The Future Party response to the Vision for a Science Nation - Responding to Science, Technology, Engineering and Mathematics: Australia's Future

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We at the Future Party are surprised that the government is even considering a review into science, considering its position on the funding of science and the decision to abolish the position of Science Minister.

We've made a few submissions to government inquiries so far, and are yet to hear of a single instance where a submission's content was taken seriously and implemented. We are worried that this process is being used as a way to allow partisan groups to make suggestions, and to placate the population into thinking that they are being listened to. That said, we will have a go at convincing the government one more time, as this is an inquiry about science, and we are the premier party for science.

We have inspected "Vision for a Science Nation - Responding to Science, Technology, Engineering and Mathematics: Australia's Future" (referred to as 'The Response' henceforth), and found some strange omissions that have occurred in it. We have addressed some of those omissions below, and given suggestions for action.

The Future Party's suggestions are straightforward. We have listed them in a manner that we believe the cabinet can digest easily, and in an order in which they are likely to be implemented.

Mistakes the government made that it can undo to help science:

- Appoint a Science Minister (see Where's our Science Minister?)
- Return funding to the ABS (see More research funding)
- Return funding to the CSIRO (see More research funding)

Awesome Future Party policies we're pretty sure the current government won't implement:

- Teach programming in schools (see Programming in schools)
- Increase the amount spent on research to about 5% of GDP (see More research funding)
- Set up an Australian Space Agency (see Space)
- Renovate the Woomera facility into a modern spacecraft launch site (see Space)
- Create a new university city between Sydney and Canberra (see A new university city for Australia)
- Act on climate change (see Climate Change)

Where's our Science Minister?

The Response does not make mention of the fact that we don't have a dedicated Science Minister. One of the biggest mistakes in the prioritisation of STEM was the abolition of the position of Science Minister. The government took all of ten days to break an 82 year history of having a Science Minister.

Instead, science was rolled under the auspices of the Industry Minister, in what seems to be a rationalisation that the only good science is science that makes money. The Future Party believes very strongly that scientific research and technological development are the main reasons we live in a society with such a high quality of life.

That said, science that makes money is not the only type of science. Basic science cannot be patented. For example, the GPS in each of our smartphones relies on extremely precise modelling of satellite motion, which wouldn't be possible without an understanding of general relativity. When the theory was first put forward a century ago, its significance to our GPS systems could almost certainly not have been predicted; basic science, by its very nature, is science that may have unimaginable ramifications in future than industrial science. This example is also a perfect example of the M in STEM; general relativity, and therefore the GPS that relies on it, would not be possible without, Riemannian geometry, a branch of mathematics born in the 19th century that is still actively researched today. No sane person could have predicted the relevance of this mathematics to the smartphones in our pockets, but an intelligent person would have realised its potential.

Recently, in a joint press release with Tony Abbott and Christopher Pyne, Ian Macfarlane announced Australia's research priorities. Included on this list is cybersecurity; an entire field that would not be possible without a great deal of mathematics research that had absolutely no application prior to the invention of digital computers. There are also many other fields of

science between industrial, patentable research, and the basic research discussed; including, but not limited to, environmental and epidemiological studies.

An effective industry minister would understand the importance of labour specialisation, and would demand their Prime Minister appoint someone specifically to handle issues related to science. Unfortunately, the Minister for Industry (renamed to Industry and Science at the end of 2014) Ian Macfarlane lacks working knowledge not only about economics, but also about polite communication, calling scientists 'precious petals' that take up too much of his time. We are not surprised the minister for Industry and Science feels overworked by having to perform the work of two major portfolios. We do, however, find it surprising that he decided to take it out on the scientists instead of the Prime Minister who burdened him with two very important portfolios.

We think that Ian Macfarlane deserves a bit of respite, and the government should have a dedicated Science Minister to ensure that STEM is sufficiently advocated for and prioritised.

More research funding

In section 3 "Research", the government's plan for a $20 billion Medical Research Future Fund is mentioned, yet none of the substantial cuts to existing scientific bodies are mentioned. In the section "What more can be done?" no mention is made of additional funding. We're pretty sure more funding would help.

We also believe that an aim for 5% of GDP in research is ambitious but not unattainable target for research in Australia.

Programming in schools

We're pleased to see coding in schools mentioned in the The Response. However, there are a few nomenclature issues.

We think that "programming" is a better term for what we should be teaching children, not coding. Coding implies we are teaching specific skills to do with specific platforms. This is a little bit of a worry, because the world of computers moves very quickly and by the time many of the students leave school, the languages and systems they are taught may become obsolete (e.g. HyperText is not used any more). What we want to see taught is generalised skills about how to write programs. Students should understand the general structures in programming (assignments, test statements, loops, order of execution etc) so that they can take these skills elsewhere.

Likewise, the term "ICT-skilled workers" implies skills using certain types of systems e.g. using current generation network infrastructure. We need ICT workers, but we also need computer scientists, who understand the theoretical underpinnings of the systems that have been created. Generally the term 'computer scientist' refers to the development of the systems ICT to implementing those systems. Both are important, but we believe that this distinction should be in the consciousness of the Chief Scientist, the Ministers and other people involved in STEM planning.

We suggest a more formal mention of programming in schools in line with our Education policy which can be found here: http://www.futureparty.org.au/2_education

Specifically, we think programming should be taught in all high schools. Learning programming has significant benefits for the individual student. Programming can help students learn logic and complex reasoning skills which can be then used in areas unrelated to programing.

Space

The Response makes no mention of space. We think this is a shortfall in the The Response. In the following paragraphs we have copied our piece from our website arguing for a space agency.

The Future Party is the only party in Australian politics with a Space Policy and vision of the future where we take advantage of the potential rewards of investing in scientific research. The Future Party Space Policy has been developed to take the best ideas from the Australian Academy of Science (AAS) National Committee for Space Science (NCSS), who have studied it, and who know how best Australia can be a part of it.

The three core ideas of our Space Policy are:

1. Create an Australian Space Agency, ASTRA
2. The Woomera launch facility
3. Adopt expert recommendations from the National Committee for Space Science.

1. ASTRA: Australia's Space Agency

ASTRA (Australian Space Technology & Research Agency) will serve many purposes including:

Australia from Space

Photo Credit: NASA [CC BY 2.0], via Wikimedia

- Developing a strong, internationally recognised, Australian space capability.
- Create partnerships of Australian and international government and private stakeholders such as NASA, CSA, ESA,JAXA and SpaceX for example.
- Provide strong economic, educational, government, and strategic benefits to Australia.
- Provide structure for further research into space and space-based technologies.

Space provides exciting opportunities for humanity to advance itself. Technological development occurring in space research and related fields has already provided us with new technology in the fields of communication, transportation, energy, physics and biology as well as some amazing spin-offs from space-based technologies. Some of these technologies are used regularly by people all over the world.

The Future Party believes that Australia has the potential to be a hub of space investment and technological development. To do so, however, would require Australia to make serious plans to invest in space research domestically and to attract investment from abroad. Establishing ASTRA will allow us to collaborate with the other major space agencies (and not major ones) around the world and start becoming a part if the conversation and benefit from those membership.

2. Woomera Launch Facility

Australia's launch facility at Woomera in South Australia will once again become world leading, open to governments and commercial groups wanting to use the facility.

Launch Area 6. Woomera, South Australia

Photo Credit: Max Ryan

The conditions are perfect for this redevelopment (images of the phoenix rising out of the ashes are invoked here!) due to recent technological developments in the space industry such as reusable launch vehicles that would benefit greatly from a vast area to land.

The Woomera Launch facility is a largely flat, featureless, quiet electromagnetic and vast terrain of 124 000 km2 the largest landlocked range in the world, approximately the size of England, which allows easier access for test object recovery (an important safety feature for launch activities). Rainfall is rare, and the climate is generally warm and dry. The stable conditions virtually assure the ability to conduct year-round operations, with little downtime.

Although Woomera isn't as close to the equator as some launch sites, (the issue being the further from the equator you are the more speed, or delta-v, you need to get to the right orbit) this is out weighed by the fact that a launch can almost be guaranteed and launch insurance considerations, time and costs will dramatically decrease.
The town of Woomera, meaning spear thrower, is perfect for redevelopment into a support community for the launch facility with heavy influence from Industry, instrumentation, education & research, technologies and services. You have heard of charter cities, well Woomera would be a perfect candidate for that!

3. Adopt recommendations of Decadal Plan for Space Science

The Decadal Plan's vision is 'Build Australia a long term, productive presence in Space via world-leading innovative space science and technology, strong education and outreach, and international collaborations'. The plan has 14 recommendations with five key imperatives in mind:

The Parkes Radio Telescope
Photo Credit: Tom Gordon

- Enable Australia to develop a strong space industry, and offset the risks of depending primarily on foreign space capabilities.
- Position Australians to solve major scientific and technological problems.
- Actively nurture, coordinate, and manage Australia's investment in space science.
- Leverage increased public investment in space science.
- Provide government, community and business with the information needed to guide investment in space science and technology.

The plan document outlines the importance and current status of space science in Australia, and the specific scientific goals of the Australian space science community the next decade and build on our strengths.
With a very large group of experts in their field of astronomy and space science, and a sizeable group of experts from industry and business. The Future Party wants Australia to be a place that is known for not only its innovation with existing space based technologies but also an innovator in the field and a provider of world class facilities and programs.
The decadal plan seeks to establish government, commercial, industry and public collaborations to better develop and strengthen our niche technologies in order to be a contributor to the international space industry.

Conclusions (Space)

Australia is currently a user of space and space based technologies. We have good relationships with countries that have big and exciting space plans and projects and we let them spend their money on those things. However, we believe our chance and indeed our duty to become a formal member of that group has arrived. We too must spend our money, and of course reap the benefits of that investment into the future!
Technologies are moving so fast, and although we contribute to the efforts and have some world class researchers and industries here, there is a chance to gain some national benefits from actively contributing and supporting the international space industry with our resources, expertise, facilities and ingenuity.
With such an impressive number and quality of experts in their fields and in the space industry, it is imperative that we listen to them and trust their evidence backed advice and recommendations. This, together with some future thinking and planning, Australia's place in the space industry will be worthwhile and beneficial.

A new university city for Australia

The Future Party has a policy that advocates the creation of a new Australian city based around a university located between Sydney and Canberra. University towns are extremely common around the world, and provide an affordable way to house students and plentiful land to develop university infrastructure. The policy is extensive and covers considerations ranging from the type of research that can be conducted at the connected institution, transportation, laws around development, and immigration. The policy can be found here: http://www.futureparty.org.au/5_australian_charter_city

Climate Change

The Future Party believes that climate change represents one of the most important environmental challenges of our time. We believe that there will be substantial costs associated with reducing greenhouse gas emissions and accommodating for the changes that we are unable to prevent. That said, we believe that action on climate change should be seen as an opportunity to innovate. We believe that acting on climate change increases the capacity of Australian researchers to innovate in this field. We worry that an uncertain future of subsidies, carbon pricing schemes and the potential banning of climate change mitigating technologies such as wind turbines is impacting on the scientific community. In particular, it is increasingly difficult to justify research into technologies that may not be implemented under the current climate change policies in Australia.