



The NAMIG patron His Excellency Rear Admiral Kevin Scarce AC CSC RANR
Governor of South Australia with students at the November 2009 C2C Expo

What is NAMIG?

NAMIG is the Northern Advanced Manufacturing Industry Group. It was formed as a consortium of local industries, government and education providers to introduce Advanced Manufacturing pathways to students. It is currently funded jointly by the Australian and South Australian governments with some additional funding from industry partners.

NAMIG industry partners have created a major workforce development project in Northern Adelaide for local students to develop career awareness, employability and entrepreneurial skills and engagement with science, maths and technology in a meaningful manner.

Since its inception in 2005 over 3,500 students and teachers from 16 schools have experienced a significant shift in the way they view careers in science, mathematics and technology, in their engagement with the working world and their development as people knowledgeable in electronics, CAD/CAM, problem solving, quality assurance and further education and work choices.

Definition of Advanced Manufacturing

Advanced Manufacturing is the utilisation of enabling technologies, incorporating design and business process innovation to deliver high value-added processes and products in ways products that are novel and competitive.



What is Advanced Manufacturing?

There is considerable scope for students to learn and explore a broad range of industries if Advanced Manufacturing is to be defined as:-

- Creates the design and manufacture of high value-add products and services undertaken by, or on behalf of, a broad range of industries, and/or
- The application of advanced concepts, technologies, processes, tools and engineering related services.

The Australian economy is striving to excel in the 'knowledge' rather than the 'labour' component of industry and a shrinking percentage of the jobs will require untrained labour. Therefore, the introduction to Advanced Manufacturing and Advanced Technology that is provided by NAMIG presents a great opportunity for students to become engaged in an authentic approach to learning.

What are the benefits of partnering with NAMIG?

NAMIG offers:-

- Provision of models of project and problem-based learning for teachers and students, plus opportunities to adopt them in a supportive environment.
- Development and promotion of employability, enterprise, mathematics, science and technical skills in the pursuit of successful transition to Advanced Manufacturing.
- Introduction to Career Development planning for pathways into a broad range of Advanced Manufacturing industries. These might be at a trade, technical or professional level.

Why Advanced Manufacturing?

The significant emergence of the Mining, Defence and Clean Technology industries in South Australia heralds great opportunities across a range of Advanced Manufacturing and Advanced Technology industries.

All industries regardless of focus employ the greater proportion of their workforce in administrative service and support roles. The development of highly transferable employability and enterprise skills in an Advanced Manufacturing environment that is provided through the C2C programs should be a well respected credential for any student.

What is the C2C suite of programs?

C2C (Concept 2 Creation) was introduced as a project-based activity whereby small groups of students used a project management process to develop a product or service from concept to creation. As this generated a range of responses from various participants, it is now being presented as a suite of programs that are complementary to the learning needs of students at various levels of learning.

The C2C suite of programs has the capacity to make significant contributions to all aspects of the Future SACE and curriculum at lower levels of learning.

The C Program (Middle Years)

“C” as in “See” programs provide an introduction to Advanced Manufacturing. This can be-:

- Tours
- Talks
- Simple tasks/projects

This program provides opportunities for students to be introduced to Advanced Manufacturing through assistance with tours, talks, simple projects and linkage with a participating secondary school.

Short courses in some relevant skills are available through partnering tertiary institutions for Year 9 & 10 students of schools that are integrated C2C in higher year levels.

The C2C Program (Year Ten)

- Student teams initiate and develop a concept using a project management approach.
- Assistance through tours, training and mentors.
- Scope for cross-curricular recognition.
- Presentation at expos

This program supports small teams of students to identify a concept for a product or service that aligns with Advanced Manufacturing and to then utilise a project management approach to create it. There is an expectation that tours, relevant training and mentorship by industry and tertiary education partners will be key component of the program.

The C2C+ Program (Year Eleven)

- Industry-developed projects.
- Student teams undertake a more advanced approach to projects compared to the C2C program.
- Assistance through tours, training and mentors.
- Scope for cross-curricular & VET recognition.
- Presentation at expos.

This program provides small teams of students with a range of concept briefs that have been developed by industry partners. Using project management skills, plus training and mentorship that is offered through NAMIG, teams work to take the concept to creation.

The C2C² Program (Year Twelve)

Two possibilities:

Extension of C2C+ or negotiated learning relevant to Advanced Manufacturing.

Assistance in preparation for-:

- a) Transition to tertiary education.
- b) BAE/NAMIG scholarship application.

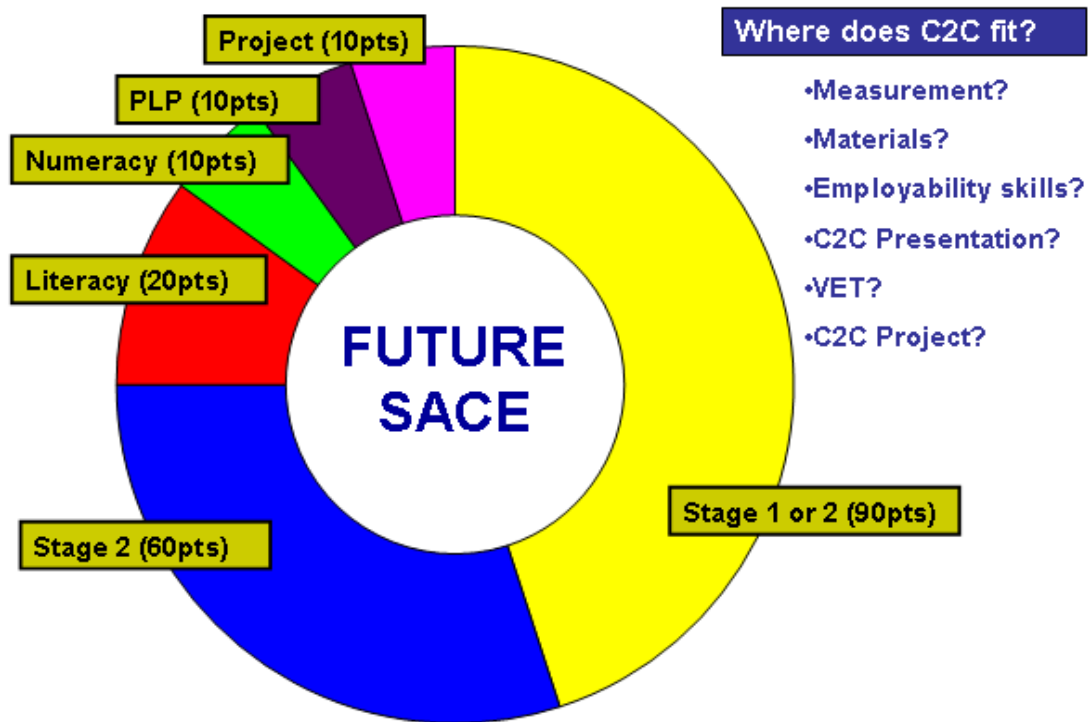
The C2C Similar Program (Year Ten –Twelve)

This option enables NAMIG to provide some assistance to schools that are currently conducting programs that are similar to the C2C suite of programs.

C2C is an ongoing career development process rather than a series of events

Where do components of C2C fit in your curriculum?

NAMIG acknowledges the need to align with SACSA and SACE frameworks



Getting started

NAMIG staff members are readily available to present or discuss the C2C suite of programs in more detail with school leaders and groups or individual teachers.

Considerable assistance is readily available to participating schools but the purpose for this funding must be respected and accessed appropriately. Therefore, a **Memorandum of Agreement** is established between NAMIG and the school to formalise a complete commitment to the program and recognition of the contributions that will be made by NAMIG and the school.

Preparatory training, tours and mentoring is provided for teachers and students and is regarded as an essential component of the preparation of programs.

Programs would ideally be conducted over a minimum of one semester period. Many schools opt for the second semester which then provides ample opportunity for preliminary training and organisation in the first semester.

Projects can be completed within one program but some schools are considering ongoing refinement and expansion of projects over subsequent years.

The accompanying checklist will clarify the process.

This checklist is provided to assist schools in delivering a program.

Step	Action	Check
1	Gain & maintain awareness, comfort and commitment from the school community to participate in NAMIG C2C programs. This could involve presentations, publications and initial use of the C2C website.	
2	Identify a member of the school leadership team (minimum Deputy Principal) to actively advocate the program and to maintain active membership of the NAMIECC leadership group.	
3	Identify and establish support for key teacher/s to develop and deliver the school program and be a representative on the NAMIG Key Teachers Group.	
4	Establish a school-based NAMIG C2C Teacher Group.	
5	Identify outcomes sought from the program.	
6	Map opportunities for delivery of C2C programs across curriculum and year levels. In particular, link to the PLP, projects and other components of Future SACE, plus scope for VET recognition.	
7	Recognise the designated year level for each type of C2C program.	
8	Evaluation of operational considerations:-Site, Timetable, Staffing, Tours & Transport, Training & Support and Time Allowance (at least 10 project weeks after preparation)	
9	Provide professional development and support for participating teachers.	
10	Specific introduction of C2C to students.	
11	Lodgement of MOA with NAMIG, including an accurate nomination of student numbers and realistic budget. *	
12	Inform parents/guardians and obtain clearance for participation, travel and use of student images.	
13	Conduct & Submit Pre-program Surveys of students and staff. *	
14	Identification of chosen programs/projects and at least one full semester to stage the program/project.	
15	Ensure projects have transparent links to Advanced Manufacturing.	
16	Establish relationship with designated mentors and other partners through an introductory meeting and initial analysis of student concepts, followed by development of a meeting schedule for the duration of the project	
17	Ensure projects are structured to ensure that all participants experience all aspects of the Project Management Process and that student teams have a work schedule/time line established.	
18	Confirm & Complete tours, workshops and other training for students with NAMIG. *	
19	Advise NAMIG of any changes in participation levels.	
20	Complete & Present projects, including reports/evaluations, for school-based and NAMIG C2C Expo.	
21	Submit final participation details to NAMIG and reimbursement claims to NAMIG. *	
22	Conduct & Submit Staff and Student Post Participation surveys. *	
23	Conduct an internal review of the program to establish continuous improvement and to establish that C2C is not just an event but that it is part of an ongoing Curriculum & Career Development process.	
24	Use the school review and/or NAMIG Focus Groups to inform NAMIG.	
25	Formally thank mentors and other partners.	
26	Celebrate & Publicise the experience.	

* Designated milestones that generate reimbursement and/or additional support for participating schools.

Strategic Industry Partners:

Active in the NAMIG Governance Process as NAMIG Management Board Members as well as Operational Partners.

- Adtech Engineering
- BAE Systems
- Futuris Automotive
- Clipsal Australia Pty Ltd
- GM Holden

Operational Industry Partners:

Assist NAMIG activities through C2C tours, projects, expert advice, mentoring and other activities for students and teachers.

- Adelaide Airport Corporation
- Air Warfare Destroyer Alliance
- Coles Distribution
- Flight Training Adelaide
- IMP Printed Circuits
- JS Sports
- Les Brazier Special Vehicles
- Lyell McEwen Hospital
- Mincham Aviation
- Royal Australian Air Force

Industry Associations:

- Australian Industry Group
- Defence Teaming Centre
- Technical Industry Association
- Manufacturing Industry Skills Advisory Council SA Inc

Funding Partners



Supported by
Government of South Australia
Department of Trade and Economic
Development

Education Partners - Schools:

Providing representation on board, reference group, and project and curriculum groups.

- Banksia International High School
- Craigmore High School
- Fremont–Elizabeth City High School
- Mark Oliphant College
- Parafield Gardens High School
- Para Hills High School
- Paralowie R-12 School
- Riverton & District High School
- Salisbury High School
- St Patrick's Technical College
- Temple Christian College
- The Heights School
- Trinity College North
- Tyndale Christian School
- Valley View Secondary School
- Windsor Gardens Vocational College

Other Education Partners:

- Association of Independent Schools SA (AISSA)
- Catholic Education SA (CESA)
- Dept of Education & Children's Services (DECS)
- Northern Adelaide State Secondary Schools Alliance (NASSSA)
- SACE Board of SA
- TAFE SA
- University of South Australia
- Flinders University
- University of Adelaide

Other Partners

- Aviation Industry Reference Group
- City of Playford
- City of Salisbury
- Northern Futures Local Community Partnership



Australian Government
Department of Education, Employment
and Workplace Relations

We welcome the opportunity to add your organisation to this list

These challenging industry-designed projects are for year 11 students



BAE SYSTEMS

Uninhabited Air Vehicle

The field of Uninhabited Air Vehicles (UAVs) holds great promise for accomplishing a wide range of exciting commercial & military missions. There is a need for highly reliable but lightweight sensory systems in order to test performance of these vehicles. Many recent advances in miniaturisation of sensors, computer processors, power supplies, and wireless technology can be incorporated into radio controlled air vehicles in order to develop these systems.



HOLDEN

Design, Manufacture and Supply GPS Vehicle Tracking System

This project defines the requirement to design a Vehicle Tracking System to be utilized to Track and Monitor the location and Build status of Prototype and Pilot vehicles that have been built on the Elizabeth Vehicle Assembly line. Maximum number of vehicles that are to be accommodated by the proposed system is 50. The specification also defines warranty, service and support contracts as part of this project.

BAE SYSTEMS

The Suburban Wetlands Acquisition and Telemetry System (SWAT)

The objectives of the challenge are to:

- Evaluate which vehicle would be best suited to this type of environment
- Design and implement a control mechanism for the vehicle.
- Design and implement data logging for position and water sample values.
- Ensure that any solution has a minimal environmental impact.
- Develop a test environment to demonstrate the capability.
- Present the data collected from the vehicle in a variety of forms.

We welcome the opportunity to develop a project for your school



NAMIG is an industry-led initiative designed to showcase Advanced Manufacturing and technology to school students in the Northern area of Adelaide.

The success of NAMIG is due to the very close co-operation of both industry and secondary schools.

The in-kind contribution by industry, industry associations and tertiary institutions is matched financially by both the Federal and State Governments through DEEWR and DTED.

NAMIG has a professional dedicated co-ordination team working with all sectors to ensure it's success.

The C2C program offers engagement and hands on experience for students and teachers.

No other organisation has achieved such outstanding results with students in preparing them for their future.





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The GIVING:

NAMIG provides the following forms of assistance to enable schools for delivery of C2C projects.

- Professional Development Workshops for teachers. This includes day or part-day workshops that provide introductions to C2C projects, Project Management, Lean Manufacturing and Occupational Health & Safety and other relevant topics that will enhance their preparation for delivering projects.
- Short Courses for teachers. These might include Electronics, Computer Aided Design and Systems Engineering.
- Contributions towards TRT allowance for the above activities and participation in challenge components of projects.
- Student workshops in relevant topics that provide preparation for successful projects.
- Tours that create an authentic context for projects.
- Contribution towards transport to tours.
- Provision of some catering at student and teacher workshops and tours.
- A subsidy for each student undertaking a project at C2C and possibly higher levels of the program.
- Provision of project support through undergraduate and industry mentors and an online 'Ask an Expert' facility.
- C2C polo shirts for participants.
- An opportunity to present at the major C2C Expo held in November each year.
- A school plaque and awards to celebrate the experience.
- Opportunities for tertiary scholarships.
- Active relationships with industry and tertiary partners.
- Reimbursement for data collection and reporting.

The GETTING:

- Schools are required to complete a Memorandum of Understanding prior to commencement of the program or provision of any assistance.
- This MOU registers agreement that schools will undertake all components of a project. These include allowing a minimum of 10 weeks preparation prior to 10 weeks for project delivery, whole school commitment and support for the program, participation in workshops and tours, legitimate use of mentors and participation in the C2C Expo.
- There is also a requirement for schools to provide relevant representation at the occasional but highly important separate meetings of teachers and school leaders.
- NAMIG is required to submit prompt and comprehensive reports to its funding bodies. Therefore, participating schools are required to be supportive of this requirement to ensure that the program can be sustained.
- An important component of the program is the evaluation. This work is contracted to a reputed organisation and can generate information that can be utilised by all participants, particularly for continuous improvement, marketing and development of curriculum and teaching methodologies. Therefore, prompt and quality responses are required by schools in return for an incentive payment to assist with this task.