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23 April 2014

By email.

AUSTRALIAN BIM R&D ACTIVITY 2013 & 2014

Please find attached a list of project summaries compiled from details provided by respondents to NATSPEC's February questionnaire conducted on behalf of the Australasian Procurement and Construction Council (APCC) and the Australian Construction Industry Forum (ACIF).

This register of projects only includes those undertaken by Australian Government or industry organisations and not by commercial companies. Unfortunately a couple of organisations, due to priority projects, were unable to furnish details of their projects. We hope they will forward their information for inclusion when possible.

We were also pleased to hear that many organisations, whilst not conducting R&D, are providing courses, seminars and conferences on BIM and IPD topics.

I have also taken the opportunity to attach a copy of "The Case for Project Team Integration" published by ACIF and APCC.

Should you have any questions, please do not hesitate to contact myself or Neil Greenstreet at this office.

Yours sincerely

Richard Choy
Chief Executive Officer

STAKEHOLDERS

- **Air Conditioning and Mechanical Contractors' Association of Australia**
- **Australian Council of Built Environment Design Professions**
- **Australian Elevator Association**
- **Australian Institute of Architects**
- **Australian Institute of Building**
- **Australian Institute of Building Surveyors**
- **Australian Institute of Quantity Surveyors**
- **Construction Industry Engineering Services Group**
- **Consult Australia**
- **Department of Finance (Federal)**
- **Department of Finance (WA)**
- **Department of Finance and Services (NSW)**
- **Department of Housing and Public Works (QLD)**
- **Department of Infrastructure (NT)**
- **Department of Planning, Transport and Infrastructure (SA)**
- **Department of Treasury (ACT)**
- **Department of Treasury and Finance (TAS)**
- **Engineers Australia**
- **Master Builders Australia**
- **Standards Australia**
- **Victorian Building Authority**

NATSPEC, founded in 1975, is a not-for-profit organisation with the objective of improving the quality of construction in Australia.

BIM R & D Project List 2013/2014

ACIF - APCC

Project name: The Case for Project Team Integration

Completion/expected completion date: March 2014

Main participating organisations: ACIF and APCC

Project goals and objectives: Provide the industry with a concise abstract of the benefits of earlier engagement of constructors in project teams, to work with designers and other client-appointed consultants to deliver required functionality within required time and budget limits.

Context: ACIF and its government counterpart the Australasian Procurement & Construction Council (APCC) have for several years collaborated on producing tools to help industry adopt and get the best from BIM. Our focus has been on the behavioural and management tools needed to best create and manage project teams, optimise the contribution of individual team members to achieving client objectives, and achieve excellent project outcomes.

We have focused on maximising the level of project team integration to best utilise the power of BIM for design materials handling and buildability, construction, and asset maintenance.

Proposed deliverables: A published document, available in limited hard copy and soft copy i.e. pdf files available from the ACIF and APCC web sites, and those of their member organisations.

Planned 2014 activity: Publication of the document.

Expected audience: All organisations involved in delivery of capital works assets.

Approach, methodology: Developed per medium of a working group drawn from ACUIF and APCC member organisations.

Project contact:

Name: Peter Barda, Executive Director ACIF; Jane Montgomery-Hribar, Director Special Projects APCC
Tel: Peter Barda 1300 854 543; Jane Montgomery-Hribar 02 6285 2255

Links: www.acif.com.au www.apcc.gov.au

ACIF - APCC

Project name: The Project Team Integration Workbook

Completion/expected completion date: March 2014

Main participating organisations: ACIF and APCC

Project goals and objectives: Provide the industry with a "Roadmap" to integration of project teams. The Workbook provides a checklist for project sponsors, designers and constructors to assess the degree to which they are able to integrate a project team, and identifies issues that need to be addressed to deliver optimal project outcomes. The focus is on the behaviours needed to ensure the project team works collaboratively and efficiently, with each member respecting the contribution of other members.

The Workbook also provides a framework for the decision-making required by the project team to enable the collaborative behaviour that needs to become the norm - “the way we do things here”.

Context: ACIF and its government counterpart the Australasian Procurement & Construction Council (APCC) have for several years collaborated on producing tools to help industry adopt and get the best from BIM. Our focus has been on the behavioural and management tools needed to best create and manage project teams, optimise the contribution of individual team members to achieving client objectives, and achieve excellent project outcomes. We have focused on maximising the level of project team integration to best utilise the power of BIM for design materials handling and buildability, construction, and asset maintenance.

Proposed deliverables: A published document, available in limited hard copy and soft copy i.e. pdf files available from the ACIF and APCC web sites, and those of their member organisations.

Planned 2014 activity: Publication of the document.

Expected audience: All organisations involved in delivery of capital works assets.
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Approach, methodology: Developed per medium of a working group drawn from ACUIF and APCC member organisations.

Project contacts:

Name: Peter Barda, Executive Director ACIF; Jane Montgomery-Hribar, Director Special Projects APCC
Tel: Peter Barda 1300 854 543; Jane Montgomery-Hribar 02 6285 2255

Links: www.acif.com.au www.apcc.gov.au

ACIF - APCC

Project name: The IPT and BIM Knowledge hub

Completion/expected completion date: June/July 2014

Main participating organisations: ACIF and APCC

Project goals and objectives: ACIF and APCC convened a BIM Summit in Sydney on 27th November 2013. The Summit was planned to provide a regular communication exchange for the Building Information Modelling and project team integration initiatives being undertaken by many organisations across the building and construction industry.

APCC and ACIF invited people and organisations working on technical and commercial aspects of BIM adoption and project team integration, to collaborate and share information on the projects they are undertaking.

The BIM Summit was planned to provide the industry with a "Knowledge Hub" to promote the better understanding of BIM activities underway and to avoid duplication of effort. The outcomes of the Summit included the establishment of 4 working groups tasked with producing identified outcomes.

Context: The BIM Summit followed work sponsored by buildingSMART to promote closer collaboration to make the best use of very limited resources. ACIF and APCC jointly act as a comprehensive peer industry group best placed to foster that collaboration.

This work is part of a wider commitment by APCC and ACIF to identify industry and government priorities in respect to improving productivity and, where appropriate, increased innovation.

Proposed deliverables: The deliverables from each working group are described below.

Project name: Adoption of Project Team Integration and BIM Road Map

Project goals and objectives: Develop an Adoption of Project Team Integration (PTI) and Building Information Modelling (BIM) Road Map (referred to as Road Map) for endorsement by APCC and ACIF members (and other key stakeholders).

Planned 2014 activity: Tabling an advanced draft of the Road Map at the Joint APCC and ACIF Meeting mid-2014. Date and location still to be confirmed.

Expected audience: All organisations involved in delivery of capital works assets.

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Approach, methodology: meetings of a dedicated working group.

Project contact:

Name: Teresa Scott, Executive Director APCC
Tel: 02 6285 2255

Links: www.apcc.gov.au www.acif.com.au

Project name: PTI and BIM Knowledge Hub – Benefits and Resources

Project goals and objectives: Undertake a scan for the purpose of developing an electronic Knowledge Hub – Benefits and Resources (collection point) for materials associated with both PTI and BIM.

Include materials such as:

- Baseline benchmarking
- Case studies

- Research undertaken internationally and in Australia, for example the McGraw Hill Report; NBS Newcastle; and NZ benchmarking
- Relevant URLs
- A bibliography
- Updated Conspectus of BIM Initiatives
- Updated Pithy Case of the Benefits of BIM

Planned 2014 activity: Launch the Knowledge Hub at the joint APCC and ACIF Meeting in mid-2014. Dates and location to be confirmed.

Expected audience: All organisations involved in delivery of capital works assets.

Approach, methodology: meetings of a dedicated working group managed by NATSPEC.

Project contact:
Name: Teresa Scott, Executive Director, APCC and Richard Choy, Chief Executive NATSPEC
Tel: 1300 797 142, 02 9321 7200

Links: www.natspec.com.au
www.acif.com.au www.apcc.gov.au

Project name: BIM Procurement Guide

Project goals and objectives: Develop a Procurement Models and Application of PTI and BIM Options Guide (BIM Procurement Guide) articulating:
1. How to integrate BIM into each procurement model;
2. Different Roles and Responsibilities for each party; and
3. Other inclusions and considerations:
   - Supply chain and life cycle benefits
   - Procurement can be the lever to improve asset management
   - Greater focus on small building projects
   - What is the best BIM solution for each project (bespoke projects)
   - Retrofit BIM for facilities management

Consider a phased approach to introducing BIM on building projects / articulating the different stages
- Opportunities to introduce PTI and BIM
- How to structure contractual arrangements to accommodate PTI and BIM – best practice
- Case studies to illustrate how BIM can be applied
- As a client, what should you know at each of three BIM adoption levels (based on the UK Maturity Model)

Planned 2014 activity: Tabling an advanced draft of the Road Map at the Joint APCC and ACIF Meeting mid-2014. Date and location still to be confirmed.

Expected audience: All organisations involved in delivery of capital works assets.

Approach, methodology: meetings of a dedicated working group.

Project contact:
Name: Teresa Scott, Executive Director APCC; Jane Montgomery-Hribar, Director Special Projects APCC
Tel: 02 6285 2255

Links: www.apcc.gov.au www.acif.com.au

Project name: Education and skills program for PTI and BIM

Project goals and objectives: Develop a draft Strategy for an education and skills program for industry and clients.

Inclusions in the Project Scope are:

- On the job training – including trades
- Industry wide training projects
- Project related training – best practice in BIM
- Multi-disciplinary, multi-vendor, collaborative teams
- List of available programs and courses currently available
- Methodology to educate public sector executive management (client) through the use of evidence based benefits derived from recent high profile building projects

Planned 2014 activity: Table final draft Strategy at the mid-2014 Joint APCC and ACIF Meeting. Dates and location to be confirmed.

Expected audience: All organisations involved in delivery of capital works assets.

Approach, methodology: meetings of a dedicated working group convened by Consult Australia

Project contact:

Name: Julia Lemercier and Sam Collard, Consult Australia
Tel: 02 9922 4711

Links: www.consultaustralia.com.au www.apcc.gov.au www.acif.com.au www.bimacademy.ac.uk

ACT Government Territory and Municipal Services Directorate

Project name: Capital Works (CW) and Urban Development (UD) Map 2014-2018

Completion/expected completion date: As at 28 Feb 14 the CW & UD map is on-line on the TAMS Intranet, we would have to consider what info is appropriate for a map that was publicly facing & then get the sign off for it to go on the TAMS Internet page (that will take some time)

Main participating organisations: Territory and Municipal Services Directorate (TAMSD), Land Development Agency (LDA)

Project goals and objectives: The objective of the project is to spatial map Capital Works projects, Urban Developments and Heritage Sites to better inform Project Managers and the Land Development Agency of opportunities to co-ordinate projects and maximise the delivery of assets and positive return on Capital investment and reduce the risk to project delivery.

Context: This was driven by the need to better co-ordinate capital assets delivered through land developments and capital works. Additional it was to better inform Project Managers of impacts to their projects due to surrounding projects and reduce the risk in delivering projects for the ACT Government.

Proposed deliverables: The deliverable was to develop an easy to use GIS mapping interface that integrated with our project reporting system (TM1) and the Integrated Asset Management System (IAMS).

Planned 2014 activity: Complete the integration of the TM1 and the IAMS. Develop the GIS map interface system.

Expected audience: The intended audience at this stage is for internal use within Territory and Municipal Services (TAMS). The future planned use is for all ACT Government Directorates. A sanitised version is intended to be publically accessible.

Approach, methodology: This project utilises existing systems – however, it required the systems to be better integrated. This initial work has been completed with testing and controlled use of the system currently underway.

Project contact:

Name: David Roulston
Position: Director of the Operational Support Branch (TAMS)
Tel: 02 6207 6628

AIA

Project name: BIM in Practice documents

Completion/expected completion date: October 2013

Main participating organisations: AEC Connect, AMCA, BSA, Geyer, Hellier McFarland, Jackson Roxburgh, NATSPEC, PTA, V-Mark Design.

Project goals and objectives: To explain in clear language, from a practitioner's point of view, some of the benefits, issues, costs and hurdles when implementing a BIM methodology into the business and projects of specialist sub-contractors and trades, Surveyors and Interior Designers.

Context: A large proportion of practitioners are still unfamiliar with BIM and the benefits it offers.

Proposed deliverables: Three publications which complement the suite of 22 papers published late in 2012. They are:

- BIM for Specialist sub-contractors and trades.
- Surveying for BIM.
- BIM for Interior Designers.

Planned 2014 activity: None. Publications completed.

Expected audience: All design, construction and facility management stakeholders.

Project contact:

Name: Dominik Holzer
Position: Editor
Tel: 03 9639 9199

Links: All papers are available for free download from www.bim.architecture.com.au

AIA

Project name: BIM Survey.

Completion/expected completion date: November 2013.

Main participating organisations: Attendees of the 2013 National BIM Seminar Series.

Project goals and objectives: To obtain Institute members' opinions of about its role in dialogues about BIM and their preferences for BIM-related events.

Context: A follow-up survey was issued to attendees of the seminar series in an attempt to ascertain future expectations from the Institute in this field. Results showed that the majority (81.95%) of attendees were Architects from medium sized firms, around 7% of the attendees were consultants. There was a firm response from the attendees that it is the role of the Institute to develop and lead the discussions around BIM for architects and that these discussions should be available to the whole AEC industry. Most would prefer for future events to be in a case study and discussion format and as a 1-2 hour breakfast or lunch event. The second preferred format was for a full day conference. Approximately 45% of the attendees would like to participate in an online discussion forum.

Proposed deliverables: Seminar attendees' opinions about the role of the Institute in developing and leading discussions around BIM for architects, and information about their preferences for the format of future events.

Planned 2014 activity: A second National BIM Seminar Series.

Expected audience: Institute policy-makers and event planners.

Project contact:

Name: Carmel McCormack
Position: General Manager Membership & Programs
Tel: 03 8620 3877

AIA Western Australian BIM Committee

Project name: Western Australian BIM committee.

Completion/expected completion date: On-going.

Main participating organisations: Representatives from Architecture, Engineering, Government, Education, Legal, Construction, Manufacturing and Cost Control.

Project goals and objectives: To improve standardisation, education and demystification of BIM in Australia.

Context: Recognition of the increasing impact of BIM on architectural and procurement practices.

Proposed deliverables: Clear, practical advice and guidance on all matters relating to BIM.

Planned 2014 activity: Results-driven monthly meetings. Preparation of case studies from the committee's collective experiences in BIM. They will be generic in nature, and not identify actual projects on which they may be based. Projects of three different values are being considered for case studies: Low (up to $20M), mid ($21M - $400M) and high (over $400M).

Expected audience: All sectors using BIM in Australia.

Approach, methodology: Utilising the Committee members' diverse expertise, sharing experiences and ideas from across all sectors using BIM in Australia.

Project contact:

Name: Richard Currie
Position: Chair of the BIM committee
Tel: 08 9381 6788

AMCA

Project name: BIM-MEP^{AUS}

Completion/expected completion date: Ongoing

Main participating organisations: Head Contractors, Specialist sub-contractors, design consultants, equipment manufacturers and suppliers, technology vendors.

Project goals and objectives: BIM-MEPAUS is a global leading industry initiative that strives to address many of the barriers holding back the adoption of building information modelling (BIM) in the Australian building and construction sector.
Whilst BIM-MEPAUS is intended to support all stakeholders in the Australian Construction and Property sectors through improved design and construction outcomes, the role of mechanical contractors throughout the design and construction process has always been important to the success of the project due to their traditional roles as lead coordinators and complexity of the mechanical services on most projects. AMCA members through their industry leadership and expertise in BIM enabled design and construction are best placed to support the property owners, developers and project design and construction teams to leverage BIM for improved project outcomes and long term facility management

Context:

Standards BIM-MEP^{AUS} aims to publish a set of standards that can be used to ensure that BIM design models are precise and accurate, practices are applied consistently, and the sharing of information follows a predictable workflow that provides all parties to a project with confidence in the integrity of both the model and the process.

BIM-MEP^{AUS} standards include:

- Specifications for plant, equipment and fittings
- Work practices (for example, standard operating procedures)
- Guideline documents
- Workflows

Practices BIM-MEP^{AUS} practices will provide documented instructions for the performance of particular operations and functions throughout the BIM design process and workflow.

Specifications Specifications detail explicit sets of requirements to be satisfied by a design model of plant, equipment and fittings. Specifications will include requirements for the physical and mechanical properties of both the design and manufacturer models to be used within the Revit MEP software.

Guidelines BIM-MEP^{AUS} guidelines provide a compendium of information or series of options to support the use of other BIM-MEP^{AUS} standards such as specifications, practices and workflows.

Models BIM-MEP^{AUS} models are the three-dimension representation of the various physical, functional and spatial characteristics (specifications) of a particular piece of plant, equipment or fitting. These models have been design in consultation with designers, manufacturers and suppliers to ensure the defined parameters are consistent in terms of design and application.

Workflows BIM-MEP^{AUS} workflows promote the efficient transfer of building information throughout the project lifecycle. BIM-MEP^{AUS} workflows achieve this by providing a clear pathway for the transfer of BIM models:
Design model → Manufacturer model → Constructible model → Commissioned as-built model

Proposed deliverables: Refer to above.

Planned 2014 activity: Progressive release of practices, specifications and guidelines fortnightly.

BIM-MEP^{AUS} Construction Innovation 2014 Forum – 7-8 August 2014, Melbourne Convention and Exhibition Centre.

Expected audience: MEP engineers, modellers, contractors and fabricators. MEP product manufacturers, suppliers and information providers.

Approach, methodology:

Other information:

Sydney Morning Herald	Measure twice; build once
Building Industry Online	Construction innovation forum highlights potentials of BIM-MEP work flow system
Chartered Institute of Building Service Engineers	Wizards of Oz
AIA/ Consult Australia	BIM for Specialist sub-contractors and trades
A Proposed approach to comparing the BIM maturity of countries	Research Paper
Business Value of BIM in Australia and NZ	McGraw Hill Construction (to be released 26 March 2014)

Project contact:

Name: Sumit Oberoi
Position: Executive Director
Tel: 03 8831 2800

Links: www.bimmepaus.com.au

buildingSMART Australasia

Project name: National BIM Initiative Working Group 1: Integrated Project Delivery (IPD)

Completion/expected completion date: June 2014.

Main participating organisations: AEC consultant organisations, contractors, legal consultant organisations, NATSPEC, tertiary education institutions.

Project goals and objectives: Develop industry protocols for information exchange, including geospatial information, to underpin BIM and collaborative practice.

Context: Following a series of MESH conferences in Sydney, Brisbane and Melbourne in early 2011, six priority areas were identified as requiring attention to accelerate the adoption of BIM in the Australian built environment sector. As a result, National BIM Initiative (NBI) Working Groups were formed in order to address these areas as part of the NBI Implementation Plan. The findings of these Working Groups were documented in a report to the Department of Industry, Innovation, Science, Research and Tertiary Education in mid 2012. With the failure of the Federal Government to support the report's recommendations with funding, buildingSMART formed Working groups in August 2013 to progress three of the six recommendations: BIM Guidelines, IPD and Object Libraries.

Proposed deliverables: A report outlining industry protocols for information exchange, including geospatial information, to underpin BIM and collaborative practice. The report is to be tabled at a conference being held in Sydney over 11-12th June 2014.

Planned 2014 activity: Development of report content through shared on-line resources, web conferences and face-to-face meetings.

Expected audience: All stakeholders in BIM projects.

Approach, methodology: Research, sharing experience and expertise.

Project contact:

Name: Andrew Orford
Position: Chair
Tel: 07 3119 6404

buildingSMART Australasia

Project name: National BIM Initiative Working Group 2: BIM Guidelines

Completion/expected completion date: June 2014.

Main participating organisations: AEC consultant organisations, contractors, NATSPEC, technical information providers, tertiary education institutions.

Project goals and objectives: Develop Australian technical codes and standards for BIM. Consistent application of standards are essential for interoperability and collaboration between BIM model authors.

Context: Following a series of MESH conferences in Sydney, Brisbane and Melbourne in early 2011, six priority areas were identified as requiring attention to accelerate the adoption of BIM in the Australian built environment sector. As a result, National BIM Initiative (NBI) Working Groups were formed in order to address these areas as part of the NBI Implementation Plan. The findings of these Working Groups were documented in a report to the Department of Industry, Innovation, Science, Research and Tertiary Education in mid 2012. With the failure of the Federal Government to support the report's recommendations with funding, buildingSMART formed Working groups in August 2013 to progress three of the six recommendations: BIM Guidelines, IPD and Object Libraries.

Proposed deliverables: A report on the BIM guidelines and standards needed to facilitate interoperability of model data and collaboration between BIM project stakeholders. The report is to be tabled at a conference being held in Sydney over 11-12th June 2014.

Planned 2014 activity: Development of report content through shared on-line resources, web conferences and face-to-face meetings.

Expected audience: All stakeholders in BIM projects.

Approach, methodology: Research, sharing experience and expertise.

Project contact:

Name: Scott Beazley
Position: Chair
Tel: 07 3327 5000

buildingSMART Australasia

Project name: National BIM Initiative Working Group 3: Object Libraries

Completion/expected completion date: June 2014.

Main participating organisations: AEC consultant organisations, AEC professional representative organisations, building product manufacturers, NATSPEC, product information providers, technical information providers, software vendors.

Project goals and objectives:

- Review the NBS National BIM Library from the UK and assess its potential to be used in Australasia. Examine local industry Object Content Guidelines prepared by ANZRS including a review by Graphisoft & Bentley to assess its more general application across all BIM vendors.
- Explain the need for classification systems for built environment stakeholders in the context of object libraries.
- Recommend the most appropriate classification systems for Australia and New Zealand. Two systems – Omniclass and Uniclass2 – will be examined in detail.
- In the context of the buildingSMART Data Dictionary (bSDD), contribute to the international bSDD team's pilot project, examining the definition of properties for two common building objects - a ceiling tile system, and a VAV box for building services. Examples of the bSDD's application include local work at QUT and some European tools such as bimSync - which allows a BIM authoring tool to query the types of external walling or available products in a model, or an Austrian tool which provides a means for building product information brokers to develop a National dictionary. The WG will also engage with product manufacturers.

Context: Following a series of MESH conferences in Sydney, Brisbane and Melbourne in early 2011, six priority areas were identified as requiring attention to accelerate the adoption of BIM in the Australian built environment sector. As a result, National BIM Initiative (NBI) Working Groups were formed in order to address these areas as part of the NBI Implementation Plan. The findings of these Working Groups were documented in a report to the Department of Industry, Innovation, Science, Research and Tertiary Education in mid 2012. With the failure of the Federal Government to support the report's recommendations with funding, buildingSMART formed Working groups in August 2013 to progress three of the six recommendations: BIM Guidelines, IPD and Object Libraries.

Proposed deliverables: A report outlining a framework and relevant standards for product information and model objects to be included in the National Object Library. The report is to be tabled at a conference being held in Sydney over 11-12th June 2014.

Planned 2014 activity: Development of report content through shared on-line resources, web conferences and face-to-face meetings.

Expected audience: Consultants, contractors, building product manufacturers, product information providers, technical information providers, model content creators.

Approach, methodology: Research, sharing experience and expertise.

Project contact:

Name: John Mitchell
Position: WG3 Project Leader
Tel: 02 9922 3785

Name: Neil Greenstreet
Position: Classification sub-group chair
Tel: 02 9321 7200

Name: Ben Fox
Position: BIM Libraries sub-group chair
Tel: 03 9826 1786

Name: Alex Shaw

Position: bsDD sub-group chair
Tel: +64 (9) 631 7044

CITB (SA)

Project Name: Construction Industry Training Board Innovations Program: Building Information Modelling (BIM) Initiative, A Practical Introductory Guide to Building Information Modelling (Version 2 October 2013) Course book for Construction Workers

Completion date: Pilot Course: a 2-day Course ran February 2011-December 2011
Version 1: a 2-day Course ran January 2012-October 2013
Version 2: a one-day Course introduced October 2013 and current
Project remains ongoing in the absence of a formal BIM training framework.

Main Participating Organisations: CITB Board comprising the following employer associations, unions and Ministerial nominees established a BIM User Group which included:

- Industry organisations: AMCA, BISCA, CCF, HIA, MBA, PIA, Property Council, AWU, CEPU and CFMEU.
- Government departments: DFEEST, DPTI, Housing and TAFE SA
- Private companies: A number of small, medium and large commercial construction companies were represented.

Training arrangements: In addition to CITB, A2K and Redstack in 2011 to present. TAFE has become involved in conjunction with delivering training at NRAH in 2013.

Project Goals and objectives: Provide BIM training to site workers in response to industry need not otherwise able to be met.

Context: Vendor training generally associated with product sales at the Introductory level.
Training by vendors and universities targeted at architects, engineers etc at the 3D design level and not the interpretive level and not at 'BIM' as distinct from '3D design'.
Cost prohibitive sales proposals and confusing advice from vendors in the market a major barrier to entry level engagement with BIM by Construction Workers on commercial sites.

Proposed deliverables: The training course has been delivered and includes the following:

- Theory – Introduction to BIM
- Practical – Navisworks Freedom with exercises from the Flinders Cancer Hospital model (a BIM project)
- Practical – Digital Layout Technology

Version 2 of the Course has two years development work in it and based on what the industry wants as actually experienced.

Planned 2014 activity: Continuing and increased uptake of the Introductory Course.
For course graduates to continue training in BIM through uptake of further levels of courses including MEP, Navisworks and Digital Layout Technology
Still working on formal recognition of a qualification.

Expected audience: The full range of Construction Workers: Labourers through to Building Company Owners.

Approach, methodology: CITB has drawn on its expertise in ensuring high quality courses for construction workers through subsidising course costs and influence on RTOs.
As no-one else has been able to establish a footprint course for construction workers to get going with BIM, CITB has designed a suitable course, trialled, delivered and continued to develop it. This provides a pathway to engagement with BIM.
The Course is a culmination of input from many parties and a primary goal of meeting industry need by finding a way to deliver the required training.
Endeavouring to find partners nationally or in other states or territories (ongoing battle).

Project Contact:

Name: Julie Kernick
Position: Manager, Research & Skills Development,
Executive Officer, Construction Industry Advisory Board

Tel: 08 8172 9500

Links and images: http://citb.org.au/

Department of Finance, Building Management and Works (WA)

Current work includes monitoring costs and benefits associated with procuring particular projects in BIM and identifying appropriate LODs for various elements.

Department of Health and Human Services (TAS)

Project Name: Strategic Implementation of BIM for Department of Health and Human Services

Completion Date: 31 December 2014

Participating organisation: Department of Health and Human Services (Tasmania)

Project Goals and Objectives: Update information management processes within the Department to capture and manage building information collected during building design and construction (and for existing buildings as practicable) to improve building management, operations and maintenance.

Context:

- Achieve triple bottom line benefits for the Department through realisation of contemporary best practice BIM practices and processes.
- Contribute toward the Tasmanian Government's adoption of the National Building Information Modelling Initiative as proposed in "Climate Smart Tasmania: A 2020 Climate Change Strategy", requiring from 1 July 2016 that:
    - new construction and major renovations of Tasmanian Government buildings be undertaken using collaborative 3D BIM (with all project and asset information, documentation and data being electronic); and
    - asset creation and operating information be based on open standards for information exchange.

Planned 2014 Activity:

- Complete a pilot project run on a three story car park utilising BIM processes.
- Migrate agency built asset information to BIM-enabled database supported processes.
- Test the market for BIM-capable Computer Aided Facility Management systems best able to support the Department's future needs.

Expected Audience:

- Senior management, Department of Health and Human Services
- Tasmanian Government Spatial Committee

Approach, Methodology:

- Participate with interstate counterparts to identify best practices for implementation.
- Complete case study on BIM pilot run for construction of three story car park.

Project Contact:

Name: Wayne Eastley
Position: Manager, Asset Sustainability, Department of Health and Human Services
Tel: 03 6233 3225

Department of Infrastructure, Executive Unit (NT)

Upcoming projects

Palmerston Regional Hospital. This project is currently undergoing a scoping study and is expected to incorporate several aspects of BIM

Department of Planning, Transport and Infrastructure (SA) - Building Management Project Services

Project Name: Building Management Building Information Modelling (BIM) Requirements and Procedures.

Project Goals and Objectives: To develop the use and implementation of BIM on nominated projects for Building Management (BM) a division in the Department of Planning, Transport and Infrastructure (DPTI).

Context: Through forums with Building Management, local South Australian industry has requested that SA Government provide a position relating to the requirements and use of BIM on government projects.

Proposed Deliverables: To define the BIM requirements and procedures for various size projects for Building Management, and develop project specific BIM briefs.

Planned 2014 Activity: Launch of Building Management BIM requirements and procedure documents, and the development of project specific BIM briefs as part of the overall briefing for new projects.

Expected Audience: To educate Lead Professional Service Contractors (LPSC), Discipline Professional Service Contractors (DPSC) and client agencies in the use of BIM.

Approach, Methodology: BM's BIM requirements are based on the NATSPEC National BIM Guide and Project BIM Brief:

- Surveys conducted with LPSCs, DPSCs and General Building Contractors (GBC)
- Consulted with Facilities Managers, Records Management, IT Specialists
- Research of current BIM policy documents from interstate and overseas.

Pilot Project: The Kensington Special School Relocation project ($9 million project value) was trialled to develop BM's BIM Requirements and the Core BIM Brief. The 3D modelling was undertaken in association with Russell Yelland Architects to define what level of development and building information is required for projects of this size.
Detailed energy modelling using Autodesk Ecotect Analysis design tool was undertaken by GHD to analyse the building's energy performance, thermal, water usage, and for daylight modelling. 3D Modelling also established the effectiveness of providing geothermal heat exchange ducts buried below ground to reduce the running costs of the A/C system.
BIM Implementation Process: The following flow chart outlines the process in determining the use and level of BIM required for all new projects and will be reviewed on a 6-monthly basis.

Project Contact:

Name: Ralph Hems
Position: Senior Architect
Tel: 08 8226 5204

Department of Transport and Main Roads (QLD)

Project Name: BIM for TMR - Road Lighting

Completion/expected completion date: December 2014

Main participating organisations:

Project goals and objectives: To provide a proof of concept for implementing BIM for TMR. The scope of this project is limited to road lighting projects. This project aims to address using the electronic model throughout the entire project lifecycle (i.e. planning, design, construction and maintenance).

Key deliverables and planned 2014 activities:

1. Develop schema/specification to define road lighting designs in electronic model. (Stage 1 – expected completion: Jun 2014).
2. Modelling road lighting design in the electronic model. (Stage 1 – expected completion: Jun 2014).
3. Automating some design calculations. (Stage 1 – expected completion: Jun2014)
4. Reviewing/ streamline the design & approval process associated with road lighting. (Stage 2 – expected completion: Dec 2014).
5. Review the content in drawings required for submission/ approval. (Stage 2 – expected completion: Dec 2014).
6. Integration with TMR's asset management system. (Stage 2 – expected completion: Dec 2014).

Project Contact:

Name: Sudharsanan Loganathan
Position: Manager (CADD Development)
Phone: (07) 3066 7940

Emergency Information Coordination Unit (NSW)

Project name: The Building & Infrastructure 3D database

Completion/expected completion date: Ongoing as stakeholders request wider coverage outside the CBD

Main participating organisations: Ausgrid, Council of the City of Sydney, Emergency Functional Area Coordinators, Emergency Information Coordination Unit, Infrastructure protection regulators, Jemena, Police CT command, Roads and Maritime Services, Sydney Trains, Sydney Water, Telstra, Transport NSW, Underground service locating industry

Project goals and objectives: The Building and Infrastructure 3D database is the result of a joint venture between Council of the City of Sydney and the EICU including the collaboration of all the major infrastructure Agencies operating in the Sydney CBD. The objective of the project is to model and map all of the underground infrastructure for the CBD including the buildings both above and below ground in three dimensions. This includes all utility and tunnel information.

The model is intelligent and facilitates full attribute and 3-D spatial queries on all features which distinguishes it from the common fly through 3-D models that are generally used to represent the built environment. The 3-D buildings include contact details for owners and occupiers and the type of industries located within the building as well as documents and photos detailing floor plans, construction details, access points and other sensitive information about the building.

High interest buildings are captured as architectural models and translated into virtual environments for exercise scenarios and then imported into the GIS data model in real world coordinate systems.

Data from the 3D building and Infrastructure database has been used in the planning of major projects like the proposed Sydney Metro, The George St light rail and the City of Sydney's Tri-generation Project.

The Sydney Down Under working group is a component of this project and it is made up of representatives from all stakeholders. The group meet monthly to monitor the progress of the 3D building and Infrastructure database and to investigate new and innovative spatial data technologies that have the potential to benefit the project as well as all stakeholder agencies.

Context: The project will deliver the following benefits:

- Planning of new infrastructure
- Emergency response
- Critical infrastructure protection
- Safety of public and responders
- Event management
- Better access and communication for all agencies
- Reduction in utility outages due to excavation errors
- Knowledge transfer between agencies
- Maintain awareness of the latest advances in technology in this field

Proposed deliverables: A 3D GIS model of the Sydney CBD showing all underground infrastructure and buildings above and below ground

Planned 2014 activity: Monthly workshops held and progress the model to include all utility and other underground infrastructure

Expected audience: Ausgrid, Council of the City of Sydney, Emergency Functional Area Coordinators, Emergency Information Coordination Unit, Infrastructure protection regulators, Jemena, Police CT command, Roads and Maritime Services, State Emergency Operation Centre, Police Operating Centre, State Crisis Centre, Sydney Trains, Sydney Water, Telstra, Transport NSW, Underground service locating industry

Approach, methodology: Cooperative research and in kind provision of resources.

Project contact:

Name: John Moore
Position: Manager EICU & Chair of the Sydney Down Under Working Group
Tel: 02 8236 7160

FMA

Project Name: Good Practice Guide for Building Information

Completion/expected completion date: Mid 2014

Description:
Project goals and objectives: The development of a technical guide which provides insight into the types of building information utilised in facilities management. It aims to set out the terms and definitions of building information which is utilised in the efficient and effective operational management of the facilities. It also provides the types of information required for differing purposes within the context of strategic, tactical and operational facilities management.

Proposed deliverables: The project aims to deliver both an electronic and hard copy guide book, including some specific checklists in worksheet format. The guide provides a range of pro forma and checklists for ensuring the type of information required to operate a facility has been identified.

Planned 2014 activity: Release of GPG.

Expected audience: The audience for the guide books are primarily facilities managers, however, architects and property owners are also key stakeholders.

Approach, methodology: Research developed report, industry expert moderated and published by FMA.

Project contact:

Name: John Casey
Position: National Policy Coordinator
Tel: 03 8641 6601

NATSPEC

Project name: NATSPEC BIM Portal.

Completion/expected completion date: On-going.

Main participating organisations: Industry experts as required.

Project goals and objectives:

- To provide free access to downloadable NATSPEC BIM documents.
- To provide a reliable source of relevant BIM resources, including tools and educational tutorials.
- To provide details of BIM research and development projects that NATSPEC is associated with.

Context: There are numerous websites, blogs, etc devoted to BIM, and no lack of information about BIM in general. For industry stakeholders wanting to implement BIM, finding relevant information can be time-consuming. The NATSPEC BIM Portal developed in 2011 selectively provides information for this purpose, with a focus on open standards that can be applied regardless of the software used.

Proposed deliverables: Information resources, downloadable documents and tools.

Planned 2014 activity: On-going updating and development of content.

Expected audience: All design, construction and facility management stakeholders.

Project contact:

Name: Neil Greenstreet
Position: Senior Architect
Tel: 02 9321 7200

NATSPEC

Project name: NATSPEC National BIM Protocol

Completion/expected completion date: Late 2014

Main participating organisations: Industry stakeholders

Project goals and objectives: The NATSPEC National BIM Protocol identifies goals for BIM adoption over immediate, short term, mid-term and long term periods. Immediate goals include establishing a common methodology for communicating owner's expectations for the LOD and types of data contained in a model in order to establish milestones for minimum modelling expectations.
NATSPEC believes a roadmap providing a common framework will assist the smooth adoption of BIM.

Proposed deliverables: A documented BIM protocol appropriate for Australian industry.

Planned 2014 activity: Industry review of draft Protocol and publication of final Protocol in June 2014. A report will be available for free at the NATSPEC website.

Expected audience: All industry stakeholders making strategic decisions about the implementation of BIM.

Approach, methodology: NATSPEC is drafting an adaptation of State of Ohio BIM Protocol with input from industry experts as required. Industry review of draft. Incorporation of industry feedback in final Protocol and publication.

Project contact:

Name: Neil Greenstreet
Position: Senior Architect
Tel: 02 9321 7200

NATSPEC

Project name: International BIM Education report

Completion/expected completion date: January 2014

Main participating organisations: ICIS members and Asian organisations.

Project goals and objectives: To understand BIM education internationally and to share this information with international respondents to assist strategic planning with regard to BIM.

Context: Contributors either described the current level of BIM awareness/use in their country or the current level of training/tertiary education available.

Proposed deliverables: A report of findings available free at the NATSPEC website.

Planned 2014 activity: Project complete.

Expected audience: Educators. Professional organisations.

Approach, methodology: Questions were emailed to members of ICIS and others associated with BIM education. Responses were compiled and incorporated into the report.

Project contact:

Name: Kevin Rooney
Position: Senior Engineer
Tel: 02 9321 7200

NATSPEC

Project name: NATSPEC BIM Paper – Getting Started with BIM

Completion/expected completion date: June 2014.

Main participating organisations: Industry experts.

Project goals and objectives: To assist organisations that have decided to implement BIM and provide guidance about what they should do next. The paper will focus on the office/organisation issues associated with implementing BIM, how such issues may be overcome and the level of BIM implementation that may be suitable for an organisation, based on its scale.

Context: There appears to be an absence of succinct guidance on this topic relevant to Australian practitioners.

Proposed deliverables: NATSPEC BIM Paper.

Planned 2014 activity: Review of draft document by a selected group of industry experts. Incorporation of feedback in final paper and publication. Seminar series in June 2014

Expected audience: Consultants, practitioners.

Approach, methodology: Desktop research and industry consultation.

Project contact:

Name: Kevin Rooney
Position: Senior Engineer
Tel: 02 9321 7200

NATSPEC

Project name: NATSPEC BIM Paper – BIM and LOD

Completion/expected completion date: November 2013.

Main participating organisations: Industry experts.

Project goals and objectives: To improve understanding of Level of Development (LOD) throughout the industry and provide guidance about using LOD as a project management tool.

Context: There had been a focus of interest in LOD over the last few years, coupled with widespread confusion and misconceptions.

Proposed deliverables: NATSPEC BIM Paper.

Planned 2014 activity: Project complete.

Expected audience: Industry stakeholders.

Approach, methodology: Desktop research and industry consultation.

Project contact:

Name: Neil Greenstreet
Position: Senior Architect
Tel: 02 9321 7200

NATSPEC

Project name: New Zealand BIM Handbook

Completion/expected completion date: 2014

Main participating organisations: NATSPEC was commissioned to produce a draft document for the NZ BIM Handbook Sub-Committee of the National Technical Standards Committee as part of the New Zealand Government Building and Construction Sector Productivity Partnership initiative.

Project goals and objectives: To create an industry wide Handbook that could be used to achieve the following:

- Promote the use of BIM throughout the project lifecycle.
- Create a common language for the industry to use.
- Clarify the briefing process for designers and constructors.
- Improve the level of coordination in both design and construction phases.
- Create a clear path for the future development of the industry.

Context: The New Zealand Government had a desire to increase the productivity of the building sector. Formalised adoption of a BIM approach to building design, construction and operation was seen as one way of achieving this.

Proposed deliverables: A National BIM Handbook.

Planned 2014 activity: Incorporation of stakeholder feedback in a final draft and delivery to the Handbook Sub-Committee.

Expected audience: NZ industry stakeholders.

Approach, methodology: Literature review, desktop research, stakeholder workshops and stakeholder and Sub-Committee reviews of drafts.

Project contact:

Name: Neil Greenstreet
Position: Senior Architect
Tel: 02 9321 7200

NATSPEC

Project name: NATSPEC Australian Government BIM Workshop

Completion/expected completion date: February 2013

Main participating organisations: State and Federal government property agencies that require, or are looking at requiring, the use of BIM on their projects.

Project goals and objectives:

- Improve agencies' awareness of each other's activities.
- Share their experiences of implementing BIM.
- Avoid duplication of effort.
- Facilitate a consistent national approach to BIM.
- Speed up adoption nationally.

Context: A number of government agencies are examining the role of BIM in their procurement processes. NATSPEC believed that a workshop would provide an opportunity to share their experiences and reduce duplication of effort.

Proposed deliverables: Increased awareness of government agency policies and activities regarding the implementation of BIM. A more consistent national approach to BIM implementation.

Planned 2014 activity: Possible 2014 BIM Workshop.

Expected audience: State and Federal government property agencies.

Approach, methodology: Workshop. Workshop notes.

Project contact:

Name: Richard Choy
Position: CEO
Tel: 02 9321 7200

NATSPEC

Projects NATSPEC is participating in:

Project name: Standards Australia BD-104, the Australian Mirror Committee of ISO TC 59/SC 13.

Responsible organisation: Standards Australia.

Project objectives: NATSPEC's proposal to form an Australian mirror committee of International Organization for Standardization Technical Committee 59/Subcommittee 13 (ISO TC59/SC13) *Organisation of information about building works* was approved by Standards Australia (SA) in 2012. The objectives of BD-104 are to:

- Participate in the development of international standards managed by ISO TC59/SC13.
- Represent Australian interests in the development of international standards.
- Inform Standards Australia (SA) decision-making with respect to BIM.

Project name: QUT ARC Linking BIM, Specifications and BOQs.

Responsible organisation: QUT.

Project objectives: NATSPEC is a partner in this Queensland University of Technology (QUT) Australian Research Council (ARC) linkage project which is examining the link between BIM, construction specifications and cost plans. The objectives of the research are to:

1. Establish new and better ways of communicating complex technical information between members of the building design team, especially at early stages of design, by making currently implicit information explicit. It focuses on exchange of information between the architect and cost planner/quantity surveyor as a key relationship;
2. To support the definition of dependencies between building components and products to ensure that requirements expressed in the drawings or specification are met appropriately and consistently. The focus will be on the relationship between the model as the source for the generation of construction drawings and specifications as an explicit textual description of requirements;
3. Implement software that demonstrates the achievement of the two goals above and that is sufficiently robust to be used in a commercial environment for the domains noted. This software will automate or semi-automate the addition of information to BIM to support specification writing and cost planning.

Project name: QUT Collaborative Object Libraries

Responsible organisation: QUT

Project objectives: NATSPEC is a partner in this project with QUT. The objective of the project is to develop standards and processes that will enable collaborative object libraries to store and share information appropriate to each stage of the built asset lifecycle, and in a platform neutral manner. Object authoring software for the creation of generic objects that can then be exported to common modelling applications has been developed.

Project name: buildingSMART International Data Dictionary (bSDD) (previously known as International Framework of Dictionaries (IFD))

Responsible organisation: buildingSMART International

Project objectives: The bSDD, originally known as the International Framework for Dictionaries (IFD), is a mechanism that allows for creation of multilingual dictionaries or ontologies. It is a reference library intended to support improved interoperability in the building and construction industry, and is one of the core components of the buildingSMART data standards programme. The objective of the project is to develop the data resources that constitute bSDD content and the tools for utilising this data.

Project name: buildingSMART International Global BIM Guide Wiki

Responsible organisation: buildingSMART International Process Room

Project objectives: To create an editable, searchable list of currently available BIM guidelines and standards. Guides will be reviewed, compared and categorised using a consistent framework. The end goal is to use the Wiki resources to formulate an international framework for BIM guidelines based on real-world procedures and industry requirements.

Project name: ICIS Project 02: Specifications and BIM

Responsible organisation: ICIS

Project objectives: To produce a report which discussed different methods for the connection/integration of specification information and BIM, including the potential advantages and disadvantages of each method. It was agreed that the subject was not sufficiently advanced to make recommendations in the report.

Project name: ICIS Project 03: Classification and BIM.

Responsible organisation: ICIS

Project objectives: To develop a guide for the industry for implementing ISO 12006-2 and a supplement for a typical national BIM-guide. Other objectives include:

- Identifying important information tasks and areas for support of classification of interest to the industry.

Identify and specify usability and functionality of classification systems.

SBEnrc

Project name: Integrated Project Environments

Completion/expected completion date: July 2014

Main participating organisations: SBEnrc, QTMR, NSW RMS, WA Dept of Finance, John Holland, Curtin University, Griffith University, Swinburne University; EA, buildingSmart and CCF

Project goals and objectives: (i) Develop a national public procurement strategy; (ii) Develop guidelines for new contractual frameworks; (iii) Close or reduce skill gaps especially for SMEs, within the context of IPD and BIM in Australia's transport infrastructure construction industry

Context: This research will contribute to realising productivity benefits of digital modelling and integrated project delivery for the Australian construction industry through a focus on the use of building information modelling (BIM) and virtual design and construction (VDC) in the delivery of transport infrastructure projects.

Proposed deliverables: Research and Industry reports, academic publications that bring an understanding of (i) the institutional environment required for the uptake of BIM/ VDC especially in relation to procurement in an integrated project environment, to maximise productivity benefits of digital modelling; and (ii) the role of knowledge intermediaries in facilitating skilling and training for the uptake of these technologies.

Planned 2014 activity: literature review, document review, peak body mapping, cross-country interview analysis, case studies

Expected audience: clients, architects, engineers, contractors, QSs, all project stakeholders.

Approach, methodology: desktop research, interviews, case studies

Project contact:

Name: Adriana Sanchez
Position: Research Associate
Tel: 07 3735 9242

Links: http://www.sbenrc.com.au/research/people-processes-and-procurement/integrated-project-environments

Images: http://www.sbenrc.com.au/images/stories/researchmapsept2013.pdf

SBEnrc

Project name: Project 3.27: Using Building Information Modelling (BIM) for Smarter and Safer Scaffolding Construction

Completion/expected completion date: 30 September 2014

Main participating organisations: Curtin University, Seoul National University, Qld Dept of Transport and Main Roads, and John Holland

Project goals and objectives: This research will facilitate the design and construction of smarter and safer scaffolding through the use of rule-based modelling systems that link with existing Building Information Modelling (BIM) software and technology.

Context: It will develop digital modelling tools and processes that integrate construction and safety constraints directly into the design, analysis, assembly, inspection and disassembly of these temporary structures. Building on a QUT funded pilot study, this project will identify opportunities for improved safety practices and more efficient design and construction processes, both in Australia and Korea, and seek to extend the results to other parts of Australasia.

Proposed deliverables:

1. A comprehensive understanding of practices related to the design and construction of temporary scaffolding structures.
2. Digital modelling tools and processes that aid scaffolding design and construction to improve the safety, productivity and profitability of construction projects.
3. Education and training requirements to facilitate the uptake of these digital modelling technologies and thus reduce workplace accidents while maximising social and business benefits for construction workers and organisations.

Planned 2014 activity:

1. Refinement of the research methodology in conjunction with industry partners to ensure practical outcomes.
2. Data collection in Australia and Korea to gather relevant information about safety and construction practices for scaffolding structures.
3. Analysis of data gained from both countries and translation of results into rules that guide scaffolding design and construction.
4. Identification of success factors and barriers to the development of BIM-based scaffolding design and construction technologies.
5. Consolidation of findings for dissemination to project partners and the broader industry.

Expected audience: All construction personnel, agencies and related organisations in Australia

Approach, methodology: The development and use of the proposed BIM-based tools for the design, analysis, assembly, inspection and disassembly of scaffolding structures will:

1. Enable rule-based design in accordance with construction and safety requirements.
2. Incorporate rule checks against related construction design and safety codes.
3. Provide 6D information for design and construction activities, i.e. scheduling, cost and lifecycle-management information in addition to the 3D model.
4. Provide visualisation of the installation procedure, design and installation options, and give working condition analyses, such as clearance limits within the surrounding environment.
5. Link to structural analysis to evaluate non-standard site conditions.
6. Provide BIM checklists for routine on-site inspections that would benefit practical safety assessment on construction sites.

Once a prototype BIM tool is ready for use, the research team will identify two construction sites for preliminary validation - one building construction project and one infrastructure project. These case studies will be important to assess the usability and practicality of the developed tool. The designers and contractors who work on these case-study projects will review the new scaffolding software tools under the guidance of the researchers and propose opportunities for further refinement and optimisation of the links between the various BIM-based modules, to improve application to real-life construction processes.

Project contact:

Name: Xiangyu Wang
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Tel: +61 8 9266 9059

Links: http://research.humanities.curtin.edu.au/centres/bim/

Images: http://www.youtube.com/watch?v=ztILo5FHt54

SBEnrc

Project name: Project 3.28: National BIM guidelines and case studies for infrastructure

Completion/expected completion date: 30 September 2014

Main participating organisations: Curtin University, Swinburne University of Technology, Qld Dept of Transport and Main Roads, John Holland, and Surveying and Spatial Sciences Institute

Project goals and objectives: The Project will:

1. Develop National BIM Guidelines for Infrastructure based on experience and practical examples that promote consistency in the implementation of digital models for infrastructure projects. The Guidelines will support stakeholders in achieving interoperability throughout the lifecycle of the facility and will be based on internationally accepted standards.
2. Highlight open and consistent processes allowing practitioners to work across industry in developing shared "virtual infrastructure" projects.
3. Undertake at least six case studies where integrated digital models have been developed and use lessons to be gained from those case studies to assist in the development of the National Guidelines and uptake of BIM in infrastructure design, construction and asset management. The case studies including a selection of roads, bridges, tunnels, and railways will span facilities that are in design development and completion phase to capture learnings across the lifecycle.
4. Collaborate with national and international groups including software vendors on the success and limitations of the available software with the intention of improving functionality and interoperability available.
5. Test selected softwares' compatibility with the National Guidelines and inform industry and software vendors regarding their respective softwares' compatibility and availability in Australia.
6. This project also aims to establish a taskforce with key stakeholders to manage a 2-year program for the delivery of the BIM Implementation Plan for Infrastructure across Australia.

Proposed deliverables:

- Literature review of existing relevant guidelines for screening.
- A framework of BIM guidelines with categories defined.
- An execution plan of organising workshops and soliciting industry feedback.
- Identify 6 BIM projects for case studies analysis across Queensland, WA, Victoria, and NSW (2-3 case studies per institution; Curtin, QUT and Swinburne)
- BIM Guidelines Alpha version: regular workshops and industry consultations
- Case studies implementation results
- BIM Guidelines Beta version
- Case studies implementation results
- Final guidelines/report release and dissemination workshops

Expected audience: Government, owners, operators, end-users, engineers, contractors, owners and facility managers involved in a project's lifecycle.

Approach, methodology: The development of the guidelines and the implementation plan for infrastructure will be initially based on the existing BIM guidelines from the building and infrastructure industry, but validated through a series of rigorous research methodologies. These research instruments include questionnaires, interviews, focus groups, multiple case studies, Charrette

workshops, and benchmarking, with which the research team will work closely with industrial partners from across Australia with participants representing a broad cross section of the Australian infrastructure industry (including clients, consultants, contractors, educators and government representatives).

Project contact:

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Links: http://research.humanities.curtin.edu.au/centres/bim/

Images: http://www.youtube.com/watch?v=ztILo5FHt54

SBEnrc

Project name: Integrating Augmented Reality with BIM for LNG Projects
Integrating Augmented Reality with Building Information Modeling: Onsite construction process controlling for liquefied natural gas industry

Completion/expected completion date: Completed in December 2013

Main participating organisations: Curtin University, Woodside Energy Ltd., Huazhong University of Science and Technology and Northeastern University (China), and Kyung Hee University (South Korea)

Project goals and objectives: The objective of this paper highlights the need for a structured methodology of fully integrating Augmented Reality (AR) technology in BIM

Proposed deliverables:

- System 1: BIM + AR Walk-through
- System 2: BIM + AR Context-aware Mobile System
- System 3: BIM + AR for Onsite Assembly
- System 4: BIM + AR for Way-finding

Expected audience: Government, owners, operators, end-users, engineers, contractors, owners and facility managers involved in a project's lifecycle

Approach, methodology: The approach is based on the rationales for the onsite information system for construction site activities, and then formulates the methods of configuring BIM + AR prototypes. It is demonstrated that, extended to the site via the "hand" of AR

Project contact:

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Links: http://www.sciencedirect.com/science/article/pii/S092658051300215X

Images: http://www.youtube.com/watch?v=ztILo5FHt54

Tasmanian Building and Construction Industry Training Board

Project name: Innovation and industry capabilities: uptake and integration of ICT/BIM across the Tasmanian AEC sector.

Completion/expected completion date: November 2015.

Main participating organisations: University of Newcastle, Tasmanian Building and Construction Industry Training Board.

Project goals and objectives:

1. To gain a detailed State-wide understanding of the attitudes, perceptions and behaviours of SME leaders and managers in relation to strategy planning and implementation.
2. To identify patterns of attitudes and behaviours which are more or less prevalent in SMEs that have demonstrably innovated with, or without ICT.
3. To identify those areas of SME decision-making that can usefully be developed with the assistance of targeted skills development and training.

Context: The Tasmanian AEC sector is comprised entirely of small- to medium-sized enterprises, very few of which are believed to employ high-level ICT or BIM. Given that both of these technologies represent significant investments both in terms of time and resources, and that return on investment is contingent upon their widespread adoption and frequent use, this project is intended in the first instance to stock-take current levels of technology adoption and innovation evaluation. Thereafter, examples of innovation and best practice are to be identified and showcased, including the use of tablet-based technologies in small and micro enterprises.

Proposed deliverables:
The project is intended to deliver the following outcomes to the TBCITB:

1. A comprehensive description of:
    a. Innovation types (ICT and non-ICT) across the AEC sector.
    b. Generic decision-making/business management approaches adopted by innovators in the AEC sector.
    c. Perceived barriers to innovation (ICT and non-ICT) by AEC sector players.
    d. ICT capability across the Tasmanian AEC sector.
2. An identification of:
    a. Capability gaps in relation to:
        i. Innovation decision-making.
        ii. ICT awareness and implementation-readiness.
    b. Training priorities.

In addition it is expected that this project will make a significant contribution to global understanding of innovation in AEC SMEs. Consequently it is intended that:

- The data collected during this project may be incorporated as part of a Ph.D. candidate's study.
- The findings from the detailed analysis of the data collected in this project be published as a series of academic papers in high-quality academic journals.

Planned 2014 activity: State-wide survey, initial round of case studies, release of preliminary results.

Expected audience: Industry bodies including Australian Institute of Architects, buildingSMART, Civil Contractors Federation of Tasmania, Engineers Australia, Housing Industry Association, Master Builders Association and the Tasmanian Departments of Health and Human Services, and Workplace Standards.

Approach, methodology: Industry engagement, survey, case studies.

Project contact:

Name: Associate Professor Graham Brewer.
Position: Director: Centre for Interdisciplinary Built Environment Research (CIBER), School of Architecture and Built Environment, Faculty of Engineering and Built Environment, University of Newcastle.
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