

## Coming up for Air: Making Sense of the Australian 'Future Submarines' Debate

Written by Alan Bloomfield

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ALAN BLOOMFIELD, MAR 5 2012

In 2009 the Australian government released a defence white paper. Its most striking feature was an ambitious naval expansion plan: previous decisions to acquire two helicopter carriers and up to four Air-Warfare Destroyers were confirmed; eight large anti-submarine warfare 'Future Frigates' would join the fleet; and 20 much-larger 'Offshore Combat Vessels' would replace the current patrol boat, oceanographic and mine-sweeper fleets. But the biggest announcement confirmed that the Royal Australian Navy's submarine fleet would double from six to twelve, and possibly further.[1] Fittingly, a picture of three Australian submarines graced the front cover.

Cabinet will likely meet to choose a preliminary plan for the submarine programme before mid-2012,[2] beginning what will almost certainly become Australia's largest ever defence procurement. Unsurprisingly, the debate about what sort of submarines should be purchased – 'off the shelf' or an 'orphan' class, nuclear- or conventionally-powered? – has become much hotter in the first few months of 2012 as commentators both anticipate the coming decision and agitate for it to be made *soon*, lest a 'capability gap' open in the 2020s as the current *Collins*-class boats are decommissioned.[3] But before we can dive into the submarine debate the wider strategic context must be considered.

### China's Rise and Australia's Dilemma

The debate is part of the wider discourse about China's rise because, for the first time in its history, Australia's major trading partner is no longer a member of the Western alliance. There is little quibbling over whether China will become an Asia-Pacific power: indeed, it is assumed by many to have already attained such status.[4] Instead, most of the debate now revolves around what *sort* of China Australia should plan for and, at the risk of oversimplification, the question boils down to whether a future China is likely to be 'nasty' or 'nice'. Australia's defence establishment was divided by this issue during the white paper's drafting process, with the major intelligence analysis organisations assuming China would be nice and the Defence Department arguing that it would be nasty[5] – or, at minimum, Defence argued that Australia should adopt a robust 'hedging' policy.

The Wikileaks scandal revealed that the then-Labor Party prime minister, Kevin Rudd, strongly favoured the Defence Department's perspective. After describing himself to US Secretary of State Hillary Clinton as a 'brutal realist', he noted that, while efforts to integrate China into the international order should continue, the US and its allies in Asia should nevertheless 'be prepared to use force if everything went wrong'. After then describing the Chinese leadership's views on matters like Tibet and Taiwan as 'sub-rational and deeply emotional', he explained that the planned enhancement of Australia's defence capabilities was 'a response to China's growing ability to project force'.[6] Kevin Rudd has lost the top job since then but his successor, Julia Gillard, moved Australia decisively closer to the US with the announcement in late 2011 that a new US Marine basing facility will be established in Australia's north.[7]

Australia, of course, is not alone in worrying about the implications of China's rise. Japan announced a 'rebalancing' of its Self Defence Forces, redirecting them more towards naval operations in the southern theatre;[8] the navies of erstwhile enemies Vietnam and America now exercise together;[9] India is upgrading ties with both Japan and

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Vietnam;<sup>[10]</sup> and Singapore has recently upgraded Changi Naval base with a dock that can accommodate a US Navy-style super carrier.<sup>[11]</sup> More pertinently, Asian nations have been enhancing their submarine capabilities, either by creating (South Korea) or 'ramping up' production programmes (Japan), or through 'off-the-shelf' purchases from European or Russian contractors (Indonesia, Vietnam, Malaysia, Singapore), or by some mix of the two strategies (India).<sup>[12]</sup> China's recent assertiveness in Asian waters, most evident in the South China Sea,<sup>[13]</sup> is grounded in improved naval capabilities, especially under the sea.<sup>[14]</sup> As a consequence, many of the above-mentioned nations have increased both the number and speed of their acquisitions.<sup>[15]</sup> It is in this context of ever-rising strategic tension that Australia's dramatic increase in its submarine fleet must be understood.

## The Options

In determining what sort of submarines should be acquired, a number of considerations come into play. Three broad options will be considered in light of the following criteria: costs, including acquisition and operating; strategic and operational capabilities; interoperability with allies (especially America); self-reliance, including production and support; and domestic political and 'wider' economic considerations.

**Conventional Off-The-Shelf:** This option involves utilising an already existing *design* (with minor modifications), because it has already been announced that the new submarines will be *produced* in Australia.<sup>[16]</sup> A recent report indicated that Spain's Navantia, France's DCNS and Germany's HDW will be asked to present tenders, and the Kawasaki-Mitsubishi consortium which builds Japan's boats may also be invited, but Sweden's Kockums (the designer of the troubled *Collins*-class) will not be.<sup>[17]</sup> A 2009 paper estimated that the cost of acquiring twelve Type 214 submarines from German shipyards may cost only \$8.8 billion, and possibly much less if the Australian dollar remains at parity with the US dollar.<sup>[18]</sup> Given that adequate facilities are already present but a fully experienced workforce is not,<sup>[19]</sup> the cost of producing them in Australia would increase (but there are no relevant estimates). They would also be fairly cheap to operate, given the existing support facilities, the experienced workforce currently servicing the *Collins*-class, and the relatively straightforward nature of diesel engines. This option would also satisfy the self-reliance criteria, both in terms of the capacity to produce additional hulls and maintaining the fleet.

Importantly, this is a politically palatable option because a significant amount of the work would be done in Australia, producing jobs (especially in South Australia) for at least two decades. On one level, this option would seem to also fit the wider economic criteria because a lot of money would be spent at home: 73 per cent of the cost of building the *Collins*-class was expended locally, for example.<sup>[20]</sup> But another report published recently claimed that Australia suffers from a significant competitive disadvantage in the production of small numbers of super-sophisticated goods like submarines.<sup>[21]</sup> It noted that each dollar spent inefficiently is one less spent on other defence items, or on public goods like health or education, and that in a near-full-employment economy like Australia's, 'poaching' skilled workers from more productive sectors (i.e. mining) may cause overall economic losses.<sup>[22]</sup> So, some criteria – acquisition and operating costs, self-reliance and political benefits – suggest that the off-the-shelf option is a good one, although some of the wider economic benefits are questionable.

Yet the strategic and operational capabilities of this option are a stumbling block. No existing conventional design has the *operating range* that most experts believe is required, and this is an important consideration; Australia's maritime jurisdiction is one of the largest in the world, and if the Australian Antarctic Territory claim is included it becomes *the* largest.<sup>[23]</sup> One commentator, Ross Babbage, has disparaged off-the-shelf submarines as little more than 'mobile minefields' and 'crocodiles in the ditch', limited to operations immediately north of Australia. He believes the future fleet must be able to harass an enemy's supply lines, fire cruise missiles at targets well inland, and deploy special forces.<sup>[24]</sup> A number of other expert commentators make similar claims,<sup>[25]</sup> the Navy openly prefers long-range boats,<sup>[26]</sup> and the 2009 white paper itself asserts that 'long transits ... in our primary operational environment demand high levels of mobility and endurance'.<sup>[27]</sup>

With respect to the interoperability criteria, off-the-shelf designs which utilise non-US combat systems are frowned upon, and it is usually assumed that an off-the-shelf design would have to be fitted with an expensive (but unquestionably superior<sup>[28]</sup>) US-designed combat system to ensure interoperability with Australia's major ally. Doing this would in turn erode many of the cost-advantages of acquiring an off-the-shelf design.<sup>[29]</sup> Perhaps more

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pertinently, US combat systems are being fitted to the Air-Warfare Destroyers, and will therefore probably also be fitted to the new ASW frigates, so failure to fit similar systems to the submarines would limit interoperability within Australia's *own* fleet. For these reasons, it seems unlikely that Australia would favour the off-the-shelf option.

Nuclear Off-the-Shelf: Calls to acquire nuclear-powered submarines have been rising, and their allure is primarily related to their strategic and operational advantages. The most commonly mentioned – America's *Virginia*-class – can operate without refuelling for 25 years, it can travel faster underwater than any surface combatant, it can do so for periods limited only by onboard food stores (and the crew's psychological health), and it does so with far less 'signal' (i.e. noise) than conventional boats.[30] By contrast, the only way for conventional submarines to run quietly is to engage batteries, which rarely last longer than 100 hours, and this reduces speed by about 80 per cent. Newer designs incorporate an 'air independent propulsion' (AIP) system, but these still currently limit the submarine to two weeks underwater, they severely reduce speed, and two engines (i.e. diesel and AIP) are required, taking up additional space in the quintessentially 'cramped' weapons system that is a submarine. Thus, nuclear-powered boats have three major advantages: they can run fast and silent for, quite literally, years at a time; they can actually range out in front of and therefore escort surface ships (or 'catch' a target); and they utilise space more efficiently.

In terms of cost, however, the nuclear-powered option runs into some problems. The US Navy recently paid USD\$14 billion for eight *Virginia*-class boats,[31] so a rough calculation suggests twelve would cost about AUD\$21 billion, but other sources suggest that their 'sail away' cost would be about USD\$2.5 billion each,[32] meaning a fleet of 12 may exceed AUD\$30 billion. With respect to the 'wider' economic cost criteria, Defence Minister Stephen Smith has expressed concerns about developing a nuclear industry in Australia, virtually from scratch, capable of maintaining the nuclear engines,[33] and a recent expert report concurred.[34] Several commentators have suggested *leasing* nuclear submarines from America, thereby both eliminating the costs of disposal at the end of their engines' lives and substantially reducing in-life maintenance costs.[35] But the cost of leasing may still be very high, this option has not been formally canvassed with the US, and perhaps most importantly, the inability to service the boats would substantially reduce Australia's self-reliant capacities: indeed, it implies no capacity to *produce* submarines at all. And, of course, the *electoral*-political benefits of producing at home would be entirely voided: there has been no suggestion that Australia would ever try (let alone be allowed to) produce *Virginia*-class submarines at home.

Finally, *legislative*-political considerations weigh heavily on the nuclear-powered option. Broadly put, the flamboyant journalist Greg Sheridan is probably right when he observes that many Australians have a 'kooky phobia about anything to do with nuclear'.[36] More importantly, the Labor government's lower house majority currently relies on a Green Party member (and several independents) and Labor also relies on the Greens to pass legislation through the Senate. Perhaps Peter Reith, a former defence minister in the Liberal Party (the current opposition) puts it best when he says 'any mention of the word "nuclear" is just not possible for a Government in bed with the Greens'. Interestingly, while his former party carefully avoids discussing the nuclear option in public, Reith unambiguously supports it,[37] so a future Coalition[38] government may choose it. But all indicators suggest that a decision will be made by Labor soon – to replace the *Collins*-class by 2025 production should begin in 2016, so the design phase must begin no later than 2013[39] – and once this process starts a Coalition government would find it politically difficult to unwind. Accordingly, it looks likely that the nuclear-off-the-shelf option is also off-the-table.

'Son of *Collins*': In 2009 one report suggested that there seemed to be 'an early consensus developing around the future submarine as a deeply-bespoke design',[40] but a recent RAND Corporation report found that designing a submarine from scratch would be beyond the capability of a cost- and time-sensitive Australia.[41] It would also be a so-called 'orphan class': design faults would only become apparent once they began operating; and maintenance efforts would suffer from poor economies of scale. Accordingly, recent commentary seems to favour the less ambitious 'Son of *Collins*' option.

The problems with the *Collins*-class have been well documented. In 1999 it was reported that they included 'a combat system that doesn't work, sonar that's 25 per cent effective, faulty periscopes and propellers, and a hull that is too noisy'.[42] Most of these issues were rectified (at great cost) but more than a decade later it is generally accepted that while *Collins*-class submarines perform very well, they don't perform very *often*: there are typically only two, and occasionally just a solitary boat from the six-strong fleet, in the water at any one time.[43] Crew shortages

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are partly responsible, but the engines are the main problem according to the first phase of the damning *Coles Review*, released in December 2011.[44] In response the Defence Minister admitted that 'one of the greatest mistakes ... was not taking into account the great burden and difficulty of maintenance and sustainment over decades.' Given the seemingly endless travails the Royal Australian Navy has been put through, it may sound strange that the Son of *Collins* option seems to be firming as the favourite. But the Defence Minister also promised that 'this is not a mistake we will make so far as planning for the Future Submarines Project is concerned.'[45] The feeling seems to be, then, that lessons have been learned and mistakes will not be repeated.

A Son of *Collins* design would largely satisfy the self-reliant criteria because the submarines would be produced in the same facilities as the *Collins*-class. The main difference would likely be longer hulls, mainly to incorporate an AIP engine and extra fuel capacity, but the extra room could also be utilised for additional armaments (i.e. vertical-launch cruise missiles) and even possibly a docking bay for unmanned 'mini-sub' or manned special forces vehicles.[46] In other respects – communications and combat systems, dive/surface mechanisms, crew quartering etc. – it would be similar to the *Collins*-class, although questions obviously remain over the engines given, first, the problems with the current ones and, second, the possible need for extra power to propel a larger hull. But the general idea would be to use as many of the same systems as possible. This would mean that the existing production facilities would need little modification, and existing expertise in building and maintenance could also be utilised, ensuring that a self-reliant capability would not have to be created from scratch: or, at minimum, less start-up effort would be required relative to a totally new design. Still, a number of reports warn that because the last *Collins*-class boat was produced in 2003 much of the *production* expertise will have disappeared by the time production begins in 2016.[47]

When one considers strategic and operational matters, the Son of *Collins* option seems to satisfy most of the criteria. Despite all the criticisms of the operational availability of the *Collins*-class, it is generally accepted that *when* they work they are excellent submarines[48]: the US Navy in particular has regularly expressed respect for their capabilities.[49] They already have impressive range, and a longer hull would increase this by enlarging the fuel capacity, while future AIP systems may allow over three weeks underwater.[50] There are some concerns about the cost effectiveness of features like cruise missiles and mini-sub.[51] but even without them, armed with the most modern torpedoes and Harpoon missiles there seems little doubt that a Son of *Collins* submarine would be a very capable weapons system. With regard to the political and wider-economic matters, similar considerations to the off-the-shelf design option discussed above apply, namely, plenty of jobs would be created in South Australia and plenty of components would be sourced elsewhere in Australia.

The most controversial aspect of the Son of *Collins* option is its cost. The debate at present is focused on acquisition costs, and the various estimates vary wildly. Beginning with the lowest, after acknowledging that his figures were necessarily a rough estimate given that the full specifications have not been settled, and after analysing 20 production runs which produced over 80 submarines since 1980, Brice Pacey gave a range of per-unit-costs of between \$1.2 and \$1.6 billion, creating a range of \$14.4 and \$19.2 for twelve submarines.[52] But this excludes start-up costs like the cost of design modifications, upgrading production facilities and acquiring a workforce. Ultimately Pacey concluded that the fleet 'might be delivered for half of some earlier estimates, or \$18 billion'.[53]

This \$18 billion figure has generated significant controversy in the press.[54] The 'earlier estimates' that Pacey referred to were contained in Sean Costello's and Andrew Davies' 2009 report for the Australian Strategic Policy Institute. They began by noting that simply extrapolating the per-tonne cost (\$360,000) of the 3,000 tonne *Collins*-class boats yielded a unit-cost figure of \$1.4 billion, so making twelve may cost \$16.8 billion (excluding start-up costs). But they believed that the costs would likely be much higher because

the basic *Collins* design is now over twenty years old and the new boats will be much more complex in many respects. The suite of capabilities will be larger and the sheer size of the boat – the largest conventional submarines ever built – means that design and construction is likely to be more challenging. The physics of submarines will also preclude any simple scaling up of existing designs.

Their consideration of historical trend data showed 'an increase in real cost per tonne of approximately 3.8% per year' because 'the additional capability built into conventional submarines over times has come with an associated

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increase in both cost and weight'. Ultimately they concluded that a fleet of 4,000 tonne Son of *Collins* boats may cost 'a staggering \$3.04 billion (in 2009 dollars) per boat. For a fleet of twelve, we are therefore looking at a cost in excess of \$36 billion'.<sup>[55]</sup> Simple consideration of the difference between the initial and the final costs of the *Collins*-class production run lends support to their eye-watering conclusions: in 1985 the estimated cost of six boats was \$2.6 billion, but by 1999 it was clear they would cost \$5.33.<sup>[56]</sup>

To add fuel to the fire, South Australian media recently reported that the total benefit to the state may be as much as \$70 billion, taking into account both acquisition and ongoing support costs.<sup>[57]</sup> This last figure seems to be based on earlier press reports, the most damning of which claimed that 'the *Collins* class submarines are more than twice as expensive to operate as US Navy nuclear submarines that are more than three times bigger': specifically, each 3,000 tonne *Collins* submarine cost \$104 million annually; by contrast, the 16,500 tonne *Ohio*-class allegedly cost \$50 million per year. While these figures may not be perfectly reliable, the implications remain troubling. Defence Minister Smith responded by claiming that most of the problems with the *Collins*-class could be traced back to mistakes in the planning stage, and he reassured reporters that the Labor government 'was being careful about plans for 12 new submarines'.<sup>[58]</sup> At minimum, pessimists could be forgiven for viewing the Minister's assertion that 'she'll be right this time around' with some degree of scepticism. Put simply, when one considers the cost criteria of the Son of *Collins* approach – both acquisition and ongoing support – serious questions remain about its viability, which is troubling given the observation above that it seems to be shaping as the preferred option.

### The Continental/Forward Defence Debate

To properly assess the relative viability of the three options presented above requires a little more contextual discussion, this time historical, to add to the contemporaneous 'rise of China' context discussed earlier. Specifically, we must consider the upcoming procurement decision – virtually certain to be the largest Australia has ever undertaken – in light of the century-old debate about whether Australia should plan for self-reliant defence (the 'continental defence' position) or prepare to send expeditionary forces overseas to fight in its allies' wars and thereby try to maintain a balance of power favourable to Australian interests (i.e. 'forward defence').

The earliest articulations of the continental versus forward defence debate were made in 1908, when Captain William Creswell – for the navy, and favouring continental defence – and Major-General John Hutton (for the army, and a forward defence advocate) squared off in public over the issue.<sup>[59]</sup> Hutton more or less won<sup>[60]</sup> that early round, and it is generally accepted that until about the 1970s forward defence logic ruled, evidenced by the enormous efforts Australia made to assist Britain in both world wars. After 1945 Australia again assisted Britain (twice) in Malaya, but more importantly, it also offered substantial support to America in its Cold War conflicts, most notably in Korea and Vietnam.

In the late 1960s two events – Britain's strategic withdrawal from Asia and Richard Nixon's enunciation of the Guam Doctrine<sup>[61]</sup> – led to a change in Australian strategic thinking, with the 1976 defence white paper usually seen as the moment at which continental defence prevailed,<sup>[62]</sup> although forward defence logic was never fully banished. So, by the time the 1987 white paper was released,<sup>[63]</sup> continental defence logic was shaping a force structure biased towards the air force and navy, especially 'sea denial' assets like submarines and long-range strike aircraft. As the 1997 white paper put it, Australia's military should be 'developed to defeat attacks against Australia, and then to provide substantial capabilities to defend our regional interests. Priority will be given to the first of these tasks, but decisions will be influenced by the ability of forces to contribute to both tasks.'<sup>[64]</sup> Mid-way through the 2000s, and while Australian forces were deployed to Afghanistan and Iraq in support of American strategic objectives, two of the commentators we will examine below argued that forward defence was perhaps 'just' dominant again,<sup>[65]</sup> while the other felt Australia had 'transcended' the continental/forward defence dichotomy.<sup>[66]</sup> Yet the 2009 white paper said:

Australia's most basic strategic interest remains the defence of Australia against direct armed attack.... Our next most important strategic interest is the security, stability and cohesion of our immediate neighbourhood.... Beyond [this] Australia has an enduring strategic interest in the stability of the wider Asia-Pacific region ... We [also] have an interest in preserving ... international order.<sup>[67]</sup>

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On the face of it, then, continental defence remains the single most important determinant of Australia's strategic posture and planning. But forward defence logic remains 'present' too, so these two strategic paradigms remain the most entrenched and influential 'ordering devices' shaping Australian strategic discourse. More pertinently, we can see this enduring tension lurking in the depths of the disagreements between three especially influential strategic thinkers over the matter of submarine acquisition.

## Three Key Strategic Thinkers

Paul Dibb, the most influential drafter of the 1987 white paper – in which continental defence principles crystallised – has recently argued for the Son of *Collins* option. He rejects the nuclear option on the grounds that it implies too much reliance on American support, claiming that 'Australian governments of both persuasions have made self-reliance a central principle of defence policy', and that to go nuclear would be to swap 'independence for subservience'. He also rejects the off-the-shelf option because the 'distance of operating areas from Australia basically determines the required range and endurance'. He seems to favour a 'Son of *Collins*-lite' design because he plays down the need for 'Australia to mount independent operations against China in distant waters' (although he does, in a seeming contradiction, discuss operations in the South China Sea – presumably against China). So, Dibb prefers an up-dated *Collins* boat without all the 'bells and whistles' – like the capability to launch cruise-missiles or mini-sub – that others favour.[68] Clearly Dibb approaches the debate from a perspective which favours 'strict' continental defence principles, but he doesn't seem to be especially concerned about Australia's future strategic prospects.

Hugh White was the primary drafter of the 2000 white paper, which favoured continental defence but also concluded various secondary interests requiring Australia to retain some forward-defence-like capabilities. White is also well-known for his 2010 *Power Shift* essay which argued that China's rise was inexorable, and to avoid future regional conflict Australia should try to persuade the great powers (America, China, Japan, maybe India in future) to form a 'Concert of Asia' to manage the region.[69] He is, in short, pessimistic about America's long-term capacity for retaining strategic primary in Asia.

White is also on the record for lamenting the fact that, while Australians tend to blithely consider themselves citizens of a 'middle power', they also consistently underestimate the cost of being such, and he believes that unless they are prepared to raise spending on defence from around 1.8 per cent of GDP to about 3 per cent, a comprehensive self-reliant defence capability is hard to achieve.[70] With this in mind, and assuming as he does that Australian taxpayers will not stump up the required sums, in 2009 he favoured building a so-called 'focused force' in which spending on surface ships is reduced and the submarine arm is expanded to '12 boats, and eventually to 18'.[71] But this was before he published *Power Shift* which, as we saw above, painted a much more pessimistic picture of American staying power. Accordingly, in early 2012 he authored a press article which stated that to 'have an independent capability to defend the continent [w]e would need an absolute minimum of 18–24 boats', which implies that

to achieve this, the boats themselves need to be as cheap and simple as possible ... they should probably be diesel not nuclear, smaller rather than larger, and developed from an existing design, not a blank slate. And if we are to build a fleet of 18–24 then it makes sense to do it in Australia.

White therefore favours an off-the-shelf design which can be delivered quickly, in large numbers, and relatively cheaply (at least as far as unit-cost is concerned). Presumably he would accept that the range of such boats should be extended as far as possible, subject to the cost-implications of doing so. But he also seems relatively uninterested in preparing to fight with the US in distant theatres.

Ross Babbage, on the other hand, has emerged as the chief proponent of the nuclear option. Babbage has a reputation as a relatively aggressive strategic thinker: back in 1990, when a still-authoritarian Indonesia loomed as Australia's main strategic threat, he argued for the development of a 'full-suite' of strategic capabilities, from the high-end strategic air-strike option to the unconventional ability to respond, should Indonesia mount a re-run of its *Konfrontasi*-era harassment campaign in Australia's north, by carrying out covert sabotage of civilian infrastructure,

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attacks on private property, and even kidnapping or assassination missions in Indonesia itself.[72] More recently he has argued, like White, for significant increases in defence spending, dramatically calling for Australia to develop the capacity to 'rip an arm off' a regional great power by deploying between 20 and 30 submarines, an air force of between 300 and 400 modern fighter jets (i.e. an approximately four-fold expansion) and the deployment of ballistic missiles.[73]

One may be forgiven for thinking that Babbage is a strong advocate of continental defence thinking. But he believes that Australia has 'transcended' the continental versus forward defence debate, mainly because demographic, and especially economic growth, has produced a modern Australia that can now afford to field large, potent and strategically flexible armed forces. His most recent contribution to the wider strategic debate reveals that he is probably the closest thing Australia has to a 'contain China now!' advocate, somewhat analogous to John Mearsheimer in the US.[74] Accordingly, he favours nuclear submarines because they give Australia the ability to act in close concert with US forces in defending Taiwan, strike at military targets on the Chinese mainland, or choke off China's export-dependent economy by means of blockade.[75] The fact that nuclear submarines offer the best strategic and operational capabilities clearly underpins his preference for this option, and their suitability for both continental and forward defence roles – a boat which can reach the distant East China Sea can obviously also operate in the Arafura Sea – reinforces his convictions.

## Conclusion

The debate about purchasing a new fleet of submarines is a very complex one, not least because it may cost up to \$70 billion over the next three decades. All sorts of relatively technical considerations – costs, performance parameters, the capacity for interoperability, political benefits – will affect the decision. But the latter half of the above discussion also demonstrates that there are deeper, more instinctive assumptions which will affect the final decision, like the likely future intentions of China, the future viability of US primacy in the Pacific, and the willingness of the Australian electorate to pay more for defence. These latter considerations are 'big', abstract questions, and answering them rests on hard-to-definitively-refute assumptions about the future shape of global and domestic politics.

For what it is worth, this author's instincts lead him to foresee China being more nice than nasty, mainly because its economy is so export-dependent, and its rulers rely so heavily on continued economic growth to maintain their legitimacy. With average living standards at only 15% of rich-world standards in 2012,[76] China has a long way to go before it can be considered 'properly developed'. The staying power of the US as the global and Asia-Pacific hegemon is also arguably greater than the pessimists like White assume if only because, as G John Ikenberry explains, China is not actually facing the US *alone*: instead, it faces a set of *Western* institutions and alliances;[77] and, as noted above, states like Vietnam and India (typically not considered Western per se) have their own reasons to side with America against China. The willingness of the Australian taxpayers to bear a higher defence burden is hard to predict, but if history is anything to go by, they did so for most of the Cold War period (at rates around 3 per cent of GDP[78]). So, if relations with China *did* deteriorate they would probably be prepared to do so again, and if relations remain good then this question largely becomes moot.

These background factors therefore lead this author to, tentatively, support the Son of *Collins* option: more specifically, a son of *Collins*-lite, so a relatively 'basic' design which incorporates an AIP system but not cruise-missiles or mini-sub. The strategic and operational capabilities of such a submarine fleet are likely to be well-suited to both defending the Australian continent, the core role of the armed forces, and to operating in tandem with US forces further afield if required: the likely range of such boats is the major advantage they have over off-the-shelf submarines, followed by their capacity for interoperability. The political considerations, the wider economic aspects, and especially the way a Son of *Collins* fleet provides self-reliance in both production and, more crucially, maintenance, also weighs heavily against the nuclear option. But the potential *cost* of the Son of *Collins* remains problematic. If we could be certain that the new fleet *would* suffer through the same sort of trials as the *Collins*-class, then this option should probably be discarded. But if one is prepared to accept the old cliché that 'forewarned is forearmed' then perhaps the optimists among us will not be too dismayed if, as looks likely, the Son of *Collins* option is ultimately successful.

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