



National  
Trust

# Digital Survey, Digital Content, Digital Visits

Keith Challis, National Trust

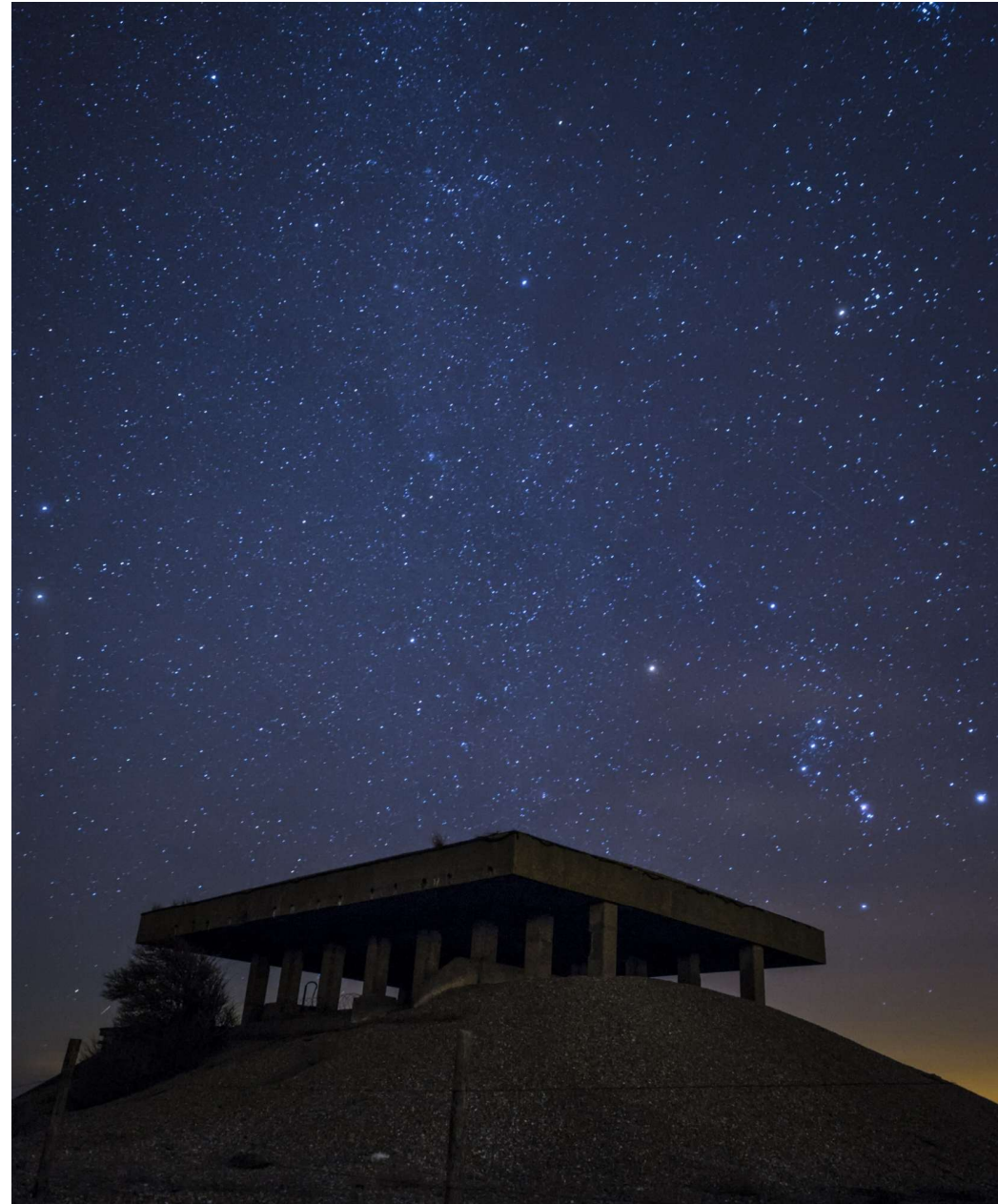
Robots at Orford Ness



# Roadmap

1. Digital Survey – Digital Content – Digital Visits
2. Orford Ness and the Atomic Weapons Research Establishment
3. Survey, technology, results, engagement
4. Some thoughts on digital visits

A starry night sky over Orford Ness National Nature Reserve, Suffolk. ©National Trust Images/Justin Minns



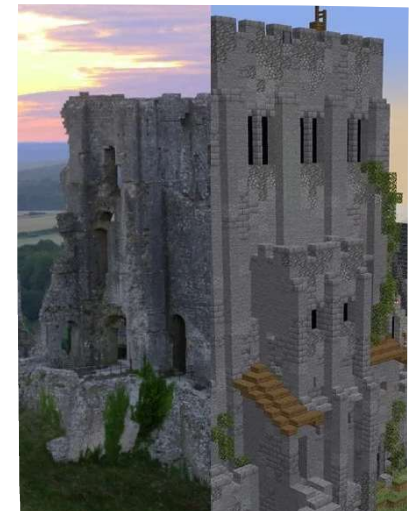


# Digital Survey – Digital Content – Digital Visits

- Born digital content is uniquely placed to generate engaging visitor experiences
- Can it enhance the visitor experience or is it a costly distraction?
- What does good look like - are we too fixated on permanence?
- Recognise the organisational challenges in embracing new technology

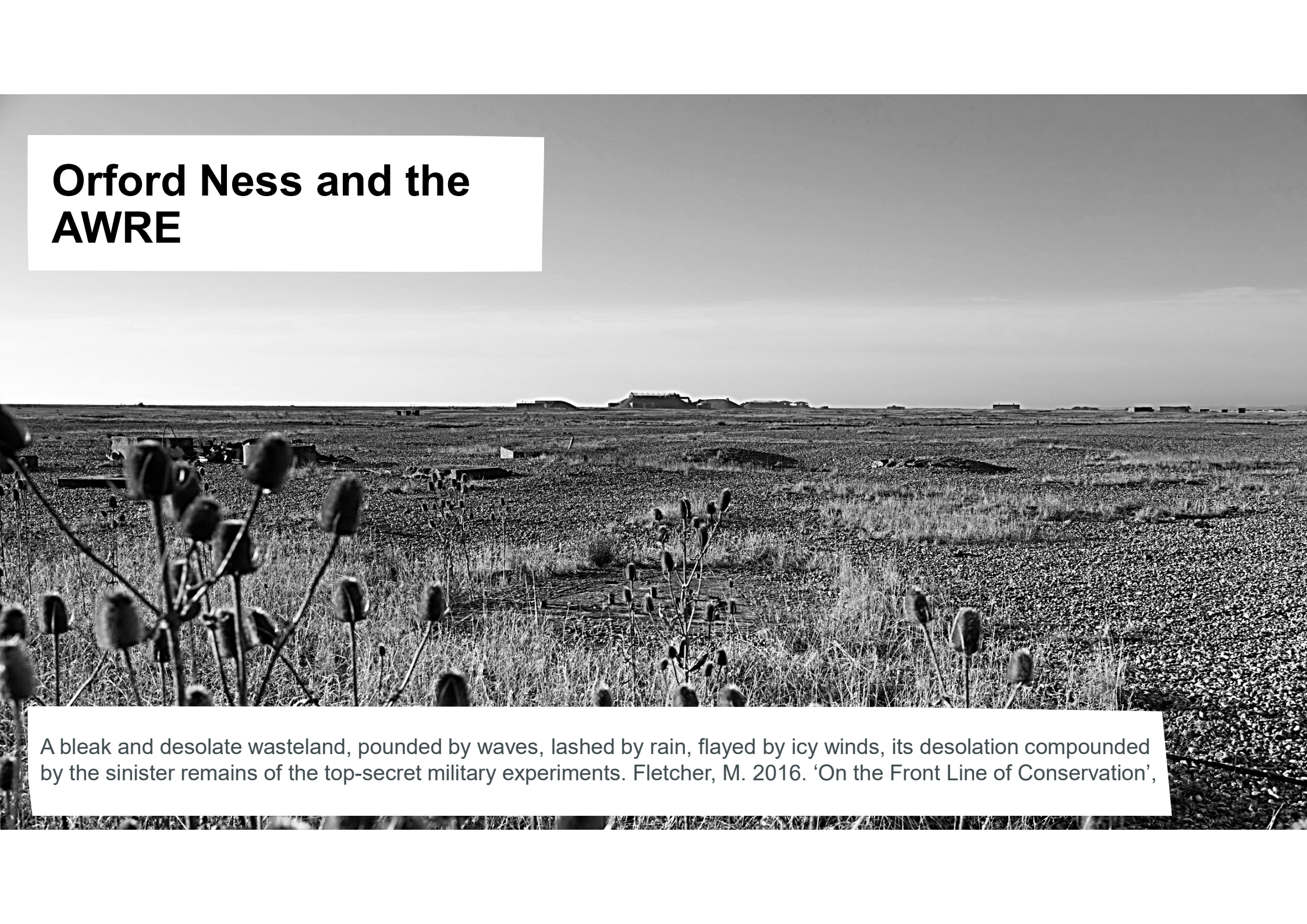


Corfe Castle – a pretty exciting place.





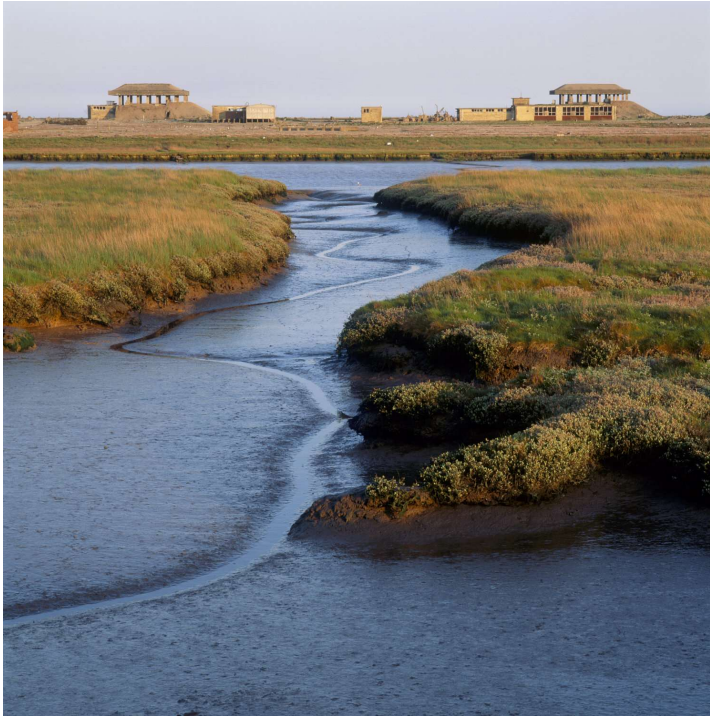
# Orford Ness and the AWRE

A black and white photograph of Orford Ness, a desolate coastal landscape. In the foreground, several tall, thin stalks of poppy plants with large, dark, rounded seed heads are visible. The ground is covered in low-lying vegetation and patches of bare earth. In the middle ground, there are several small, dark, rectangular structures, likely ruins of buildings. The background shows a flat, open landscape extending to a distant horizon under a pale sky.

A bleak and desolate wasteland, pounded by waves, lashed by rain, flayed by icy winds, its desolation compounded by the sinister remains of the top-secret military experiments. Fletcher, M. 2016. 'On the Front Line of Conservation',



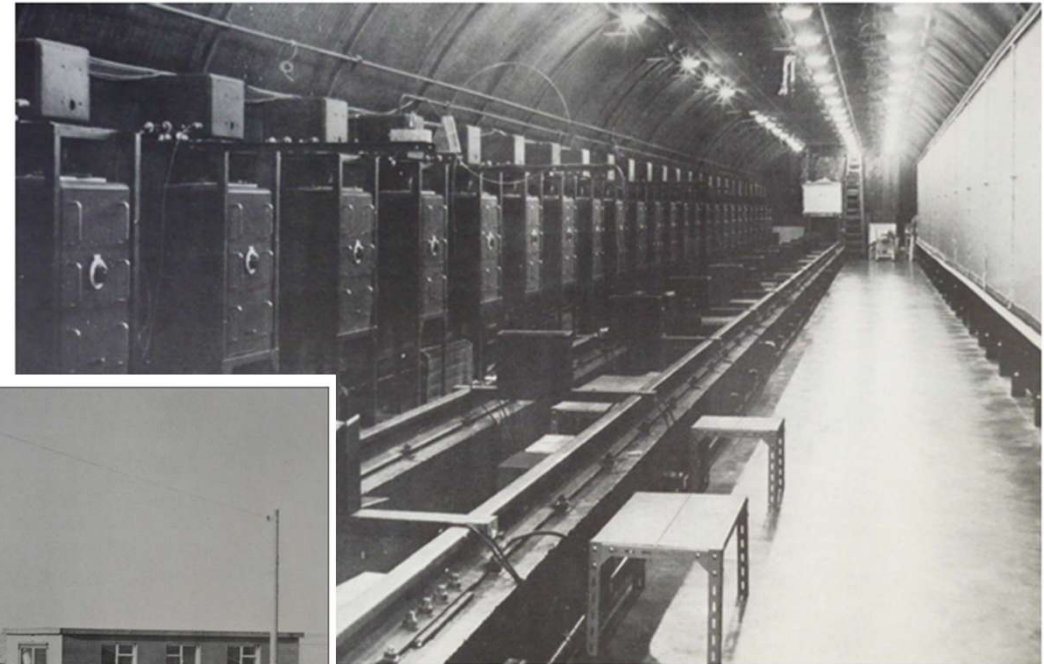
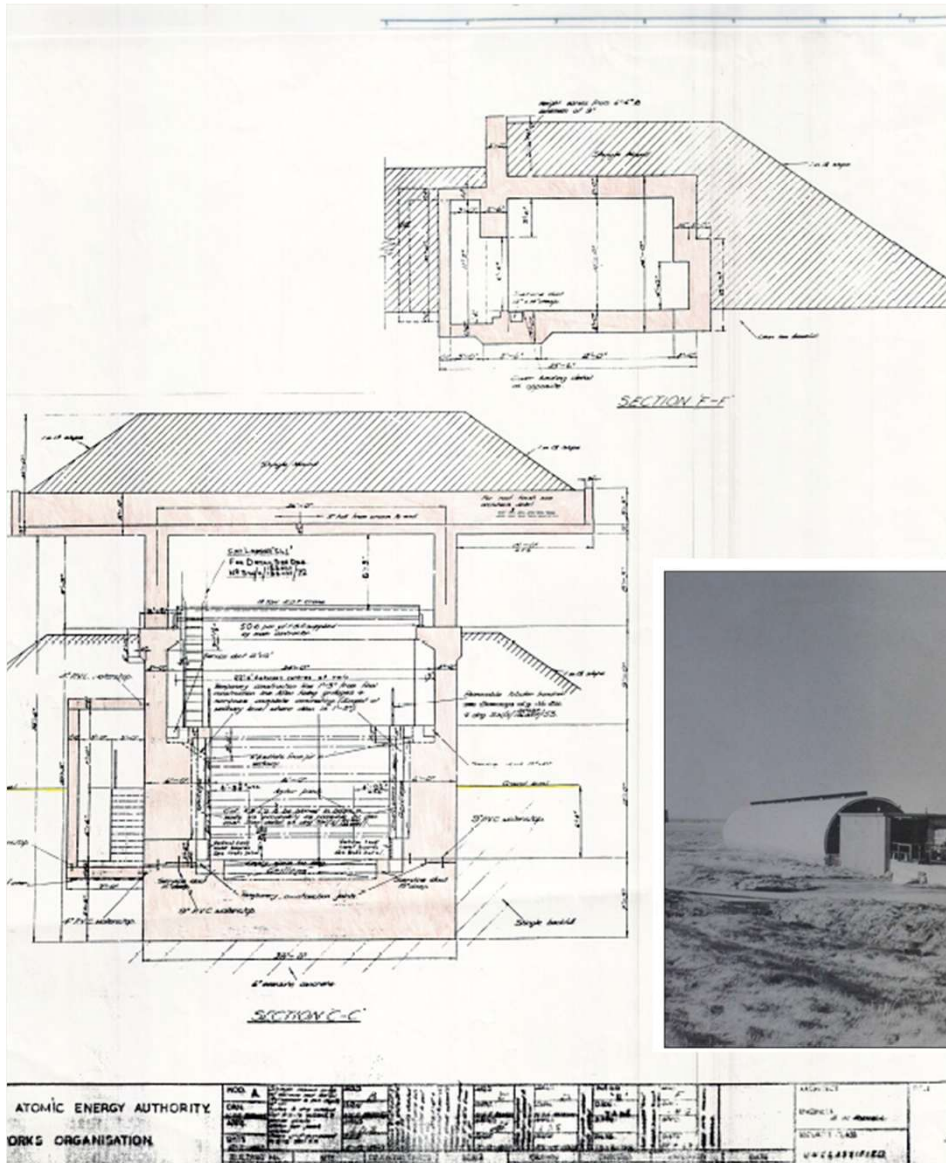
# Orford Ness



"On the way down to the lighthouse at the shore, the shingle shifts and crunches underfoot, ripping through the silence and locking my attention down to the ground. Heavy legs. Mesmerized by the vast expanse of shingle marked by decaying, surreal objects." *War, Ruins and Wildness at Orford Ness*, Sophia Davis



# Historical Context



The RFC came to the Ness in 1915..the RAF left in 1986.



# The AWRE

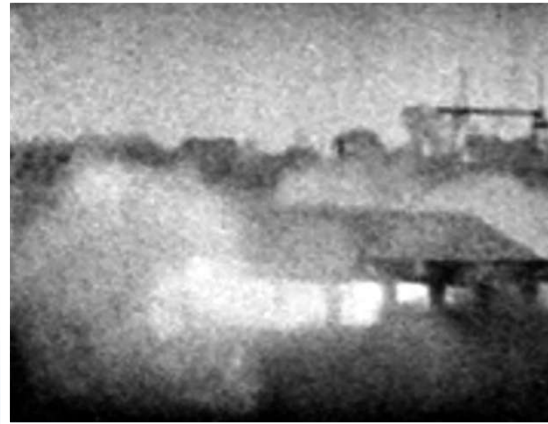


"Down a dark hallway, I drift into a side room along the way, rubble on the floor, switches on the wall. Back in the hallway, paint peeling on the walls, I reach a wire fence, beyond which bright light pours in through the steel skeleton of the roof." *War, Ruins and Wildness at Orford Ness*, Sophia Davis



# The Pagodas

(Vibration Testing Laboratory)





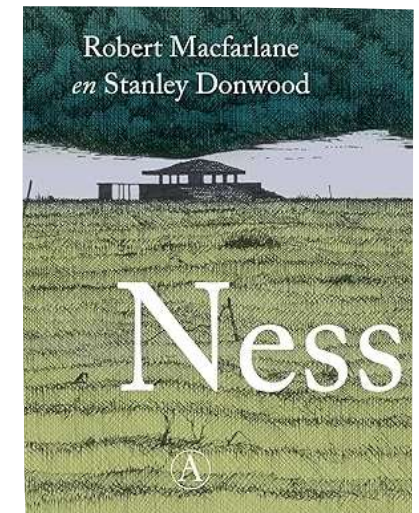
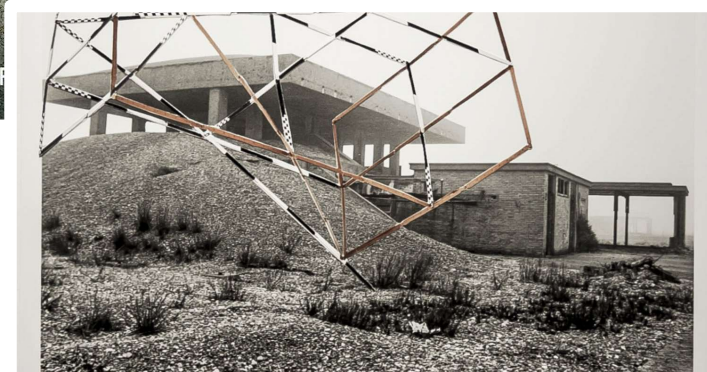
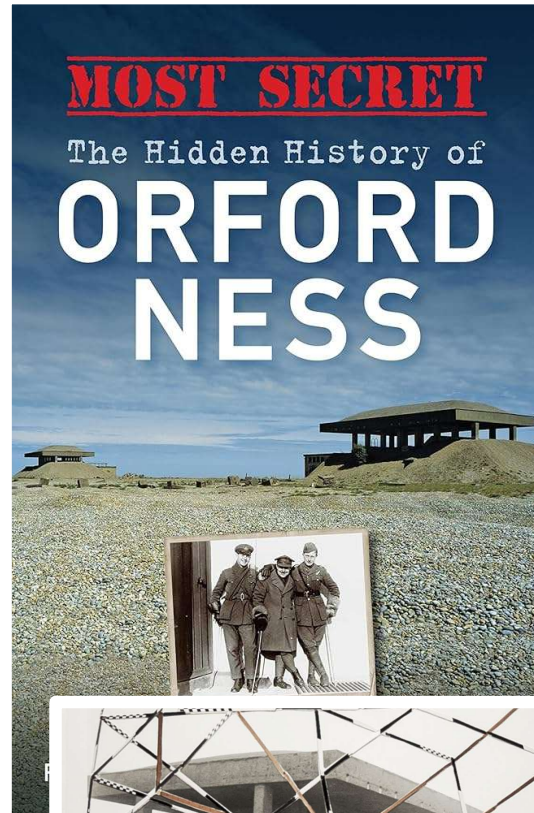
# Social Context



David Gorton: Orfordness

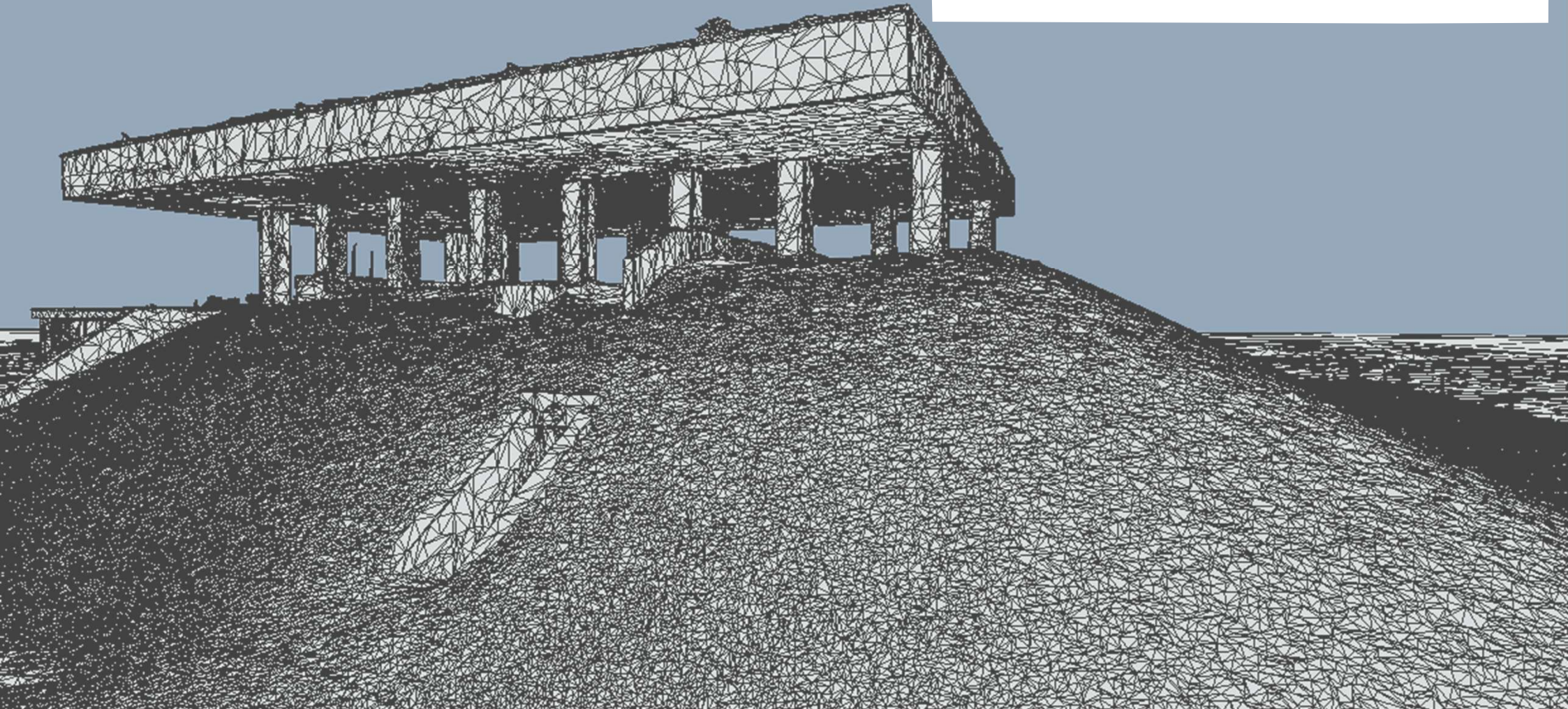


“Ness is the land awakened. Ness is lichen skin and willow-bones, condensing mist and tidal drift. Ness has hagstones for eyes and Ness speaks only in birds. And Ness has come to take this island back.” Robert MacFarlane, *Ness*.





# Survey, Technology, Results, Engagement





# Objectives

Managed decline means the Scheduled AWRE buildings will, eventually decay and be lost

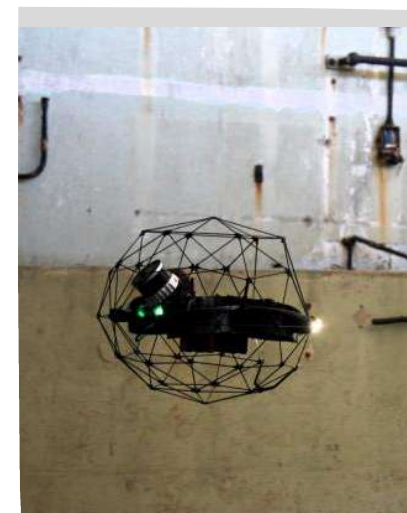
- Document the AWRE buildings before they degrade
- Test autonomous survey technology – unsafe to enter
- Use born digital content to improve our visitors' experience of Orford



# Technology

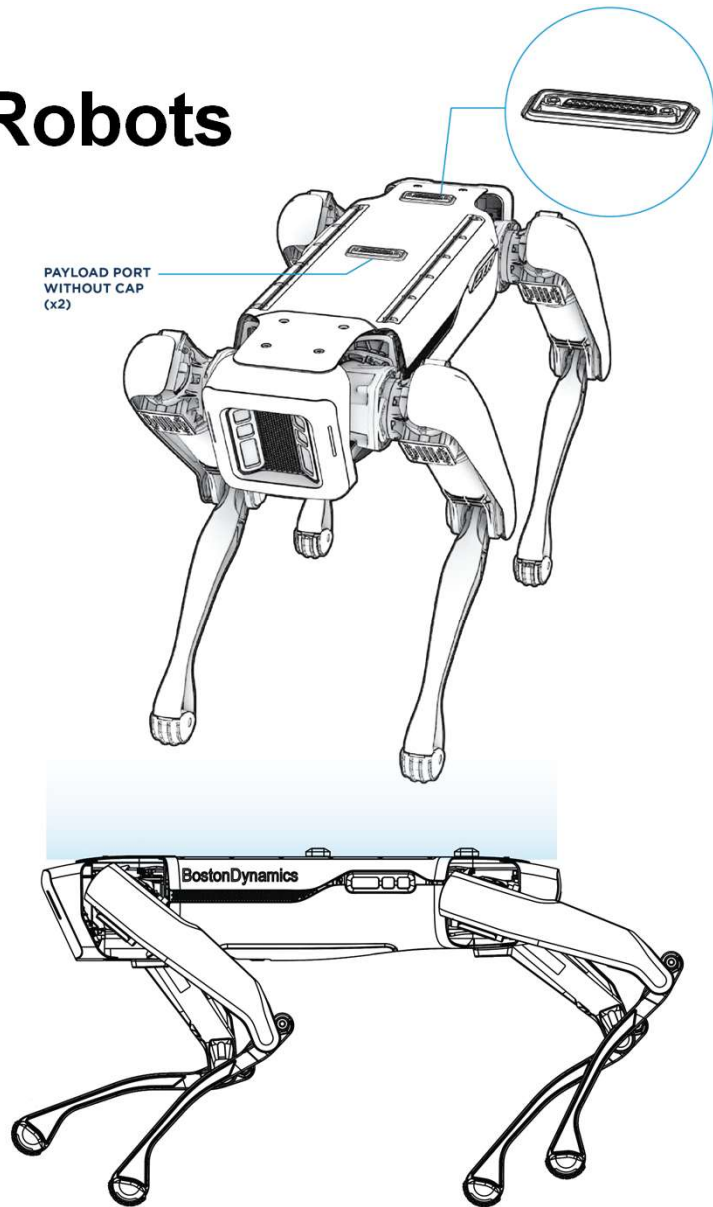
Since the buildings are not safe to enter autonomous survey techniques are required

- Two Boston Dynamics SPOT Agile Mobile Robots with laser scanners and cameras
- Elios 3 caged quadcopter with SLAM lidar and camera
- DJI Matrice UAV with high resolution camera





# Robots



## Results

- Approximately 700 million points
- RMSE c.1.25mm
- 6500 photographs
- GSD of 5mm (degraded to 10mm for modelling)
- 1.5TB of data



Point cloud derived from initial data analysis





Conventional orthorectified elevation images  
derived from the final 3D model



# Engagement



Orford visitor facilities







**SketchFab**



**Unreal Engine**



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# Orford Ness: Robotic 'dog' surveys ex Cold War site in National Trust first

8 September 2023

Cold War



ALEX DUNLOP/BBC

Robot operator Aimee Cooper, from BAM Nuttall, said it can go up and down stairs and over most terrains, but it does struggle on shingle

By Katy Prickett and Alex Dunlop

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## Orford Ness bunkers' secrets found by Suffolk Robodogs

## CONSTRUCTION MANAGEMENT

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NEWS JOBS



Digital Construction

## Spot goes atomic for BAM in Suffolk Cold War survey

Robotic 'dogs' carry out pioneering surveys at Orford Ness

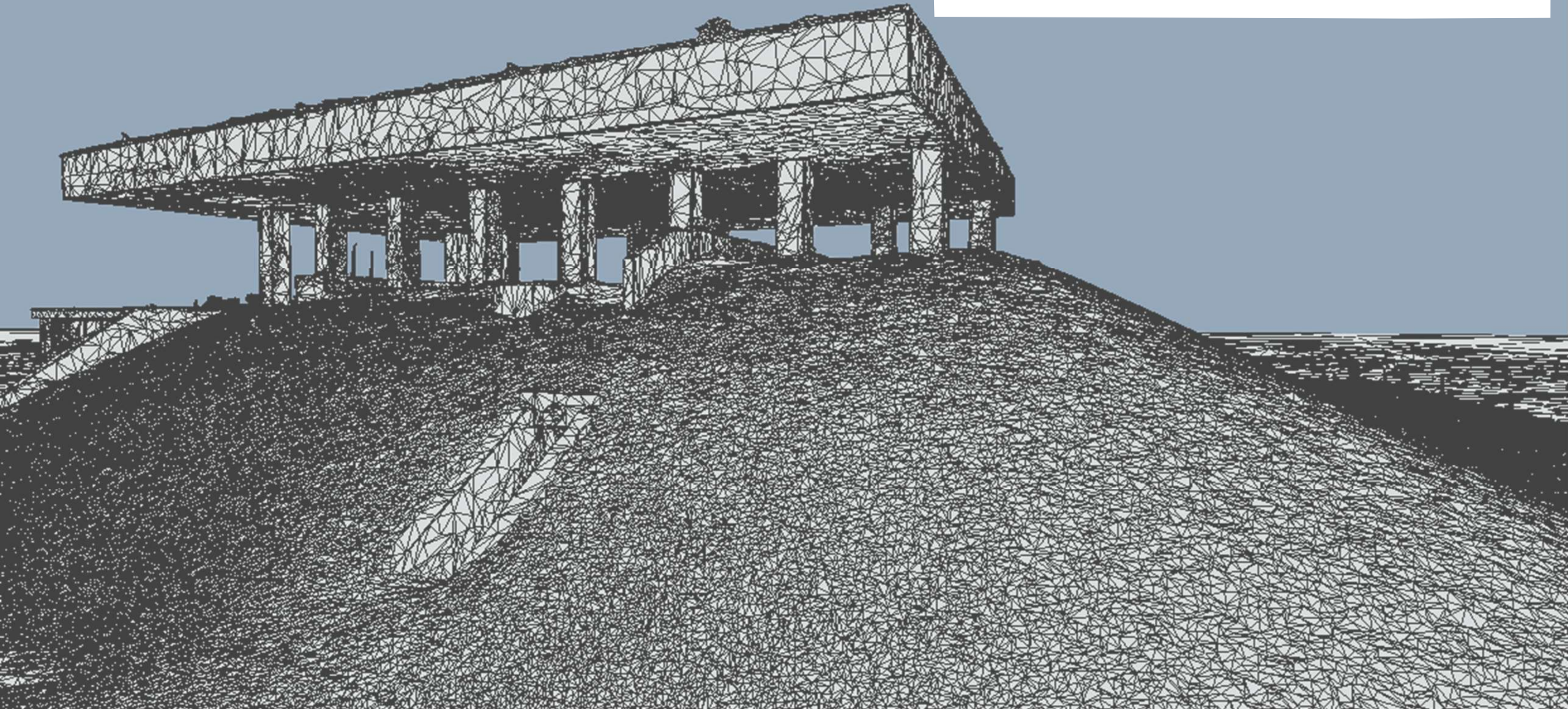


Lego – a legitimate business expense

# Response

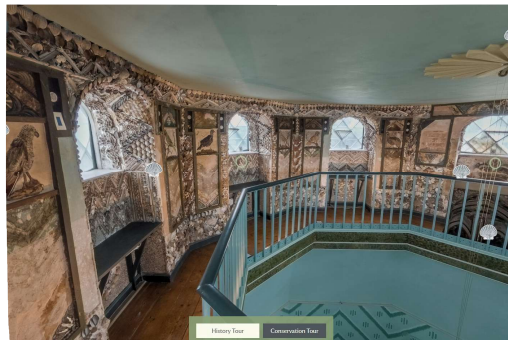


# Some Thoughts on Digital Visits





# Digital Visits



## Likes and dislikes of virtual access technology – on property

### Popular and widely understood

Video	3D models	Audio guides	Interactive screens	QR codes
<ul style="list-style-type: none"> <li>✓ Accessible, and easy to use</li> <li>✓ Large-screen theatre style of most interest</li> </ul>	<ul style="list-style-type: none"> <li>✓ Great to allow collection items to be enjoyed from all aspects</li> </ul>	<ul style="list-style-type: none"> <li>✓ Informative and personal</li> <li>! Can lead to bottlenecks around key points</li> </ul>	<ul style="list-style-type: none"> <li>✓ Useful and positioned in relevant locations</li> <li>! If too detailed may be monopolised by someone for a long time</li> </ul>	<ul style="list-style-type: none"> <li>✓ Useful to direct to further information</li> <li>! Need an understanding of how to use and an internet connection</li> </ul>

### Object recognition tech

- ✓ Opportunity to learn more
- ! Not understood by everyone and requires an internet connection

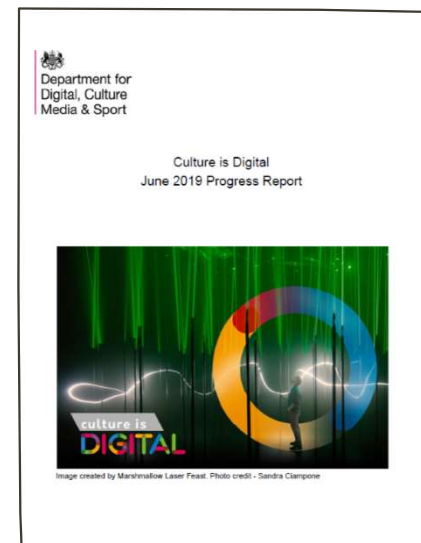
### AR or VR

- ✓ Can aid visualisation and immersion
- ! Technology not seen to be advanced enough, and not everyone would understand

### Speaking signs

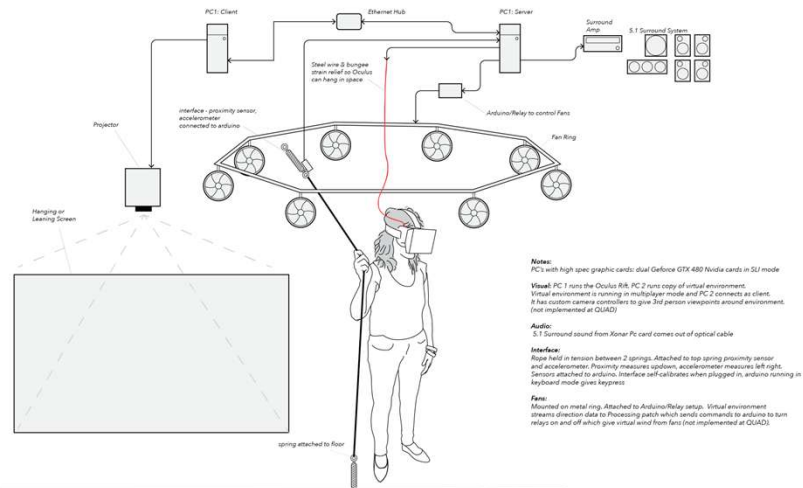
- ! Disruptive and seen to only provide surface-level information

### Less popular or widely understood

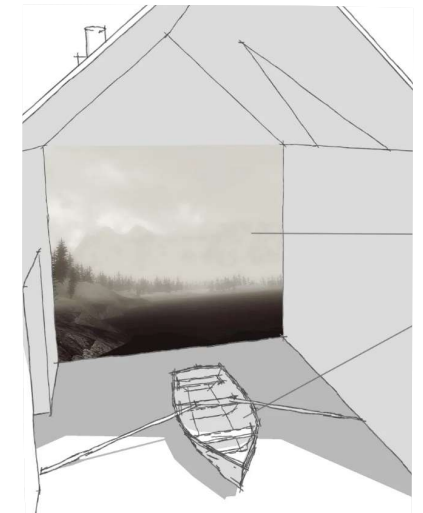




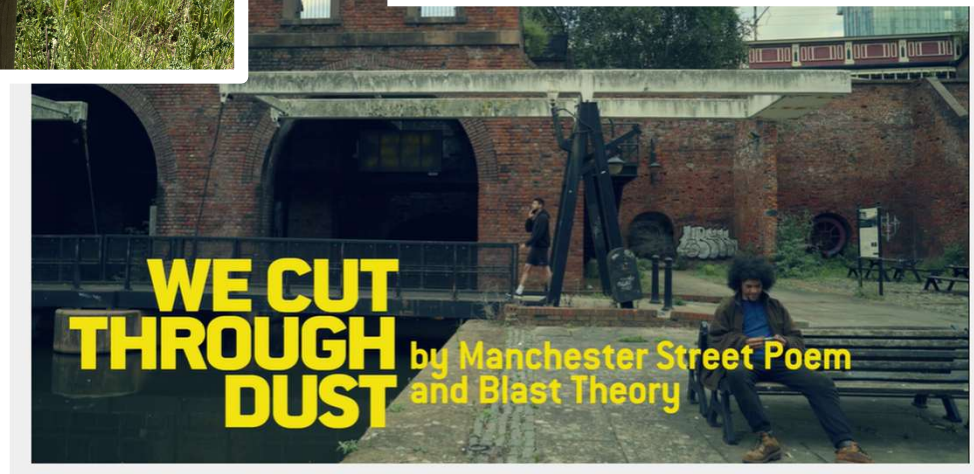
# Digital Experiences



Vermillion Lake and White Island  
 Artists Gibson/Martelli. [gibsonmartelli.com](http://gibsonmartelli.com)



# Event and Performance



Dunham Massey, Stamford Military Hospital, Sutton Hoo, Virtual Archaeologist  
Blast Theory "Uncle Roy all Around You" and "We Cut Through Dust" [blasttheory.co.uk](http://blasttheory.co.uk)





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'The first rule of Orford Ness is never believe anything you're told about it'  
(Macfarlane 2012)

If you'd like this information in an  
alternative format, please contact  
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