The Director of the SMART Infrastructure Facility (SMART or the Facility) convened with key stakeholders a workshop to develop the strategic directions for the Facility and to garner input and knowledge for the research priorities for the Facility as it develops. The workshop was held at the Novotel Wollongong, on the 18th November 2010 and included stakeholders from Industry, Government and Academia.

1 THE CONTEXT FOR SMART RAIL

The initiation of SMART represents significant investment by Government and Industry in developing the long term future of infrastructure. The facility aims to deliver research that is significant, and of an appropriate scale in order to deliver long term gains for the country. To achieve this, SMART faces critical challenges, not the least being a public mindset that sees rail as an adjunct to roads and cars as the primary transport mode.

While SMART has a mandate to research nation-wide solutions across all aspects of infrastructure (ie economic and social) the purpose of this workshop was to develop the strategic research themes for the SMART Rail Institute. The Institute will operate within the Facility as an operating group and report to the SMART Director, Garry Bowditch. Recruitment for personnel in the Rail Institute will commence shortly.

David Marchant acknowledged that while rail has been historically significant, connecting the cities to the country, it has lacked critical development and investment to allow for modernisation which has resulted in rail infrastructure that has not grown in parallel with the country. Rail has seen its relevance diminish significantly since the 1950s, and has been replaced by road due to a lack of timing and capacity. Rail freight on the east coast has fallen to 19% of the total freight market and will continue to slide without crucial change.

Importantly transport in Australia is interlinked, with all modes dependant on the others in some form. Despite this a distinct silo mentality is present amongst transport modes, indeed within modes (i.e. rail freight and passenger rail) and hinders the ability of policy makers to provide interlinked and intermodal infrastructure solutions.

SMART will operate in a sector that has critical shortfalls, but will also operate with broad support, significant investment and an independent remit to move beyond historic bottlenecks.
2 THE OPERATING ENVIRONMENT – STRATEGIC CHALLENGES FOR RAIL

2.1 TRENDS, DRIVERS AND PLANNING ASSUMPTIONS

<table>
<thead>
<tr>
<th>Trends</th>
<th>Drivers</th>
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<tbody>
<tr>
<td>Rail is diminishing in relevance</td>
<td>– Inflexible infrastructure (a lack of dedicated freight lines)</td>
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<td></td>
<td>– Poor integration of rail into lifestyles</td>
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<td></td>
<td>– Road use (cars) dominates Australian culture</td>
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<td></td>
<td>– A lack of long term planning and governance</td>
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<tr>
<td>Increasing price of energy for transport</td>
<td>– Fuel prices to continue to rise</td>
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<td></td>
<td>– Carbon pricing will impact on all transport</td>
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<tr>
<td>Increasing labour costs</td>
<td>– Shifting workforce expectations and lifestyle choices</td>
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<tr>
<td>Demographic shifts</td>
<td>– Increasing urban density and congestion</td>
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<td></td>
<td>– Continued coastal migration</td>
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<tr>
<td>Technological progress</td>
<td>– Continued advances in technology</td>
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<td></td>
<td>– Need for more dynamic and flexible responses from infrastructure</td>
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<tr>
<td>Customer focussed rail</td>
<td>– Increasing demand for customer oriented services (tailoring)</td>
</tr>
<tr>
<td></td>
<td>– Rising need for multiple options in transport</td>
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<tr>
<td></td>
<td>– Customer needs for speed, reliability and price sensitivity should drive industry</td>
</tr>
</tbody>
</table>

2.1 STRATEGIC CHALLENGES – POSITIONING RAIL FOR THE FUTURE

1 How to develop rail as a mode of choice?
   – When is rail fit for purpose? What is the right mode for the right purpose?
   – What are the right markets for rail?
   – There needs to be a focus on the customer that looks at speed, reliability, whole of journey planning and price

2 How does rail become integral to the transport system?
   – Better land use planning and collaboration with all the tiers of government
   – Customer driven supply chains across modes
   – Differentiated traffic systems (i.e. dedicated freight lines)
3 How will we develop an integrated system?
   – Smart tools that talk to each other
   – Assess the interdependencies and behaviour present in the system
   – Deliver complex simulations of the system for the future
   – Ensure thorough modelling of rail infrastructure and land use

2.2 PLANNING ASSUMPTIONS FOR 2020

SMART will make the following planning assumptions to 2020 based on the trends and drivers in its operating environment.

- Rail will include multiple options (light, heavy, freight).
- New options for freight and transport will be enabled by new technologies and will require increased flexibility from the rail sector.
- The movement of people and goods will become increasingly complex due to congestion, energy costs, price, and population.
- The customer should be a dominant driving force for change in the rail sector.
- New business and operating models will be implemented.
- Rail will become more cost competitive over time as compared to road.
3 THE STRATEGIC DIRECTIONS FOR SMART RAIL

3.1 THE VALUE PROPOSITION FOR SMART RAIL

Garry Bowditch provided an outline of the value proposition for SMART which will be delivered through the following main contributions and attributes:

- SMART has the ability to plan and integrate various modes without serious conflict (a non vested interest capability, non-threatening) – if successful it will be a trusted brand/partner.
- Development of a sophisticated model that allows for a collaborative approach and environment with a repository of knowledge.
- Development of new sustainable knowledge for infrastructure – thought leadership and key people for the future of rail.
- Develop and deliver integrated modeling with visual packages that are easy to understand.
- A place where government and industry will invest to get intelligent outcomes and can address gaps.

In summary, the value proposition for the SMART Rail lies in its ability to be an independent, respected and knowledgeable research institute that furthers thinking and policy around rail infrastructure for Australia.

3.2 OUTCOMES AND MEASURES OF SUCCESS

The SMART Facility will aim to achieve the following outcomes in the short (2012) and medium (2015) term:

By 2012:
- Have a better understanding of the intermodal model
- Have an understanding of the trends and drivers relevant to rail for the future
- Have delivered one or two case based examples of collaboration between industry
- Deliver a simulation of all the major urban transport modes in the country
- Ensure evidence based outcomes result in government policy
- Ensure SMART has a profile
- Manage stakeholder expectations
By 2015 the facility aims to:

- Have 200 PhD students
- Develop strategies for the future of rail infrastructure

### 3.3 SWOT ANALYSIS

<table>
<thead>
<tr>
<th>Strengths to nurture</th>
<th>Weaknesses to overcome</th>
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<tbody>
<tr>
<td>– Close links to government operators with the ability to influence</td>
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<tr>
<td>– Strong research culture within the University</td>
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<tr>
<td>– The caliber of the advisory council</td>
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<td>– High level of PhD student capacity</td>
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<tr>
<td>– Funding</td>
<td></td>
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<tr>
<td>– Poor links with manufacturers offshore and private operators</td>
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</tr>
<tr>
<td>– Unclear understanding of research output/outcomes (defining PhD topics that are relevant)</td>
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<tr>
<td>– Profile is currently poor (no track record of success)</td>
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</table>

<table>
<thead>
<tr>
<th>Opportunities to exploit</th>
<th>Threats to plan to overcome</th>
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</thead>
<tbody>
<tr>
<td>– Demand for integrated approaches to infrastructure is apparent</td>
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<tr>
<td>– No institutional capacity in freight economics</td>
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<tr>
<td>– Generational change in professional capacity</td>
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<tr>
<td>– Lack of political leadership/loss of political support</td>
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<tr>
<td>– High expectations of stakeholders and the timeframe of system change</td>
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<tr>
<td>– Contestability of research/consultancy market</td>
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<tr>
<td>– Lack of access to information</td>
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</table>

### KEY FACTORS OF SUCCESS FOR SMART RAIL

From an analysis of the SWOT, and taking into consideration the operating environment and strategic challenges the following emerge as the key factors for which the SMART Facility must achieve strategically in order to be successful.

1. **Relevance.**
2. **Stakeholder Management.**
3. **Evidence of success.**
4. **Funding.**
4 THE RESEARCH AGENDA FOR SMART RAIL

David George of the CRC for Rail Innovation outlined the major challenges and research themes and issues that will impact on SMART Rail and the CRC over the next few years. Noting that some of the core challenges for rail include a doubling in volume and movement of freight in ten years, as well as the likely increase in costs due to congestion, the CRC will focus on seven key research themes for rail innovation:

- Climate change and the environment
- Safety and security
- Performance
- Smart technology
- Urban rail access
- Workforce development
- Adoption and commercialisation

For SMART and its stakeholders the key areas of research to focus on include the following themes and possible research questions:

**Passenger movement**

- How do we move more people within the current system?
- Modeling to understand future customer needs (Synthetic population modeling)
- What are the costings for increased passenger movement (Social and economic)?
- Reaction to crowding (what’s the capacity of the system to deal with crowding?) what are the behavioral responses?
- How will we go about evaluation of service?

**Freight**

- Differential pricing (bulk and container, system options)
- Noise and emissions
- Current practices and future practices for freight (integrated land use planning)
- Supply chain futures (freight growth and urban planning)
- Interface between freight and transport modes (as well as bus, car etc)

**Others**

- Funding for multi-user facilities (freight villages)
- Patronage study for high speed rail – will people use high speed rail and at what price rate?
- What’s the tipping point for customers to change modes (behaviour change)
- What is the flow on effects of a high speed rail? Can we leverage this mode?
5  RAILCORP: CHALLENGES FOR THE FUTURE

Jim Moudravanous, General Manager Chief Engineers for Railcorp provided a synopsis of the major challenges facing Railcorp in the future.

KEY CHALLENGES:

1  Sydney
   –  A growing city >1% pa
   –  989k passenger journeys per year

2  Asset base must deliver higher levels of performance
   –  Maximize the capacity and availability of the network
   –  Reduced maintenance expenditure
   –  Cost effective construction
   –  Construction techniques that are compatible with running an operational railway

3  The community benefit must clearly be articulated
   –  High expectation of the community
   –  Projects must demonstrate their contribution to livability in Sydney

4  Environmental performance must be improved
   –  Creation of a sustainable railway
   –  Noise
   –  Vibration
   –  Visual impacts
   –  Power saving technologies
   –  Water reuse

5  Skilled workers to maintain the network
   –  Currently a lack of skilled knowledge and experienced workers
   –  Engagement with the private sector is required

6  Real time asset performance information
   –  24/7 availability
   –  Technology
   –  Simulation techniques
   –  Threat monitoring

7  Upgrading assets for growth
   –  Structures
– Platforms
– Geotechnical and civil
– Power

8 Electrical discipline challenges

How can SMART contribute to these challenges?
Through the provision of:
– High caliber R&D that contributes to real solutions
– Performance modeling
– A vision for the future of railway development
– Promote cross discipline research and solutions
– Train the next wave of transport professionals

How will success be measured?
– Add to existing capability in track
– Creation of sustainable capability