AUSTRALIAN PANDEMIC & EMERGENCY TRANSPORT INFRASTRUCTURE: POTENTIAL NEAR-FUTURE REQUIREMENTS

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EXECUTIVE SUMMARY

This paper examines transport infrastructure requirements to support pandemic (and other emergency) responses from the perspective of Australian residents. The goal is not only to preserve productivity during times of likely pandemics, but also our way of life as much as possible. The following questions are therefore firstly addressed:

- Might a greater pandemic response be required in the near future?
- What will be the transport needs of likely future pandemic / emergency responses?
- What new transport infrastructure is needed to enable rapid and sustained pandemic and emergency responses?

The answers are profound: The evidence now shows COVID-19 is <u>not</u> a '100 year event' but man-made, could flare up again, or others like it, with greater virulence. Regardless of the source, we know that leaky lockdowns, masking and jab mandates were unable to contain the pathogen. This means future responses dealing with pathogens of enhanced virulence, will likely rely on strict quarantines to seal both uninfected and infected communities, and the rapid distribution of anti-viral/bacterial preparations. Continuing sustainment of standing sealable whole-local-communities, perhaps for many months in wide-scale quarantine, is what pandemic transport infrastructures will be required to provide, perhaps in the near future.

While Australia's transport infrastructure has coped admirably with the COVID-19 pandemic to date, it must considered unsafe and inadequate if an equally-contagious yet significantly more-virulent pathogen suddenly appeared – as it almost inevitably will. The following recommendations result:

1. Investments should be made in touchless transport capable of shipping 100 million kilometer-tons of air freight per day using a fleet of 3,000 autonomous vehicles. Being competitive with road freight, this could be mainly funded through ordinary capital markets.

2. Such a touchless freight network should link to irradiation hubs to destroy any biological pathogens while goods transit between standing sealable communities (akin to local government areas). Likewise all imported goods.

3. The age of 20th century jet-set tourism must give way to pandemic preparedness, with quarantine becoming a standard procedure for human or animal immigration before accessing Australia's standing sealable communities. This will require air-tight yet humane and workable quarantine infrastructure to be built at every

international non-freight terminal, and the decentralisation of domestic passenger terminals.

Without such pandemic transport infrastructure, Australia will sorely lack resiliency through and rapid recovery from the predictable adverse events to come. This would render other projections of Australia's transport requirements practically meaningless. For the inescapable lesson of the pandemic is this: Our future will not always be business as usual, and well-prepared nations will fare far better than unprepared ones.

COVID NOT A 100-YEAR EVENT

The proliferation of defence bio-labs[1] and inexpensive, widely available CRISPR gene editing tools[2], strongly suggests un-attributable pandemics will no longer be 100-year freak events. Indeed, the COVID-19 pandemic, now understood as probably man-made[3], may not yet have run its full or most severe course[4]. **In any case, Boston University has created a new variant in their lab based on Omicron, which "robustly escapes vaccine-induced humoral immunity" to kill 80% of humanised mice, according to their pre-print publication which they conveniently published on the internet[5].**

Greater pandemic responses may therefore be required anytime, for perhaps multiple crises even within the next year. An example was the World Trade Centre destruction in New York in 2001 coinciding with anthrax biological attacks on U.S. Senators[6]. A more-modern scenario might be an un-attributable pathogen release[7] combined with an electromagnetic pulses knocking out key data centres[8]. In the aftermath, inadequately prepared nations can expect to be exploited by those who were ready.

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1 Cate Cadell, Washington Post (17 Aug 2023) *"Pentagon biodefense review points to Chinese, Russian threats"* available at https://www.washingtonpost.com/national-security/2023/08/17/bioweapon-defense-pentagon-threats-china/

2 UN News (17 Aug 2018): *"Terrorists potentially target millions in makeshift biological weapons 'laboratories', UN forum hears"* Available at https://news.un.org/en/story/2018/08/1017352

3 Max Matza & Nicholas Yong, BBC (1 March 2023) *"FBI chief Christopher Wray says China lab leak most likely"* available from https://www.bbc.com/news/world-us-canada-64806903. See also Imogen Braddick at news.com.au (6 Dec 2022): *"Scientist who worked at Wuhan lab says Covid was man-made virus"* available at https://www.news.com.au/world/coronavirus/health/scientist-who-worked-at-wuhan-lab-says-covid-was-manmade-virus/news-story/af6f203ffdf3ac62fa6dd802f631b974

4 Covid variant *"BA.2.86 may be more capable of causing infection in people who have previously had COVID-19 or who have received COVID-19 vaccines"* according to U.S. Centers for Disease Control (23 August 2023) *"At this point, there is no evidence that this variant is causing more severe illness."* Risk Assessment Summary for SARS CoV-2 Sublineage BA.2.86 is available at https://www.cdc.gov/respiratory-viruses/whats-new/covid-19-variant.html.

5 Da-Yuan Chen et al (Updated 10 Jan 2023) *"Role of spike in the pathogenic and antigenic behavior of SARS-CoV-2 BA.1 Omicron"* available at xxx

6 Tucker, Jesse, Homeland Security Journal (2008) *"Proliferation of Biodefense Laboratories and the Need for National Biosecurity."* Homeland Security Affairs, Supplement: CHDS Essay Contest (First Annual – 2008). https://www.hsaj.org/articles/159

7 As COVID-19 was described by the late Australian senator and general Jim Molan, in his book *"Danger On Our Doorstep, Could Australia Go To War With China?"*, Harper Collins Publishers August 2022.

8 U.S. Department of Homeland Security: "DHS Combats Potential Electromagnetic Pulse (EMP) Attack", available at https://www.dhs.gov/news/2020/09/03/dhs-combats-potential-electromagnetic-pulse-emp-attack

This is because dispassionate examination of recent events will conclude our most effective pandemic responses are still quarantine and anti-viral / anti-bacterial preparations. Mass vaccination is only proven effective if having a sterilizing effect on the pathogen. Mere suppression has provided mass-opportunity for mutations to escape the antidote, with such escapees becoming the most successful and therefore dominant variants which may become (but so far have not been) more virulent[9]. So-called "lock downs" which nevertheless allowed limited travel over relatively-wide areas likewise proved too leaky to contain the virus. The mass-use of face-masks also failed to stop transmission, and even more contagious pathogens are certainly possible. For COVID-19 is (for the moment) extremely mild compared with Ebola virus having a 50% death rate[10] , or pathogens kept in the world's poorly secured defence bio-labs today[11].

Having dodged a bullet, we must not waste this present opportunity to greatly improve our emergency fright transport capabilities before the next crisis emerges. Quarantine in the form of border closures (excepting movement of only non-contagious persons) did indeed stop COVID-19 despite the pathogen being reasonably contagious. For example, Western Australia did not record a single case of COVID-19 'community transmission' for more than six months as the virus raged around the world[12]. Further, until the TGA intervened in favour of mass-vaccination, early anti-viral treatments were effectively treating COVID-19 disease in Victoria[13]. Anti-virals have since become a standard COVID-19 response[14], and the Victorian government has restarted research into prophylactic nasal sprays that unfortunately stalled in 2020[15].

The good news is such quarantine and anti-viral/bacterial responses apply to a wide range of pathogens. Therefore any standing pandemic response based on these will raise the bar on otherwise existential threats to Australian society. Such responses may also buy time to allow the development of more specific preventative procedures, prophylactics and treatments – such as our own vaccines for example instead of us being hostage to overseas suppliers. However, without a touchless transport system between standing

9 The U.S. Food and Drug administration recently reported a variant adapted to infect those who have had COVID-19 and who have been vaccinated: FDA

10 World Health Organisation *"Ebola virus disease"* (20 April 2023) available at https://www.who.int/news-room/fact-sheets/detail/ebola-virus-disease

11 Kimberly Drake, Healthnews (20 March 2023) *"Report Reveals Concerns Over Increasing Number of High-Security Biolabs"* available at https://healthnews.com/news/report-reveals-concerns-over-increasing-number-of-high-security-biolabs/

12 After banning regional travel on 31 March 2020 and closing its State borders on 6 April, community transmission of COVID-19 was eliminated in Western Australia by 11 April 2020: Heather McNeill, WA Today,"*A timeline of WA's COVID-19 response: Was our success luck, good management, or a bit of both?"* available at https://www.watoday.com.au/national/western-australia/a-timeline-of-wa-s-covid-19-response-was-our-success-luck-good-management-or-a-bit-of-both-20200827-p55q03.html

13 Anthony Piovesan, news.com.au (11 Sep 2020) *"Drug combo 'can cure' coronavirus symptoms, gastroenterologist says"* available at https://www.news.com.au/lifestyle/health/health-problems/drug-combo-can-cure-coronavirus-symptoms-gastroenterologist-says/news-story/2a17194b73e2e095877575eb64da174d

14 Victorian Health Department (26 June 2023) *"Medications for patients with COVID-19"* available at https://www.health.vic.gov.au/covid-19/vaccines-and-medications-in-patients-with-covid-19#early-therapies:

15 Aisha Dow, The Age newspaper (17 July 2023) *"Don has never had COVID. Now volunteers can put his unique theory to the test"*, available at https://www.theage.com.au/national/don-has-never-had-covid-now-volunteers-can-put-his-unique-theory-to-the-test-20230716-p5dokb.html

sealable communities, a more virulent pathogen will be able to cause catastrophic havoc through unwitting transmission via human transporters.

Large infrastructure investments are therefore required to create more effective, more humane, longer-tern and more pro-active quarantine services, as part of a broader community re-orintation towards pandemic preparedness. In this age of potential pandemics, quarantine services must no longer be viewed as mere border protection but one of the organising principles of society. These must be conducted consistently with fundamental freedoms and human rights to the greatest possible extent, to preserve our way of life on a sustained basis through prolonged crises. Our present transport infrastructure cannot be expected to operate at all under such easily foreseeable conditions of a more contagious and more virulent pathogen. Inter-community freight will require pandemic-resistant infrastructure capable of stopping the spread of pathogens while in operation.

TRANSPORT NEEDS OF LIKELY PANDEMIC / EMERGENCY RESPONSES

Whereas presently State and Territory borders harshly divide the country into pandemic jurisdictions for want of proper federal quarantine legislation, a standing pandemic response is now required that takes geographies, industries and most importantly, demographics into account. These should determine the boundaries of standing sealable communities, with new infrastructure supporting independent or touchless trade and commerce in times of emergency. For example, border-communities like Albury-Wodonga or Echuca-Moama should be treated as a whole, not split along State-jurisdictional or geographical lines. In this way, public infrastructure can continue to be shared in those regions, and be efficiently extended with standing pandemic responce infrastructure on standby for more frequent or extended pandemics.

In theory, every standing sealable community should have its own stockpile of anti-viral drugs, ready to assist at a moment's notice. Every State should have its own manufacturing capacity of the same. Likewise, every standing sealable community should ideally have its own life-support such as food production or long-term storage, and renewable energy for continued operation during extended emergencies. For example, Melbourne's planners have already envisaged seven 'National Employment Clusters' plus the traditional CBD[16]. However for such to become standing sealable communities, each will require various investments in standing pandemic response infrastructures, to allow internal productivity and social interactions to continue as normal during more frequent or extended pandemics. While operating this way, pathogen-resistant emergency transport systems will need to convey vital supplies between standing sealable communities.

So with air travel being the principal COVID-19 entry mechanism into Australia, care-free twentieth-century 'jet-set' tourism must inevitably give way to pandemic preparedness. ***Since jabs did not and cannot be assumed to stop transmission in future[17], infrastructure must be provided for the comfortable and workable quarantining of***

16 Victorian Planning Authority (2017): *"National Employment and Innovation Clusters"* available at https://vpa.vic.gov.au/national-employment-clusters/

serious international travelers, before freedom of movement into Australia's standing sealable communities is granted. Especially so as bad actors will rarely provide credible warnings for timely airport closures in advance.

Since the continuation of jet-set tourism would likely bring all other standing pandemic responses to naught, this *must* be subject to mandatory quarantine to avoid an inevitable repeat of the 2020/21 disaster. Such will require fit-for-purpose construction of air-tight accommodation on all international airport sites, plus a domestic air passenger terminal for each standing sealable community.

MODES OF TOUCHLESS TRANSPORT

Clearly Australia's emergency transport infrastructure must become highly resilient. A mesh autonomous transport network between standing sealable communities, unbounded by rails or roads to dynamically re-configure to meet multiple contingencies as they arise, would seem most appropriate. Development of large vertical air-lift transport capacity, as envisaged by the Victorian Government's Advanced Air Mobility initiative[18], should be viewed as an essential part of such future wide-scale emergency responses. AAM chiefly involves electric motored aircraft including large drones. However Victoria is a relatively densely populated and compact State. Moreover AAMs based on vertical thrust are unlikely to be economic over long distances to sustain whole standing sealable communities. Although the State is off to a good start but more must be done.

Australia's civil defence requires a minimum capability of moving 100,000 tones of cargo between standing sealable communities per day. This would provide 4 kilograms of supplies per Australian resident every day in a nation-wide worst-case scenario. Each autonomous freight vehicle could perform up to four daily 250-kilometer hops, allowing 100 million kilometer-tons per day of emergency carrying capacity. As discussed shortly, such could be mostly privately-funded while still providing fair and equitable access. Associated infrastructure is also required for the routine irradiation of vehicles and freight, to destroy pathogens in transit. The standing sealable community concept also calls for the acceleration of (EMP-protected) local renewable energy investment, to create robust independent supplies for each.

This means to rapidly, cheaply and safely network our vast geography, Australia's best option is to facilitate a minimum national fleet of 3,000 autonomous hybrid-airships – examples described shortly – each carrying between 10 to 50 tons of cargo per hop – potentially at cheaper than road-freight prices[19]. This could well attract government-backed

17 Only a minority of vaccines ever developed are 'sterilising' to stop transmission: Belinda Smith / Olivia Willis, ABC Web site *"Do COVID-19 vaccines prevent transmission of coronavirus — and how much does that matter?"* https://www.abc.net.au/news/health/2021-02-05/covid-19-vaccines-do-they-prevent-coronavirus-transmission/13121348

18 Victorian Ministry of Economic Development (2022) *"Advanced Air Mobility in Victoria Vision Statement"* available at https://www.invest.vic.gov.au/__data/assets/pdf_file/0006/703077/AAM-Industry-Vision-Statement-2022.pdf

19 Non-autonomous air freight costs are already quite competitive: U.S. Bureau of Transportation Statistics (July 2022) *"Average Freight Revenue per Ton-Mile"* available at https://www.bts.gov/content/average-freight-revenue-

open-market capital. (Assuming new Western Australian helium gas-capture technology (NERA) bears fruit.[20])

With such a commitment, hundreds of Australian airfields should be upgraded to be robotic irradiation transfer hubs. The aim is to create a network of automated civilian freight-lift between disbursed sealable communities across the nation – using hydrogen-motors (e.g. Cummins X15H) running local fuel. Such would avoid autonomous road transport risks; be up to three times faster than autonomous shipping; more adaptable and disbursable than autonomous monorail.

In a hot war, such civilian autonomous freight-lift could be quickly reconfigured to boost RAAF capacity, for pinpoint transport to the rear, reducing military transport requirements. Mounting a defence anywhere in Australia could thus become logistically feasible at aggressor-deterrent scale – supplying up to 10 divisions in the field -- without requiring highly vulnerable major railways and highways (if any be nearby).

Lockheed Martin (which develops autonomous flight in Australia) has transferred its FAA-approved hybrid-airship (LMZ1M) for commercialisation to AT_2 Aerospace[21]. If these technologies were combined, Z1 helium airships[22] could network Australia's existing airfields, or deliver to 150-meter clearings in emergencies. Another contender is Hybrid Air Vehicles Ltd (UK) which has a collaboration with BEA Systems. Their 'Airlander 10' has a 10-ton payload with UK CAA certification and up to 100% CO_2 reduction[23]. If Australia moves quickly, we could also become a world-leading manufacturer by partnering with such companies.

CONCLUSION

The provision of standing pandemic response transport infrastructures should mitigate the risk of bio-terrorism or accidents by allowing society to operate in a safer, more decentralised fashion. It will also make our society more energy-efficient and resilient to other potential threats. The alternative is to become hostage to the untested 'emergency use' products of foreign drug companies, or the dictates of bad bio-actors.

By implementing sufficient pandemic and emergency transport and other infrastructures, the entire country need never be locked down again. Instead, there should be touchless autonomous transport between irradiation hubs, servicing standing sealable communities each able to directly trade with any other through expanded local airlift. If we wish to maintain our way of life domestically, we must also implement pandemic-resistant immigration procedures, with airtight infrastructures at all international passenger

ton-mile

20 National Energy Resources Australia (2020) *"Australia's Helium Future: Low-cost Helium Production and Recovery from Australia's Natural Gas"* available at https://www.nera.org.au/NERA-projects/Helium-Recovery

21 Peter Lobner, Lyncean Group (10 May 2023) *"Lockheed Martin Passes Its Mantle for Hybrid Airship Development and Commercialization to AT2"* available at https://lynceans.org/all-posts/lockheed-martin-passes-its-mantle-for-hybrid-airship-development-and-commercialization-to-at2-aerospace/

22 AT2 Aerospace (2023) *"No roads, no problem"* available at https://at2aero.space/

23 Hybrid Air Vehicles (2023) "Airlander 10" available at https://www.hybridairvehicles.com/our-aircraft/airlander-10/

terminals. All this will require major transport infrastructure investments, much of which may be funded through existing capital markets.

ABOUT THE AUTHOR

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