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Lost in Space? The Changing Nature of Australia's Space Policy

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Abstract

The past 18 months have seen the beginnings of a significant overhaul of the space policy of Australia, one of the most significant countries in the Asia-Pacific region. Having originally developed its national space laws around a policy based upon the proposed – but now defunct - development of a launch services industry, the Government altered its approach in the aftermath of the September 11 attack, directing that space policy should be closely related to national security. In so doing, however, it failed to expand upon its space laws or provide any incentives or guidance to most sectors of Australia's space industry, with the then revised policy lacking real direction and not facilitating the growth of space related activities.

The Government has, however, more recently actively sought to reassess Australia's role in space, having concluded a Senate Committee Report that makes significant recommendations for a new direction for Australia's space science and industry sectors. Coupled with this, the 2009 Defence White Paper, which sets out the Government's approach to defence planning, emphasises the increasingly significant role of satellite technology in the conduct of Australia's military defence activities. However, the fact remains that Australia still does not have its own space agency or any coherent, up-to-date space policy. Nor do its current national space laws readily allow for such developments. Instead, Australia relies upon a random mixture of local and foreign commercial enterprises and other Governments for access to essential satellite services, leaving the maintenance of space skills and technologies on the ground almost entirely to chance and market forces.

This paper discusses the evolution of Australia's national space laws and policy, focussing particularly on these recent developments, and assesses what tangible steps must now be taken if Australia is to regain lost ground and secure access to vital space resources.

I. Introduction – Australia's Early Involvement in Space Activities

Australia has had a long involvement in space activities, beginning at the very dawn of the space age. As early as 1949, a test launch facility was developed at a site in Woomera, a remote area in South Australia, principally to support the United Kingdom's nuclear program.[2] As its relationship with the USA further strengthened, Australia permitted that country to also utilise Woomera and other facilities, thus cementing what has become an increasingly strong bond of cooperation between the two countries in various military, strategic and space-related matters.

As a result of the utilisation of Woomera to develop additional technical expertise, Australia became an early 'leader' in space rocket science. At its peak, Woomera was the world's second most heavily used launch site (after Cape Canaveral), involving the launch of American, European and Australian rockets.[3] The Australian Government still describes the facility as 'the largest land-based test range in the world'.[4]

On 29 November 1967, Australia launched the WRESAT-1 satellite.[5] This was its first 'indigenous' launch,[6] making Australia only the fourth country in the world to have successfully done so, and only the third to launch a satellite from its own soil.[7]

Australia also took an active position from the very beginnings of the international legal framework regulating the exploration and use of outer space. It was one of the initial 18 Member States of an *ad hoc* Committee on the Peaceful Uses of Outer Space (COPUOS) established in 1958 by the United Nations General Assembly,[8] remained as a Member of COPUOS when, in 1959, it was established as a permanent body,[9] and has been an active Member ever since.[10] It was a signatory to the Treaty on Principles

Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (Outer Space Treaty)[11] when that instrument was opened for signature (27 January 1967), and ratified it on the day that it came into force (10 October 1967).

Indeed, Australia is one of only 13 States (as at 1 January 2010) that are parties to all five of the main United Nations space treaties. It was the seventh State Party to the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Moon Agreement),[12] having acceded to that instrument on 7 July 1986,[13] primarily due to its arms limitations aspects, which complemented Australia's strong stance against the proliferation of nuclear weapons.[14] Having said this, Australia has since conceded that the Moon Agreement 'does not embody a set of principles common to most Member States'.[15]

Australia also regularly complies with its obligations to provide information to the United Nations Secretary-General[16] pursuant to article IV of the Convention on Registration of Objects Launched into Outer Space (Registration Convention.[17]

In 1961, Australia entered into bilateral arrangements with the USA regarding that country's satellite program.[18] This and subsequent agreements with the USA led to the establishment of a number of important space tracking stations in Australia, which continue to play an important role. During the 1960s, Australia was also a Member of the European Launcher Development Organisation (ELDO)[19] – the only non-European country to have that status - and has provided various launch services to several European countries.[20] However, it did not take up the opportunity to become a Member of the European Space Agency (ESA) when that body began to function de facto from May 1975,[21] although it did conclude a bilateral cooperation treaty with ESA in 1979.[22]

II. A Failure to Develop Comprehensive Space Policies and Law around this Momentum

Despite this initial space legacy, the euphoric early days up to the 1970s were not followed through by tangible Government action that would have allowed Australia to retain its place in the ever changing 'space world'. Indeed, as an increasing number of other countries, including some in the nearby Asian region,[23] began to develop their space capabilities, Australia seemed to relinquish its role as a significant participant. Instead of building upon its early successes and developing a clear focus on space, a period of 'bureaucratic inertia'[24] took hold. Whatever steps it did take in this period were only half-hearted. For example, the Government did establish an Australian Space Office in 1987, but this was under-funded and lacked political support,[25] and was eventually disbanded in 1996.

Things seemed to change, however, in the late 1990s, when the Government began to seriously consider the potential for the establishment of a significant domestic commercial space launch industry. As the international commercial launch industry became more competitive and sophisticated, several private overseas consortia explored the possibilities of providing commercial satellite launches from Australia. Largely in response to this private sector interest, in December 1998, the Government passed the Space Activities Act (SAA), becoming only the sixth country to introduce specific domestic legislation directed towards space activities.[26] Prior to this, there had been no existing Australian legislative or regulatory framework that specifically applied to 'national' space activities.

Much has been written about the SAA framework.[27] In essence, the legislation was designed to facilitate a commercial space launch industry in Australia, as well as launches of Australian payloads from overseas sites, and the possible return of a space object that was not launched from a launch facility located within Australia, all within the context of protecting public safety. Shortly afterwards, in 2001, the Government heralded Australia as a future 'significant player in the satellite launch industry',[28] asserting that, over the following ten years, Australia could reasonably expect to gain between 10-20% of the worldwide demand for satellite launches, generating approximately $2.5 billion of revenue.[29] By 2005, there were predictions of 10-12 satellites launches per year.[30]

In reality, however, there has been, and will be no commercial launch service likely in Australia for a considerable period of time, if ever. In the words

of the recent Government Senate Report (described below):[31]

'[w]hile not opposed in principle to Australia regaining its role as a launch site if a commercial venture wishes to do so ... the committee does not see this as likely, nor as something the government should be supporting with taxpayers' money.'

Thus, the policy underpinning the existing national space law of Australia has in many respects proven to be irrelevant and unattainable. However, it must be noted that the licensing regime under the legislation has been and continues to be used to authorize overseas launches by a major Australian satellite and telecommunications company,[32] as well as the return in mid-June of the Hayabusa asteroid probe, which was launched from Japan in 2003.[33]

III. A Return to a Space 'Non-Policy'

The post 9/11 geopolitical climate resulted in a further change of focus by the Government in relation to future space activities. This was implemented not by refinements to the law, but rather by generalised and ad hoc 'policy' statements. The 2003/2004 'Australian Government Space Engagement: Policy Framework and Overview'[34] took no cognisance of the need to change existing national space law, but rather indicated that there was no Government support for a centrally funded 'space office' or 'space program',[35] notwithstanding that Australia was, by this time, the only developed country in the world without such a program.

The Government also announced the termination of funding in 2005 for the Cooperative Research Centre for Satellite Systems (CRCSS), which had built and operated FedSat, the first Australian-built satellite in more than 30 years, which was launched in December 2002. FedSat's signal eventually failed in 2007.[36]

At this time, the Government treated the space sector as just another high technology industry, competing with those other industries for assistance through general industry and science support programs. It provided no tangible incentives to encourage growth and innovation among those already involved in domestic space-related industries. Even more significantly, there was no serious Governmental consideration of Australia's need for, and dependence upon space technology for its future economic, strategic and military effectiveness. Nor was there any reference to the need to enhance Australia's domestic space laws.

IV. Moving (at last) to a 21st Century way of Approaching Space?

There are now, however, some indications that the future of Australia's participation in space may take a more positive direction. Two important Government documents have recently been produced in rapid succession, which have raised interesting issues in relation to Australia's ongoing involvement in space activities. They will have an undoubted impact on Australia's future space policy and legal regulation.

Government Senate Report

In March 2008, at the instigation of the then newly elected Labour Government, a Senate Committee was convened to conduct a public inquiry, and then report, on the current state of Australia's space science and industry sector. Its purpose was to examine options to 'strengthen and expand Australia's position in fields that strongly align with space science and industry', with particular reference *inter alia* to arguments for and against expanded Australian activity in space science and industry.[37]

The Committee issued an interim report in June 2008 and its final report – somewhat mischievously (partly) entitled 'Lost in Space' - in November 2008. The thrust of the Government Senate Report is geared towards a 'whole of Government' approach to space. In the view of the authors of the Government Senate Report:[38]

'the recommendations [made in the Government Senate Report] ... chart a course towards Australia regaining an important place in global space science and industry by gradually developing a dedicated space agency.'

A year after its release, the Government issued its response to the recommendations,[39] generally accepting the findings. In its 2009 budget, $160.5 million was dedicated to space science and

astronomy infrastructure acquisitions and development, and a further $8.6 million was allocated to establish a Space Policy Unit (SPU), which began operations in mid 2009 with various functions, which included acting as a central point of contact and coordination for all civil space activities with international space organisations, and developing a national space policy.[40] In addition, the Government set up a dedicated website dealing with space-related matters and established the Australian Space Industry Innovation Council to provide strategic advice to the Government.[41]

Defence White Paper

Following a review of the existing capabilities and requirements of its Navy, Army and Air Force, the Department of Defence issued a paper intended to explain:

'how the Government plans to strengthen the foundations of Australia's defence ... to meet the challenges of an uncertain strategic future' and to 'lay[ ] out the Government's future plans for the development of Force 2030'.[42]

The Defence White Paper deals with all aspects of the current and future defence capabilities and needs of the country, including issues relating to its increasing demand for assured access to specific space-related technology. It emphasizes the need of the Australian Defence Forces (ADF) to exercise greater self-reliance, whilst at the same time maintaining the country's strong existing strategic alliances, predominately with the USA. Importantly, it recognises that the ADF must be able to adapt to changes of a political, strategic, economic and military nature in the Asia-Pacific region, including the modernization of the military and the increasing space capability of Australia's regional neighbours, fuelling what some observers have called an 'Asian space race'.[43] Implicit therefore in the Defence White Paper (which predicts this to be 'the Asia Pacific Century') is a shift in emphasis towards planning based on possible strategic threats and developments in Asia.[44]

In relation to space technology, the Government Senate Report Committee had already heard evidence that over 50% of the ADF's major capability for the period 2006-2016 will 'have a dependency on services that are derived from space'.[45] Yet, although Australia does currently benefit from a comprehensive network of communications satellites, for its other needs, it is entirely reliant on satellites operated and controlled offshore. Of course, these 'offshore' satellites are not subject to Australian ownership or jurisdiction and control (either in a practical sense and/or as contemplated in the Outer Space Treaty).[46] As a consequence, access to these satellites in a crisis would be solely dependent on the strength and enforceability of contractual terms and political ties.

The Defence White Paper therefore places a 'high priority on assured access to high quality space-based imagery', in order to meet the ADF's requirements for 'mapping, charting, navigation and targeting data'.[47] In addition, an emphasis is placed on the need to enhance Australia's Intelligence, Surveillance and Reconnaissance (ISR) capabilities,[48] designed to give it the ability 'to collect, share, interpret and act upon information in a timely manner'.[49] As a result, the Defence White Paper confirms the Government's intention to:

'acquir[e] a satellite with a remote sensing capability, most likely to be based on a high-resolution, cloud-penetrating synthetic aperture radar'.[50]

These strategies are proposed to augment existing strategic alliances with the USA, which already involve the sharing of imagery access with that country, as well as enhancing Australia's ISR capability by linking it with that of the USA. Moreover, they complement the terms of a 2008 Statement of Principles between the respective Governments establishing the USA-Australia Military Satellite Communications Partnership (USA - Australia Partnership Agreement),[51] which specifies that the countries will 'jointly pursue the development of satellite capabilities – both commercial and military'.[52] These proposals are also in addition to other committed joint projects with the USA, including a $927 million arrangement to provide funding to, and participate in, the Wideband Global Satellite Communications constellation (WGS).[53]

The Defence White Paper, recognising both a need for 'space situational awareness' and

appropriately skilled space professionals, also indicates that the ADF will develop a 'career stream for space specialists'.[54] Any emphasis on the development of specific and up-to-date technical expertise is to be welcomed, and will also require the involvement of lawyers who are across a whole range of issues related to the interaction of the laws of armed conflict, military law and space regulation, a convergence that is not entirely straightforward under existing international law.[55]

VI. The Need for Law to Follow

These proposed initiatives give rise to (cautious) optimism, particularly if one is to compare them with prior Government attempts to articulate a space policy. No doubt, there are many details yet to be finalised, and it will be some time before the precise direction of Australia's space initiatives are apparent, particularly given the rapidly changing geopolitical and technological factors at play. Moreover, any long term strategy will require considerable and unwavering Governmental support and political will, something that has been sadly lacking in the past.

The articulation of clear, relevant and comprehensive domestic laws, as well as appropriate legally binding multi- and bilateral international arrangements, will also be necessary to provide the proper legal and regulatory framework for the implementation of this new policy. Some aspects of future legal regulation associated with the proposed new space policy initiatives are briefly considered below.

Maintaining the Space Activities Act

As noted, Australia already has some domestic space law, although (despite its broad title), it only applies to a relatively narrow field focussed on the creation of a licensing mechanism (with associated safety oversight) to deal with commercial space launches (and returns). Nevertheless, the SAA should remain in place to deal with any relevant activities that fall within its coverage. Indeed, despite the fact that the primary motivation for the promulgation of the law did not translate into reality, the licensing regime it has established appears to operate effectively for overseas launches and returns. Moreover, the legislation also deals in some detail with issues of financial responsibility for liability arising from launch activities and, in certain aspects, is (or at least was at the time it came into force), quite innovative, for example in relation to the still vexed question as to 'where space begins'.[56]

However, the current domestic legal framework in Australia is far from adequate to deal with the much broader range of activities that the revised space policy initiatives envisage. A considerable body of additional law will be necessary. The Government Senate Report and Defence White Paper convincingly argue for an expansion of Australia's space capabilities, their centralized coordination and the development of additional links with both private industry and international and inter-governmental organisations. Yet, they make scant reference to the changes that are required to existing legal arrangements to accommodate these ambitions, as well as the need for additional laws. This is a worrying oversight.

Additional (Remote Sensing) Legislation

The policy specifies the intention that Australia acquire its own remote sensing satellite. While it is not clear as to the precise range of activities in which this indigenous satellite will be engaged, the implication is that it will be primarily involved with sensitive ISR operations. This in itself poses an interesting dilemma as to the form and substance that the necessary legal regulation to facilitate this. There will be a need for national law to deal with remote sensing ISR activities. Yet, given the (seemingly) sensitive nature of those proposed activities, it is not apparent that whatever Australian national law is eventually drafted will be particularly clear (as opposed to vague) or comprehensive (as opposed to limited).

It may well be that, therefore, in this area of legislation, Australia may see a 'staged' process of law-making, initially dealing with data collection and imagery for sensitive ISR purposes and, only later, when (or if) the use of the imagery expands in a broader (perhaps commercial) sense, with a wider range of remote sensing activities. This expanded range of activities may eventuate, particularly given the other needs that Australia has for remote sensing images, including agricultural and crop management, resources exploration, disaster management and monitoring the effects of climate change.

There may therefore be restrictions in place as to the use and dissemination of information obtained from the utilisation of our newly acquired remote sensing capabilities. If this were to be the case, it may raise interesting legal questions, and pose a challenge to the general principle of 'non-discriminatory' access to remote sensing data, as articulated in the Principles Relating to Remote Sensing of the Earth from Outer Space (Remote Sensing Principles).[57] No doubt, the contra argument to justify this will focus on those national security concerns. However, given that Australia has, in the past, generally been a good 'international citizen' when it comes to its obligations under the various international space treaties and principles, it would be disappointing if this were to change when it came to its remote sensing activities.

Legal Framework for the Establishment of a National Space Agency

Just as the implementation of the SAA required the establishment of the Space Licensing and Safety Office (SLASO), the proposed eventual establishment of a national space agency will also necessitate appropriate legislation, since the establishment of a space agency does not easily fit within the existing structure of the SAA. Obviously, the precise functions and responsibilities of any national space agency will depend upon issues of sovereignty, as well as the internal constitutional and administrative requirements of the relevant country – not to mention, of course, its peculiar economic, political, developmental, societal and cultural situation. The precise scope of intended space activities will also be highly relevant. The Government Senate Report itself recognises that there are 'various models of space agency within the OECD and emerging economies'.[58]

It therefore remains to be seen exactly what 'model' will be considered as the most appropriate for Australia. Clearly, although the revised space policy for Australia will, if implemented, see a significant broadening of its participation in space, the scope of these expanded activities will never approach those administered by, for example, NASA, and will also differ in various respects from the respective national space agencies of its regional neighbours.

The Regulation of Government – Private Partnerships in Space Activities

The major problem in the past with Australia's existing private space industry has been the lack of a coordinating body to properly lobby Government. There have also been occasions when it has not spoken with one voice. This has been a cause of frustration on all sides. The creation of a centralised space agency must incorporate legal and administrative mechanisms to enable clear communication and cooperation between Government and industry.

Even more importantly, legislation must be introduced as required to provide appropriate financial incentives to private industry, both to undertake the necessary research and development to allow it to 'joint venture' with Government in a true Public-Private enterprise in the furtherance of Australia's space activities, and also to enhance its capacity building. From the perspective of private industry – and increasingly from that of Government as well, particularly in the wake of the recent Global Financial Crisis – an appropriate and realistic commercial 'business case' must be made for space activities.

Yet, significant tax, subsidy and/or other types of financial and administrative incentives and support for private industry are also required to complement these proposals. This will require amendment to taxation and other national laws, and perhaps also the introduction of specific legislation related to the establishment of a future space industry financial support mechanism.

International Cooperative Legal Agreements

Coupled with the necessary changes to Australian national law, there is another important issue to consider. Australia is one of the most important countries in the Asia-Pacific region and is committed to ongoing engagement with its neighbours.[59] The countries of this region share a number of significant challenges, including security concerns, disaster management, people smuggling, drug trafficking and dealing with so-called 'Failed States'. The appropriate use of space technology plays an important role in addressing every one of these challenges.

It is therefore imperative that, as well as continuing to strengthen existing strategic alliances, Australia work (more) closely with its regional neighbours in the use and exploration of outer space. The return to Woomera of the Japanese Hayabusa space probe in mid-June provided an excellent example of inter-regional cooperation giving rise not only to mutual benefits, but also actively promoting international cooperation in relation to peaceful space activities. It is therefore important for Australia to develop further legally binding multi- and bilateral international arrangements with the countries in the region involving the shared access to data obtained through the utilization of space technology. Such initiatives should not be seen as conflicting with the partnership that Australia has with the USA, but rather as an important adjunct to that partnership, which will further enhance regional prosperity, cooperation and stability, as well as the peaceful use of outer space.

VII. Concluding Remarks

Australia's early promise as a major space faring nation has suffered due to the lack of direction and support on the part of successive Governments. At the same time, many other developed and developing countries have devoted considerable legal and technical expertise towards capacity building in relation to their own space activities. Australia's failure to invest in space technology in the past, and to promote a legal climate that encourages such endeavours, has caused it to fall well back in the space race.

More recently, however, the Government has initiated a series of studies into Australia's role in space and the initial findings and Government response show encouraging signs. A key difference between these new proposals and previous attempts to promote (albeit half-heartedly) a national space policy is that they incorporate 'top-down' initiatives.[60]

Of course, there is a considerable amount of work yet to be done. Much of the detail of Australia's proposed space policy remains to be finalised. Notably, the costs associated with many of the initiatives have not been comprehensively reported; nor is it clear what the budget implications will be, particularly given the prevailing uncertain financial international position.[61] The current uncertainties following the recent inconclusive general election will almost inevitably lead to further delays. Moreover, no work of substance has been done on the legal implications of the new policy and there has been little formal account taken of the views of space lawyers.

Yet, Australia can no longer afford to fall further behind its friends and neighbours in relation to important aspects of the use and exploration of outer space. In this regard, one further observation bears emphasizing. Whatever the final model that is ultimately considered to be the most appropriate, it is crucial that an Australian *space agency* is ultimately established. A failure to do so would send negative signals to the rest of the world about the seriousness with which the Government approaches its commitments to future space participation. The effective implementation of a focussed space policy, coupled with the establishment of a comprehensive and relevant body of national law, as well as additional international cooperative arrangements, are crucially important if Australia is in the future to play its part in an ever changing world.

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[2] Brett Biddington and Roy Sach, 'Australia's Place in Space: Toward a National Space Policy', Kokoda Paper No. 13, June 2010, page 13 (copy on file with author).

[3] Australian Senate Standing Committee on Economics Report, 'Lost in Space? Setting a new direction for Australia's space science and industry sector', November 2008 (Government Senate Report), paragraph 4.1, citing Senate Standing Committee on Transport, 'Communications and Infrastructure, Developing Satellite Launching Facilities in Australia and the Role of Government', April 1992, pages 1 and 6.

[4] Australian Government, Department of Defence, 'Japanese spacecraft to land in Australia', Defence Alert, 2 June 2010, <http://www.defence.gov.au/media/

AlertTpl.cfm?CurrentId=10368> (accessed 4 June 2010).

[5] For further details of the WRESAT-1 launch, see UN Doc. A/AC.105/INF.180 (5 December 1967), lodged by the Australian Government in accordance with United Nations General Assembly Resolution 1721 (XVI) B on International Cooperation in the Peaceful Uses of Outer Space (20 December 1961), paragraphs 1 and 2.

[6] See, however, Jo-Anne Gilbert, '"We can lick gravity, but...": What trajectory for space in Australia?', 25 (2009) *Space Policy* 174, who (at footnote 2), casts some doubt as to the extent that the launch of WRESAT-1 was, in fact, 'indigenous'.

[7] Cheryl Jones, 'Watch this empty space', *The Australian*, 31 March 2010, <http://www.theaustralian.com.au/highereducation/watch-this-empty-space/story-e6frgcjx-1225847659700> (accessed 1 June 2010).

[8] See United Nations General Assembly Resolution 1348 (XIII) on Questions on the Peaceful Uses of Outer Space (13 December 1958). The 18 States were Argentina, Australia, Belgium, Brazil, Canada, Czechoslovakia, France, India, Iran, Italy, Japan, Mexico, Poland, Sweden, the Union of Soviet Socialist Republics, the United Arab Republic, the United Kingdom of Great Britain and Northern Ireland and the USA.

[9] See United Nations General Assembly Resolution 1472 (XIV) on International Cooperation in the Peaceful Uses of Outer Space (12 December 1959). In addition to the original 18 States, Albania, Austria, Bulgaria, Hungary, Lebanon and Romania were included at that time as Member States of this permanent body.

[10] This being said, it is this author's personal observation and experience that, at least in recent years, the chair at the Australian delegation desk at UNCOPUOS Meetings is as often left empty as it is occupied.

[11] 610 UNTS 205.

[12] 1363 UNTS 3. The earlier States Parties to the Moon Agreement were Austria, Chile, The Netherlands, Pakistan, The Philippines, and Uruguay.

[13] The Moon Agreement entered into force for Australia on 6 August 1986: see Australian Government Report 106, 'Nuclear Non-Proliferation and Disarmament – Appendix E 'Nuclear Non-Proliferation and Disarmament Treaties", page 223, <http://www.aph.gov.au/House/committee/jsct/nuclearnon_proliferation/report/appendixe.pdf> (accessed 1 June 2010).

[14] For a discussion of Australia's policy against nuclear weapons, see Jo-Anne Gilbert, '"We can lick gravity, but...": What trajectory for space in Australia?', 25 (2009) *Space Policy* 174, 178-9.

[15] See, for example, the transcript of the Statement by C. Cannan, representative of the Australian delegation, 629th Meeting of the Legal Subcommittee of UNCOPUOS, UN Doc. COPUOS/LEGAL/T.629, (30 March 2000), page 3.

[16] See, for example, Note verbale dated 30 November 2009 from the Permanent Mission of Australia to the United Nations (Vienna) addressed to the Secretary-General, UN Doc. ST/SG/SER.G/584 (18 January 2010).

[17] 1023 UNTS 15. Article IV of the Registration Convention requires a State Party to furnish certain information relating to space objects carried on its national registry to the Secretary-General of the United Nations.

[18] Exchange of Notes constituting an Agreement between the Government of Australia and the Government of the USA for Cooperation in a Transit Navigational Satellite Program, 5 June 1961, [1961] ATS 10.

[19] As an interesting aside, one of the main hotels in Woomera is called the ELDO Hotel.

[20] Jo-Anne Gilbert, '"We can lick gravity, but...": What trajectory for space in Australia?', 25 (2009) *Space Policy* 174, 177.

[21] See Convention for the Establishment of a European Space Agency, 1297 UNTS 161 (ESA Convention). The ESA Convention came into force on 30 October 1980. Australia has, since then, on four occasions been offered associate membership of ESA, but has declined to take up the opportunity each time: Jo-Anne Gilbert, '"We can lick gravity, but...": What trajectory for space in Australia?', 25 (2009) *Space Policy* 174, 177.

[22] Agreement between the Government of Australia and the European Space Agency for a Co-operative Space Vehicle Tracking Program, 15 June 1979, [1979] ATS 9.

[23] In the Asian region, China, Taiwan, Japan, Malaysia, Indonesia, Vietnam, South Korea and Thailand (the latter principally through its membership of the Asia-Pacific Space Cooperation Organization) all have dedicated space programs and continue to develop increasing space capability.

[24] Jo-Anne Gilbert, '"We can lick gravity, but...": What trajectory for space in Australia?', 25 (2009) *Space Policy* 174, 174.

[25] Jo-Anne Gilbert, '"We can lick gravity, but...": What trajectory for space in Australia?', 25 (2009) *Space Policy* 174, 175.

[26] The previous countries were the USA, Sweden, the United Kingdom, the Russian Federation and South Africa: Frans G von der Dunk, 'Launching from "Down Under": The New Australian SAA of 1998', (2000) 43 *Proceedings of the Colloquium on the Law of Outer Space* 132, 139 (footnote 9).

[27] For a description of the principal terms of the SAA and Regulations, see Steven Freeland, 'Difficulties of Implementing National Space Legislation Exemplified by the Australian Approach', in Stephan Hobe,

Bernhard Schmidt-Tedd and Kai-Uwe Schrogl (eds), *'Project 2001 Plus' - Global and European Challenges for Air and Space Law at the Edge of the 21st Century* (2006), 65, and the various references therein.

[28] The then Minister for Industry, Science and Resources Nick Minchin, quoted in Michael Perry 'Australia Announces Christmas Island Spaceport', *SpaceFlight*, 25 June 2001, <http://www.space.com/missionlaunches/launches/aussie_spaceport_wg_010625.html> (accessed 1 June 2010).

[29] 'Australia Signs Space Launch Agreement with Russia', *Space Daily*, 23 May 2001, <http://www.spacedaily.com/news/aust-01a.html> (accessed 1 June 2010).

[30] 'Christmas Island Asia Pacific Launch Facility, Australia', Website of Space-Technology.com, <http://www.aerospacetechnology.com/projects/christmas/> (accessed 1 June 2010).

[31] Government Senate Report, paragraph 4.1.6.

[32] One of the licences established under the SAA is an Overseas Launch Certificate, which is required for an Australian national to launch 'a space object ... from a launch facility located outside Australia': SAA, section 12 (a). For example, in August 2009, Optus Networks Pty Limited launched its D3 communications satellite from French Guyana, pursuant to a Overseas Launch Certificate.

[33] See Steven Freeland, 'Space jump better late than never', *The Age* (Melbourne), 7 June 2010, page 11 col 1 and 'Dearth of Australian space presence highlighted' *The Canberra Times* (Canberra), 12 June 2010, page 27 col 1. One of the licences established under the SAA is an Authorization to Return, which is required for the 'return to a place anywhere in Australia of a space object that was not launched from a launch facility located within Australia': SAA, sections 14 (a) and (b).

[34] Version issued by the Australian Department of Industry, Tourism and Resources (the revamped name of the Department of Industry, Science and Resources) in August 2004, <www.industry.gov.au> (accessed 10 April 2005).

[35] Australian Government Space Engagement: Policy Framework and Overview, page 3.

[36] Cheryl Jones, 'Watch this empty space', *The Australian*, 31 March 2010, <http://www.theaustralian.com.au/highereducation/watch-this-empty-space/story-e6frgcjx-1225847659700> (accessed 1 June 2010).

[37] Government Senate Report, Terms of Reference, page vii.

[38] Government Senate Report, paragraph 1.4. For a discussion of the recommendations contained in the Government Senate Report, see Noel Siemon and Steven Freeland, 'Regulation of Space Activities in Australia', in Ram Jakhu (ed), *National Regulation of Space Activities* (forthcoming).

[39] Australian Government, 'Government Response to the Inquiry by the Senate Standing Committee on Economics into the Current State of Australia's Space Science and Industry Sector', November 2009 (Government Response), <http://www.industry.gov.au/Industry/Space/Documents/GovernmentResponsetoSenateinquiryintoSpace.pdf> (accessed 2 June 2010).

[40] Australian Government, Department of Innovation, Industry, Science and Research, 'Australian Space Science Program – Space Policy Unit', <http://www.innovation.gov.au/Industry/Space/Pages/SpaceEngagementandPolicyFramework.aspx> (accessed 3 June 2010).

[41] Australian Government, Senator The Hon Kim Carr, 'Industry Council to Boost Australian Space Innovation: Government response to Senate Space Report', Media Release, 19 November 2009, <http://minister.innovation.gov.au/Carr/Pages/INDUSTRYCOUNCILTOBOOSTAUSTRALIANSPACEINNOVATION.aspx> (accessed 3 June 2010).

[42] Australian Government, Department of Defence, 'Defending Australia in the Asia Pacific Century: Force 2030', April 2009, (Defence White Paper), paragraphs 1.1 and 1.2.

[43] See, for example, 'South Korean rocket launch delayed', *BBC News*, 9 June 2010, <http://news.bbc.co.uk/2/hi/science_and_environment/10269459.stm> (accessed 9 June 2010).

[44] As an example, as this article is being written, there is increasing tension in the Korean peninsula following the claim by South Korea that North Korea had fired a torpedo that sank the South Korean navy ship, the Cheonan, in March 2010, with the loss of 46 lives. See 'The Sinking of the Cheonan', *The New York Times*, 20 May 2010, <http://www.nytimes.com/2010/05/21/opinion/21fri2.html?scp=1&sq=The%20sinking%20of%20the%20Cheonan&st=cse> (accessed 21 May 2010); 'Their number is up', *The Economist*, 20 May 2010, <http://mobile.economist.com/daily_news_16167868.php> (accessed 21 May 2010).

[45] Government Senate Report, paragraph 5.56.

[46] Article VIII of the Outer Space Treaty provides in part as follows:

' A State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body. Ownership of objects launched into outer space, including objects landed or constructed on a celestial body, and of their component parts, is not affected by their presence in outer space or on a celestial body or by their return to the Earth.'.

[47] 'Government Response to the Inquiry by the Senate Standing Committee on Economics into the Current State of Australia's Space Science and Industry Sector', November 2009 (Government Response), page 3, <http://www.industry.gov.au/Industry/Space/Docum

ents/GovernmentResponsetoSenateinquiryintoSpace.pdf> (accessed 2 June 2010).

[48] Defence White Paper, paragraph 9.78.

[49] Australian Government, The Hon Joel Fitzgibbon, Minister for Defence and The Hon Warren Snowden, Minister for Defence Science and Personnel, 'A Smarter Defence for a more Complex World', Media Release, 2 May 2009, <http://www.defence.gov.au/whitepaper/mr/07_A_SmarterDefence.pdf> (accessed 31 May 2010).

[50] Defence White Paper, paragraph 9.80; Government Response, page 3.

[51] See Australian Government, Australian - USA Ministerial Consultations (AUSMIN), 2008 Joint Communiqué, <http://www.dfat.gov.au/geo/us/ausmin/ausmin08_joint_communique.html> (accessed 4 June 2010).

[52] USA-Australia Partnership Agreement, page 121.

[53] For further details of this and other planned joint projects, see Jo-Anne Gilbert, '"We can lick gravity, but...": What trajectory for space in Australia?', 25 (2009) *Space Policy* 174, 176.

[54] Defence White Paper, page 85.

[55] For a general discussion of the possible application of the international laws of war (*jus in bello*) within the international legal regulation of outer space, see Steven Freeland, 'The Applicability of the *Jus in Bello* Rules of International Humanitarian Law to the Use of Outer Space', (2006) 49 *Proceedings of the Colloquium on the Law of Outer Space* 338.

[56] The SAA incorporates into the definitions of a 'launch', a 'launch vehicle', a 'return' and a 'space object' a reference to 'the distance of 100 [kilometres] above mean sea level' (section 8). At the time of introducing these definitions, the relevant Government Ministry explained that this was necessary to:

'address the issue that there is uncertainty as to where "outer space" begins given that there is no definitive explanation of the term in either Australian or international law. The effect of these amendments is that the [Space Activities] Act will now apply to launches or attempted launches that go to a clearly defined point – being an area beyond the distance of 100 [kilometres] above mean sea level. In doing so, it will provide certainty to industry about the point where industry players become subject to the provisions of the [Space Activities] Act': Australian Ministry for Industry, Tourism and Resources, 'Explanatory Memorandum to the Space Activities Amendment Bill 2002', 2002, item 2, <http://www.austlii.edu.au/au/legis/cth/bill_em/saab2002257/memo1.html> (accessed 31 May 2010). See also Steven Freeland, 'Difficulties of Implementing National Space Legislation Exemplified by the Australian Approach', in Stephan Hobe, Bernhard Schmidt-Tedd and Kai-Uwe Schrogl (eds), '*Project 2001 Plus' - Global and European Challenges for Air and Space Law at the Edge of the 21st Century* (2006), 65, 79-81.

[57] United Nations General Assembly Resolution 41/65 on Principles Relating to Remote Sensing of the Earth from Space 3 December 1986). Principle XII of the Remote Sensing Principles provides in part as follows:

'As soon as the primary data and the processed data concerning the territory under its jurisdiction are produced, the sensed State shall have access to them on a non-discriminatory basis and on reasonable cost terms.'

[58] Government Senate Report, Recommendation 6.

[59] See, for example, Australian Government, The Hon Joel Fitzgibbon, Minister for Defence, 'Cooperation with South East Asia and Pacific Nations', Media Release, 2 May 2009, <http://www.defence.gov.au/whitepaper/mr/04_SE_AsiaPacificFixed.pdf> (accessed 31 May 2010).

[60] Australian Space Industry Chamber of Commerce (ASICC), Newsletter #1, December 2009, page 3, <http://www.symbioscomms.com/ASICC/newsletter.html> (accessed 18 May 2010). See also Jo-Anne Gilbert, '"We can lick gravity, but...": What trajectory for space in Australia?', 25 (2009) *Space Policy* 174, 176.

[61] In this regard, see Jonathon Amos, 'German space escapes budget cuts', *BBC News*, 9 June 2010, <http://news.bbc.co.uk/2/hi/science_and_environment/10271637.stm> (accessed 9 June 2010).