# A Digital Future for Traditional Buildings: Practical Applications for Survey and Management: Abstracts

COTAC Conference 2013

Edited by Ingval Maxwell OBE

COTAC

## Council on Training in Architectural Conservation (COTAC)

COTAC originated in 1959 in response to the need for training resources for practitioners in the repair and conservation of historic churches. Since its inception the Charity has consistently worked to lift standards across the UK's conservation, repair and maintenance (CRM) sector. This has involved working in partnership with national agencies, professional and standard setting bodies, educational establishments and vocational training interests.

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### Acknowledgments

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*A Digital Future for Traditional Buildings*

**COTAC Conference: The Gallery, Alan Baxter and Associates, Cowcross Street, London
 26 November 2013**

Edited by Ingval Maxwell OBE

**Conference Intentions**

The ICOMOS Guidelines on Education and Training are at the heart of COTAC's omnibus approach to improve the standard, education and awareness of those disciplines working in the broad field of building conservation. Through their holistic approach the Guidelines identify the need to read, understand and obtain relevant information about what is being worked on so that appropriate decisions can be taken based on relevant information.

Significantly, the Guidelines also indicate the need to document what has been done, and to make that documentation accessible in the future. In this, the third of COTAC's Annual Conferences, the focus is on how emerging digital technologies can be used to help achieve that with pragmatic gains and practical applications.

With the support of case studies, the event will consider how the latest digital technologies can be of assistance to practitioners, and it will address how to assess the relevance of what can be adopted to suit particular needs. It will also look at the issue of how to archive such material, and how it could be supportive of developing Building Information Modelling initiatives.

In this fast moving field, the conference topic is both timely and relevant. It will be useful to a wide variety of practitioners in a manner that will introduce them to the benefits of, and enhance their abilities to use, digital technologies to greater advantage.

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## Conference Programme

9.50    *Conference Introduction*

10.00   ***CyArk: Using Data to Inform Conservation***
        *Ruth Parsons, Executive Director, CyArk Europe*

10.30   ***Embracing a Digital Future - the Experience and Adventures of Historic Scotland amongst the Cloud of Points***
        *Dr. David Mitchell, Director of Conservation, Historic Scotland*

11.30   ***Case Study: Data and Conservation Management at St. Michael's Mount***
        *Richard Davies, Partner, MRDA Architects*

12.00   ***Case Study: Developing and Using Digital Information at Freemason's Hall***
        *Roger Carter BSc CEng FCIM, Director of Operations, Freemason's Hall (2004-2013)*

12.30   ***Historic Building Information Modelling – A Low Cost Option***
        *Dr. Maurice Murphy, College of Engineering and Built Environment, Dublin Institute of Technology*

14.00   ***New Techniques: Drone Surveys of Historic Buildings***
        *Craig Hellen, Director, Bexmedia, Bexcopter*

14.30   ***Beyond Scanning: Data for Managing Historic Buildings Sustainably***
        *John Edwards, Assistant Director, Properties in Care, Cadw*

15.30   ***Developing COTAC's Online Resources***
        *Ingval Maxwell OBE, Chairman, COTAC*

16.00   ***Conference Summary and Resolution***

**Summary of Presented Papers**

**1: CyArk: Using Data to Inform Conservation**

**Ruth Parsons, Executive Director CyArk Europe**

This scene setting presentation put the international aims and objectives of CyArk and CyArk Europe in perspective. CyArk was established in 2003 as a not for profit organisation by Ben and Barbara Kacyra. Spurred by the Taliban's destruction of the 1600-year-old Bamiyan Buddha's in Afghanistan, they founded CyArk to help ensure that heritage sites were available to future generations, through making them easily accessible in a digital format. Operating internationally, the CyArk mission uses new technologies to create a free, 3D online library of the world's cultural heritage sites before they are lost through the passage of time.

Working with experienced teams, the resultant engineering-grade data can also be used to create highly accurate documentation drawings for site conservation, and realistic visualizations for education and interpretation. CyArk transfers its knowledge and processes to local organizations through establishing Technology Centres with local schools and universities. With Executive Director, Ruth Parsons, based at its headquarters in Edinburgh, CyArk Europe was launched on 22 October 2012 at the 'Digidoc' Conference. CyArk Europe will advance CyArk's mission to digitally preserve heritage sites and structures in Europe, the Middle East and Africa. The related 'CyArk 500 Challenge' aims to 3D scan and digital preserve 500 world heritage sites within a period of 5 years. This Challenge was formally launched at the Tower of London on 21 October 2013.

## 2: Embracing a Digital Future - the Experience and Adventures of Historic Scotland Amongst the Cloud of Points

**Chris McGregor, Deputy Director of Conservation, Historic Scotland**

The impressively detailed presentation revealed the integrated digital recording work that has been recently advanced by Historic Scotland.

Laser scanning allows the Agency to accurately record the 3D surface of the built environment without any physical contact. This technology allows it to better understand built environments, terrains, urban streetscapes, heritage structures and archaeological sites. The scanned digital information can be used for GIS applications, architectural drawings, 3D renderings and animations.

Laser scanning contributes significantly to the way that the historic environment is recorded. It allows buildings and sites to be viewed back in time with an accuracy and level of detail that was hitherto impossible. The collected data also greatly benefits practical conservation and preservation programmes.

The' Scottish Ten' Project is an ambitious five-year initiative to use cutting-edge scanning technology to digitally record Scotland's five UNESCO World Heritage Sites, along with five international sites, in order to better conserve and manage them.

**3: Case Study: Data and Conservation Management at St. Michael's Mount**

**Richard Davies, Partner, MRDA Architects**

St Michael's Mount is the jewel in Cornwall's crown. The most famous of the county's landmarks, it has a fascinating history, steeped in legend and folklore. It has stunning panoramic views across Mounts Bay to Lands End and The Lizard, and it boasts a picturesque harbour, and a spectacular Castle, complete with majestic gardens.

Originally the site of a Benedictine Chapel, the Castle dates from the 14th Century. Now in the care of the National Trust, access is by foot across a causeway at low tide, or by short ferry crossing at high tide.

The presentation offered an insight to the challenges faced in dealing with the service upgrading and conservation of this complex monument, and promoted the need for an integrated digital building information modelling approach to handle the plethora of required material for effective management and control.

**4: Case Study: Developing and Using Digital Information at Freemasons' Hall, London**

**Roger Carter, Director of Operations, Freemason's Hall (2004-2013)**

This imposing art deco London building, covering 2¼ acres, was built between 1927 and 1933 as a Memorial to the many Freemasons who died on active service during the First World War. Chaired by Sir Edwin Lutyens, then President of the Royal Institute of British Architects, an international architectural design competition was held in 1925. Of the 110 submitted schemes, the jury selected 10 to be fully worked up. The winning design was by the London partnership of H V Ashley and F Winton Newman.

Initially known as the Masonic Peace Memorial, at the outbreak of war in 1939 it reverted to the Freemasons' Hall name. It is now Grade 2 listed, and is the only art deco building in London that has been preserved 'as built' and used for its original purpose.

Central to the building is the Grand Temple, the meeting place for Grand Lodge, Grand Chapter and the annual meetings of a number of Provincial Grand Lodges. Masonic bronze doors, each weighing one and a quarter tonnes, open on to a Chamber 123 feet long, 90 feet wide and 62 feet high capable of seating 1,700. The Grand Hall and Grand Temple is increasingly being used for concerts and musical theatre – having almost perfect acoustic and clear sight lines.

With a view to future developments, and the need to integrate the knowledge and understanding regarding the management and conservation needs of a multitude of different levels within the building complex, the presentation considered the benefits of digitally sourcing that information.
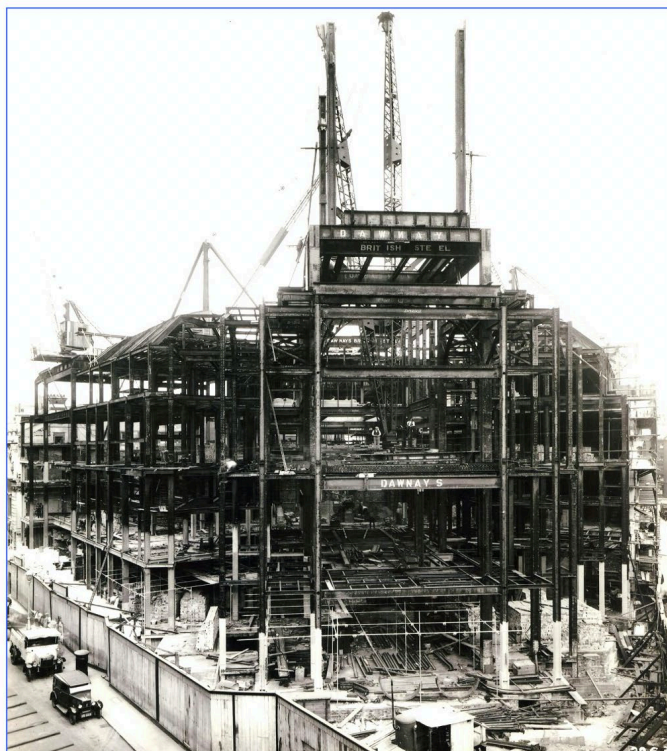


Freemason's Hall – Steel frame + Opening Ceremony June 1927

**5: Historic Building Information Modelling – A Low Cost option**

**Dr Maurice Murphy, College of Engineering and Built Environment, Dublin Institute of Technology**

The presentation focused on describing a low-cost option for historic building information modelling (HBIM), and the process of creating digital 3D models of historic buildings and their environments from remotely sensed data, being developed by the Dublin Institute of Technology. The system employs Trimble, Sketchup, 3D CAD and Autodesk 123d photo-modelling software (which is free at present). In addition, a library of architectural objects (with some present limitations) is used as a database for required details.

As Sketchup does not model historic buildings on its own, it requires photo-survey software to capture the building (which in this case, is AutoDesk 123d catch) and a library of historic elements that are plotted into the photo survey. The whole process that builds the 3-D information model is a low-cost option as opposed to using more expensive laser scanning and full BIMs software (Revit or ArchiCAD).

For details on the Historic Building Information Modelling (HBIM) that has been developed in the Dublin Institute of Technology, see:
https://www.dropbox.com/sh/62fagxyt28klf3c/jZaRcRWkzj

As the objective of the current project is to share knowledge and develop a low cost option for HBIM, see:
https://www.dropbox.com/s/99qlmkem8pz95nh/Low%20cost%20HBIM.mp4

123d Catch:
https://www.dropbox.com/sh/jpq9i52rlqlef2j/5lhK2wgjxA

Sketchup Models:
https://www.dropbox.com/sh/_/hUjLpuXfSD

Historic Text for building library objects:
https://www.dropbox.com/sh/t6t6yqhmqlh3umt/FotFcn_DXT

Tutorials for using Sketchup:
https://www.dropbox.com/sh/83idsqd4o5v1373/gCXTOqxkRc

Sketchup download:
http://www.sketchup.com/download

(Note: The Library of Objects is currently under construction).

## 6: New Techniques: Drone Surveys of Historic Buildings

**Craig Hellen, Director, Bexmedia Bexcopter**

Bexmedia is a Gloucestershire based production company with specialisms in video for web, webcasting and motion graphics animation. The company has full in-house production capabilities and can produce quality material to broadcast level. To get the most out of the content they produce, they embrace every new proven technology to allow for the highest possible production values for their projects.

The presentation summarised the:
- Specifications of the aerial survey vehicles, along with other market options
- The payloads the vehicles can carry: cameras, infrared and other options
- How a typical aerial survey operation takes place
- Demonstration case studies of some technologies that are used
- Situations where the technology might be developed
- Regulatory requirements and current limitations
- What the future might entail



Bexcopter created a short video about St Peters Church in Frocester, Gloucestershire. The following video was made to act as an example of building survey and inspection, to see what an unmanned aerial system could do to help conserve and monitor buildings for an up and coming conference in November 2013. The COTAC conference works closely with English Heritage and National Trust to provide an insight into how modern technology, such as aerial systems, can help monitor and maintain Englands heritage. As you'll notice the video features a basic overview of the church spire and its grounds as well as a close up of the lead work, spire and brick work. Previously using old methods this would have required rigging or scaffolding.

**7: Beyond Scanning: Data for Managing Historic Buildings Sustainably**

**John Edwards, Assistant Director, Cadw**

The presentation considered the potential of what BIM could achieve by 'starting small and thinking big' through adopting a domestic property (the Heritage Cottage) upon which to consider the issues. Emphasis was put on getting an understanding of how traditional buildings performed and how these issues needed to be integrated. The underlying aim was to obtain information that would help sustain traditional buildings in Wales.

Through building up an additional knowledge base from reliable standard information, there was a need to better understand the real thermal and moisture performance of traditional construction, and how this relates to the environment and building occupancy. In turn, this should lead to a greater awareness of the real benefits and costs of any adopted energy efficiency measures on an incremental basis towards finding realistic solutions.

The next stages of the approach will involve Cadw working in partnership with Cardiff Metropolitan University to create a BIM, and part of a learning programme, involving:
- Creating a BIM in Revit – inputting real data.
- Evaluating effectiveness of the new build type BIM.
- Taking forward BIM development in the most appropriate form.
- Learning lessons from Heritage Cottage – before undertaking any larger applications

**8: Developing COTAC's Online Resource**

**Ingval Maxwell, Chair + Henry Russell, Vice Chair, COTAC**

The presentation outlined the background to COTAC's website developments and the framework within which these were conceived. It addressed the range of influences across the conservation, repair and maintenance construction industry sector that COTAC had recently been involved in, and how these had used the ICOMOS Education and Training Guidelines as the basis for an integrated approach.

The refreshed 'Understanding Conservation' educational website in support of all the peer-reviewed professional body Conservation Accreditation Schemes was formally launched with a demonstration of its content, and future intentions for its further development were revealed. See: http://www.understandingconservation.org

## 9: Discussion and Conference Summary

In reviewing the range of options offered by the various presentations, it was revealed that the array of available techniques has an international, national and local relevance. The challenge for practitioners was to determine what is relevant and fit for purpose in satisfying their needs, including consideration of the likely costs involved.

Consequently, categorising the various options and choices would be an appropriate way to address and promote the relevant values and applicability of each available system. The following three categories could provide a core baseline within which to place the various technological approaches to address the needs of:

* Education: leading to the enhancement of knowledge to advise on -
* Training: leading to the development of relevant operative skills to support -
* Operational requirements: leading to site-specific applications.
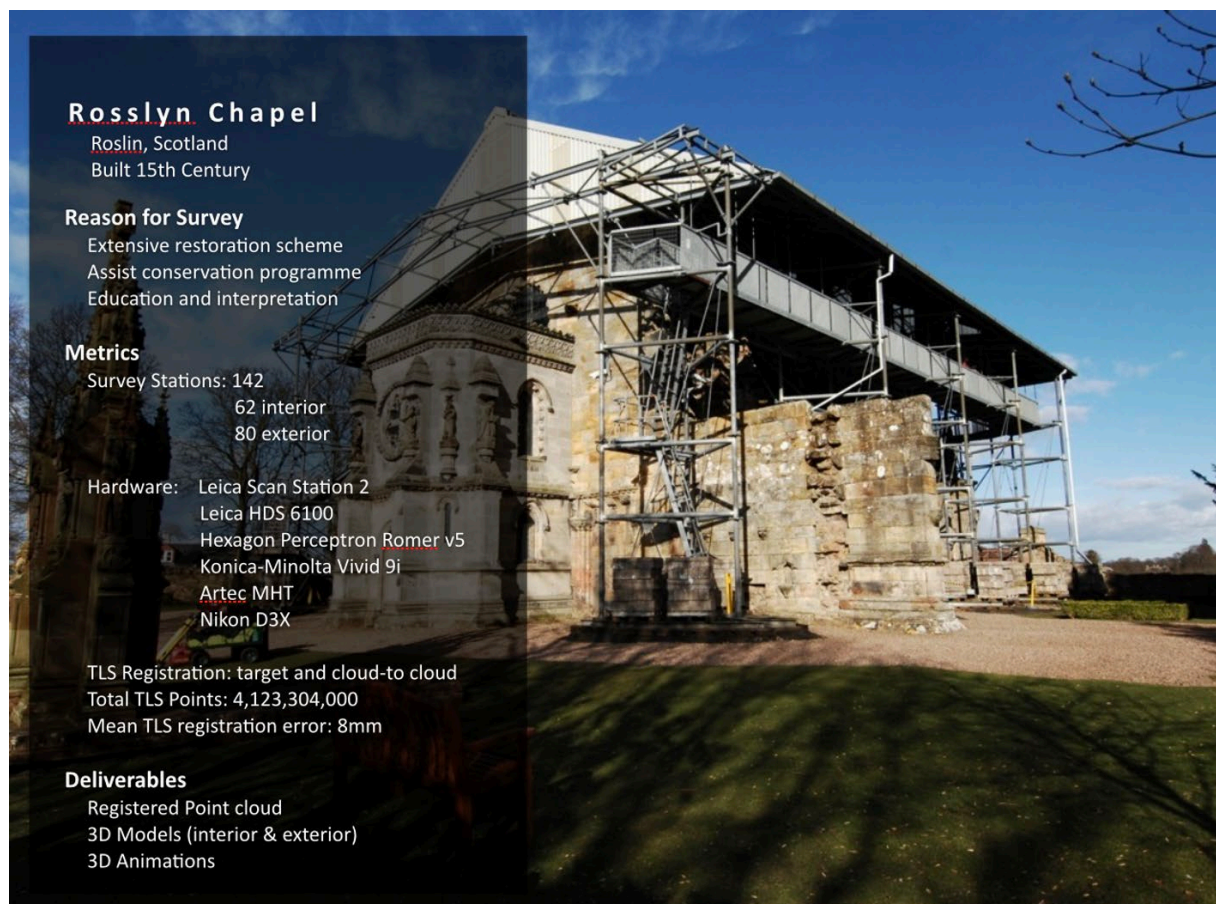
# A Digital Future for Traditional Buildings:
## Practical Applications for Survey and Management
*COTAC conference, London, November 26th, 2013*

*Outline Programme:*

| | |
|---|---|
| 9.00 | **Arrivals and Registration** |
| 9.50 | **Conference Introduction** |
| | Ingval Maxwell OBE,  Chairman,  COTAC |
| 10.00 | **CyArk: Using Data to Inform Conservation** |
| | Ruth Parsons, Executive Director, CyArk Europe |
| 10.30 | **Embracing a Digital Future - the Experience and Adventures of Historic Scotland amongst the Cloud of Points** |
| | Chris McGregor, Deputy Director of Conservation, Historic Scotland |
| 11.00 | **Break** |
| 11.30 | **Case Study: Data and Conservation Management at St. Michael's Mount** |
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| | Roger Carter BSc CEng FCIM,  Director of Operations, Freemason's Hall (2004-2013) |
| 12.30 | **Historic Building Information Modelling  – A Low Cost Option** |
| | Dr. Maurice Murphy,  College of Engineering and Built Environment, Dublin Institute of Technology |
| 13.00 | **Lunch and Networking** |
| 14.00 | **New Techniques: Drone Surveys of Historic Buildings** |
| | Craig Hellen, Director, Bexmedia, Bexcopter |
| 14.30 | **Beyond Scanning: Data for Managing Historic Buildings Sustainably** |
| | John Edwards, Assistant Director, Properties in Care, Cadw |
| 15.00 | **Break** |
| 15.30 | **Developing COTAC's Online Resources** |
| | Henry Russell and Ingval Maxwell |
| 16.00 | **Discussion and Conference Summary** |
| 16.30 | **Close** |

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