

Craig Neal MSc Research Student -Undertaking research into the feasibility of cargo airships for freight operations within Australia.

The Australian freight industry is at a cross roads, with freight modes becoming more and more specialised with rail and sea carrying the majority of bulk freight and road carrying the majority of non bulk freight, this leaves operators with little modal choice. Does the industry and government want competition between modes, and will we continue to rely solely on road transportation for the majority of productivity gains in the non bulk market. This inquiry presents an opportunity for the federal government to provide direction and leadership in freight and supply chain strategy, and bring together all levels of government and industry. There is opportunity to examine the current freight task for its needs and opportunities to increase efficiency and in hand productivity while also devising and planning for the future freight task through an assessment of key factors such as mode efficiency, current modal technology and new and emerging freight modes and technology.

In my research I have been examining an alternative mode of freight transportation (Cargo Airship), seeking to determine its feasibility for freight operations within Australia, via freight mode choice modelling. I have also have spent considerable time investigating and discussing the issues around non bulk freight modal share, and why road transportation is the vastly dominant mode. I was initially interested in cargo airships for freight operations in Australia due to their unique capabilities (ability to land and take off from a variety of surfaces e.g. sand, water etc) and ability to undertake freight operations without the requirement for significant additional investment in infrastructure. And because Australia is also uniquely suited for cargo airship operations with its vast land mass, low altitude terrain and the costly burden of infrastructure investment and maintenance due to a low population base. Having undertaken this research I provide some comments as to what I believe are some of the challenges and some potential solutions to Australia's future freight task.

When you examine Australia's current and future freight task there are two stand out issues:

1. There has been and will likely continue to be a significant freight infrastructure investment shortage, especially for the modes of rail and sea. Over the last 20-30 years rail has been heavily underinvested in by governments. Thus in the future we need to invest more wisely, to maximise the return and continuing efficiency of freight infrastructure, and to stimulate private investment as much as possible.
2. The supply chain network can no longer continue to rely so heavily on road freight for the transportation of and future productivity gains in the non bulk market with its 78% market share (based on BITRE 2015 yearbook). Strategies need to be developed to enable a more even multi modal approach to the future freight task and future infrastructure investment. The strategy needs to consider what freight is being carried, what are its requirements and where is it being transported to. We need to move towards a model which provides incentive to align each mode's comparative advantages for carrying different commodities over varying distances. For example we need to shift significantly more long distance freight from road transportation to rail and sea, and utilise road transportation for increased productivity on medium to short distance routes.

From my research examining the Australian Freight network through a freight mode choice approach I have the following suggestions/recommendations;

1. Significant more support, investment and incentive for research into Australian freight transportation to occur, especially in a non urban environment, and that universities are engaged with more and given the opportunity to undertake a greater share of studies for the government. I would encourage more research into freight mode choice and mode shifting potential in Australia as there have been very few studies undertaken using this methodology in Australia.
2. Support the proposal by the ALC for the establishment of a dedicated Freight Planning and Strategy Division within the Department of Infrastructure and Regional Development, and further propose that this department should also oversee federal government freight research and seek to partner and coordinate with universities to take advantage of the research expertise that these facilities can offer.
3. That the inquiry examines the freight task in a disaggregated manner by individual freight type/commodity group by mode. For example when you remove bulk freight the modal share of the freight task is very different and you can see the massive dominance of road freight with a 78% market share.
4. That Government and industry undertake more to encourage modal shift from road to rail/sea. This will require significant investment to improve rail/sea infrastructure to increase their service (all characteristics excluding price) offering. From my research *service* is the key differentiator between the modes, and rail and sea have been lagging for quite some time. If nothing changes as history has shown the market share of road transportation in the non bulk freight market will continue to increase which will consequently place more burden on the road network and associated road infrastructure. [Thus will governments have the funding to maintain road infrastructure at current levels with an increasing volume of higher mass vehicles, and to maintain and fund new road infrastructure. The major productivity strategy for most state governments is to increase access to more road infrastructure for higher mass vehicles, but at what cost? And will road transportation be able to maintain its service levels in the future with potentially degraded and congested road infrastructure.](#)
5. That Rail technology is investigated as to how it can aid in the maximisation of Australia's current freight infrastructure. E.g. signalling and control systems, new locomotives, automated systems etc. We should be aiming for an a much faster more automated system in the near future 3-5 years (*not in 10-15 years time*). We are also far too slow in investing in rail, as evidenced by the timeframes of the proposed inland Melbourne to Brisbane rail project with a targeted completion date of around 2024-25. [Why should it take such an extensive period of time to build a vital piece of freight infrastructure such as this?](#)
6. Examine how we can increase the efficiency of all existing freight transportation infrastructure and systems. [Are we getting the most out of freight infrastructure?](#)

7. Examine new technologies which can have a positive influence on the freight system, and reduce the infrastructure burden, including new modes of freight transportation such as Cargo Airships and Drones. Are we thinking about new technologies enough, and their potential impact on the future freight task? For example *cargo airships have the potential to revolutionise freight transportation in remote areas, and remove a vast quantity of freight from the road network such as Oversize Overmass (OSOM) freight as discussed in the article (<https://logisticsmagazine.com.au/the-potential-for-cargo-airships-in-the-osom-market/>)*
8. Investigate, plan, protect and implement freight corridors linking Australia's current and future freight infrastructure and hubs. E.g. we should be developing plans for modal transition for the disbursement of sea freight domestically given the land use pressure surrounding most major ports. In the very near future we need to transition away from manned road/rail transportation disbursement from sea ports to fast automated transport systems (e.g. automated trains or other future systems which link via fast, frequent, and automated services, sea ports to intermodal hubs). *The future supply chain in Australia will be supported by a network of highly automated, frequently connected, intermodal freight hubs, which disburse freight via a multitude of modes.*
9. That government and industry *seek to stimulate a shift* in mindset of participants in the freight industry from being laggards in innovation adoption to moving towards being early adopters. Through early adoption of innovation there is greater opportunity to increase efficiency more quickly, as opposed to the current laggard adoption in the industry.
10. That an automation strategy for freight transportation modes is formed in hand with state governments so that an Australian wide strategy and policies are developed.

Given Australia's unique terrain, vast land mass and geographically dispersed and comparatively low population, we need a unique freight and supply chain strategy, not something seeking to emulate the USA or Europe. Given Australia's comparatively expensive cost base for freight transportation we need to seek greater efficiency through technological innovation such as automation and new modes of freight transportation. We can no longer continue to just make small incremental gains in efficiency, we need to seek revolutionary step changes in productivity in order to meet the demands of our future freight task.