Chapter 6

Space policy and agency

The Australian government's current involvement in space

6.1 A complete picture of how much Australia spends on space services has not emerged from the inquiry, but it is a significant amount, perhaps approaching a billion dollars. One witness suggested:

> We had studies in the nineties which suggest that Australia was spending somewhere between $500 to $800 million per year on space services.[1]

6.2 There is also no single definitive figure on how much the public sector spends on space. Some examples include the following: the Department of Defence is contributing $927 million as a proportionate partner in the US military Wideband Global SATCOM constellation; the Jindalee Over the Horizon Radar cost approximately $1.8 billion; spending on the SKA and related projects already exceeds $100 million; and Australia contributes around $100 million per annum to gain access to meteorological data. The Department of Defence say that more than half of their major capability projects for the period 2006 to 2016 have a critical dependency on services that are derived from space.[2]

6.3 The CSIRO spent $56 million on space and astronomy in 2007-08. This comprised advanced aerospace ($24 million), earth observation ($10 million), navigation and communication ($1 million) and radioastronomy ($21 million).[3]

6.4 The Department of Innovation, Industry, Science and Research (DIISR) is responsible for Australia's space policy (or lack thereof). It only has a very small amount of resources devoted to the task:

> It is not a full-time job for me by any means. I have about one and a half people who help me with space matters.[4]

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1 Mr Kirby Ikin, Australian Space Industry Chamber of Commerce, *Proof Committee Hansard*, 1 August 2008, p. 27. This is consistent with the Madigan Report's forecast that 'by 1995 Australia's annual expenditure on space services will be between $370m and $500m.; Australian Academy of Technological Sciences, *A Space Policy for Australia*, June 1985, p. 3.

2 Department of Defence, *Submission 70*, p. 2.

3 CSIRO, answer to question taken on notice at public hearing on 29 July 2008.

4 Dr Michael Green, Director, Space Licensing and Safety Office, DIISR, *Proof Committee Hansard*, 1 August 2008, p. 61.

6.5 This limited resourcing reflects the decentralised approach to space policy:

> agencies of the Commonwealth have their own operational responsibilities in the space arena. The Bureau of Meteorology has responsibility for securing access to weather data. Geoscience Australia has responsibility for maintaining a range of ground stations that can downlink Landsat and a range of other information and distributing that to appropriate agencies and to the private sector. Defence obviously has its defence related responsibilities, including national security remote sensing and defence communications.[5]

6.6 Among the agencies currently involved in space science and industry are:

- Department of Defence, including the Defence Science and Technology Organisation, Defence Imagery and Geospatial Organisation, and Australian Hydrographic Service;
- Department of Broadband, Communications and the Digital Economy, including the Australian Communications and Media Authority;
- Department of Innovation, Industry, Science and Research;
- Commonwealth Scientific and Industrial Research Organisation, including the Office of Space Science and Applications, the Division of Marine and Atmospheric Research and the Canberra Deep Space Communications Complex;
- Department of Climate Change;
- Department of the Environment, Water, Heritage and the Arts, including Australian Antarctic Division;
- Bureau of Meteorology, including the Ionospheric Prediction Service ;
- Geoscience Australia; and
- Office of Spatial Data Management.

6.7 DIISR also chairs the Australian Government Space Forum, which brings together representatives from various government departments and agencies to

5 Dr Michael Green, DIISR, *Proof Committee Hansard*, 16 May 2008, p. 3. The decentralised approach is set out in the November 2006 document *Australian Government Space Engagement: Policy Framework and Overview*, attached to *Submission 7*.

exchange information about twice a year.[6] However, it does not include academics or industry representatives, so it only has a restricted focus. It does *not* provide a forum for the broader space community to give feedback to the government agencies.

6.8 On the science side, the Australian Academy of Science created its National Committee for Space Science (NCSS) specifically for monitoring space science developments. (Like the Australian Bureau of Statistics, the Academy distinguishes space science from astronomy). The NCSS also aims to facilitate international links to the wider space science community through international bodies such as the Committee on Space Research (COSPAR). The NCSS is comprised predominantly of academic scientists, so also does not form a bridge between academia, industry and government.

6.9 Over the last two years the NCSS has been developing the first Decadal Plan for Australian Space Science, which seeks to outline the collective vision and aspirations of the space science community in Australia. A draft was released for public comment on 29 February 2008.[7] It proposes research projects which the NCSS regards as very high value, low expense and with a high multiplier benefit. Over the next 10 years it involves investment in new projects costed at around $120 million; less than 60 cents per Australian a year.

A brief history of space policy in Australia and reviews thereof

6.10 A recurring theme raised in submissions and by witnesses is that Australia does not have a well articulated space policy and this state of affairs is stunting the growth of the space industry as well as causing the country to miss opportunities. However, the evidence received by the committee suggests that the current decentralised policy has been formulated in response to previous policies. Therefore, a brief consideration of the different approaches to space that Australia has taken in the recent past can provide some context to Australia's current approach.

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6 The Forum's terms of reference are included in an attachment to *Submission 7*. As at February 2008, its membership comprised DIISR; CSIRO; the Australian Research Council; Geoscience Australia; Office of Spatial Data Management; Defence Space Engagement; Broadcasting Division of Department of Broadband, Communications and the Digital Economy; Australian Communications and Media Authority; Department of Infrastructure, Transport, Regional Development and Local Government; International Organisations and Legal Division of Department of Foreign Affairs and Trade; Emergency Management Australia; Public International Law Branch of Attorney-General's Department; Office of International Law; Bureau of Rural Sciences; Corporate Strategies Division of Department of Environment, Water, Heritage and the Arts; IPS Radio and Space Services; and the Bureau of Meteorology.

7 The plan is discussed by the Australian Academy of Science (*Submission 38*). It is commended by the Universities of Sydney (*Submission 18*), Tasmania (*Submission 20*), La Trobe (*Submission 24*) and Newcastle *(Submission 53),* as well as by the Geological Society (*Submission 30*) among others. The plan is reproduced in *Submission 41* and a summary is given in Appendix 3.

The Madigan Report

6.11 In July 1984, the Hon. Barry Jones MP, Minister for Science, invited the Australian Academy of Technological Sciences to prepare a report on space science and technology for Australia. The Academy established a Working Party under Sir Russel Madigan which delivered its report in June 1985.

6.12 The Madigan Report concluded, in words that could well be used today:

> …our space potential is fragmented and dispersed, and requires to be drawn together and fostered under a national space policy. [8]

6.13 There was optimism about Australia's potential, believing that the country had the technological capacity and could develop the required industrial capacity. However, the report warns:

> It is not possible for the private sector, from its own resources, to develop a space industry which will carry the rest of Australia on its back into the space age. The commitment to a space programme must be a government decision, not a commercial one. [9]

6.14 A contemporary participant told the committee:

> the guiding principle behind the Madigan report was not space as such but that a space capacity would be a driver for high-tech industry in a broader sense…the training of engineers and the general increase in capacity. It was part of the Barry Jones 'sunrise' industry strategy.[10]

Response to the Madigan Report

6.15 The Madigan Report made 16 recommendations, many of which were subsequently taken up by the government. However, the government did not agree with the recommendation to establish an independent statutory authority to advise it on space policies and priorities. Instead, it announced the formation of an Australian Space Board as a non-statutory body reporting directly to the Minister for Industry, Technology and Commerce.[11]

6.16 Neither did the government concur with the level of funding recommended in the Madigan Report. The Report had concluded:

> An effective programme could be set up for a total expenditure of $100 million over the first five years, leading perhaps to an annual expenditure of

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8 Australian Academy of Technological Sciences, *A Space Policy for Australia*, June 1985, p. 1.

9 Australian Academy of Technological Sciences, *A Space Policy for Australia*, June 1985, p. 2.

10 Dr John Boyd, former deputy director of the Australian Space Office, *Proof Committee Hansard*, 29 July 2008, p. 75.

11 *An Integrated National Space Program*, Report by the Expert Panel, 15 June 1992, p. 7.

> some $60 million depending on the extent to which an initial review shows that expectations are being realised.[12]

6.17 Instead it was decided to provide $5.25 million for the National Space Program in the 1986-87 Budget with future years' monies to be considered in each year's budget context. The actual budget funding for the programme appears in Table 6.1.[13] It never approached the amounts envisaged in the Madigan Report.

Table 6.1

Major R&D Granting Programs and other Support for the National Space Program through the Budget ($m)							
1986-87	*1987-88*	*1988-89*	*1989-90*	*1990-91*	*1991-92*	*1992-93*	*1993-94*
5.0	3.2	5.4	2.4	5.5	5.7	5.4	5.4
1994-95	*1995-96*	*1996-97*	*1997-98*	*1997-98*	*1998-99*	*1999-2000*	*2000-01*
9.0	2.7	1.7	0.7	0.5	1.5	-	-

6.18 A contemporary witness recalled:

> A small budget like that, particularly as we had to ramp it up with great difficulty through successive budgets and so on, made it very difficult to do any long-term strategic planning.[14]

6.19 The Government established the National Space Program in 1986, under the direction of the Board, around a number of space related projects administered by the Department of Science and Technology. The Board was initially supported by an ad hoc secretariat in the department, but in 1987 the Australian Space Office (ASO) was established as a unit within the Department of Industry, Technology and Commerce. The ASO provided secretariat support to the Board and had carriage of day to day running of the programme.[15] The Board acted as an advisory and supervisory body reporting directly to the Minister. It consisted of a Chairman and up to five members appointed by the Minister, with the head of the ASO being an ex-officio member.

6.20 The former deputy director of the ASO recalled:

> …we were always facing a lack of concerted support at the higher levels in departments and among ministers... there certainly was a lack of general enthusiasm for it, apart from being undermined in some quarters.
>
> There were three main agencies with space interests. Defence is the big one. Then there was the Bureau of Meteorology and …the Australian Centre for Remote Sensing…They were supportive in the sense of saying, 'Go for it.

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12 Australian Academy of Technological Sciences, *A Space Policy for Australia*, June 1985, p. 1.

13 Department of Innovation, Industry, Science and Research, *Submission 7*, p. 3.

14 Dr John Boyd, former deputy director of the Australian Space Office, *Proof Committee Hansard*, 29 July 2008, p. 78.

15 For information about the work of the ASO and the Board, see Dr John Boyd, *Submission 82*.

> You've got a space programme—do what you want, but don't expect us to pay for any of it and also don't tell us what to do.'[16]

The Academy of Science report

6.21 A review of space policy was undertaken by a committee appointed by the Academy of Science, with some support from the ASO. Its March 1989 report concluded:

> In the world's most advanced industrialised nations, space science drives technology development…The longer Australia postpones entry into space, the more costly it will become.[17]

6.22 On funding, it recommended:

> The recommendations of the Madigan report on space science should be implemented, specifically the recommendations on Commonwealth funding of a space program over five years of up to $100 million and the formation of an independent space authority.[18]

6.23 The Academy's review did not appear to have had any significant impact on government policy.

The Bureau of Industry Economics Report and the Curtis Review

6.24 The Madigan Report had recommended that the national space programme should be reviewed at the end of the fourth year of operation to enable the government to review its strategy and long-term commitment and provide the basis for industry planning and allocation of resources.

6.25 The Bureau of Industry Economics (BIE) carried out an economic evaluation of the National Space Program (NSP) and reported in May 1992. It adopted a narrow economic focus, admitting that it had 'placed little value on a space program per se, though some clearly disagree with this position'. It concluded that:

> Overall, however, the BIE has not found evidence to support a conclusion that the NSP's industry development activities will enhance welfare either through efficiency gains (a more efficient long term allocation of resources) or through externalities (spill-over benefits to the rest of the community).[19]

6.26 It accordingly recommended:

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16 Dr John Boyd, *Proof Committee Hansard,* 29 July 2008, pp 76-8.

17 Australian Academy of Science, *Ready for Launch: Space Science in Australia,* p. 5.

18 Australian Academy of Science, *Ready for Launch: Space Science in Australia,* p. 8.

19 Bureau of Industry Economics, *An Economic Evaluation of the National Space Program,* Research report no. 43, p. 97.

> …that industry development objectives for the space sector be delivered through the existing range of industry assistance programs.[20]

6.27 In parallel with the BIE evaluation, the Government had commissioned an expert panel review of the National Space Program (the Curtis Review), also asking it to comment on the BIE report. After eight public hearings, the review reported in June 1992 and observed:

> A view strongly put was that Australia does not have a strategic plan for space-related activities.[21]

6.28 The panel's own view was that while the development of the National Space Program and the performance of the Australian Space Board/Office had not been beyond criticism, overall they gave a good account of themselves and, with minor exceptions, provided value for money.[22] The panel considered that this was all the more true when the limitations and constraints of the organisational and financial arrangements were taken into account. The panel made numerous recommendations covering policies, priorities and their corresponding budgetary requirements, together with the necessary administrative arrangements.

6.29 In commenting on the BIE report, the Curtis Review agreed with a number of the BIE's views, but it did not favour the BIE's recommendation for decentralised administrative arrangements and funding.

6.30 The government generally accepted the Expert Panel's recommendations and established the Australian Space Council under the *Australian Space Council Act 1994* which replaced the Australian Space Board. The Act defined the functions of the Council, with the main emphasis being to:

- inquire into, and report to the Minister on, such matters affecting the application of space-related science and technology by the Australian public and private sectors as are referred to the Council by the Minister; and
- recommend to the Minister a national space policy (the National Space Program) that encourages the application of space-related science and technology by the Australian public and private sectors.

Abolition of the Australian Space Office

6.31 In 1994, the Australian Space Council produced a 'Five Year Plan' which was adopted by the minister.[23] However, funding for the space programme was withdrawn

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20 Bureau of Industry Economics, *An Economic Evaluation of the National Space Program*, Research report no. 43, p. 98.

21 *An Integrated National Space Program*, Report by the Expert Panel, June 1992, p. 85.

22 *An Integrated National Space Program*, Report by the Expert Panel, June 1992, p. xi.

23 Dr John Boyd, *Submission 82*.

in 1995 and the ASO and Australian Space Council were abolished in 1996. The *Australian Space Council Act 1994* was repealed in 1999.[24]

Cooperative Research Centre for Satellite Systems

6.32 In 1998, a Cooperative Research Centre in Satellite Systems was established. It carried out research and development, education, training, operations and commercial activities relating to space technologies, particularly in the field of low-cost satellite missions. Its first major project was the scientific and engineering satellite Federation Satellite 1 (FedSat).

6.33 The CSIRO Office of Space Science and Applications undertook development of the programme and FedSat was launched into orbit in December 2002. The Centre ceased operations in December 2005 after its funding was not renewed in the 2004 CRC Selection Round. The Department of Defence assumed responsibility for the satellite until its signal failed in 2007.

6.34 Its former CEO described the Centre as follows:

> Largely due to the profile of the key mission of the CRC for Satellite Systems, which was the FedSat small satellite, it is sometimes forgotten that the CRC was actually set up to ensure that Australia had relevant capability for affordable access to space and to the skills effectively to use and acquire space services as a system, whether they be in the space segment or the ground segment. Out of the total $90 million or so in cash and in kind that was applied to the CRCSS over eight years, $25 million or so was applied to FedSat, and the remainder was successfully purposed to the broader goals.[25]

6.35 Elaborating on FedSat, he remarked:

> It was the first satellite mission in 30 years that Australia actually conducted. It was launched from Japan under a bilateral government agreement to celebrate the Centenary of Federation; although, being launched in December 2002, it was a little bit late…it was a microsatellite with four primary payloads—it actually achieved some quite significant science and technology outcomes, and it did succeed in actually building for a time a capacity, a capability and connections with international agencies for a price tag that, in the space business, was quite small.[26]

6.36 As noted below, with the abolition of the ASO, the Centre became in some ways a de facto representative of the Australian space industry.

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24 Department of Innovation, Industry, Science and Research, *Submission 7*, p. 3; and Dr John Boyd, *Submission 82*.

25 Professor Andrew Parfitt, *Proof Committee Hansard*, 29 July 2008, p. 99.

26 Professor Andrew Parfitt, *Proof Committee Hansard*, 29 July 2008, p. 100.

The Chapman Review

6.37 In 2005, Senator Grant Chapman convened a Space Policy Advisory Group. It prepared a report which called for a national space policy, assigned to a specific agency, which among other things would:

> …periodically review our critical national space interests, reduce our vulnerability to disruption or denial of space data and services…[27]

6.38 A brief response from the Government indicated they were not intending to change the decentralised policy.

The case for a whole-of-government 'space policy'

6.39 Most witnesses told the committee that Australia's decentralised approach falls short of what is required as a 'space policy'. Some typical views are:

> We do not believe that the current arrangements are satisfactory and that a far more proactive approach by government is necessary to underpin and sustain Australia's capability in this increasingly vital sector.[28]

> … Australia is very absent in the area of space science. It does not have an effective policy on space science generally and has not had one at all for many years. There is no policy for developing and articulating the strategic framework for space science,…[29]

> …we certainly support a more coordinated approach, a coordinating mechanism.[30]

> We need a policy that properly addresses the long-term requirements of Australia in this area. It needs to set a vision for Australia and it needs to have the right policy settings. It is vital that that be developed at the same time as the right suite of market drivers to ensure that we, as a nation, can have a prospering private sector in this area.[31]

> …we have no effective whole-of-government mechanism for addressing the wide-ranging implications for our national security of the now fast-moving developments in space-related strategic policy, international relations or technology — issues which most other comparable economies have long since taken up as a matter of national priority. [32]

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27 *Space: A Priority for Australia*, December 2005, p. 4.

28 Australian Space Industry Chamber of Commerce (ASICC), *Submission 64*, p. 21.

29 Mr Warwick Watkins, Australian Space Consortium, *Proof Committee Hansard*, 29 July 2008, p. 36.

30 Mr Shaun Wilson, Engineers Australia, *Proof Committee Hansard*, 29 July 2008, p. 96.

31 Dr Peter Woodgate, CRC for Spatial Information, *Committee Hansard*, 23 May 2008, p. 75.

32 Senator Grant Chapman, *Space: A Priority for Australia*, December 2005, p. 1.

6.40 The ANU's Professor Butcher advocates a 'space plan' which would be:

> …a national sector plan…not a government plan or a plan from CSIRO but a plan which all stakeholders—industry, government and universities—would consider to be their own.[33]

6.41 Submitters put it to the committee that in the space sector, government has a critical role in industry coordination and policy leadership, in consultation with industry. However, this role is not articulated in the government's key Space Engagement document.[34] This only recognises—as does the Australian Government Space Forum—the need for coordination between government agencies. The Australian Space Industry Chamber of Commerce makes the following points in relation to the role of government:

- only governments can set priorities and targets for national civil space infrastructure, such as satellite systems, environmental monitoring, remote communications and Earth observation;
- only governments can ensure continued funding for long term programmes and for infrastructure that extends beyond the scope and duration of ad hoc and generic science and technology funding programmes;
- only governments can formulate policy positions and represent a country internationally in issues such as the future of international law in space, non-proliferation of space weapons, orbital debris and the exploitation of resources in space;
- only government scan enter inter-governmental agreements for cooperation and collaboration with other countries; and
- only government agencies with appropriate skills and charters can represent a country's national interests (including the interests of industry) in international space-related deliberations and forums.

6.42 The Chamber states that the lack of a clear and focussed Australian government space policy designed to use Australian capabilities for the good of the nation and underpinned by sufficient funding and commitment, is a significant limiting factor in the advancement of Australian space science and industry.

6.43 Other industry witnesses attributed some of the decline in Australian capabilities to the lack of a policy:

> In late 2007 EADS Astrium… made the decision to shut down Auspace based on the limited Australian industry opportunities…and also because, with no whole-of-government strategy or policy fostering this sector, they

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33 Professor Harvey Butcher, Australian National University, *Committee Hansard*, 16 May 2008, p. 52.

34 Department of Industry, Tourism and Resources, *Australian Government Space Engagement*, Policy Framework and Overview, November 2006.

> could not justify maintaining this level of capability in Australia... key specialists leaving the industry.[35]

6.44 The South Australian government called for a white paper, suggesting:

> In developing the white paper, the Australian Government should rely heavily on the 2005 Chapman Report, *Space: a Priority for Australia*, which to date has been inadequately considered.[36]

6.45 This emphasis on the role of government was consistent with the views put to an earlier Senate committee:

> The majority of contributors to the inquiry saw a prominent role for government in the development of launching services and the space industry in general…Most witnesses felt that if Australia was to become more active in space industry matters…[governments] need to take a more prominent role in policy formulation and industry support. [37]

Comparison with other countries

6.46 It is often noted that Australia is becoming unusual among its peers in not having a space programme:

> …we are the only OECD country without a space programme of any sort.[38]

6.47 There are also very many developing countries that are much further advanced than Australia in space activities, making Australia's lack of contribution incongruous considering its relative wealth.[39] As one witness noted:

> South Africa, I am sorry to say, is well ahead…They see the challenges ahead for them—population stress, food stress, water stress—and have decided that space infrastructure is a very important way of securing the information they need as a nation. For that they have passed a space affairs

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35 Mr Peter Nikoloff, Auspace, *Proof Committee Hansard*, 29 July 2008, p. 64.

36 South Australian Government, *Submission 79*, p. 12.

37 Senate Standing Committee on Transport, *Communications and Infrastructure, Developing Satellite Launching Facilities in Australia and the Role of Government*, April 1992, p. 73.

38 Mr Tony Wheeler, ASIBA, *Proof Committee Hansard*, 29 July 2008, p. 39. Similar observations were made by, for example, Dr Andy Thomas, *Draft Committee Hansard*, 23 May 2008, p. 11; Mars Society, *Submission 22*; Dr James Moody, *Submission 32*; Australian Spatial Information Business Association, *Submission 37*, p. 5; Mark Ramsey, *Submission 43*, p. 7; Australian Space Research Institute, *Submission 46*, p. 4; Luke Webb, *Submission 47*, p. 2; Epsilon Foundation, *Submission 56*, p. 1; and Australian Space Industry Chamber of Commerce, *Submission 64*, p. 10; Senator Grant Chapman, *Space: A Priority for Australia*, December 2005, pp 25-6; and Jeff Kingwall 'Punching below its weight: Still the future of space in Australia?', *Space Policy*, no 21, 2005, p. 162.

39 The space programmes of several Asian economies, mostly smaller than Australia, are discussed in Dr Bruce Middleton, *Submission 87a*.

act, or something along those lines. This is a bill that went to the National Assembly last August.[40]

6.48 An indication of government expenditure on space in other countries is given by Table 6.2.

Table 6.2: Government space budgets, 2007, US$ billion

United States (of which NASA $16.3 billion)	62.6
European Space Agency	4.0
Japan	2.2
China	1.5
Russia	1.3
France*	1.0
India	0.9
Italy*	0.7
Germany	0.4
Canada*	0.4
United Kingdom	0.1

*Civilian agency only. Source: Space Foundation, *The Space Report 2008*, pp 24-6.

The United Kingdom model

6.49 The United Kingdom's space agency, the British National Space Centre (BNSC), has been suggested as a model. It 'essentially coordinates the activities of a range of ministries that still retain their budgets and their responsibilities'.[41] The BNSC reports to the Minister of State for Science and Innovation. It describes its role in the following terms:

> …BNSC is at the heart of UK efforts to explore and exploit space. Formed from 10 Government Departments and research councils, we: co-ordinate UK civil space activity; support academic research; nurture the UK space industry; and work to increase understanding of space science and its practical benefits.
>
> We have three long-term objectives: to enhance the UK's standing in astronomy, planetary and environmental sciences; to stimulate increased productivity by promoting the use of space in government, science and

40 Mr Stephen Ward, Symbios Communications, *Proof Committee Hansard*, 1 August 2008, p. 41.

41 Dr Michael Green, DIISR, *Committee Hansard*, 16 May 2008, p. 5.

commerce; and to develop innovative space systems, to deliver sustainable improvement in the quality of life.[42]

6.50 This was attractive to some witnesses:

> Perhaps the UK approach, which is more like a national committee which has the key representatives at the table, may be an appropriate model. [43]

> …the British National Space Centre presents an excellent model for what could be achieved here. It is a partnership among government departments, research bodies and the Met Office, or the Bureau of Meteorology as it is known here... The director-general…I think is the single employee of the British National Space Centre…the rest of them are on secondment from various places…There are 50 of them, or something like that. They spend UK£207 million a year. It is about to go up hugely because the UK sees its needs in climate and environment as really escalating in this century...I could see the Bureau of Meteorology here and the CSIRO, Defence, and you could probably name a few others to take in the astronomy people such as Tidbinbilla and all those people, getting together in the same way and organising their money in the same way. Before you know it, you have a critical mass, which you did not think was possible.[44]

6.51 It is also consistent with the views of the United Kingdom Parliamentary Science and Technology Committee, which concluded:

> Space is a highly significant area of science policy and it is necessary for the Government to take a strategic approach to space activities…The forthcoming civil space strategy should inspire and motivate the UK space sector and emphasise the UK Government's commitment to space.[45]

6.52 The former head of the ASO had some reservations about the BNSC model:

> In 2007 BNSC received £50.67 from its portfolio department and subscribed £21.37m to the ESA general budget, suggesting that it had available £29.3m for administration and program activities. Its total expenditure of £217.88 indicates that other agencies – principally the Science and Technology Facilities Council, the Natural Environment Research Council and the Meteorology Office – provided a total of £167.21m towards the programs BNSC supported. BNSC's contribution would appear to be around 1/7th of the total space program expenditure by the UK in that year. Based on my experience at the ASO, this would not be high enough in the Australian context to secure investment by other agencies.[46]

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42 www.bnsc.gov.uk.

43 Dr Susan Barrell, Bureau of Meteorology, *Committee Hansard*, 16 May 2008, p. 18.

44 Mr Stephen Ward, Symbios Communications, *Proof Committee Hansard*, 1 August 2008, p. 36.

45 United Kingdom Parliamentary Science and Technology Committee, July 2007.

46 Dr Bruce Middleton, *Submission 87*, p.2.

A space agency as a contact point

6.53 Entering 'Australia space' into the Google search engine gives the website of the National Space Society of Australia, followed by that of the Australian Space Research Institute (and then the *Lost in Space* Australian Fan Club!). There is no sign of the relevant parts of the Department of Innovation, Industry, Science and Research.

6.54 This may explain why the committee heard of two amateur enthusiasts in their twenties being approached by the media looking for the Australian view on space issues or by overseas organisations looking to arrange international collaborations:

> The National Space Society is frequently confused with being Australia's national space agency by the general community and tends to be confused by the media as well. I am the first one that is called when something happens…Just this morning with Sky News I was asked to comment on what the water on Mars would mean for Australia and the world.[47]
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> Anecdotally we have had a number of requests from people who come and speak to BLUEsat, thinking that perhaps we are some sort of conduit to the Australian space industry…[48]

6.55 With no disrespect to the young enthusiasts concerned, it would be better if the point of contact was a professional government agency.

6.56 The former CEO of the Cooperative Research Centre for Satellite Systems described how he by default was sometimes regraded overseas as representing Australian space science:

> I was introduced at a number of international fora …as head of the closest thing Australia had to a space agency… it was a tag with which I was quite uncomfortable because I had no executive authority to act or represent the whole or even part of government, unlike the majority of colleagues around the table…I continued to be invited to represent Australia even to chair or co-chair important meetings such as the Asia-Pacific Regional Space Agencies Forum in Canberra in 2004 and in Japan in 2005.[49]

6.57 Similarly, private industry organisations are sometimes regarded as a proxy space office:

> I received an email from the Korean Space Agency saying that they did not know who to speak to in Australia. They got my name from NASA and were contacting me to see if I could give them some specific information... we are repeatedly contacted by international companies who are looking for

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47 Ms Anntonette Joseph, National Space Society of Australia, *Proof Committee Hansard*, 1 August 2008, p. 13.

48 Mr Anthony Wicht, BLUEsat, *Proof Committee Hansard*, 1 August 2008, p. 7.

49 Professor Andrew Parfitt, *Proof Committee Hansard*, 29 July 2008, p. 99.

> someone to talk to in Australia about the nation's needs, the opportunities, and so on.[50]

6.58 This concern that there was no prominent point of contact in Australia for overseas agencies or private companies who wish to discuss space matters was expressed by many witnesses:

> …'Who do we come and see?' has been the question to many of us in the industry.[51]
>
> …there should be a centralised coordinating body…which has the capacity to act as an international point of contact.[52]
>
> When I came here first of all, I said, 'So who do I talk to that is coordinating your requirements and the industry?' and there was no-one.[53]
>
> One of the standard complaints is that the international space agencies or companies or just the research groups do not know who to contact in the Australian government if they want to do something.[54]

Other perspectives on a new Australian space agency

6.59 Although some submissions advocated the establishment of an 'Australian NASA', many others recognised that Australia already has much occurring in the space arena and better coordination, as well as political will to enhance the sector, is what is required.

6.60 The committee found the views of Dr Bruce Middleton, former Executive Director of the Australian Space Office between 1987 and 1993 to be particularly instructive. Dr Middleton considers that Australia is making a serious mistake in not investing significant public funds in space, in addition to the funds invested by individual government agencies in pursuit of their own missions:

> I believe that by not investing we are missing out on opportunities and making ourselves more dependent on others. I believe our current policy on space short-changes the educational, scientific, technological, innovation, industrial, environmental, public good and national security objectives of national policy. I believe we will pay a heavier price in the future if we continue not to invest.[55]

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50 Mr Kirby Ikin, Australian Space Industry Chamber of Commerce, *Proof Committee Hansard*, 1 August 2008, pp 25-6.

51 Mr Roger Franzen, Earthspace, *Committee Hansard*, 16 May 2008, p. 44.

52 Institute for Telecommunications Research, *Submission 48*, p. 2.

53 Mr Richard Kolacz, COM DEV, *Proof Committee Hansard*, 22 July 2008, p. 10.

54 Professor Iver Cairns, National Committee for Space Science, *Proof Committee Hansard*, 29 July 2008, p. 92.

55 Dr Bruce Middleton, *Proof Committee Hansard*, 23 September 2008, pp 2–3.

6.61 One thing that came out clearly from the inquiry is that although large amounts of funds can be expended on space related activities, they do not have to be. A range of estimates of appropriate funding levels were advanced. Dr Middleton suggested $50 million a year:

> I would think that if Australia was not committing A$50 million a year it was not serious and would be seen for that. I would not see $50 million in a national program as being a honeypot. I would see it as a very careful effort to target that to national objectives, with those objectives being carefully weighed and with a very hard-nosed decision being asked: are we going to address national prestige? If the answer is yes, we might train an astronaut, because that goes a long way to getting people excited about space. If it is no, forget about things like that, forget about things like the remote manipulator arms and focus your money in other areas. Those decisions have to be made. [56]

6.62 The Australian Space Research Institute argued that an agency would:

> …give cohesion to the various disparate space elements that are still in Australia and help bring back some of the expatriate space assets that have had to go overseas to look for work in the last decade or so.[57]

6.63 The lack of an agency may mean that Australia misses out on larger interdisciplinary projects:

> Missing are large coordinated programmes of research and development that span many organisations both in Australia and obviously internationally. We cannot do things like this alone. As director of a research institute, that is really where I see the lost opportunity.[58]

6.64 Dr Andy Thomas argued:

> I do personally believe that a single coordinating body is needed in Australia…I do have a sense that there are a lot of competitive organisations in the Australian arena in all of those various dispersed activities that you referred to. I am sure the people in those organisations have the best of intentions of their organisations, but I think you do need an operation that has a vision that looks at the national scale of what has to be done on a national basis and pull all of those things together to support that national programme.[59]

6.65 The Australian space industry is supportive of a central coordinating body:

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56 Dr Bruce Middleton, *Proof Committee Hansard,* 23 September 2008, p. 9.

57 Mr Gary Luckman, *Committee Hansard*, 16 May 2008, p. 35.

58 Professor Alexander Grant, Institute for Telecommunications Research, *Committee Hansard*, 23 May 2008, p. 4. Similarly Dr Peter Woodgate was approached by a Chinese agency interested in a joint satellite venture but unable to find an agency in government to approach.

59 Dr Andy Thomas, *Committee Hansard*, 23 May 2008, pp 17-8.

> …noting a persistent call from industry and other groups for stronger and more visible coordination of effort, recommend that the Australian Government establishes a national coordination body responsible for, and to show leadership in, all facets of Australia's space engagement, including relationships with international space agencies.[60]

6.66 A number of other groups also felt the absence of a single space agency was damaging to Australia:

> …Australia has become ever more dependent on space based services, often invisibly. Much like water in a tap, we do not understand where the services come from; we just expect them to be there…there appears to be no whole-of-government coordination that addresses our dependencies and hence our vulnerabilities that arise from those dependencies...[a space agency] should initially reside probably within the Department of the Prime Minister and Cabinet so that it holds a whole-of-government perspective and does not need to consider individual departmental priorities, and therefore it can look at all of the nation's dependencies at a strategic level.[61]
>
> The primary impediments [to strengthening space science and industry in Australia] are first, that Australia has no single coordinating body for space science.[62]
>
> There is an urgent need to establish a single coordinating framework for Australian space related research and applications.[63]
>
> Having an agency gives you a centralised, unified voice that can look after the governance and provide leadership, vision and so on and so forth. Our space agency reports directly to our minister of industry…[64]
>
> If we had an Australian space agency—a national body that could encourage that, could fund it, could coordinate and ultimately could buy the technologies that we produce—I think that would lead to long-term benefit for the country.[65]
>
> …so many countries—in fact, almost all countries in the Western world—look to Australia and wonder why Australia is not running any sort of serious space programme. The reason for that is that we are part of a civilisation that expects to find more and more work in space and those countries are bit surprised that we do not accept that as part of the culture and take it up.[66]

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60 Appendix 4.

61 Mr Roger Franzen, Earthspace, *Committee Hansard*, 16 May 2008, p. 42.

62 University of Sydney, *Submission 18*.

63 University of Newcastle, *Submission 53*, p. 2.

64 Mr Jocelyn Dore, Canadian Space Agency, *Proof Committee Hansard*, 22 July 2008, p. 11.

65 Professor Russell Boyce, Australian Hypersonics Network, *Proof Committee Hansard*, 29 July 2008, p. 20.

66 Professor Raymond Stalker, *Proof Committee Hansard*, 29 July 2008, p. 20.

> There currently appears to be a lack of cohesion across state and federal jurisdictions in dealing with space sciences, with no specific agencies identified as having carriage of space-related issues…herein lies the opportunity to seriously consider the formation of a national council, group or forum, comprising key federal and state stakeholders, focusing specifically on space science related issues.[67]
>
> You need a group of good people to make the decision as to which way we are going, to work out a long-term policy and hopefully to provide funding for five- or 10-year plans to achieve that.[68]
>
> Ultimately I think the government has to set the policy and you need an agency to implement it.[69]
>
> It is not possible to extract maximum return from public investment in space through a decentralised structure; there will inevitably be gaps and overlaps, not to say duplication. Therefore, effective coordination is essential.[70]
>
> We have been losing credibility [internationally] regarding…global issues—like climate change, perhaps, and security aspects which are global. We have been losing that credibility over some period of time… I think that Australia is viewed as a country which has had individuals doing a lot but which has not had an organised programme at all…[71]
>
> the establishment of a single, national, coordinating agency that covers all space related policies, programs and directions is absolutely vital.[72]
>
> It is dangerous for a major country not to have an organised way of assessing space opportunities. This capability is the minimum. It isn't enough to know that there is a lot of expertise scattered here and there in universities, industry, et cetera. It requires a more systematic approach. But this need not be expensive, especially if Australia can demonstrate enough expertise to make it once again an interesting international partner.[73]

6.67 The Bureau of Meteorology commented:

> …Australia would benefit from a more coordinated national policy framework on space matters, developed and administered through a whole-of-government mechanism; that, through such national policy

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67 Western Australian Department of Industry and Resources, *Submission 85*, p. 22.

68 Professor Richard Morgan, *Proof Committee Hansard*, 29 July 2008, p. 23.

69 Dr John Boyd, *Proof Committee Hansard*, 29 July 2008, p. 77.

70 Dr Bruce Middleton, former head of Australian Space Office, *Submission 87*, p. 3.

71 Professor Iver Cairns, *Proof Committee Hansard*, 29 July 2008, p. 91.

72 Ms Anntonette Joseph, National Space Society of Australia, *Proof Committee Hansard*, 1 August 2008, p. 13.

73 Professor Roy Gibson, who served as inaugural director of both the European Space Agency and the British National Space Centre, asked for these comments to be passed onto the committee by Mr Stephen Ward, *Proof Committee Hansard*, 1 August 2008, p. 43.

> arrangements, the value of current and continued international collaboration on space is recognised and coordinated; and that targeted national investments in space science and technology in relation to both ground and space segments should build on and complement the international effort, with a special focus on Australia's national objectives—for example, in relation to climate monitoring, water resources, environment, and disaster mitigation… in terms of a coordinated engagement with other countries, there is no single framework for that to happen. [74]

6.68 The Department of Defence sounded supportive:

> Defence could see value in greater national level policy coordination of Australia's space dependency. We believe that the current arrangements are not able to fully address this complex area of policy. We think that some form of coordinated whole-of-government policy discussion might assist a more consistent and clearer approach, especially as space policy becomes more complex. As for a national coordinating body, Defence's position would be guided by the scope and authorities of such a body. However, as a key stakeholder, Defence would be happy to work closely with such a body should government choose to create one.[75]

6.69 The CSIRO sounded unenthusiastic about having their space-related activities hived off into a new agency:

> it is actually a real benefit because we can bring together the Earth Observation folk with the hydrologists or with the spatial analysts or whatever and you can actually do that in a very flexible way…one of the real benefits that we have at the moment is that space is embedded within other parts of the…CSIRO. I think that, for government to consider that, you would probably want to take into account whether we could maintain all of those particular linkages.[76]

6.70 An agency could also help give Australian entities more credibility overseas. For example, the BLUEsat student satellite-builders thought:

> An Australian space agency would also add to our credibility when we go overseas for most of the launches which we have targeted as useful. If there was an Australian space agency which was able to say, yes, BLUEsat, or a similar student project, is a legitimate project that gives us more credibility and would make the space launch and certification process much more straightforward.[77]

6.71 A representative from Canada's largest manufacturer of space technology noted that in Australia:

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74 Dr Susan Barrell, *Committee Hansard*, 16 May 2008, pp 14 and 18.

75 Ms Rebecca Skinner, Department of Defence, *Proof Committee Hansard*, 29 July 2008, p. 3.

76 Dr James Moody, CSIRO, *Proof Committee Hansard*, 29 July 2008, p. 34.

77 Mr Anthony Wicht, *Proof Committee Hansard*, 1 August 2008, p. 4.

> I have found a range of very good capabilities and technologies associated with the space, ground and data-processing segments. However, in my opinion, what was lacking was an ability to bring these elements together.[78]

6.72 An agency could help to bring together people working in aspects of space science:

> Up until about two years ago, there was essentially no communication at all between different members of the space science community—as in even space physicists like me from the University of Sydney might have had absolutely no idea what our colleagues at the University of Newcastle, a scant 200 kilometres away, were doing, let alone what our colleagues in astrobiology were doing. We want to become a much more cohesive community which manages itself and identifies scientific goals which are important and crucial in our opinion but which also have national benefit.[79]

6.73 Dr Middleton suggests that there are two elements for coordination: some machinery where people with sufficient authority to commit their agencies meet together; and a program with enough money to 'put mortar between the bricks'. [80]

6.74 One suggested model for a co-ordinating agency was a unit within the Department of Prime Minister and Cabinet:

> the National Security Science & Technology Unit that was set up in PM&C a few years ago to provide a single point of contact for counterterrorism technology development. This organisation is peopled by secondments from the interested organisations and agencies so that there is representation there and no-one feels that their sovereignty is being threatened or that their toes are being stepped on.[81]

6.75 It will always be a challenge in getting departments to agree to a coordinating agency which may be seen as encroaching on their turf. The former deputy director of the Australian Space Office recalled:

> I would never expect them to hand over any responsibility to some central agency…I suppose you would always lose their support if they thought that money was coming out of their budget to go into the Space Office, which I think might have been part of the problem all along.[82]

6.76 Drawing on his experience with the Australian Space Office, its former director suggested:

> I would think that if Australia was not committing A$50 million a year it was not serious and would be seen for that. …I would say it needs to be a

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78 Mr Richard Kolacz, COM DEV, *Proof Committee Hansard*, 22 July 2008, p. 2.

79 Professor Iver Cairns, *Proof Committee Hansard*, 29 July 2008, p. 85.

80 Dr Bruce Middleton, former head of Australian Space Office, *Submission 87*, p. 3.

81 Dr Miriam Baltuck, CSIRO, *Proof Committee Hansard*, 29 July 2008, p. 35.

82 Dr John Boyd, *Proof Committee Hansard*, 29 July 2008, p. 81.

> statutory agency. It needs to have enough staff but not too many, and it needs to have expert staff. It needs to have a board of eminent people who command respect in government and in the industry—and in the research community…[83]
>
> …high-level secondees from stakeholder departments and agencies (including the Department of Defence)…[84]

6.77 The success of a space agency may also reflect its status as reflected in the seniority of the minister assigned responsibility for it. Examples of very senior ministers include India, where at one stage the Minister for Space was Indira Gandhi, and the United States, where the National Space Council is chaired by the Vice President.[85] The former director of the Australian Space Office suggested:

> Clearly a minister needs to be responsible…It needs to be a senior minister. A junior minister is a kiss of death. The bureaucracy is very sharp: 'Junior minister? Don't pay it as much attention; he doesn't have the horsepower in cabinet.' And you are on the slippery slope.[86]

6.78 An alternative view is that what is more important is that the minister have a commitment to, better still an enthusiasm for, a space policy.

6.79 There were some views that a new agency should start off with modest goals:

> I think we should start it small and get its foundations laid and then let it evolve in an appropriate way.[87]
>
> …a space agency in Australia could start off at a very simple level by simply acting in a coordinating role, pulling together various industries and academia throughout Australia…[88]

Conclusions

6.80 The committee notes that for each successive review into the Australian space sector, broadly similar findings are made each time, including for the committee's current inquiry. Principally, these findings are that the Australian space industry is fragmented, there is a lack of clarity in organisation, confusion as to who does what and who is able to fund what.[89]

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83 Dr Bruce Middleton, *Proof Committee Hansard*, 23 September 2008, pp 9 and 11.

84 Dr Bruce Middleton, *Submission 87*, p. 3.

85 Senate Standing Committee on Transport, *Communications and Infrastructure, Developing Satellite Launching Facilities in Australia and the Role of Government,* April 1992, pp 101-2.

86 Dr Bruce Middleton, *Proof Committee Hansard*, 23 September 2008, pp 9 and 11.

87 Mr Shaun Wilson, Engineers Australia, *Proof Committee Hansard*, 29 July 2008, p. 98.

88 Mr Anthony Wicht, BLUEsat, *Proof Committee Hansard*, 1 August 2008, p. 4.

89 For example, *An Integrated National Space Program*, Report by the Expert Panel, 15 June 1992, p. xii.

6.81 However, it notes the problems that arose when these findings were implemented in the mid-1980s. It would be highly undesirable if a new agency were again to dissolve after a decade with promises unfulfilled. Accordingly, the committee wants a new agency to evolve gradually.

6.82 The committee notes that firms within the Australian space industry seem keen for an agency to succeed. They already donate time to industry and enthusiast organisations and share information. They may be willing to contribute to a space agency.

Recommendation 1

6.83 The committee recommends as a first step that the Government give the existing unit within the Department of Innovation, Industry, Science and Research more resources to enable the establishment of an Australian government Space Information Website. This would provide information on government programmes and contacts, and links to Australian companies working in the space industry as well as Australian universities offering courses in space science and space engineering.

Recommendation 2

6.84 The committee notes that Australia is the only OECD country without a national space agency and, as a consequence is missing out on opportunities to engage in this important area of innovation and technology. The committee also notes the comments by the Chief Scientist and the conclusion of the Cutler Report in relation to the importance of the space industry for innovation within Australia. The committee recommends that immediate steps are taken to coordinate our space activities and reduce our over reliance on other countries in the area of space technology.

Recommendation 3

6.85 The committee notes the wealth of expert, well informed evidence received by the committee. Despite some deviations, the overwhelming majority of witnesses strongly supported the formation of a government unit to coordinate Australian space activities, including those in the private sector. The committee supports this conclusion and notes that there must be a proper balance between industry and government involvement.

Recommendation 4

6.86 The committee notes the various models of space agency within the OECD and emerging economies and supports Australia having a space agency. The committee recommends initially establishing a Space Industry Advisory Council comprising industry representatives, government agencies, defence, and academics. The committee recommends that the advisory Council be chaired by the Minister for Innovation Industry Science and Research or his representative.

Recommendation 5

6.87 As a precursor to the establishment of the space agency the Advisory Council would:

- **Conduct an audit of Australia's current space activities within six months of the establishment of the Council;**
- **Analyse the strengths, weaknesses opportunities and threats to Australia's emerging space industry;**
- **Focus on the key "workhorse" space applications of Earth observation, satellite communications and navigation as the most practical and beneficial initial priorities;**
- **Systematically evaluate the medium/long-term priorities for a space agency including the national benefit of defence related activities, Earth observation, environmental, land management, exploration, national disaster prevention and management, treaty monitoring, e-commerce and telemedicine;**
- **Examine the benefits to Australia of improved international collaboration including membership of the international space groups;**
- **Develop a draft strategic plan for the establishment of a space agency and the most appropriate form of that agency, including public/private funding, budget and staffing priorities; and**
- **Identify critical performance areas such as research, technological development, development of the skill base, effective partnerships, delivery of new services, and financial management.**

Linkages with other space agencies

6.88 Back in 1985 the Madigan Report had suggested that:

> Australia should also initiate discussions with other West Pacific countries on the establishment of an appropriate agency to create the synergy which the European Space Agency has brought so beneficially to its subscribing nations.[90]

6.89 An Australian space agency would facilitate linkages to other space agencies. The European Space Agency has four times offered Australia an associate membership. Some leading space scientists advocate taking up the offer, pointing out it would allow Australian companies and universities to win contracts with the ESA and gain better access to satellite data.[91] However, the committee was told that a lack of an Australian space agency makes it harder to take up membership. When the ESA approached Australia in 2006:

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90 Australian Academy of Technological Sciences, *A Space Policy for Australia*, June 1985, p. 1.

91 Associate Professor Lachlan Thompson and Professor Pavel Trivailo, *Submission 33*, p. 3.

> the request was sent all around Canberra. There was no-one really in a position to say yes or no and there was no individual agency that had the funds to commit to it. So Australia was not in a position to say yes even though there was some enthusiasm to do so.[92]

6.90 An interesting case is Canada, arguably the most similar country to Australia.[93] It has its own space agency, funded to around $300 million per year.[94] The Canadian Space Agency is an associate of the European Space Agency. They gave this example of how the relationship works:

> we were the first non-European country to join the Galileo program. As a result of that we have several companies in the GNSS domain who have secured contracts. Since Galileo will be here for many years to come, that spells out great opportunities for Canadian industry.[95]

6.91 The committee heard that there can be strong returns to industry from associate membership with the European Space Agency:

> Canada has enjoyed great success in the space domain, largely due to our international cooperation and participation programmes…Our contribution to ESA alone has resulted in over $420 million in contracts.[96]
>
> Under the ESA rules they would expect about 80 per cent of what they contribute to come back in contracts to Canada…[97]

Recommendation 6

6.92 **The committee recommends that any Australian Space Agency reassess the case for Australia becoming more closely linked to an international space agency**.

Senator Annette Hurley

Chair

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92 Mr Tony Wheeler, who had been working on a project with CSIRO at the time, *Proof Committee Hansard*, 29 July 2008, p. 42.

93 As Mr Richard Kolacz of COM DEV noted, 'both have a large landmass and relatively small populations and also similar requirements and views relating to maritime security, safety, surveillance, environmental monitoring and resource management'; *Proof Committee Hansard*, 22 July 2008, p. 2.

94 Mr Jocelyn Dore, Canadian Space Agency, *Proof Committee Hansard*, 22 July 2008, p. 6.

95 Mr Jocelyn Dore, Canadian Space Agency, *Proof Committee Hansard*, 22 July 2008, p. 4.

96 Mr Jocelyn Dore, Canadian Space Agency, *Proof Committee Hansard*, 22 July 2008, p. 3.

97 Dr Bruce Middleton, *Proof Committee Hansard*, 23 September 2008, p. 4.