The Parliament of the Commonwealth of Australia

Smart ICT

Report on the inquiry into the role of smart ICT in the design and planning of infrastructure

House of Representatives
Standing Committee on Infrastructure, Transport and Cities

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Canberra ACT

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Foreword

The report on the role of smart ICT in the design and planning of infrastructure had its genesis in the 2014 inquiry by the House Infrastructure and Communications Committee into infrastructure planning and procurement. During that inquiry, the Infrastructure and Communications Committee received evidence outlining exciting new developments in the application of smart ICT to infrastructure. This evidence, particularly from BCE Surveying and Autodesk, revealed a new way of designing, planning, building and managing infrastructure. The Committee determined to explore this further and the smart ICT inquiry was born.

The inquiry began under the House Infrastructure and Communications Committee, led by its Chair, Mrs Jane Prentice. In October 2015 that committee was disbanded and two new committees were formed. This inquiry was adopted and completed by the House Infrastructure, Transport and Cities Committee. It is testament to the importance attached to this inquiry that former committee members, and particularly the former Chair, have maintained a close interest in its progress and outcome.

The inquiry ended up being more comprehensive and time-consuming than originally anticipated. The more evidence that was received about the role of smart ICT in infrastructure, the more the Committee recognised the possibilities inherent in new technologies and systems. These technologies, if used effectively, have the capacity to transform the design, construction and management of infrastructure assets; the management and use of existing assets; and the operation of transport, communications, energy and utility systems. These technologies are *transformational*, with the capacity to increase the productivity of the Australian economy. In order to achieve this, however, governments and industry must be aware of the potential of smart ICT, and must invest in the technologies, skills and systems to make the transformation a reality. That is the core of this report.

In its recommendations, the report urges the Government to take a more coordinated and integrated approach to the development of smart ICT and its application to infrastructure planning. The central recommendation of the report is the formation of a Smart Infrastructure Task Force — based on the UK model — to provide national coordination between governments, industry and researchers for the development and implementation of smart ICT in the design, planning and development of infrastructure, and in the maintenance and optimisation of existing infrastructure. The development of capacity within and between governments is central to a successful Task Force, and several recommendations address this issue.

The collection and management of data is the key to the development of smart infrastructure. Data makes the management of existing systems possible and allows us to explore ever more efficient and effective ways of doing things. Information is the bedrock of innovation. The Committee has recommended that the Smart Infrastructure Task Force be given responsibility for the national coordination of protocols and standards relating to infrastructure data and the development of an objects library. It has also recommended that the National Archives of Australia be given the resources to oversee the development of a whole-of-government infrastructure data strategy.

The Committee has also recognised the capacity of smart ICT to transform emergency management and disaster planning and remediation. It has called on government to give greater recognition to the capacity of new technologies and systems, including recognizing public safety communications systems as critical infrastructure.

I would like to thank all those who have contributed to this inquiry. The Committee received a significant amount of high quality evidence which, nonetheless, only scratched the surface of this fascinating subject. I thank my Committee colleagues and the secretariat for their hard work, enthusiasm and patience in seeing this report through the transition between two committees. Lastly, I would like to thank the members of the former Infrastructure and Communications Committee for having the vision to investigate this important issue, and in particular the former Chair, Mrs Prentice, for her support in seeing this report through to a successful conclusion.

Mr John Alexander OAM MP
Chair

Membership of the Committee

Chair	Mr John Alexander OAM MP	
Deputy Chair	The Hon Matt Thistlethwaite MP	
Members	The Hon Julie Collins MP	Mr Angus Taylor MP *(to 02/03/16)*
	Mr Andrew Giles MP	Mr Bert van Manen MP
	Mr Andrew Hastie MP *(from 04/02/16)*	Mr Matt Williams MP
	Mr Keith Pitt MP *(to 11/11/15)*	Mr Trent Zimmerman MP *(from 02/02/16)*
	Ms Joanne Ryan MP	Ms Nola Marino MP *(to 04/02/16)*
Supplementary members	Mrs Jane Prentice MP	Ms Nola Marino MP *(from 04/02/16)*

Former Standing Committee on Infrastructure and Communications

Chairman	Mrs Jane Prentice MP	
Deputy Chair	The Hon Matt Thistlethwaite MP	
Members	Mr John Alexander OAM MP	Mr Keith Pitt MP
	Mr Andrew Giles MP	Ms Michelle Rowland MP
	Ms Nola Marino MP	Mr Bert van Manen MP
	Mr Clive Palmer MP	Mrs Lucy Wicks MP

Committee Secretariat

Secretary	Ms Lynley Ducker
Inquiry Secretary	Dr Bill Pender
Senior Research Officer	Mr James Bunce
Research Officer	Ms Belynda Zolotto
Administrative Officer	Ms Cathy Rouland

Terms of reference

The Committee to inquire into and report upon the role of smart ICT in the design and planning of infrastructure, in particular:

- identifying innovative technology for the mapping, modelling, design and operation of infrastructure;

- identifying the new capabilities smart ICT will provide;

- examining the productivity benefits of smart ICT;

- harmonising data formats and creating nationally consistent arrangements for data storage and access;

- identifying international best practice in the use of smart ICT in the design and planning of infrastructure;

- considering the use of smart ICT in related fields, such as disaster planning and remediation; and

- considering means, including legislative and administrative action, by which government can promote this technology to increase economic productivity.

List of abbreviations

ADAC	Asset Design As Constructed
AECOM	Architecture, Engineering, Consulting, Operations, and Maintenance
AECOO	Architect, Engineering, Construction, Operator and Owner
APCC	Australasian Procurement and Construction Council
ARTC	Australian Rail Track Corporation
ASEAN	Association of Southeast Asian Nations
ATMS	Advanced Train Management System
ATSE	Australian Academy of Technology and Engineering
AURIN	Australian Urban Research Infrastructure Network
BCA	Building and Construction Authority
BIM	Building information modelling
CAD	Computer Aided Design
CAP	Common Alerting Protocol
CAV	Connected and autonomous vehicles
COAG	Council of Australian Governments
COBie	Construction Operations Building Information Exchange
C2C	Centre to Centre
DIRD	Australian Government Department of Infrastructure and Regional Development
DPTI	South Australian Government Department of Planning, Transport and Infrastructure

DRM	disaster risk management
DSSO	Decision Support System Optimiser
EA	Engineers Australia
GIS	Geographical Information Systems
GNSS	Global Navigation Satellite Systems
ICT	Information and Communications Technology
IFC	Industry Foundation Classes
IIC	Industrial Interconnect Consortium
IOM	Integrated Optimisation Modelling
IoT	Internet of Things
IPWEAQ	Institute of Public Works Engineering Australia Queensland Division
ISO	International Organization for Standardization
ITS	intelligent transport systems
ITU	International Telecommunications Union
LCM	Land Capability Modelling
LOD	Level of Detail
MEP	mechanical, electrical and plumbing
MLS	mobile laser scanning
NAMS	National Asset Management Strategy
NATSPEC	National Building Specification
NICTA	National ICT Australia
NCICS	National Committee for Information and Communications Sciences
NSW	New South Wales
OGC	Open Geospatial Consortium
OIC	Open Internet Consortium
OSS	open source software
PTI	Project Team Integration
QUT	Queensland University of Technology
SCATS	Sydney Coordinated Adaptive Traffic System

SIBA	Spatial Industry Business Association
the Strategic Forum	Strategic Forum for the Australasian Building and Construction Industry
TMR	Queensland Government Department of Transport and Main Roads
TISOC	Transport and Infrastructure Senior Official's Committee
UAVs	Unmanned Aerial Vehicles
VDCO	Virtual Design Construction & Operation

List of recommendations

Recommendation 1

The Committee recommends that the Department of Infrastructure and Regional Development, the Department of Communications, and Geoscience Australia continue to build their smart ICT capacity, in partnership with private sector actors where appropriate. Where possible, these departments should seek to share their knowledge and thus build capacity with their state and local government counterparts.

Recommendation 2

The Committee recommends to the Australian Government that the proposed Smart Infrastructure Task Force take responsibility for the national coordination of:

- the development of national protocols for the release of infrastructure related data in both the government and private sectors, including creating mechanisms for the brokerage or sale of private sector data;

- the development of standards for the collection and management of infrastructure related data, including metadata standards; and

- an objects library.

Recommendation 3

The Committee recommends the Australian Government appoints and resources the National Archives of Australia to oversee the development of a whole-of-government strategy for the collection, management, storage and security of data related to the design, planning, operation and management of infrastructure.

Recommendation 4

The Committee recommends that the Australian Government recognise public safety communications systems as critical infrastructure, and continue to support the development of these systems, including funding research, promoting implementation, and providing national coordination.

Recommendation 5

The Committee recommends that the Australian Government continue to support the development of disaster planning and emergency response systems, including funding research, promoting implementation, and providing national coordination.

Recommendation 6

The Committee recommends that the Australian Government leads the formation of a suitably qualified and resourced Smart Infrastructure Task Force, led by Infrastructure Australia, on the model of the UK BIM Task Group, representing governments at all levels, academia and industry to provide for the coordination and implementation of smart ICT in the design, planning and development of infrastructure, and in the maintenance and optimisation of existing infrastructure. The Task Force will act as a coordinator and conduit for the development and implementation of policy nationally, including the development of industry and product standards and training and education. The Task Force will have responsibility for the development of a national strategy to accelerate the adoption of new technologies and innovations; and engage Australia with international experience and global best practice.

Recommendation 7

The Committee recommends that the Australian Government, as part of its infrastructure procurement processes, require BIM to LOD500 on all major infrastructure projects, exceeding $50 million in cost, receiving Australian Government funding, including projects partially funded by Federal Government in partnership with state, territory and local governments, and that it focus on tendering mechanisms that will facilitate this outcome, on a project-by-project basis, with a view to ultimately establishing BIM as a procurement standard.

Recommendation 8

The Committee recommends that the Department of Infrastructure and Regional Development adopts a practice of examining whether the use of Smart ICT, in optimising the operation and maintenance of existing built infrastructure assets, can provide a more cost-effective solution than their physical replacement or upgrade.

Recommendation 9

The Committee recommends that the Australian Government, through COAG, works with state and territory governments to develop a national approach to the application of Smart ICT in the design and planning of infrastructure, particularly with respect to state government responsibilities in land management, utilities, and transport systems.

Recommendation 10

The Committee recommends that the Australian Government invite Infrastructure Australia to consider the use of smart ICT in infrastructure as a means of identifying savings that can be made in the short term.