ASIA PACIFIC AEROSPACE CONSULTANTS Pty Ltd

A REVIEW OF CURRENT AUSTRALIAN SPACE ACTIVITIES

Executive Summary

April 2010

A report to the
Space Policy Unit
Department of Innovation, Industry, Science & Research

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Background

This study was initiated by the Space Policy Unit (SPU) of the Department of Innovation, Industry, Science and Research (DIISR) to provide a detailed review of Australia's civil space-related activities and an economic assessment of the current value of space to the Australian community and associated trends. The scope of the study included activities in the space industry, state and local governments, and education and research sectors, but excluded Federal Government activities. For the purposes of the study "civil space activities" were defined by the SPU as any space activities not conducted by the Federal Government. The term "current activities" was defined by the SPU as any activity currently being undertaken and did not include any future or past activity.

Objectives

1) To identify as many organisations currently conducting "civil space activities" as possible within the two month timeframe; and
2) To obtain from these organisations relevant information about their current space activities and related economic information for an assessment of the current value of these activities to the Australian economy.

Methodology

Primary data was collected through an online survey specifically designed for this study. Overall 832 survey invitations were distributed to universities, State Governments and companies likely to be involved in current space activities. Over a period of two weeks 266 responses were received which, after quality control review for validity and overlapping responses, produced 183 consolidated responses. The survey data was supplemented with internet research and consultation with key sector participants.

Findings on Current Space-Related Activities

This study identified 456 organisations conducting current space-related activity in Australia (73% private sector, 17% education/research, 10% government/non-profit). Based on international studies and their approach to categorising space activities, as well as knowledge of the unique characteristics of Australia's current domestic space scene, the following primary classifications of space activities were defined for this study:

Major Categories of Space-Related Activities	Number of Active Organisations
Space Systems	42
Launch Activities & Support Services	17
Ground Systems	125
Space Enabled Services & Applications	272
Space Activity Support Services	78
Space Science and Research & Development	104
Space Education & Training	80
Space-Related Associations and Public Information Activities	47
Other Space-Related Activities	15

The number of organisations currently active in each category is shown in the table above. A total of 1,136 activities across 52 subcategories have been identified for the 456 organisations currently conducting space activities, indicating an average of 2.5 activities per organisation. Many of these organisations currently have only one activity while others have three current activities or more.

The 'Space Enabled Services & Applications' Category is the largest area of activity by far. This is consistent with international trends. This category includes Telecommunications and Broadcasting services, Earth Observation services including provision of satellite imagery and Positioning, Navigation and Timing services. There is a strong representation of organisations across all the subcategories in this field. The second largest area of activity is the 'Ground Systems' Category which reflects Australia's strong heritage and active role in satellite communications and hosting ground stations for international organisations.

'Space Science and Research & Development' and 'Space Education and Training' are major areas of current Australian space activity. These are dominated by university departments which have indicated a vast array of space-related studies and research endeavours. There are 69 separate research activities that were identified within university departments. In the 'Education and Training' Category a total of 53 space-related undergraduate and 63 graduate programs were identified as currently being offered. In addition to these formal programs 188 individual undergraduate and 75 individual graduate space-related courses were identified. The combined enrolment in these courses exceeds 4,000 students derived from the sum of the students enrolled in each individual course in the program. This number does not equate to the total number of students in these programs because most students would take multiple courses and hence be counted multiple times, however it does indicate a strong interest by university students in space-related courses.

Findings on the Economic Contribution of Australia's Space-Related Activities

The economic value of space to the Australian community has three different but interrelated components, which cannot all be readily quantified:

1) Direct economic measures such as the direct revenue generated by space activities and the number of people employed,
2) Indirect economic benefit to the second tier of organisations that supply products and services to the main organisations conducting space activities,
3) Induced effect upon the broader community where the products, services and impact of space activities ripple out and affect all aspects of the community.

Revenue information (indicated within a certain revenue range) was received from 131 survey respondents which revealed a minimum current space activity revenue of at least $460m with the upper end of the range as high as $940m. These 131 respondents combined have staff headcounts of 1,812 and Full-Time Equivalent (FTE) staff of 1,141. The direct economic measures were derived by extrapolation of total revenue and staff reported by 131 survey respondents across the 456 organisations with current space activities. This yields the following estimates for current Australian space activities:

Estimated Revenue Range p.a.	Estimated Workforce Headcount	Estimated Workforce FTE
$0.8-$1.6 Billion	**6,453**	**4,339**

Beyond these direct measures of economic value there is an induced effect upon the broader community. Studies in the UK have estimated that there is an employment multiplier of 3.6 for the UK space industry, meaning that for every job directly supported by the space industry another 2.6 in total are supported indirectly in the supply chain and from the induced spending of those directly or indirectly employed by the UK space industry. Applying a similar multiplier to the Australian community would conservatively suggest that the employment of more than 15,000 Australians is supported directly or indirectly by current Australian space activities.

The same UK studies found that the productivity of workers in the UK space industry was more than two and a half times higher than the figure for the UK economy as a whole due in part to the highly qualified nature of the workforce. This same trait of a highly qualified workforce was identified for Australian space activities and hence it is likely that the staff employed on current Australian space activities similarly have higher average productivity than that of the Australian economy as a whole.

The study found that virtually every part of the Australian economy draws on space-related activities in some way. Clients for current space activities were identified in all 22 ANZSIC industry codes provided in the survey. Many of these industries are multibillion dollar industries and much of their productivity is heavily influenced by the utilisation of space derived data. Hence the economic impact of space activities is greater than what has been quantified within the scope of this study. It is also clear that space derived data and communications are an essential part of Australia's national security, emergency response and disaster management activities hence the value of space activities to the Australian community extends well beyond standard economic measures.

The study also examined attributes of staff demographics, particularly age, gender, level of qualification and geographic location around the country. The analysis shows that the vast majority of employees in the Australian space industry are between 20-50 years of age with most in the 30-50 years age range. In terms of gender the workforce engaged on current space activities is split 61% male and 39% female. A high proportion of staff engaged in current space activities in Australia hold post graduate qualifications. Staff are engaged in space activities in every Australian state and territory. The survey responses indicate that the highest staff concentration is in NSW with Victoria and South Australia having the next highest concentrations. These three states have approximately 67% of all staff employed on current space activities based on the survey responses.

Trends and Business Sentiment

In general survey respondents indicated trends of stability for revenues, exports, imports and employment in their space activities over the last 3 years and in their projections for the next three years. Roughly 30-40% of respondents expected no change, 30-40% indicated growth ranging as high as 25%, and 10-15% expected small declines.

Survey participants were asked if they experienced skill shortages in this field. Of the 129 respondents to this question 42% reported skill shortages and problems in finding qualified staff for space-related activities. Of the 54 organisations encountering these shortages 45 had recruited staff from overseas to meet their needs indicating an issue that must be addressed for the continuance of space activities in Australia in the future.

Conclusions and Next Steps

This is the first Australian study on space activities in many years and it has uncovered significant data on the industry. Initial and intermittent studies can rarely capture all the necessary information in a sector as complex as space particularly within a short time-frame and that is certainly the case with this study. Hence the findings of this report must be regarded as preliminary indications requiring more thorough exploration and quantification. Overseas studies have required several years of annual data collection to yield more reliable and valid econometrics and trends. It is strongly recommended that, consistent with overseas practice, this survey be repeated annually in order to yield more comprehensive and accurate data after learning from this initial study.

The findings of this study indicate the significant size and complexity of Australia's space-related activities. These are a major contributor to Australia's economy, security and skill-base as well as a major employer. Australia has significant strengths in many space activity areas and Australia's universities are educating many highly skilled people. It would serve Australia well to have focussed and co-ordinated Government support and funding to develop and optimise this important industry and retain our brightest minds.

