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The game-changer

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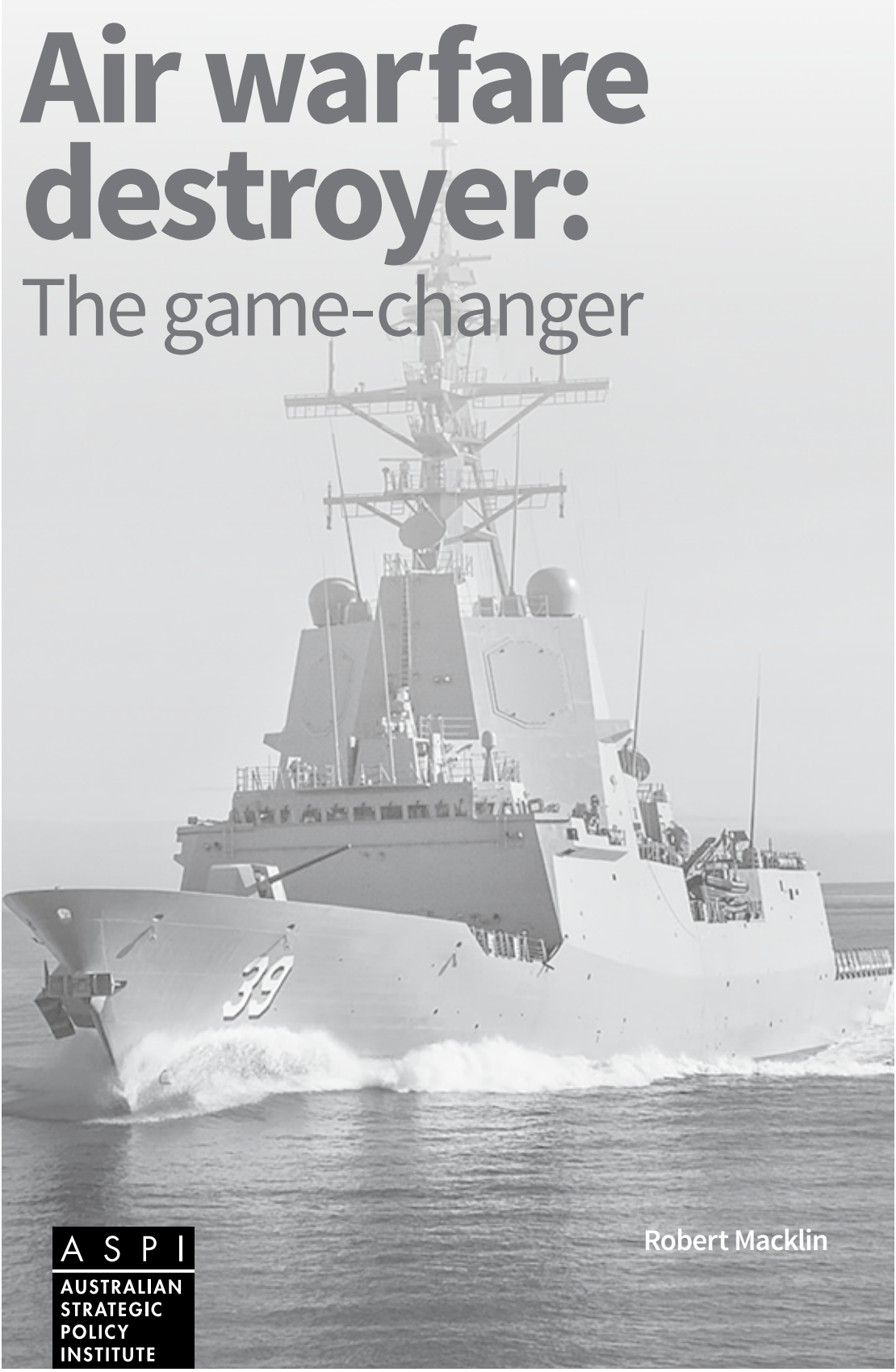

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Cover image: *The Hobart* on sea trials. Photo © AWD Alliance.

Contents

The Navy is concerned with capability and schedule; the government is concerned with cost and schedule. So if schedule blows out, the whole program has problems across the board.

—Dr Stephen Gumley, CEO of Defence Materiel Organisation, 2004–2011

Ships do not want to be constructed; a ship will fight you the whole way; it will do everything it can never to go to sea.

—Commodore Craig Bourke, Air Warfare Destroyer Program Manager, 2015–

Preface

Robert Macklin explains in this case study why the production of the 'muscular trio' of air warfare destroyers (AWDs) presented some of the most challenging procurement dilemmas ever faced by the Australian Government and the Defence organisation:

> The AWD procurement was like none other. It involved the reluctant departure from office of two defence ministers; it fell into almost every organisational pitfall imaginable; it ran wildly over budget and schedule; yet it laid the foundation for a continuous naval shipbuilding industry for the first time in Australian history.

Robert's second monograph for the *ASPI case studies in defence projects* series brings out the human drama and dilemmas of decision-making in what is a multi-billion-dollar, high-stakes business to equip the Australian Defence Force. Our aim, which he delivers on superbly, is to present a balanced, 'warts and all' account of the challenges involved in getting these decisions right. There's so much more to complex project management than simply cost, schedule and capacity. Robert shows how politics (both big and little p), technology, budgeting and the fallibility of human decision-making all intersect to make the defence capability development and acquisition business one of the most demanding of all public sector tasks.

Robert's overall conclusion is heartening:

> I have no doubt that we possess a cohort of extraordinarily well-qualified executives, naval officers, public service administrators, scientific and technical personnel—as well as an eager and motivated shipyard workforce—perfectly able to accomplish the challenges set for them … provided always that they remember the hard-won lessons afforded them by the AWD procurement.

This study offers a contribution to help those in Defence, industry and parliament, and interested observers, to better understand the complexities of the business—all with the aim of improving how Australia equips the ADF.

My thanks go to Kim Gillis, the Deputy Secretary of Defence's Capability Acquisition and Sustainment Group, for his continuing support of the case studies series. Like us, Kim wants to build a library of case studies in the interests of helping government, defence and industry leaders make the best possible capability decisions. As with all studies in this series, ASPI has shared drafts of the study with Defence and other interested individuals, but the judgements made here, along with any factual errors, rest with the author and the institute.

Peter Jennings
Executive Director
Australian Strategic Policy Institute

1. The launch

They gathered like the survivors of some mighty sea battle. Their vessel had taken several hits amidships, and there were times when it was hammered from all sides. Some of their shipmates had been badly wounded; others had been lost overboard. Their masters and commanders had been struck down and replaced. But they, the survivors, the veterans, had each made their presence felt in what must at times have seemed a war without end.

But end it did; and here, today, on the morning of 19 May 2018, at the massive Adelaide Techport, they had come to mark a closure to the struggle that had been waged for almost 20 years.

They all bore the scars or the honours of battle, often some of each. As they milled around towards the rear of their VIP section with its white chairs beneath a covering against the threat of rain, the Navy band began playing martial airs, and flights of seagulls rose into the fresh sea breeze.

From the green seats, where perhaps 600 other ranks from the battle sat in the open with their families, familiar faces could be discerned as the VIPs recalled the skirmishes won and lost. Their body language gave hints of the parts they'd played, and were still playing, in the narrative of the battle.

Over the past three or four months, most had kindly agreed to tell of their roles in the struggle that had produced the great, grey air warfare destroyer (AWD), NUSHIP *Sydney*, in the dock to our left. A powerful presence, its soaring superstructure and its clean, streamlined design overshadowed the men and women who danced attendance on their creation.

Warren King, for example, stood as still as a bollard, staring ahead from a face creased no doubt with pride that this, the last of his brood, would soon take its place with the two other AWDs, HMAS *Hobart* and *Brisbane*, as the strong right arm of the nation's surface fleet. But those hard-earned creases as the initial Program Manager and later CEO of the Defence Materiel Organisation (DMO) were joined today by a natural anxiety, for since those crowded days and nights of the build he had parted from government service to become the chairman of Navantia Australia. And the company's future was even now being decided in the high echelons of government as one of three contenders for the massive future frigate contract …[1]

Commodore Steve Tiffen, another long-term member of the AWD fraternity, chatted amiably with everyone around him, shaking hands, kissing cheeks, filled with the bonhomie of success. Steve was never so happy as when he was building a ship, unless it was seeing his handiwork launched upon the ocean wave …

Raytheon's Rod Equid, who as the AWD Alliance CEO had piloted the build through some of its darkest hours, seemed busy even now, when the job was done. He moved from group to group, back and forth like the organiser of some engrossing new project …

Steve Ludlam appeared, tall and expansive with a ready smile, a bright red tie and a grey topcoat. The former head of ASC Pty Ltd, the principal shipbuilder, his was a controversial tenure. As the master of ceremonies called the crowd to order, Steve relaxed in the last row of the white seats. Indeed, he had found a whole row to himself …

The MC, the neatly bearded Lieutenant Commander Desmond Woods, whose rounded vowels and clipped consonants bespoke a prideful past in the Royal Navy, filled the minutes before the ceremony proper with anecdotes and *bon mots*. He paid warm tribute to a man of remarkably good fortune in 97-year-old Ken Brown, who was 'with us today'.

Ken had served on *Sydney II* from 1936 but had left the ship before it was sunk with all hands by the German cruiser *Komoran* off the Western Australian coast. Transferred to HMAS *Perth*, he had also departed from that vessel before it was sunk by the Japanese in the Sunda Strait. Ken acknowledged the polite applause as the rain clouds rolled in from the west, but parted as they reached us to reveal blue sky.

Suddenly, Lt-Cdr Woods announced the imminent arrival of the first of the dignitaries, Minister for Defence Industry, Christopher Pyne, representing the Prime Minister. Then he cried, 'Car approaching!' And the Navy band gave a flourish!

My green-seat companions—two mid-level managers from Raytheon and BAE Systems—gave a start, but relaxed when the television screen on stage revealed the minister, dapper in his college grey suit, shaking hands with his naval hosts and making his way to the front of the white seats.

His was but the first of many 'Car approachings!' until the final arrival of 'the Lady Launcher' or, in modern parlance 'Ship's Sponsor', Mrs Judy Shalders, wife of the former Chief of Navy, Vice Admiral Russ Shalders, who also played a prominent role in the early days of the AWD story. For the moment, however, Lt-Cdr Woods reserved his eloquence for Shalders' captaincy of *Sydney IV*, the Adelaide-class guided missile frigate that *Sydney V*'s Hobart class was replacing.

Mrs Shalders, he told us, was Ballarat born and after studying Arts at Melbourne University had worked in the food industry in Sydney and Canberra.

They had married in 1976 and 'enjoyed the challenges and rewards of four decades of Navy life'.

However, in between the 'Car approaches!' and flourishes, Lt-Cdr Woods confided to the crowd that this was not only the first of the five *Sydneys* to be launched in Australia but, without our noticing it, the mighty destroyer was actually in the process of launching herself. 'She has begun her descent into the water,' he said, and only when 'her bottom is thoroughly wet' would Mrs Shalders do the honours.

This came as a disappointment to those of us who had been hoping for a traditional dramatic slide, rear first, into the briny, or better yet, the American version of a sideways slump into the harbour. Alas, the Australian way is more stately than dramatic: great and powerful apparatus lining the dock lowered the big baby girl gently into a harbour font.

Thereafter, as the speeches from Minister Pyne and the Navy Chief, Vice Admiral Tim Barrett, warmly congratulated all concerned, the spectators kept a weather eye on the traditional red kangaroo motif on the bridgework of NUSHIP *Sydney* as she sank very slowly towards the surface of her natural habitat, hopefully for the next 30 years.[2]

When the speechifying was done, Lt-Cdr Woods returned to the microphone with the news that we weren't the only ones witnessing this ceremony. A live feed of the event was going out to some 1,200 viewers across the nation and in Spain and the US. And when *Sydney's* 'bottom' finally touched water, he introduced Mrs Shalders, who accepted an armload of colourful proteas from a naval rating and a pair of long, silver ceremonial scissors.

Then, at an unseen signal and with grace and natural charm, she used the scissors to cut the tie to a splendid bottle of 'Bird in Hand' sparkling Pinot Noir from the Woodside winery in the Adelaide Hills.

'I name this ship "Sydney",' she intoned. 'May God bless her and all who sail in her.' And the Bird in Hand bottle willingly sacrificed its contents against the destroyer's prow.

To add a little dramatic flair, two modest pillars of steam rose simultaneously from behind the stage, the Navy band did a quick chorus of *Waltzing Matilda* and in the harbour the fire safety crews on boats sent plumes of water skywards from their hoses as the applause rang out from across the assembly.

The Navy Chaplain, Rev. Wayne Philp, took the lectern and, with his white hair blowing in the breeze, sought the blessings of the Almighty 'who has power over the wind and waves, so that, whether in storm or calm, peacetime or conflict, she may always be guided by You and brought safely to her desired destination'.

It was then left only to Commodore Craig Bourke, the final AWD Project Manager and Alliance General Manager, to give his special praise to the people on the green seats. 'Your commitment has been fundamental to the program's success,' he said, 'and its ability to deliver these essential assets to Australia's national defence. We are extremely thankful for your commitment to the program and are very pleased to see so many of your families here to witness this major milestone.'

The *Sydney* rocked gently at her moorings, all 7,000 tonnes and 146.7 metres of her. Her top speed was 28+ knots (52 kilometres/hour), and her range at 18 knots more than 9,000 kilometres. Her armaments were impressive: the Aegis weapon system Baseline 7.1, the AN/SPY-1 phased array radar, a Mk 41 vertical launch system (VLS) with 48 launch cells), a Mk 45 5'/62 calibre gun, and advanced Harpoon weapon control with two quad launchers.

While she was some 82% complete, there was still much to be done before she could take her place with sister ships *Hobart* and *Brisbane.* But when her sea and combat trials were done, this muscular trio of warships would take their place at the forefront of the Australian fleet.

Only then would the battle of the build gradually fade in memory as new challenges were measured and met in the great maritime sovereignty of our island nation.

2. The plan

The AWD procurement was like none other. It involved the reluctant departure from office of two defence ministers; it fell into almost every organisational pitfall imaginable; it ran wildly over budget and schedule; yet it laid the foundation for a continuous naval shipbuilding industry for the first time in Australian history.

It was the ultimate game-changer.

Both the departed ministers were and remain enthusiastic supporters of the project. In 2007, Joel Fitzgibbon was appointed the first Defence Minister of the Rudd government, and it was his initiative to create a 'Projects of Concern' declaration that would warrant government intervention into the AWD Project when it struck trouble. 'I decided we needed a structure on programs at risk and a rehabilitation program,' he says.

However, by 2008, he had come under pressure for not declaring free trips to China donated by a supporter. And when it was disclosed the following year, by then Senator David Johnston, that Fitzgibbon's businessman brother had used government offices to meet a top defence official, Fitzgibbon tendered his resignation. Nevertheless, he willingly participated in the research for this case study and retains a strong interest in the success of the AWD and a local naval shipbuilding industry.

Ironically, in November 2014 the same Senator Johnston—by then the first Defence Minister of the Abbott government—publicly berated the AWD's prime contractor, ASC Pty Ltd, which is owned by federal government, saying he 'wouldn't trust them to build a canoe!' A media outcry followed; morale at ASC took a body blow and soon after Abbott demanded Johnston's resignation.

Behind the scenes, he says, other factors were in play. 'Abbott knew what was happening down at ASC.' he says. 'He wanted to buy Japanese submarines off the shelf. I said you've got to be kidding. He persisted and I just said, 'No way' and Navy supported me.' But either way, within a month Johnston was gone. Today, he remains a valued member of the defence industry fraternity—on the board of SAAB and the Council of ASPI.

But whatever the political twists and turns, there can be no question about the extraordinary trajectory of the project. It plunged into horrendous problems of scheduling, productivity and quality control before dramatic remedial action dragged it back to an acceptable throughput. And opinions vary widely among observers and the strong-minded participants as to the cause of the problems and the keys to the recovery.

Policy, procedure and personality all played their part in both aspects of the program. Another factor unique to the AWD Program was a pervasive concern with 'culture'. In this context, it refers to the manner and method of both shipbuilding and management. The relative importance of each element remains at issue. This case study can only cast a retrospective light on both. The reader will judge the significance of the merits and the mistakes revealed.

Almost from the beginning, the program was the focus of fierce debate. Its genesis was the Navy's deep concern for an air warfare defence capability. Vice Admiral David Shackleton had developed a 'State of the Navy' report for Defence Minister John Moore and says that in 1999 he presented the minister with a plan showing 'the stark reality' of their requirements. Later that year the INTERFET action in East Timor 'was a fundamental wake up call for Australia. If it wasn't for the US Navy with its Ticonderoga cruiser, any air threat from Indonesia could have been a very big problem,' he says, 'Getting the AWD program into the 2000 policy statement occupied an enormous amount of my time and energy. Getting it in the White Paper literally was *the* game changer.'

Vice Admiral Peter Jones Rtd says the Navy sought the inclusion not just of the AWDs but of 'a long-range 30-year plan for local naval shipbuilding'. It wasn't an easy sell. It's author, Hugh White, a Deputy Secretary of the Defence Department and later the founding director of ASPI, was at best an agnostic about the efficacy of surface warships. 'Modern surveillance systems make [them] easy to find and modern long-range precision-guided munitions make them easy to hit and quick to sink,' he later told *The Age*.

However, he says, Prime Minister John Howard was determined to expand and improve all elements of the nation's defence capability and, after a series of prime ministerial briefings, the AWDs were approved. Peter Jones says, 'We missed out on the long-range plan, but we did get the DDGs.'

The ships would replace the four remaining Adelaide-class frigates, which had been in operation since the early 1980s and would be progressively withdrawn from service, the last scheduled for 2019. By then, to Peter Jones's pleasant surprise, his long-range naval shipbuilding quest would be a done deal. Indeed, former minister Johnston calls him, somewhat colourfully, 'the founding father of the new Navy'.

The White Paper was released in October 2000 by then Defence Minister John Moore and Prime Minister Howard, who proclaimed it 'the most far-sighted reshaping of Australia's defence capability in a generation'. But by 2002, when Vice Admiral Chris Ritchie became Chief of Navy, the White Paper, he says, 'was almost worthless because we'd run out of money'. This was but one of the impediments in the vital

Phase 1 of the AWD Project between 2000 and the first pass by the National Security Committee of Cabinet scheduled for 2005. Indeed, it now seems clear that many of the subsequent problems can be traced to decisions taken in this critical period.

Ritchie, now 69, a tall man with an avuncular manner, recalls wrestling with the funding gap. 'It got to the point in 2003 where we had to revise the whole stream of procurements,' he says. Defence Department Secretary Ric Smith convened a roundtable conference with his top people. 'We all sat down and said "Where do we go from here?"' Ritchie says, 'and out of that capability review we firmed up the requirement for the three air warfare destroyers and two LHDs [landing helicopter docks].'

These amphibious assault ships weren't specifically mentioned in the White Paper but were at the top of the Navy's needs for regional operations. 'One depended on the other,' Ritchie says. 'If you had an LHD with 1,000 troops on it there was no point in sending it anywhere if you couldn't protect it. So they came as a package and we had to decide what came first.'

As often happens in government departments, outside consultants would be engaged to assist the process, ostensibly to provide expertise not available within the department. By then a new Defence Minister was at the helm. Senator Robert Hill, a proud South Australian, would remain in the portfolio until 2006 and bring a much-needed sense of continuity to the post.

But since one of the current concerns was the future of the government's own shipbuilding facility, the ASC (nominally owned by the Minister for Finance, Nick Minchin), they would engage the Melbourne firm Carnegie Wylie for financial advice. As we shall see, Carnegie Wylie would play a more significant role that was perhaps first envisaged.

The 2003 Kinnaird Report had led to a rigorous two-pass system by federal cabinet for new acquisitions.[3] The first pass required a business case 'based on clear cost/benefits and risks'. This is where Carnegie Wylie made its initial impact on the project. Finance Minister Minchin was an economic 'dry' with little appetite for government ownership of shipbuilding facilities. Both he and his department were anxious to sell ASC to private enterprise at the earliest opportunity. He and Defence Minister Hill asked Carnegie Wylie for advice 'on a range of issues associated with the naval shipbuilding and repair sector, and the ASC'. One of the more pressing issues was the potential sale of ASC.

The consultancy was formed only in 2000 by Brisbane-born John Wylie, whose commerce degree at Queensland University was followed by a Rhodes Scholarship to Oxford, where he took his PhD before joining the investment bank, First Boston.

In 1991, he moved to Melbourne and was managing director of Credit Suisse/First Boston there between 1994 and 1999, during time which he worked on the privatisation of Qantas and the Victorian Government's selldown of its power industry. He was (and remains) a very keen sports administrator and became chairman of the Melbourne Cricket Ground Trust in 1998. He oversaw the ground's $465 million redevelopment from 2001—an experience that, somewhat surprisingly, would have far-reaching effects on the AWD procurement.

His business partner Mark Carnegie, son of the highly influential Melbourne businessman Rod Carnegie, was already an established figure in financial circles. He had taken a science degree at Melbourne University and a BA in jurisprudence from Oxford. As a venture capitalist, he'd made a series of lucrative investments and would later join with advertising figure John Singleton in a major media acquisition. According to the Melbourne University magazine *3010,* he'd gained a reputation as 'a big-thinking investor with a range of social and political views that are never less than challenging'. Shipbuilding didn't figure at all prominently in Wiley's and Carnegie's experience at the time.

While the sale of ASC to a private concern was the trigger for their engagement, they were also asked to advise on which of the big shipbuilding projects should take priority. And, since the AWD build was far more complex than that of the troop carriers, four months after the company received its commission the ministers announced that 'the $4.5–$6 billion contract for the AWD will be brought forward before the proposed $1.5–$2 billion contract for the amphibious vessels.' They also accepted the advice that:

> the sale of ASC will be deferred until after the AWD and amphibious vessels contracts have been let to allow the shipbuilding industry, including ASC, to focus on tendering for these projects. As a result, ASC is unlikely to be sold until 2006.
>
> In the meantime, ASC will be established as a Government Business Enterprise (GBE) which will formally require the company to operate efficiently, earn at least a commercial rate of return and observe a more standardised and transparent reporting framework.

Meanwhile, the government had decided, on recommendation from the Defence Science and Technology Organisation (DSTO) and the Navy, to install the well-tried Aegis combat system from the US in whatever vessel (or 'platform') was chosen. Dr David Kershaw, now DSTO's Chief of Marine Division, was deeply involved. 'Up to 2003 we were very much part of the recommendations that led to saying Aegis is the way to go,' he says. 'We had a number of other studies that we were going to do through that period, but once the Aegis decision came through we decided to close down on that point. From about 2004 on, our role was primarily to address issues as they were brought up by the AWD team and then the Alliance.'

Aegis was the core of the project's air defence capability, the 'active ingredient' in the operation. Indeed, there's a rare general agreement that the combat system is the greater part of the ship's sum and substance. 'Its job is to shoot down missiles and protect its element of the fleet from attack,' according to one high-ranking naval officer who asked not to be named. 'Everything has to be directed to that purpose.'

The AWD's Aegis system is designed to detect incoming short- and medium-range missiles through its SPY-1 phased array radar and to intercept them using powerful computers to track and guide defensive missiles fired from the ship's vertical launchers. It also has the capacity to incorporate antisubmarine and land-attack missiles in its defensive capability.

Vice Admiral Ritchie was given the task of negotiating the Aegis purchase from the US on a 'foreign military sales' (FMS) basis that guaranteed a price, schedule and quality very similar to those enjoyed by the American military, though with some protective intellectual property rules. 'I clearly remember going to America, staying in a hotel suite near the Washington Navy Yard,' he says, 'and on a Sunday, Fred Moosally [Aegis General Manager within Lockheed Martin] came and sold me on the idea.

'Fred's avowed enemy,' he says, 'was Dan Smith, the Raytheon man.' Indeed, so lively was the competition between the two US defence contractors that, when one of them scored a tender win over the other, the winner sent a van to park outside the loser's office carrying a big painted sign saying, 'WE WON!' Ritchie laughs. 'He was just trying to annoy the other bloke.'

Raytheon lobbied vigorously on its own behalf. 'Dan Smith was trying to say to us, "This [Aegis] is old technology; you want to get with [our] new technology".' However, Ritchie consulted the US Navy which, he says, advised him: *It's okay to be on the leading edge of technology, but not the bleeding edge of technology.* 'So we said Aegis, and that was not very controversial.'

But nothing in the AWD procurement is without a twist in the tail. The fierce competitor, Raytheon, would be given the task of 'integrating' the Aegis system into the other complex elements of the AWDs' electronic systems.

Indeed, Raytheon would be responsible for the design, integration, testing and activation of the Hobart-class combat system for the three destroyers, as well as the delivery of the associated land-based support facilities.

This involves the integration of 10 major subsystems, including the Aegis weapon system, with more than 3,500 major pieces of equipment required to establish the war-fighting capability of the AWD. It was a big element of the project, and, by force of circumstance, Raytheon would come to play a leading role in the program.

3. The first decisions

The Kinnaird Report also gave added responsibility to the DMO as an executive agency with the task of managing the projects and authorised its CEO to assign 'capability managers' to particular projects. The CEO chosen for the role was Stephen Gumley, who after taking an engineering degree at the University of Tasmania won a Rhodes Scholarship to Oxford, where he earned a PhD in engineering and followed it with an MBA.

He had strong qualifications in defence industries such as Boeing in Seattle, and just before his appointment to DMO he had headed what was then the Australian Submarine Corporation in Adelaide. He would remain in the post through much of the AWD's most difficult period until 2011. Indeed, he says it would become one of the most troubling projects among his more than 200 procurement operations at a time.

'Everybody was lobbying for position early in the program,' he says. 'They'd come to my office; they'd write letters; or they'd get appointments with the minister of the day or they'd lobby their local member.' The pressure would be unrelenting throughout.

He appointed an AWD Program Director in Warren King ,who would work full time on the project. Indeed, the dapper, articulate King would become the central guiding figure throughout most of the operation.

Born in Ferntree Gully in Victoria's Dandenong Ranges, he left his local high school at 17 to join the Navy in 1967. His first ship was the Battle-class HMAS *Anzac*, commissioned in 1951, and life on the ocean wave harked back to the early seafaring days, with the sailors sleeping in hammocks. 'Every morning you had to jump out, lash up your hammock and put it in storage,' he says. 'You then erected tables and had your breakfast. That's where the term "mess deck" came from. One of the kindest acts that ever happened to me was it blew up its boiler. I don't think it ever went to sea again.' He transferred to the newly built guided missile destroyer, HMAS *Hobart*. 'It was fabulous,' he says. 'Ultra-modern, American style, really good.'

He would spend 20 years in the Navy, returning to high school as an apprentice, and rising through the naval colleges and the University of NSW in Sydney. Then came transfers to the US, where he worked on combat system integration and engineering for the FFG-7 class of guided missile frigates being built in multiple shipyards. 'At the peak there was a ship being delivered every 10 weeks,' he says.

It was a turning point. He was excited by shipbuilding. 'I learned an awful lot about project management there,' he says. 'My whole career was much more combat system management, but if you think about a warship, about 65% of the value is in electronics.'

He left the Navy in his late 30s and worked in defence industries before joining Raytheon. 'I ran the bid and the team that did the Collins [submarine] replacement combat system,' he says. 'Since that time there's been no complaints about Collins' performance in the combat system. So from that background I was then recruited to run the AWD project.'

At the same time, two other significant figures entered the arena: Kim Gillis and Peter Croser. Both men would play vital parts in the drama as it played out over the next 15 years. Gillis was the Program Director of the LHD project and later worked in the high echelons of the Defence Department. Croser would become a vigorous proponent in the AWD design competition and then act as one of the 'saviours' of his former opponents' endeavours.

But before the ship that would carry the combat system was selected, the first phase of the AWD project involved two more critical decisions: the choice of the shipbuilder and the *modus operandi* of the build. Both would be highly contentious. Traditionally, the shipbuilder was the principal in the operation and would engage subcontractors to draw all elements of the build into the shipyard. However, in this case they chose to create an 'alliance' of the major parties.

According to Warren King, the finance consultant, John Wylie had been greatly impressed by an alliance system used in the construction of a substantial part of his Melbourne Cricket Ground redevelopment. In essence, all parties would operate as a team, sharing in the gain in profits for bringing it in on time and budget and the pain of losses for overspending and failing to meet the schedule.

Wylie wasn't alone. According to DMO head Steve Gumley, the concept had been vigorously promoted by some Australian industry leaders as far back as 2002. It had never previously been used in shipbuilding but was said to be suitable for high-risk ventures. Warren King says, 'It was one of the principles of the project I questioned early on. It was the absolute flavour of the month. I got a resounding, "Get back in your box and run the project!"'

A highly regarded study by Queensland academic John Paul Davies found that 'All alliances create accountability tensions with shared decision-making and diluted accountability. In particular, alliances can potentially hide broader problems such as poor specification development, project management and contract drafting

practices.' Those warnings would echo down the years ahead. 'On the other hand,' Davies says, 'I do consider that there is a legitimate niche for using the alliance process in high risk projects that are subject to variable scope.'

The underlying concept is attractive. Whether it was an appropriate vehicle for a complex shipbuilding operation is an open question. According to a 2013–14 audit by the Australian National Audit Office (ANAO), 'The Alliance contract is intended to provide financial incentives to motivate the Industry Participants to work together to mitigate AWD Program costs and to quickly resolve issues.' However, if it were to have the best chance of success, all the major participants would be party to the contract.

Vice Admiral Chris Ritchie had accepted the role of Chairman of the AWD Principals Council, a body initiated by Minister Hill to provide him, Ritchie says, with some insight into what was happening in the program. 'In the Alliance structure,' he says, 'that was where dispute resolution would occur. It comprised ASC chairman John Prescott (formerly of BHP), the head of Raytheon, Dan Smith, normally resident in America, and Steve Gumley as head of DMO.

'The issues concerned how the contractual part of Alliance was coming together; and how the issues coming up would be brought to this body. It was where Prescott, Smith and Gumley could beat each other around the ears and come to an agreement.' In the event, according to the ANAO report, it would meet only rarely, and one essential player would decline to join it.

4. The shipbuilders

The second critical decision was the choice of shipbuilder. This became a contest between the government's own ASC in Osborne, at the port of Adelaide, and Tenix Defence in Williamstown, Victoria. Moreover, they would be asked to bid without knowing what vessel they would be required to build.

They weren't working entirely in the dark. Separate Defence committees incorporating the Navy, DMO and DSTO had first considered three options, including the German Blohm & Voss F124. However, at 5,600 tonnes it was basically an air defence frigate and had never employed an Aegis combat system, so it was soon eliminated. The second option was first described as an American Gibbs & Cox DDG-51 Arleigh Burke-class destroyer. The class is named after a distinguished American admiral and built principally at the Bath Iron Works shipyard in Maine. The third option was the Spanish Alvaro de Bazan-class (F-100) built by Navantia at its Ferrol yards in northern Spain.

Apparently believing—with some justice—that the American option would be the favoured contender, ASC engaged Bath Iron Works as a consultant when it was preparing its bid. And although ASC had never before built a surface warship—and its Collins-class submarines had attracted massive criticism—the CEO of the shipbuilding division, John Gallacher, mounted a very spirited campaign.

A Scot by birth, Gallacher had come to Australia after completing high school and studied engineering at RMIT. He gained a wealth of experience in major project development in a range of shipbuilding, mining and construction industries, where he became known for his strong team loyalty and open communication.

Tenix Defence had more than one iron in the fire. Its record was excellent. While its headquarters were in Williamstown, it also operated from Henderson shipyards in Western Australia and the Whangarei site in New Zealand as well as smaller units in Darwin, Cairns, Brisbane and Sydney. If ASC were to be sold, Tenix was the most likely buyer, and the sale would deliver it a virtual monopoly as Australia's naval shipbuilder.

Tenix had built 10 Anzac-class frigates and was the clear leader in the LHD contract proposed as a joint operation with Spain's Navantia. As a Victorian operation, it had some powerful political clout through federal Treasurer Peter Costello, as against senators Hill and Minchin from South Australia.

Both state governments invested political prestige and substantial funding to assist the bids. South Australia committed to a common user shipyard facility, which later became Techport at the Osborne yards. Victorian Premier Steve Bracks mustered support from all elements of industry, from the unions to the major employers.

However, since neither bidder could fully anticipate the demands of a yet-to-be-chosen vessel, they could do little more than parade their virtues. 'It was a beauty contest,' says Commodore Steve Tiffen, one of the few participants in the project able to view the entire program at close quarters. 'The ASC bid in particular was full of glitz and glamour,' he says.

Born in 1966, Tiffen joined the RAN at 20 as an undergraduate engineer officer. Posted to sea on HMAS *Parramatta* in 1989, he rose through the engineering ranks and by 1998 was instructing in marine engineering theory for the Royal Navy at HMS *Sultan* in the UK. Promoted to captain, he became Capability Manager for the Anzac frigates in 2004 and transferred to DMO as Platform Systems Director for the AWD Program in 2006. He would remain with the program in various key roles until 2014. 'Shipbuilding is in my blood,' he says. 'I love it. Seeing something created from nothing, you're really crafting something; you can see it come to life in front of you.'

The bid was a fascinating operation. 'Tenix relied heavily on the fact that they were in continuous production and that they had a pedigree,' he says, 'but without really answering the tender.' On the other hand, 'the ASC bid was really good. And they considered so many things, even down to splitting the build up because they realised that they couldn't do it all in Adelaide and they'd have to spread it around Australia. I think that was a big seller in the bid.'

Warren King says, 'We had contemplated that as a solution. But they certainly offered it in order to make it a national approach. It seemed to us at the time that it defrayed a lot of the risk of the workforce. You can assess other yards; you can distribute the work; you didn't have the same peaks and troughs.'

From the federal government's viewpoint, it meant it could be seen to bring employment and investment to several states, earning political credit. Moreover, the Navy had no objection to sharing in the political windfall. Vice Admiral Chris Ritchie says, 'You build stuff to get a capability, but also to establish an industry and create jobs. Everything has a dual purpose. It's got a political purpose and a capability purpose; I don't have any problem with that.'

However, he was concerned that the yards were tendering before the ship design had been chosen. 'Structurally, it had gone wrong,' he says. 'How can you tender to build something when you don't know what it is you're going to build? It's illogical to do things that way.'

In May 2005, Minister Hill announced ASC as the winner 'based on ASC's superior bid in terms of value for money'. Then, in an example of what Warren King would later term 'a conspiracy of optimism', the minister said, 'I do think we can have a degree of certainty in relation to this project on price and schedule … a degree of confidence that we haven't had in past major projects.'

At the launch ceremony, Vice Admiral Russ Shalders, soon to become Chief of Navy and a very active player in the AWD narrative, said the ships were likely to become 'the centrepiece of the Navy for the next 40 years'. The minister confirmed that the government would provide $455 million for Phase 2 of the project—the choice of the vessel—while the losing bidder, Tenix, announced that it would 'focus its efforts on securing the contract for the next major Australian naval shipbuilding program, the two LHDs'.

In that, Tenix would be successful, but before that program would be completed the Australian company would be taken over by BAE Systems, formed in 1999 following the merger of British Aerospace and Marconi Electronic Systems. This would eventually throw a 'cultural' spanner in the AWD works.

Vice Admiral Ritchie says, 'The Victorian Government thereafter always believed that there had been political interference from South Australia, and that government put a lot more into it than Victoria.' However, Steve Gumley disagrees. 'It wasn't a consideration as to how much money the two governments put in,' he says, 'but clearly infrastructure is an important factor in the overall efficiency of building a ship. And South Australia had made a decision previously to build the Techport facility. ASC put in a bid based on efficiency.'

Nevertheless, Warren King says he 'was always concerned that they had no shipbuilding experience'. Moreover, 'About halfway through that program I came to the conclusion ASC didn't have the commercial drive to be an effective shipbuilding partner, and I said so to the minister of the day.' He sought out Brendan Nelson. 'I said, "Personally, I think we probably need to stop the process". He said, "Well, what's the way around this?" and I said, "The only other way is that we commercialise ASC the day the contact's signed."'

As it happened, the surface shipbuilding arm of ASC, he says, became ASC AWD Shipbuilders, a separate Australian company that (in theory) could be sold off separately from the submarine business.

In the meantime, the two contenders for the ship design—America's Gibbs & Cox and Spain's Navantia—began laying the foundation for their bids. From the outset, it appeared to all concerned that the Americans were probably a shoo-in for the job. That was hardly surprising. The security alliance with the US had been the basis of Australian defence since World War II. Australia's navy prides itself on its 'interoperability' with the US Navy. The Arleigh Burke destroyers were well regarded

internationally, and they boasted the Aegis combat system, which ensured the defensive capability that the AWD planners demanded.

The Navantia F-100 class was also equipped with the Aegis system and had a good record with the Spanish Navy. It had performed well in blue water and was well regarded internationally. But it had never been built outside the company's Ferrol yards, and Australia had virtually no defence relationship Spain and no knowledge of its shipbuilding practices.

Navantia would clearly prefer to build the vessels in Spain. According to Steve Gumley, 'They were saying you could build four AWDs at Ferrol for the same price as three in Australia. They claimed that the Australian build was a 33% cost premium. That was never tested—it's a marketing statement—but that was the sort of information they were giving out.'

In choosing an Australian build for the AWDs, the Howard government bypassed not only the overseas build option but the chance to buy three AWDs 'off the shelf' from the US or Spain. By general agreement, there's little doubt that in each case the ships could have been delivered in relatively short order at a considerable saving in cost.

However, both sides of the Australian political spectrum favoured the Australian build. The shadow Defence Minister, Labor's Joel Fitzgibbon, personally supported the plan. The project, he knew, would create jobs in politically sensitive regions, and Australia would develop local expertise in maintaining, repairing and upgrading the vessels.

Each of the contenders was given space at ASC to develop its bid, but with a 'Chinese wall' between them. Steve Gumley helped arrange the engagement of eminent jurist Sir Laurence Street as the probity auditor to ensure that neither side was getting an unfair advantage. 'It was an unusual situation, but the number of dollars at stake was so great it made sense to appoint him,' he says.

This was the state of play when Steve Tiffen applied for and won the approval of Warren King and his deputy Program Manager, Commodore Andrew Cawley, to become Platform System Director for the two variants being considered. And, somewhat to his surprise, he discovered that the American ship wasn't the Arleigh Burke. 'It was very different,' he says, 'nothing like an Arleigh Burke.'

Behind the scenes, the government had decided that the American ship, at about 10,000 tonnes and with a crew of at least 300, was too big and too expensive to be sustained by an Australian administration with limited funds. Indeed, it was among the largest destroyers in the world and its operational range was only about 3,000 kilometres, while Australia's location called for at least double that range. Its one saving grace was that it carried 96 vertical launch cells. And Admiral Russ Shalders—who declined to be interviewed for this study—regarded this

capability as essential if he was going to provide protection for his sailors in time of war. When he noted that the Navantia vessel carried only 48 vertical launch cells to counter incoming fire on an Australian flotilla, he knew he had a problem.

In January 2006, Senator Hill abruptly departed his ministry and retired from the Senate, to be replaced by the up-and-coming Brendan Nelson, a former president of the Australian Medical Association and until then the Minister for Education, Science and Training.

Now director of the Australian War Memorial but blessed with a forensic memory and a politician's easy charm, he sits forward in his pleasant office in the memorial's admin centre. 'When I came into the portfolio,' he says, 'it was pretty clear that our Navy wanted the American ship, and it expected to get an American ship.'

By this time, the size constraint required a smaller platform design, but it incorporated what was termed 'Arleigh Burke technology'. It was officially referred to as an 'evolved' Arleigh Burke, though the Navy top brass still seemed in no doubt that it should be the preferred model.

And the Gibbs & Cox team driving the bid included some powerful and well-respected figures. Chief among them were the company's Australian managing director, Peter Croser, and Raytheon Australia's top man, Rod Equid. Croser, a strong-minded Navy man, came from a distinguished South Australian family. He joined the RAN in 1975 as a marine engineer officer and added to his qualifications in the UK, graduating from the Royal Naval Engineering College in 1978.

His seagoing experience included operational service in the Cold War with the Royal Navy, and in industry he had taken a leading role in the development of CEA Technologies, which made great advances in phased array radar under the tutelage of his elder brother, Ian Croser. 'My team were developing the evolved design,' he says, 'and Rod was in charge of the total solution, including logistic support, training through life, support, the whole bit.'

Rod Equid is a personable man with a tutorial air. Born in Melbourne and an engineering graduate of Monash University, he joined the Air Force, completed a master's degree and became a weapons engineer specialising in guided weapons. After 15 years, he turned to industry, worked for a small company consulting to Raytheon, came aboard and helped establish Raytheon's capability in Australia.

He says, 'The [Defence] Department went into first pass with the government and said, "We've got this good idea. We've picked Raytheon. We've picked ASC. We want to pick Gibbs & Cox to do an evolved design. And that's our first-pass proposal". And the government, I believe, at the time said, "Thanks very much for that. But [in line with the Kinnaird Report] you're also to consider and contrast that with an off-the-shelf design." So Navantia was chosen to propose an existing design, the F-104 ship which was in service, [but] with limited changes to suit the [Australian] constraints.'

That was when a coalition of the interested parties formed around the American design. Rod Equid says, 'I was asked by all of the partners—the Commonwealth, ASC and Raytheon—to run the evolved design … and there was another team running the existing design so that at second pass these two could be contrasted. That was a really good process because it meant that the government got a pretty good look at the cost [and] schedule.'

The Gibbs & Cox sales pitch would cover all the bases. And they left no stone unturned. Peter Croser says:

> I led the communications strategy to government ministers, opposition shadows, anyone who'd listen. I visited [Foreign Minister Alexander] Downer at his offices up in the Adelaide Hills. I sat with him and said, 'Here are the reasons you need this ship—if you get involved in an altercation you'll need every last missile, because modern warfare says you're basically going to stand off and fire missiles at each other until someone wins.'
>
> His answer was, 'I am advised by those who know that you don't need so many missiles.' Someone had done a pretty good sell job on government that more missiles means more cost, more weight, more through-life cost, and more missiles aren't needed for Australia. We now had 64; they had 48. It just means you've got to have two ships on station if you want to have a full-blown war.

Brendan Nelson was the focal point for the most aggressive lobbying. He says:

> I had various meetings. Gibbs & Cox were pretty … not inappropriate, but certainly quite keen to maintain their visibility. You'd see them regularly and they'd update you on things. But the key moment for me came in September or October 2006, when I went to Adelaide to officially open the Australian Air Warfare Systems Centre.
>
> 'Before the opening, I was to get a presentation from Gibbs & Cox and then Navantia. Now I've learned over the years that the more people who come to a meeting, the less confident those people are in whatever they're trying to sell you. In a big boardroom, Gibbs & Cox filled every single space on the other side of the table, plus they had others sitting in the back seats.
>
> 'They gave us the presentation on the design work, their staffing, their commitment to the thing, the whole stuff. I nodded at the right times and, on the face of it, it seemed very good. And then Navantia came in … three guys! They gave me a presentation that took about half as long as Gibbs & Cox. When they left, I turned to my chief of staff and said, "These guys are not serious."'

5. The next decisions

Seeking a genuine competition as the only way to get the best result, Nelson made it clear he wanted to see the president of Navantia. 'He came to Australia and I had a meeting with him in my office in Parliament House,' he says:

> I said to him, 'Whatever the Navy leadership is telling you, I am the Minister and I will be making a recommendation to the National Security Committee as to the design of the ship that will be in our national interest.'
>
> In my own mind, I'm thinking, 'We're probably going to get an American ship', but I said to him, 'You need to understand this is a serious competition. I'm suspicious that you and your company think you're just a stalking horse to make sure Gibbs & Cox and the Americans are kept honest about the whole process.' And after that I could see that they were upping their effort.

Nevertheless, he says, he still felt that Gibbs & Cox was the most likely contender. But then, in about April 2007, the Spanish brought their F-100 vessel to Australia and he was invited to inspect it with Navy Chief Russ Shalders. 'I spent my youth around ships,' Nelson says, 'because my father was a marine chief steward. I don't know much about them, but I love them and I'm meeting the captain and the Navantia propagandists. We're on the bridge and Russ Shalders said to me, "Minister, of course we're never going to have a Spanish ship."'

For a moment, he says, he was speechless. 'I said "I beg your pardon?", and he said, "Minister, we can't have a Spanish ship; we're not going to get a Spanish ship". And I said "Russ, I can't believe you're telling me this. We're two months or something away from a decision point and if you guys, the Navy, were never going to accept a Spanish ship, why on earth are we going through this whole process?" Because by that time Navantia was starting to self-select.'

Indeed, the ship's visit turned out to be the most effective stratagem in the Spanish campaign. And by then an increasingly desperate Gibbs & Cox design team, faced with the demand to reduce the tonnage of their contender, had been forced by the iron rules of physics to also reduce the missile cells (from 96 to 64) and make other compromises to the design.

Peter Croser says, 'I think that in our design we followed too much the goals of the Navy, which was more missiles, more capability, and that grew the size of the ship that was heading up to 10,000 tons, whereas the Navantia was around eight.' In fact, the design went through a range of substantial changes.

Steve Tiffen, who'd been given the task of evaluating the two contenders, was bemused:

> Here you've got a problem for the poor old designer. He's going, 'You want 12,000 tons worth of capability in 7,000 tons? Well, that's impossible.' That's why we ended up where we did—it's a design impossibility.
>
> During this process, they were diverging and diverging away from the DDG backbone,' he says. 'The final thing they produced was a corvette hull that was 'geo-simmed'[4] up to the size of 7,000 tonnes and with everything crammed into it—all the war-fighting capability that the thing had never seen. The corvette hull they'd chosen to place the capability on was an applicant for the international frigate program many years before from Gibbs & Cox and they'd lost that.
>
> I and a few other people were nervous. We said, "Let's go and get some testing done on this thing." So we got the hull form, put it into a tow tank and found that at its optimum design speed it had the most drag. That is not a good thing for a hull; and it really went pear-shaped from there.

DSTO was deeply involved in looking at the combat system implications for the two ships. 'We were helping with discussions around the ships' ranges, air warfare capability, the number of cells, the number of missiles and fire control directors,' David Kershaw says:

> We were working closely with the CDG [Capability Development Group] team. We wanted the ability to carry a helicopter to do the range of things a helicopter is required to do. And then you have benefits for a second helicopter, but they come at the cost of a larger platform and you need a second support team. Therefore you put your crew numbers up. So a lot of our studies were to help that decision-making and understand the envelope.
>
> We also did a lot of performance analysis on the undersea warfare system, which was a sonar prediction detection range—how far out can the sonar options detect a submarine and what does that mean? We're also looking at torpedo defence based on a lot of evasion tactic modelling we've done. We know specific ranges by which we want to be reacting.
>
> Submarine warfare is a team sport. Your perfect scenario is the submarine doesn't get anywhere near the task group. If your special forces can take it out in the enemy harbour, great. Failing that, then the idea is to detect the submarine as far out as possible [so] that you can send your helicopter out to detect and prosecute.

In the meantime, Commodore Tiffen travelled to Ferrol to 'set foot on the ship, ask a bunch of questions, make sure what they were saying was not just salesmen's bluff.' He returned to Australia satisfied that the Navantia people were 'fair dinkum'. 'We took the two platforms—an apple and an orange—to a competition,' he says, 'and they were so different in many respects. We compared their production techniques, their platform characteristics, their combat systems and their support systems. That's how we pulled the comparison together.' All of the four elements were examined separately by small discrete teams.

Steve Tiffen was most intimately involved with the platform. One of the key processes, he says, was their final presentation to a selection panel—the Capability Options Review Board. 'It was headed by the Chief, Capability Development Group, General David Hurley; the Chief Defence Scientist, Dr Roger Lough; the Chief of Navy, Vice Admiral Russ Shalders; and Warren King.'

The four teams all contributed to the presentation. 'The combat systems were effectively the same thing,' he says, 'except the [evolved Arleigh Burke] had one extra fire control director and that provided a capability of detection and tracking that was marginally better than the [Navantia] option; as well as two helicopters instead of one on the [Navantia] ship. So on capability, the evolved ship represented 100% of requirements and the [Navantia] ship met 86% of them.'

Production techniques and support systems were both relatively similar. However, the real discriminator was platform. 'The difference was so overwhelming,' he says, 'one was US pedigree and design standards but no evidence of it existing anywhere. The other one was an existing ship; we had set foot on it; we'd actually been to sea on the thing. All we did was present the two pictures. And the advice I gave them was "this one, the evolved one, will take four more years to build [the three ships] and cost about $4 billion extra".'

By now it was mid-2007 and Australia was in election mode. The Howard government had ruled the country since 1996, but polling suggested it had run its race. Having triumphed against an incompetent Opposition led by a febrile Mark Latham in 2004, it had rammed an anti-union Work Choices Bill through the Senate. The unions fought back with an emotional campaign that captured public attention and support. Then, in December 2006, Labor elected fresh-faced Kevin Rudd to the leadership, with Julia Gillard as his deputy. A Howard defeat seemed increasingly likely.

Since the Coalition was traditionally more expansive in its military spending, there was a growing concern among the defence fraternity that unless the AWD Program were approved and funded before the election it could be scrapped by the incoming government. Brendan Nelson says, 'I knew we were going to lose.' Chris Ritchie says, 'We knew that there were people [in Labor] who didn't like AWD; there was a fear that if you didn't make a decision it might not go ahead.'

Moreover, Nelson was detecting a change in attitudes to the Spanish option. 'In all the key milestones, and in all the things we wanted from the ship, the Navantia option was edging ahead,' he says. 'And from the advice I was getting from Warren King, Navantia was not only competitive, but it could possibly be the one that we would choose. I was very disturbed about this. I thought it was going to be pretty hard to get John Howard to accept advice other than that of the Navy on the design of the ship, particularly when what they want is American.'

To finesse the Prime Minister's clear preference for all things American, Nelson hatched a subtle intrigue. In Singapore for a regional defence conference, he sought out US Defense Secretary Robert Gates in colloquy with US Admiral Tim Keating, the commander of US Pacific Command. 'We talked about Afghanistan and Iraq and various things we were doing together,' he says. 'But then the real thing I wanted, I said to him, "Robert, we're very close now to making a decision about our destroyers. Does the US Government have a particular view of what we should do?"'

Gates deferred to Admiral Keating, who, according to Nelson, said, 'What design you choose is your business, but if you're putting more vertical launch cells in your part of the world, that's what we need for the alliance and that's what we need for security.' Nelson says, 'So I pocketed that. The view I had was "as long as you've got vertical launch cells, Aegis combat system, that's great."'

It was similar to the advice that Vice Admiral Peter Jones had received from the US Navy during a visit to Washington. Either ship would be acceptable, since they both had the Aegis combat system. And by now Nelson was becoming convinced that the Navantia ship should be chosen. 'I felt between Warren King and David Hurley I had two people I could really trust and rely on. Every question I asked I got a sensible answer on the Navantia design. And also, doing my homework, I realised if Navantia didn't get this contract and the LHDs they might go under.[5]

'I thought, these guys are going to go to the end of the earth to make sure this is done right. Gibbs & Cox wanted another year and another $100 million for a complete design … Navantia had a very good design, it had the capability, it had the range, and the Spanish Government support.'

However, Nelson was still unsure what the National Security Committee of cabinet would decide. Recognising that the Gibbs & Cox design problems were taking the American vessel out of contention, some senior former and current Navy officers were turning to the existing Arleigh Burkes—with their 96 missile capability—as a last ditch alternative.

'I thought this is going to be hard when the Navy, through its Chief, is recommending that we go in another direction,' Nelson says. 'So, prior to the Cabinet meeting I made sure I knew every conceivable thing that I could possibly know about these two designs so I could confidently answer pretty much anything that was bowled up.'

Finally, the cabinet committee met in the evening of 19 June 2007. According to Nelson, those present were Prime Minister Howard, Treasurer Peter Costello, Trade Minister Mark Vaile, Attorney-General Philip Ruddock, the heads of the intelligence agencies and PM&C, as well as the Chief of the Defence Force, at the time Air Chief Marshal Angus Houston. At the request of the Prime Minister, Navy Chief Vice Admiral Shalders also came into the room.

First, they dealt with the LHDs. That was quickly resolved. Navantia won that contract over the French consortium headed by Thales. The ships were to be built as a collaboration in Spain and at BAE's Williamstown shipyard.

Then came the AWDs. 'It was a lengthy discussion,' Nelson says. 'It was an extremely rigorous interrogation of me and the officials. Every single person in the room was invited to express a view as we went through. It wasn't a case of four or five ministers having a debate about it. Everyone else sitting there, every single person was actually invited to express a view.'

(According to the defence correspondent for *The Australian*, Patrick Walters,[6] 'Vice-Admiral Shalders unsuccessfully argued the case for an "off-the-shelf" Arleigh Burke class destroyer on which Gibbs & Cox based their design. Vice-Admiral Shalders wanted a larger ship with greater firepower than the F-100 offered.')

Nelson says, 'It didn't hurt that we'd just made a decision to go with Navantia on LHD. But there's no doubt in my mind we made the right decision; and mate, if we'd gone with Gibbs & Cox you'd be getting an invitation some time next year to see the first ship go in the water.'

Peter Croser was waiting for the result in a Canberra motel. 'I got a phone call from Brendan Nelson,' he says. 'He was very apologetic and said, "Look, I'm really sorry, but we've decided to go the other way." At that point my world sort of shattered, because I realised that it made a difference to the 50 people I'd taken on and all the planning and work we'd done the previous two years.'[7]

Next morning, Nelson says, the Prime Minister remarked that 'I have chaired many meetings of the National Security Committee; it is the best meeting I have ever attended.' That day, John Howard made the announcement that Navantia had won the contest. The cost to Australia for the three AWDs and the two LHDs would be about $8 billion. The AWDs, he said, would be delivered in 2014, 2016 and 2017. They would be assembled in Adelaide by an 'alliance' between ASC, the DMO and Raytheon.

Australian industry would provide about 55% of the content, and some 3,000 locals would be employed on the build. The ships would be equipped with powerful missile defence systems that could intercept an enemy aircraft 150 kilometres away.

In a classic example of cabinet solidarity and democratic governance, Vice Admiral Shalders told reporters, 'The Navy is very excited, very optimistic about both of these decisions. This will change the face of the Navy for the next 30-plus years. In 2050 we'll be looking back at the decisions and in 2050 I'm very confident that we'll look back and say that was the right decision.'

Nelson assured the public—and the Navy—that 'the 48 missile cells on this ship, the Aegis combat system and many other things make the AWD fully interoperable with our key ally, the US. The Australianisation of the Spanish F-100, with larger engines, sonar buoys and a whole variety of other capabilities—and subsequent updates—will well and truly deliver the capability that the government set for itself.'

The cost of the three ships would be $4.5 billion, and they would not only create jobs in South Australia and Victoria but 'a bonanza for more than 1,000 Australian contractors throughout the country.'

Warren King's 'conspiracy of optimism' was alive and well in the corridors of power.

6. The AWD Alliance

However, the quick choice of Navantia for the $3-billion LHDs gave the Project Manager, now Defence Department Deputy Secretary Kim Gillis, the green light to develop a 'collaboration' between Navantia and Tenix (later BAE). The hulls of the 27,000-tonne amphibious landing vessels would be built at Ferrol, while the superstructure and most of the fit-out would be completed in Melbourne.

Gillis, a spirited bureaucrat whose long days are leavened by a cheerful sense of humour, says, 'Ultimately my schedule was to build predominantly overseas because of the size of the ship. There was no facility in Australia that could build it.' This was a blessing he was happy to accept. The great advantage was that 'most of the work would be done by experienced shipbuilders.' It was also estimated that the premium to build the two vessels in Australia would have been approximately $1 billion.

This is the first emergence of 'culture' in the project—in this case that of the Spanish shipbuilding process. 'Ferrol is a 400-year-old shipyard,' he says. 'You've got generational workforces of shipbuilders. When they look at something coming down from the design house that is patently wrong they go, "That doesn't make any sense; you do it like this." And that's the way they work. A lot of that goes on in the European shipyards, especially the Spanish ones.'

As we shall see, that's not the Australian way.

Gillis ensured that the two yards worked independently. He says, 'The hull, right up to the main deck was finished [in Spain]. The cabins had mattresses in them. The galleys had been fitted out. Everything was done. When they arrived here they put the [Australian built] superstructure on and that was the only interface. I limited the interface to the absolute minimum that you can ever possibly do.'

After the cabinet meeting, his friend and colleague Warren King had suggested a small wager on whose project would produce the first ship through the Sydney Heads. Gillis chuckles, 'The air warfare destroyer was due much earlier than mine was … I just picked the better project.'

Warren King set to with a will. The plan to privatise ASC was still 'up in the air'. He had toured shipyards in Norway, the UK and other European facilities with Carnegie Wylie in 2006 and felt that once ASC signed the build contracts that would give it a value in any negotiation for its sale. He says, 'I told the minister of the day, "We commercialise ASC the day the contract's signed." Everyone can [then] come in and do due diligence—here's the contract, here's the price—and they can tell you whether ASC is worth a dollar or $200 million. We get three or four companies to have

a look at it and decide what their offer is to take over the contract. A formal decision was taken by government to privatise ASC on the execution of contracts.'

So the first order of business was negotiating the contacts. Raytheon was already inside the contractual tent. In an excellent example of American business 'culture', Raytheon and its US competitor Lockheed Martin had made perfect peace over the combat system and its integration. Moreover, they and ASC had been operating as a de facto alliance. That left Navantia as the wild card, and the negotiation wasn't going well. Since Commodore Tiffen had spent time in Ferrol during the selection competition, Warren King brought him into the process.

'He told me they'd got into a real bind,' Tiffen says:

> It was Navantia's first exposure to the Australian market and they were really keen on a couple of fundamentals. They wanted to protect their IP and they wanted a good reputation out of this. But the government had pitted a bunch of commercial people to negotiate with a bunch of engineers and naval architects and they weren't making any progress. So Warren replaced the commercial team and he picked me from obscurity and said, 'Steve, you're going to do this.'
>
> 'I'd never negotiated a contract in my life, other than domestic stuff with tradies, and he thrust me into this $300–400 million contract and said, 'Close that.'

Tiffen and his team began a process that would engage them night and day for almost three months. 'Non-stop from July to September 2007,' he says, 'living in Raytheon's building [in Canberra], we sat there day on day, weekends, negotiating all the clauses in a 1,000-page contract.'

Once that marathon was run, the next pivotal step was to persuade them into the AWD Alliance. 'Warren was negotiating how that would come together,' Tiffen says. 'And he decided, since I had just negotiated the contract, they should send me as their rep. So I went over [to Spain] in uniform. I represented the Alliance.'

On arrival, he confronted another facet of Spanish 'culture'. 'Their approach,' he says, 'is for a very informal contract. And they put it in the bottom drawer. For them, it's all about relationships. Australia is the opposite; it's very English in its approach, it's all about contract law. That scared them a bit. And they're a government enterprise and would have had to get the state involved in a decision to join an Alliance.'

Undoubtedly, these were important factors, but all agree that the relative scale of Navantia's part in the project was the most serious impediment. Its $300–400 million contract represented only about a tenth of the $4.5 billion commitment of the other two commercial entities—ASC and Raytheon. Warren King says, 'It's very easy to explain why Navantia wouldn't be in it.' Their view was, "We've got a design; we've built it five times. Why should I risk my profit on something that I know is right?"

Why take a risk that ASC who knows nothing about building a ship will get it right? Or Raytheon who does know about integrating ships will get it right. We tried everything to convince them; they just didn't want to be in it.'

Chris Ritchie, who in retirement from the Navy would become a member and then chairman of the ASC board, says, 'That was a mistake that we collectively made. They were a relatively small player but as the designer they turned out to be a relatively big player. It was partially that, and our difficulty in talking to them, that caused a lot of the issues we were faced with down the track, just because they were separate.'

Indeed, at least one leading member of the Alliance, who preferred not to be named, said that 'Warren should have tried harder.' Warren King says, 'I put an extra $40 million into the Alliance budget to buy Navantia services for the Alliance and in particular for shipbuilding assistance. I think the issue around drawings was more a matter of an inexperienced shipyard who had rightly retained Bath Iron Works to assist them when we thought an evolved Arleigh Burke would have been the ship of choice but should have embraced Navantia fully when the F-100 was chosen. Navantia knew the hows and whys of their design, while Bath Iron Works, despite being a great shipyard, did not.'

However, Raytheon's Rod Equid could see that the schedule was 'relatively tight, particularly in the early stages', and so was keen to get started. 'We needed somebody to be in charge, somebody that had construction experience, a little bit of shipbuilding experience [and] understood Alliance arrangements,' he says. John Gallacher, the man who had run the successful tender for ASC, was 'ideal', he says, 'and he absolutely had the right personality to run the team.'

A man of quiet determination, Gallacher was an enthusiast for the Alliance structure, 'provided it's handled correctly', he says. He had already participated in alliances—one of which he had run—during his time with BP. 'I knew how it should be set up,' he says. 'And I knew that it wasn't the soft option. One of the biggest challenges was getting companies to work together, because they were used to operating in a traditional adversarial framework. In alliances we all work together and succeed by collaborating. But it's hard work getting people out of that traditional mindset. We brought in external people to do workshops and we worked at it every day, every month and every year to get that collaboration.'

Equid, as the business manager, was effectively deputy CEO. 'John and I worked together really well,' he says. 'His role was to get us in contract and mine was to establish the enterprise—the organisational structure, the teams—which I was very comfortable doing as a project manager. I was still employed by Raytheon and John was still employed by ASC, but we were in an environment where we're badge-less.

Another ASC executive, Doug Callow, ran the operational side. The government representative was Commodore Andrew Cawley. Equid says, 'Andrew was pretty important from a continuity point of view because at the start he was part of the Commonwealth project office, flowing down to being the project manager; and then internally he was the Commonwealth representative in the contract.'

In the meantime, John Gallacher was also deeply involved in developing ASC's shipyard adjacent to the Common User Facility at Osborne. It was a massive operation but at least it was running on schedule and budget.

By 4 October 2007, the government was able to announce the formal 'build phase' of the Alliance in a sparkling ceremony at ASC attended by Minister Nelson. According to the Defence Department's press release, 'Program Manager Warren King joined his Alliance colleagues in underlining the significance of this milestone. "This is the first time Defence has used an Alliance contracting strategy for a major defence project and signals the beginning of a new era in defence and industry engagement," he said. "The DMO looks forward to working as one team alongside ASC and Raytheon Australia in delivering this next generation capability to tomorrow's Navy."'

The release also celebrated 'the beginning of the DMO's partnership with the Hobart-class platform system designer, Navantia, which has centuries of experience designing and building warships for the Spanish Armada and a number of international customers.

'While Navantia will be a subcontractor to the commonwealth, the design team will be seamlessly integrated into the Alliance working environment to achieve common Alliance goals. The AWD program ensures the timely and efficient delivery of an affordable, effective, flexible and sustainable AWD capability for the security of Australia.'

John Gallacher told the gathering, 'While DMO, ASC and Raytheon Australia have been working together for two years now, this signing ceremony signals the beginning of a period of high intensity for the Alliance.'

The chairman of ASC, John Prescott, said, 'As ASC now turns to the exciting challenge of building Australia's next generation warship, we do so with the comfort and knowledge that this dedicated alliance team will be at the helm.'

Rod Equid tried to make the best of the failure to co-opt Navantia into the Alliance. 'We took a decision that, even though they weren't formally in the Alliance, we would treat them in an Alliance-like manner,' he says. 'They were contracted to the Commonwealth but the Commonwealth gave that contract to the Alliance to manage.

So in fact John Gallacher managed the subcontract. There was quite a lot of give and take in the arrangement … so in my opinion the pure contractual relationships at the end of the day made no difference because it all came down to how we behaved with them.'

However, despite his and others' best efforts, the ANAO audit report, which notes the subcontractual relationship, says, 'The fact that [Navantia] is not part of the Alliance has detracted from the Alliance's ability to collectively and collaboratively manage risks and to do so in a timely manner … It has also resulted in an incomplete alignment of incentives for sharing of best practices and for reducing costs, from design conception through to shipbuilding and ship acceptance.

'The design issues have highlighted that ideally an alliance should include all of the key industry contributors to the task being undertaken, as initially envisaged for the AWD Program.'

As Australians went to the polls the following month, the ripples from that failure would begin to grow; in the next few years, they would rise to a height and a ferocity that threatened to seriously disable the program.

7. The build

The Labor Party under Kevin Rudd duly won the 2007 election, Joel Fitzgibbon was elevated to Defence Minister, and, despite the forebodings of the defence fraternity, the new government firmly backed the AWD Program.

Indeed, Rudd's strategic vision—spelled out in the 2009 Defence White Paper—involved 'a major new direction [requiring] a significant focus on enhancing our maritime capabilities'. In a wide-ranging address to the Townsville RSL, Rudd said, 'We have unresolved border disputes between many countries including between China and India and between China and its maritime neighbours in the South China Sea—it is reassuring to note that these disputes have been managed to this point.'

Accordingly, the government planned an additional 12 submarines, a fleet of eight new future frigates, a range of new naval combat helicopters, and offshore combatant vessels 'able to undertake offshore and littoral warfighting roles, border protection tasks, long-range counter-terrorism and counter-piracy operations [and] support to special forces.'

Joel Fitzgibbon says, 'I'd been Opposition spokesman for three years, so I was fortunate to come to the portfolio pretty well versed in all matters.

There was no appetite in the cabinet for the sale of ASC, and in February 2009 the idea was quietly dropped. All the time, travel and expertise that had gone into the proposal was simply written off. However, as a government business enterprise, the company retained its charter requirements 'to earn at least a commercial rate of return and observe a standardised and transparent reporting framework.' Whether it conformed with either requirement would become apparent in the years ahead.

While Fitzgibbon was comfortable with the AWD Program, he didn't entirely grasp the detail of the Alliance, which on the face of it seemed unnecessarily complicated. 'I recall sitting in a hotel in Romania having breakfast with [Chief of the Defence Force] Angus Houston and [Defence Secretary] Nick Warner and getting Warren King on the phone to have a conversation about it,' he says. 'I don't know what time it was in Australia. There were parts of it I just couldn't get my head around and I rang Warren to get it clearer in my mind.'

But at the time it wasn't a first-order concern. 'It was a period of very high operational tempo,' he says.

However, there was some pressure from the Navy—and parts of DMO—for the inclusion of a fourth ship in the AWD build. Since the Navantia design mandated 'only' 48 missiles, naval capability experts saw 'a number of deficiencies'.

Indeed, there was a belief that in an all-out war two of the destroyers would have to be deployed together to respond to the threat. This would be tactically difficult with only three units in service. The counter-argument was that the eight Anzac frigates were currently being upgraded with anti-ship missile defences.

There was also a concern about a 'valley of death'[8] between the AWDs and the next major naval procurement. A fourth ship would help fill the gap.

Fitzgibbon took both concerns on board and raised the issue with Prime Minister Rudd. 'The answer at the time,' he says, 'was "We can't afford it".'

Fitzgibbon was relieved of the portfolio in 2009 and returned to the backbench; he was replaced by Senator John Faulkner.

DMO's Steve Gumley was equally preoccupied. He had long been concerned that Australia needed more trained technicians to complete the rollout of new defence capabilities, the AWDs among them. 'I'd commissioned quite a bit of research from some of my economics people on staff to try to work out where the skills existed or where they didn't exist,' he says. 'And it was pretty conclusive to me that we didn't have enough skilled people to do all that was required.' Behind the scenes, he was talking to government, seeking new initiatives to train apprentices and technicians to meet the rising demand.

The Alliance, too, was pressing ahead at full speed, driven by the demands of the schedule. Equid says:

> It was quite constrained, so we certainly hit the ground running. Costs were also very optimistic from a project planning point of view, just due to the general inexperience in the [shipbuilding] community. People were optimistic and enthusiastic; they were trying to artificially get a delivery date at the end of 2014 for the first ship.
>
> Effectively, our first ship from the point of view of production hours was bid on the basis of achieving productivity equivalent to the Spanish third ship. There wasn't any significant allowance for it being a first ship and the rationale was that we had a really good facility. The Spanish build on an inclined shipway; we had a land level construction facility that allows you to [increase] productivity, in theory. And it does if you're an experienced yard. So you ended up being overly optimistic of the productivity being achieved.

Nevertheless, they pressed on as quickly as possible, calling tenders for the building of the 'blocks'—more than 30 separate modules of the entire vessel—from five separate shipyards. In addition, requests for tender covered a vast range of materiel for the undersea warfare suite, Harpoon missile launchers and integration, torpedo launch tubes, bow thrusters and many other elements.

Tenix declined to bid for the blocks, as it was deeply involved with the LHDs. It was also negotiating its sale to BAE. In 2009, the Alliance selected two winners—NQEA from Cairns and Forgacs in Newcastle—to build 70% of the blocks (worth some $450 million in total); the other 30% went to ASC. However, at the last minute—and to Warren King's immense frustration and annoyance—NQEA dropped out.

'It was the eleventh hour,' King says, 'The financial structure that had been offered for the blocks was dramatically and materially altered. They then approached the Queensland Government for guarantees. First, the Queensland Treasurer said, "I'll have to study it", but that was like 24 hours before the scheduled announcement. Then he said "No."'

It was a blow to the schedule. The tender for the blocks was recontested, and now BAE was keen to acquire some of the action. BAE proved disinclined to comment on the build, but according to several former executives who asked not to be named, 'We were lobbying hard to say we were still here and still able to do the job and after due diligence from the Alliance we won the bid.'

On 9 June 2009, the Alliance announced, 'BAE Systems will be one of two contractors to build 70% of the blocks that will make up Australia's three air warfare destroyers.' The contract was signed and was expected to provide work for 400 people in BAE's Williamstown shipyard. 'There was great celebration since it was thought it was a relatively straightforward piece of work,' a former executive says. 'We went through a range of production readiness reviews and got through them without any problem.'

To avoid the 'valley of death' since the completion of the Anzac frigates in the yard, they had retained a core of about 100 shipbuilding workers. 'And now,' he says, 'being part of a much larger organisation [than Tenix], we had a reach back to UK shipyards and manufacturing skills with equal or more depth of experience and expertise.' However, as we shall see, the building would be anything but 'straightforward'.

Forgacs was a family concern, the creation of Hungarian migrant Stephen Forgacs, who reached Australia after escaping the 1956 Soviet invasion of his country. After he arrived in Newcastle, his first job was with BHP, and he later joined Ullman Engineering as a machinist. He eventually bought Ullman and built Forgacs into one of Australia's biggest privately owned shipbuilding, repair and heavy engineering companies. At its height, his company employed 1,250 people at seven industrial sites and shipyards in New South Wales and Queensland.

The key to business success, he believed, was 'to balance best worker conditions and international business competitiveness'. Forgacs became a regular supplier of defence materiel, and Stephen was highly regarded in the department.

In total, the 90 prefabricated hull blocks and three sonar blocks for the three AWDs—averaging 200 tonnes each—were to be made in Adelaide, Williamstown, Newcastle and Spain. And in January 2010, Prime Minister Kevin Rudd opened the ASC's $120 million shipbuilding facility. It alone had created 650 jobs and was expected to employ some 500 in the AWD workforce. The first ship of the class, the *Hobart*, was still scheduled for a 2014 delivery, followed by the *Brisbane* in March 2016 and the *Sydney* in June 2017.

In March, Warren King assured a Senate Estimates committee:

> Progress overall is still very good. I am able to report that blocks are under construction now at BAE Williamstown, Forgacs in Newcastle and fabrication work has started at ASC in Adelaide. We completed the critical design review as planned; we have opened the Common User Facility in Adelaide and it is excellent. We did lose some scheduled progress due to the NQEA problem, but we are working with BAE and Forgacs to regain that on the ship construction … There are no adverse indicators, but we are ever alert.

However, Warren King's indicators had failed to anticipate some serious developments. It had become clear to Alliance CEO John Gallacher in 2009 that there were problems with the structural plans arriving from Navantia in Spain. They weren't only deficient, as perceived by the Australian builders, but they couldn't be altered unless the alterations were specifically authorised by Navantia.

That entailed a time-consuming operation that was affecting the tight schedule. In an attempt to cut through the blockade, Gallacher travelled twice to Spain for talks with the design team, on one occasion with Rod Equid. But no sooner had he come to an agreement with the Navantia chief engineer than the man was transferred to another overseas post. Nevertheless, he believed he'd made some good progress and would next engage with the company's CEO.

But then, Gallacher suddenly departed. While he was aware that his contract was for three years, and was looking towards a 'good smooth transition, heading in the same direction', he was unprepared for the sudden marching orders from ASC. A new managing director and CEO from Britain, Stephen Ludlam, terminated Gallacher's employment shortly after his arrival. Raytheon's Rod Equid was made acting CEO of the Alliance and would soon be confirmed in the position.

Ludlam, recruited by ASC board chairman Chris Ritchie and one other board member, came from a very long association with Rolls-Royce, having joined that company in 1975 and risen through the ranks over the next 30 years to become president of its submarine division in 2005.

He arrived in Adelaide determined to give his best to the revival of ASC from the terrible publicity it had received over problems with the Collins-class submarines.

And he was well aware of the government's requirement that ASC 'operate efficiently, earn at least a commercial rate of return and observe a more standardised and transparent reporting framework'.

Shipbuilding expert John White, who ran the successful Anzac frigate program and would later play a key role in the AWD project, views the appointment as serious misstep. He's a man of firm opinions, firmly expressed. 'John Gallacher was on the cusp of meeting with the president of Navantia and sorting out the whole issue,' he says:

> He was bringing it to a head. Letting him go was a tragic mistake.
>
> I know and like Steve Ludlam, but he was the wrong man for the job. He'd never been in an Alliance. He'd spent his whole working life at Rolls-Royce with procedure and process and quality controls. He was never going to succeed. To put a foreigner into that situation was pretty stupid.
>
> One of the first things he did—to cut costs—was to amalgamate the submarine and shipbuilding divisions.

This meant that John Gallacher's position disappeared. Gallacher says, 'Ludlam was keen to see me go. He believed if I went he could restructure the thing the way he wanted.'

Rod Equid says, 'Steve was very focused on driving ASC as a complete entity to be a very successful Australian prime, less focused on buying into the Alliance arrangement.'

When interviewed by *Australian Defence Magazine* later in 2010, Ludlam was scathing in his attitude to ASC when he joined it. 'Before I arrived the company operated as several small companies working in isolation, not thinking about the customer and operating with a sense of entitlement,' he said. However, he had quickly rung in the changes. 'We've made a very good start but we can't afford to make any mistakes … It means doing everything we do perfectly.'

Of the Alliance, he said, 'The positives are that it's a huge program that will deliver three warships and possibly a fourth. It's an incredibly complex program that benefits greatly from having the involvement of DMO, the customer and Raytheon Australia … Team members wear lanyards and polo shirts that represent AWD.'

While Steve Ludlam's attitude to the Alliance lacked Gallacher's enthusiastic commitment, he wasn't alone. Indeed, the ASC chairman until October 2012, Vice Admiral Chris Ritchie, says, 'I wanted to get rid of the Alliance because it was an overhead—in terms of people—that I didn't think was adding much to it and it was costing us.'

Other significant figures in the defence fraternity expressed their sympathy with Ludlam's situation. 'I have a lot of time for Steve,' one said, 'and he seemed very frustrated at the time. He was brought in to drag ASC kicking and screaming into modern shipbuilding and submarine sustaining practices, but found himself consistently stymied by DMO not giving him any latitude, Navy being at best inconsistent in their application to the issues, and the Department of Finance's total lack of engagement with the entity they own.'[9]

8. The unforeseen

The next unforeseen development could hardly be blamed on Warren King; it took almost all Australians by surprise. On 23 June 2010, the Labor Party rebelled against its own leader and, led by his deputy Julia Gillard and the factional leaders, it voted Prime Minister Rudd from office. Gillard claimed that Rudd had 'lost his way'.

The effect on the AWD procurement was both symbolic and real. It reflected the growing discord in the operations of the program and it led directly to the replacement of the well-liked Defence Minister, John Faulkner, by much less popular Stephen Smith from Western Australia. Indeed, one senior member of the AWD leadership team would resign his post rather than continue to work for and with the minister.

The final unforeseen issue concerned the blocks. At the start, ASC was building the ships' forward structures, Forgacs the rest of the superstructures, and BAE in Williamstown the keel blocks. The three sonar blocks were slated for Spain and the UK. They would all then be brought together by ASC in Adelaide. However, the first 'straightforward' keel block allotted to BAE, No. 107, was a calamity. In October 2010, the Alliance revealed that 107 was 'distorted' and wouldn't fit the other sections of the *Hobart,* the first of class.

Almost everyone closely concerned—and many who weren't—has fixed views of the problem and its causes. They range from outright condemnation of BAE for 'arrogance and incompetence' to criticism of Navantia not just for inadequate plans but the inaction of and lack of advice from its technicians in the BAE yard. Indeed, there are even suggestions that Navantia was disinclined to intervene because BAE was a long-time competitor. One respected official says, 'As soon as BAE acquired Tenix, Navantia said, "We don't want [them] to have any of our design know-how." They're British and the British and Spanish fought wars with each other, naval battles. They're competitors in the international market … in Europe they still hold these grudges.'

Warren King says, 'BAE at the time were in my mind misguided about their own capabilities. They'd completely atrophied, and they didn't know it. Their senior people didn't know it.'

Gregor Ferguson, writing for ASPI, said:

> The reality was ugly. Block 107 is one of the most complex keel blocks, requiring the heavy steel plate of the ship's bottom to be curved and shaped very precisely. It includes the ship's stabilisers and their operating mechanisms … its 20 m x 20 m flat upper deck also supports one of the ship's two propulsion diesels, one of its LM 2500 gas turbines, one of its gear boxes and one of its propeller shafts.

> Tolerances are very tight and the technical difficulty is compounded because Block 107 also contained some 2,000 pipes, ducts and vents for electrical cables, air conditioning and fuel, water and sewage.
>
> The weld quality on 107 was found to be poor; just as bad, heat distortion had buckled the flat deck plating out of tolerance. A significant amount of re-work was necessary, which has delayed delivery of the first blocks from Williamstown.

Rod Equid believes the problem arose 'largely from inexperience, a lack of fundamental shipbuilding capability; and that also leads you to ask the question why the designer and builder of the four F-100s [Navantia] wasn't more engaged in the early production? The answer comes back to general inexperience. There was a belief—and this belief was pervasive across everybody that was involved—that you just get the design delivered and it would be like an IKEA product—a piece of furniture. Sometimes it's complex, but here's the instructions. Just build that and it'll all work. Well, it didn't work and [there are] any number of reasons for it, but at BAE, I believe, it was experience.'

BAE finally imported a dozen technicians from its UK works to provide remedies. Unfortunately, those concerned just the big structural elements. As the build became more intense, the issue of the Navantia plans—and the design changes required by Defence—would become increasingly problematic. Indeed, it was soon clear that the blocks would have to be redistributed. On 26 May 2011, Defence Minister Smith and Jason Clare, the Minister for Defence Materiel, announced that the AWD Alliance had informed the department that 'there was the potential for schedule delays because the BAE Systems facility in Melbourne could not keep up with production schedules.'

The ministers played down the company's production problems and largely attributed the need for the intervention to 'the BAE dock also constructing the superstructure blocks for the LHDs'. Minister Smith said:

> The Government, the AWD Alliance and BAE Systems take the schedule for both these important projects extremely seriously. In February 2011 BAE Systems advised the AWD Alliance of potential schedule delays. Over the last few months the Alliance and BAE have been working closely to develop options to improve the production program … The advice of the Alliance is that if no action is taken to relieve the pressure on the Melbourne BAE shipyard, the first ship would be two years late, approximately 25% over schedule.

According to Steve Gumley, this went to the heart of the build. 'The Navy is concerned with capability and schedule,' he says, 'the government is concerned with cost and schedule. So if schedule blows out, the whole program has problems across the board.'

In response, seven BAE blocks were taken over by ASC, four by Forgacs and five by Navantia in Spain. That left BAE with only two blocks but even then, the Ministers said, delays of 'up to 12 months' could be expected for each vessel.

Stephen Forgacs was willing to cooperate with a Defence Department in trouble. Unfortunately, the limited size of his Newcastle yard and the intense scheduling demands would cause bottlenecks and workplace chaos that took its toll on all concerned within the family business.

Rod Equid says:

> Initially the work at Forgacs was pretty good. We got concerned about BAE's capability and capacity, exacerbated by dealing with these repairs and problems and we went into the mode of moving blocks from BAE to Forgacs to clear the way for them to recover, and also because they were starting to do the LHD superstructure work which was competing for resources.
>
> But as we put more work [into Forgacs] you tended to overload the organisation. And shipbuilding productivity, if it's driven by anything, it's driven by being organised. So the bigger the activity, the more difficult it is to organise it. We did end up with problems at Forgacs but it was more, I believe, a capacity issue.

At ASC, Stephen Ludlam fired a broadside at Navantia. Cost blowouts and delays had afflicted the program because of 'the constant changes' from the ship's designer, he said:

> That ship design should have been well understood; it had been built four or five times. We therefore expected that the design would be largely complete. And there's a thing called "build-to-print"; you build it to the drawing exactly.
>
> We have been in business a long time … and you recognise that there is no such thing as build to print, you know there's going to be a level of change, so you accommodate for that in the schedule; but the changes we have seen have been way beyond that.

Rod Equid takes a broader view and returns to the 'culture' issue:

> The ASC position was the problems were driven by design change. But how much was that normal for shipbuilding? At Ferrol where they build these ships, Navantia are the design authority and the production organisation. And you don't want to spend more than the ship's worth in finishing the design. You don't want to take 10 years to design it. You want to get it built using good practice. So if there's [design problems] you find in production, you deal with them using normal shipbuilding practice.

> But in Australia we were contracted to build to a design but we had no authority to divert from that design. So every time something didn't quite work, or we found something in production [that caused problems], we had to ask Navantia.

However, when the project fell behind schedule and design changes were coming in on top of new work, the problems were exacerbated. 'If the design had been more finished—if we'd slipped the start of production by even six months—it would have made an enormous difference. Instead of which, we were in catch-up mode,' he says.

Under the contract with Navantia, it supplied technical advice in the Australian shipyards, but that was insufficient to meet the problems. 'We had *a* level of engagement with the Navantia people,' Equid says. 'We had, I think, two structural guys at BAE. We probably had two at Forgacs and probably half a dozen in Adelaide … way insufficient. There again you get to a different culture, different language, and to be frank there was quite a lot of not listening by all of us, and we were learning as we go, as things went wrong.'

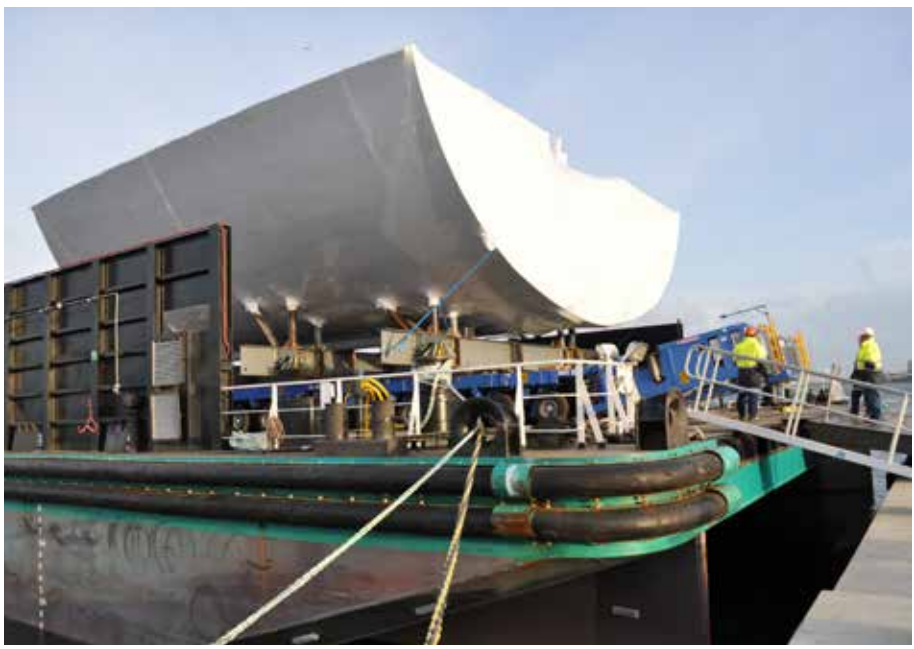
9. The Senate grilling

A week after the ministerial announcement, the leading Defence Department lights of the AWD build, Secretary Ian Watt, Steve Gumley, Warren King and Andrew Cawley, appeared before the Senate's Foreign Affairs, Defence and Trade Legislation Committee. It was a pivotal moment in the narrative and it became a marathon grilling, principally from the Liberal senators, the ACT's Gary Humphries and Queensland's Ian McDonald. It shed more light than ever on the project.

Warren King took Humphries' first question, which sought a 'summary' of the project to date. The project director, who had come well prepared, responded with a *tour d'horizon*, complete with props and encompassing the LHDs, each of the participants in the build, and indeed the future of Australia. He said:

> I do worry about our capacity as a nation to take on these challenging projects,' he said. 'While we have an issue at the moment which is substantial and one we must address, this neglects all the achievements since 2007.
>
> We have built a shipyard in Adelaide; we have assembled a workforce of about 1,200 white-collar engineering management logistics people and about 800 production workers. We have an apprentice training system. [He paused to brandish a piece of steel.] This piece of steel is an example. This iron ore came from Western Australia, was turned into steel and milled at Port Kembla, and cut and shaped by Australian industry.
>
> There are about 20,000 of these units to go into each ship. If I was to convert these into the weight of the ship, there would be 30 million of them. Of course, we need a few other shapes to make a ship but that is the sort of thing we have undertaken.
>
> Now we do have a challenge. Like most challenges with complex projects it is a combination of factors, but the most challenging one at the moment is capacity in the [Williamstown] yard to complete AWD modules and take on the LHD project for which [BAE] are making the large superstructure that goes on top of the ship, and to deliver both projects on time.
>
> We have known about it for some time. We have worked very hard and assiduously to look at options for government on the most appropriate way forward. I liken this sort of thing to a four-legged stool. I do not know if you have ever done any home renovations, but if you have ever tried to adjust a four-legged stool to get the right balance and height you will know it's very challenging. Our four-legged stool here is cost, capability, schedule and of course safety …

Aerial photo of the AWD Alliance shipyard, 2015. Photo © AWD Alliance.



The first Air Warfare Destroyer (AWD) block to be shipped by sea from interstate arrived at the Government of South Australia's Common User Facility wharf on 15 August 2011. AWD block 109 was successfully rolled off the barge on Wednesday night and into ASC's AWD shipyard where it will be housed until the consolidation process begins in 2012. Photo © Department of Defence.

Hobart-class DDG Block 407 during its PO2 phase, May 2013. Photo © AWD Alliance.

Consolidation of the final keel block for the *Hobart*. Photo © Department of Defence.

A 136 tonne block joins the ship structure. Photo © AWD Alliance.

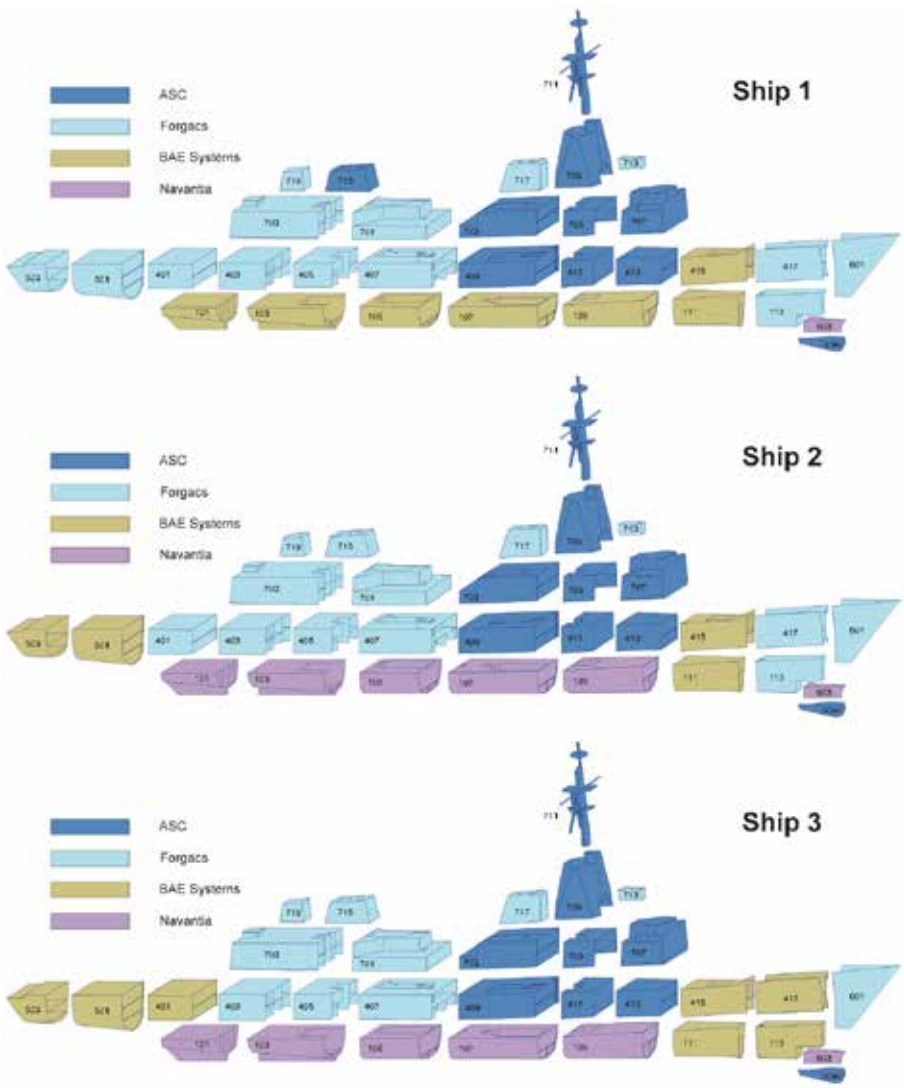
AWD engineers. Photo © AWD Alliance.

Pipe waste in temporary storage at ASC. Rework was an issue for the program. Photo © AWD Alliance.

Minister for Defence Marise Payne speaks with Commodore Rob Elliott and Commodore Craig Bourke on the bridge of the *Hobart* following successful testing of the AWDs' Cooperative Engagement Capability. April 2018, South Australia. Photo © Department of Defence.

Hobart sea trials off the coast of South Australia. Clearly showing the 48 Vertical Launch System missile cells in the bow of the ship. Photo © AWD Alliance.

HMAS *Hobart* (DDG 39) alongside HMAS *Parramatta* (FFH154) and HMAS *Darwin* (FFG 04). Photo © AWD Alliance.



Specific DDG blocks allocated to shipyards, as at January 2014. The ASC allocation includes the three mast blocks (Block 711), which ASC subcontracted to MG Engineering, Adelaide. Diagram © AWD Alliance.

> My question is: do we as a nation, do we as a department, stand by these tough times, come up with appropriate decisions and leave a better capability for the next generation, or do we just fold and say, "The world has collapsed"? What I would like to say on this project is that we have a serious matter that we are pursuing. At this stage it looks like a 12-month delay in the delivery of the ships. But against all the challenges that we have overcome, overall this project is in very good shape!

Not all the senators were reassured, and the questioning continued. However, it did produce some new information, notably from DMO chief Steve Gumley and Project Manager Andrew Cawley. Gumley defended BAE's response to the problem:

> BAE has acted very maturely in working with us to rectify it. They had the very important project of the LHDs. There have been many discussions. One is: do you do the superstructure of the LHDs in Spain? The answer is no. Because of the very large amount of systems integration Mr King referred to, it makes far more sense technically and programmatically to do that work in Australia. BAE has acted responsibly on behalf of both projects. We thank them for it.

Later he took issue with the '2,400 faults or defects' in the Navantia construction data requiring 'clarifications' from the shipbuilders, as reported in a newspaper before the previous week's announcement by the ministers:

> This is normal shipyard practice. To build a large warship you would expect many tens of thousands of clarification questions. When I saw that 2,400 number I certainly didn't panic. To my mind there are a number of reasons [for the problems], but frankly I think it is just that BAE took on a little bit too much work for the number of skilled people they had and they have done the right thing by everybody by being prepared to distribute it.

Andrew Cawley supported him:

> The fundamental engineering design of these ships is proven. Four are at sea and a fifth is under construction. The exchange of technical queries and answers is about anything on the project. It might have to do with drafting errors in a document pack. It might be to do with material supply—more or less is needed. It might be to do—as one was—with a clarification of which orientation a piece went into the block, because it was not entirely evident. The engineers do these checks; it is done in a disciplined way and capped …

The committee chair, Labor's NSW Senator Forshaw, intervened: 'Does this mean that when the contract was awarded [to BAE] and the system developed for its implementation, relevant officers within either Defence or DMO advising government at the time didn't comprehend the likely complexity and time issues of the project?'

Warren King took the question:

> I provided that advice. We did do an analysis as you would expect. BAE were quite firm that they had the capacity. They had plans for the expansion of the site, the investment in the site and the investment in new plant machinery to support construction. We analysed all of that. We did think it tight but not unreasonably … the Alliance and ASC who are the managing shipbuilder on the project were comfortable that they had the skills, capacity and history to take on this task.
>
> The obvious truth is that … they do not have the capacity. It is a relatively small yard by today's standards. Ships are getting larger. It is demonstrated now that that cannot all come together in the required time frame. So my advice to government at the time was wrong.

It was a rare *mea culpa* before a Senate committee.

Andrew Cawley explained that it was certainly not unusual in other countries—South Korea for one—that shipbuilding schedules blew out. However, he said, 'progress is being made. It is very impressive. We have seen improvement in all the yards. They are learning. It is good work.'

Senator Forshaw: 'I am not so sure I would characterise it as good work. Up until the decision of Minister Smith and Minister Clare a few days ago, the likely delay in the build process was two years out from a process of six years. That is 33%. It has now come back to 12 months. You outlined the complexity of the job, but I just do not accept that you can characterise work to date as a good process. It is a process, but not a good process.'

It then became clear in a sharp exchange that ASC under Stephen Ludlam had taken action against Navantia on the quality of its plans as delivered to the Alliance and the shipyard.

Senator Humphries to Steve Gumley: 'So, are you categorically rejecting that there is, as reportedly claimed by BAE, a problem with the design drawings that the Spanish company has produced … that the drawings are too sloppy and incomplete to be relied upon for construction? Are you ruling that out as a factor in this delay?'

Dr Gumley: 'No, I do not rule it out entirely. There will be an expert determination on the quality of those drawings.'

Senator Humphries: 'By whom?'

Dr Gumley: 'If we need to go to expert determination, we will find a shipbuilder to do that.'

Mr Cawley: 'To be appointed by the two companies.'

Dr Gumley: 'Yes, there is a dispute resolution process in the contract, and we will go through that process to see if there is a problem …'

Senator Humphries raised the possibility for the first time that the AWD Program should perhaps be declared a 'project of concern'. Steve Gumley responded that it hadn't reached the point where the intervention would apply. The 'triggers', he said, were:

> Cost—if it is going over budget, and from what we know now it is not. The second is schedule. This is an Australianised military off-the-shelf product and you need a 20% schedule slip … it is now about 9%. There is no indication of any capability impairment. That leaves the fourth qualitative factor—contractor commitment, and we have found after a couple of months of deep discussions, the very fact that BAE have done what they have done indicates that there is a contractor commitment to finish the project properly. So at this stage it does not trigger any of the projects of concern gates.

Department head Ian Watt intervened: 'But if you are worried that the project is not getting the close management that it needs to work through this, I think Dr Gumley, Mr King and Mr Cawley would all say this has been very closely managed from the Commonwealth's point of view.'

Senator Humphries: 'I'm glad to hear that. I am surprised, given the size of the project and the acrimonious relationship between the parties.'

The hearing then meandered to other well-trod issues.

10. The acrimony

The 'acrimony' between some of the parties continued to grow. Steve Tiffen, by then deputy Program Manager, says, 'The relationships between the parties were starting to deteriorate quite badly because of money and schedule pressures. We were declaring that we were a glass half full but we were starting to realise this was no longer realistic.'

Within the DMO structure as it related to the AWD project, Warren King replaced the retiring Steve Gumley as the CEO, and Andrew Cawley moved up to General Manager Ships. The new Program Manager and chairman of the AWD Board was Peter Croser Following his Gibbs & Cox appointment, Croser had become Head of Engineering at BAE for the Wedgetail electronic warfare project for the RAAF until 2010, when he rejoined DMO. He was first deputy to Cawley, then took the reins of the AWD project officially in July 2011. By then, according to Steve Gumley, he had been handed 'a near broken project'.

In one of those ironies of the shipbuilding fraternity—and a measure of their professionalism—Croser and Alliance CEO Equid, who had combined to oppose the Navantia ship in favour of their Gibbs & Cox design, now found themselves in harness, working to save their erstwhile opponent. Croser says, 'We understand each other enough to come to a common ground and work it through in an Alliance like we had.'

Croser did a 'deep dive' into the program. 'By September,' he says, 'I'd come to the conclusion that there was a real problem between ASC and BAE. They were about to go to war in the courts about delivery of a schedule which BAE couldn't deliver. They didn't know when they could get product out the door.'

As to ASC:

> I could not get any focus on productivity and performance and cost. Every time we did an FMI[10] performance evaluation on ASC it was 'wrong data' and 'FMI got it wrong.' In fact, they never got it wrong. But it was always, 'fight the data; don't agree with the data.' They weren't listening.
>
> Navantia had good people from Ferrol there in the yards waiting for things to be asked of them … but really they were marginalised; and it was the same at Williamstown. When I visited Williamstown I never saw them once; never even knew where they were. So that's how visible they were.

Croser and Equid made an urgent journey from Adelaide to Canberra, where they carried an unwelcome message to Warren King and Andrew Cawley. Croser says:

> I said, 'Look, we've got a situation in which they're out of control on cost; they're not meeting schedule; they're not meeting quality and performance. We need to bring in Navantia expertise or similar expertise in shipbuilding or we're never going to finish. This is a real mess, Warren; we need to do something about it.'
>
> I must say I felt for Warren. He was being asked to carry out a reform on his program, that he set up in a way that he felt was safe, was on track. And here I am telling him it's not on track, it's not safe, it's in danger. And bless his cotton socks, he said, "Okay, we need to do something about this," and he agreed.

In the meantime, the Alliance's Equid struggled to keep the project on the rails. Despite all the criticism, he says the Alliance had scored some signal successes:

> Pretty early on, it was discovered that the version of Aegis we were getting ran on a lot of common off-the-shelf computing hardware, not military hardened hardware. But it turned out that computing hardware doesn't like living on a normal ship power supply. It doesn't like the potential for noise or interference. So, literally, the risk you have is there's spikes on power supply, the computing hardware shuts down, and you've got 'the blue screen of death', which isn't really what you want for a combat system.
>
> So the problem landed on the Alliance. We could have been in the mode of saying, 'Commonwealth, that's your problem because you bought that FMS. Just give us a whole bunch of money and two years delay to fix the problem.' Instead, we got together and looked at it. From Raytheon's side, we could change the combat system so you could filter power at compartment level. You could change Aegis. You could harden up the computing equipment. Or you could redesign the ship's power supply system.
>
> We did a trade study on those [options]. We thought [option] three is the answer for the product and the Navy. Navantia had already scoped out what we needed to change to do that. So we implemented that change. We had to buy some additional hardware, so there was a cost to the Commonwealth for that, but the design was done, the modification was implemented. There was no impact to the schedule.
>
> That's a success story. In a more traditional arrangement you'd be writing letters to each other about whose fault it was, instead of which we were able to get together as a group. That was on my watch, so it was controlled between myself as CEO and the Commonwealth representative.

Equid is a firm defender of the Alliance system, provided it's handled correctly by its participants. However, he's fully conscious of the problems that the AWD project suffered. The slippage in the schedule and the cost overruns were eliminating the 'gain' from the Alliance process, and tensions became evident.

'It was very hard to hold things together at that point in time,' he says. 'You were really starting to get into the blame game; the focus becomes fighting and not solving problems.' The replacement of John Gallacher had withdrawn a personality who was dedicated to the Alliance structure. 'John left four or five years of good work, of having this one team approach to things.'

Under Stephen Ludlam, he says, ASC was 'very focused' on its own corporate agenda. 'That started to cause some of the tensions.' This was exacerbated because it was the shipbuilding side of the program—as opposed to the combat system—that was causing the overruns:

> We saw a lot of instability when we did the quarterly estimates, re-estimates and estimates of completion. So the job was getting more and more expensive to a point where you could tell that neither organisation was going to make any money. All the profit went away, so that's not good for anybody. A little bit of finger pointing started to happen.

However, it was equally clear to Equid that the issue surrounding Navantia's design plans was a major factor in the project's travails. Indeed, he expressed it with some precision in a later response to the ANAO audit report:

> While there has been some debate regarding the 'design to production' process, it is clear that Navantia is required to work with the Shipbuilder to develop the AWD Build Strategy. The parties have endeavoured to achieve this outcome, however the requirement to adjust the content, structure and schedule of the design product … in order to align with the AWD Build Strategy remains vague, and a major source of frustration with the Alliance parties.
>
> For example, as the [technical data package] content, structure and delivery schedule is based on Navantia's own build strategies for its shipyards, the resulting design products have not aligned with the AWD Build Strategy (that is, a distributed vs centralised build strategy). This issue has been compounded by … design maturity issues.

Clearly, Navantia wasn't meeting the demands of its contract to adjust its operation to deal with blocks and other elements of the build coming from various shipyards instead of its own single yard. And the plans themselves weren't fully developed for the Australian builders.

DSTO's David Kershaw says:

> What was not fully appreciated or factored in was the art in the traditional Spanish shipyard building. Where pipes and things get run [in a block] often comes down to which of the trades is in the compartment first. So if the electrician gets there first they'll run their [wires] in the easiest way. And if the pipes come in next they have to adjust.
>
> On the other hand, in the next compartment the water pipes might have got in first and the air conditioning might have gone in. Then the electricians have got to put their stuff around it. And that's where you come down to a skill about the trade workers automatically knowing what supports they have and then they just work it out. And they've been doing it since the Spanish Armada. This is very different from a fully modern, full sketched out and laid out shipyard that you have today. But you look at almost any of the projects of concern that we've had over the last 20 years. It comes down to [this]: Do we fully understand the culture and the heritage of where things are coming from? In this case, with BAE and Navantia, it's about a mismatch of understanding.

Through 2012, the project struggled to find its way back to an even keel. In Ship 01, other major issues included the need to replace 25% of the destroyer's internal pipework due to faulty manufacture, and the initial rejection of the ship's mainmast block because of defects in the cabling and combat system equipment.

Peter Croser says that Warren King and he decided to do a presentation to the Department of Finance. 'Basically, it said [the build] was getting so far behind against all goals that we need to do something drastic.' The response, he says, was 'Why didn't you tell us earlier?' And this from the organisation that owned the shipbuilder!

On 6 September 2012, Minister Smith announced that the AWD schedule would be 're-baselined' to extend the operation for the Alliance and its partners, including ASC and Forgacs, in a revised plan. The new arrangement was designed to 'reduce peak demand on project critical resources and project risk; not increase the cost of the project nor result in any job loss; and help retain skills in the naval shipbuilding industry.'

The minister said, 'The re-baselined schedule is intended to help the Navy reduce the demands and risks associated with accepting into service two major capabilities—LHDs and AWDs—at around the same time.'

11. The review

Despite his broad portfolio as the head of DMO, Warren King retained a deep emotional connection with the AWD project. Chris Ritchie says, 'Warren was intensely personally involved with the thing throughout its life. Without being unfair to Warren—because his heart was exactly in the right place—but it was personal, and if things didn't look right, Warren didn't take it all that well. He regarded it almost as his personal property because he'd been there at the birth of the whole thing.'

Nevertheless, he accepted the value of a special audit of the program initiated by the ANAO—under the auspices of the Department of the Prime Minister and Cabinet (PM&C)—beginning early in 2013. It would lay bare some of the more intractable problems in the system.

Powerful attachment to a personal cause was reflected even more potently in the higher reaches of government throughout this period. Former Prime Minister Kevin Rudd had never accepted the legitimacy of his deputy's accession, privately branding it a 'coup' and railing among friends and associates against Julia Gillard's occupancy of the Lodge. The effect was to distract and demoralise her government. And, despite an unsuccessful public challenge to her leadership in 2012 and his banishment to the backbench, Rudd's campaign of destabilisation continued.

At the same time, the Opposition Leader, Tony Abbott, waged an unremitting campaign against Labor and its increasingly desperate leader.

Although, for someone running a minority government, she would get a substantial program through the parliament, by the beginning of 2013 Gillard was in desperate political straits. When she foreshadowed an election in September of that year, the forces of opposition to her leadership came on bounding feet to the battleground.

On 27 June 2013, the Labor caucus accepted the inevitable and joined Rudd in a counter-coup, with the privately declared intention of 'saving the furniture' of the Labor team. Rudd retained a certain popularity in the electorate, particularly in his native Queensland, and initially his government received a bounce in the polls. But it faded as election day approached and the Abbott team cruised to a comfortable victory. In its wake, Senator David Johnston took the oath as Defence Minister.

'Navy was my focus,' he says. 'Air Force you don't have to worry about—they buy off the shelf; Army [is] nickels and dimes … but Navy is the big budget item.' He turned his attention almost immediately to the troubled AWD project.

He had followed its path, he says, through Senate estimates and wasn't impressed. 'I said to Warren, "Where did you get this Alliance from? This is the most complex and confusing thing I've ever seen". He didn't really have an answer but I know what it's about: the department sees private industry as rent-seeking carpetbaggers, and to some extent they are. But contracts solve the problem; liquidated damages solves the problems.'

Some elements of the build had been done well, he says. 'Raytheon were very, very good. The integration went smoothly; we'd never done any of it before, but they used expertise from the US and they did an absolutely fantastic job.'

He was especially concerned about the financial arrangements surrounding the government's ownership of ASC. While it was owned by Finance, he says, there was never a remedy for lack of productivity:

> If they had contracted properly to private industry they could enforce contracts. If we'd have contracted Forgacs and BAE and demanded money from ASC in a bond, the Defence Department would have had a remedy and we would have had a commercial outcome.
>
> Warren and I used to tear our hair out about how we're going to get money from Finance. They thought it was good for the Commonwealth to control and have the security and secrecy of the Commonwealth doing their own work. I think that was folly … [ASC's financial performance] was a basket case. When I got there, the earned value for ASC was about 55 cents in the dollar. The issue was that Finance refused to shoulder any responsibility or burden for these ridiculously high cost figures. The other thing was that I knew that ASC didn't have the data to benchmark their own performance.
>
> I was saying to them, 'Give me a schedule' and they said, 'We can't.' I said, 'Why not?' and they said, 'We don't have the data' and I said, 'Hang on, these are fundamental issues for shipbuilders; they need to know where they're going, how they're going and how much they're spending.' ASC could not tell us a thing.

However, by December, following briefings by King, Croser and other senior officials, the government took action. The newly appointed Finance Minister, Senator Mathias Cormann, joined with Johnston to foreshadow an expert review 'intended to give government an independent perspective on all the issues with the program and to make recommendations on the best way to proceed.'

Early in the new year, they appointed Professor Don Winter, who was the US Secretary of the Navy in the George W Bush administration, and Dr John White, the former Transfield chief who had successfully run the Anzac frigate build, to conduct the review. Both men were well qualified for the task. Winter had been head of Northrup Grumman Mission Systems and was no stranger to the Australian shipbuilding scene.

In fact, Peter Croser was on good terms with him and was able to supply the review with much of the necessary data for them to draw their conclusions. Winter told him of his immediate response: 'New shipyard, new design, new workforce, new strategy in distributive blocks … too many news.' Croser was reassured, 'I went, "Ah, sounds like we've got an ally here who understands the problem."'

On 25 February 2014, while the review was underway, the ANAO released its audit report. It was couched in the relatively neutral terms befitting a public auditor and incorporated responses from all the major participants, but it clearly delineated cost overruns of more than $300 million to date, with more likely to follow. Moreover, the schedule continued to blow out by between 15 and 21 months.

Other findings from the audit included a latter-day realisation that, while the Alliance required the industry participants to deliver AWD parts to schedule, when they failed to do so, 'the Commonwealth bears most of the residual costs.'

Other major conclusions were equally plainly spoken:

- The effective 'premium' for an Australian build, as opposed to overseas construction, was 30%.
- The design as delivered by Navantia contained 'drawing errors and omissions'.
- Revisions had 'saturated' the Alliance's engineering and planning department.
- It was costing ASC $1.60 to produce work originally estimated at $1.00.
- Defence had underestimated the risk in 're-establishing Australian shipyards which had not been used for some time'.

The audit proved a valuable tool for the White–Winter review team. Their report, while compiled in relatively short order, was both thorough and incisive. Both men visited the construction facilities and interviewed both current and former participants. The report arrived on the ministers' desks in time for cabinet consideration and the release of a single page 'summary' on 4 June 2014. In fact, it was a bowdlerised precis that eliminated conclusions that would have embarrassed some participants and undermined the reputations of others seeking further involvement in the Naval Shipbuilding Program.[11]

Nevertheless, the summary included two 'direct causes' for the cost and schedule overruns:

- The initial program plan for AWD development and production was unrealistic in its cost and schedule estimates.
- The Alliance, as structured, composed and staffed, had been unable to effectively manage the AWD Program.

'The AWD Alliance and ASC were unable to effectively manage the AWD block subcontractors,' the summary said, and, in a direct critique, 'the oversight provided by the Commonwealth of Australia has been of limited effect.' Moreover, 'more difficulties can be expected.' Its 'key recommendation' was 'increasing the shipbuilding management capacity of the AWD program through the insertion of an experienced management team.'

The ministers set the current cost of the AWD build at $8.5 billion and said that the implementation of the review strategy would improve ASC's productivity and that of BAE, Forgacs and Navantia, which would insert an experienced shipbuilding management team into ASC.

At the press conference when releasing it, Senator Cormann said, 'You'd appreciate that there are a number of senior partners both in the public sector and in the private sector that are involved in this. There will be some complex negotiations in the next few weeks … that is the reason we've decided not to release the full report at this point in time, because we don't want to hinder the proper conduct of those negotiations, essentially by creating too much disturbance as those discussions take place. But at the right time the report will be released.'

By 2018, the 'right time' had still not arrived.

Nevertheless, Cormann did elaborate:

> What it says is that ASC did not have the adequate capability to cost-effectively manage a project of this size. Let's not kid ourselves—effectively, the ASC was quasi learning on the job how to deliver a project of this sort of complexity, which is why the review made very clear that there were problems with the initial program plan; and there were problems in terms of the inadequate government oversight.

He added that he had spoken to ASC chairman Bruce Carter and was assured that the ASC board would work 'collaboratively' with the government. However, 'matters related to management at the ASC is a matter for the ASC board.'

Later the same month, 'due to increasing commercial, schedule and cost risks,' the AWD project was placed on Projects of Concern list.

It was the final blow: the program had reached the low point of its trajectory. From here, the only option was a radical regrouping; the alternatives—abandoning it as a lost cause or continuing its present course—were unthinkable. The only question was whether the government and the builders had the will and the discipline to set a new course and to see it through.

12. The final fix

Within two weeks, Finance Minister Cormann announced that the government had decided to appoint 'commercial and legal advisers' to assist in implementing the reform strategy.[12] He chose Greenhill & Co., an investment bank, as the commercial adviser and Ashurst Australia, the local branch of a global law firm, as the legal adviser. They would start 'without delay'.

He said the program 'was in serious trouble', with advice the overall project was 'about 21 months behind' schedule, with 'serious cost overruns'.

Defence Minister Johnston noted that 'this proposed remedial action is the third remediation cycle for this program' and he was hopeful that it 'would ensure that the AWD program delivers this vital defence capability effectively and efficiently'.

Coincidentally, on 16 July 2014, Bruce Carter announced that ASC CEO Steve Ludlam would leave the company, shortly before his five-year contract expired. Carter paid tribute to Ludlam's work in expanding the company's role beyond submarine maintenance and his 'oversight of significant improvements' to ASC's efficiency as a shipbuilder.

'During Steve's time as head of ASC, we have seen the opening of the $120 million shipyard as ASC South, Osborne; substantial construction of the first Air Warfare Destroyer, HMAS *Hobart*; consolidation of the second AWD, HMAS *Brisbane*; the start of blockwork for ship 3, HMAS *Sydney*; as well as strong growth at our submarine maintenance facility at Henderson in Western Australia,' he said.

He was supported by Minister Johnston, who earlier that month said ASC 'has done exceptionally well in recovering productivity levels … I want to say here in Adelaide that that is down to Steve Ludlam and his team. We have recovered the situation with submarines,' he said.

Ludlam would remain in Australia and become a valued member of the South Australian Defence Advisory Board. He would be replaced at ASC by Stuart Whiley as interim CEO. Whiley had been with the company for 28 years and was regarded as 'a safe pair of hands'. He wouldn't be confirmed in the permanent position until February 2018.

Moreover, they would undo the amalgamation initiated by Ludlam into two separate businesses: one for submarines, the other to focus solely on shipbuilding. They recruited Mark Lamarre, an American formerly of Bath Iron Works, as interim CEO of ASC Shipbuilding.

Meanwhile, Peter Croser, his deputy, Commodore Craig Bourke and Rod Equid at the coalface of the AWD reform program had the task of turning the review's recommendations into a going concern. Bourke, a large man with a single-minded dedication to the job, was soon appointed Program Manager for the implementation of the reform.

He had joined the Navy in 1984 and after seagoing experience had been seconded to the US for almost five years, operating in naval shipyards. He had taken over the successful LHD build as Kim Gillis moved up through departmental ranks. Indeed, the first LHD was commissioned in November 2014.[13]

Getting the AWD reform up and running would entail an enormous workload and a rejuvenation of the workforce, particularly in ASC. It wouldn't be assisted by Minister Johnston's outburst in the Senate in November 2014. He said that ASC was 'delivering no submarines for $1 billion' and that it was more than $350 million over budget on the three AWDs. In fact, he said, the real figure was probably more than $600 million, but the bad data wouldn't grant him an answer.

He then said, 'You wonder why I'm worried about ASC and what they're delivering to the Australian taxpayer; you wonder why I wouldn't trust them to build a canoe.' The media sized on the remark, and the effect upon ASC workers was 'devastating', according to those close to the workforce. Indeed, the raising of morale among ASC staff and the Alliance was one of the more important tasks of the reformers.

In December, Johnston would be replaced by Prime Minister Abbott's close associate, Kevin Andrews, whose tenure in office, at 10 months, would be even shorter than that of his predecessor. But the broad outline of the reform—the upgrading of the shipbuilding management—was soon refined to a two-step process: first, identifying the options; then, second, spending sufficient time investigating the capacity of each before letting the tender. And in this the reformers were answering in large part to the Finance Department as owners of ASC. Finance Department Secretary Jane Halton told participants, 'the interim arrangements are to gain an understanding of the extent of financial exposure and to allow a re-baselining of the project.'

The options were either to enhance the capability of ASC itself or to bring in an outside company to take over the management of the build. And, if the latter course were taken, the two obvious contenders were BAE and Navantia, both of which expressed a willingness to take on the task. Peter Croser says:

> In the interim, we decided to bring those two parties in quickly, from January to July 2015, so they could have a look at the program, in a sense do a due diligence before they put an offer on the table.[14]

> The biggest question in the minds of industry was 'What is the state of the program?' They've got the ANAO report, they've heard their own rumours, but they wanted to be on the inside. So we allowed them to come inside, work with the shipbuilding management team, work with the Alliance to develop an understanding of the program, be involved in the cost review, the schedule review, which happened from January through March, and then understand enough to be able to put an offer on the table after July, when we put out a tender to BAE, ASC and Navantia.

ASC responded to the tender by promising to enhance its own performance and bring Navantia in to work under its management. On 15 April, ASC management released an 'update on progress', assuring those involved that 'the first ship is more than 70% complete; seventeen of the 31 blocks for Ship 02 have been consolidated on the hardstand at the Common User Facility. Once ship 01 is launched, ship 02 will take its place to finalise its consolidation. And preparations are underway for the keel laying of ship 03.'

By May 2015,[15] Senator Cormann and then Defence Minister Andrews had announced a project cost overrun of $1.2 billion and two and a half years of delay in ship deliveries.

BAE and Navantia each proposed to take charge of the shipbuilding program themselves.

Croser says, 'Those three models [ASC's, BAE's and Navantia's] were compared, competed and eventually a down select occurred and we finalised negotiations in December.' The BAE option was declined, as was the ASC proposal to engage Navantia under ASC management. Instead, for a figure of approximately $150 million, Navantia took over the management and ASC was 'in essence under the instruction of Navantia' to carry out the work on the ground.

There followed a testing time of negotiations to get ASC to accept that its workforce would be managed by Navantia. It involved Croser engaging with all parties from Raytheon and the Finance and Defence departments to get a contract completed. In the event, Finance, as the ASC 'owner' under the leadership of Secretary Jane Halton and Minister Cormann, was supportive, and the contacts were at last signed by the parties. It was a pivotal moment.

Croser says, 'What was gained from that was a structure whereby an experienced designer and ship builder is brought in to finalise the last stages of the three ships using the workforce of ASC under a similar Alliance construct.'

Navantia was still not an Alliance member, but it now had a vote on shipbuilding decisions at the AWD board on behalf of ASC. 'So they truly are in control of shipbuilding management,' Croser says.

The new arrangement would at last bring certainty to the schedule. The delivery of the first ship, *Hobart*, to the Navy had recently been scheduled for June 2017. The second vessel, *Brisbane*, was scheduled for delivery in September 2018, and the third, *Sydney*, in March 2020.

By now, Rod Equid had been promoted from CEO of the AWD project to membership of the board, representing Raytheon. The new CEO was an American, Lloyd Becket. 'He worked for Raytheon as a project manager for many years and had been in the project for about eight months,' Equid says:

> Lloyd was only there for about one year and he found it quite stressful and had enough, so he left. In any case, Navantia came in; they redid all the planning; they drove the work in a different way.
>
> They understand shipbuilding and they understood how to build that ship … One of the things that's a bit disappointing is that the impact of Navantia is not broadly recognised in the community. You see ASC having a lot to say about how they've improved in AWD—and they have—but I'm here to tell you that a big contribution to that is the Navantia involvement—a knowledgeable shipbuilder, good people, and really having the lead yard services that we probably should have had from the beginning.

Peter Croser says:

> The big difference between an ASC and a Navantia logic was this: ASC says 'I'm doing a quality product and you'll get it when I'm finished.' Navantia says, "I will deliver you the capable product that meets spec on this date … and you will save any overexpenditure you might have had by meeting that date.' I agree with that logic—if you constrain the date to deliver, you will constrain the cost.[16]
>
> One of the key dependencies for national shipbuilding is that this program gets its act together and proves that we've got a capable industry. We've now put in the fix, which has stabilised it. Now they have to prove that they can be still more productive and meet their commitments … getting this project right was a prerequisite for getting the whole thing right. Without this, the whole [concept of] national shipbuilding might have been thrown out the window and we might have been buying them offshore. We are shaping the industry. We're saying to industry, you can't get away with doing it the way you have always done it.

Once the reform process was bedded in, Croser accepted the opportunity to return to Canberra in 2015 as Director General Specialist Ships Acquisition at Capability Acquisition and Sustainment Group, which was the successor to DMO. 'I was sad to leave it,' he says. However, from that viewpoint he's able to see ASC today in a new light. 'I'm getting along really well with ASC at the moment,' he says.

'I really look forward to working with them on the next project because I know it's within their capacity.'

On 17 November 2015, the Australian group Civmec announced that it would acquire Forgacs, the founder of which, Stephen Forgacs, had died in 2012. According to a respected official, 'What killed the Forgacs company was the air warfare destroyer program. It was just too big and too difficult. They didn't have the design control. And they really, really struggled as they got further and further behind. But even BAE, the big British shipyard, couldn't build the complex hull forms. Eventually, we just gave up and had them built back in Spain. And it was only the third ship that we actually started getting to that structure. ASC itself didn't build any complex hull forms. They were essentially an assembly yard. Not many people realise that we didn't actually build all the air warfare destroyers in Australia.'

Warren King also departed his post at DMO in 2015. He joined CMAX Advisory, an international company with 'a proud record of providing bipartisan business advisory, communications and political services to Australian and international clients, ranging from emerging enterprises to industry leaders and key government agencies'. In 2016, he was appointed to the board of Navantia Australia and is now its chairman.

13. The culture

Part of the reason for the improvement in the AWD project and at ASC can be laid at the big military feet of Commodore Craig Bourke, who took over from Peter Croser. As much as any member of the fraternity engaged in the AWD procurement, he has made an emotional, intellectual and physical commitment to the project. From his desk in a modest office at the Osborne plant, he expresses himself in the uncompromising terms of the enthusiast. He's accompanied by the AWD Communications Director, Danielle DeSantis.

The key, he says, is 'culture', but he uses the word in a different sense from the perennial concern about Spanish and Australian differences:

> Projects are long. They're complex. They have difficult histories, and they have lots of emotions, lots of behaviours, and their own manifested culture. And what I can tell you, as somebody who had worked in shipyards and had delivered ships before … the culture that was here prior to, and even after, reform wasn't a culture that would ever give you the outcome of a ship.
>
> Process is important, but culture eats process for breakfast. If you've got the best process in the world and bad culture, you'll never get good outcomes. If you've got good culture, even if you've got bad process, you'll get an outcome. If you've got good culture and good process, you'll get good outcome.

He's particularly gratified by his experience as Program Director in bringing the LHDs forward to delivery. He was working at the Williamstown yards when the first one, HMAS *Canberra,* was commissioned:

> … we essentially had the second one just about to start its sea trials … We built the LHDs in four shipyards—two in Australia and two in Spain; and we brought them from halfway round the world and they fitted together. 'The hard stuff is actually the interface between the hull [from Spain] and the superstructure [from Williamstown]. All the smarts for the ship are in the superstructure and all the power and distribution of the systems operate in the hull. So all the interconnects go through the interface. If you wanted to see an interface control spec with complexity, that was it. If you wanted to see risk in bringing together a distributed build, that was it.

Yet the workers on the job completed it, he says, in a way that reflected the workplace culture that he had engendered:

> We then had a different problem because the shipyard was going to die when those ships were finished. We used to run town hall meetings there and I had a good relationship with the senior leadership of the shipyard. I used to address them at town halls. I got up there one month and I said, 'Gents, I know the future looks bleak. But you need to understand, what we're doing here is of national significance. Somewhere down the track you're going to be sitting home one night and on the news you're going to see that ship. And it's going to be somewhere in the world doing something really significant, and you're going to say, "I helped build that," and I remember a couple of them laughed at me.
>
> Twelve months after delivering *Canberra* it got sent to Operation Fiji Assist. I got six phone calls from guys from the Williamstown shipyard that said, 'You're effing right. I'm proud as punch.' I said, 'What are you doing now? Come to South Australia!'

He had carried the same message to the AWD build, he says. 'They're no longer sticking steel together; they actually understand they're building a significant capability for Australia. Australians are not silly.'

This attention to workplace culture remans a top priority:

> We have deliberate strategies that we employ. I work with the Communications Director and with the management team to deliberately try to change the culture to be one that will be more successful at building ships.
>
> Teamwork builds ships. I don't know very much; I'm probably the dimmest light bulb you'll find in any box, but I can tell you I've worked in a lot of shipyards, and if the shipyard workers don't think they're a team, and they don't actually subscribe to the knowledge that they're all in it together, you don't get a ship. Because ships don't naturally want to be constructed. A ship will fight you the whole way; it will do everything it can never to go to sea.

Danielle DeSantis says, 'Commodore Bourke is a rare bird. There are only a handful of people in the world, let alone Australia, who have had his experience.'

Bourke says:

> Not long after we completed *Hobart*, we opened the ship up for the workers to bring their families in to have a look. The shipyard workers were all four inches taller the next week because they'd gone from going out in public where you didn't say you were a shipbuilder because you're one of those lazy bloody spongers who can't build a canoe, to someone who can say, 'I built this.' In fact,

> the day went way longer than it should have because there was Mum or Dad with the family standing around with the tradie saying, 'You see that there? I did that.'

Other strategies included regular barbecues with the team and a concentration on elements that directly affected the workers, such as workplace safety:

> Prior to me arriving they had started to grapple with it and they had started a safety-specific program, but that was in response to what they were seeing occur, not as a concept that safety is a by-product of doing things well. [My] message is 'I want you to go home in as good if not better condition than you arrived at work.'
>
> Different areas respond to different levers. We changed communications mechanisms; we shared information; we sent out delegation and authority instruments; we established different team relationships.

DeSantis says:

> Last year, when we delivered the first ship, we had a barbeque for all the staff. Craig stood up, and just having visible leadership from the Commodore to the thousands of people in the shipyard makes a big difference; and to hear them be thanked from the senior leader in the organisation is quite a big deal.
>
> That kind of thing has had a massive impact on the workforce, more than I ever could have imagined. And not just that but the turn in the media from 23 May 2015, when we launched ship 1—that was a huge turning point in the media, which then has an effect on the morale.

Indeed, Bourke had no doubt that if greater attention had been paid to the workplace culture he promotes, the entire AWD build would have been much the better for it. 'I'm a John Gallacher fan,' he says. 'This program failed the day the executives that were running it allowed John Gallacher to be first side-tracked and then removed. Had John Gallacher stayed, I'm not saying it would have been problem-free—they're never problem-free—but there would have been somebody with the right background and experience to get through the difficult times.'

He believes the internal operations of the AWD Alliance were imperfect. 'That legal construct did not have a cohesive culture that enabled them to work in any meaningful way to produce a product,' he says, and uses the example of technical data packs from Navantia that caused problems of inadequacy:

> The [technical data pack] was considered insufficient to build the ship. It was an issue because the culture had no other way of addressing the grievance between the organisations or aligning the organisations. In that case, you focus on things you can blame. You form arguments to have your dispute, and usually those arguments are disputing not the real issue, but the symptom. The issue was poor culture—a culture that didn't understand what it takes to build ships.

[Nevertheless,] I hope my workforce and, I hope, the AWD Alliance now have a huge sense of achievements. The Australian and international partners that have participated should feel proud of what they've done. They've turned around what was a disaster into a success. And they've done it by applying themselves and focusing themselves on the generation of ships and not on increasing their own power or status.

We've learned lots of lessons. We came to this program with a new workforce, a new shipyard, new design, new contracting strategy, new construction method, new test and evaluation acceptance method and new standards. What could possibly go wrong?

So, [in future] the first thing you need to do is you limit your 'news'; and continuous shipbuilding addresses a huge number of those because it allows you to take learnings and move them forward. It enables you to correct failures so they don't occur in the future.

14. The ships

After that May 2015 launch, when only 67% of construction was complete, *Hobart* was fully fitted out and accepted by the Navy on 16 June 2017.[17] It was officially commissioned as HMAS *Hobart* at Fleet Base East (Garden Island) three months later on 23 September.

Subsequently, it conducted weapons firing trials off the east coast, including naval gunfire support drills, anti-air gunnery practice and torpedo testing against real and simulated targets. The trials also involved the ship's Seahawk Romeo helicopter in trials that were designed to test both the ship's and the crew's performance. Both came through with flying colours.

A series of official visits by VIPs and those most closely involved in the planning and production of the warship followed. In April 2018, my colleague Christopher Dixon and I were shown through the ship by Captain John Stavridis, whose officers and key personnel are among the 186 crew, including 35 women.

From the wharf, it's a handsome vessel, sleek and powerful; beside it at anchor, the exposed superstructure of earlier warships seems complex and elaborate. Waiting at the head of the gangway, Captain Stavridis is one of the more highly qualified of the RAN's masters and commanders. Born in Sydney, he joined up in 1988 and graduated from the Australian Defence Force Academy in 1991 with a BSc (Honours) in oceanography. He went on to take master's degrees in science, commerce and business administration. He's also a certified practising accountant.

He has served at sea as a principal warfare officer with expertise in surface warfare and communications in the frigates *Anzac* and *Stuart*, as well as the predecessor of his current command: HMAS *Hobart II*, the Charles F Adams guided missile destroyer built for the RAN in the US.

Proudly aboard the successor, he says, 'The more time we spend operating the platform and understanding Aegis, the more we realise how capable the ship is.' He's looking forward to a deployment to the US Navy's combat system qualification trials conducted on its instrumented range off the US west coast. 'It will put us and our ship to the test. When we pass those serials, that is the milestone which means *Hobart* is ready for operations.'

Captain Stavridis leads us to the bridge overlooking the 48 missile cells for'ard. With the eager assistance of his department heads, we tour the ship, from operations room to the propulsion control centre to the substantial sick bay, which can be expanded as needed in the event of conflict or humanitarian operations.

The captain's quarters are relatively spacious, but when an admiral is aboard they're divided neatly; the furniture is functional but of a quality that wouldn't be out of place in a courtroom or the office of a departmental head of the Australian Public Service. The same goes for the wardroom and the tightly designed cabins of the department heads. The crew's quarters are clearly popular, as are the areas for exercise and relaxation.

Dixon is struck by 'just how little the *Hobart* looks like a warship below decks'. It's very different from his experience touring a minesweeper, for example. 'I expected her to have low ceilings and be forced to duck through every hatch or door; instead it felt almost spacious. It was the same with the painted walls—other warships I've seen had been the same grey colour inside as outside.' In Hobart's case, the walls are painted black above deck—to preserve night vision—and white below, where lights are always on.

The ops room, where the warship's fighting capability is tested, is rather more stiff and formal than those of the Anzac-class frigates following the upgrade of their anti-ship missile defence systems. The frigates' ops rooms are reminiscent of the bridge on television's *Star Trek* series. Indeed, there have been suggestions that Australian AWD crews are 'adapting' their ops activities from the more formal approach of the Spanish. But in any new class of warship, such tweaking of the original isn't only inevitable but expected.

Back on the foredeck, Captain Stavridis was eager to return to the drills that will prepare his ship and crew for the testing time at the American range off San Diego. If the enthusiasm of his officers was a fair indicator, HMAS *Hobart* will pass with colours flying.[18]

According to Commodore Rob Elliott, the Navy's capability sponsor of the AWDs, who spent time aboard, 'Everyone on that ship is super happy to be on it.'

Back at Osborne, as the build of Ship 03 reaches its final stages, Commodore Bourke says earlier talk of low productivity suggested that it was 'a blue collar problem', which it never was. 'Improved productivity didn't come from whipping the workers harder,' he said. The fact that Navantia was playing a greater role and ASC Shipbuilding CEO Mark Lamarre was leading internal reforms at the shipyard meant that we're planning and executing much better, so our blue collar workforce is able to be productive.'[19]

The combat systems and their integration continued to perform well. A representation of the combat system was built on land and then fully tested before being installed on board, 'So we knew the electronic boxes would talk to one another and we knew the wiring was basically right. When we got to sea, we could turn it on to its full operational state to test that it functioned to the performance levels we expected; and it did.'

Lamarre said ASC's improved performance, beyond Navantia's involvement, was the result of broadening the company's shipbuilding expertise. 'We brought in value stream experts,' he said, 'to pinpoint improvements on our scope, for instance, in installing the vertical launch system on Ship 03. This is demonstrating our international competitiveness.'

The Osborne yard gave a 'huge advantage' over older shipyards, such as Navantia at Ferrol, where ships were still constructed and launched on an incline. Moreover, his workforce was freed from the very strict union agreements and rules that applied in America's Bath Iron Works, for example. 'We simply don't have that here,' he said. 'We have a union workforce that has been very resilient through a tough time and has been very flexible and cooperative.'

Defence Deputy Secretary Kim Gillis says:

> Ultimately, the workforce in South Australia produced a really fine ship and I'm comfortable that we got a really fine outcome. I've been all over *Hobart* and I think that it's as good a ship as built anywhere in the world. The management of the company had learned a lot; and it did significantly improve the time frame of doing it so that by third ship the management was competent. I wouldn't say it's world's best practice; I would say it's competent.

Brisbane was duly launched—by Mrs Robyn Shackleton, the wife of former Navy Chief, Vice Admiral David Shackleton—on 15 December 2016. It was 84% complete, and when fully fitted out it, too, cruised through its sea trials. Lamarre said it was a remarkable 40% less expensive to build than *Hobart*; and *Sydney* would be a further 36% improvement on *Brisbane* for ASC Shipbuilding's 'scope of work'.

'The workforce has put their shoulder into this job, and the expertise we've developed here is the nation's leading shipbuilding capability,' he said. 'This is my fifth lead ship now for a new program and it's the best I've seen in terms of learning.'

It had taken until February 2018 for the program to be formally removed from the Projects of Concern list 'following continuing improvements in shipbuilding performance'. By then, HMAS *Hobart* had been commissioned into service, and both *Brisbane* and *Sydney* were 'on track to be delivered against the reformed schedule'. Then, three months later on 19 May, the final act of the struggle to complete the AWD build came to pass with the launch, by Mrs Judy Shalders, of the *Sydney.*

By now the cost was well over $9 billion, which included a real cost overrun of $1.2 billion. And, while the project had certainly run well over schedule, Australia's strategic defence posture had survived unharmed. Moreover, former minister David Johnston says, 'The three vessels are fantastic. And there's plenty of scope for upgrades. The time will come when launchers will take missiles into the stratosphere. With these ships, we have the capacity at reasonable cost to upgrade and consolidate missile defence.'

15. The future

In the meantime, the 2015 changing of the guard at AWD in Adelaide had found echoes in the national capital, where Prime Minister Abbott was replaced by the man whom he had defeated for the leadership of the Liberal Party six years previously. Malcolm Turnbull acceded to the Lodge in September and replaced Abbott's Defence Minister, Kevin Andrews, with Marise Payne, the first woman to hold the portfolio.

A senator for NSW, she had been in the upper house since 1997 and in the shadow ministry from 2007, before taking the Human Services portfolio in the Abbott government. Throughout, she had evinced a growing interest in defence issues and was well liked in the department. In 2016, she was joined at the hip to South Australia's Christopher Pyne as Minister for Defence Industry, giving him carriage of a soon-to-be-released program designed to transform naval shipbuilding in Australia.

At the first opportunity, *Hobart* and *Brisbane* trialled their 'cooperative engagement capability' in blue water off the South Australian coast. The exercise, which combined radar and fire control data, tested the capacity of each ship to engage an adversary based on the other ship's data. While it was standard operating procedure for warships in the US fleet, it was a first for Australian ships and reflected the early suggestions during the build that the AWDs would be most effective when operating in tandem. Defence Minister Payne said that it represented:

> an important milestone … as we face increasing threats from cruise missiles and advanced aircraft.
>
> Together, *Hobart* and *Brisbane* bring revolutionary air defence capabilities—not by adding new radars or weapon systems, but by utilising existing sensors and weapons in a more effective manner. In the coming years, the Australian Joint Integrated Fires capability will link our ships, aircraft and land-based assets to create an increasingly sophisticated air defence network that can see over the horizon. This means that a combat system can engage a target that it otherwise couldn't see by using data from another warship's sensors.
>
> Not only does this capability enable us, for the first time, to share targeting data in real time between ADF assets, it will also enable us to share it with US assets, providing new levels of interoperability within a coalition force.

However, her announcement was only one aspect of a massive program of increased naval capability. On 16 May 2017, Prime Minister Turnbull travelled to Osborne with ministers Payne and Pyne to launch the $90 billion Naval Shipbuilding Plan, which will transform the Australian Navy.

‘This is an end to the boom and bust pattern that we’ve seen with shipbuilding in Australia,’ he said. ‘This is the largest investment in the defence capability of our Navy ever in peace time.’

The plan, he said, would incorporate a ‘rolling acquisition’ of 12 diesel-powered submarines, the continuous build of nine future frigates and ‘a follow on of surface combatants’, as well as a continuous build program for ‘minor naval vessels’, which include 19 patrol boats to be built at Henderson in Western Australia and ‘gifted’ to Pacific nations.

Moreover, the previously announced program to build 12 offshore patrol vessel (OPVs) for the RAN would be split between Henderson and Osborne.

The first two OPVs would be built at Osborne immediately after the AWD Program ended to prevent a ‘valley of death’ there prior to the start of the future frigates program, which is expected to ‘cut steel’ in 2020.

Kim Gillis says, ‘We’re going to keep on doing two OPVs in the yard so the predominance of the workforce will stay. It’s too late to do a fourth AWD. You could have made that decision years ago and it would have been a [useful] transition. It was also not a capability that the Navy required.’

The other ten OPVs—designed and overseen by the German shipbuilder Lurssen Werft—would be built at an upgraded Henderson facility.

Turnbull said a request for tender for the $35 billion future frigates had resulted in a short list of three contenders: BAE Systems’ ‘global combat ship’, the Italian Fincantieri’s multi-purpose frigate, and Navantia for a derivative of its F-100 design. (In the result BAE Systems was the successful tenderer). In addition, the Navy would acquire the $50 billion fleet of 12 French-designed Barracuda submarines, which are also to be built at Osborne, starting in 2022.

The announcement was generally welcomed within the defence fraternity and certainly among the shipbuilders. Warren King called it ‘a once in a lifetime opportunity’ for Australia’s shipbuilding industry and ‘a key pillar’ of the country’s industrial base.

Former Labor Defence Minister Joel Fitzgibbon says:

> In the medium future, we need to continue to build surface ship capacity. But we also need to be mindful that there might be an end game in that area and to be focusing—as we are—on underwater, cyber and space itself. It means spending a lot of money—2% of GDP is good because it gives you some discipline, but I suspect we’ll need more. And if the US goes more insular on us, we’ll need more again.

> We have to aim for an independent defence capability because we don't know what the strategic situation will look like in 20 years time—and not only military situations, but natural disasters and of course global warming. I believe we'll face sea-level rise issues that will probably call on Defence.
>
> There's an expectation now that we take care of the near Pacific. That's not going away, and the emphasis could become more positive if the US becomes more insular.

His Liberal successor, David Johnston, says:

> Australia has needed a proper deepwater, long-range Navy for a long time. In Western Australia, we have $500–600 billion worth of oil and gas and minerals on the Northwest Shelf.
>
> Now Tokyo, Beijing, Seoul and Taipei are alight at night because of our LNG. We will be providing energy for the booming Asian and Southeast Asian environment for my great grandchildren's lifetime and beyond.
>
> We must have the capacity to deal with problems between now and then, be it pirates, terrorists, a rogue state—who knows what the future holds? But we've got to have the capacity and we've got to pay the premium on our insurance policy. That's why the Navy is being rebuilt. But the price of that rebuild is what we've been through with AWD.

But, while the response of much of the Defence fraternity was strongly positive, there were immediate concerns among commentators that the all-important future frigate program schedule, with its deadline for 'cutting steel' in 2020, was too rushed. And the idea of splitting the OPV build between two shipyards in order to counter a skill shortage at ASC was at best inefficient and at worst a possible repetition of the early mistakes made by the AWD Program.

However, the most immediate and fundamental aspect of the shipbuilding plan for those closest to its realisation was the program to radically upgrade the ASC and Henderson shipyard and facilities. It's a development in which Kim Gillis, as Deputy Secretary of the Defence Department, is very closely involved.

One of the key aspects of the new arrangements is that formal ownership of the government's shipbuilding facilities at Osborne, now run by Australian Naval Infrastructure is now shared by the Minister for Defence Industry and the Finance Minister.

By August 2017, to support the shipyard expansion and upgrades, the government had created a commercial entity, Australian Naval Infrastructure Pty Ltd, which had completed the purchase of the initial tranche of state-owned land and facilities at

Osborne and received state planning consent for the new infrastructure. And that month it was able to unveil the design of the new surface shipyard.

Chaired by Lucio Di Bartolomeo, with more than 40 years in the transport industry, the Australian Naval Infrastructure executive includes former Santos CEO David Knox as CEO and Paul Bates as General Manager Operations. Paul Bates moved across from his equivalent role at the Techport Common User Facility from 2009 and throughout the AWD program. He's an Australian Defence Force Academy graduate and served 18 years in the RAN.

'The Department of Finance is a great institution, but they're not a shipbuilder,' Gillis says from his office at Russell Hill:

> So in AWD we ended up with a government-appointed [ASC] board. And there was a dearth of real shipbuilders on their board. Now it's not just Finance as the shareholder of all the shipbuilding facilities, it's Finance and Defence.
>
> For the future frigates, we'll have built $550 million worth of new facilities [at Osborne] but we're doing that for any generic ship of frigate or destroyer size. It will be there for the next 50 to 70 years. The Commonwealth will own it and we will lease that to whoever their successful shipbuilders are. That way it gives us a leverage; if we own the shipyard, the infrastructure, the IT network for foreground and the background intellectual property, a company comes in and performs poorly, we can say, 'You leave. Adios.' These are all things that we learned from AWD.
>
> Almost everything that is structured about the [Future Frigate] program is from the knowledge of the air warfare destroyer. People will say, 'Why do they pick an international designer to be the builder? Why is the government specifying their sovereignty of IP ownership in Australia and mandating that the design work be done in Australia?' It's because of what lessons we learned from the air warfare destroyer.

Gillis is also concerned to increase the Australian component in the supply chain of the new shipbuilding regime: 'In the AWD, the Australian component is worth about 56%, and it went up to 65%. That's good; we got a better Australian component number. But the problem with that is that it was mainly because it was late and we were spending more on labour doing rework. And that's not a great way to grow Australian industry capability.'

Under the Turnbull plan, Australia's shipbuilding workforce is expected to grow to more than 5,000 by 2025. A Naval Shipbuilding College to be opened in 2018 is planned to expand and develop the pool of skilled staff and tradespeople. 'We will transform our naval shipbuilding and sustainment industry with Australian workers in Australian shipyards using Australian resources,' Turnbull said.

'We believe that we have been too much a customer and not enough a supplier of our own defence needs,' he said. 'That is the big strategic objective—it not only secures the capabilities, the physical assets, that our Defence Forces need, but also our industrial future by having the skills and the industries to deliver the advanced manufacturing processes.'

Work on the transformation of the ASC shipyard began immediately and has kept up a cracking pace. Since April 2018, from the AWD System Centre building at Osborne, Commodore Bourke has been in the centre of a whirlwind of activity, not least the planning for the launch of the last of his AWD charges, *Sydney*. However, he's deeply engaged in the new era of continuous shipbuilding, and the infrastructure to support it is all around him. He says:

> The southern aspect will be focused on building surface combatants, and the northern aspect will be concerned with building submarines, with the Common User Facility through the centre. That's the bit that takes the things you build and puts them into their natural environment.
>
> There's a couple of ways you can build ships—vertically integrated or horizontal integration. Part of the AWD Program was very much horizontally integrated. It looked to distribute the work over lots of spaces. When you distribute the work, it requires you to have systems and controls to be able to keep all those thousands of interfaces in good shape so that when they do come together, they plug in.
>
> That's what you might do if you're only going to do something one-off. If you're going to do it continuously, you need to have more vertical integration because there would be a constant demand. So the shipyard extension seeks to suit a continuous build—it seeks to take in the raw plate and be able to put [completed] ships out at the end.

Kim Gillis said that, whoever won the future frigate shipbuilding contract, 'the design work will be done in Australia and then we will grow a capability to design the next generation of frigates out of Australia, built in a shipyard better than anything else that anyone's ever built.' We'll now see how the winner, BAE Systems, delivers on this vision.

However, while he reflects the enthusiasm of the defence and shipbuilding fraternity for the new era in prospect with its $90 billion budget, in May 2018 the ANAO released an appraisal that sounded a note of caution:

> Successful implementation of the Naval Shipbuilding Plan will depend on managing the high to extreme levels of associated risk. While the key elements for success have been identified by the Plan—focussing on infrastructure, workforce, the industrial base and a national approach—progress in the planning and delivery of those key elements is mixed.

High level governance to coordinate and advise on implementation of the Plan are still evolving. Defence is currently meeting scheduled milestones to deliver the Offshore Patrol Vessel, Future Frigate and Future Submarine construction programs, although each program is still at an early stage.

Defence has identified the key elements for a successful continuous shipbuilding enterprise. Implementation of the Plan is based on 'guiding principles' adopted by the Government which were informed by lessons learned from previous Australian shipbuilding programs including the Collins Class submarine and Hobart Class Destroyer (AWD). The guiding principles focus on achieving productivity, the selection of mature ship designs, limiting unique Australian changes, and adopting an integrated approach to design and construction.

At this early stage, the effectiveness of governance arrangements cannot be established. In response to internal governance reviews, Defence appointed a senior responsible officer for the Plan in early 2018. A framework of senior advisory and coordinating committees has also been established.

Defence's planning and mobilisation activities relating to the four key enablers of the Plan remain a work in progress. Specifically:

- Short term shipbuilding infrastructure requirements have been identified and construction of infrastructure has commenced, with longer term requirements under development.
- A workforce plan for the naval construction programs as a whole is currently under development, however, the cost-effectiveness of Defence's approach to maintaining a shipbuilding workforce between the end of the Hobart Class Destroyer build and the new surface ship programs hasn't been established.
- The broad areas of industrial reform required to achieve productive an cost-effective naval construction programs have been identified, but there has been no decision how these reforms might be achieved.
- Initial activities have commenced towards adopting a national approach.

Defence is currently meeting scheduled milestones for the naval construction programs, noting that each program is in its early stages. Over time, Defence has advised the Government of the high to extreme risks the shipbuilding programs present. Certain risks are now being realised, including the progress of the Offshore Patrol Vessel through second gate approval without detailed sustainment costs and finalised commercial arrangements.

Defence has not updated its cost assumptions for its naval construction programs to reflect the earlier design and build milestones for its surface ships and the decision to build the Future Submarine in Australia.[20]

The report's principal recommendation was that Defence 'determine the affordability of the Plan and related programs and advise the government of the additional funding required to deliver these programs, or the ADF's capability trade-offs that may need to be considered'.

The Defence Department rejected the recommendation. In its response, it said:

> Defence takes an enterprise approach to its Naval Construction Programs. The shipbuilding provisions identified in the Integrated Investment Program are consolidated to enable government to consider the affordability of the program as each project is presented … Offsets are recommended to government if there is a shortfall between the funding requirement and existing provision. Consequently, Defence disagrees with the ANAO recommendation.

Minister Pyne backed the department. 'Given the size and scope of the Plan, risk was always inevitable,' he said:

Building an Australian shipbuilding and submarine industry is a huge undertaking. It's a nation building project so of course it contains risk.

> The alternative would be to send the $200 billion of taxpayers' money we are spending on the largest build-up of our military capability in our peacetime history overseas, creating jobs and advanced manufacturing opportunities in other countries.[21]
>
> We make no apologies for deciding to invest in Australian-built ships, creating Australian jobs and using Australian steel rather than buying foreign ships off the shelf and using Australian tax dollars to strengthen the defence industries and increase employment and wealth overseas.

That is an appropriate note upon which to end a case study that began in controversy, suffered the legendary 'conspiracy of optimism' in its initial stages, safely traversed the 'valley of death', seesawed from travail to triumph, and ended in a kind of victory—albeit, some believe, of the Pyrrhic variety.

However, from my experience of many days and weeks of conversation with all the key players in the AWD program, I have no doubt that we possess a cohort of extraordinarily well-qualified executives, naval officers, public service administrators, scientific and technical personnel—as well as an eager and motivated shipyard workforce—perfectly able to accomplish the challenges set for them … provided always that they remember the hard-won lessons afforded them by the AWD procurement.

Notes

1 In the event, the contract went to BAE.

2 Australian ships have carried the kangaroo motif since 1911 to differentiate them from their Royal Navy equivalents.

3 A review of problems associated with major Defence acquisition projects by Malcolm Kinnaird (chair), Len Early and Dr Bill Schofield.

4 Geo-simmed: stretched the design of the hull from the 2,000-ton corvette's hull in a computer simulation.

5 The global financial crisis began in 2007.

6 Patrick Walters is currently on the staff of ASPI.

7 Oral history interview with Commander Derek Abraham-James RAN, December 2014.

8 Valley of death: a shipbuilder's term for the dispersal of skilled shipwrights between projects.

9 On 14 May 2018, I emailed Steve Ludlam:

Dear Steve, As mentioned earlier I have been charged by ASPI to write a 30,000 word case study of the AWD procurement. It comes from a Defence Department concept to create a library of such studies to assist those with major defence procurements to avoid and overcome the pitfalls inherent in such programs.

I have now reached the time frame in which you played an important role at ASC. And in the Q&As already conducted I have been made aware of a considerable empathy with you as a 'good bloke' and a very likeable person who, in accepting the role offered, found himself in an almost impossible situation. While seeking to raise standards at ASC, you were new to the Australian 'culture' of politics and business and operating within an Alliance structure that by universal agreement was flawed, not least by the absence within it of the ship's designer, Navantia … to say nothing of the problems of the 'blocks' coming from BAE and Forgacs.

I feel the study would be seriously deficient if it didn't provide you with an opportunity to put your point of view. So, if I may, I have put together a few questions that I hope will give you the broadest possible chance to do so. So here goes:

1. What was the state of ASC as a shipbuilder when you arrived?
2. What steps did you take to improve performance?
3. What part did the Alliance play—for good or ill—in your endeavours to raise standards?
4. Was the Alliance an appropriate vehicle for the AWD build?
5. What kind of cooperation did you get from the government, including the Finance Department, which owned ASC, and the Defence Department, through DMO's Warren King?
6. What was your attitude to parting from ASC rather than renewing your contract?
7. What advice do you have for the next big naval build—the so-called future frigates?

I look forward very much to your replies. If you would care to have a chat before or afterwards I would be delighted to hear from you. In fact I'm coming to Adelaide on the 18th of this month and staying overnight at the Ibis Hotel in the city before returning to Canberra immediately after the launch of HMAS *Sydney* the following day. If you were free I, would be happy to meet then.

With best regards

Robert

On 14 May, Steve Ludlam replied:

Dear Robert, Thank you for your email. I have decided not to comment on your questions or to take part in the case study. The numerous Audits and Reviews together with newspaper articles record the progress of AWD between 2010 and 2014. I took part in all the Audits and Reviews. They should suffice as records. I apologise if this inconveniences you. I continue to provide Leadership in Industry Development and continue to strive for Sovereign Shipbuilding Capability.

Regards
Steve.

10 First Marine International: a Danish shipyard technology and marine market research group.

11 It shouldn't be assumed that the author has read the unexpurgated report.

12 Mathias Cormann and David Johnston, Joint media release, 'Putting the Air Warfare Destroyer Program back on track', 4 June 2014, https://www.financeminister.gov.au/media-release/2014/06/04/putting-air-warfare-destroyer-program-back-track.

13 Thus Kim Gillis won his friendly wager with Warren King, by a substantial margin.

14 RAN Oral History, interview by Commander Derek Abraham-James, 14 December 2015.

15 Mathias Cormann and Kevin Andrews, Joint media release, 'Air Warfare Destroyer Program - Still Fixing Legacy Issues', 22 May 2015, https://www.financeminister.gov.au/media-release/2015/05/22/air-warfare-destroyer-program-still-fixing-serious-legacy-issues

16 RAN Oral History, 2015.

17 An initial calculation of 76% was later revised to the lower figure.

18 As, indeed, they subsequently did.

19 *Australian Defence Business Review*, 10 January 2018.

20 Australian National Audit Office, *Naval construction programs—mobilisation*, report 39 of 2017–18, May 2018.

21 *Defence Connect*, 14 May 2018.

Acronyms and abbreviations

ADF	Australian Defence Force
AWD	air warfare destroyer
DMO	Defence Materiel Organisation
DSTO	Defence Science and Technology Organisation
FMS	foreign military sales
LHD	landing helicopter dock
OPV	offshore patrol vessel
PM&C	Department of the Prime Minister and Cabinet
RAAF	Royal Australian Air Force
RAN	Royal Australian Navy

ASPI Case Studies

ASPI case studies in defence projects is a series dedicated to telling the 'warts and all' stories of major undertakings in Australian defence procurement and project management. The 'dates and dollars' of defence projects are available in reporting from Defence and the Australian National Audit Office, so this series explores the less quantified but nonetheless crucial aspects of project management—the organisational, human and technological challenges that occur along the way. ASPI hopes that future project managers will be able to turn to this series to see how their predecessors dealt with the problems they faced, and be able to see how outcomes—good or bad—were shaped by events along the way.

Robert's second monograph for the *ASPI case studies in defence projects* series brings out the human drama and dilemmas of decision-making in what is a multi-billion-dollar, high-stakes business to equip the Australian Defence Force. Our aim, which he delivers on superbly, is to present a balanced, 'warts and all' account of the challenges involved in getting these decisions right. There's so much more to complex project management than simply cost, schedule and capacity. Robert shows how politics (both big and little *p*), technology, budgeting and the fallibility of human decision-making all intersect to make the defence capability development and acquisition business one of the most demanding of all public sector tasks.

Robert Macklin

Robert Macklin is one of Australia's most respected and popular authors of Australian history and biography.

His four novels and twenty-three books of non-fiction have won many prizes including the prestigious $30,000 Blake Dawson award for his history of BHP Billiton, *The Big Fella* in 2009. His controversial history of Norfolk Island, *Dark Paradise* in 2013 won the Canberra Critics Circle award for the best book of the year, as did his *One False Move*, the story of four Australian naval officers who travelled to Britain in WWII and volunteered to defuse the massive German parachute mines being dropped on English cities and ports.

He is the authorised biographer of former Prime Minister Kevin Rudd and prior to the bestselling *Hamilton Hume* he has written three biographies of SAS soldiers and the authoritative history of Australia's Special Forces and intelligence agencies entitled *Warrior Elite*.

His new work *Dragon and Kangaroo*, the hidden history of Australia–China relations was published in August 2017.

Born in Queensland and educated at Brisbane Grammar School, the University of Queensland and the ANU, he has been a jackaroo, a leading journalist, documentary film maker, university lecturer and in government the press secretary to an Australian Prime Minister, Sir John 'Black Jack' McEwen. He lives in Canberra and Tuross Head with his wife, Wendy.

Acknowledgements

I'm once again greatly indebted to ASPI Director Peter Jennings, who took up the suggestion of Defence Deputy Secretary Kim Gillis to create a series of case studies of major Defence procurements and who entrusted the AWD project—one of the more complex and consequential of them—to me. I'm very grateful for his confidence and the support he offered throughout the process. Andrew Davies, in the initial stages before his departure from ASPI, and Michael Shoebridge, who took his place, have been equally helpful and supportive and for that I thank them.

In the circumstances, a remarkable number of the key participants in the program agreed to speak to me on the record about their roles in the procurement. They include, in the political arena, former defence ministers Brendan Nelson, Joel Fitzgibbon and David Johnston; from the Defence Department, Kim Gillis, Dr Stephen Gumley, Warren King, Peter Croser, Dr David Kershaw and former Deputy Secretary Hugh White; from the Navy, Vice Admiral Chris Ritchie Rtd, Vice Admiral Peter Jones Rtd, Commodore Rob Elliott, Commodore Craig Bourke, Commodore Steve Tiffen and Captain John Stavridis; industry figures Rod Equid, John White and Danielle DeSantis; and, in his private capacity, Andrew Davies.

I'm enormously grateful that, with only the rarest exception, all were prepared to be quoted despite their knowledge that their viewpoint might differ from that of others engaged in the procurement, who would also be quoted in the case study.

In addition, a number of men and women among all categories were more than happy to provide guidance and insights on the understanding that their names wouldn't be used. Their reasons—usually of commercial sensitivity—were perfectly understandable, and I'm grateful for the confidence they showed in my judgement and integrity. Indeed, there were one or two occasions during the writing of the study when I took the liberty of voluntarily editing expressions that were unnecessarily offensive, without losing the general tenor of the remarks.

Of course, not all interviews were used *in toto*. That was never the nature of the exercise, which was to present the AWD story in a readable manner for prospective participants in major procurements, to reveal the experiences and pitfalls to be confronted and avoided. I should also mention that, while the overwhelming majority of the quotations in the story are taken from my interviews, on occasion I have drawn from other sources, recorded in endnotes and written in the past tense.

As well as the interviewees, a great many very helpful people contributed to the arranging of my schedule and assisted in the process, none more than ASPI intern, Christopher Dixon, whose assistance was invaluable. It has been a pleasure to work with him and, indeed, all the people at ASPI, who have embraced the project so warmly.

Robert Macklin
Canberra, 2018
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ASPI case studies in defence projects
Air warfare destroyer: The game-changer

Air warfare destroyer: The game-changer is Robert's second monograph for the *ASPI case studies in defence projects* series which brings out the human drama and dilemmas of decision-making in what is a multi-billion-dollar, high-stakes business to equip the Australian Defence Force. Our aim, which he delivers on superbly, is to present a balanced, 'warts and all' account of the challenges involved in getting these decisions right. There's so much more to complex project management than simply cost, schedule and capacity. Robert shows how politics (both big and little *p*), technology, budgeting and the fallibility of human decision-making all intersect to make the defence capability development and acquisition business one of the most demanding of all public sector tasks.

Robert Macklin has written extensively on defence matters and Australian history. His 28 books include three biographies of SAS soldiers and the history of our Special Forces and Intelligence Agencies in *Warrior Elite*. His Australian histories include the bestselling *HAMILTON HUME, our greatest explorer* and most recently *Dragon and Kangaroo*, the chronicle of Australia-China relations over the last 200 years. This is his second ASPI Case Study after *Rearming The Anzacs* in 2017.

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