

The Infrastructure Road to Recovery

Conquering Space

speaking country, and these are all definite advantages, and pluses in why Australia should get involved in some of these things.

Q: One would think that there is great interest in manned space programs in Australia, since it has had two astronauts that have flown in space.

Thomas: That does need to be clarified a bit. [The two of us] got our start in Australia, but we do not represent Australia in any way.

Paul Scully-Power was a payload specialist as an oceanographer. In fact, he was not an astronaut. He was an oceanographer who did not represent Australia, but flew as a U.S. citizen. I flew as a U.S. citizen on my first flight. I subsequently had my Australian citizenship reactivated because they changed the laws there, so I also do fly as an Australian citizen, but I don't represent Australia formally. It's an informal representation by virtue of my heritage.

That's a point I make when I'm in Australia, because a lot of people say, "Why should we get involved in space? We've had Andy Thomas as an astronaut, we've gotten an Australian citizen into space, we've had Scully-Power as a payload specialist, what more should we do?"

The fact of the matter is none of these was formally linked with Australia. Australia does not have a formal role in human space flight.

Q: This is similar to the case of Costa-Rican-born Franklin-Chang Diaz, who is an American astronaut, but has played an important role in trying to promote more involvement in space exploration in Central and South America, and in Costa Rica he is one of the best known people in the country.

Thomas: Yes, you don't have a formal role, but there is an informal role and that is undeniable. The reception that my flights have gotten in Australia has certainly been consistent with that, and it has been extremely complimentary to have people there be so excited by what I've done. But I do have to reaffirm that Australia is not actually formally involved.

Q: To accomplish the kinds of goals you are recommending for Australia, there would have to be a government policy to do so. Would that be part of a larger orientation of the government towards research and development programs?

Thomas: That is the big issue. The big push I've tried to make is to get the government to think about these kinds of activities, that are really part of a bigger research, development, and technology plan that I think governments do need to follow through with. You have to make an investment in the future, in research and development. You have to make an investment for your grandchildren.

You can't run an economy just looking at what is going to be the return in the next election cycle, because some things take longer to develop than that.

If the United States had worked on just trying to get a return before the next election, we would not have all the computers and the Internet, and all the capabilities we have, because they have taken many, many years to develop. They take a stable policy of research and development that is bipartisan in support and is agreed upon by everyone as being in the country's national interest.

Politicians tend not to be focused on something that's beyond their own election horizon. That is something that political leaders need to get away from.

Q: One very important long-term benefit from investment in research and development, and space

exploration, in particular, is in advancing the quality of education in society.

Thomas: That's true, and if you look at what NASA has done over many years, there's been a huge contribution that NASA spending has made within the university system of this country. It's just huge.

An unbelievable amount of the work that goes on in flying the Shuttle, in developing the payloads and the systems, believe it or not, a large part is done by graduate students earning their degrees. Those graduate students may not stay in the space program, but they get a specialised skill which they take out into the community and that enriches the community in other areas.

That was one of the pushes I made with the Australian government, that if you do these things, you put value-added into the community which, I think, is impossible to quantify, but is profound. You change the nature of your society in a very positive way for the next 20 years. It's an unbelievable effect these things have. That's the intangible part.

It's a very hard sell to political leaders because they have to justify the return to their constituency, and it's hard when people are unemployed, and so on, to get them to think that they need to worry about the legacy they are going to leave for their grandchildren.

That's been the fundamental issue within Australian social structures; that it's been very hard to get people to think because there are more near-term issues that have to be addressed, but I think that's changing.

When I briefed the Federal Cabinet about the space station, they were of the opinion they could only be involved in it if they committed hundreds of millions of dollars. That's true, if you want be a full-up active partner.

However, you don't have to do that. You can be a participant in the science programs, for example, by just spending some millions of dollars in research and development programs that would, for example, be done collaboratively with investigators here. By doing that, you access all the other research and development that's going, so you lever your small investment. You get a lot more for it than you might otherwise.

Q: When you discuss Australian participation in the International Space Station, does anyone bring up the fact that Brazil is making a significant contribution to the space station program?

Thomas: I bring that up all the time. I use Brazil as an example. I point out, as I've done with the Prime Minister's Chief Scientist, that Brazil is spending this money on the space station and has got an astronaut here [at NASA's Johnson Space Centre in Houston].

They are trying to show the world that they have these capabilities, and that they are a player on the world stage. They want countries to come to them to launch vehicles because they have a geography that's ideally suited for launching vehicles. By being a player in this activity they are bringing that business, potentially, into their country.

I make the point that Australia is exactly the same. It has the same kind of geography for launch vehicles, and it would be very much in Australia's interest to follow the Brazilian paradigm and start getting involved.

I think there's a large school of thought there that this is a valid message.

This year [2001] is an election year. I think neither of the political parties were willing to step up to this kind of high-risk vision, during an election campaign.



Above Left: The first Australian-built satellite, Wresat, was launched from Woomera in 1967. (Photo: Australian Space Research Institute)

Above Right: The AUSROC-1 project was started in 1988 by undergraduate students in Mechanical Engineering at Monash University. Here they are readying the rocket on a rail. AUSROC-1 was successfully launched on Feb. 9, 1989, and reached 3 kilometres in a one-minute flight. (Photo: Australia Space Research Institute.)

Right: The HyShot payload is set to undergo shake testing, in this photograph, to make sure it can withstand the rigors of launch. Left to right are Dr. Susan Anderson, Joe Gisa, Dr. Hans Alesi, and Dr. Allan Paull. (Photo: University of Queensland)



However, I'm hoping that after the election campaign we will see steps in this direction.

A thrust for both political parties for this election has been on improving education and research and development. I think it is generally being recognised that Australia has languished in those areas in the last 20-odd years, that the quality of education in universities has fallen, and there is no doubt that it has, unfortunately.

Class size is bigger, teaching loads have become larger, pupil-teacher ratios have gone up, with fewer and fewer teachers in universities. It is generally recognised that Australia is paying a price for this, by virtue of the fact that right now the Australian dollar is about 51 U.S. cents.

It was nearly on a par with the U.S. dollar 20 years ago, but that's changed now. To a very large extent Australia's economy, which is a service economy, it serves the economies of the rest of the world, doesn't do a lot of value added in its own right. When you don't have research, and you don't have education, that's the inevitable outcome. You have a 50-cent-on-the-dollar economy.

If you want to change that, you're not going to do that overnight with some political policy. It's going to take a huge shift in the values of the society, and the promotion of innovation. The way you do that is through education and research and development.

Q: There are certainly many avenues Australia can take to participate in the space station. What pathway would you recommend?

Thomas: I think Australia could get to the point where it flies an experiment on the space station. I don't think it would be right to just, overnight, spend hundreds of millions of dollars. The plans I've proposed to the chief defence scientist were to move cautiously on this.

Start with a modest investment in research and development and some collaborative science. Slow-

ly build up that capability. Start developing, perhaps, flight hardware as a collaborative venture with the major [space] agencies, to develop your credibility and capability, and then slowly build up to the point where you can build flight hardware that specifically serves Australia's needs and can be funded at a level that is appropriate for Australia. That's the way you do it.

Brazil's doing that. I think Australia should, too. Look at Canada. That's an example of a British Commonwealth country. It's larger than Australia, in population, but it is a big, wide open space. Canada, of course, has the great advantage of being next door to the main customer, and Australia's not.

But I don't think in this 21st Century that we can argue that distance is an issue any more, because it's not. I think collaborative ventures are now very viable. I would certainly like to see it happen.

Q: There is a tremendous economic reorientation now throughout Asia as a whole, with a series of very large infrastructure projects underway, including the building of new rail connections to form a Eurasian landbridge, creating development corridors throughout Asia. Over the last year, many Asian countries have realised that their dependence upon the United States to import their goods is on shaky ground.

These countries are looking at what large-scale infrastructure projects must be implemented, and Australia is sitting nearby with industrial and other capabilities.

Thomas: I agree with that. I think that's the big cultural shift that Australia is facing, and has been facing over the last 20 years or so, which is to come to recognise that Australia is in fact part of the Pacific nations. Australia traditionally was part of the British Commonwealth, but really Australia's role in the world today doesn't lie with Europe or even, for that matter, with the United States.

It's going to lie primarily with

Southeast Asia, and especially Indonesia, and that's the big cultural paradigm that is changing in Australia. I think that's all the more reason why Australia should be involved in these space activities, because those nations are going to be looking for representation in human space flight and in launch capability, and Australia can do that.

Q: What do you see for Australia's role in space, further in the future?

Thomas: There is going to be a great human adventure of the 21st century, and that is going to be a trip to Mars. I think one hundred years from now, historians will look back and say that the big exploration of the 21st Century was a human exploration of Mars. I would love to see some part of that mission have an Australian contribution.

It's probably not realistic to have an Australian crew person fly on that mission, unless there was a huge investment, which probably is not viable. But Australia could certainly develop some of the hardware for that mission and when that mission goes, just imagine how excited the people of Australia would be to say, "That mission is happening because we've got this device that we built. We actually contributed to that mission."

Marsha Freeman is currently Associate Editor of *21st Century Science & Technology magazine*. She has been a science writer for twenty years, specialising in space exploration, advanced energy technology, and science policy. She has testified before the U.S. Congress on issues in science and technology, has been an invited lecturer at NASA and international conferences, and is cited in *Who's Who in American Women*.

Freeman is the author of *How We Got to the Moon: The Story of the German Space Pioneers*, published by 21st Century in 1993; and *Challenges of Human Space Exploration*, published by Praxis-Springer in 2000.