Historic England

Review of 2017-18 Virtual Dive Trails Scheme (7374)

Accessibility: summary of key best practice features

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Dive Trail Accessibility:

summary of key best practice features

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1 Background

1.1 Historic England has commissioned a number of virtual dive trails in 2016-18, to add to the existing physical dive trails.[1] As this is a new field with evolving technology, briefs for these were left open to give developers a free hand.

1.2 There is a clear evolution from 2013's physical trails, with standard web presentation and functionality; the subsequent generation of dive trails hosting early 3D content;[2] to the present generation of stand-alone 3D sites with increasing content capacity, which form the subject of the present paper.

1.3 However, the potential for accessibility in a wider sense (for viewers with sensory and mobility impairments) is also being realised through these trails. The recent DCMS *Culture is Digital* report, identifies a current participation gap for disabled people, who yet derive the greatest benefit from digital access.[3]

1.4 As Marine Information Officer and Chair of HE's Disability Network, Serena Cant has been uniquely placed to review the virtual dive trails for accessibility as part of HE's pre-release feedback for each trail. This paper establishes a sound basis for consistency in review against different platforms and in future audits.

1.5 The 2016 commissions employed three different platforms, all offering competing advantages and disadvantages in accessibility terms: **cloudtour.tv (*U-8, London*), 3deepmedia (*Holland 5*)** and **Wordpress (Isles of Scilly)**.

1.6 User-friendliness and **accessibility** are not the same thing, but targeted at the general user and specific access needs respectively. To some degree, the two are converging. The point has been well made that the coffee/mobile juggle effectively makes us all one-handed![4]

1.7 This paper distils recent feedback from Serena Cant and the very positive developer responses to these, to inform briefs and provide guidance for HE and developers against a consistent accessibility template across any platform, and is intended to be integrated into other recommendations from HE, as set out in a separate overarching review of the Dive Trail Scheme by Alison James.[5] Both reviews aim to achieve consistency across the brand, and maximise the potential of the trails in line with HE's current Change Programme, which prioritises public engagement.

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[1] **https://historicengland.org.uk/get-involved/visit/protected-wreck-dive-trails/**

[2] **Traditional websites:** ***Iona II*** dive trail; ***Colossus*** dive trail; new media 3D content; ***HMSM A1*** dive trail (using 3deepmedia); ***Coronation*** dive trail; ***HMT Arfon*** trail (cloudtour.tv)

[3] Department for Culture, Media and Sport (DCMS). 2018. ***Culture is Digital***

[4] Robin Christopherson MBE, Head of Digital Inclusion, AbilityNet, ***Celebrating Ability*** event, DCMS, 11.12.2017

[5] James, A. 2018 *Review of the Virtual Dive Trails Scheme (7374): A big splash or a damp squib?* internal report for Historic England

2 Recommendations

2.1 Recommendation 1: Accessibility is always easier to incorporate at planning stage, rather than retrofitted. It should become a key consideration in planning HE's digital offering, maximising enjoyment for all and engaging new audiences. This is in line with the identified emphasis on public engagement as part of HE's Change Programme, and the specific participation gap for disabled people, identified in DCMS' Culture is Digital report.

2.2 Recommendation 2: Although this report demonstrates which all have their own advantages and disadvantages, this paper is intended to be used **as a tool to help inform the choice of platform for both HE and developers,** securing maximum return for HE's return on capital investment and helping to future-proof the trails against maintenance and update.

2.3 Recommendation 3: A unified access point for the trails, as in Alison James's **recommendation 5** in her parallel review, would not only make the dive trails more accessible generally, it makes it much easier for people with disabilities to find the trails (fewer clicks: sight, mobility, cognition; eliminating language obstacles: age, cognition, hearing).

2.4 Recommendation 4: Disability-specific recommendations are covered at section **9** to form the basis of an accessibility checklist for all trails.

2.5 Recommendation 5: 'Nothing about us without us', the mantra of Disability rights movements worldwide. HE's Disability Network to be asked to provide wider comment and feedback, as trails are released, which also feeds into HE's Change Programme in providing opportunities for cross-departmental working.

2.6 Recommendation 6: Involve HE's Disability Network in social media publicity for future trails. This ties in with Alison James's **recommendation 6**. Disabled people are huge consumers of social media, offering huge potential for HE to harness in public engagement.

3 Why do it? Overview of the legislative and cultural frameworks

3.1 The legal framework is provided by the **Equality Act 2010**.[6] Section 6 defines disability as a protected characteristic of the Act, Section 20 the requirement to make adjustments under the Act; and Section 149 sets out the public sector equality duty. The NHS England *Accessible Information Standard* is an example of a policy formulated in response to this duty.

3.2 Historic England is the lead body championing the historic environment and access to the historic environment, including the 2015 publications *Easy Access to Historic Buildings* and *Easy Access to Historic Landscapes*. Given the speed of technological developments, these guides have been identified by the present author as already in need of revision.

3.3 Historic England is committed to the **accessibility of its website**, and, by extension, materials hosted on its website. This is recognised by HE as a work in progress[7] but recent gains have included subtitles on its YouTube channel and campaign videos for *Out There* and *I am London* and transcripts of the 2017-18 ***100 Places*** campaign podcasts.

3.4 Maximising the audience. Statistics suggest that 1 in 6 of the population has a disability, impairment, or long-term health condition, while there are age-related disabilities from an ageing demographic.[8]

3.5 Informed by the protections afforded by the public sector equality duty and by their generally positive experiences and expectations of established modern media (apps, internet, social media), disabled people come to both new and established media with high expectations which are not always met. Campaigns to force companies and providers to become more accessible can be mobilised very quickly via the very same means: for example, Twitter's recently enabled descriptive captioning feature (2016) for visually-impaired users led to a campaign in early 2018 to ask corporate users to make more use of this feature, including Tweet schedulers enabling this feature.[9] This type of campaign will happen more and more often, placing the onus on public bodies and information providers to get it right, and **get it right first time**.

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[6] ***Equality Act 2010***
[7] Historic England. 2015 ***Accessibility Statement***
[8] Department for Work and Pensions, 2014. ***Official Statistics: Disability Facts and Figures*** suggests 11m of the population has a disability; Action on Hearing Loss (nd) ***Facts and Figures*** quotes the same figure for the spectrum of hearing loss alone; RNIB, 2015 ***Key Information and Statistics*** states that 2m people in the UK are living with sight loss. According to Sense (nd), ***What is Deafblindness?*** over 390,000 people in the UK are deafblind. The National Autistic Society (nd), ***Autism Facts and History***, quotes a figure of 700,000 for autism, or just over 1 in 100 of the population; Government Office for Science. 2016 ***Future of an Ageing Population***
[9] Sulleyman, A. 2018 "Little-known Twitter feature can help blind and visually-impaired people use the site", ***Independent online***, 5 January 2018.

4 Access benefits offered by the dive trails

4.1 The dive trails offer an unparalleled opportunity to visit areas of the historic environment that are difficult to access by virtue of both their location (offshore) and the requirement of specialist skills to access the site (learning to dive). They provide access for all (all ages, a point also made by Alison James at **3.5** of her report),[10] and improve access on socio-economic grounds (costs of travel, costs of learning to dive).

4.2 Access can also be understood in terms of **accessibility for visitors with both disabilities and long-term health conditions**. Placing the trails online is an immediate access gain for disabled visitors and treats them equally with all other visitors. This can be viewed in similar terms to the provision of entrance ramps to buildings: this does not just deliver benefits for wheelchair users, but for parents with buggies, people temporarily on crutches, and blind users, for whom the trip hazard and need to count stairs is obviated, those suffering from fatigue and cardiac conditions, and so on. In other words, an access gain benefits users far beyond the target group.

4.3 For site visitors with **mobility issues** dive trails immediately offer access to a new environment in a new way. New technologies such as VR, AR, drones, robotics, etc. currently offer new and evolving opportunities for access in all areas of the historic environment.[11]

4.4 In some cases, swimming and diving may be an **enabling activity** and more accessible than land-based activities, so physical and virtual dive trails may function less as a substitute activity and more as an enhanced familiarisation and preparation tool for an appropriate dive experience.[12]

4.5 Sensory disabilities (sight, hearing) also make diving difficult but not necessarily impossible. Challenges include taking off external aids and consequent communication issues, exacerbated by the low visibility characteristic of UK waters.[13]

4.6 The dive trails also offer enhanced familiarisation potential for those of these groups who do dive, and a safe alternative for those who cannot.

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[10] James, A. 2018 *Review of the Virtual Dive Trails Scheme (7374): A big splash or a damp squib?* internal report for Historic England

[11] ***Brave, Poor (and Invisible)*** Symposium, M Shed, Bristol, 20.10.2017; **Celebrating Ability,** DCMS, 11.12.2017

[12] **The Scuba Trust**

[13] For deaf divers, taking off aids is an issue. Cochlear implant manufacturers offer external equipment with a water resistance rating of IP 68, sufficient for snorkelling and swimming, or submersion up to 10m, but inadequate for prolonged submersion. See, for example: **http://www.cochlear.com/wps/wcm/connect/us/recipients/nucleus-5/nucleus-5-accessories/aqua-plus** For an approach to diving with vision impairment, see: Leibs, A. 2011 **"Feel-Good Diving"**, ***Diver***

5 Overview of access barriers informing this paper

5.1 The potential of IT, social media, and new technology is all around us, and will only continue to grow. Mainstream developments unlocking accessibility for all – for example, apps (such as taxi apps, which mean deaf people without speech can book taxis), drones (which allow wheelchair users to visit sites remotely), smart remote controls in the home (enabling people with a variety of disabilities to perform domestic tasks), smart watches (which allow deafblind people to navigate the world independently), and wearable technology which can monitor health conditions and save lives.

5.2 Despite this, a key barrier in new media is the lack of an **overarching inclusive or accessible approach** in an evolving field, which tends to be driven by other aspects of technological potential, though this in itself can push accessibility boundaries.[14] Accessibility statements for any medium and its content and offer are good practice, but are not always present in new media, whereas more established technologies tend to have incorporated technical support for accessible features. In other words, new media currently lags behind, but will catch up, as more established online media has already done.

5.3 There is no 'one size fits all' inclusive approach. Disabled people are individually as unique and diverse as any member of the wider population. Needs, experiences, and coping strategies are unique to the individual. As an example, a broadly similar disability may have different impacts when acquired or experienced from birth. However, common adjustments that reach a wide number of people across permutations of disability may easily be made.

5.4 A key barrier is **social**: the perception by non-disabled people that making adjustments is too difficult, too expensive, or too specialist for the average person to deal with. None of this is true – small changes can reap big dividends, and many accessibility features can be 'switched on' in many applications, software, or technology without cost, effort, or time.

5.5 Allied to this is the **relative lack of literature and consensus on good practice**, which is emerging piecemeal. This review therefore aims to pick out key features corresponding to guidelines in so far as they currently exist, and to

[14] ***Wordpress*** is an example of good practice, with an accessibility **handbook**, features, and community. For an example of an inclusive approach to the commercial offer, see, for example, **Premier Inn's *Access Statement***. It should be noted that Historypin, 3deepmedia, and cloudtour.tv, in common with much new media, have no access statements, otherwise fairly standard across the web.

make suggestions in the future, to ensure HE is in a good position to proceed in terms of best practice as the virtual reality field evolves further.[15]

5.6 Blind and visually-impaired visitors may find the following difficult: low contrast of images and text; small text; fine or elaborate typefaces; low magnification; lack of image description; lack of voiceover in video.

5.7 Deaf and hard of hearing trail visitors may experience difficulty with: background noise or music if listening to voiceover; lack of subtitles, transcript, or BSL; language – individual terminology, clarity of language (many terms may be unfamiliar due to educational barriers).

5.8 Cognitively visitors with neurodiverse traits (autism, Asperger's) or living with long-term health conditions with a cognitive impact as a symptom (fibromyalgia and ME) or degenerative conditions (Alzheimer's) may struggle with: processing information, particularly if presented in only one format (e.g. video but no voiceover). Conversely sensory overload may be an issue (distracting background noise, or abrupt transitions between images).

5.9 Visitors with **low manual dexterity** (lack of fine motor skills) may find it hard to navigate small features (icons, pins), easily.

[15] Disability Visibility Project. 2017 ***Virtual Reality and Accessiblity: Interview with Hannah Gillis*****:** University of Melbourne, nd. ***Accessibility of Virtual Reality Environments***

6 General issues particular to the dive trail environment

6.1 VR offers particular challenges in terms of the realism of the dive environment. The very things that recreate the site in the VR environment are also those making real-life diving challenging for people with sensory needs, particularly in terms of vision needs.

6.2 By the very nature of the site environment **low visibility** is inherent to the wreck sites, so video may offer low contrast – naturally, very little can be done about this other than the current practice of shooting in optimal conditions.

6.3 Similarly, there is often **low contrast** between static imagery of the site and its surrounding environment – dark timbers against silt, metal hulls against green algae or rocky environments, and so on. At present there is little that appears to be customisable about this, but this may change in the future.

6.4 Other static imagery – such as plans and recreations of the vessel as built, can, however, be improved (see Section **7** for specific recommendations).

6.5 Undersea background noise (breathing, tidal noises, wind noise) similarly recreate atmosphere, but can make it difficult to make out voiceover, which impacts on both visually-impaired and hard of hearing visitors in different ways.

6.6 The **specialist icons and layout** may be less familiar or intuitive to users than those commonly encountered on the web, so may offer particular challenges for those with vision impairments or who are elderly/less familiar with the internet, and who have dexterity issues.

7 Advantages and disadvantages of each platform

7.1 Cloudtour.tv (ArtasMedia/CyanSub)

Advantages: clear tutorials on landing page; excellent zoom facility on both main page and information sidebar with full-screen flyouts for both video and stills; subtitles can be run on the main screen while video plays on sidebar, or overlaid on full-screen flyout; placement of subtitles can be changed between views, so as not to obscure features if overlaid on full-screen detail flyouts;[16] high colour resolution (enabling contrasting and easily visible location pins); settings icon for user-enabled accessibility customisation (e.g. mute audio, increase font size); functionality will play with minimal mouse/fingertip scroll effort; icons appear to have auto-generated tooltips which aids screenreader navigation, and is more user-friendly for all, including an older demographic which may be less 'tech-savvy'; ability to present detailed textual information in the sidebar alongside images

Disadvantages: no accessibility statement on the platform; sidebar menu requires scrolling down to see full menu tabs (less cognitively intuitive, more manual effort required); sidebar reading view seems to be presented as white on black, which presents a good visual contrast with the homepage site view of the wreck (a positive) but is less easy to read (black on white is preferred by most – but not all – viewers); magnification setting for text, even where customisation on, does not extend beyond 2x; developers require prompting to maximise the potential or fully enable the features on the settings icon.

7.2 3deepmedia

Advantages: simpler format; opportunity to change view and see the wreck in different ways; information presented in a less complex way under the 'Information' icon with a single sidebar view of text and no menu requiring scrolling down; sidebar text magnification enabled several font sizes (although line spacing compromised after 8x magnification); ability to zoom in great detail and clarity in static views (e.g. plans) though developers require prompting to enable this feature; simplicity appears to enable easier application/retrofit of desired accessibility changes (e.g. +/- zoom buttons); larger icons
Disadvantages: no accessibility statement on the platform; no user-enabled customisation setting feature; icons less familiar/intuitive and do not come with

[16] Not always consistently applied. For example, playing **Wreck Information** as a full-screen flyout in the ***London*** wreck tour, the subtitles are superimposed on the image of the ship so it is impossible to view the detail.

tooltips as standard, developers require prompting to label these; text is grey on black, so not optimal for contrast.[17]

7.3 Wordpress/Sketchfab

Advantages: Wordpress: accessibility statement; access functionality readily supported on platform, e.g. alt.text for screenreaders; readily customisable by the developer, including text size, font, and contrast; more traditional website presentation, thus more familiar with greater ease of navigation; ability to present menus both as a sidebar and as top tabs, making it easier to navigate; internal links and photographic material can be incorporated, further facilitating navigation; text can be presented as black on white, which is more helpful to more visually-impaired readers; text can be presented outside the 3D models; ability to present clear textual instructions which can be referred to alongside the 3D models, including their accessibility features, so do not require separate tutorials; ability to host multiple trails; ability to incorporate 3D and other interactive material separately, rather than place text within a 3D environment; **Sketchfab:** accessibility features such as the ability to stop and examine artefacts, and zoomable

Disadvantages: Wordpress: a more complex and less integrated option, but outweighed by accessibility support within the platform; **Sketchfab:** loses resolution and contrast at high magnification, so is less readily interpretable for visually-impaired viewers.

7.4 Summary

No option offers complete accessibility functionality; each option has its advantages and disadvantages. **Wordpress,** which has been around for a number of years now, and therefore has a plethora of access features and supports, demonstrates that new media has not yet caught up with or taken account of the functionalities available in more established media platforms.

At present **Cloudtour.tv** appears to offer the most accessibility functionality over **3deepmedia**, although in places it is limited (e.g. limited magnification), including zoom and contrast; **3deepmedia** is simpler with larger icons and greater text magnification options; **Wordpress** has greater existing support and can host 3D material within the site, so may be the preferred option for importing media such as video and text with greater accessibility functionality.

[17] Grey on black text was also present in the trail for HMS/m ***A1***, which was also created on 3deepmedia.

8 Conclusions: factors to be considered in platform choice

8.1 Despite the existing enabling capacity and future potential of IT and new media in increasing access for disabled people, accessibility functionality still lags behind as not routinely, or only partially considered, in new media development. For example, none of the 3D technologies available currently appear to offer a viewer customisation option – although in and of itself such media offers current and future accessibility potential. As it evolves, more accessibility tools and standards will become available within the 3D community, analogous to previous web developments.

8.2 That said, it is possible to make some recommendations for good practice and to inform briefs within existing capabilities in line with existing published guidance.

8.3 Overall, **cloudtour.tv** appears to offer greater current functionality and future potential than **3deepmedia** (although the latter offers certain advantages that should not be ignored, particularly in magnification and zoom capacity. **Wordpress** contains the greatest current level of support for accessibility features, not least the ability to navigate around in more than one way (greater cognitive functionality), and the ability to host 3D media.

8.4 It is recommended that the trails are hosted on a separate **dedicated launch page within the HE website**, in line with Alison James's **recommendation 5**, and which will also enable the tours to benefit from existing functionality and support capacity on the HE web platform, e.g. **alt.text** captioning.[18]

8.5 In turn this would make the dive trails both more easily discoverable and drive them higher up search engine rankings (SEO), an added benefit.[19]

8.6 A further advantage would be a greater consistency in presentation and branding across the suite of sites, particularly over time.

8.7 It should be noted that any other media imported into any site, e.g. Sketchfab, will require separate assessment.

8.8 All recommendations are easily incorporated into future development briefs, which this paper is intended to inform.

[18] James 2018
[19] As a comparator, adding transcripts to HE's podcasts for the ***100 Places*** campaign is a good example of SEO as well as good practice, generating two entries for each podcast; see the ***Science and Discovery*** example.

9 Disability-specific recommendations: sight and hearing loss

9.1 It is helpful to stress that accessibility is not about adding layers of complexity, but about enhancing the experience to everybody's benefit, in an evolving field which has not been extensively studied. For example, adding tooltips to unfamiliar icons improves user-friendliness for the public, as well as making the site more accessible to people with vision impairments (screenreader-friendly) and understandable for other demographics (e.g. an ageing population).

9.2 For site visitors with visual impairments:

9.2.1 Alt.txt Where possible, enable **alt.text** captioning functionality for images and consider how the alt.text can complement standard captions. Consider placement of images within text for screenreader use (if not placed appropriately, alt.text images can interrupt the narrative flow when read out by the screenreader).

9.2.2 Background Sounds: Environmental sounds are liked by some for atmosphere but are discouraged throughout discouraged – one presentation had a constant tidal noise while the site was playing. This detracts from listening to narrative content, which also impacts on deaf viewers (see **9.3.1**).

9.2.3 Contrast 1: Text should optimally be **black on white** for ease of reading: where this is not possible, or creates contrast issues with the main screen within a 3D site, white on black is preferred to grey on black. (See **9.2.11** for recommended fonts.)

9.2.4 Contrast 2: consider also **contrast in subtitles**, e.g. bold white, or white on a black background, to make them more legible.

9.2.5 Contrast 3: Optimise contrast in still images created for the site, such as presentation of the vessel as built (e.g. as in the ***U8*** presentation) – a grey vessel on a grey background is not optimal.

9.2.6 Contrast 4: At present it is not possible to improve **contrast in still or moving images of the wreck created in 3D media**. Future functionality may enable developers and users to customise high contrast viewing options for still images (e.g. by choosing a different colour for the wreck), which should be a consideration in future developments.

9.2.7 Location pins 1: if two images are placed side by side (as in the ***U8*** presentation) **number the pins differently** but in relation to one another, e.g. 1a and 1b. This avoids confusion for screenreader users.

9.2.8 Location pins 2: Keep them high contrast, and as large as is feasible (both for visibility and for those with low manual dexterity), i.e. don't place green coloured pins next to depictions of seaweed features, which was removed from the ***London*** site on feedback.

9.2.9 Narrative 1: Ensure that there is voiceover to the video.

9.2.10 Narrative 2: where there is no narrative in video, ensure that the content of the video is described as a transcript (screenreader-discoverable).

9.2.11 Text: The Royal National Institute for Blind People (RNIB) recommends the use of Arial 12pt and above or a similar clear sans-serif typeface for use by readers with low vision: developers and users are not confined to Arial, but it is the most commonly-used accessible typeface, and crucially, is supported on all versions of Word and all platforms.[20] Historic England similarly recommends the use of Arial on communications involving external parties. Although the recommended guidance is used for documents rather than web or moving content, the overarching principles are helpful, especially for parties new to the principles of accessibility. (See also **9.2.3** and **9.2.4** for contrast in text.)

9.2.12 Tooltips Enable tooltip functionality over all icons for screenreader use, and to make them more readily understood by all.

[20] UK Association for Accessible Formats (UKAAF). 2011. *Creating Clear Print and Large Print Documents*; Historic England Brand Guidelines, 2017

9.3 For site visitors with hearing impairments

9.3.1 Background sounds: They detract from ability to hear the narrative by hard-of-hearing viewers in particular (see also **7.2.2**).Try not to incorporate background tidal sounds for atmosphere throughout, or at least incorporate a sound-specific mute button, perhaps at the point of initiating navigation around the site. The general 'mute' button is insufficient as it will turn down the whole sound.

9.3.2 Subtitles 1: Auto-generated subtitles (e.g. on YouTube) are not recommended, as this introduces too many errors and incoherencies. The only possible exception is with a very clear speaker generating very accurate subtitles (as in the ***Holland 5*** presentation).

9.3.3 Subtitles 2: Consider font type, size and bolding for legibility, contrast (against a black caption background if appropriate), and placement against both still and video (e.g. place in the upper part of the screen if more appropriate). There is no point producing subtitles if they cannot be read! Ensure salient details to which the subtitles refer are not obscured by the subtitles themselves in either stills or video.

9.3.4 Subtitles 3: Some developers felt font bolding etc. detracted from the look of the video. Functionality is more important than aesthetic considerations, although more elegant solutions are possible if desired.

9.3.5 Subtitles 4: If there is no narrative to a short clip or where the text is presented on video or slides as narrative captions rather than as subtitled content, ensure there is a caption stating that the video has no narrative/ or has only atmospheric sounds, or that the voiceover is reading out the text, so that user expectations are met.

9.3.6 Subtitles 5: Historic England's *I am London* and *England in Love* videos demonstrate what is achievable aesthetically in terms of placement and appearance if desired through the use of integrated subtitles. (Note the font is the house Source Sans font.)

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