013). Syrian heritage under threat. Journal of Eastern Mediterranean Archaeology & Heritage Studies, 1(4), 351-366. Amy, R. (1933). Premières restaurations a l'arc monumental de Palmyre. Syria, 396-411.

Bonomi, J., & Botta, P. E. (1852). Nineveh and its Palaces. The discoveries of Botta and Layard applied to the elucidation of Holy Writ. Illustrated London Library.

Fangi, G., Piermattei, L., & Wahbeh, W. (2013). Metric documentation of some Syrian monuments in the UNESCO Heritage sites before the war, using the spherical photogrammetry technique. International Congress UID: Patrimoni e Siti UN-ESCO Memoria Misura e Armonia, Matera, Gangemi Editore.

Furukawa, Y., & Ponce, J. (2010). Accurate, Dense, and Robust Multiview Stereopsis. IEEE Transactions on Pattern Analysis and Machine Intelligence, 32(8), 1362-1376.

Heipke, C. (1997). Automation of interior, relative, and absolute orientation. ISPRS journal of photogrammetry and remote sensing, 52(1), 1-19.

Khairzada, K. M. (2013). Mes Aynak. Archeologia, (508), 62-71.

Kelly, Crystal, "Living in Afghanistan on the Eve of the Russian Invasion" (2014). Senior Theses and Capstone Projects. 19. http://scholar.dominican.edu/senior-theses/19

Lowe, D. G. (2004). Distinctive image features from scale-invariant keypoints. International journal of computer vision, 60(2), 91-110.

Reeves, D. M. (1936). Aerial photography and archaeology. American Antiquity, 2(2), 102-107.

Roy, S., & Cox, I. J. (1998, January). A maximum-flow formulation of the n-camera stereo correspondence problem. In Computer Vision, 1998. Sixth International Conference on (pp. 492-499). IEEE.

Sansoni, G., Trebeschi, M., & Docchio, F. (2009). State-of-the-art and applications of 3D imaging sensors in industry, cultural heritage, medicine, and criminal investigation. Sensors, 9(1), 568-601.

Stanco, F., Battiato, S., & Gallo, G. (Eds.). (2011). Digital imaging for cultural heritage preservation: Analysis, restoration, and reconstruction of ancient artworks. CRC Press.

Yastikli, N. (2007). Documentation of cultural heritage using digital photogrammetry and laser scanning. Journal of Cultural Heritage, 8(4), 423-427.

Yilmaz, H. M., Yakar, M., Gulec, S. A., & Dulgerler, O. N. (2007). Importance of digital close-range photogrammetry in documentation of cultural heritage. Journal of Cultural Heritage, 8(4), 428-433.

Livio Zerbini

Professor at the University of Ferrara and Director of the L.A.D. (The Study and Research Centre on Ancient Danubian Provinces)

I will start sharing with you my experience, the experience of a person who has a background in archaeology but has approached new technologies, in order to reach some considerations about how our profession is changing.

I run a center at the University of Ferrara which deals with new technologies to be applied in education and in the cultural assets. In this sense, there are some problems that I have to deal with as an archaeologist and a communicator with experiences connected to new technologies.

A kind of Copernican revolution is taking place in conveying knowledge, not only in the conveyance of knowledge, but also in the cataloguing, archiving and inventorying and not everybody is aware of this huge revolution. Because of that, it is important to develop some thoughts in order to be prepared to the forthcoming progress.

Talking about cataloguing and documentation issues, we need a systemic approach where two objectives have to be pursued: the first one is an immediate, direct perspective which is connected and linked to emergency situations we are always lagging behind, which are also very difficult to foresee (just think of what has recently happened in Syria). To give a personal example, I had an archaeological mission in Georgia in 2008 and I was in the midst of a conflict between Russians and Georgians without every kind of early warning. For this reason, it is very difficult to work in these areas. Nevertheless, this year I will also work in Pontic Olbia in Ukraine, where there is still war taking place which we often forget. In this sense, my suggestion would be to carry out a clear and accurate mapping of the areas which are at risk.

The second objective concerns the importance of the use of new technologies by archaeologists and the relevance of sharing research data. In fact, there is an increasing need of a focused training which educates the future professionals to the use of high-tech instruments, both in the field of archaeological sites and in the spread of data by the web.

People who perform excavations - like me - realize that nowadays archeologists have to come to grips with new technologies. Over a very short period of time, undoubtedly, our work has changed and the most important piece of it is the archeologists performing excavations during the documentation and cataloguing stage. It is important to underline it in this field. In terms of methods we should rethink our working methods, which is a very important aspect. Archeologists are not emphasizing how much progress has been made: for example, the use of laser scans on moving vehicles, which allow us to have quick data.

When I think about the framework I am coming from, I realize we are still dealing with a very rigid separation of knowledge. There is no professional figure which is an interface between the archeologist and the expert in new technologies. I approached new technologies just accidentally for the wish and desire to communicate due to the lack of education I saw. Young people who are now approaching to this job show that there is a lack in schools and Universities, that are not able to convey knowledge and the founding value of identity, due to that cultural asset.

Therefore, it is important to think in a systemic way, both mapping the emergency situations in the word – also in the years to come- and in sharing data throughout the community. In a word in which every day there is a constant increasing amount of information scattered and often not appropriately confined, it is difficult to share data through the archaeologists' community because they frequently consider excavations and research's results as something which belongs to them. This is an element which has to be overcome, in particular inside Universities, because Cultural Heritage belongs to everybody, first and foremost to the people worldwide. In this sense, when I deal with the excavations abroad, I directly involve the local communities in order to develop culture and tourism in these archeological sites.

Finally, I would like to focus on the importance of storing data. Nowadays the web is the manner that provides the highest level of guarantees,



but where are all these data going to? How these data are used? Certainly, open data is a fundamental resource which must be used, but there is a need for international standards, common protocols and common languages, in order to establish an uninterrupted dialogue that goes beyond the national boundaries. In this sense, a joint platform managed by UNESCO should be very helpful.

These are the thoughts I would like to share with you considering my double side: I am an archaeologist but also a communicator dealing with new technologies.

TECHNOLOGIES IN THE DOCUMENTATION, MANAGEMENT AND DEVELOPMENT POLICIES: **BETWEEN LOCAL** DEVELOPMENT AND INTERNATIONAL COOPERATION

Chance Coughenour

Program Manager - Preservation, **Google Arts & Culture**

What is Google Arts and Culture?

Google Arts & Culture is a new website and app that lets users explore artworks, artifacts, and more from over 1,000 museums, archives, and organizations that have partnered with the Google Cultural Institute to bring their collections and stories online. Available on desktop, mobile web, iOS and Android, it's designed to be a place to explore and enjoy art and culture online. Google Arts and Culture has been created by the Google Cultural Institute.

What is the Google Cultural Institute?

Launched in 2011, the aims of the Google Cultural Institute are in line with Google's broader mission to organize and make accessible the world's information. The Google Cultural Institute and its partner institutions are putting the world's cultural treasures at the fingertips of Internet users, and are building tools that allow the cultural sector to share more of its diverse heritage online.

The aim of the Google Cultural Institute is twofold — giving access to art and culture to everyone, and working with the cultural sector to make the most of digital opportunities and preserve cultural content for the future.

- It enables the culturally curious to discover, explore and share cul-• tural treasures of the world in a new way and in extraordinary detail, thanks to immersive technologies and through the stories underlying artworks and historical moments.
- It helps cultural institutions bring history and heritage online with • powerful technologies to digitize, showcase artworks in new ways and reach a wider audience.

We're making freely available technology that's specially designed for the cultural sector, built in collaboration with the sector. We partner with the cultural sector to develop technologies that meets their needs and expectations:

Online exhibitions: Google Arts & Culture gives cultural insti-• tutions an easy-to-use tool to create beautiful online exhibitions which can be customised with videos, text, Street View imagery and interwoven with storytelling.

- Super high resolution imagery with Art Camera: A gigapixel image is made up of over one billion pixels, and can bring out details invisible to the naked eye. Creating digital images in such high reslution is a complex technical challenge. This is why we built the Art Camera, a robotic camera, custom-made to create the highest possible resolution images of paintings. It will bring an unprecedented number of works online for everyone to explore in new level of detail.
- **Google Cardboard:** The Google Cultural Institute Lab is where the first prototype of Google Cardboard, a virtual reality viewer made of cardboard, was made.
- Street View inside museums: You've seen Street View cars and • Street View Trekkers, but what about the Street View Trolley? Now also used to collect Street View images indoors, this high-tech pushcart was initially developed in 2009 to give viewers the experience of a museum walkthrough.

In numbers, Google Arts & Culture:

- Showcases more than 1,000 institutions from 70 countries
- Provides a platform for over 400,000 artworks, and a total of 6 million photos, videos, manuscripts and other documents of art, culture and history
- Offers over 3,000 digital exhibition.

Pierre Grussenmeyer

Professor at the INSA Graduate School of Science and Technology

Taking into account two decades of cultural heritage documentation projects managed by the author, the photogrammetric archives of the great Omayyad mosque of Aleppo (Syria) can be considered as a reference. The aim of this documentation collected between 1999 and 2002 by the Engineering Unit of the University of Aleppo was to provide topographical maps and elevations, planimetric and altimetric details of the walls and entrances, of the dome and the minaret of the Great Mosque. More, 3D vector models of each structure were provided. The Mosque has unfortunately been seriously damaged during the recent conflict in Syria (Figure 1). Based on this experience, the presentation shows a summary of documentation tools and methods, as well as the importance of accurate documentation guidelines. The archives (Fig. 2 and 3) used in the Aleppo project can be considered as a valuable data source required for 3D reconstruction of destroyed or damaged historical monuments.

The documentation process has changed in the last decade, strongly driven by technology. Today, new approaches and tools are available, offering more efficient solutions to deal with the complexity of monuments and sites. The approaches are based on dense points clouds obtained from photogrammetric recording (terrestrial and more and more drone based) and terrestrial laser scanning techniques. The choice of the best workflow relies on several parameters such as the site configuration, the performances of the sensors, and criteria such as geometry, accuracy, resolution, texturing and georeferencing solutions able to produce the required deliverables. Terrestrial laser scanning techniques are today widely used for recording large and complex objects, sites and caves. Dense point clouds processed from images are used as an alternative or complementary method to laser scanning.

Experimentations about the possibilities of using these archives to



Figure 1. Great Mosque of Aleppo (before and after the war). The minaret has been destroyed in 2013. Figure 2. Views from the top of the minaret towards the inner court of the Mosque and the citadel of Aleppo (photos from April 2000). Figure 3. Large format archive images (left Wild 32 Metric camera-2001 right UMK10/1318 Metric camera-1999)
Figure 4. Virtual reconstruction of the inner part of the Aleppo Mosque from a set of archive images from 2000:
Left: photogrammetric recontruction, the camera positions displayed for the vertical part in the figure correspond to the minaret),
Right: point cloud processed from the archive images).

generate dense point clouds using photogrammetry and Structure from Motion (SfM) methods have been successfull. Several control points, based on visible details of the monument, and recorded by total station during the 1999 campaign, have been used for the processing of the photogrammetric project (Figure 4, left). Agisoft PhotoScan and PhotoModeler software packages have been setup to orient the selected images and finally to generate dense point clouds of the inner part of the Mosque and the minaret (Figure 4, right). First results show that an accurate virtual reconstruction based on the available archives is possible with the current tools.

Guidelines for the creation of a standardized documentation system should take into account the new tools and technologies. Photogrammetry also provide low cost solutions to merge archives and recent images, for a better understanding of damaged sites and reconstruction planning.

More details about the project in:

GRUSSENMEYER, P., AL KHALIL, O. (2017). From metric image archives to point cloud reconstruction: case study of the Great Mosque of Aleppo in Syria. 26th CIPA Symposium, Ottawa (Canada), 28 August to 1 Sept. 2017. International Archives of Photogrammetry and Remote Sensing Spatial Information Sciences, 7 Pages.

Annamaria Mauro

Architect Parco Archeologico di Pompei

The Great Pompeii Project. Knowing for Conserving

Conservation at Pompeii is a problem that has always involved those who have worked at the site almost since its initial discovery. As is well known, Pompeii is a Roman city which was entirely buried by the eruption of AD 79. Since the middle of the eighteenth century there has been a campaign of progressive excavation, with the result today that 44 of the 66 hectares, around two-thirds of the ancient city, have been brought to light.(1)

riod, around 100 years after the discovery of the city, the creation of the extraordinary 1:100 scale model of Pompeii (2) (currently preserved at the Archaeological Museum of Naples) constituted an irreplaceable testimony to the condition of the excavations in 1860-64, and can be considered the first systematic act of documentation for conservational purposes. Alongside traditional methods of recording everyday excavation, the use of technical (and no longer artistic) drawing to document the site has been established in a continuous and systematic manner. Similarly, photography has become the main instrument of scientific evaluation during the unearthing phase. Pompeii is a vast example of archaeological heritage, consisting of an array of masonry structures, road networks and highly rich and complex decorations. The fragility of this heritage was laid bare in 2010 with the collapse of the Schola Armaturarum. The media focused its attention on the site. Italy and Europe understood the risk of losing such extraordinary heritage, and thus a change of strategy was required for managing the conservation and enhancement of the site. From this perspective, the Great Pompeii Project has made it possible to conduct a series of projects which allow us to confront conservational problems from various points of view, funded by the European Union to the sum of €105 million. The Project has also repre-

Under the direction of Giuseppe Fiorelli in the post-unification pe-




3 - Pompeii 4 - Regina Carolina alley, pre-opera 5 - Regina Carolina alley, post-opera 6 - Plan of Knowledge

2 - Model of Pompeii at the Archaeological Museum of Naples

sented a kind of workshop from a point of view of understanding the ancient city, returning previously unthinkable systemic information through a plan of timely interventions. It is an urban scale project, with a targeted plan of interventions, which has incorporated: the plan of works, the plan of site use and communication, the capacity building plan, the security plan and the knowledge plan. (3)

The Great Pompeii Project, therefore, has also been a 'Laboratory' of experimentation, of ideas and skills, with professionalism that faces design and site aspects on a daily basis, and amounts to a crossroads of diverse cultures of restoration and archaeology. Here archaeologists and architects, restorers and engineers of differing cultural and national backgrounds, with differing vocabulary and priorities, have faced the problems of the site in the field and in an emergency situation. The first and most immediate response was directed towards the plan of works, with stabilisation work of the ancient city through widespread interventions, which were necessary for successive restoration work, aimed at safeguarding gravely at-risk structures and halting the advance of degradation both with respect to the wall elements, and the wall and floor decorative elements connected to the aforementioned seriously compromised masonry. On the whole, the areas not open to the public in particular displayed widespread degradation, whose level of seriousness had reached a critical threshold beyond which the masonry could have swiftly entered a state of crisis with even the slightest change in the surrounding conditions. (4-5)

A large part of the inspected area is in fact composed of a dense and stratified urban fabric, largely without roof covering and consequently characterised by ruined masonry structures, constructed with volcanic stone or limestone and joined with mortar of varying compositions, often in a poor state of conservation.

A second response came from the realisation of cognitive projects such as the Plan of Knowledge and the Information System which allow a detailed analysis of the state of conservation and problems which have plagued the site (degradation phenomena, weeds etc.), as well as a means of storage and management of data that has few comparisons in the field of archaeology. In this sense the Plan of Knowledge represents a formidable diagnostic and cognitive instrument that has involved the entire city of Pompeii and its nine *Regiones*.(6)

The new 3D laser scanner survey provides systematic and comprehensive information on the presence or absence of plaster on walls, masonry techniques in cross-section and any instances of being out of plumb, all data which can be useful for both safeguarding heritage and research. (7)

The ability to have available a 1:50 scale survey of the entire archaeological area (the previous definition was 1000), together with highly accurate photographs of every single wall obtained via orthophoto and an archive complete with mapping of the degradation - which can be accessed through an ad hoc created operating system - guarantees a thorough, precise and more dynamic knowledge of the site. Dynamic as it is modifiable to reflect the changes in conditions of the monument, which also allows us to greatly simplify the planning process, enabling immediate verification of the state of conservation and a rapid quantification of surfaces on which to intervene, with consequently effective estimates of project costs. Thanks to the architecture of the Plan of Knowledge, all of this data will progressively enter and become part of a system which will allow the scientific community to quickly and easily access a wealth of information, whose consultation will contribute towards a steady advance in our levels of understanding of the site. This system is the Information System (SI-GPP), which allows the creation of a unique instrument of knowledge for the entire city of Pompeii.

Knowledge is useful for conservation: knowing to conserve and conserving to know. The Great Pompeii Project has safeguarded and enhanced the great photographic and paper assets of the park through the digitisation and cataloguing of the photographic and paper archive, and through the execution of a - highly challenging and thrilling - multilayered CAT performed



on the casts of Pompeii's victims, the study of whose images has brought to light DNA data through examination of bones and teeth. The overall picture described so far confirms the ability of the archaeological data to contribute to an ever more accurate definition of the city situation in AD 79.(8-9) The acquisition of the vast quantity of information rendered possible by field interventions has however shifted attention onto the urban stratification, acquiring new data on the *forma urbis* prior to the eruption.

The transition from a traditional systems-based documentation method (creation of scale models, excavating journals, use of technical and artistic drawings and photography) to the use of innovative technologies and systems applied to our cultural heritage, is evident. It is necessary to preserve our culture, to raise awareness and visibility of our cultural heritage, but at the same time to understand that knowledge and documentation require protection and that technology is at the service of knowledge.

7 - laser scanner 8 - examination for DNA 9 - examination for DNA

James Shulman

Founder of Artstor and Senior Fellow at The Andrew W. Mellon Foundation

For 15 years with my colleagues I organized and built a digital slide library for teaching at universities-- a non-profit organization created by the Mellon Foundation. It began when every university in the United States was going to digitize very poor slides, so instead of paying for each slide to be created at thousands of universities, we created an organization called Artstor. The relevance of this discussion today really comes from the fact that we had the experience of aggregating digital content from cultural institutions. The content was not nearly as complex or sophisticated as digital archeological information, but some of the lessons that I will discuss briefly were about what we learned as an aggregator of digital content and what it meant to do the real work of collaborating with real complicated institutions, museums, archives, and the passionate people who created art or photographed it. I can also touch upon some of the lessons that we learned along the way.

The first lesson I would say is that it was very important for us to have a specific audience. When we talk about the questions of aggregating heterogeneous data from any sources, a complexity of different software, different data models, and different data standards need to be accomdated. Any of you who have tried that realizes that some degrees of complexity of the data have to be lost along the way. The complexity of the work is wonderful; getting the work to be rich and precise is part of what makes passionate people devoted to these activities. In order to aggregate one cannot do everything perfectly, so for us what was important was that we knew that we were going to serve university teachers. As we aggregated content from museums and archives, we did not try to do what was perfect, we tried to do what was best for a specific purpose. As you all think about the needs for documentation -- reconstruction, preservation -- thinking of a particular audience rather than serving everyone might be helpful, it helped us to get something done. One of the other lessons we learned was that (and I think this is particularly true of archeology and this was mentioned earlier) there are many different levels of access to data needed. One can either say that everything must be immediately open and free or one can recognize the reality of how people work. So there are often collections that need to be private for a while as somebody does his or her research. Sometimes they are shared within a particular institutional workspace, sometimes they are shared across a series of collaborating institutions, sometimes shared in a library such as Artstor or other aggregations of cultural heritage material. Then sometimes when possible those materials should be shared as widely as possible through any number of platforms such as Google or other collaborations.

What we learned is that these progressive layers of releasing data reflect a way in which people are comfortable doing their people work in the real world. When they they start at the last level and say that everything must be immediately available, you may not have fruitful conversations. So allowing for data to progress and be shared allows more institutions to become involved. This next slide shows the documentation (compiled by New York University, the University of Michigan and others) related to a particular dig in Egypt that used our software which allowed the data to be private at first but then open in the end. So I will just summarize with seven lessons learned that I think are more general than our experience. I hope it will be helpful as we think about the levels of aggregation for cultural data for the purposes of documentation. The first one was to respect the work of the people within the particular institutions. It is their work and you all work very hard on your projects. The way to have and begin the conversation is to understand and respect that and find out what benefits will accrue to them to share their data and to make their data available for broader aggregations. Most of the speakers today are very noble in their purposes and even if they use a particular software or data model or work with a particular institution, I think the purpose that brings us together today is something that will inspire people to share. We have to understand that there are different legal and intellectual property regimes associated with the creation of these data and



E m Current IFA Projecte al Abydos Street of the local division of the local di

Use Cases in Shared Shell: Collaborative Cataloging at New York University



10,000,000



Shared Shelf

7 Goals of trusted data intermediaries

Identifying the various constituences within content-owning institutions who could make or block the decision to share institutional content, understanding and respecting their needs.

2. Making and strengthening value propositions encouraging those decision makers and their institutions to place their content with the intermediary organization;

3 Deviaing programs legal and intellectual property regimes for doing this in ways that respected the concerns of the creations.

Working out practical technology solutions for carrying out the work, depending upon institutionally based partners;

5 Ensuring that users get enough of what they needed to:

6. Orealing a business model to support the operating costs of the maintenance of, and controlled access to. The appreciated contant:

7. Extending the use and outputs of the data held within the Trusted Data

Intermediary in accordance with changing exogenous opportunities

we have to respect those concerns as we aggregate the data.

The fourth suggestion is to be practical in how we do this: as we have seen in some of the wonderful projects today, there is an enormous amount of data being created in different ways and in different software; it is important to figure out pragmatic ways to aggregate the data rather than assuming that it should all originally be created in the same system. Again, turning back to my earlier point about an audience, it is better to have that audience in mind at the beginning of aggregating content rather than at the end, because since one will be making decisions about how to aggregate data, one should know whom one is trying to serve and what they really need most. The sixth point may sound like a business proposition, but I think that we all know that this work is difficult (extraction, transformation, loading of data, maintaining it, migrating it over time and preserving it as referred is a concern to all of us). I think figuring out the models by which such an aggregator can be sustained financially is important, otherwise as we know data can easily be lost.

Finally, as opportunities arise that we cannot foresee today, those data can be used and reused and shared in different ways, but I think the key point is to maintain the trust of the scholars, the researchers, the archeologists, the institutions, and the nations that are sharing these data that they have been aggregated for a particular set of purposes. When those purposes can be extended in ways that had not been originally intended or specified, it is important to make sure that these partners agree with the new steps and the various constituencies understand how the extensions are part of the reverberation and further dissemination of the data.

Vincenzo Sommella

CEO ES s.r.l. Progetti e Sistemi

I am an architect by training and I have worked in the sector of cultural heritage documentation and system management for over 25 years. In these 25 years we have been fighting everyday against the destruction of our Cultural Heritage all over the world.

The destruction can be divided into three type of phenomena:

- The first one is the everyday consumption, the erosion of the heritage; everyday there are many small factors that erode our heritage: rain, wind, sun, human fruition, pollution, vandalism, and much more .

- The second ones are the natural and anthropic disasters: the wars, the earthquakes, the fire, the flooding, the landslides and all the events that will suddenly destroy a large part of our heritage.

- The third one, last but not the least, is the oblivion and the ignorance. Oblivion and ignorance will erode our heritage as well as the war, and maybe they are much more dangerous because they can make heritage disappearing silently all over the world.

What is our job?

Our job is to build a system of values that social memory tries to root in the absolute, in order to preserve it from precariousness, instability and destruction, in short: to free him from time and death.

A system of values is really important, because just a system of values and of knowledge can help us, as many speakers said before, to save our heritage. for this reason we will choose as our Goddess Memosine, the mother of the Muses, because she is the memory capable of defending from death and oblivion, or, more, capable to resurrect what is dead.

That is what we try to do: to save from death our heritage and sometimes to resurrect it when we reconstruct something or we just create something that will substitute what we lost.

Some points to think about:

a trustable and reliable scenario

- There is a lack of information about the Cultural Heritage hit by the • disaster, what were inside the area, which kind of monuments, which were the most important and the most vulnerable historic buildings, churches, castles, archaeological sites. In most cases nobody is able to write a simple list of what is closest or farthest from the center of the catastrophe. So nobody can answer to the question: what probably happened to what this means that nobody is able to draw in few hours
- There are no priority lists. Nobody knows what is necessary to check first, which monuments are most in danger, which one contains the most important art objects. There is only a generic consciousness of some well known monuments, but without trustable information about the state of conservation, the vulnerability of the monuments towards that kind of catastrophe, So nobody can answer to the question: what is urgent to do, what is important to do

this means that nobody is able to write a priority list and a plan;

Very often there are no information about the way to reach the monuments, about who is the owner, who and where is the manager or the guardian, if it's possible to go inside or close with a big truck, if there are fire prevention systems or video control systems; so nobody can answer to the question:

How can we do to get in and with whom we have to collaborate This means that we could lose time and do the wrong choice

There are no methodology for monuments first aid. No protocols, no check lists, no plans and rare organization for rescue teams. During the Irpinia earthquake I saw many monuments destroyed in the first weeks after the disaster by the rescuers because they were just worried about new collapses and they weren't trained to understand the importance of the monuments or to assess quickly the condition of an historic building. so nobody can answer to the question:

How we have to do what we have to do This means that the efforts made could be useless or dangerous instead of useful. Our goals:

- we need to decide priorities to use in the best way our resources for programmed maintenance that faces everyday consumption. We cannot stop the consumption, we cannot stop the erosion but we can slow it as much as possible.
- The second one: we need to be ready to face the emergency quickly and in the best possible way; what we have to do is: to reduce risk, to rescue after the disaster and to restore it.
- The third one: we need to preserve the most detailed memory possible of the heritage because memory is something that is not intangible, it is something that is physically touchable.

I believe that it is anachronistic today to think of thousands systems all over the world: one for each country, each city and each institution is useless, what we need is one system, one standard, but it cannot be a unique database because it is utopian. What we can create is a sort of hub, a system as a sort of Google style, but more structured and more sharp towards our needs, that will keep information from big data (because nowadays we are in the age of big data). That means that we need to keep data from everything, from mobile phones, cameras, texts, videos, all the databanks, all the pictures and drawings, everything. It should be compatible with other main cultural heritage systems in order to exchange data, able to support decisions for programmed maintenance as a support decision system, otherwise it would be useless; and It should be helpful in case of emergency and crisis for rescue and restoration and useful for disseminating knowledge and storytelling about the Cultural Assets.

All this information needs to be transformed into knowledge, because a huge quantity of information is necessary but without a powerful system it will not solve our problems,

"the real value of information isn't in the information itself but in the relationships that link them"

Surveying and Cataloguing it's indispensable but it's useless if we don't have a powerful Management System capable of transforming information into knowledge and of making it easily available. To do this we need to understand the links, the relationships between pieces of information and the laws that lead the evolution of phenomena.

What I think of is a system that would be capable of creating a sort of digital avatar of the cultural assets, or better, new digital cultural assets that will be something real, different from the existing cultural assets, but something that has its own value linked to reality

Now I will briefly describe two projects that we developed and released during the last years; they could be the base for a unique system for the safeguard of endangered sites.

The two projects are:

- The Risk Map System for Sicily Cultural Heritage, developed in 2009 a) by RPA s.p.a.- Perugia and ES s.r.l. Progetti e Sistemi - Rome for the Sicilian Regional Government
- The SIGPP, The Great Unesco Pompeii Project Information System, b) developed in 2015 by Consortium Glossa - Naples and ES s.r.l. Progetti e Sistemi - Rome for the Pompeii Superintendence

This Projects are all WebGIS based and they answer to different aspects of the safeguard; mainly:

- **Risk Management and Documentation** a)
- **Programmed Maintenance**, Site Management and Documentation b)
- The first one is The Risk Map System for Sicily Cultural Heritage; we realized this project in collaboration with the Central Institute for Conservation of the Italian Ministry of Culture, and it is a development of ICR's Risk Map because we changed the scale level approaching each monument with its own hazards and vulerabilities and

up to practical information about accessibility and a Decision Support System to make priority lists, considering the historical and artistic importance of each building and site and the urgency of intervention, of course following the different hazards, I mean fire, earthquake, flooding, pollution etc.

The second one is the system for the great Pompeii project that I think is one of the most powerful systems existing today about cultural heritage. In this project 40 terabyte of data have been collected and surveyed, so you can imagine that it is impossible even to look at 40 terabyte of data without a very powerful system capable of extracting knowledge from this data.

The Risk Map System for Sicily Cultural Heritage Background

A disaster occurs at the point of contact between social activities and a natural or anthropic phenomenon of unusual scale. Disasters occurring in larger scale may have a serious impact on society and the Cultural Heritage, resulting in a significant human and Cultural Heritage loss.

Disaster prevention should be one of the most important policies of the Government of a country. "One who can rule rivers can rule a country, too" - tell an old theme of statesmanship.

Although it's difficult to avoid natural phenomena such as rain and volcanoes, it is essential to understand their behaviour and how we can live with them by reducing their impacts and to strengthen our ability to deal with their effects. Thus, we need to take measures for disaster prevention. In short, disaster prevention is necessary to protect human lives and our Cultural Heritage against disaster phenomena.

In 2006 the Sicily Regional Centre for Conservation (CRPR) decided to develop a Risk Map for Cultural Heritage System for its territory where there are a huge number of historical buildings, monuments and archaeological sites.

The Sicily CH Risk Map System have been conceived starting from

the experience of the ICR (Central Institute for Conservation, Dept. of Italian Ministry of Culture) Risk Map but, on the same time, it has been designed using up to date technology and methodology and it has gone far beyond towards a more detailed and richer database and more powerful tools and algorithms in a web architecture.

The System

The expression "Cultural Heritage" has in itself the idea of many items that form a unity both in abstract and in material way; for this reason it's necessary to think to conservation as a process that should involve the "Cultural Heritage" of a region or a country as an organism made of parts that interact among themselves and with their context. This is the base concept of Risk Map: to consider Cultural Heritage as a complex structure located into a complex world.

Of course every description of a complex system is necessarily a simplification, so our main work has been to assess the significant parts of the structure and their relationships in order to built a working simulation of reality.

This simulation is our Risk Map Data Model that includes:

- The main available base maps: orthophoto, street map, technical map, geological map and more;
- The georeferred inventory of the non movable Sicilian Cultural Heritage (Historical Buildings and Monuments, Archaeological Buildings and Monuments, Urban Ambits) made by detailed cards of each monument;
- The inventory of the structural and artistic conservative condition of each monument: the vulnerability;
- The geodatabase of the main Hazard factors: Structural (earthquakes, flooding, eruptions; erosion, landslides...); Environmental (pollution, rain, wind...); Human (urbanism, street traffic, vandalism, war...): the Hazard;

And, last but not the least, the algorithms that permit to cross vul-

nerability and danger to evaluate the risk and to support decisions about conservation planning and priorities.

To end: what we try to make it is an instrument for helping best practises in Cultural Heritage conservation and management.

The Risk Map is a webGIS system which was developed in 2009; it is still a 2D webGIS, but it is web-oriented and also mobile-oriented (in 2008 that was quite technologically new). The risk management tools work at the single monument level and produce a powerful SSD for risk reduction and programmed maintenance.

To end, in our project for the first time the Urban Cultural Ambits like historical waterfront are conceived and studied as a unique Monumental Complex .



The project included:

- **10.000** Monuments inventoried (just a portion of the whole heritage of Sicily) ID Card (denomination, code, coordinates, address,...)
- **2.638** Architectural base cards
- **632** Archaeological base cards Patrimonial Card (context, ownership-management, security systems, value, accessibility, assets, law protection...)
- **1.950** Architectural conservative cards
- 562 Archaeological conservative cards Vulnerability Card (historical info, works and changes, description, decoration, damages, tech plants)





An example of the richness of the Geodatabase data structure that allows a powerful risk management : Landslides data structure (about the 5%of the total data structure)





Waterfronts and axes, Trapani and Siracusa

The SIGPP The Great Pompei Unesco Project Information System

INTRODUCTION

The first projects about Software Management Systems for Large Archaeological and/or Historical Sites date from the '80; from then until now we had a lot of small solutions, mainly developed by Universities and Research Institutions, that in most part of them were focused on documentation and scientific purposes (archaeological and historical research).

Until few years ago the cost of software licenses and maintenance was very high for the cultural institutions, in particular for that of the Mediterranean Basin; this matter has been a serious obstacle for the development of more powerful and advanced systems.

Nowdays three facts lead to overcome the existing obstacles: the first is the cultural change happened in the Large Cultural Sites Management that today includes all the aspects from the research to the touristic fruition; the second is the technological progress that create the conditions to develop powerful and complex systems fully open sources; the third one is the starting of a comprehensive and large project in one of the most important and

fascinating archaeological Sites of the world under UNESCO guidelines and control.

This three facts made possible the SIGPP - The Great Pompei UNES-CO Project Information System.

The Italian Ministry of Culture and UNESCO launched in 2013 the Great Project Pompei. The GPP included the «Knowledge Plan», a complete and HD survey campaign all over the area of ancient Pompei including laser scanner and state of conservation. The GPP included also an extensive campaign of conservation and infrastructural works. To manage the huge quantity of data delivered by the survey and, on the same time, the considerable number of yards in the archaeological area was launched a tender for the design and development of the GPP GeodataBase Management System. The tender was won by a group formed by two companies that work since long time in the sector of IT for Cultural Heritage: Consorzio Glossa - Naples and ES srl Progetti e Sistemi - Naples/Rome.

The GPP System's mission is very ambitious: to collect in one system all the information about every aspect of the Ancient Pompei and to manage contemporary the scientific data, the state of conservation and the programmed maintenance, the conservation works and any yard in the area and their impact on the fruition by the visitors. The functional areas of GPP are: GeoDataBase – alfanumeric and geographic editing, query and reporting, State of Conservation Monitoring, Programmed Maintenance and Works Management.

The GPP System has been fully developed in Open Source Software without any license's cost and it's fully web oriented.

The Project

To understand the real value of GPP Management System it's necessary to understand the scenery; Pompei it's not only the most famous archaeological site of the world, it is a whole ancient city fixed in one moment of its life with everything on site: the houses, the furniture, the food, the plants and

the bodies. It's a site re-discovered in the 18th century that passed throughout many deeply different cultural approaches during three centuries; three centuries of different excavations, different restorations, different interpretations, different managements, different surveys, different damages, different evaluations, different problems.

This all left deep traces over Pompei and over our way to look at it and to think at Pompei itself.

From the beginning of the digital age many solutions for Pompei have been designed and developed to archive scientific data or to manage some aspects of Pompei's life, but no one of the projects looked at Pompei in all its aspects as a living city and, moreover, it was never realized a contemporary survey of the whole city wall by wall with the damage conditions of every structure, every fresco, every mosaic.

This detailed picture of the whole city is the starting point for a Management System that will support all the main today aspects of Ancient Pompei life: Geodatabase of all the Archaeological data and survey; geodatabase of the damage conditions of all the surfaces and walls; geodatabase of the old detectable restoration works; new works management; programmed maintenance; interference between works and touristic fruition.

The GPP included the survey of the whole Pompei made by total station, laser scanner and ortophoto, with the damage mapping of every surface surveyed and analyzed by "inspection teams" composed by: architects, conservators, engineers, archaeologists and photographers; during the "Knowledge Plan" about 60.000 damage conditions cards have been input into the system.

To understand better the huge work done here there are some figures:

- 67 Hectares
- 262.000 s.m. of wall surface
- 23,000 s.m. of wall paintings
- 28,000 s.m. of plaster
- 16,000 s.m. of floors
- More than 3,000,000 of visitors per year

And the critical issues

- Maintenance Priorities and Planning
- Conservation Inspection Activities and Research
- Knowledge Survey and Archive
- Tourism Fruition



The files size of surveyed data is about 40 TeraByte but, as you know, the real value of information isn't in the information itself but in the relationships among them. The GPP System has the aim to transform information into knowledge. To get knowledge means to understand something more than before about a subject and throughout the GPP System we can now understand how to plan and to manage in the best way the ancient Pompei maintenance, conservation and fruition; we can decide which are the most

important things to do and which are the urgencies; in few words: we have now a Decision Support System for Pompei.

The system is conceived for back office purposes so the users could be only the Pompei Superintendence's officials or any authorized consultant and contractors in charge for any project.

The only granted access to the GPP System from external users, at the moment, can be that of authorized Researchers and Scholars for scientific purposes.

The GPP System has been fully developed in Open Source Software and it is fully web oriented. We worked mainly in Java and Javascript (Open-Layers) using Geoserver, PostGis, PostGres, Alfresco, (documents management), Activiti (workflow management) and other Open Source software



Regio I – 3D Survey - (MD Technology and RPA srl, Perugia)

The functional areas

• GeoDataBase - alfanumeric and geographic editing, query and reporting.

All the parts of Pompei Site have been archived following the traditional logical structure: Site - Regiones - Insulae - cadastrial units (buildings, domus and streets)- ambients/rooms- surfaces - surfaces decorations - antique furnishing; to these we added: modern furnishing, safety elements

and technological networks. In the next release of the system we will include the archaeological excavations scientific data structure too.

The database has interoperability functions with the SIAV (Vesuvian Archaeological Informative System) and with the ICCD (Central Institute for Cataloguing and Documentation of Italian Ministry of Culture) SIGECWEB that is used all over Italy and that is the reference standard for Italian Cultural Heritage.

The system has powerful editing functions available on mobile devices too.



• State of Conservation Monitoring/Inspection Activities

Each surface and surface decoration has an inspection card with the damage mapping and the structural damage for the walls. The graphic base is the survey of the surface and its ortophoto with HD standard, rectified over the digital survey. The work flow of the Inspection Activities is managed by the system in order to check on time the completeness of the cards and to trace every contribution from each member of the inspection teams including laboratory's analysis. Each team coordinator has the privilege to create the cards and to validate all the expert's texts and drawings.



	0 1 1	Lana .	-	-
Diverse Diverse Diverse			410 ·	Y
			and the	
			5	24
		公開。	E	
			Ville -	1

• Programmed Maintenance

This functional area gives the tools to assess the damage conditions using the inspection cards data and the decision support system to design the programmed maintenance interventions to the managers in charge for the maintenance.

The system gives the average indexes of Importance, urgencies and kind of damage for any Regio, Insula and Domus both in chart form and in map form.

Of course the single surface data are fully available in order to design the executive maintenance and conservation projects.

Each programmed works has a workflow that leads the process from the assessment to the executive project throughout the preliminary and the definitive projects; in the workflow are involved the procedure responsible, the project director and the designers.





Works Management

.

ortance, urgencies and kind chart form and in map form. wailable in order to design ects.



This functional area gives the tools to manage every kind of works inside the Archaeological Site of Pompei to the works Managers. The work flow starts from the beginning of the procedure, the tender, and it follows all the phases of the works until the final tests. The protocol obliges the Companies that do the works to survey and to record in the GPP system all the works executed using the same standards of the Knowledge Plan; this is a fundamental issue because one of the main obstacles for a well done maintenance programming is the lack of trustable data about the previous interventions on the same structure. As you can imagine in Pompei we have more than two centuries of unrecorded works that represent a serious obstacle to any correct maintenance design and work.

Moreover, the system allows a complete and permanent control by the superintendence of all the work progress

This area has one more important aim: to manage the interference between the works and the touristic fruition to schedule the works in order to leave the largest possible portion of the site available for the visitors and to avoid any possible risk for the visitors themselves. In some cases the system will allow to organize visitor's paths that will make possible to look at the most interesting tasks of conservation works.

Assessment of the interference between works and touristic fruition.

Acknowledgements For Risk Map System

Thanks to The Sicily Regional Center for Conservation in the person of : the Director Arch. Guido Meli the Project Director Arch. Roberto Garufi the team of the Center Thanks to RPA srl, Perugia in the person of: the Project Director Arch. Enrica Rasimelli the RPA team Thanks to the ES team: Maurizio Dragoni, Nicoletta Capanna, Stefano Piermattei, Luca Tiberia

For SIGPP

Thanks to The Superintendence of Pompei in the person of : the Superintendent Prof. Massimo Osanna the Responsible of the Procedure Dott.ssa Annamaria Sodo the Project Director Dott. Andrea Garelli Thanks to Consortium Glossa in the person of: the president Ing. Bruno Frangipani the Glossa team Thanks to the ES team: Maurizio Dragoni, Nicoletta Capanna, Stefano Costa, Stefano Piermattei Many Thanks to MD Technology and RPA srl, Perugia, in the person of Arch. Enrica Rasimelli for courtesy of the survey drawings of Regio I

Regio I – survey – (MD Technology and RPA srl, Perugia)

Efstratios Stylianidis

Assistant professor at the School of Spatial planning and Development at the Aristotle University of Thessaloniki, Greece

My name is Stratos Stylianidis, I am Assistant Professor of Photogrammetry and Surveying in the Aristotle University of Thessaloniki, Greece. At the same time I have the honor to represent CIPA-Heritage Documentation, the ICOMOS-ISPRS Scientific Committee for heritage documentation, as Secretary General for the period 2015-2018.

This is the structure of my presentation. You can see the outline of my talk. Let's start from the cultural heritage documentation framework. As you are aware many international organizations, such as ICOMOS, are involved in relevant Charters and many of them make a clear reference to documentation. Here you may see what is mentioned in the Venice Charter of 1964 and then what is declared in the one in Paris, in 1972. Then we have one more Charter in 1987 in Washington. These are all Charters adopted by the international community and make clear reference for the need on documenting cultural heritage; that documentation is an integral part of the preservation process.

Talking about the various international organizations in the heritage domain, let me introduce ISPRS, the International Society for Photogrammetry and Remote Sensing. Together with ICOMOS are the mother and the father of CIPA. ISPRS is the scientific community working in photogrammetry, remote sensing and geographical information systems. On the other side we have ICOMOS, which is also a non-governmental organization working more on cultural heritage monuments and sites. In 1968, these two organizations decided to establish a scientific committee, originally named Comité International de la Photogrammétrie Architecturale, in English International Committee of Architectural Photogrammetry. It was adopted to keep up with technologies, to train people, to focus on the cultural heritage documentation, education and dissemination of knowledge.

This is a table that presents the outline of CIPA activities, the topics, the actions, the techniques we are using, all related to the documentation framework. This is a snapshot from CIPA's website: I invite you to visit it. We restructured it recently, and so you will have the opportunity to find more stuff that may be is of your interest. If you would like to further join our community, you may also become a CIPA member. It is totally free! We have a newsletter and here is another invitation to you to send any contribution. We have a huge e-mailing list of persons to whom all this information is disseminated all around the world. So, feel free to send us articles, projects, etc. Let me also announce that the forthcoming weeks we are running our summer school in Paphos, Cyprus. Paphos is the European Capital of Culture for 2017. It is actually my birthplace, and it is a UNESCO heritage place as you may know. More information can be found on the website. It is our pleasure to welcome you in this summer school, dedicated to the 3D surveying and modelling techniques in cultural heritage documentation.

Human threats and natural hazards: this is the starting point of any discussion related to cultural heritage documentation. Threats and hazards are the real danger for cultural heritage. We are all aware of many events; you see here just three of them, there are many. The Buddha's of Bamiyan in Afghanistan, in 2001. In 2015 we had an event in Greece, in the Plaka's bridge, which collapsed due to a natural disaster. This bridge was collapsed due to the heavy raining and the overflowing of the river. Recently we had the destruction in Palmyra, Syria, by ISIS, as you can in the slides.

Let's move now to another topic. This is the typical pipeline we used in the documentation process: it is a typical pipeline that we are using in photogrammetry, starting from the object/space, to deliver the 3D model, using sensor platforms and tools in order to reach the outcomes. We can say that in image-based techniques, we are using passive sensors, usually images while in range-based sensors, we are using active sensors, usually laser scanners, and of course we have the conventional surveying techniques.

Here is a figure that is placing cultural heritage with respect to the











Bister sense





60MA 30



178



INNOVATIVE SYSTEMS (VI)



expected precision of the outcomes. As you can see, cultural heritage (as a domain) is placed in the area of centimeters, especially in the documentation perspective. You can also recognize the various technologies we are using, also with respect to the object size and the complexity of the object; reflecting to the number of points that we wish to capture for the object modelling.

Image-based + range-based techniques: I will not go through them, you have seen some things from previous presentations. Just on slide for the comparison between imaging and ranging, what are the pros and cons between the two methods.

Trends: I think this is very crucial if we want to schedule something for the future. We have to see how things are moving and what do we foresee. From these slides, I would like you just to keep in mind that if we monitor the technologies and their advancements, definitely we should have in mind that everything trends to be mobile. It seems that probably citizens are going to act like sensors, contributing in data acquisition. This is what we see considering both technology and the users. These are the two driving forces that are going to act as challenges and trends for the coming years; i.e. citizens and mobile technology. Of course dealing with sensor technology many surprises and developments are coming almost every day. There are also some examples of sensors and platforms with respect to cameras, scanners and UAVs as you can see in this slide.

Passing to the tools, it is very much recognized that it is a fundamental component in order to deliver the outcomes. In practice, we have commercial and also free and open source tools. These slides give the different options we have nowadays.

A few things about the outcomes. This is an outline of what can expect in 2D and 3D products. These slides are giving the different options we have.

I have some slides to show you illustrating the state of the art, the technology, innovative systems that are out there. Here you see a solution, a device and how it works with images around the object (360) and how the user can reach a 3D model. Another system is coming from Germany and Fraunhofer IGD. This is a laser scanner which produces very high resolution

3D models of the objects; and in this video you can see an example on how it works. Let's go to the next one. This solutions is coming from Microsoft and then we will see Google product. This is the mobile solution coming from Microsoft; as you see mobile technology is here doing many fantastic things. How can you document and how can you produce 3D models even from a mobile device like that we are using. We have Chance Coughenour from Google with us. This is Tango solution from Google. Tango is also used in tablets and smartphones. Another solution following structure for motion and photogrammetric algorithms in order to produce 3D models from mobile devices. You see here the Tango device. We now move to another solution, the structural sensor. The three last solutions are acting more or less in the same way and there is another one I would like to show you in this slide, also acting on a mobile device: you have a small object in front of you, you capture the images and you get the 3D model.

Concluding remarks and I am finishing my presentation. It is very crucial, and I think we will have the opportunity to discuss this in the panel following. If we can reach some common points that are acceptable by all. This will strengthen the collaboration between the different organizations at national and international level. It is very important for me, coming from academia but also working in the industry as well, to involve younger generations in this process. They can do many and amazing things. Organizing these educational activities with CIPA I realized that it is very important to go to the areas of interest, the areas of conflict, the areas facing natural disasters, and train people there to do the job, document and preserve their traditions, cultural heritage.

Ulrike Wulf-Rheidt

Head of Architectural Department at the German Archaeological Institute

Documenting our heritage at Risk The Archaeological Heritage Network

When does the conflict in modern wars really end? And when can the rehabilitation of cultural heritage begin? Since it is not easy to answer these questions, and since there is a danger that even trying to find answers keeps us from taking any action at all, new concepts are needed. Nevertheless, a look at the past is useful in helping us to better understand the pitfalls and opportunities in postwar situations.

While World War II cities were badly damaged by aerial warfare. But in many cases they experienced their complete destruction after the war. City planners implemented concepts that had been developed in the 1930s and 1940s to create a modern, functional city, as for example in Dresden. War damage was frequently regarded as an opportunity to completely eliminate all traces of the 19th century city, except for a few historically important buildings.

In contrast, in some European cities the decision was made to reconstruct the former urban structure and the traditional appearance of important streets and their buildings. Because they offer a distinctive quality of life, today they are appreciated more than many newly-planned quarters.

This Experience particularly from World War II onwards has shown that post-conflict rebuilding of historic cities has often led to a second destruction. Valuable urban fabric and structures, including ruins and debris, fall victim to wholesale rebuilding. This adversely impacts or destroys the cultural identity and spirit of place of historic cities.

In the current conflict areas we are facing the same situation as seventy years ago in Germany. The need to rebuild infrastructure and make buildings habitable again inevitably competes with the safeguarding of cultural heritage. Therefore the two processes of urban planning and safeguarding cultural heritage must be brought together and a special expertise for this post conflict situation should be established. This needs coordinated efforts and pooling of expertise and manpower

This was the reason that the German Archaeological Institute was one of the moving powers for the foundation of the Archaeological Heritage Network (http://www.archernet.org). This network was inaugurated in April 2016 in the presence of the former German foreign minister, Frank-Walter Steinmeier. It is being financed by the Federal Foreign Office. The network links the expertise of various German institutions for the purpose of jointly contributing to the documentation, preservation and safeguarding of cultural heritage. But more should be done. We need clear and simple guidelines for dealing with cities destroyed by warfare.

Prof. Dr. phil. Leo Schmidt, Head of the Chair of Architectural Conservation

from Cottbus University has taken the first step in the context of the Archaeological Heritage Network and in cooperation with ICOMOS and many international colleagues. The output of an international working group last summer is a "Toolkit for Safeguarding the Cultural Significance of Historic Urban Fabric Damaged in Armed Conflict". It provides implementable recommendations for conflict and post-conflict responses.

The first joint project of the Archaeological Heritage Network has the title "Die Stunde Null – A future for the time after crisis". This title may sound confusing. We all know that especially at this time of modern warfare there is no obvious moment at which everything can begin anew. We also know that there is no point waiting for such a time before getting to work. It is necessary to begin planning already now, to build up expertise already now, so that in the future decisions can be made and plans carried out. After the war is over, the people should be given every encouragement to remain in, or to return to, their homeland, and actively contribute to its heritage-centric sustainable development.



The aims of the Archaeological Heritage Network

The first joint project of the Archaeological Heritage Network

Integrative and holistic approach

· To promote international cooperation

To enable experts to safeguard and protect their heritage

· To encourage sustainability by education

This gives rise to a much more central question: who are the stakeholders and decision makers in this entire process? The people - whose associations give these historic urban landscapes a meaning, and who are responsible for continuity in their

living traditions – have an important role to play in the rebuilding.

In the first project of the Network it is not we, the German institutions, who are the stakeholders and decision makers. We are merely the ones who have considerable experience with rehabilitation in postconflict situations and can share our knowledge for consideration in planning and implementation projects. It is obvious that planning and decisions about the postconflict rehabilitation of cultural heritage in conflict areas has to come from these areas themselves, or from people coming from those areas, for example from Iraq, Yemen and Syria.

Of course, particular situations can be very different, depending on the conflict area. With only a few examples the basic approach that the network follows should be illustrated: If we want to implement specific ideas and decisions, we first need to have excellent documentations and information. Modern technology makes it easy to create the appropriate geoinformation systems, data bases and planning tools. For the reconstruction of individual buildings, city quarters including our heritage available information must be linked worldwide.

With the assistance of the Federal Foreign Office and in cooperation with the Qatar Sudan Archaeological Project, we have for example started to digitize our archives on Sudan. The aim is to support our colleagues there to establish and expand digital lists of historical monuments, to establish cultural heritage registers.

In 2012 the German Archaeological Institute started together with the Museum for Islamic Art in Berlin the Syrian Heritage Archive Project (http:// syrian-heritage.org/de). The Federal Foreign Office is funding the project. The main goal is to digitalize our important archives and to make the information available in a structured form for all measures to protect, safeguard and reconstruct destroyed monuments. Approximately 150.000 photographs,



Training in documenting techniques in Beirut. Training in hand drawing. Training in documenting techniques in Beirut. Training in modern technologies. Training courses for stonemasons in Gadara/Jordan

© German Archaeological Institute

plans and drawings are available in a digital form now. Data are being added to this information base, such as from the GIZ project to restore the historic inner city of Aleppo.

Such information provides a basis for projects to develop concepts for reconstructing monuments or cities, such as in Syria. For example, we provide scholarships to enable Syrian experts and postgraduate students, some of them came as refugees to Germany, to make these plans. It is, of course, not we, but the Syrians themselves, who must plan the future of their country. These young scientists need to be excellently trained for their future roles as decision makers. Since 2013 the German Academic Exchange Service (DAAD) has supported a joint master's curriculum involving Helwan University in Cairo and BTU Cottbus-Senftenberg in Germany. This university-level course of study incorporates refugees, as does a new study program at the German-Jordanian University in Amman dealing with the rehabilitation of cities.

The technology is evolving so rapidly that even experts require continuous training. With this in mind, we have supplemented our long-existing Iraqi-German summer program with a two-month expert's forum in Berlin. Training in documenting techniques from the old fashioned hand drawing to modern technologies like "structure from motion" applications is provided. Training programs are also offered in cooperation with the UNESCO Field Office in Beirut, as well as for a group of scholarship-holding Syrian refugees in Turkey.

It is of course also essential to train practitioners in the manual skills they need to carry out rehabilitation projects. As a result, we offer training courses for stonemasons in Lebanon and Jordan. For the Syrian refugees this is a kind of humanitarian aid, and for the local population one road to training and jobs. The monuments in Lebanon and Jordan benefit from being a training ground for learning skilled work, so we and our local colleagues are at the same time contributing to the preservation of the cultural heritage, and also sending out positive signals.

In the Archaeological Heritage Network it is crucial that all these

modules be implemented together with local colleagues and that we jointly contribute to the protection and preservation of the cultural heritage and especially for the heritage at risk. Rebuilding must be reconciliation-oriented and people-centred so that those affected by the war and their future generations are not cut-off from their own traditions and identity in the long run.

THE ROME AGREEMENT **ON DOCUMENTATION OF ENDANGERED** CULTURAL HERITAGE

PREAMBLE

All participants in the conference recognize that documentation plays a critical role in managing, safeguarding and ensuring the respect for cultural heritage. Documenting is essential when it comes to the identification, protection, interpretation, and physical preservation of movable objects, historic buildings, archaeological sites, and cultural landscapes, as well as intangible heritage.

It has never been more urgent and imperative to find ways to ensure the preservation and permanence of world cultural heritage for present and future generations. Today's documentation has the potential to play a key role in achieving this goal. The measures referring to documentation are already in force in all major international conventions on the protection of cultural heritage, attesting to the importance of these activities.

At the same time, participants acknowledge that while an institutional framework for documenting cultural heritage at risk is well defined, both politically (for example by the mandate attributed by all international conventions and normative instruments), and also in terms of programmes, through the actions of various intergovernmental organizations such as UNESCO and ICCROM, and non-governmental organizations such as ICOMOS and ICOM, there is often a lack of financial and technical resources to allow Member States to efficiently document their own cultural heritage.

WHEREAS

- Article 5 of the 1970 UNESCO Convention on the Means of Prohibiting and Preventing the Illicit Import, Export, and Transfer of Ownership of Cultural Property calls for the establishment and maintenance of national inventories of cultural property;
- Article 5.4 of the 1972 UNESCO Convention Concerning the Protection • of the World Cultural and Natural Heritage calls on each State Party to the Convention: "<to take the appropriate legal, scientific, technical, administrative and financial measures necessary for the identification, protection, conservation, presentation and rehabilitation of

this heritage;" where the identification in particular, but also all other subsequent steps of the conservation process, imply the documentation of the cultural and natural heritage;

- Article 2 of the Council of Europe's Convention for the Protection of the Architectural Heritage of Europe (Granada, 1985) states that: "For the purpose of precise identification of the monuments, groups of buildings and sites to be protected, each Party undertakes to maintain inventories and in the event of threats to the properties concerned, to prepare appropriate documentation at the earliest opportunity";
- Article 2 of the Council of Europe's Convention on the Protection of the Archaeological Heritage (Valletta, 1992) requires each party to make provision for "the maintenance of an inventory of its archaeological heritage and the designation of protected monuments and areas";
- The 1995 UNIDROIT Convention on the International Return of Sto-• len or Illegally Exported Cultural Objects underlines the importance of inventories, according to Article 4, which states that the possessor of a stolen cultural object who is required to return it shall be entitled to fair compensation only if it can be proved that he or she: "exercised due diligence when acquiring the object. In determining whether the possessor exercised due diligence, regard shall be had to the circumstances of the acquisition, including the character of the parties, the price paid, whether the possessor consulted any reasonably accessible register of stolen cultural objects, and any other relevant informa tion and documentation which it could reasonably have obtained";
- The ICOMOS Principles for the "Documentation of Monuments, Building Groups and Sites" (1996), which indicate the reasons and responsibilities for heritage documentation and identify the principles of planning, managing, disseminating and sharing documentation and content;

- Article 5 of the Second Protocol of 1999 to the Hague Convention of 1954 on the Protection of Cultural Property in the Event of Armed Conflict includes, inter alia, preparatory measures adopted in peacetime for the protection of cultural heritage against the effects caused by armed conflicts, in accordance with Article 3 of the Convention, including the preparation of inventories;
- The UNESCO General Conference, through Resolution 38 C/48, adopted in 2015 the Strategy for Reinforcing UNESCO's Action for the Protection of Culture and the Promotion of Cultural Pluralism in the Event of Armed Conflict, followed by a Plan of Action for its implementation which also includes natural disasters;
- UN Security Council Resolution 2347 of March 24, 2017, the first resolution devoted entirely to the protection of cultural heritage during armed conflicts, underlines the link that exists in many cases between destruction and smuggling of cultural heritage and threats to international peace and security;
- The Final Statement of the G7 Meeting of Culture, held in Florence at the end of March 2017;

•

- The Council of Europe adopted (3 May 2017) a new convention on criminal offenses relating to cultural property, in which Articles 22 and 23 draw attention to the importance of documenting as a means of preventing and combating the destruction, damage and illicit traffic of cultural goods;
- The European Parliament and the Council of Europe, have announced 2018 as the European Year of Cultural Heritage;

GOALS

We attending the International Conference on Documenting our Heritage at Risk - held in Rome on 19 and 20 May 2017 in Palazzo Poli, where the Trevi Fountain is located, and in the Ex-Planetarium of the National Museum of Rome at Terme di Diocleziano – make the following appeal:

- The Member States of UNESCO and ICCROM should: a.
 - take the necessary measures to document their cultural heritage, as provided for in the above-mentioned international instruments;
 - share cultural heritage data banks in order to create a common knowledge platform for cultural heritage;
- The Member States of UNESCO should: b.
 - undertake, in the appropriate ways and times, specific activities under the Action Plan for the implementation of the Strategy for Reinforcing UNESCO's Action for the Protection of Culture and the Promotion of Cultural Pluralism in the Event of Armed Conflict, notably in relation to the inventorying and documentation of cultural heritage;
 - consider that the UNESCO General Conference's forthcoming resolutions should include a specific appeal to all Member States to strengthen both technical and financial measures to foster inventory and documentation of cultural heritage at risk, with priority given to cultural heritage that is:
 - affected and threatened by conflicts and human-made disasters,
 - affected and threatened by natural disasters,
 - identified as being most vulnerable to the consequences of climate change, especially in coastal and insular areas due to the future increase in sea levels, as well as consequences of neglect and encroachment;
- The Member States of ICCROM should consider at the next General c. Assembly the approval of a motion to:

- grant to the Secretariat the mandate and resources needed to define jointly the scientific methodologies appropriate for identifying and cataloguing cultural heritage in areas at risk;

- o study and disseminate the best available documentation technologies according to the latest experiences; - contribute to the technical-scientific comparison of the principles, criteria and modalities for future restoration, rehabilitation and re construction;

d. The European Parliament and the Council of Europe, which together proclaimed 2018 as the European Year of Cultural Heritage, should take the necessary measures and mobilize the appropriate human and financial resources to lead an international initiative for the documentation of cultural heritage at risk worldwide.

This "Rome Appeal" is offered to the Italian Prime Minister, requesting his support to achieve its contents and objectives. We will strive for the broadest acceptance of the "Rome Appeal" within the scientific community, institutions, and public opinion.

Vincenzo Amendola, Undersecretary of State of Foreign Affairs and International Cooperation, during his speech

Palazzo Poli, first day of the conference