CHAPTER 4

Techno-documentaries of the New Navy

The consideration of naval representation within factual television and drama has so far concentrated on the production, reception and detail of sustained series. This chapter addresses different examples of televisual coverage of current naval issues, with one stand-alone documentary – *Building Britain's Ultimate Warship* (Channel 4, 2010) – and one episode within a wider defence- and technology-oriented series devoted to a naval subject, *How to Build… a Nuclear Submarine* (BBC2, 2010). In these examples, the emphasis upon people and crews in naval documentary is balanced against the concentration on and celebration of the Navy's most up-to-date hardware. However, negative publicity associated with the newest additions to the fleet appears to have inspired or required a remedial form of documentary, combining the technological focus with the human story of overcoming difficulties in a televisual diary format. After nearly a decade of reappraisal of the role and viability of Britain's armed forces, and in the tense climate of the 2010 Strategic Defence Review, two of the Navy's most important and expensive construction programmes gained prominent televisual representation in this hybrid documentary form. The design, building and testing of the new Type 45 *Daring*-class destroyers (Figure 4.1) and *Astute*-class submarines were revealed to the public with considerable candour in these two programmes.

The goal of public relations was served in these examples by adopting the form of revelatory documentaries, shot over lengthy periods of time as the projects progressed, in order to divulge both the difficulties and their solutions behind tabloid accusations of endless delay and spiralling cost.[141] Although

[141] The Ministry of Defence's own data on both projects recorded their 'variances' from original plans and estimates. The Type 45 exhibited a 29% variance (i.e. increase) in price and a 42-month variance (i.e. delay) in time. The *Astute* displayed 48% price and 47-month variances. The National Audit Office, Ministry of Defence Major Projects Report 2008 (London: HMSO, 2008), pp.26–28.

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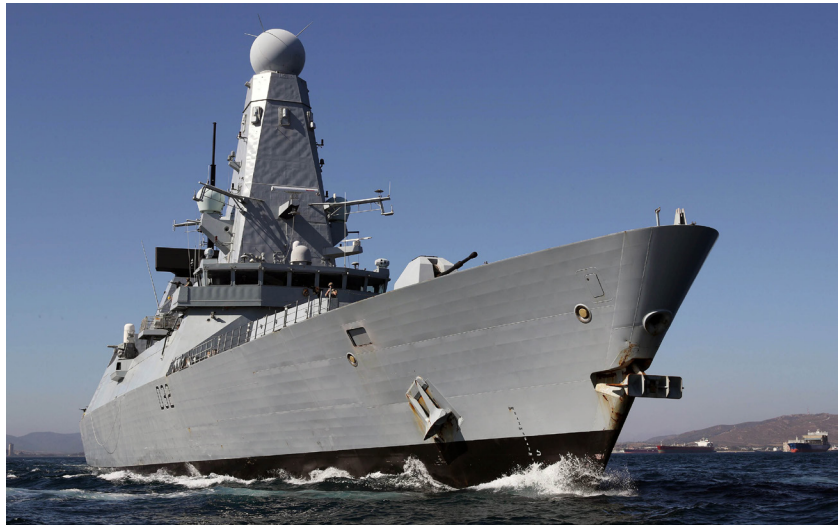

Figure 4.1: HMS *Daring*. PO PHOT Ray Jones, 2016. UK MOD © Crown copyright: Open Government Licence.

both projects had begun several years earlier, by the time of the television programmes' airing in 2010, debates about defence spending and controversies over reductions in the size of the Navy had become topical again with the ongoing Strategic Defence and Security Review (SDSR 2010).[142]

Although they spotlight specifically naval and topical matters, these programmes converge with contemporary factual television in style and subject. Where some contemporary and more recent series giving concerted coverage of naval subjects can be seen to occupy some of the overlapping textual, ideological and entertainment territories in popular culture, labelled as 'reality TV' or 'docusoap' (see Chapters 5 and 6), science- and technology-based documentaries summarising and visualising challenges of design, engineering and construction reflect the rise of hybrid 'infotainment' in global commercial television. As a term, 'infotainment' ('a portmanteau word of "information" and "entertainment"'[143]) refers to an 'explicit genre-mix' in news and current affairs programming.[144] Therefore, though the term has been related

[142] HM Government, Securing Britain in an Age of Uncertainty: The Strategic Defence and Security Review (London: HMSO, 2010).

[143] Lukas Otto, Isabella Glogger and Mark Boukes, The Softening of Journalistic Political Communication: A Comprehensive Framework Model of Sensationalism, Soft News, Infotainment, and Tabloidization, *Communication Theory*, 2017, 27, 136–155, p.144.

[144] Daya Kishan Thussu, *News as Entertainment: The Rise of Global Infotainment* (London: Sage, 2007), p.7.

most frequently to simplified or sensationalised news coverage, it has also been very broadly defined and applied across a scale or spectrum of current affairs and entertainment programming (including talk shows or coverage of celebrities and lifestyles).[145] A highly formulaic, globalised and hybrid form of documentary for which the infotainment neologism is especially apt is popular science or engineering series. These provide a combination of untaxing and entertaining factual treatments for lay audiences, explicatory voice-overs and/or expert or celebrity presenters, illustrative animations and computer graphics, and reality television techniques in observing modern workplaces. Such series (for example, *World's Biggest Shipbuilders*, Discovery Channel, 2013) function as a commercialisation of previous generations of public information programming, with their depiction of globalised industries and multinational corporations matching their international syndication. In Richard Kilborn's appraisal of generic categorisation and increasing hybridisation of programme types within factual television, this form of 'popular documentary' is grouped with 'infotainment' on the basis of its 'engagement with real-life subjects' being 'kept at quite a superficial level'.[146] The criticism implied in Kilborn's description, suggesting that an emphasis on entertainment leads to diminution of documentary inquiry into a given subject, represents more than elitist expectation for popular television. The rise of infotainment in news and current affairs coverage and the perceived consequences for public access to comprehensive and reliable information hold relevance for the robustness of representative democracies. The spread of infotainment from America to Europe in the late 1990s has been linked with changes in broadcasting legislation and with 'the level of political knowledge and participation in and, more generally, with the quality of the democratic system'.[147] However, in its displacing of traditional documentary and representing a burgeoning majority of popular factual programming, 'supporters of popular communications paradigms have tended to valorise the rise of infotainment, suggesting it expands and democratises the public sphere'.[148] The role and the format of 'infotainment' within a varied but over-populated reality television environment, where more traditional documentary forms have been absorbed, adapted or perhaps usurped, therefore require examination.

Numerous versions of the popular 'infotainment' programme or series provide comparisons for *Building Britain's Ultimate Warship* and *How to Build… a Nuclear Submarine*, on the basis of their long-term scrutiny

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[145] Kees Brants and Peter Niejens, The Infotainment of Politics, *Political Communication*, 1998, 15, 149–164.

[146] Richard Kilborn, *Staging the real: Factual TV programming in the age of Big Brother* (Manchester: Manchester University Press, 2003), p.11.

[147] Kees Brants, Who's Afraid of Infotainment, *European Journal of Communication*, 1998, 13(3), 315–335, p.317.

[148] Thussu, *News as Entertainment*, p.7.

and narrativisation of extraordinary design and engineering challenges. The occurrence of these two closely contemporary and specifically British naval-focused examples, charting and explaining the progress of landmark national projects central to the future of the Royal Navy, prompts analysis of their representation and address within this context of hybrid factual entertainment. For comparison of style and subject matter, *Impossible Engineering* (2015–20) is an international co-production involving five companies in Europe and North America, broadcast by Discovery Television in the United States and Yesterday in the UK. In total the series has run to nearly 50 episodes across seven seasons addressing the engineering and technical challenges of constructing bridges, ships, airports, skyscrapers, tunnels, airliners, spacecraft, trains, dams, stadiums, canals, oil rigs and record-breaking vehicles.[149] One of the earliest episodes in the first season addressed warship construction with the story of the building of the Royal Navy's latest and largest aircraft carrier. *Impossible Engineering: Ultimate Warship HMS Queen Elizabeth* (2015) epitomises the series' formulaic approach. Location shooting of the construction process (Figure 4.2) is supplemented by computer graphics and archive footage.

Simplified demonstrations (provided by scientists, engineers or academics) or diagrammatic representations of scientific problems and principles, are punctuated by a voice-over narration replete with superlatives and hyperbole. The ship is described breathlessly as 'not only the largest warship ever produced in the UK. It's also one of the most innovative in the world'; 'a ship of record-breaking proportions'; and 'a giant piece of impossible engineering' with 'an on board power station generating enough electricity to power the equivalent of a large town'. A frequently repeated animation segmenting each episode shows a computer graphic rendering of the programme's subject being continually assembled and disassembled, to explain the function and lineage of each scientific or engineering innovation. An accompanying ticking clock counts years backwards and forwards through the history of development, providing a progressive, predestinate link between previous inventions and present obstacles. Archive footage presented by a diagrammatic frame reminiscent of an engineering design or blueprint structures this 'inspiration from the past' as the basis for new application and innovation.

In order to explain the new ship as both a natural progression from the past and a futuristic marvel, *Queen Elizabeth*'s lineage is established within a brief history of naval aviation. The voice-over explains: 'It's now more than a century since man [sic] took his first tentative, pioneering steps towards creating the phenomena [sic] of the aircraft carrier.' Archive footage identifies the World War I ancestor HMS *Argus* with uninterrupted flight deck, and the World War II precedent of the mass-produced American *Essex* class: by comparison

[149] Two spin-off series of *Impossible Trains* (2018–19) add another 12 episodes.

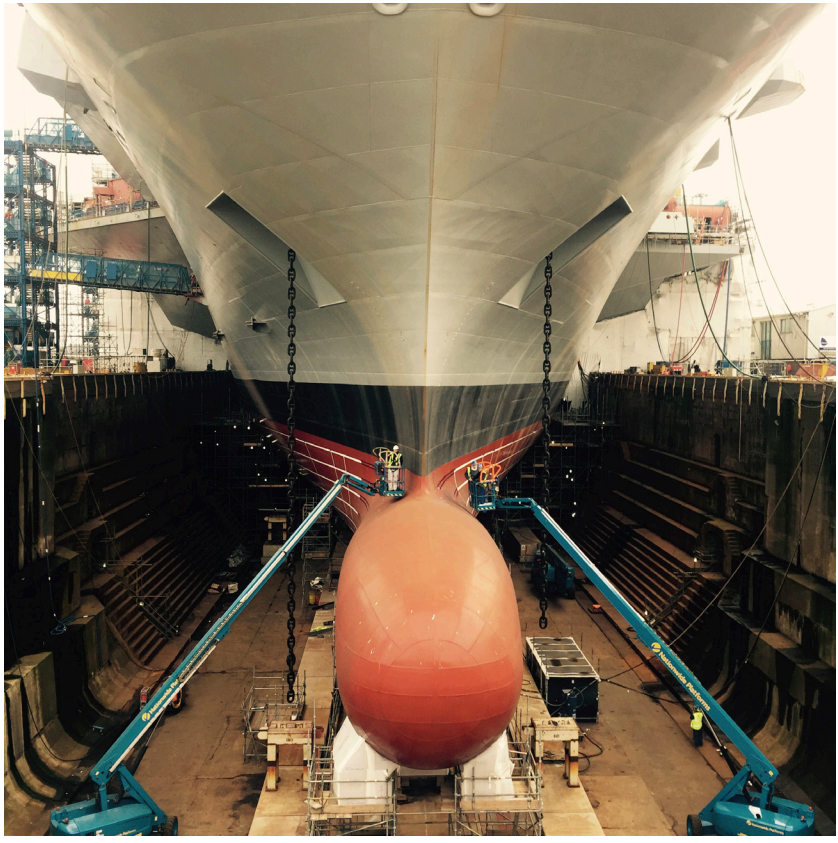

Figure 4.2: HMS *Queen Elizabeth* under construction. Photo copyright Chris Terrill. Used with permission.

with *Argus,* '*Queen Elizabeth* is twice as long and three times as wide'. However, the present-day challenges of building the Royal Navy's new carriers require the verbal transformation (and obfuscation) of inhibiting industrial realities into an exceptional technological solution. Engineer Stuart Justice admits in interview: 'No one company within the UK had the capability to be able to actually design and construct the aircraft carrier.' The voice-over therefore poses its own rhetorical question: 'So how could this monster feat of impossible engineering actually be accomplished? The solution: three different companies would form a ground-breaking collaboration.' Without investigation of the repercussions (in delays, inefficiencies and costs) that this arrangement entails (and which *Building Britain's Ultimate Warship* and *How to Build… a Nuclear Submarine* probe in their records of similar projects), *Impossible Engineering* in this case merely celebrates this 'unique method of construction'. (*Impossible Engineering: Ford Class Aircraft Carrier* from series four similarly bypasses the major

technological obstacles encountered in the development and construction of the world's most expensive warship.)[150]

Subsequent episodes of *Impossible Engineering* portraying naval construction follow this congratulatory pattern. In an episode from series three in 2018, both variants of the US Navy's highly unusual (and controversial) littoral combat ships are depicted. Emphasising the unprecedented aspects of their design as well as celebrating their technological innovations again allows the programme to sidestep the controversies of these vessels' procurement, cost, employment and functional effectiveness.[151] In series two, *Impossible Engineering: US Navy's Super Submarine* (2016) follows the building of the *Virginia*-class USS *Colorado*. This vessel is hailed as a 'technological titan as long as 26 family cars', displacing '7,800 tonnes, equivalent to forty blue whales'. This episode provides a similar potted history of the submarine, with time-lapse sequences of the sectional modular construction and launch of the newest nuclear submarine juxtaposed with comical cell animations of the earliest submarine experiments. A rapid and varied assembly of lessons and examples from the past are interspersed in this narrative: Bushnell's *Turtle* is examined at the Gosport Submarine Museum in the UK; experts at the Webb Institute of Marine Engineering in New York explain the 'teardrop' hull shape of USS *Albacore*; filming at the Royal Navy's hyperbaric test unit in Portsmouth exposes the problem of maintaining a breathable atmosphere. At the episode's conclusion, a renewed chorus of overstatement cements the submarine's technological triumph: the voice-over trumpets the 'super-flexible maritime marvel … pushing nautical boundaries'. Again, in celebrating new manifestations of scientific and engineering prowess, it repeatedly stresses that 'none would have been possible without the groundbreaking innovators of the past'. The series' refrain echoed at the conclusion of each programme reinforces its positivist technological narrative with a rhetorical flourish: 'the engineers, designers and workers constructing the *Virginia* class are making history. They've succeeded in making the impossible, possible.'

The *Impossible Engineering* model epitomises the hybrid factual entertainment format, providing a diverting and informative amalgam of documentary and simplified popular science and engineering. Although experts and participants in the represented projects are portrayed, their roles are limited to circumscribed and positivist cause-and-effect (or problem-and-solution)

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[150] Elizabeth Elizalde, Navy's $13.2 billion aircraft carrier still experiencing problems, *New York Post*, 10 January 2021, https://www.nypost.com/2021/01/10/uss-gerald-r-ford-still-experiencing-problems/ [accessed 26 April 2022].

[151] Christopher P. Cavas, LCS: Quick Swap Concept Dead, *Defense News*, 14 July 2012, http://www.defensenews.com/article/20120714/DEFREG02/307140001/LCS-Quick-Swap-Concept-Dead [accessed 6 May 2022]; Tony Capaccio, Littoral combat ships see new delivery delays, Navy says, *Stars and Stripes*, 9 May 2013, http://www.stripes.com/littoral-combat-ships-see-new-delivery-delays-navy-says-1.220267 [accessed 6 May 2022].

explanations of circumstances, innovations and applications that overcome the allegedly insuperable obstacles. The auspices under which the projects being documented began, the needs or interests they serve, alternatives that might have been explored or tried unsuccessfully and their impact over a lifetime remain largely unaddressed once the problems have been overcome and the projects completed. Occasionally the connection presented between problem and solution may seem conceptual or even tenuous: inventor Isaac Peral's development of lead-acid battery power as a form of propulsion not requiring air for combustion is linked to the development of nuclear propulsion for submarine before being associated with USS *Gerald R. Ford*'s reactors; the innovation of afterburning in jet engines predates by decades the requirement of *Ford*'s aircraft for additional thrust for take-off. The brisk tour each programme undertakes in charting the obstacles to and solutions for scientific and engineering advancement creates an illustrated magazine of miniature case studies, cumulatively answering each streamlined question within the larger 'impossible' project. Human involvement in these projects is limited to privileging exceptional individuals (past inventors and present-day project leaders and architects) and experts, presenters or academics acting effectively as teachers or demonstrators.

By contrast, the Canadian Discovery Channel series *Mighty Ships* (2008–present) combines illustrated explicatory portraits of technologically advanced or unusual vessels with focused documentary records of ships' crews and their work environments, in a splicing of concentrated docusoap and popular documentary. Over a current total of 10 series and 62 episodes, the series' infotainment package has documented ships and shipboard communities at work, depicting civilian and military ships, their design aspects and day-to-day operations. The series utilises extensive location shooting supported by computer graphics but also explicitly narrativises events with foregrounded (or even manufactured) time pressures, and stressing dangers, tests and obstacles that crews must face with additional music and conspicuous editing. In total the series has covered a multitude of international seafaring subjects, including freighters, icebreakers, cable layers, container ships, car and livestock carriers, diving and research ships.[152]

Portraits of naval ships and Coast Guard vessels have composed only nine episodes, with seven of these being American. The first warship subjects appear in the second season, with the fourth episode following the aircraft carrier USS *Nimitz* returning to service after refit and nuclear refuelling and preparing for active deployment to the war in Afghanistan, and the fifth portraying the Danish warship HDMS *Absalon* leading the international anti-piracy patrol off the coast of Somalia. In the third season, the Trident missile submarine

[152] The '*Mighty*' franchise also includes series documenting other types of transport and technology in operation, including four seasons of *Mighty Planes* (2012–17) and four of *Mighty Trains* (2016–21).

USS *Kentucky* is recorded at sea on deterrent patrol, and in the fifth season the *Arleigh Burke*-class destroyer USS *Gravely* is filmed on trials soon after completion. In keeping with the series' manufactured aura of 'high stakes, high seas, high drama', *Mighty Ships* creates tension and advertising-break cliffhangers through stress upon obstacles, deadlines and difficulties that the ships' crews have to overcome.[153] With the warship subjects, these spectacles are provided by accompanying the subjects during intensified training (including live-firing of weapons), as seen in the episodes depicting USS *Nimitz*, USS *Gravely*, HDMS *Peter Willemoes* and USS *New York*. Aside from commanding officers, crew members with varying tasks and ranks are also interviewed to provide the necessary but limited insight into the ships' roles and functions. However, the series' tendency to instead resemble reality television or docusoap in its exploitation of minor crises is most discernible in its depiction of the travails of cruise ships' companies and their passengers, spawning the spin-off series *Mighty Cruise Ships* (2014).

While *Impossible Engineering* and *Mighty Ships* provide analogies to the subject coverage of *Building Britain's Ultimate Warship* and *How to Build… a Nuclear Submarine*, the comparisons between these versions of contemporary documentary reveal important divergences. As part of a themed series, *How to Build… a Nuclear Submarine* provides an unusually multifaceted examination of the naval, industrial and social communities involved in the construction of the *Astute* class, rather than simply the technical challenges the programme presents. As a stand-alone documentary, *Building Britain's Ultimate Warship* provides a sustained scrutiny of technical, personal and political circumstances that also encompasses a broader consideration of the Royal Navy's culture and history.

Daring to bare: *Building Britain's Ultimate Warship*

Building Britain's Ultimate Warship follows the lead ship HMS *Daring* (Figure 4.3) through design, construction, launching, trials and acceptance into service, compressing several years' work and filming into a 90-minute slot. It is an ITN Factual production written and directed by Jeremy Llewellyn-Jones, who has worked on many factual, historical and current affairs programmes since the 1970s.[154] These included acting as director or producer of episodes of *Nova* for PBS in the United States, *Equinox* and *Cutting Edge* for Channel 4,

[153] Anonymous, Seventh Heaven! Discovery's Worldwide Hit MIGHTY SHIPS Drops Anchor for Season 7, Nov 10, *Bell News Media*, 18 October 2013, https://www.bellmedia.ca/the-lede/press/seventh-heaven-discoverys-worldwide-hit-mighty-ships-drops-anchor-for-season-7-nov-10/ [accessed 21 April 2022].

[154] Since no narrator is credited for *Building Britain's Ultimate Warship*, it is possible the voice-over may have been provided by Jeremy Llewelyn-Jones himself.

Figure 4.3: HMS *Daring*, the first Type 45 destroyer. PO PHOT Ray Jones, 2016. © Crown copyright: Open Government Licence.

and *QED* and *Forty Minutes* for the BBC. He also contributed to the technologically focused construction series *Megastructures* (National Geographic, 2004–present) and acted as series producer for military documentaries featuring veteran interviews alongside historical re-enactments such as *D-Day to Victory* (Impossible Pictures/Entertainment One, 2011) and *World War II: The Last Heroes* (Impossible Pictures, 2011). For *Building Britain's Ultimate Warship*, interviews with *Daring*'s designers, commanders and complement are integrated with historical details (such as the mixed fates of previous bearers of the name *Daring*), operational factors (the necessary enhancement to the fleet's capabilities that the Type 45 represents) and institutional concerns (the controversies associated with the budgeting and scheduling of the programme and taking untried technology to sea).[155]

Underlying the programme is a recognition of the tension between tradition and innovation, between previous certainties and present circumstances affecting the Navy, which become distilled in its voice-over commentary. Opening the programme, a sequence of white capitalised titles on a funereal black background (and accompanied by almost melancholy music) establishes this tone: 'THE ROYAL NAVY IS ONE OF BRITAIN'S OLDEST INSTITUTIONS … IT'S STEEPED IN HISTORY … BATTLE HONOURS … TRADITION … NOW IT'S CREATING A NEW DESTROYER, BUILT TO BE THE WORLD'S BEST.' Introducing aerial views of the new ship at sea, the voice-over continues to strike a cautious rather than celebratory note on both modern technological advancement and the influence of long-standing national and naval culture:

> This is HMS *Daring*, the first new destroyer built in Britain since 1985. *Daring* is one of six new destroyers that are a quantum leap forward in naval technology. As an island nation, Britain emerged as a world power by taming and controlling the seas. Britain's role in the world is diminished, but the Royal Navy still feels it can influence the four corners of the globe. With old and outmoded ships standing guard over our shores, the Navy needs defence for the twenty-first century, with a ship that's new, with technology that's never been to sea. How will this ancient institution adjust to the modern world?

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[155] For official statements on the origins, costs, delays and outcomes of the *Daring* construction programme, see National Audit Office, Providing Anti-Air Warfare Capability: the Type 45 Destroyer (London: HMSO, 2009); House of Commons Public Accounts Committee, Ministry of Defence: Type 45 Destroyer (London: HMSO, 2009). The reduction of the Type 45 programme from 12 (as specified in the Strategic Defence Review 1998) to eight, to finally just six ships raised questions about cost and overall capability even within the government itself: House of Commons Defence Committee, Defence Equipment 2010 (London: HMSO, 2010), pp.27–29.

A more atypical introduction to a popular documentary, eschewing the expected technological positivism and foregrounding doubt in the present and the burden of the past, is difficult to imagine. The uneasy emphasis placed on tradition and transition at this and other points within *Building Britain's Ultimate Warship* contrasts with the celebration of institutional history in an American production documenting the construction of the US Navy's analogous *Arleigh Burke*-class ships. *Destroyer: Forged in Steel* (Discovery, 2004) (broadcast in re-edited form in the UK as *Building a 21st Century Warship*) presents a narrative of construction, delivery and testing comparable to the Channel 4 documentary. It portrays a history of both tradition and advancement in the *Burke* destroyer programme (contrasting today's computer-assisted design process with the original hand-drawn blueprints of the first ship, launched in the 1980s), as well as the cultural history of the shipbuilders themselves (Bath Iron Works in Maine 'on the Kennebec river, and a rocky coast steeped in maritime history', where new ships sail past the Civil War-era Fort Popham on their way to the sea). Echoing *Mighty Ships* and *Impossible Engineering*, the programme describes the *Burke*-class destroyers as 'one of the most advanced and lethal warships ever … a modern engineering marvel and an heir to a hundred years of shipbuilding heritage'. The high technology facilitating and incorporated into the long-running construction programme is contrasted with highly traditional skills and job titles (blacksmiths, anglesmiths and shipfitters), with each ship being described as 'hand-built … by the sweat and skill of an expert team of shipbuilders, through four years of back-breaking work'. Although (solvable) problems do emerge on the trials of USS *Chafee*, the *Burke* and Bath Iron Works are therefore championed as proud fusions of tradition and modernity.

Past, present and future are not so seamlessly melded in the case of the *Daring*. Throughout *Building Britain's Ultimate Warship*, the affirmation of progress is counterbalanced by emphasis upon tradition, resulting in an ironic recognition of the Navy's history of technical innovation: 'More than 70% of the key equipment in *Daring* and the other Type 45 destroyers is completely new. The Navy thinks they are as groundbreaking as the evolution from sail to steam.' However, the celebration of the ships' construction remains inseparable from their contemporary context. This is noted during a later sequence detailing a port visit to Liverpool in 2009 that reemphasises the economic and political moment of such a high-profile defence programme. This is introduced sceptically by the voice-over as 'all part of a PR exercise to let the public see how the defence budget is spent. The £6 billion total [for all six ships] represents a fraction of the cost of bailing out British banks, but the Navy still thinks it should explain where the money's gone.' In parallel to this constant consciousness of present justification more than explanation within the documentary address, the programme's observation of the project's progress maintains awareness of potential technological fallibility as well as the mixed blessing of cultural inheritance. In an extended exposition, the programme first establishes its own observational credentials in following *Daring*'s construction with narration

('Since 2004 we've had special access to watch and analyse the whole process, as the Royal Navy overturns tradition to embrace the computer generation') and image (screens showing the computer-assisted design and a CGI-simulation of the new ships escorting future aircraft carriers). These give way to long shots of shipyard cranes and workers at dawn and the verbal assurance that 'we'll watch the shipbuilders come to terms with building a modern warship, new skills alongside traditional jobs.' The soundtrack assumes a more martial and triumphal tone to accompany images of *Daring*'s crew parading on joining their ship, before the exposition ends with a tantalising foretaste of the documentary's final spectacle: 'We'll watch as the captain leads his crew into action stations, the reality of life in the Navy, and war … It's the closest thing to real battle.' Dramatic shots of the ship engaged in realistic exercises precede a fade to black. The voice-over's adoption of the plural first person pronoun in this exposition is notable. It could suggest that the 'we' that observes specifies the documentary makers' interrogative gaze, which is subsequently gifted to the audience, or that the 'we' encompasses the audience too from the outset, uniting responsible viewer and committed maker in scrutiny of a publicly significant project. Either interpretation underlines a journalistic imperative more than the provision of spectacle, despite the promise and preview of climactic action.

The fade-up from this opening therefore positions the remainder of the documentary essentially as a flashback that then progresses towards the ship's completion. This narrative organisation is signalled explicitly by the voice-over: 'Our story in *Daring*'s life starts in March 2003.' The programme's representation of *Daring*'s building process does not entirely avoid contemporary tendencies towards accessibility and simplification: the complex modular programme spread over several sites is described as involving 'over 10,000 contractors' in 'the ultimate in mega-Lego construction', while time-lapse sequences depict the assembly of the massive sub-structures deck by deck and section by section. However, as with *How to Build… a Nuclear Submarine*, a sustained emphasis is placed upon recalling a cultural history of British shipbuilding. *Daring* is noted (somewhat anxiously, given the physical constraints of the Clyde) to be the largest ship ever launched at the Scotstoun yard, which, nonetheless, as 'the spiritual home of shipbuilding' is celebrated as 'a fitting birthplace'. Shots of the iconic (and markedly no longer used) shipbuilding cranes on the Clyde are contrasted with massive sheds at Portsmouth and Scotstoun where the Type 45's component modules are built and assembled. The modular process is illustrated with an extended time-lapse sequence. While the verbal description of this modern construction method is intensified to match the visual stylisation ('Giant steel boxes are hoisted into position and welded together to make up the thirteen deck layers. It takes six hundred men and women working in shifts day and night to keep the construction on schedule'), the individualisation of this process reintroduces the emphasis upon continuities of tradition and community. Before he is identified by an official title – 'Ross McClure BAE Systems' – this specific participant is distinguished for other reasons by the voice-over:

'Some things in shipbuilding never change. Generation following generation into the yards. Like his brother, Ross McClure has worked on the Clyde since he was a 16-year-old apprentice. His sons are following in his footsteps.' This explicit insertion of local and familial heritage accompanies an unprecedented technological and engineering challenge: the installation of *Daring*'s unique electric motors, which test the limits of the shed's cranes.

The presentation of *Daring*'s 'integrated electric propulsion system' resembles the informative approach of less demanding popular documentary. The ship's chief engineer, Lieutenant Commander Julian Lowe, is compared to 'Scotty from *Star Trek*'. The ship's generating power of 46 megawatts is 'scaled' for the audience's comprehension as sufficient to 'keep the lights on in Coventry or Leicester'. Lowe explains, 'it's a large power station, essentially'. In contrast to the uncertainty with which *Daring*'s innovations are noted elsewhere in the documentary, the marine engineering officer is a confident advocate of the Navy's history of technological advancement:

> The Royal Navy's always been on the front foot, it's always been introducing new technologies, and this is just another example of where we're leading the world, really. If you think back: ironclads, introduction of steam propulsion at sea – the point is we've always been world leaders.

The voice-over still manages to strike an equivocal note: 'Gone are the days of soot-covered stokers shovelling coal. This is the clean environment of modern gas turbines and electric motors – but it's still deafening.' Similarly, Commander David Shutts, the first naval representative aboard *Daring* during her fitting out, explains to camera the excitement of being assigned to this revolutionary vessel:

> It's a once in a career opportunity … To get the first of class, to get HMS *Daring* is simply the icing on this particular cake for me. The technical problems associated with a brand-new ship are technical problems – they will be resolved – but to be part of that first crew, to set that ethos, and that tone, and that fighting spirit that will underpin this warship …!

As crew members come aboard and remark on the extra space in passageways and the 'airier' environment compared to the 'dank' old Type 42 destroyers, the change from the past is again reluctantly welcomed by the voice-over. The recognition of the differences ('It's as if sailors' living conditions have been taken seriously for the first time. No more 50 or 75-man messes: all the rates inhabit 6-person berthing compartments') is followed by a stark shot of and wry comment on an uninhabited berthing space: 'Things must have been pretty bad on previous ships if they think these cabins are spacious.'

This critical perspective on the Navy's cultures of tradition and innovation is explored concertedly in an earlier sequence which invokes *Daring*'s

predecessors in order to contextualise (if not necessarily justify) the need for the new ships. Shots of the fleet's surviving Type 42 destroyers in Portsmouth, described as 'showing their age', but which 'evolved from the best technology of their time' are followed by a cut to an unmistakable symbol of naval identity: the white ensign. Through the subsequent summary of the Navy's own past (accompanying shots of the modern *Daring* at sea), the tone of the voice-over fluctuates, by turns assuming a celebratory, elegiac and critical phrasing in charting the role of the Navy in war and empire in previous centuries, and voicing doubts about capability or relevance in the present:

> For hundreds of years the Royal Navy has sailed the world's oceans, protecting British interests abroad. The Navy was crucial to building the only truly global empire and establishing colonies in all four corners of the world. Until the Second World War, the Royal Navy was the biggest, best equipped and most capable on the high seas.

Following commentary on the Royal Navy's supremacy from the 17th to the 20th centuries, the apotheosis of its power during the Napoleonic Wars and its subordination to the US Navy in World War II, the voice-over ushers in a more specific naval history with a reiteration of loss and doubt: 'Naval victories like Trafalgar might be written into the legend of great sea battles, but more recent history reveals a catalogue of uncertainty in committing to new technology at sea.' The discourse of risk in both technology and conflict is wedded to a simultaneously melancholy and celebratory treatment of tradition with the following illustrated timeline showing the six previous HMS *Daring*s.[156] These ships embody a representative (and apparently inseparable) history of technical invention and human loss. The first *Daring* 'ran aground off west Africa in 1813' and 'was scuttled to prevent capture by the French'; the second served in the Atlantic and Caribbean for more than 20 years; the third, serving in China and the Pacific, combined steam and sail and an iron hull sheathed in teak and copper; the fourth, an early destroyer, was built in London and 'briefly hailed as the fastest ship ever'; the fifth was the first destroyer sunk by a U-boat in World War II, and 'almost all of her crew perished'; the sixth is remembered for humanitarian work following a Greek earthquake in 1953. From this catalogue of global commitment (which appears to stress sacrifice and danger rather than valorising underlying national or imperial history), the present *Daring* is reintroduced by a cut before the detailing of the most recent history inspiring the design of the Type 45 – the performance of the preceding Type 42s in the Gulf Wars (and losses in the Falklands) – underlines the definition and requirement

[156] This narrative of the previous ships to bear the name *Daring* is paralleled by a brief illustrated 'Unit history' of HMS *Daring* on the Navy's own website. Anonymous, HMS *Daring* (D32), *Royal Navy*, https://www.royalnavy.mod.uk/our-organisation/the-fighting-arms/surface-fleet/destroyers/hms-daring [accessed 9 May 2022].

for the new class's capabilities. The replacements for Navy's previous destroyers (described as 'designed before the internet and the mobile phone') must be conceived 'with the computer generation in mind'.

Just as its earlier use of the first person plural implied communal investigative scrutiny, the voice-over's wary attribution of motive or mindset to the institutional subject ('The Navy still thinks…', 'The Navy needs…', 'The Navy feels…') suggests a persisting doubtful distance towards the construction project and the wider national objectives it allegedly serves. A similar need for examination and evidence registers in the voice-over's description of the public relations exercise the Navy must address in convincing its own sailors. Interviewed on the bridge as the ship heads through rough weather to replenish at sea, Captain Paddy McAlpine explains the needs of the 21st-century recruit:

> The young sailor that joins the Navy today is a higher calibre than those that have gone in the past. I think they're more educated, a great many of them have done higher education. There are a number of able seamen on board with degrees, and they need better management, better leadership … They need to understand what they're doing and why they're doing it. They need to understand why the Navy needs a Type 45 and why the UK needs to have a Royal Navy.

This articulation of the Navy's apparent consciousness of the need to educate its own personnel as much as inform the public (and in parallel justify its roles, costs and existence to both) is voiced just before the new ship engages in its most exacting tests. The war simulation that serves as the documentary's climax highlights the vulnerability of the ship's new technology but also provides a compensatory vindication of traditional skills and values. In the operations room as the exercise begins, a montage of shots shows the radar picture compilers, and sudden zooms-in on the displays as the voice-over describes the environment ironically in the language of the contemporary 'computer generation': 'On a quiet day it's like a call centre: today it's more end-of-pier arcade, packed with people huddled around dozens of screens.' Yet it is precisely the new technology, the 'computer power that's a radical step forward', which is seen to let the ship down:

> Just at the crucial moment, the computer-controlled command and combat management system crashes and screens freeze. Suddenly the ship has no ears and eyes. The crew reverts to old technology that would make Nelson proud: binoculars out of the bridge windows. The computer crash isn't a simulation – it's for real.[157]

[157] In subsequent years of service, power outages and propulsion failures have frequently affected the *Daring*-class destroyers, and required extensive and costly remedial work; Ben Farmer, £1bn HMS Dauntless abandons training exercise after technical

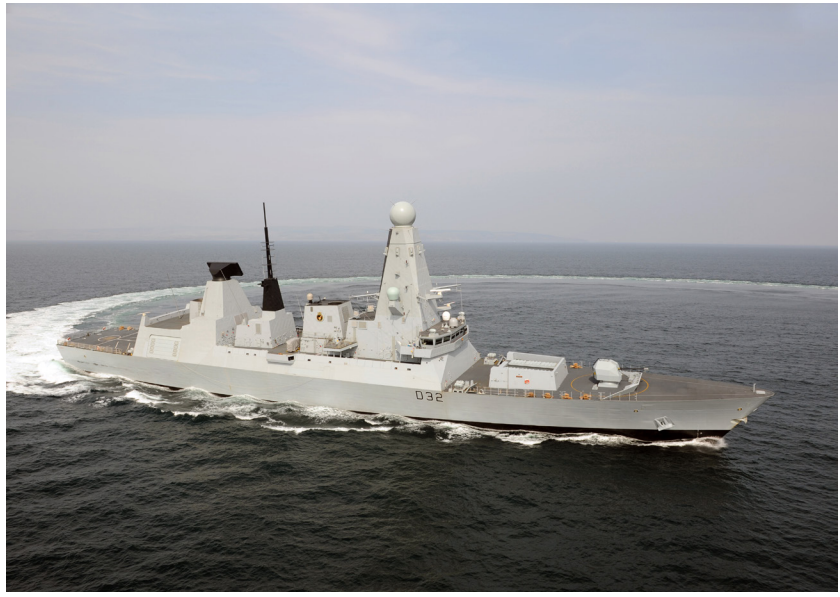

Figure 4.4: HMS *Daring* manoeuvres at speed. 2009. Royal Navy. Crown copyright: Open Government Licence.

Following this moment of both failure and success on exercise, the documentary ends in maintaining its mixed and equivocal observations on innovation and tradition, the Navy's painful past and the country's uncertain future. Alongside scenes of *Daring*'s crew disembarking and forming ranks on the quayside, the voice-over affirms that: 'history and tradition stand comfortably alongside the new technology that dominates most people's lives' but also recalls that: 'the loss of so many ships and men in the Falklands war haunts the Royal Navy. At last, it thinks it has the ship that should make sure it never pays such a heavy price again' (Figure 4.4). Interspersed with conclusive interview comments from Captain McAlpine, still averring the positive, revolutionary potential of the Type 45 for the Navy, the final images of *Daring* at sea frame some final, fundamental, but ultimately unanswerable questions of the construction programme and of national defence itself:

trouble, *The Daily Telegraph*, 24 February 2014, https://www.telegraph.co.uk/news/uknews/defence/10656958/1bn-HMS-Dauntless-abandons-training-exercise-after-power-trouble.html [accessed 9 May 2022]; Jonathan Beale, Type 45 destroyers: UK's £1bn warships face engine refit, *BBC News*, 29 January 2016, https://www.bbc.co.uk/news/uk-35432341 [accessed 9 May 2022]; Anonymous, Royal Navy warship heads for repairs after four years in port, *BBC News*, 15 September 2021, https://www.bbc.co.uk/news/uk-england-hampshire-58571232 [accessed 9 May 2022].

> While some feel spending on defence is wasteful, the Navy thinks its new ships are needed more than ever because our world is changing so quickly. No one can know for certain if these ships are a hangover from outdated Cold War thinking or will be more relevant than anyone dare contemplate.

(Learning again) *How to Build… a Nuclear Submarine* (BBC2, 2010)

How to Build… a Nuclear Submarine was aired as the first in a three-part series of technological exposés. Given the mystique and secrecy attached to virtually all aspects of the construction and capabilities of nuclear submarines, the programme's subject would appear to offer substantial scope for exaggeration and hyperbole. However, the documentary also emphasises more mundane realities of the building programme (and the importance of its continuation in the lives of shipyard employees) and other unexpected challenges (the need to repair the channel and sea gate that the new submarine would have to negotiate after launching). While the second programme in the series centres on civilian aviation (*How to Build… a Jumbo Jet Engine*), the final programme (*Britain's Secret Engineers*) concentrates on another controversial military project: the preparation of Chinook helicopters for operations in Afghanistan by the defence contractor QinetiQ. The programme's record of the complex overhaul and improvement of the aircraft, following engineers working within a highly demanding schedule, obscures (or rather omits to clarify) the impetus for the project in the first place. The helicopters involved are eight RAF Chinook aircraft held in storage, which require rapid and extensive modification and upgrading (referred to euphemistically as 'reversion') in order to be able meet the 'demanding operational needs' of deployment to Afghanistan.[158] Given shortages in aircraft following losses of helicopters in accidents and in combat, and the need for air transport for British ground forces to avoid roadside IEDs, the unserviceability of part of the RAF's fleet of Chinooks represents both a danger and an embarrassment.[159] While stressing the urgent need for the helicopters, this episode celebrates the technicians' efforts and highlights the extraordinary capabilities the aircraft would possess.

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[158] Madonna Walsh, Modified Boeing Chinook Mk3 Successfully Completes 1st Test Flight, *Boeing Defence UK Communications*, 7 July 2009, https://boeing.mediaroom.com/2009-07-07-Modified-Boeing-Chinook-Mk3-Successfully-Completes-1st-Test-Flight [accessed 8 March 2022].

[159] Mark Tran, UK Troops blow up damaged helicopter in Afghanistan, *The Guardian*, 30 August 2009, https://www.theguardian.com/uk/2009/aug/30/chinook-helicopter-destroyed-afghanistan [accessed 28 February 2022.

This apparent, unacknowledged focus on topical headlined stories (delayed submarines and unusable helicopters) means that the motivation as well as the form of the programmes veers from an investigation of to an apologia for unproven high technology, runaway costs and tardy projects within the defence establishment. As a result, *How to Build… a Nuclear Submarine* strives to balance several conflicting tones and threads in the narrative of the *Astute* class's design and development: national pride in the project, verbal embellishment of its secrecy and technological difficulty, and consciousness of its social and political consequences, evinced in the voice-over narration as well as in critical responses to the television programme itself: 'So how to build a nuclear submarine? Well, very slowly. And expensively. Four years late, and £800m over budget. But at least a lot of people in Barrow-in-Furness still have jobs.'[160] Even more than in relation to the *Daring* construction programme, and even more than in terms of cost, the employment context for the building of the *Astute* submarines was at the forefront of contemporary commentary. Rear Admiral Simon Lister, director of submarines, overseeing the *Astute* programme, was quoted in official government statements:

> To see *Astute* commissioned is momentous not only for the Royal Navy, who have been eagerly anticipating this quantum leap in capability, but for the thousands of people around the country who have been involved in this most challenging of engineering projects.[161]

In recognition of the wide regional, industrial participation in the project, the government report listed BAE Systems in Barrow, Rolls-Royce in Derby, and Thales UK and Babcock, Strachan and Henshaw in Bristol as the most significant contractors.[162] Nonetheless, as with the Type 45s, controversy had followed the initiative, with the BBC reporting at the first submarine's launch that the '£3.5bn programme was dogged with delays and budget overruns'.[163] By the time HMS *Astute* (Figure 4.5) was accepted into service (and just before she would make the news again by running aground off the Isle of Skye), the impact of the programme on jobs, the local economy and the national defence budget was also reported with concern:

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[160] Sam Wollaston, Doctor Who and How to Build a Nuclear Submarine, *The Guardian*, 28 June 2010, https://www.theguardian.com/tv-and-radio/2010/jun/28/docto-who-nuclear-submarine [accessed 20 April 2022].

[161] Ministry of Defence, UK's most powerful submarine joins the Navy, *Ministry of Defence*, 27 August 2010, https://www.gov.uk/government/news/uks-most-powerful-submarine-joins-the-navy [accessed 8 March 2022].

[162] Ministry of Defence, UK's most powerful submarine joins the Navy.

[163] Anonymous, New UK nuclear submarine launched, *BBC News*, 8 June 2007, http://news.bbc.co.uk/1/hi/uk/6733777.stm [accessed 8 March 2022].

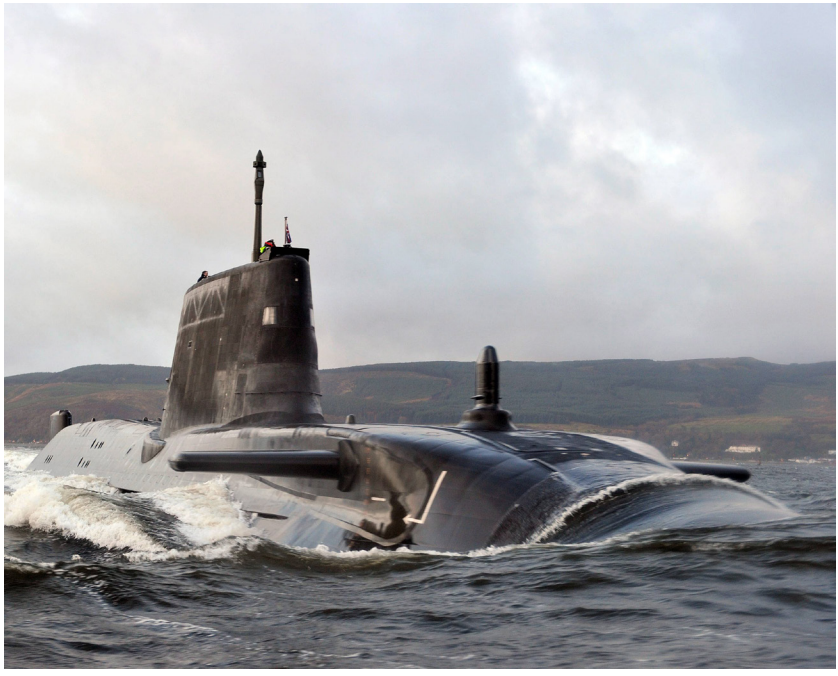

Figure 4.5: HMS *Astute*. LA(Phot) J Massey, 2009. UK MOD © Crown copyright 2021: Open Government Licence.

> HMS *Astute* is the first of four in its class, with the initial three now expected to cost £3.9bn, a hefty chunk of the annual £38bn defence budget … four years late and more than £1bn over the original budget, although the work on the four submarines currently guarantees almost 6000 UK jobs.[164]

Although part of a comparable series, *How to Build… a Nuclear Submarine* exhibits different emphases from the infotainment models of *Impossible Engineering* or *Mighty Ships*, but also diverges from *Building Britain's Ultimate Warship* in exploring the commercial and social landscape of 21st-century British shipbuilding as much as the technical challenges. Within the documentary, the culture of submarine construction at Barrow-in-Furness overlaps with discourses of industry and high technology, allowing in a politics of employment as much as a dogma of defence.

The programme's introductory sequence (as with the other episodes) provides a rapid sequence of anticipatory images and interview sound bites,

[164] Caroline Wyatt, New submarine in a class of its own, *BBC News*, 3 September 2010, https://www.bbc.co.uk/news/uk-11173266 [accessed 8 March 2022].

condensing the narrative that follows into a tantalising, affective collage of secrecy and revelation, deadlines and time pressures, technology and complexity. At first, green titles resembling computer text scroll enigmatically across the screen: 'She is one of Britain's biggest and most secretive engineering projects … costing over £1bn.' A cross-fade to radiation warning signs, with an alarm sounding on the soundtrack, is followed by a computer graphic of the submarine submerged, and a cut to an engineer, who opines: 'the submarine's huge, it's 100 metres long, it's three decks deep. There is no inch of the submarine that's similar to another inch of it. I would definitely put it in the same league as the Space Shuttle or projects of that size.' Sound and image transform again to provide a time-lapse sequence of the submarine's incomplete bow section moving across the construction hall, and a cut to a senior naval officer (Rear Admiral Simon Lister), who remarks: 'To my mind this is a 7000-ton Swiss watch.' Further cuts follow, between the computer rendering of the submarine and cuts back to Lister ('There are stages when it's like blacksmithing and there are stages when it's like brain surgery'), before the green computer text returns: 'And it took more than 5000 people 14 years to build her.' Additional excerpts from interviews and visual effects that merge the computer graphic with the real submarine under construction introduce a clip of a board meeting, in which Simon Lister spells out the demands of the programme: 'I'm in charge of purchasing submarines for the Ministry of Defence and it's my job to make sure that the programmes that we're hearing from the company are sensible and real and we're getting value for money out of them.' A rapid series of shots introduces the problem of the sea gate, which could prevent the finished vessel from leaving Barrow. The sequence ends with the series *How to Build* logo, before the green titles identify the starting point in 'November 2009'. A fade in on a long shot of the shipyard, and shots of mustering crew members and tugs are accompanied by the voice-over (by actor Gerard Fletcher) setting the tone of excitement and awe:

> It's a wet and windy weekend in the middle of November, and the first new British submarine to be built for ten years is now preparing to sail out into the open sea for the very first time. Fourteen years in the making and costing over £1billion, she is one of the most technologically advanced machines in the world … This is the story of how one of the world's most complicated machines is built. And the people that build it.

Finally, with the insertion of the additional jeopardy of stormy weather affecting the launch, the specific episode's title, in green text, appears on a black screen.

Occupying nearly three minutes of the episode's 60, this opening's emphases on high technology (in and through conspicuous visual effects), complexity and controversy (via interview comments) and insertion of dramatic cliffhangers (in the preview of the 'crisis' of the sea gate) appear to fit the structure, address and deterministic approach of popular documentary. Later sequences

employ the same collaging of visual and editing effects (vertical wipes accompanied by the sound of a cutting saw blade) alongside more predictable observation of work and interviews on site. Other segments depicting the computer-aided design process (championed as 'one of the largest concentrations of such expertise in the world') and the submarine's density and complexity (it 'packs in three times more machinery and equipment than any surface ship' and has 'a quarter of a million miles' worth of cable on board') strongly resemble the enhanced visualisation and hyperbolic descriptions of equivalent infotainment examples. However, this introduction also gives prominence to the workforce and the workplace as important components of the narrative. Akin to *Building Britain's Ultimate Warship*, alongside the related threads of the Navy's pressing technological needs and the designers' and technicians' technical challenges, *How to Build…* stresses a regional heritage distinguishing submarine building at Barrow. (The second programme in the series, *How to Build… a Jumbo Jet Engine*, similarly highlights the centrality of Rolls-Royce to the identity of and employment in Derby.) A significant part of the 'how' is consumed with identifying *who* does the building of Britain's submarines.

Succeeding the extending introduction is a sequence showing the assembly of those involved in the construction, and their positioning in naval and regional communities. A young woman (later identified by green text as apprentice electrician Erin Browne) exits her home with a bicycle, intercut with shots of a naval officer (Commander Paul Knight, with 30 years' service and 'literally fifteen years underwater') leaving home on his motorbike. An older man (subsequently introduced as John Hudson, 'MD BAE Systems Submarine Solutions') is glimpsed in his office. The conclusion of the varied journeys to work marks what the voice-over describes, with understatement nonetheless suggesting the extraordinary, as 'the start of a typical working day for the people who build Britain's nuclear submarines'. Within this segment an unidentified woman working in a café stresses the inseparability of the town's business from common social connections: in addition to her husband, sister-in-law, brother, and brother-in-law, 'every family that I know, at least one or two people actually work in the yard'. Having isolated specific individuals, the programme's images evoke universalities, with cross-fades from the town centre to the town hall and to a view of the shoreline. This is followed by a cut to shots of a local statue representing shipbuilders, accompanied by the voice-over's observations: 'Barrow in Furness is a town of 62,000 people on the edge of the English Lake District. The town has an amazing history of building submarines, launching its first in 1887.' A shot of the Albion's pub sign (bearing a painting of a ship) frames a yard crane in the background. As Erin clocks in, the voice-over confirms the constant cycle: 'And generations of the same families from all around the area still build them today.'

However, the documentary's isolation of Erin, contrasting and celebrating a new generation joining an established tradition, tacitly admits how vulnerable this cycle has become. The 10-year gap between the *Astute* building programme

and the construction of the last submarine at Barrow (the *Vanguard*-class Trident submarines, the last of which was delivered in the late 1990s) led to a cessation of apprenticeships and threatened the yard's future. At least some of the delays and costs afflicting the programme can be attributed to this state of affairs. During a later sequence showing her at work, the voice-over places Erin's employment within a more generalised economic and industrial context, while recognising the specific local relevance:

> Erin is one of 500 apprentices and graduates working in the shipyard. Apprentice schemes all over Britain are now being reintroduced to stop the decline of traditional skills. And this is especially essential for the survival of Barrow.

Erin's personal progress towards full qualification as an electrician will parallel the *Astute* programme, each being utterly dependent on the other for the Royal Navy's and the yard's future. In another brief interview, Erin's team leader, Nigel Moore, reinforces the impact of the gap in orders, the lack of apprenticeships and the loss of skills. While admitting this crucial situation, the programme nonetheless skirts a more overt or provocative probing and criticism of the historical circumstances that precipitated it.

However, as with *Building Britain's Ultimate Warship, How to Build…* is prepared to recognise the controversy of the submarine programme itself. Scenes involving John Hudson, both in interview and framing board meetings recorded with Admiral Lister (previewed in the introduction), foreground the role and responsibility of BAE Systems. The introduction of John Hudson follows and extends the expository images and commentary upon the town. The voice-over's remarks are accompanied by images emphasising the inseparability of the town from its signature industry – a time-lapse long shot of the huge facility with clouds scudding overhead, with a cut to shot of the streets below from the top of church steeple, and a cross-fade to an aerial shot of narrow terraced houses:

> The current owner of the shipyard is British defence company BAE Systems. The business employs over 35000 people across the UK, with around 5000 of them in Barrow alone. BAE Systems is not without its critics. But in this town the company forms the very backbone of the local economy.

As Hudson is identified by green text on screen, his comments in interview reassert the company's relevance and responsibility ('The business has a real family feel to it … We play a vital part in the community') alongside further aerial views of terraces stretching towards the towering construction hall, and a shot at street level of a pub with the yard's buildings immediately behind. As further cuts juxtapose the town in long shot and the submarine in close-up in the Devonshire dock, the voice-over guardedly acknowledges the debates

inspired by the submarine project, while espousing only the obvious economic need the construction programme serves:

> Britain's need for submarines splits opinion. Some think they're critical for defence, others that they're a waste of taxpayers' money. But with a potential order book of seven *Astute* submarines, Barrow depends on them to prosper into the next decade and beyond.

The opposite perspective, of the town's population, is offered in a notably brief sequence summarising the responses to the submarines' nuclear propulsion. In a working men's club, interviewed patrons reflect wryly on their acceptance of this factor ('the things are totally safe. Hopefully, touch wood. It's a bit of a strange thing to be used to, obviously…'). The treatment of this exceptional aspect to the town's industry presents a problem of representation to the documentary, in sensationalisation of the threat in its opening, by stylised images of radiation warnings and sound effects, and diminution of it through the locals' nonchalance (at the club a man jokes, 'we're all doomed, sir!'). When John Hudson reappears after sequences articulating the design and construction process, he offers the company's perspective as the representative of the builder in relation to Simon Lister as the Royal Navy 'customer'. Lister's concerns about delays and 'defects' unearthed on his visits are articulated via cuts between his questions in the meeting (which the voice-over has warned ominously will last 'late into the night') and Hudson's responses while he inspects the dockyard. This discontinuity may reflect the sensitivity of information in his replies during the meeting, but the separation of criticism and justification appears to validate Lister's enquiries (on the taxpayer's as much as the Navy's behalf) and undermine Hudson's indirect replies:

> We've had no fundamental issues, but we have had some minor teething troubles and difficulties. Nothing major but a few obstacles that we've had to overcome … Yeah, the word 'defects' is something we've debated. In the construction industry I think they use the word 'snagging.' I know in the US they use the word 'unsats' – 'unsatisfactories.' We use the word defects. It's anything that doesn't comply with the requirements or the specification. So the vast majority of defects are pretty modest … It's hugely frustrating, not just for me but for the whole company. We really do want to see *Astute* go to sea.

Following this indirect apologia from the managing director, the voice-over offers its own exculpation by restating that the *Astute* is 'almost four years late on its delivery and estimated to be overspent by around £800 million' but claiming that BAE 'inherited' problems with the loss of skills, demise of apprenticeships, and design and contractual issues when it took over the Barrow complex in 1999. As if to confirm this view of the past and vindicate the yard's future, the

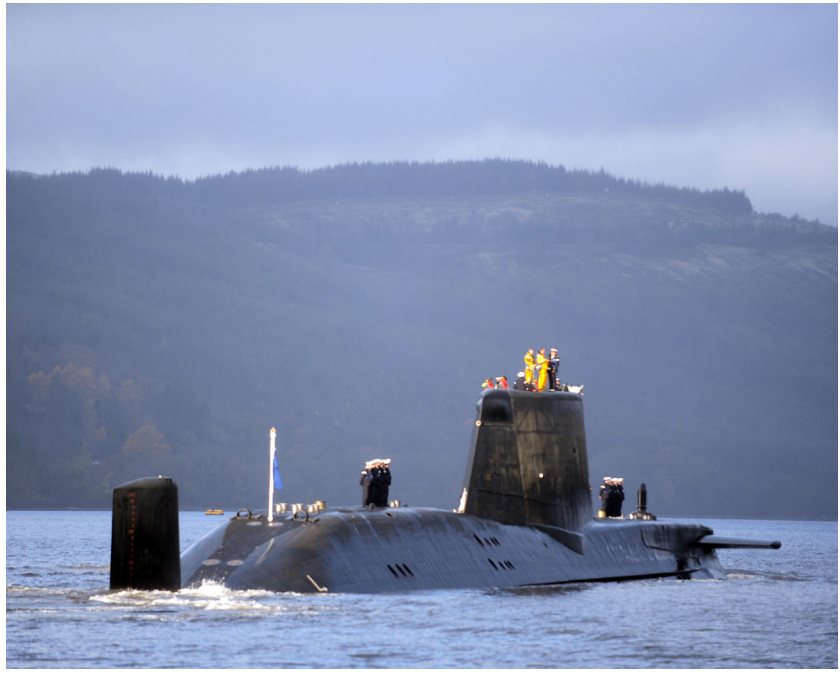

Figure 4.6: HMS *Astute* arrives at Faslane. WO(Phot) Ian Arthur, 2009. Crown copyright: Open Government Licence.

sequence concludes with a shot of Erin leaving work. Although questioned, the eventual completion, activation and successful departure of HMS *Astute* (in defiance of the anticipated, narrativised impediment of the sea gate) therefore appear assured (Figure 4.6).

Where *Building Britain's Ultimate Warship* frequently confronts the inseparable questions (and justifications) of cost, capability and delay, *How to Build…* therefore offers a mixed approach to the exorbitant technical and specific social circumstances of Britain's nuclear submarines. Both these aspects receive treatment reminiscent of other popular documentaries. The hyperbole devoted to the technology, the observation of the workforce, and the dramatisation of challenges all recall *Impossible Engineering* and *Mighty Ships*. By contrast, the national specificities and controversies of the *Astute* programme receive, like the similar questions accruing around the Type 45, an albeit limited articulation comparable to the political consciousness discernible in *Building Britain's Ultimate Warship*. Produced in an era of increasingly hybridised factual television, in which forms of reality television, docusoap and infotainment are seen to overlap, these two programmes both reflect contemporary stylistic enhancement but still evince the persistence of journalistic, investigative, observational and informative documentary.

Conclusion

> It is only by building ships that we will once again become good at building ships.[165]

While they appear to fit a current vogue for popular documentaries that focus on high-technology and engineering challenges (for example, in their coverage of the intricacies simply of launching both *Daring* and *Astute*), these cognate programmes articulate differing views on two of the major construction projects that define the current and future Royal Navy. Where *How to Build… a Nuclear Submarine* eschews criticism of delays and costs in celebrating the technological triumph and communal benefit of submarine building in Barrow, *Building Britain's Ultimate Warship* continually acknowledges the need for accountability, transparency and justifiability, yet without explicitly undermining its subject. Although they therefore assume different documentary positions towards what are topics of national importance and debate, both programmes provoke and inform wider consideration of these particular naval, politicised and British construction projects than their superficial parallels to *Mighty Ships, Impossible Engineering* or *Destroyer: Forged in Steel* might suggest.

Despite their controversies, the arguments accruing around these problematic design and construction projects should be seen in a context in which virtually all 21st-century defence procurement, let alone naval construction programmes, are subject to scrutiny and plagued by controversy surrounding their expenditures and inefficiencies. The designing and building of the US Navy's latest surface ships (the futuristic DDG-1000 *Zumwalt*-class destroyers and the *Freedom*- and *Independence*-class littoral combat ships) have been pilloried for endless material, technological and conceptual failures.[166] An AU$8 billion programme to provide the Royal Australian Navy with new air-defence destroyers comparable with the *Daring*s encountered similar technological and

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[165] Ministry of Defence, National Shipbuilding Strategy: The Future of Naval Shipbuilding in the UK (London: HMSO, 2017), p.6.

[166] Problems identified with the ill-starred LCS units included questions over their combat survivability, hull cracking, engine defects and failures to provide the mission modules required for them to perform different roles: Ronald O'Rourke, Congressional Research Service Report: Navy Littoral Combat Ship (LCS) Program: Background, Issues, and Options for Congress (Washington DC: CRS, 2012). The curtailing of the DDG-1000 programme from 32 ships down to three drove individual unit cost to increase by more than 550% over the prolonged period of design and construction: United States Government Accountability Office, Report to Congressional Committees: Defense Acquisitions – Assessment of Selected Weapons Programs (Washington DC: GAO, 2015), p.73.

engineering problems, and was accused of being disorganised, overpriced and needlessly prolonged.[167] In Europe, design and engineering problems have similarly afflicted prestigious defence projects within NATO navies, such as Germany's F-125 frigates and the Spanish Navy's *Isaac Peral*-class submarines.[168]

In these examples, the emphasis placed on shipbuilding as factual focus and cultural reflection – a subject with a documentary history stretching back to *Shipyard* (Paul Rotha, 1935), which also portrayed Barrow – marks their difference from the hyperbolic spectacles and problem-and-solution formats of *Impossible Engineering*. The stress placed upon and uncomplicated celebration of continuity and tradition in family and community connections to shipbuilding in both programmes obscures recent and longer-term factors affecting the sociopolitical history of the industry, which are themselves inseparable from the difficulties and delays the depicted construction projects are seen to suffer. While the locations of Barrow and the Clyde embody strong regional and national connotations of heavy industry, which *How to Build…* and *Building Britain's Ultimate Warship* certainly recognise, the programmes do not probe the reasons for (or effects of) delays in government decisions hinted at by the 'ten-year' gap in orders for submarines mentioned at *Astute*'s launch, or the 20 years between generations of naval destroyers observed but not explained alongside the advances *Daring* represents. While *How to Build…* does remark on the reinstitution of apprenticeships as a necessity for the *Astute* programme, the difficulties and delays BAE representatives note in reviving and embedding continuity in a skilled labour force equally skirt the issue of how apprenticeships came to vanish in the first place. Despite the aura of journalistic investigation around *Building Britain's Ultimate Warship*'s lengthy observation of the Type 45

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[167] Cameron Stewart, $8bn navy flagship founders after construction bungle, *The Australian*, 26 October 2010, http://www.theaustralian.com.au/national-affairs/bn-navy-flagship-founders-after-construction-bungle/story-fn59niix-1225943475303 [accessed 5 January 2016]; Ian Phedran, Destroyer project now three years behind schedule, *News.com.au*, 1 May 2015, http://www.news.com.au/national/destroyer-project-now-three-years-behind-schedule/story-fncynjr2-1227330086648 [accessed 26 June 2017]; Andrew Greene, Companies building multi-billion-dollar warships feared defects would damage their reputations, leaked documents show, *ABC Radio Australia*, 9 May 2015, http://www.radioaustralia.net.au/international/2015-05-09/companies-building-multibilliondollar-warships-feared-defects-would-damage-their-reputations-leaked-/1445454 [accessed 26 June 2017].

[168] Steve Nolan, Spain's £1.75billion submarine programme is torpedoed after realising near-complete vessel is 70 tonnes too heavy because engineer put decimal point in the wrong place, *The Daily Mail*, 6 June 2013, https://www.dailymail.co.uk/news/article-2336953/Spains-1-75bn-submarine-programme-torpedoed-realising- [accessed 18 April 2022]; Anonymous, Germany returns lead F125 frigate to builder, report, *Naval Today.com*, 22 December 2017, https://www.navaltoday.com/2017/12/22/germany-returns-lead-f125-frigate-to-builder-report/ [accessed 18 April 2022].

programme, and *How to Build…*'s recognition of the importance of renewed submarine construction at Barrow, neither programme reveals how BAE's ownership of both Barrow and the Clyde represents a virtual monopoly on British naval construction.[169] Conceding that discontinuity in orders for naval ships has afforded 'a fluctuating source of business' and recognising a withering of skilled labour and lack of competitiveness in warship exports, the National Shipbuilding Strategy inaugurated in 2017 claims to respond to and redress the institutional issues afflicting programmes like the *Astute* and Type 45, and to inspire a 'renaissance' of UK shipbuilding as a national and international enterprise epitomising a post-Brexit 'global Britain'.[170]

A superficially similar coverage, of a technologically advanced and controversial building project, occurs with *Britain's Biggest Warship* (BBC, 2018–19), Chris Terrill's linked series following the building, trials and entry into service of the new aircraft carrier HMS *Queen Elizabeth* (see Chapter 6). However, Terrill's focus (in line with his other armed service and civilian documentary projects) rests emphatically on the human crew rather than the technological or political aspects of the project. This differs from the instrumental inclusion of interview subjects within the construction and engineering narratives of *How to Build…* or *Mighty Ships*, where the human dimension is incorporated pragmatically to embody the process (and provide solutions to its problems). As such, *How to Build… a Nuclear Submarine* and *Building Britain's Ultimate Warship*, despite their resemblance to contemporary series focused on engineering operational challenges, lack direct formal parallels within the catalogue of recent naval documentary. The correspondence of *How to Build… a Nuclear Submarine* to episodes in series such as *Impossible Engineering* (and indeed its own placement within a comparable series) belies its difference in documenting a highly specific instance of national shipbuilding, and its admission of detail relating to its cultural and economic as much as commercial or military significance. Similarly, the comparison of *Building Britain's Ultimate Warship* to the formulaic treatments of *Mighty Ships* underlines its concentrated and compellingly contextualised discussion as well as documentation of HMS *Daring*'s origins, innovations and aspirations, and the relationship between naval institutional and national cultural traditions. Both programmes acknowledge, without necessarily fully confronting or disputing, the political considerations affecting the planning, process and products of the shipbuilding they depict.

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[169] BAE Systems's website celebrates the history – 158 years of Vickers at Sheffield and Barrow, and over a hundred years of Vosper Thornycroft in Southampton and Portsmouth – which its shipbuilding arms inherited via mergers and acquisitions in the early 2000s, following the decline and closure of many British shipyards in the 1980s. BAE Systems UK, Heritage, https://www.baesystems.com/en-uk/heritage/vickers-shipbuilding; https://www.baesystems.com/en-uk/heritage/vosper-thornycroft [accessed 10 May 2022].

[170] Ministry of Defence, National Shipbuilding Strategy, pp.10–11.

Where these documentary examples address the technical and societal environment of the modern Navy and Chris Terrill's have explored the cultural and anthropological factors, the political aspects of the Navy's employment have instead received a staunch and stylised treatment in the contemporary *Warship: Life at Sea*.