RED RIVER COLLEGE
OF APPLIED ARTS, SCIENCE AND TECHNOLOGY

Program & Curriculum Development

Curriculum Validation - Program Renewal 2006

Aerospace Manufacturing Technician

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OF APPLIED ARTS, SCIENCE AND TECHNOLOGY

Aerospace Manufacturing Technician

Curriculum Validation – Program Renewal

Final Report

Fall 2006

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Representatives from the community

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Nick Young	Acetek Composites Inc.

The Aerospace Manufacturing Technician Program Faculty

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Curriculum Validation – Program Renewal Project Team

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Table of Contents

Aerospace Manufacturing Technician Program

Curriculum Validation – Program Renewal

Final Report

Introduction:

The Curriculum Validation – Program Renewal for the Aerospace Manufacturing Technician (AMT) program was carried out between December/05 and June/06. The purpose of the Curriculum Validation – Program Renewal process was to assess the program and to develop a 5-year plan for program renewal.

The Curriculum Validation – Program Renewal process utilizes a structured format that identifies the current status of industry expectations, a description and vision for a desired future state, and a plan for creating it. The process normally requires the completion of a series of seven activities that result in the deliverables outlined below.

However, since the AMT program had been suspended for a number of years and did not have an active Advisory Committee an **Industry Focus Group** was conducted as the lead activity of the Program Renewal process. The purpose of this focus group was to determine the training needs of the local aerospace manufacturing industry and the role that the AMT program could play in meeting those needs. The information that resulted from the focus group discussion assisted the key stakeholders to the Program Renewal process with determining the requirements for subsequent activities that form part of the Program Renewal for the AMT program.

Curriculum Validation - Program Renewal Deliverables:

In addition to the **Industry Focus Group** report (**Appendix A**) the Program Renewal process resulted in the following 7 interrelated deliverables:

1. Environmental Scan and Analysis of the key findings of similar programs across Canada.
2. Industry Occupational Analysis (DACUM)
3. Graduate Skills and Abilities Chart
4. Graduate Profile
5. Program Renewal Vision and Goals
6. Program Renewal Plan
7. Final Report

Outcomes from the Deliverables:

1. Environmental Scan and Key Findings (Appendix B)

The Environmental Scan provides the faculty and Director with information on similar programs currently offered at colleges across Canada. However, RRC's AMT program is unique because it was developed to meet the specific training needs for entry-level workers at Boeing Canada and because of its emphasis on providing students with hands - on experience in working with composites.

As a result, the Curriculum Validation Facilitator was only able to gather information on five programs that contained some components similar to the AMT program and to identify general trends influencing their development and direction. This information was gathered through program web sites, email and telephone contact. The following information was gathered as part of the Environmental Scan:

- Name of institution, location, and contact person
- Size of program
- Credential offered
- Program features
- Curriculum Model
- Curriculum Content
- Student Assessment
- Current and Coming Challenges
- Curriculum Renewal
- Partnerships
- Additional Information (Other and comments)

The following 5 programs were included in the Environmental Scan:

1. Confederation College's Aerospace Manufacturing Engineering Technician program (Confederation)
2. Sault College of Applied Arts and Technology's Aircraft Structural Repair Technician program (Sault)
3. Northern Alberta Institute of Technology's Aircraft Skin and Structure Repair program (NAIT)
4. Southern Alberta Institute of Technology's Aircraft Structures Technician program (SAIT-S)
5. Southern Alberta Institute of Technology Aircraft Maintenance Engineer program (SAIT-M)

Key findings from the Environmental Scan

Purpose:

Although there are some similarities in the curriculum of these programs, the purpose of the program and training methodology varies:

- The training delivered by RRC's AMT program is aimed at providing the students with hands - on experience in the repair, fabrication and assembly of composite and sheet metal panels.

- The training delivered by SAIT-S is focused more on the inspecting, repairing, installing, and troubleshooting of aircraft structural components. The graduate from this program can apply for the Aircraft Maintenance Engineer (AME) “S” license after completing 24 months of related work experience. The SAIT-S follows the Transport Canada’s and Canadian Aviation Maintenance Council’s (CAMC) AME ‘S’ training curriculum. This curriculum only introduces the students to composite repair.
- The training delivered by SAIT-M develops the knowledge and skills in maintenance of both large and small airplanes and helicopters. The program follows the Transport Canada’s and CAMC’s AME “M’ training curriculum. This curriculum introduces the students to inspection and the theory portion of composites repair.
- The training delivered by Sault’s Aircraft Structural Repair Technician certificate program is focused more on the inspecting, repairing, installing, and troubleshooting of aircraft structural components. Graduates from this program require 24 months of related work experience to qualify for the AME “S” license. The Aircraft Maintenance Engineer “S” program follows the Transport Canada training curriculum. This curriculum introduces the students to composites repair.
- The training delivered by Confederation’s Aerospace Manufacturing Engineering Technician program is focused more on the certified technician level and has a process management focus and not a technician’s hands-on repair and manufacturing focus.

Enrolment:
Entrance requirement ranged from Grade 11 at SAIT to high school diploma at the other colleges with a general emphasis on Math, English and Science.

The number of annual intakes varies – the two diploma programs have a single intake with 30 students for SAIT-M and 24 students for Confederation and the three certificate programs have two intakes per year with 25 students for Sault, 24 students for NAIT and 30 students for SAIT-S.

Delivery:
Programs varied in length from 5 months at RRC to 2 years at Confederation and SAIT-M.

PLAR is available for NAIT, SAIT-S and SAIT-M.

Course Content / Curriculum:
Course listings for the programs seem to indicate similarities in content. However, the SAIT-S and SAIT-M programs and Sault’s Aircraft Structural Repair Technician program have an inspection and replacement focus, while the Confederation program has a supervisory and process focus. As a result, graduates from these programs have different capabilities and skill sets.

Unlike RRC, the other programs do not develop the skills in the manufacture and repair of composite materials to the standard specified by Boeing Canada. However, the SAIT-S, SAIT-M, NAIT, and Sault programs have Transport Canada and CAMC accreditation, and graduates from these programs will qualify for AME ”S” or AME “M” licenses once they have completed the appropriate apprenticeship training.

Experiential Component:
Although Industry tours may be part of all the programs, none of them have a work experience component.

Additional Challenges/Opportunities:
The major challenge reported by the majority of colleges was keeping-up with the rapid changes in composite repair techniques and materials used in aerospace manufacturing. These changes in aerospace manufacturing require that colleges maintain budgets that will allow them to provide training using the latest technology, and that will provide instructional staff with sufficient professional development to remain current with emerging technology.

Colleges are also concerned with establishing and/or maintaining program accreditation with Transport Canada, CAMC and other industry regulatory bodies.

Partnerships:
Four of the programs (SAIT-M, SAIT-S, NAIT, and Sault) are recognized by Transport Canada and CAMC. Graduates from these programs receive credit towards meeting Aircraft Maintenance Engineer licensing requirements.

RRC recognizes graduates from the Aerospace Manufacturing & Maintenance Orientation Program delivered by Tec Voc High School as meeting the standard for admission to their AMT program.

Summary:
With the development of new aircraft that contain an increasing amount of composite material there is an emerging expectation that graduates from aerospace manufacturing programs have more specialists training in composite manufacturing and repair. RRC's AMT program currently leads the other programs that were scanned by putting greater emphasis on developing those hands-on skills in composites manufacture and repair that are currently required by new workers entering the industry.

RRC's AMT program is not accredited by Transport Canada and CAMC and, unlike the majority of the other programs that were scanned, graduates from the program do not qualify to receive credit towards AME (S) or AME (M) licenses.

2. Industry Occupational Analysis (DACUM) Chart (Appendix C)

The Industry Occupational Analysis using the DACUM process is a familiar component of the curriculum development process at Red River College and provides the program with a description of skills required for an entry-level position in the aerospace manufacturing industry. Included in the process is the identification of emerging and retiring industry trends. The DACUM occupational analysis took place over two full days (February 22 and 23, 2006). A total of 7 representatives from a number of large and small employers in the aerospace manufacturing industry participated in this workshop.

Participants were asked to identify the major competencies required by entry-level aerospace manufacturing and repair workers. At the end of the two days, the resulting DACUM occupational analysis chart identified 17 general areas of competencies broken - down into 132 skills and abilities.

Also, as part of the aerospace manufacturing technician occupational analysis the following emerging and retiring trends were identified:

Emerging Industry Trends:

- ergonomics
- automation
- laser technology
- automatic lay-up machines
- unidirectional fibers
- more composites
- new standards in painting
- less toxic repair products
- more emphasis on health and safety
- more computerization
- more accountability (human factors)
- more specialization (value added services)
- emphasis on quality and excellence

Retiring industry trends:

- metal to metal
- toxic materials (paints)
- paper drawings

3. Graduate Skills and Abilities Chart (Appendix D)

The Graduate Skills and Abilities workshop was conducted with the instructional staff to identify the skills and abilities required of graduates from the AMT program. This workshop was held on March 24, 2006.

The outcome of this workshop was a chart that integrates:

- Competencies identified in the DACUM occupational analysis chart,
- RRC's College Wide Learning Outcomes (Employability Skills), and
- Revisions made to the DACUM chart based on faculty's assessment of what would constitute realistic learning expectations of students in the program.

This Graduate Skills and Abilities chart serves as the focus for curriculum renewal and the basis for the development of Graduate Profile.

4. Graduate Profile (Appendix E)

From the Graduate Skills and Abilities Chart, the Graduate Profile was developed by the Curriculum Consultant in consultation with the Director. This draft Graduate Profile was then vetted by the faculty before being finalized. The Graduate Profile is an outline for the development of curriculum and it serves to guide the assessment of student learning.

5. Program Renewal Vision and Goals (Appendix F)

The renewal of the Aerospace Manufacturing Technician program is the result of translating the preceding five deliverables into a coherent plan for the renewal of the program. (Note: the **Industry Focus Group** report is an additional deliverable of the Program Renewal process for the AMT program)

A half-day workshop was held with faculty and the Director to identify a program vision and goals for program renewal. Utilizing the results of this vision and goals workshop, the Curriculum Consultant in collaboration with the Curriculum Validation Facilitator and the Director created a final vision statement along with 7 goals that will guide the program renewal process over the next five years.

The Aerospace Manufacturing Technician program's vision is to be recognized as a leader in the provision of training that prepares graduates for employment in the aerospace composites manufacturing and repair industries. The following goals were identified to realize this vision:

Marketing

- Raise the profile of the program and implement strategies to recruit prospective students.

Program Recognition

- Maintain leadership in the training for composites manufacture and repair and ensure that this leadership is recognized by employers and accreditation bodies.

Partnerships

- Strengthen existing partnerships with industry, government bodies, materials suppliers and other groups to ensure that the program graduates continue to meet current and future industry requirements.
- Continue to offer industry partners with specialized training to meet their ongoing employee development needs.

Curriculum

- Deliver an up-to-date certificate program that will meet the training needs of persons preparing for a variety of entry-level positions in aerospace composites manufacture and repair.

Industry Experience

- Determine the viability of introducing a work experience component to the program to reinforce classroom and lab training with in-industry exposure.

Resources

- Ensure that the facilities, staffing and other resources that are available to the program are sufficient to achieve its vision.

6. Program Renewal Plan (Appendix G)

The Program Renewal Plan will serve as the basis for the improvement of the Aerospace Manufacturing Technician program. The Director and faculty are committed to renewing the program over the next 5-year period.

The following tasks (and timelines) were identified for completion by the end of June 2011.

1. Raise the profile of the program and implement strategies to recruit prospective students.
    - Change the name of the program to ***Aerospace Composites Technician*** which would more accurately reflect the focus of the program. (Jan./07 – March/07)
    - In collaboration with Marketing and Public Relations develop and implement marketing strategies to recruit local, national and international applicants to the program. (Feb./07 – Sept./07)

2. Maintain leadership in the training for composites manufacture and repair and ensure that this leadership is recognized by employers and accrediting bodies.
    - Continue to work with the Canadian Aviation Maintenance Council (CAMC) to meet their curriculum standards and program accreditation requirements. (Sept.06 – June/11)
    - Work with Transport Canada to have the program recognized as meeting some of the credit requirements toward Aircraft Maintenance Engineer (AME) licensure. (Sept./07 – June/09)
    - Develop a quality system to document and verify that the training being conducted meets the requirements for accreditation. (Jan./08 – June/08)

3. Strengthen existing partnerships with industry, government bodies, materials suppliers and other groups to ensure that the program graduates continue to meet current and future industry requirements.
    - Establish a Program Advisory Committee to provide guidance and advice on all matters related to the program and to ensure that the program remains relevant to both students and employers. (Sept./06 – Feb./07)
    - Request clear and consistent reporting on future industry trends from the industry led strategic council which provides overall guidance to the Stevenson Aviation and Aerospace Training Centre. (Sept./06 – Oct./06)
    - Re-establish program affiliation with Career Trek Inc. to provide at-risk, middle-years students with age-appropriate, hands-on experience in working with composites. (Oct./06 – Nov./06)
    - Continue to work with the Manitoba Aerospace Human Resources Coordinating Committee (MAHRCC) and establish strategic relationships with local educational institutions that offer related programming (e.g. Tec-Voc High School, Murdoch MacKay Collegiate and the Faculty of Engineering and Composites Innovation Centre, U of M). (Sept./06 – June/11)
    - Work with industry partners and RRC Human Resource Services to create return-to-industry opportunities for on-going faculty development. (Sept./06 – June/11)

4. Continue to offer industry partners with specialized training to meet their ongoing employee development needs.
    - Maintain a modularized approach in the delivery of the program that will provide RRC/SAATC the flexibility to offer only those specific program components that industry partners require to upgrade their employees' skills. (Sept./06 – June/11)

5. Deliver an up-to-date certificate program that will meet the training needs of persons preparing for a variety of entry-level positions in aerospace composites manufacture and repair.
    - Revise the curriculum to reflect the Graduate Skills and Abilities chart and place more emphasis on CARs, human factors, lean manufacturing, quality assurance/inspection, autoclave, and additional manufacturing processes. (Oct./06 – Feb./07)
    - Update all course outlines to adhere to the standardized course outline using the Course Outline Web. (Dec./06 – Aug./07)

6. Determine the viability of introducing a work experience component to the program to reinforce classroom and lab training with in-industry exposure.
    - Work with the program Advisory Committee to assess the need for and the impact of introducing a work experience component on the delivery of the program. (Feb./07 – Dec./07)

7. Ensure that the facilities, staffing and other resources that are available to the program are sufficient to achieve its vision.
    - Work with materials suppliers to ensure that the program faculty has access to the newest materials to test and use in the delivery of the program. (Sept./06 – June/11)
    - Equip the composites manufacturing and repair labs with computer work stations. (July/08 – June/09)
    - Provide faculty with sufficient professional development opportunities and resources to ensure that they maintain high teaching standards and remain current with the latest technology and the requirements of industry. (Sept.06 – Feb.09)

Conclusions:

The Curriculum Validation – Program Renewal process has provided a benchmark against which the renewal of the AMT program can be tracked and measured. The Program Renewal goals that were identified will ensure that the program is recognized as a leader in the provision of training that prepares graduates for a variety of employment opportunities in aerospace manufacturing and repair industries. The Program Renewal plan will serve to guide the Director with the assignment of resources to accomplish the renewal goals within a 5-year timeframe.

Appendix A - Industry Focus Group Report

AEROSPACE MANUFACTURING TECHNICIAN PROGRAM

INDUSTRY FOCUS GROUP

Thursday, January 12, 2006

Purpose:

The Aerospace Manufacturing Technician program prepares graduates for positions as skilled production workers in the area of aerospace composite manufacturing. The program is seen as unique among the College's base-funded programs in that it is manufacturer specific with Boeing having been the primary employer of graduates from the program. The program was suspended in September 2003 when it was determined that Boeing would not be recruiting new workers for the foreseeable future.

The program was nominated for Program Renewal during academic year 2005-06 by the Senior Academic Committee and because the program does not have an active Advisory Committee and to ensure industry input to the Program Renewal process an Industry Focus Group was conducted as the lead activity of the Program Renewal process. The purpose of the focus group was to determine the aerospace composite manufacturing training needs of the industry and the role that the Aerospace Manufacturing Technician program can play in meeting these needs. The information that resulted from the focus group discussion assisted the key stakeholders to the Program Renewal process with determining the requirements for subsequent activities and deliverables that form part of the Program Renewal process.

There were eleven participants representing existing and potential employers of graduates from the Aerospace Manufacturing Technician program. Also, there were representatives from the Manitoba Aerospace Human Resources Coordinating Committee and a private consultant representing the Composites Innovation Centre.

There were five observers representing Red River College/Stevenson Aerospace and Aviation Training Centre that were in attendance during the discussion.

Facilitator:

Gene Semchych – Program and Curriculum Development, RRC

CART/ Transcription:

Darcia Hewak - WordVision Captioning Services

Participants:

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Sean McKay
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Barbara Bowen
D'Arcy Phillips
Private Consultant/Composites Innovation Centre
Robert Tarry

Observers:

Red River College/Stevenson Aerospace and Aviation Training Centre
Brian Harris
Dennis Doersam
Sam Lacoste
Don MacDonald
Jim Mackey
Robert Richard

Focus Group Discussion

As an introduction to the focus group discussion and to ensure that all participants had the same understanding of the Aerospace Manufacturing Technician Certificate program Brian Harris provided an historical overview of the AMT program's purpose and objectives and outlined the existing curriculum for the program.

The following 4 questions were asked during the discussion and all the participants were given an opportunity to respond to each question. The (abridged) participant responses follow each question.

As an employer what are your projections for your need for skilled production workers in the area of aerospace composites manufacturing and/or repair?

- One employer is looking at probably tripling the work force over the next 18 to 24 months. Currently there are 8 employees on the floor and pending the results of several proposals, they think they will be increasing to about 20 in 2006. This employer hires workers part-time evenings/week-ends who are also working full-time at another larger employer whenever they have a demand for new workers.
- The majority of work for another employer is repair work. But they are doing some manufacturing work. Right now they have about 8 people on the floor and within three years, they want to see that increase to about 45. This year would probably be the biggest increase. They can see needing about 15 additional employees this year - then a gradual slow down. They expect to see their total number of employees peak at about 45.

- One of the largest employers (500-600 workers) indicated that the need for employees will pick up significantly over the next four or five years. In 2006, they are probably looking at, in addition to the 10 or 12 in the last group, probably another 60 or so, but those would be recalled (from lay-off) workers. So, the training requirements for these workers would just be skills brush up. They expect to run out of former workers who could be recalled in early 2007. They anticipate needing between 80 and 100 new workers each year in 2007 and 2008.
- The other large employer indicated that they are currently in the midst of laying-off some of their composite fabricators. They have approximately 50 of them and some will be gone in two to three weeks. However, they are trying to win over some contracts and if successful, they would need numerous people. At the moment it is not looking too good, but they are hopeful - their situation could change in a hurry if they get specific contracts.
- Another employer indicated that from an aerospace perspective, they like to both hire AMT types of graduates as well as assist in developing programs to bring in new technologies or their understanding of new technologies.
- It was reported by a non-employer that there is also a very small local employer (8 to 9 employees) for which we have no information on future need.
- It was also mentioned by a non-employer that the big unknown is Air Canada's future need for new workers.
- It was reported that Winnipeg is the "composites capital of Canada" and it is bigger than aerospace, but aerospace is probably the most coherent part of it in terms of people talking to each other about what they are doing.

Has the Aerospace Manufacturing Technician Certificate program been meeting the training requirements that you have for entry level workers?

- 90% of the new hires for one of the smaller employers are directly out of the RRC/Stevenson's AMT program.
- A research and development employer indicated that from an aerospace perspective they like to both hire graduates from programs such as AMT program as well as assist in developing programs to bring in new technologies.

What changes and/or additions can you suggest be made to the existing program to increase the variety of employment possibilities for graduates of the program?

- One employer indicated that human factors and Canadian Aviation Regulations (CARs) is a mandatory requirement for workers in the company. This same employer indicated that they needed workers with sufficient language skills to do the job.
- Another employer echoed the need for workers to understand Transport Canada's and CARs requirements, human factors and the seriousness of the paperwork that they are required to process and the quality systems that they have to follow. This same employer believed that workers at his company required the ability to undertake repairs and to do SRMs with different aircraft (e.g. Airbus). Also, workers will be required to complete technical orders to specs other than what is required by Boeing. Some of the other areas that this employer thought that the AMT program could include were actual (dis)assembly. (e.g. rivet removal), Autoclave, self-inspection, ERRs, like extended repairs, for engineering above and beyond the SRM. This employer concluded by saying that things have changed over the years and that they manufacturer and repair and would require workers that could do both.

- One of the large employers also indicated that it was critical for their workers to have understanding of “lean manufacturing” and it would be valuable for them to be able to hire new workers with this understanding. This employer reported that they have about three times as many workers who run NC trim equipment as they do who are doing manual trim operations. This employer went on to say that as some of their older programs phase out there will be less and less requirement for manual trim. NC robotics type of applications is becoming more and more popular with them and it would be important for new workers to understand NC processes and the role they play in manufacturing.
- One of the large employers reported that they have introduced a formal self-inspection and acceptance program to make sure that the work is accurate as per the drawings. All workers are required to read all the paperwork properly and then use the correct inspection techniques to inspect and “stamp-off” the parts. Also, this employer felt that the concept of lean manufacturing could be introduced into the program because it is an upcoming part of all industry - not just in the aerospace industry. This employer also indicated that they will be needing workers with entry level NDI skills especially in the ultrasonic transmission (UT) area. There is also a need for workers to know how to maintain a strict clean-room environment because they will be building with shear ties and other structural material components.
- The other large employer reiterated the need for workers who both understand, and have the skills to inspect their own work and certify it themselves. Also, this employer requires workers familiar with cold bonding (cold bonding with graphites and metal-to-metal bonding). This employer would like entry workers to have an understanding of the theory of autoclave.
- One non-employer indicated that some of the newer programs (e.g. joint strike fighter aircraft) require workers to use some slightly different technologies in terms of automated tape layer. Also, there are companies developing new smaller aircraft with large composite components that will likely require local companies to produce using some slightly different technologies.
- Another non-employer indicated concern with the name of the program and the resulting acronym (AMT). He is aware that AMT is also used by CAMC for their AME program and that there were AMT programs in the USA. He suggested that since “this is really a composites course” that it would be appropriate to have the word “composites” in the name of the program. Also, there is a need to find a balance between developing the factory-based aerospace manufacturing skills with the hangar-base repair and maintenance skills.

Would you continue to hire program graduates if the program was expanded to include other materials and fabrication processes?

- One of the largest employers indicated that if the AMT program was renewed to include additional training required for other employers that they wouldn't want to see any of the existing curriculum removed in order to make room for the additional training.
- One non-employer offered that the College must define what should and shouldn't be included as part of the 600 hour program and having a “boundary statement” of what this program is intended to do may be of assistance (in program renewal process). Industry is using newer technologies and techniques (e.g. thermoplastics, fusion etc.) and they are always changing. The program should focus on the key areas and only build into the program those newer technologies and techniques that have become critical to industry.

Summary

The feed-back that was received from the participants during the focus group discussion indicated that:

1. there would be a continued need by local employers for aerospace manufacturing technicians for the foreseeable future,
2. former AMT program graduates are the primary source of current re-hires by local employers,
3. several of the local employers would be hiring new workers over the course of the next 3 years.
4. RRC/Stevenson could build on the existing AMT program and introduce a composites repair component to increase the employment opportunities of program graduates, and
5. the technological advances being introduced into the aerospace manufacturing and repair industry and the increasing quality assurance expectations of all industry workers could provide additional focus for the renewal of the AMT program.

Appendix B - Environmental Scan and Key Findings

Environmental Scan

College	**Red River College Stevenson/Aviation Aerospace and Training Centre** Winnipeg, MB R3J 3Y9	**Confederation College** Thunder Bay, Ontario P7C 4W1	**Sault College of Applied Arts & Technology** 443 Northern Ave. Sault Ste. Marie, ON, P6A 5L3
Contact	Dennis Doersam, Director Phone: (204) 945-6001 stevensonaviation@rrc.mb.ca	Program Coordinator Jim Zeleny (807) 473-3733 Zeleny@confederationc.on.ca	Phone: 1-800-461-2260 Fax: (705) 759-3273 Instructors at 705-759-2554 Ext. 2545
Program Name:	**Aerospace Manufacturing Technician**	**Aerospace Manufacturing Engineering Technician**	**Aircraft Structural Repair Technician**
Size of Program	• Number of students: 32 • Faculty: 3	• Number of students: 24 • Faculty: 2	• Number of students: 25 • Faculty: 2
Credential Issued	•Certificate	•Diploma	• Certificate
Program Feature	•Length: 5 months •Two intakes per year - ◦Sept 18, and Feb 18 •Entrance requirements: ▫ Manitoba senior 4 **or** ▫ Successful completion of the Aerospace Manufacturing & Maintenance Orientation Program delivered by Tech Voc High School. •Mature student entrance policy: ◦ Applicants who will be 19 years of age on or before September 30 in their year of registration, and who have been out of high school for a minimum of one year who do not meet the regular admission requirements may apply under the	•Length: Two years •Admission Requirements: ▫ Ontario Secondary School Diploma (or equivalent). Applicants with an OSSD showing senior English and/or Mathematics courses at the Basic Level, Workplace or Open courses are required to complete mature student testing. **or** ▫ Successful Completion of Mature Student Test. **and** •Courses Required: ◦ Grade 12 College or University preparation English, ◦ Grade 12 College or University preparation Mathematics.	•Length one year ◦ 32 weeks (two semesters) •Admission Requirements: ▫ Ontario Secondary School diploma with Grade 12 English (C) ENG4C or mature student status.

NAIT Northern Alberta Institute of Technology Edmonton, Alberta, T5V1A2	**SAIT Polytechnic Southern Alberta Institute of Technology** Calgary, Alberta T2M0L4	**SAIT Polytechnic Southern Alberta Institute of Technology** Calgary, Alberta T2M0L4
Program Head John McLeod Career Services (780) 471-8874 jmcleod@nait.ab.ca	Program Coordinator: Len Filmer, (403) 284-8675 transportation.info@sait.ca	Program Coordinator: Len Filmer, (403) 284-8675 transportation.info@sait.ca
Aircraft Skin and Structure Repair	**Aircraft Structures Technician**	**Aircraft Maintenance Engineers Technology (M)**
• Number of students 24 • Faculty 20 (includes all aviation / avionics programs)	• Number of students 30 • Faculty 20 (including all aviation / avionic programs	• Number of students: 30 • Faculty: 20 (includes all faculty for aviation / avionics programs)
• Certificate	• Certificate	• Diploma
• Length: One year (43 weeks) • Admission Requirements: ◦ Grade 11, with 50% in English 20 or 23, Math 20 or 23, and a Grade 11 Science (Physics 20 is recommended). • PLAR: Other relevant aircraft courses and experience will be considered.	• Length: One year • Admission Requirements: ◦ Alberta High School Diploma or equivalent with at least 50% in the following courses or their equivalents: Pure Math 20 or Applied Math 20 and 50% in English Language Arts 30-1 or English Language Arts 30-2. Special Selection: Students with higher grades usually experience more success in SAIT programs. • PLAR: Advance credit may be granted to applicants who have completed equivalent education at a post-secondary institution	• Length: Two years (32 weeks per year) • Admission Requirements: ◦ Alberta High School Diploma or equivalent with at least 50% in the following courses or their equivalents: Pure Math 30 or Applied Math 30 and English Language Arts 30-1 or English Language Arts 30-2. • PLAR: Advance credit may be granted to applicants who have completed equivalent education at a post-secondary institution which is also accredited by Transport Canada and the Canadian Aviation Maintenance Council.

College	**Red River College Stevenson/Aviation Aerospace and Training Centre** Winnipeg, MB R3J 3Y9	**Confederation College** Thunder Bay, Ontario P7C 4W1	**Sault College of Applied Arts & Technology** 443 Northern Ave. Sault Ste. Marie, ON, P6A 5L3
Program Features cont'd	special admission requirements. Individuals applying as a special admission applicant must have successfully completed a minimum of one English 40S credit, and one Math 40S credit. • Graduation Requirement: ◦ Successful completion of 9 modules with a mark of 70% in each module required as a prerequisite to progress to the next module. • PLAR may be available to incoming students.	◦ Applicants with a Grade 11 Functions course may be considered for admission and may be required to take an additional mathematics course as part of their program of study. • Courses Strongly Recommended: ◦ Grade 12 Math for College Technology (MCT4C or an equivalent mathematics course) will receive priority admission consideration.	
Curriculum Model	• Full time program - training is structured so that all students are required to complete each course as a prerequisite for continued movement in the program. ◦ 25% Theory and 75% Practical	• Full time program	• Full time program • Practical experience will be gained by completing 45 to 60 projects associated with aircraft fuselages, control surfaces, wings, composite panels, plastics and sealing procedures.

NAIT Northern Alberta Institute of Technology Edmonton, Alberta, T5V1A2	**SAIT Polytechnic Southern Alberta Institute of Technology** Calgary, Alberta T2M0L4 P	**SAIT Polytechnic Southern Alberta Institute of Technology** Calgary, Alberta T2M0L4
	which is also accredited by Transport Canada and the Canadian Aviation Maintenance Council. • Requirements for progression through the program: ◦Students must attain a SPGPA and/or CPGPA of 2.0 or better in each semester to progress through the program. To qualify for graduation, students must pass all courses and attain a CPGPA of 2.0 or better.	• Requirements for progression through the program: Students must attain a SPGPA and/or CPGPA of 2.0 or better in each semester to progress through the program. • Graduation Requirements: ◦To qualify for graduation, students must pass all courses and attain a CPGPA of 2.0 or better.
• Full Time program • There may be some field trips during the program.	• Full time program • Students are divided into 2 groups of 15 for practical component. ◦60%practical and 40% theoretical.	• Full-time program • Students are divided into 2 groups of 15 for practical component. • The curriculum is based on Transport Canada and Canadian Aviation Maintenance Council curriculums, local advisory committee recommendations and SAIT requirements. • Class time is split into 60% practical and 40% theoretical.

College	**Red River College Stevenson/Aviation Aerospace and Training Centre** Winnipeg, MB R3J 3Y9	**Confederation College** Thunder Bay, Ontario P7C 4W1	**Sault College of Applied Arts & Technology** 443 Northern Ave. Sault Ste. Marie, ON, P6A 5L3
Curriculum Content	• Introduction to Aerospace Manufacturing 30 hrs. • Safety and Tool Handling 30 hrs • Blueprint Reading Including Process Specifications 30 hrs. • Honeycombe Core Fabrication 90 hrs. • Composite Fabrication 120 hrs. • Trim Including Inspection 30 hrs. • Composite Repair 60 hrs. • Sheet Metal and Composite Assembly 180 hrs. • Exterior Finish 30 hrs. Total Contact Hours 600	**Semester 1** • Technician Mathematics 4 credits • Microcomputer Applications I 3 credits • Physical Science for Aerospace & Mechanical Engineering 3 credits • Graphics Communication I 3 credits • Metal Fabrication Methods 3 credits • Machine Shop I 4 credits **Semester 2** • Technical Communications 3 credits • Mathematics 3 credits • Statistics 3 credits • Graphics Communication II 3 credits • Aircraft Assembly Techniques Methods I 3 credits • Machine Shop II 3 credits • Computer Aided Design (CATIA) 3 credits • General education course 3 credits **Semester 3** • Strength of Materials 3 credits • Aircraft Assembly Methods II 4 credits • Chemistry of Metals, Polymers and Ceramics 3 credits	**Semester 1** • Shop Management 36 hrs • Blueprint Reading 72 hrs • Mechanics of Flight 54 hrs • Aircraft Structures 72 hrs • General Repairs I 216 hrs • Trade Calculations 34 hrs • General Hand Tools 36 hrs • Introduction to Composites 18 hrs **Semester 2** • Aircraft Systems 54 hrs • Plastics & Sealants 36 hrs • Non- Destructive Testing 36 hrs • Metallurgy & Heat Treating Processes 36 hrs • Canadian Aviation Regulations (CARS) 36 hrs • Advanced Composites 54 hrs • General Repairs II 270 hrs Total contact Hours: 1060

NAIT Northern Alberta Institute of Technology Edmonton, Alberta, T5V1A2	**SAIT Polytechnic Southern Alberta Institute of Technology** Calgary, Alberta T2M0L4	**SAIT Polytechnic Southern Alberta Institute of Technology** Calgary, Alberta T2M0L4
Semester 1 • Non-destructive Inspection and Materials 45 hrs • Shop work I: Manufacturing and Structural Repairs 214 hrs • Aircraft Theory I 92 hrs • Aircraft Drawings and Blueprint Reading I 32 hrs • Measurement Methods and Practices I 26 hrs • Pattern Layout Techniques I 26 hrs • Basic Structural Welding I 45 hrs **Semester 2** • Shop work II: Manufacturing and Structural Repairs 386hrs • Aircraft Theory II 28 hrs • Aircraft Drawings and Blueprint Reading II 28 hrs • Measurement Methods and Practices II 14 hrs • Pattern Layout Techniques II 24 hrs **Semester 3** • Aircraft Wood Structures III 60 hrs • Composite Structures III (Practical) 96 hrs • Composite Structures III (Theory) 42 hrs • Aircraft Fabric Covering III 36 hrs • Fluid Lines, Fittings and	**Semester 1** • Aircraft Wood and Fabric 4.0 credits • Aircraft Windows and Lenses 2.0 credits • Aerodynamics for Aircraft Structures 2.0 credits • Interpretation of Aircraft Drawings 2.0 credits • Canadian Regulatory Requirements 3.0 credits • Intro to Aircraft Metallurgy 1.0 credit • Introduction to Aircraft Metal Structures 12.0 credits • Aircraft Propulsion 1.0 credits • NDI Introduction for Aircraft 0.5 credits • Standard Practices I Lab 4.0 credits • Standard Practices I Theory 4.0 credits **Semester 2** • Airframe Systems Theory 2.0 credits • Aircraft Composite Structures 10.0 credits • Advanced Aircraft Metal Structures 20.0 credits • Human Factors - 2.0 credits • Aircraft Corrosion Control 3.0 credits	**First Year** • Aerodynamics 3.0 credits • Reciprocating Engine Applications 12.0 credits • Reciprocating Engine Theory 6.0 credits • Aircraft Applied Mathematics 3.0 credits • Canadian Regulatory Requirements 3.0 credits • Aircraft Instruments 2.0 credits • Aircraft Electrical Systems 3.0 credits • Aircraft Electrical Systems & Applications 4.0 credits • Aircraft Structural Materials 10.0 credits • Aircraft Materials & Structures Theory 5.0 credits • Helicopters Introduction 2.5 credits • Standard Practices I Lab 4.0 credits • Standard Practices I Theory 4.0 credits • Standard Practices II Lab 2.0 credits • Standard Practices II Theory 2.0 credits **Second Year** • Interpretation of Aircraft Drawings 2.0 credits

College	Red River College Stevenson/Aviation Aerospace and Training Centre Winnipeg, MB R3J 3Y9	Confederation College Thunder Bay, Ontario P7C 4W1	Sault College of Applied Arts & Technology 443 Northern Ave. Sault Ste. Marie, ON, P6A 5L3
Curriculum Content cont'd		• CNC Programming and Metal Cutting Theory 3 credits • Joining Processes 3 credits • Tool Design I 3 credits • General education course 3 credits **Semester 4** • Mathematics 3 credits • Aircraft Structural Design 3 credits • CNC Programming 3 credits • Manufacturing Processes 3 credits • Tool Design II 3 credits • Metallurgy and Materials Testing 3 credits • Composites I 3 credits • General education course 3 credits Total Credit hours 90	

NAIT Northern Alberta Institute of Technology Edmonton, Alberta, T5V1A2	**SAIT Polytechnic Southern Alberta Institute of Technology** Calgary, Alberta T2M0L4	**SAIT Polytechnic Southern Alberta Institute of Technology** Calgary, Alberta T2M0L4
●Windows and Lenses III 42 hrs Total Contact hours 1290	●Aircraft Sealing 1.0 credits ●Standard Practices II Lab 2.0 credits ●Standard Practices II Theory 2.0 credits Total Credit hours 77.5	• Aircraft Sys Maintenance Process 4.5 credits • Aircraft Practices Program I 9.0 credits • Airframe Systems Theory 5.0 credits • Large Aircraft Maintenance System 1.0 credits • Aircraft Adv Sys Op/Maint Process 8.0 credits • Auto Pilot and Control Systems 3.0 credits • Communications for Aircraft 3.0 credits • Computing for Aircraft Maintenance 3.0 credits • Aircraft Elect Component Test/Repair 2.0 credits • Electronics I for Aircraft 4.0 credits • Electronics II for Aircraft 5.0 credits • Aircraft Metallurgy 2.0 credits • Helicopter Advanced Theory 1.0 credits • Human Factors 2.0 credits • Non-Destructive Inspection 2.0 credits • Aircraft Gas Turbine Theory I 2.0 credits • Aircraft Gas Turbine Theory II 2.0 credits Total credit hours: 126

College	**Red River College Stevenson/Aviation Aerospace and Training Centre** Winnipeg, MB R3J 3Y9	**Confederation College** Thunder Bay, Ontario P7C 4W1	**Sault College of Applied Arts & Technology** 443 Northern Ave. Sault Ste. Marie, ON, P6A 5L3
Student assessment			
Current and coming challenges	• Changes to Industry Requirements: The demand for graduates from this program varies with the trends in the Aerospace Industry, Since 9/11 there has been little or no demand for new workers/graduates from the program as a result of downsizing and layoffs in the industry, This trend resulted in the suspension of delivery of the Aerospace Manufacturing Technician program in 2002. However, as of 2005, and with the development and production of new aircraft, companies like Boeing, Air Canada, and Bristol Aerospace have recalled their work force. These employers first recall previously laid-off workers, but several reported that they will soon be requiring graduates from the program to meet the return to demand for new technicians. Other training institutes that were surveyed report a similar trend and so there appears to be an increasing nation-wide demand for aerospace manufacturing technicians.	• To change the length from two to three years and to seek acceptance by OACETT (Ontario Association of Certified Engineering Technologist and Technicians) To adapt to the changing demands of which companies will actually hire their graduates in a given year.	• Changes to Industry requirements: Staff indicated a strong demand for graduates from this program in the last two years.

NAIT Northern Alberta Institute of Technology Edmonton, Alberta, T5V1A2	**SAIT Polytechnic Southern Alberta Institute of Technology** Calgary, Alberta T2M0L4	**SAIT Polytechnic Southern Alberta Institute of Technology** Calgary, Alberta T2M0L4
• Actively seeking CAMC (Canadian Aircraft Maintenance Council) approval of the program.	• Content: Included is theoretical knowledge of the physics of flight and performance characteristics that is essential to succeed in the industry. • Changes to Industry requirement: Conversations with staff indicate that there is marked increase in demand from industry for graduates.	• Students learn the skills and knowledge recommended by the Canadian National Advisory Committee to Transport Canada on the training and licensing of Aircraft Maintenance Engineers (A.M.E.) for an entry level "M" A.M.E. To this core curriculum, SAIT adds material that enhances graduates' ability to succeed in a rapidly changing industry.

College	**Red River College Stevenson/Aviation Aerospace and Training Centre** Winnipeg, MB R3J 3Y9	**Confederation College** Thunder Bay, Ontario P7C 4W1	**Sault College of Applied Arts & Technology** 443 Northern Ave. Sault Ste. Marie, ON, P6A 5L3
Curriculum Renewal	• Curriculum renewal is undertaken on an as needed basis and a possible formal Curriculum Validation occurring approximately every 5 years. The Senior Academic Committee may nominate a program to undergo a basic face Validation or a more comprehensive Program renewal.	• The college meets with their steering committee annually to confirm that they are meeting Industry's expectations.	• The curriculum follows the CAMC (Canadian Aircraft Maintenance Council) and Transport Canada model for content and last revision was 2005.
Partnerships	• Red River College recognizes that Graduates of Winnipeg School Division #1 Tech Voc High School's AMMOP (Aerospace Manufacturing & Maintenance Orientation Program) meet the entrance requirement for the Aerospace Manufacturing Technician program. • The Aerospace Manufacturing Technician program was developed in collaboration with Boeing Canada and Bristol Aerospace to specifically meet their requirements for new workers.	• Students are able to transfer credits to and from other programs enabling them to pursue a higher or specialized credential through one of their numerous affiliations with other learning institutions in Ontario.	• This is a Transport Canada approved program (TC 2003-03-4022). Transport Canada Approval accredits graduates ten months toward an "S" category Aircraft Maintenance Engineer License. Graduates may work toward attaining an Aircraft Maintenance Engineer "S" category license by completing the required apprenticeship time/tasks and Transport Canada exams. • Sault College has created an employment network and pursues employment

NAIT Northern Alberta Institute of Technology Edmonton, Alberta, T5V1A2	**SAIT Polytechnic Southern Alberta Institute of Technology** Calgary, Alberta T2M0L4	**SAIT Polytechnic Southern Alberta Institute of Technology** Calgary, Alberta T2M0L4
• Currently fall under Transport Canada's 3 year curriculum audit as well as NAIT's internal program curriculum review.	• The program's accreditation is ongoing and subject to periodic audits from Transport Canada and the Canadian Aviation Maintenance Council (CAMC).	• The program's accreditation is ongoing and subject to periodic audits from Transport Canada and the Canadian Aviation Maintenance Council (CAMC).
• Students meeting all Transport Canada Accreditation requirements will receive the TC 2004-03-2002 number on their certificate. This means that Technical Knowledge meets Standard 566.03(4)(c)for Aircraft Skin and Structures Repair Basic 'S".	• There are currently no formal transfer arrangements.	• Graduates who are in compliance with the required attendance (95%) and minimum marks of 70% will receive Transport Canada credit of 20 months work experience towards the "M" Category A.M.E. License. Students that achieve a B- or better in all courses, and meet the minimum requirements will be eligible for a work experience credit toward an "M" AME license.

College	**Red River College Stevenson/Aviation Aerospace and Training Centre** Winnipeg, MB R3J 3Y9	**Confederation College** Thunder Bay, Ontario P7C 4W1	**Sault College of Applied Arts & Technology** 443 Northern Ave. Sault Ste. Marie, ON, P6A 5L3
Partnerships cont'd			opportunities with companies like Boeing, and Kelona Flight Craft, Company Reps sit on the advisory board.
Other		• The Aerospace Manufacturing Engineering Technician program at Confederation College's Aviation Centre of Excellence (ACE) is a relatively new program and was developed in consultation with Canada's leading aerospace manufacturers".	
Comments	• Graduates will be able to work effectively within a Composite Manufacturing environment, which includes Core manufacturing, Composite repair, Core assembly and basic Sheet metal assembly in aerospace and non aerospace industry.	• Graduates are not expected to function as shop floor technicians, but work more as technical liaison between engineers and technicians in aerospace manufacturing development.	• Students acquire the expertise, knowledge and understanding of both aircraft structural repairs and manufacturing techniques. Techniques, standards, and practices conform to guidelines established by aircraft manufacturers. Employment opportunities have been and are expected in the manufacturing, repair and overhaul sectors.

NAIT Northern Alberta Institute of Technology Edmonton, Alberta, T5V1A2	**SAIT Polytechnic Southern Alberta Institute of Technology** Calgary, Alberta T2M0L4	**SAIT Polytechnic Southern Alberta Institute of Technology** Calgary, Alberta T2M0L4
• The curriculum is designed to provide a broad basic knowledge of the principles involved in modern aircraft structural repairs.	• Students will learn to remove damage, repair aircraft skin, fabricate and assemble components, assess and control corrosion and learn the methods of non-destructive testing.	• The program prepares graduates for career opportunities in all areas of the aviation industry including fixed-wing and rotary-wing aircraft, engine and component overhaul, aircraft heavy maintenance and general, commercial and corporate aviation.

Appendix C- Industry Occupational Analysis (DACUM) Chart

RED RIVER COLLEGE
OF APPLIED ARTS, SCIENCE AND TECHNOLOGY

Aerospace Manufacturing Technician DACUM

Facilitated by Gene Semchych and Jim Mackey
February 22nd and February 23rd, 2006

DACUM Skill Rating Scale

1 - Can perform some parts of this skill satisfactorily but requires assistance and/or supervision to perform the entire skill.
2 - Can perform this skill satisfactorily but requires periodic assistance and/or supervision.
3 - Can perform this skill competently without assistance or supervision.
4 - Can perform this skill competently without, assistance with more than acceptable quality, and with initiative/adaptability to unique situations.

USE TOOLS A

Use measurement tools A1	Measure using metric and imperial systems A2	Convert measurements A3	Use power tools A4	Use hand tools A5	Maintain tools A6	Confirm calibration of tools A7	Use lay-up tools (Mandrel) A8
1 2 3 **4**	1 2 **3** 4	1 2 **3** 4	1 **2** 3 4	1 2 **3** 4	1 2 **3** 4	1 2 3 **4**	1 **2** 3 4

Use assembly tool (Jig) A9	Store tools A10	Use computers A11
1 **2** 3 4	1 2 **3** 4	1 **2** 3 4

USE INDUSTRY RELATED EQUIPMENT B

Use hot bonder B1	Use Autoclave B2	Use CNC B3	Use curing ovens B4	Use cranes B5	Use forklift B6	Use vacuum pumps B7	Maintain equipment B8
1 **2** 3 4	**1** 2 3 4	**1** 2 3 4	1 **2** 3 4	1 **2** 3 4	**1** 2 3 4	1 2 **3** 4	1 **2** 3 4

Use band saws B9	Use lasers B10	Use pneumatic tools B11	Use heat press B12
1 **2** 3 4	1 **2** 3 4	1 2 **3** 4	1 **2** 3 4

WORK TO SPECIFICATIONS C

Select current revision C1	Read / interpret resident plan / op sheet C2	Read / interpret drawings and blueprints C3	Read / interpret data cards and tip sheets C4	Read / interpret gauges and measurement tools C5	Navigate through manuals (digital and hard copy) C6	Read / interpret manuals C7	Read / interpret MSDS C8
1 **2** 3 4	1 **2** 3 4	1 **2** 3 4	1 **2** 3 4	1 2 **3** 4	1 **2** 3 4	1 2 **3** 4	1 2 **3** 4

Apply math and science skills and concepts C9
1 2 **3** 4

COORDINATE PROCESSES
D

Plan and monitor work flow	Assemble tools and material	Coordinate with other areas	Identify problems / deficiencies	Implement changes
D1	D2	D3	D4	D5
1 2 3 4	1 **2** 3 4	**1** 2 3 4	**1** 2 3 4	**1** 2 3 4

WORK WITH TEMPLATES AND SHOP AIDS
E

Verify correct template	Check cleanliness and serviceability	Use core locating templates	Use PLY locating template	Create custom molds / templates	Clean and service template	Use intensifiers and pressure pads	Store templates and shop aids
E1	E2	E3	E4	E5	E6	E7	E8
1 2 **3** 4	1 2 **3** 4	1 2 **3** 4	1 2 **3** 4	**1** 2 3 4	1 **2** 3 4	1 2 **3** 4	1 2 **3** 4

BUILD THE KIT
F

Identify the material	Verify parts list	Record batch numbers	Fill-out material traceability record	Perform visual inspection	Verify stacking sequence	Cut the material	Bag the kit
F1	F2	F3	F4	F5	F6	F7	F8
1 **2** 3 4	1 2 **3** 4	1 2 **3** 4	1 2 **3** 4	1 2 **3** 4	1 2 **3** 4	**1** 2 3 4	1 2 **3** 4

Store the kit
F9
1 2 **3** 4

CONSTRUCT THE PART
G

Select the kit	Select the tooling	Confirm material orientation	Lay-up flat	Lay-up contour	Inspect part	Bag flat part	Bag contour part
G1	G2	G3	G4	G5	G6	G7	G8
1 2 **3** 4	1 2 **3** 4	1 2 **3** 4	1 **2** 3 4	**1** 2 3 4	**1** 2 3 4	1 **2** 3 4	**1** 2 3 4

Check bag for leaks	Label the bagged part	Send to cure
G9	G10	G11
1 2 **3** 4	1 2 **3** 4	1 2 **3** 4

CURE THE PART
H

Verify serviceability of autoclave H1	Load autoclave racks H2	Connect hoses and thermocouples H3	Check for leaks H4	Enter data H5	Push in the racks H6	Select and run schedule H7	De-bag the part H8
1	1	2	1	1	2	1	2
2	2	3	2	2	3	2	3
3	3	4	3	3	4	3	4
4	4	1	4	4	1	4	1

Clean and Frekote mandrel H9
1
2
3
4

REWORK THE PART
I

Assess the damage I1	Initiate repair plan I2	Remove damaged composite I3	Remove damaged structures I4	Perform scarf sanding I5	Perform step sanding I6	Remove core I7	Fabricate core plug I8
1	1	2	1	2	1	2	1
2	2	3	2	3	2	3	2
3	3	4	3	4	3	4	3
4	4	1	4	1	4	1	4

Repair to specs I9	Perform wet lay-up I10
1	1
2	2
3	3
4	4

PREPARE THE CORE
J

Sand the core J1	Splice the core J2	Pot the core J3	Stabilize the core J4	Carry-out heat forming J5	Cut the core J6
1	1	2	1	2	1
2	2	3	2	3	2
3	3	4	3	4	3
4	4	1	4	1	4

TRIM
K

Load / unload part into jig or trim tool K1	Drill holes K2	Countersink holes K3	Spot face / counter bore K4	Trim and debur K5	Chamfer edges K6
1	1	2	1	1	2
2	2	3	2	2	3
3	3	4	3	3	4
4	4	1	4	4	1

SAND AND FILL
L

Prepare the surface	Perform water break test	Mix compound	Apply compound
L1	L2	L3	L4
1 **2** 3 4	1 **2** 3 4	1 2 **3** 4	1 **2** 3 4

PERFORM FINAL ASSEMBLY
M

Fit parts	Clamp components	Install fasteners	Bond and seal	Perform continuity test	Perform electrical bonding	Wet install fasteners	Perform self-inspection and acceptance
M1	M2	M3	M4	M5	M6	M7	M8
1 2 3 4	1 **2** 3 4	1 2 **3** 4	1 2 **3** 4	1 2 **3** 4	1 2 **3** 4	1 2 **3** 4	**1** 2 3 4

Remove fasteners	Torque the fasteners	Use locking fasteners
M9	M10	M11
1 **2** 3 4	1 2 **3** 4	1 **2** 3 4

PAINT
N

Mix paint	Tape off area	Prepare surface for paint	Apply primer	Apply finish coat	Touch-up paint	Remove masking tape	Protect part integrity
N1	N2	N3	N4	N5	N6	N7	N8
1 2 **3** 4	1 **2** 3 4	1 **2** 3 4	1 **2** 3 4	**1** 2 3 4	1 **2** 3 4	1 2 **3** 4	1 **2** 3 4

Buff and polish
N9
1 **2** 3 4

WORK SAFELY
O

Maintain clean environment (5S)	Follow WHMIS	Follow HAZMAT	Use personal protective equipment	Apply ergonomic principles	Follow workplace safety procedures
O1	O2	O3	O4	O5	O6
1 2 **3** 4	1 2 **3** 4	1 2 **3** 4	1 2 **3** 4	1 2 **3** 4	1 **2** 3 4

APPLY PROFESSIONAL SKILLS P																															
	Adapt to changes P1				Demonstrate integrity P2				Anticipate problems P3				Respect others F4				Respond to challenges P5				Work with others P6				Think outside the box P7				Demonstrate punctuality P8			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	Display positive attitude P9				Respond to human factors P10				Demonstrate reliability P11				Demonstrate accountability P12				Demonstrate ethical behaviour P13				Learn continuously P14				Work as part of a team P15							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				

COMMUNICATE Q																															
	Share information Q1				Report problem Q2				Report damage Q3				Report hazards Q4				Initiate service difficulty report Q5				Read Q6				Write Q7				Listen Q8			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	Demonstrate appropriate non-verbal communication skills Q9				Communicate in a manner appropriate to audience Q10				Demonstrate negotiation skills Q11																							
	1	2	3	4	1	2	3	4	1	2	3	4																			

Appendix D - Graduate Skills and Abilities Chart

RED RIVER COLLEGE
OF APPLIED ARTS, SCIENCE AND TECHNOLOGY

Aerospace Manufacturing Technician DACUM Graduate Skills and Abilities Chart

Facilitated by: Robert Richard
Date: March 24/06

DACUM Skill Rating Scale:

1 Can perform some parts of this skill satisfactorily but requires assistance and/or supervision to perform the entire skill.
2 Can perform this skill satisfactorily but requires periodic assistance and/or supervision.
3 Can perform this skill competently without assistance or supervision.
4 Can perform this skill competently without assistance, with more than acceptable quality, and with initiative/adaptability to unique situations.

Indicates skill rating.
DACUM Committee Skill deleted.
Skill or Competency added by Faculty or DACUM wording changed.

Grey shaded Box = General Areas of Competency (GAC)
Unshaded Box = Specific skill within GAC
Capitalized text in CWLOs = General Area of Competency (GAC)
Normal text in CWLOs = Specific skills within GAC

Industry DACUM	Faculty Expectations	College-Wide Learning Outcomes (CWLOs)
USE TOOLS A	**USE INDUSTRY RELATED TOOLS A**	K4 - select and use appropriate tools and technology for a task or project
Use measurement tools A1	Use measurement tools A1	
1 2 3 **4**	1 2 3 **4**	
Measure using metric and imperial systems A2	Measure using metric and imperial systems A2	
1 2 **3** 4	1 2 **3** 4	
Convert measurements A3	Convert measurements A3	
1 2 **3** 4	1 2 **3** 4	
Use power tools A4	Use power tools A4	
1 **2** 3 4	1 2 **3** 4	
Use hand tools A5	Use hand tools A5	
1 2 **3** 4	1 2 **3** 4	

Maintain tools A6	Maintain tools A6	
1 2 **3** 4	1 2 **3** 4	
Confirm calibration of tools A7	Confirm calibration of tools A7	
1 2 3 **4**	1 2 3 **4**	
Use lay-up tools (Mandrel) A8	Use lay-up tools (Mandrel) A8	
1 **2** 3 4	1 **2** 3 4	
Use assembly tool (Jig) A9	Use assembly tool (Jig) A9	
1 **2** 3 4	1 **2** 3 4	
Store tools A10	Store tools A10	
1 2 **3** 4	1 2 **3** 4	
Use computers A11	Use computers A11	
1 **2** 3 4	1 **2** 3 4	
USE INDUSTRY RELATED EQUIPMENT B	USE INDUSTRY RELATED EQUIPMENT B	
Use hot bonder B1	Use hot bonder B1	
1 **2** 3 4	1 **2** 3 4	
Use Autoclave B2	Use Autoclave B2	
1 2 3 4	**1** 2 3 4	
Use CNC B3	Use CNC B3	
1 2 3 4	**1** 2 3 4	

Use curing ovens B4 1 2 3 4	Use curing ovens B4 1 2 3 4	
Use cranes B5 1 2 3 4	Use overhead cranes B5 1 2 3 4	
Use forklift B6 1 2 3 4	Use forklift B6 1 2 3 4	
Use vacuum pumps B7 1 2 3 4	Use vacuum pumps B7 1 2 3 4	
Maintain equipment B8 1 2 3 4	Maintain equipment B8 1 2 3 4	
Use band saws B9 1 2 3 4	Use band saws B9 1 2 3 4	
Use lasers B10 1 2 3 4	Use lasers B10 1 2 3 4	
Use pneumatic tools B11 1 2 3 4	Use pneumatic tools B11 1 2 3 4	
Use heat press B12 1 2 3 4	Use heat press B12 1 2 3 4	

WORK TO SPECIFICATIONS C	WORK TO SPECIFICATIONS C	A1 - read and understand information presented in a variety of forms (e.g. words, graphs, charts, diagrams) B1 - locate, gather and organize information using appropriate technology and information systems B2 - access, analyze and apply knowledge and skills from various disciplines (e.g. the arts, languages, science, technology, mathematics, social sciences, and the humanities) C1 - decide what needs to be measured or calculated D6 - readily use science, technology and mathematics as ways to think, gain and share knowledge, solve problems and make decisions K3 - work to agreed quality standards and specifications
Select current revision C1	Select current revision C1	
1 **2** 3 4	1 2 **3** 4	
Read / interpret resident plan / op sheet C2	Read / interpret resident plan / op sheet C2	
1 **2** 3 4	1 2 **3** 4	
Read / interpret drawings and blueprints C3	Read / interpret drawings and blueprints C3	
1 **2** 3 4	1 **2** 3 4	
Read / interpret data cards and tip sheets C4	Read / interpret data cards and tip sheets C4	
1 **2** 3 4	1 2 **3** 4	
Read / interpret gauges and measurement tools C5	Read / interpret gauges and measurement tools C5	
1 2 **3** 4	1 2 **3** 4	
Navigate through manuals (digital and hard copy) C6	Navigate through manuals (digital and hard copy) C6	
1 **2** 3 4	1 **2** 3 4	
Read / interpret manuals C7	Read / interpret manuals C7	
1 2 **3** 4	1 2 **3** 4	
Read / interpret MSDS C8	Read / interpret MSDS C8	
1 2 **3** 4	1 2 **3** 4	
Apply math and science skills and concepts C9	Apply math and science skills and concepts C9	
1 2 **3** 4	1 2 **3** 4	

COORDINATE PROCESSES D	FOLLOW LEAN MANUFACTURING PRACTICES D
Plan and monitor work flow D1	Plan and monitor work flow D1
1 2 3 4	1 2 3 4
Assemble tools and material D2	Assemble tools and material D2
1 2 3 4	1 2 3 4
Coordinate with other areas D3	Coordinate with other areas D3
1 2 3 4	1 2 3 4
Identify problems / deficiencies D4	Identify problems / deficiencies D4
1 2 3 4	1 2 3 4
Implement changes D5	Implement changes D5
1 2 3 4	1 2 3 4
	Participate in "Kaisen" team blitzes D6
	1 2 3 4

D1 - assess situations and identify problems
D2 - seek different points of view and evaluate them based on facts
D3 - recognize the human, interpersonal, technical, scientific and mathematical dimensions of a problem
D4 - identify the root cause of a problem
D5 - be creative and innovative in exploring possible solutions
D7 - evaluate solutions to make recommendations or decisions
D8 - implement solutions
D9 - check to see if a solution works, and act on opportunities for improvement
G3 - be innovative and resourceful: identify and suggest alternative ways to achieve goals and get the job done
G4 - be open and respond constructively to change
J1 - understand and work within the dynamics of a group
J2 - ensure that a team's purpose and objectives are clear
J3 - be flexible: respect, be open to and supportive of the thoughts, opinions and contributions of others in a group
J4 - recognize and respect people's diversity, individual differences and perspectives
J5 - accept and provide feedback in a constructive and considerate manner
J6 - contribute to a team by sharing information and expertise
J7 - lead or support when appropriate, motivating a group for high performance
J8 - understand the role of conflict in a group to reach solutions
J9 - manage and resolve conflict when appropriate
K1 - plan, design or carry out a project or task from start to finish with well-defined objectives and outcomes
K2 - develop a plan; seek feedback, test, revise and implement,
K6 - continuously monitor the success of a project or task and identify ways to improve

WORK WITH TEMPLATES AND SHOP AIDS E	WORK WITH TEMPLATES AND SHOP AIDS E
Verify correct template E1	Verify correct template E1
1 2 3 4	1 2 3 4
Check cleanliness and serviceability E2	Check cleanliness and serviceability E2
1 2 3 4	1 2 3 4

Use core locating templates E3					Use core locating templates E3				
1	2	3	4		1	2	3	4	
Use PLY locating template E4					Use PLY locating template E4				
1	2	3	4		1	2	3	4	
Create custom molds / templates E5					Create custom molds / templates E5				
1	2	3	4		1	2	3	4	
Clean and service template E6					Clean and service template E6				
1	2	3	4		1	2	3	4	
Use intensifiers and pressure pads E7					Use intensifiers and pressure pads E7				
1	2	3	4		1	2	3	4	
Store templates and shop aids E8					Store templates and shop aids E8				
1	2	3	4		1	2	3	4	
					Use core trim template E9				
					1	2	3	4	
					Use hand routing fixture E10				
					1	2	3	4	

BUILD THE KIT F					BUILD THE KIT F				
Identify the material F1					Identify the material F1				
1	2	3	4		1	2	3	4	

Verify parts list F2	Verify parts list F2	
1 2 3 4	1 2 3 4	
Record batch numbers F3	Record batch numbers F3	
1 2 3 4	1 2 3 4	
Fill-out material traceability record F4	Fill-out material traceability record F4	
1 2 3 4	1 2 3 4	
Perform visual inspection F5	Perform visual inspection F5	
1 2 3 4	1 2 3 4	
Verify stacking sequence F6	Verify stacking sequence F6	
1 2 3 4	1 2 3 4	
Cut the material F7	Cut and label the material F7	
1 2 3 4	1 2 3 4	
Bag the kit F8	Bag / label the kit F8	
1 2 3 4	1 2 3 4	
Store the kit F9	Store the kit F9	
1 2 3 4	1 2 3 4	

CONSTRUCT THE PART G	CONSTRUCT THE PART G	
Select the kit G1	Select the kit G1	
1 2 3 4	1 2 3 4	

Select the tooling G2 1 2 **3** 4	Select the tooling G2 1 2 **3** 4	
Confirm material orientation G3 1 2 **3** 4	Confirm material orientation G3 1 2 **3** 4	
Lay-up flat G4 1 **2** 3 4	Lay-up flat G4 1 2 **3** 4	
Lay-up contour G5 **1** 2 3 4	Lay-up contour G5 **1** 2 3 4	
Inspect part G6 **1** 2 3 4	Inspect part G6 1 **2** 3 4	
Bag flat part G7 1 **2** 3 4	Bag flat part G7 1 **2** 3 4	
Bag contour part G8 **1** 2 3 4	Bag contour part G8 **1** 2 3 4	
Check bag for leaks G9 1 2 **3** 4	Check bag for leaks G9 1 2 **3** 4	
Label the bagged part G10 1 2 **3** 4	Label the bagged part G10 1 2 **3** 4	
Send to cure G11 1 2 **3** 4	Send to cure G11 1 2 **3** 4	

Perform temporary compactions G12	1 **2** 3 4	
Label the part G13	1 2 **3** 4	

CURE THE PART H	CURE THE PART H	
Verify serviceability of autoclave H1	Verify serviceability of autoclave H1	
1 2 3 4	**1** 2 3 4	
Load autoclave racks H2	Load autoclave racks H2	
1 2 3 4	**1** 2 3 4	
Connect hoses and thermocouples H3	Connect hoses and thermocouples H3	
1 **2** 3 4	1 **2** 3 4	
Check for leaks H4	Check for leaks H4	
1 2 **3** 4	1 2 **3** 4	
Enter data H5	Enter data H5	
1 2 3 4	**1** 2 3 4	
Push in the racks H6	Push in the racks H6	
1 **2** 3 4	1 **2** 3 4	
Select and run schedule H7	Select and run schedule H7	
1 2 3 4	**1** 2 3 4	

De-bag the part H8 1 **2** 3 4	De-bag the part H8 1 **2** 3 4	
Clean and Frekote mandrel H9 1 2 **3** 4	Clean and Frekote mandrel H9 1 2 **3** 4	

REWORK THE PART I	REWORK THE PART I	C2 - observe and record data using appropriate methods, tools and technology C3 - make estimates and verify calculations
Assess the damage I1 **1** 2 3 4	Assess the damage I1 **1** 2 3 4	
Initiate repair plan I2 **1** 2 3 4	Initiate repair plan I2 **1** 2 3 4	
Remove damaged composite I3 1 **2** 3 4	Remove damaged composite I3 1 **2** 3 4	
Remove damaged structures I4 1 **2** 3 4	Remove damaged structures I4 1 **2** 3 4	
Perform scarf sanding I5 1 **2** 3 4	Perform scarf sanding I5 1 **2** 3 4	
Perform step sanding I6 1 **2** 3 4	Perform step sanding I6 1 **2** 3 4	
Remove core I7 1 **2** 3 4	Remove core I7 1 **2** 3 4	

Fabricate core plug I8 1 2 3 4	Fabricate core plug I8 1 2 3 4	
Repair to specs I9 1 2 3 4	Repair to specs I9 1 2 3 4	
Perform wet lay-up I10 1 2 3 4	Perform wet lay-up I10 1 2 3 4	

PREPARE THE CORE J	PREPARE THE CORE J	
Sand the core J1 1 2 3 4	Sand the core J1 1 2 3 4	
Splice the core J2 1 2 3 4	Splice the core J2 1 2 3 4	
Pot the core J3 1 2 3 4	Pot the core J3 1 2 3 4	
Stabilize the core J4 1 2 3 4	Stabilize the core J4 1 2 3 4	
Carry-out heat forming J5 1 2 3 4	Carry-out heat forming J5 1 2 3 4	
Cut the core J6 1 2 3 4	Cut the core J6 1 2 3 4	
	Identify core material J7 1 2 3 4	

TRIM K	TRIM THE PART K	
Load / unload part into jig or trim tool K1	Load / unload part into jig or trim tool K1	
1 2 3 4	1 2 3 4	
Drill holes K2	Drill holes K2	
1 2 3 4	1 2 3 4	
Countersink holes K3	Countersink holes K3	
1 2 3 4	1 2 3 4	
Spot face / counter bore K4	Spot face / counter bore K4	
1 2 3 4	1 2 3 4	
Trim and debur K5	Trim and debur K5	
1 2 3 4	1 2 3 4	
Chamfer edges K6	Chamfer edges K6	
1 2 3 4	1 2 3 4	

SAND AND FILL L	SAND AND FILL THE PART L	
Prepare the surface L1	Prepare the surface L1	
1 2 3 4	1 2 3 4	
Perform water break test L2	Perform water break test L2	
1 2 3 4	1 2 3 4	
Mix compound L3	Mix compound L3	
1 2 3 4	1 2 3 4	

Apply compound L4 1 2 3 4	Apply compound L4 1 2 3 4 Finish the surface L5 1 2 3 4	
PERFORM FINAL ASSEMBLY M	PERFORM FINAL ASSEMBLY M	
Fit parts M1 1 2 3 4	Fit parts M1 1 2 3 4	
Clamp components M2 1 2 3 4	Clamp components M2 1 2 3 4	
Install fasteners M3 1 2 3 4	Install fasteners M3 1 2 3 4	
Bond and seal M4 1 2 3 4	Bond and seal M4 1 2 3 4	
Perform continuity test M5 1 2 3 4	Perform continuity test M5 1 2 3 4	
Perform electrical bonding M6 1 2 3 4	Perform electrical bonding M6 1 2 3 4	
Wet install fasteners M7 1 2 3 4	Wet install fasteners M7 1 2 3 4	

Perform self-inspection and acceptance M8	Perform self-inspection and acceptance M8	
1 2 3 4	1 2 3 4	
Remove fasteners M9	Remove fasteners M9	
1 2 3 4	1 2 3 4	
Torque the fasteners M10	Torque the fasteners M10	
1 2 3 4	1 2 3 4	
Use locking fasteners M11	Use locking fasteners M11	
1 2 3 4	1 2 3 4	

PAINT N	PAINT THE PART/ASSEMBLY N	
Mix paint N1	Mix paint N1	
1 2 3 4	1 2 3 4	
Tape off area N2	Tape off area N2	
1 2 3 4	1 2 3 4	
Prepare surface for paint N3	Prepare surface for paint N3	
1 2 3 4	1 2 3 4	
Apply primer N4	Apply primer N4	
1 2 3 4	1 2 3 4	

Apply finish coat N5 1 2 3 4	Apply finish coat N5 1 2 3 4	
Touch-up paint N6 1 2 3 4	Touch-up paint N6 1 2 3 4	
Remove masking tape N7 1 2 3 4	Remove masking tape N7 1 2 3 4	
Protect part integrity N8 1 2 3 4	Protect part integrity N8 1 2 3 4	
Buff and polish N9 1 2 3 4	Buff and polish N9 1 2 3 4	

WORK SAFELY O	WORK SAFELY O	C2 - observe and record data using appropriate methods, tools and technology C3 - make estimates and verify calculations E4 - take care of your personal health F3 - assess, weigh and manage risk I1 - be aware of personal and group health and safety practices and procedures, and act in accordance with these
Maintain clean environment (5S) O1 1 2 3 4	Maintain clean environment (5S) O1 1 2 3 4	
Follow WHMIS O2 1 2 3 4	Follow WHMIS O2 1 2 3 4	
Follow HAZMAT O3 1 2 3 4	Follow HAZMAT O3 1 2 3 4	
Use personal protective equipment O4 1 2 3 4	Use personal protective equipment O4 1 2 3 4	

Apply ergonomic principles O5					Apply ergonomic principles O5						
1	2	3	4		1	2	3	4			
Follow workplace safety procedures O6					Follow workplace safety procedures O6						
1	2	3	4		1	2	3	4			
APPLY PROFESSIONAL SKILLS P					APPLY PROFESSIONAL SKILLS P						E1 - feel good about yourself and be confident E2 - deal with people, problems and situations with honesty, integrity and personal ethics E3 - recognize your own and other people's good efforts E5 - Show interest, initiative and effort F1 - set goals and priorities balancing work and personal life F2 - plan and manage time, money and other resources to achieve goals F4 - be accountable for your actions and the actions of your group F5 - be socially responsible and contribute to your community G1 - work independently or as a part of a team G2 - carry out multiple tasks or projects G5 - learn from your mistakes and accept feedback G6 - cope with uncertainty H1 - be willing to continuously learn and grow H2 - assess personal strengths and areas for development H3 - set your own learning goals H4 - identify and access learning sources and opportunities H5 - plan for and achieve your learning goals K2 - develop a plan; seek feedback, test, revise and implement
Adapt to changes P1					Adapt to changes P1						
1	2	3	4		1	2	3	4			
Demonstrate integrity P2					Demonstrate integrity P2						
1	2	3	4		1	2	3	4			
Anticipate problems P3					Anticipate problems P3						
1	2	3	4		1	2	3	4			
Respect others F4					Respect others F4						
1	2	3	4		1	2	3	4			
Respond to challenges P5					Respond to challenges P5						
1	2	3	4		1	2	3	4			
Work with others P6					Work with others P6						
1	2	3	4		1	2	3	4			
Think outside the box P7					Think outside the box P7						
1	2	3	4		1	2	3	4			

Demonstrate punctuality P8 1 2 3 **4**	Demonstrate punctuality P8 1 2 3 **4**	
Display positive attitude P9 1 2 3 **4**	Display positive attitude P9 1 2 3 **4**	
Respond to human factors P10 1 2 **3** 4	Respond to human factors P10 1 2 **3** 4	
Demonstrate reliability P11 1 2 3 **4**	Demonstrate reliability P11 1 2 3 **4**	
Demonstrate accountability P12 1 2 3 **4**	Demonstrate accountability P12 1 2 3 **4**	
Demonstrate ethical behaviour P13 1 2 3 **4**	Demonstrate ethical behaviour P13 1 2 3 **4**	
Learn continuously P14 1 2 **3** 4	Learn continuously P14 1 2 **3** 4	
Work as part of a team P15 1 2 3 **4**	Work as part of a team P15 1 2 3 **4**	

COMMUNICATE Q Share information Q1 1 2 3 **4**	COMMUNICATE Q Share information Q1 1 2 3 **4**	A2 - write and speak so others pay attention and understand A3 - listen and ask questions to understand and appreciate the points of view of others A4 - share information using a range of information and communications technologies (e.g. voice, e-mail, computers) A5 - use relevant scientific, technological and mathematical knowledge and skills to explain or clarify ideas

Report problem Q2 1 2 3 4	Report problem Q2 1 2 3 4	
Report damage Q3 1 2 3 4	Report damage Q3 1 2 3 4	
Report hazards Q4 1 2 3 4	Report hazards Q4 1 2 3 4	
Initiate service difficulty report Q5 1 2 3 4	Initiate service difficulty report Q5 1 2 3 4	
Read Q6 1 2 3 4	Read Q6 1 2 3 4	
Write Q7 1 2 3 4	Write Q7 1 2 3 4	
Listen Q8 1 2 3 4	Listen Q8 1 2 3 4	
Demonstrate appropriate non-verbal communication skills Q9 1 2 3 4	Demonstrate appropriate non-verbal communication skills Q9 1 2 3 4	
Communicate in a manner appropriate to audience Q10 1 2 3 4	Communicate in a manner appropriate to audience Q10 1 2 3 4	
Demonstrate negotiation skills Q11 1 2 3 4	Demonstrate negotiation skills Q11 1 2 3 4	

Appendix E - Graduate Profile

Aerospace Manufacturing Technician Program

Graduate Profile

The Aerospace Manufacturing Technician Graduate:

- Works safely, following relevant government and industry guidelines, regulations, standards, safety codes and practices.
- Reads and interprets information in a variety of formats (e.g. manuals, forms, schematics, blueprints and drawings) to plan and complete tasks.
- Communicates effectively using the written, spoken, and non-verbal communication skills that fulfills the purpose and meets the needs of the audience.
- Interacts with others in ways that contribute to effective working relationships and the completion of tasks.
- Selects, uses and maintains a variety of specialized tools and equipment to fabricate, repair and assemble parts and structures.
- Selects, uses and maintains a variety of precision measurement equipment to ensure compliance of all work to material and process specifications.
- Applies a variety of mathematical techniques to plan and complete tasks.
- Plans, implements and monitors work flow in accordance with lean manufacturing principles.
- Fabricates honeycomb core details using a variety of techniques for composite sandwich panels.
- Fabricates complex structural aerospace components using a variety of hand lay-up techniques.
- Trims composite structures to drawing size requirements.
- Assembles sheet metal and composite structure following specified fitting, fastening and sealing processes.
- Uses surface finishing compounds and techniques to prepare the composite structure for the final paint process.
- Paints and polishes the finished composite structures.
- Repairs defective composite structures to specifications using a variety of repair and refinishing techniques.
- Maintains high standards in all aspects of the job by adhering to quality assurance practices and by responding to the human factors affecting performance.
- Works as a professional, demonstrating a positive attitude, commitment, and discipline.
- Learns continuously, keeping up-to-date with industry skills requirements.

Appendix F - Program Renewal Vision and Goals

Program Renewal Vision and Goals (Appendix F)

The renewal of the Aerospace Manufacturing Technician program is the result of translating the preceding five deliverables into a coherent plan for the renewal of the program. (Note: the **Industry Focus Group** report is an additional deliverable of the Program Renewal process for the AMT program)

A half-day workshop was held with faculty and the Director to identify a program vision and goals for program renewal. Utilizing the results of this vision and goals workshop, the Curriculum Consultant in collaboration with the Curriculum Validation Facilitator and the Director created a final vision statement along with 7 goals that will guide the program renewal process over the next five years.

The Aerospace Manufacturing Technician program's vision is to be recognized as a leader in the provision of training that prepares graduates for employment in the aerospace composites manufacturing and repair industries. The following goals were identified to realize this vision:

A. Marketing
    1. Raise the profile of the program and implement strategies to recruit prospective students.

B. Program Recognition
    2. Maintain leadership in the training for composites manufacturing and repair and ensure that this leadership is recognized by employers and accreditation bodies.

C. Partnerships
    3. Strengthen existing partnerships with industry, government bodies, materials suppliers and other groups to ensure that the program graduates continue to meet current and future industry requirements.
    4. Continue to offer industry partners with specialized training to meet their ongoing employee development needs.

D. Curriculum
    5. Deliver an up-to-date certificate program that will meet the training needs of persons preparing for a variety of entry-level positions in aerospace composites manufacture and repair.

E. Industry Experience
    6. Determine the viability of introducing a work experience component to the program to reinforce classroom and lab training with in-industry exposure.

F. Resources
    7. Ensure that the facilities, staffing and other resources that are available to the program are sufficient to achieve its vision.

Appendix G - Program Renewal Plan

Program Renewal Plan (Appendix G)

The Program Renewal Plan will serve as the basis for the improvement of the Aerospace Manufacturing Technician program. The Director and faculty are committed to renewing the program over the next 5-year period.

The following tasks (and timelines) were identified for completion by the end of June 2011.

1. Raise the profile of the program and implement strategies to recruit prospective students.
    - Change the name of the program to ***Aerospace Composites Technician*** which would more accurately reflect the focus of the program. (Jan./07 – March/07)
    - In collaboration with Marketing and Public Relations develop and implement marketing strategies to recruit local, national and international applicants to the program. (Feb./07 – Sept./07)

2. Maintain leadership in the training for composites manufacture and repair and ensure that this leadership is recognized by employers and accrediting bodies.
    - Continue to work with the Canadian Aviation Maintenance Council (CAMC) to meet their curriculum standards and program accreditation requirements. (Sept.06 – June/11)
    - Work with Transport Canada to have the program recognized as meeting some of the credit requirements toward Aircraft Maintenance Engineer (AME) licensure. (Sept./07 – June/09)
    - Develop a quality system to document and verify that the training being conducted meets the requirements for accreditation. (Jan./08 – June/08)

3. Strengthen existing partnerships with industry, government bodies, materials suppliers and other groups to ensure that the program graduates continue to meet current and future industry requirements.
    - Establish a Program Advisory Committee to provide guidance and advice on all matters related to the program and to ensure that the program remains relevant to both students and employers. (Sept./06 – Feb./07)
    - Request clear and consistent reporting on future industry trends from the industry led strategic council which provides overall guidance to the Stevenson Aviation and Aerospace Training Centre. (Sept./06 – Oct./06)
    - Re-establish program affiliation with Career Trek Inc. to provide at-risk, middle-years students with age-appropriate, hands-on experience in working with composites. (Oct./06 – Nov./06)
    - Continue to work with the Manitoba Aerospace Human Resources Coordinating Committee (MAHRCC) and establish strategic relationships with local educational institutions that offer related programming (e.g. Tec-Voc High School, Murdoch MacKay Collegiate and the Faculty of Engineering and Composites Innovation Centre, U of M). (Sept./06 – June/11)
    - Work with industry partners and RRC Human Resource Services to create return-to-industry opportunities for on-going faculty development. (Sept./06 – June/11)

4. Continue to offer industry partners with specialized training to meet their ongoing employee development needs.
    - Maintain a modularized approach in the delivery of the program that will provide RRC/SAATC the flexibility to offer only those specific program components that industry partners require to upgrade their employees' skills. (Sept./06 – June/11)

5. Deliver an up-to-date certificate program that will meet the training needs of persons preparing for a variety of entry-level positions in aerospace composites manufacture and repair.
    - Revise the curriculum to reflect the Graduate Skills and Abilities chart and place more emphasis on CARs, human factors, lean manufacturing, quality assurance/inspection, autoclave, and additional manufacturing processes. (Oct./06 – Feb./07)
    - Update all course outlines to adhere to the standardized course outline using the Course Outline Web. (Dec./06 – Aug./07)

6. Determine the viability of introducing a work experience component to the program to reinforce classroom and lab training with in-industry exposure.
    - Work with the program Advisory Committee to assess the need for and the impact of introducing a work experience component on the delivery of the program. (Feb./07 – Dec./07)

7. Ensure that the facilities, staffing and other resources that are available to the program are sufficient to achieve its vision.
    - Work with materials suppliers to ensure that the program faculty has access to the newest materials to test and use in the delivery of the program. (Sept./06 – June/11)
    - Equip the composites manufacturing and repair labs with computer work stations. (July/08 – June/09)
    - Provide faculty with sufficient professional development opportunities and resources to ensure that they maintain high teaching standards and remain current with the latest technology and the requirements of industry. (Sept.06 – Feb.09)

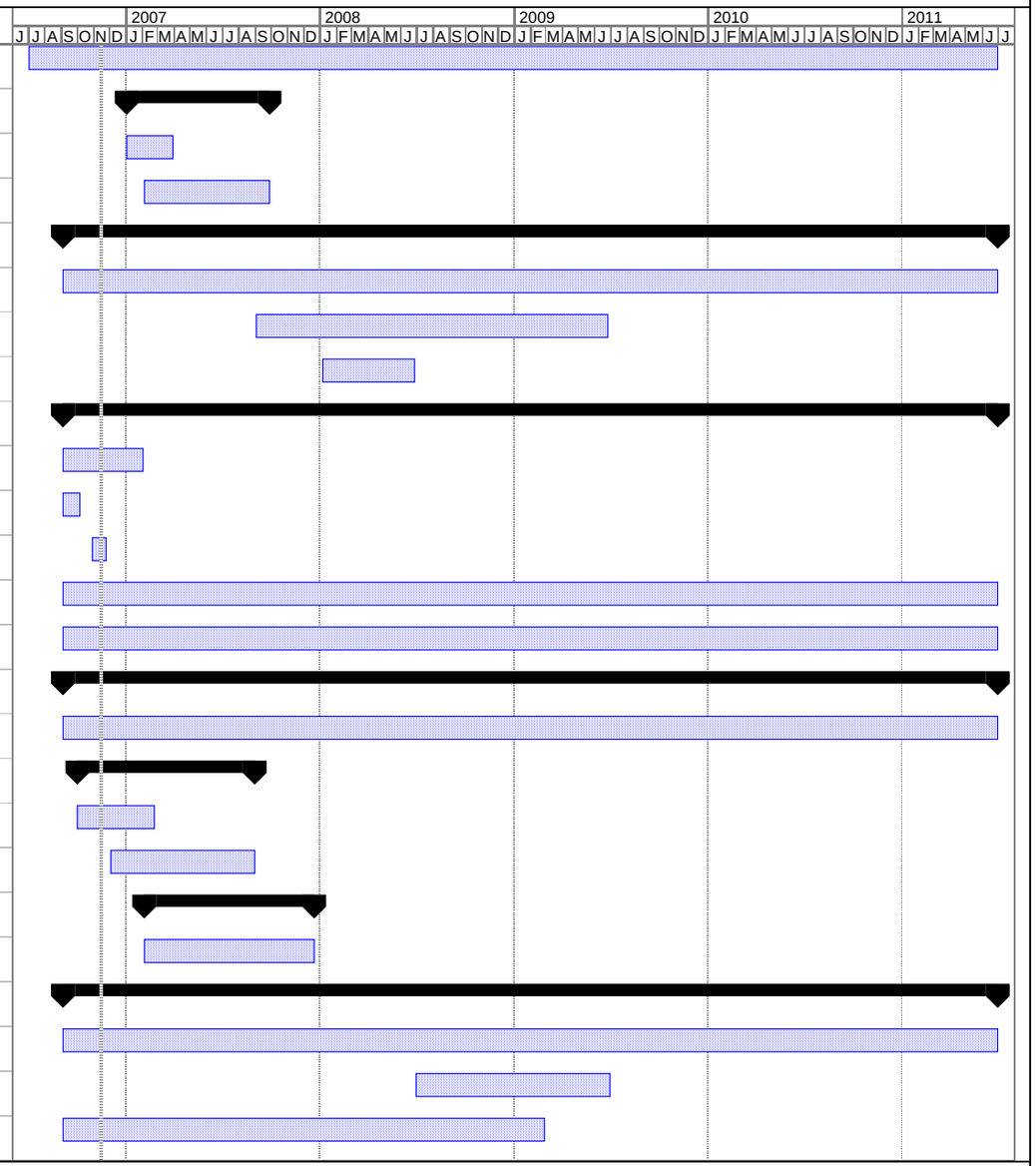
Conclusions:

The Curriculum Validation – Program Renewal process has provided a benchmark against which the renewal of the AMT program can be tracked and measured. The Program Renewal goals that were identified will ensure that the program is recognized as a leader in the provision of training that prepares graduates for a variety of employment opportunities in aerospace manufacturing and repair industries. The Program Renewal plan will serve to guide the Director with the assignment of resources to accomplish the renewal goals within a 5-year timeframe.

Appendix H - 5 –Year Program Renewal Timeline in Gantt format

Aerospace Manufacturing Technician
Program Renewal

ID	Task Name
1	AMT Program Renewal Plan
2	**1. Raise the profile of the program and implement strategies to recruit prospective students.**
3	Change the name of the program to Aerospace Composites Technician which would more accurately reflect its focus.
4	In collaboration with Marketing and Public Relations develop and implement marketing strategies to recruit applicants.
5	**2. Maintain leadership in the training for composites mfg./repair and ensure recognitionof the program by employers and accrediting bodies.**
6	Continue to work with the CAMC to meet their curriculum standards and program accreditation requirements.
7	Work with Transport Canada to have the program recognized as meeting some of the credit requirements toward AME licensure.
8	Develop a quality system to document and verify that the training being conducted meets the requirements for accreditation.
9	**3. Strengthen existing partnerships to ensure that graduates continue to meet current and future industry requirements.**
10	Establish a Program Advisory Committee to provide guidance and advice on all matters related to the program.
11	Request clear and consistent reporting on future industry trends from the industry-led strategic council which provides overall guidance to the SAATC.
12	Re-establish program affiliation with Career Trek Inc.
13	Continue to work with the MAHRCC and establish strategic relationships with local educational institutions that offer related programming.
14	Work with industry partners and RRC Human Resource Services to create return-to-industry opportunities for on-going faculty development.
15	**4. Continue to offer industry partners with specialized training to meet their ongoing employee development needs.**
16	Maintain a modularized delivery approach that will provide the program the flexibility to offer components that industry requires to upgrade employees.
17	**5. Deliver an up-to-date program that will prepare persons for a variety of entry-level positions in aerospace composites mfg./repair.**
18	Revise the curriculum by placing more emphasis on CARs, human factors, lean mfg., QA/inspection, autoclave, and additional mfg. processes.
19	Update all course outlines to adhere to the standardized course outline using the Course Outline Web.
20	**6. Determine the viability of introducing a work experience component to the program.**
21	Work with the program Advisory Committee to assess the need for and the impact of introducing a work experience component.
22	**7. Ensure that the facilities, staffing and other resources that are available to the program are sufficient to achieve its vision.**
23	Work with materials suppliers to ensure that the program faculty has access to the newest materials to test and use in the delivery of the program.
24	Equip the composites mfg. and repair labs with computer work stations.
25	Provide faculty with sufficient professional development opportunities and resources.



Date: Tue 14/11/06

Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline