



# **A Hyperloop One transport network in Australia**

## **Submission to the Australian House of Representatives Standing Committee on Infrastructure, Transport and Cities**

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## 1. Introducing Ultraspeed Australia

### About Ultraspeed Australia

Ultraspeed Australia (<https://hyperloop-one.com/>) comprises a team of independent consultants with the necessary range and depth of capability to demonstrate the wide range of benefits Hyperloop One technology offers for ultra-high-speed ground transport.

We are aligned with, and bring together, international specialists who have many years of technology, engineering, technical, financial, economic, and environmental assessment expertise independent of any high-speed ground transport provider or infrastructure developer.

We are the official representative of Hyperloop One in Australia.

Our key contribution lies in the management, delivery and communication of a comprehensive, yet independent, analysis to support a business case for a Hyperloop network in Australia – an ultra-high-speed ground transport solution in the best interests of stakeholders, communities and taxpayers.

### Our objectives

Our objectives are to:

- Identify a project or projects in Australia that can be taken to the next stage of the development process.
- Secure local financial and other support for Project Scoping Study (initial feasibility assessment) of a Hyperloop One project in Australia – similar to others internationally.
- Prepare a robust business case to support the implementation of Hyperloop based transport system.
- Support Proof of Operations Facility inward investment in Australia by Hyperloop One.

### Our proposition

We propose consideration be given to an ultra-high-speed ground transport system linking Newcastle and Geelong, using Hyperloop One technology.

We consider that there have been significant contextual changes in Australia since previous proposals for ultra-high-speed ground transport links between cities were assessed. This suggests a clear need to research rigorously a viable ultra-high-speed transport system.

Our approach is driven by understanding and addressing social, economic and connectivity requirements of capital cities and regional centres, rather than the development of high-speed infrastructure for its own sake.



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In addition, we are concerned that work will continue to ignore new technology as a potential transport solution for Australia and continue only to consider and debate the relative merits of conventional high-speed rail.



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## 2. About Hyperloop

### Hyperloop – the next form of transport

Hyperloop is a new form of transport, originally proposed by Elon Musk in 2013, to move people or things anywhere in the world quickly, safely, efficiently, on-demand, and with minimal impact to the environment.

The system uses electric propulsion to accelerate passenger or cargo vehicles, or 'pods', through a tube in a low-pressure environment at speeds of over 1,000 km/h. This eliminates direct emissions, noise, delay, weather concerns, and driver/pilot error.

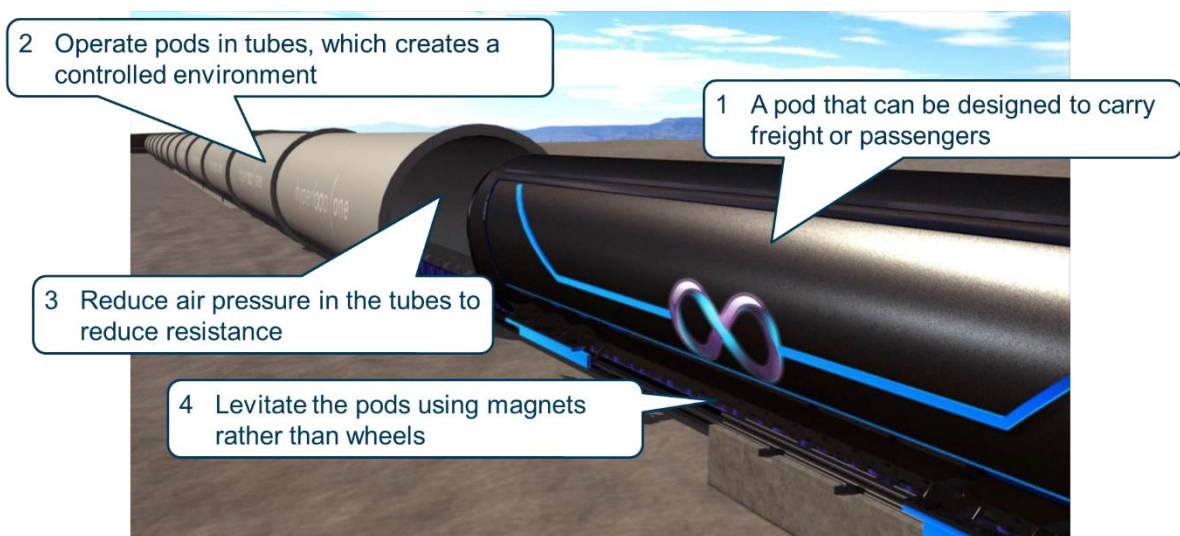
Operating under autonomous control, at intervals as short as ten seconds between pods, maximises system capacity.

With almost no friction or drag, pods levitate within tube guideways and glide at faster-than-airline speeds over intercity distances. Rapid acceleration and deceleration also enables the Hyperloop to be used on metropolitan or regional scales.

Hyperloop is designed for both passenger and freight applications – containers, pallets and airfreight can all be accommodated according to requirements on a given transport corridor. This is another fundamental advantage with a single Hyperloop One system doing what would otherwise be four separate transport systems: aviation, ultra-high-speed rail, super-metro regional rail, and heavy haul freight.

Figure 1 provides an overview of Hyperloop's main features.

**Figure 1: An overview of Hyperloop transport**



Source: Hyperloop One.



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## About Hyperloop One

Hyperloop One (<https://hyperloop-one.com/>) is the Los Angeles-based company building Hyperloop.

The company was founded in 2014 and, to date, has raised significantly more than US\$100 million. It has nearly 200 full-time staff, as well as dozens of patent applications filed on Hyperloop technology.

Having successfully built and demonstrated its proprietary propulsion system in May 2016, Hyperloop One intends to conduct a full-system test early in 2017, at its Nevada facility, DevLoop. This will be the fundamental Proof of Technology of the Hyperloop One's system. The company's goal after that is to build longer and faster systems, capable of cruising over 1,000 km/h.





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### 3. The proposed Hyperloop transport project

#### An East Coast Hyperloop corridor

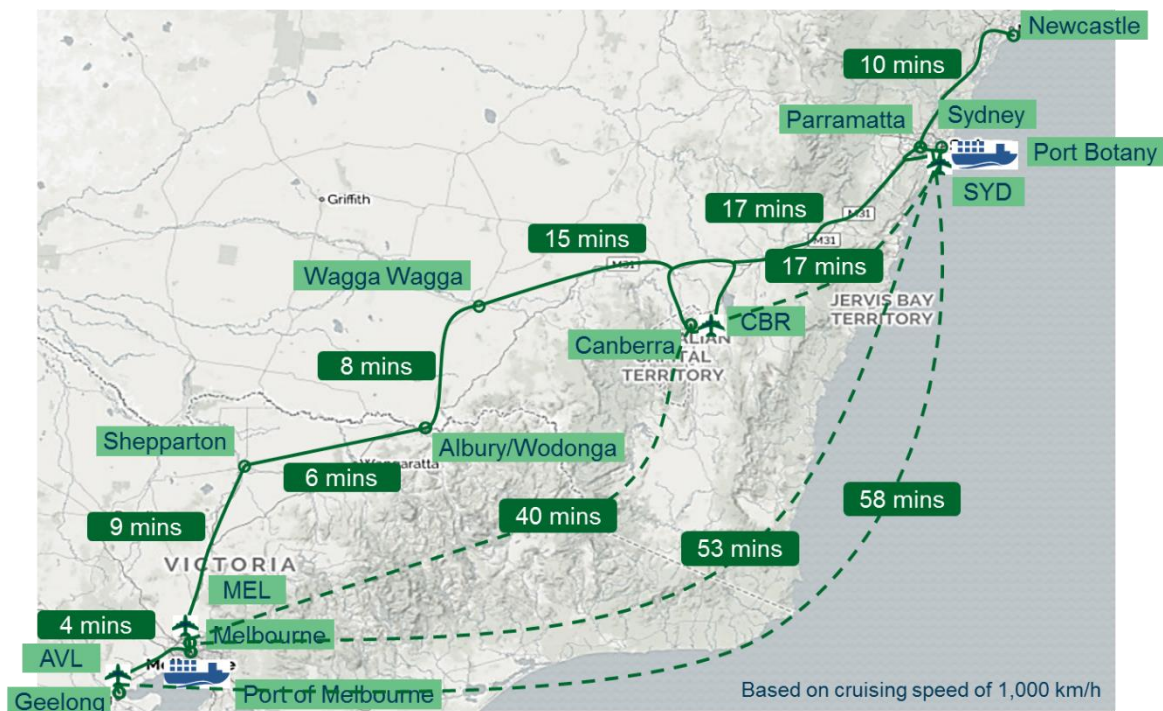
We propose the development of an ultra-high-speed (1,000 km/h) transport project for Australia, using Hyperloop One technology.

As Figure 2 shows, the project envisages a Hyperloop transport corridor on an inland transport corridor along Australia's east coast.

This potential transport corridor will link Geelong in Victoria with Newcastle in New South Wales. It will connect a state capitals and a number of regional centres in Victoria and New South Wales.

The route also encompasses links to Port of Melbourne and Port Botany as well as Avalon, Tullamarine, Canberra and Sydney airports. This is take advantage of Hyperloop's container freight carrying capabilities.

Figure 2: Hyperloop travel times along a potential east coast route



Source: Ultraspeed Australia, based on provisional assessment of a potential Hyperloop route.

We anticipate that the route will be developed in stages, which will be determined as an output of the feasibility assessment.

The connectivity, speed and travel times that Hyperloop affords will have a truly profound transformational effect on how we live, work and travel, as well as Australia's international image and reputation as a location for innovation.



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## **Transforming connectivity between cities and regional centres**

We consider that there is a very strong case to be made for an ultra-high-speed route along Australia's East Coast.

Since the early 1970's, when the Whitlam government announced investment in regional Australia, successive governments have supported the concept of developing regional centres. Existing regional centres and cities, like Albury and Orange are proof that the concept does deliver in terms of development.

What is missing from the model is access and connectivity. The NBN will address part of that issue. Only an ultra-high-speed ground transport solution will truly transform time and distance. The scale and impact of the strategic transformation by enhancing accessibility, integration, and connectivity, with resultant changes in economic geography, brought about by Hyperloop transport will be profound.

Growth pressure on Sydney could also be released by connections to intermediate locations and regional centres such as Newcastle, Canberra and Albury taking minutes not hours – imagine the impact of Newcastle to Sydney in 10 minutes, or travel times anywhere within the Sydney to Melbourne corridor between capitals and regional centre being less than 20 minutes. It would facilitate and later the redistribution of populations, business investment and development opportunities.

The East Coast corridor has no sunk investment in conventional wheel-on-steel, high-speed rail. As such, it is thus well positioned to leapfrog a generation by installing a 1,000 km/h Hyperloop system. Such a system will deliver significantly greater benefit at lower cost and environmental intrusion than current high-speed rail proposals.

A smart, high-speed ground transport system that Hyperloop One offers is clearly part of the answer to problems that have been on the agenda in Australia for the last 40 years.

## **Addressing the freight transport challenge on Australia's East Coast**

In Sydney, for example, Kingsford Smith airport and Port Botany are approaching capacity. There is also heavy reliance on road-based transport. Both the M4 and M5 arterial corridors supporting access to the major population, employment, transport and freight distribution centres in Sydney are heavily congested.

In addition, the ability of Port Botany to tranship containers is currently higher than the ability of the land transport system to clear the cargo from the terminals and adjacent container depots. Further, it is not clear that existing infrastructure solutions, with continued reliance on the efficiency and reliability of the road and rail network, will be sufficient to address the current congestion and bottlenecks, especially in and out of Port Botany.





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A Hyperloop solution, combined with new inter-modal infrastructure, will substantially improve the capacity and productivity for both Port Botany and the Sydney metropolitan region without reliance on road or rail infrastructure.

Further, Hyperloop system along an East Coast corridor (one that links Port Botany and the Port of Melbourne, via Sydney and Melbourne airports) will fundamentally transform container freight delivery for the logistics industry. It will also create a new short-haul distribution business in regional Australia, aiding employment and economic development.



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## 4. Proposed Project Scoping Study

### Purpose of the Project Scoping Study

The purpose of the Project Scoping Study (PSS) is to create outputs of sufficient depth and rigour to allow the fundamental “Go”/“No-go” decision regarding a Hyperloop One project along a determined route to be taken. The outputs also define the project’s potential project finance and procurement structures.

The outputs of the PSS represent a “Strategic Business Case” in Australian terms for a Hyperloop One based transport system.

### PSS process

The PSS for a Hyperloop feasibility assessment will follow two-stage process.

#### Stage 1 Preliminary Assessment

Stage 1 is designed to deliver an initial report which includes preliminary recommendations. This is similar to other assessments currently being undertaken of Hyperloop transport systems in other countries (for example, see attachment: Pre-feasibility study Stockholm –Helsinki using Hyperloop One technology, Short summary, July 2016).

The foundation for the Stage 1 Preliminary Assessment is the technical work carried out to date by Hyperloop One, which is made available as input to the PSS. This includes all information relating to the core technology of the Hyperloop system itself, and the methods developed to enable its construction and operation on transport corridors generally.

Key outputs from Stage 1 are initial recommendations regarding the most appropriate and cost effective solutions for the implementation of a Hyperloop network, with possible options and variants. Project assumptions and rationales are iteratively reviewed and updated as necessary.

The report provides comfort on all key aspects of the project and maps out how the project will be progressed through the next stages of a full feasibility and development study.

Completion of the Stage 1 Preliminary assessment will typically provide existing sponsors and investors with a robust platform for publicity and project promotion.

The output report from Stage 1 gives sponsors and investors the opportunity to consider additional support for further development of the Hyperloop project in Stage 2. The report provides the basis for exploring whether the Hyperloop project is likely to meet criteria for an unsolicited proposal to Government for consideration.



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## Stage 2 Validation Assessment

Work on Stage 2 is contingent on the outputs of Stage 1 indicating the Hyperloop network is potentially feasible, or is deemed of sufficient interest to Government to warrant further development and progression to a more defined project as an unsolicited proposal – a “Go” decision.

Stage 2 builds on the framework and findings established in Stage 1. It produces a significantly more detailed feasibility analysis. Specifically, it fully defines the proposed Hyperloop network on the specified corridor:

- As a unique transport project capable of physical implementation.
- As an investible proposition with a specific project finance model, incorporating:
  - Whatever mix of private sector commercial debt and equity investment is applicable to the corridor and the project finance model in question.
  - Whatever upstream government or agency capital inputs are applicable, including direct capital (co)-investment, whether directly by the State or by its arms-length agencies and/or Sovereign Wealth funds.
  - Whatever upstream risk mitigations may be available (e.g. government guarantees for debt investors, inward investment incentive packages, etc.).
  - Whatever downstream risk mitigations may be available (e.g. availability payment, project finance structures removing traffic risk and providing predictable cash flows and IRR, thus enabling investment from infrastructure funds and the like).

Outputs from Stage 2 are intended to enable a firm and formal decision to be made as to whether to proceed with the Hyperloop network, and on what basis and timetable. It also provides the basis for existing or potential new investors to undertake initial due diligence on the proposed project and, having satisfied themselves, to reach the stage where MOU or Letter of Intent pre-commitments become possible.

The output report from Stage 2 can also form the basis of a submission to State Government as an unsolicited proposal. It will provide sufficient grounds to justify direct dealing and to warrant further development and progression to a more defined project.



Official representative of **hyperloop** | one

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