



Innovation Through Research Excellence

ANNUAL REPORT 2007-2008

AUTO21 . Developing the knowledge, technologies and people for Canada's automotive sector

Through a collaborative approach to automotive research and development, the AUTO21 Network of Centres of Excellence is strengthening Canada's automotive sector. Since 2001, AUTO21 and its partners have invested more than \$85 million in automotive research, including a commitment from the Government of Canada of \$52 million. This funding supports projects in the areas of health, safety and injury prevention; societal issues; materials and manufacturing; design processes; powertrains, fuels and emissions; and intelligent systems and sensors. The projects provide hands-on research and industry training to graduate and post-graduate level students at more than 40 Canadian universities.

The AUTO21 Mission

AUTO21 will help build a stronger automotive sector in Canada through excellence in public/private sector collaborative research and the development of human and social capital.

People and Partners

University researchers - 244
Industry researchers - 6
Public-sector researchers - 20
Highly qualified people (HQP) - 438
Industry partners - 70
Public sector partners - 34
University partners - 41
Research projects - 41

The AUTO21 Vision

AUTO21 will create a dynamic Canadian research and development community contributing to a sustainable, globally competitive Canadian automotive sector resulting in enhanced quality of life for Canadians.

Knowledge Transfer: April 1, 2007 - March 31, 2008

Number of papers published/accepted - 240
Number of papers in submission - 57
Number of papers presented at conferences - 445
Patents filed/granted - 9
Copyrights - 3
Licences - 2



Member of the Networks of Centres of Excellence of Canada
Membre des Réseaux de centres d'excellence du Canada



The University of Windsor is proud to host
the AUTO21 Administrative Centre.



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A Message from the Chair of the Board of Directors



Renewal. It is a word and a process that has shadowed many of AUTO21's operations over the last 18 months. Since our success at the 2004 mid-term review, planning for the renewal application has been a priority for the Board of Directors, and this priority has filtered through to all AUTO21 stakeholders.

A key challenge affecting the planning process has been the constantly evolving industry with which we work. The global automotive sector is undergoing rapid and dramatic changes that are all having a strong influence on Canada's own automotive sector. The price of oil continues to set new records, and other commodities and raw materials are facing similar increases. These increases, particularly in fuel costs, are causing shifts in market share and vehicle popularity at a breathtaking speed. Automakers are also facing very intense regulatory pressure to improve fuel efficiency with aggressive improvements that can only be achieved through a very strong and sustained research and development effort in virtually all aspects of automotive technology. At the same time, the rapid depreciation of the U.S. dollar has dramatically changed the fundamental economics of Canada's export-based auto industry.

I know that we can count on our community and supporters to continue to work together to do even more of the awesome things that have already had such a tremendous impact on Canada's automotive industry.

All of these issues, and many more too numerous to describe, have implications to AUTO21 and the research programs it supports. For many of us, the result is opportunity. In fact, there has never been a time when the research and development, and the HQP that AUTO21 supports, were more important than they are right now.

The Government of Canada working together with the automotive industry recognizes the many challenges facing the sector and has developed an action plan to address them. One of the pillars of this action plan is innovation. Together with industry, Canada has re-invested in AUTO21 for a second funding cycle. We know that our partners see the value of a national automotive research organization and the many positive benefits that we have created thus far for both the industry and for Canada at large. Looking forward, we must continue to remind ourselves that we are partnered with two powerhouses: the Government of Canada and the country's auto industry, and that our fundamental mission is to help build a stronger auto sector in Canada to the benefit of the many hundreds of thousands of Canadian families who depend on it.

Renewal means celebration, but it also means setting our sights on the future. Under the current NCE structure, AUTO21's NCE funding is fixed at \$5.8 million per year till the next review and will conclude in 2015. However, the research community, industry, and AUTO21's Board of Directors have all clearly signalled that we must find a way to continue to grow and increase our contributions to the sector well beyond the next funding cycle. Therefore, with renewal successfully behind us, it is now time to turn our thoughts and planning toward increasing our contributions and life after 2015. What will be needed by the Canadian auto sector? How can AUTO21 best help the industry to achieve success? What steps should AUTO21 take to ensure that it can become even more flexible and agile for all of its stakeholders so that it can continue to play an even more vital and relevant role in Canada's automotive research and development arena?

Over the course of the next seven years, I know that we can count on our community and supporters to continue to work together to do even more of the awesome things that have already had such a tremendous impact

on Canada's automotive industry. But, while we do that, I also ask you to turn your ingenuity toward continuous improvement, even greater value creation, and to life after 2015. The next seven years will pass in the mere blink of an eye. With your help, we will be ready when that time arrives and we will all look back on what we have done with great pride – we will look forward to new challenges with confidence and determination – and we will celebrate again.



Dr. John L. Mann,
Chair of the AUTO21 Board of Directors

A Message from the Scientific Director and CEO



This past year has been one of endings and one of new beginnings. It marks the seventh and final year of AUTO21's first funding cycle. As per the Networks of Centres of Excellence program, all NCEs are funded for seven-year terms, with the opportunity to apply for a total of two funding terms for a lifespan of 14 years.

What has AUTO21 accomplished in its first seven years? Lots! Eight years ago, pockets of automotive research and development existed at a few universities across Canada, with little interaction or collaboration amongst them. Today, more than 300 researchers at 43 universities from coast to coast are actively engaged in a thriving automotive R&D community supported by AUTO21 and other funders.

What's even more exciting is the ever-expanding pool of highly qualified people (HQP), or student researchers, who have gained valuable experience through participation in the AUTO21 network. In our first seven years, more than 1,100 students have taken part in the Network and activities that focus on building their skills as researchers while increasing their awareness of the Canadian and global automotive sector and the challenges and opportunities the sector presents. Many AUTO21 HQP have graduated and now work in the auto industry, while others have

This remarkable community of human capital has generated 92 patents, licenses and copyrights filed and/or granted since 2001.

continued their studies or moved into other important fields where their knowledge of the world's largest and fastest moving business will stand them in good stead. A select few have paid AUTO21 the best compliment: they have become faculty members and project researchers and in some cases, project leaders. The whole picture of how our HQP and the network researchers have grown and evolved in their respective careers is one of the most exciting parts of chapter one of the AUTO21 story.

This remarkable community of human capital has generated 92 patents, licenses and copyrights filed and/or granted since 2001. And these patents, licenses and copyrights aren't sitting on a shelf. Thanks to AUTO21's requirement that each project have at least one receptor organization, the knowledge and technologies generated by the Network are being embraced within the Canadian automotive sector.

Since 2001, AUTO21 has funded 91 projects, 37 of which are complete. In total, current and previously funded projects have led to more than 3,500 papers being published in academic journals and presented at conferences in North America and abroad.

Developing the knowledge, technology and people required for the success of Canada's automotive sector requires research excellence and a firm investment by both the public and private sector. AUTO21 possesses both. Since 2001, the Government of Canada has invested \$40 million, while external investment from private and public sector partners has added another \$24 million. One must also consider the countless hours of senior executive time that has helped to steer projects and to govern the Network itself through the participants on the Board of Directors and Research Management Committee.

For seven years, AUTO21 has cultivated this national pool of talent, developed key relationships within the automotive industry and finely honed the mechanisms to support such a venture. We were pleased with the confidence shown by the Government of Canada during the Network's request for renewal of a second seven-year term. The successful application was announced in November 2007. The \$23 million during the first four years will allow AUTO21 to continue to invest in automotive R&D and also to enhance the programs it offers to its research community.

These new programs will help students learn more about the auto sector and also to polish the complementary skills

needed to succeed in today's global business environment. The programs will provide funding assistance to researchers and students to travel within Canada and overseas to share their research with the others and also to learn from finest international experts.

And to better meet the needs of the quickly-evolving automotive industry, AUTO21 has introduced a new funding mechanism to allow for short-term feasibility investigations between research teams and the private sector to explore potential collaborative opportunities.

All of these programs and the successes so far are thanks to the hard work of AUTO21's committed research community, its Board of Directors, the Research Management Committee and the Scientific Advisory Committee, and the administrative centre staff. In closing, I would also like to acknowledge the continued support from the Government of Canada and AUTO21's private and public sector partners. Together, we are achieving great things!



Dr. Peter R. Frise
Scientific Director & CEO

AUTO21 Projects: 2007-2008

PROJECT TITLE

Health, Safety and Injury Prevention

Safe Transportation for Seniors

Injury Prevention for Auto Workers

Advanced Automotive Seat Design

Enhanced Child Safety in Automobiles

Societal Issues

Evolution of Life Cycle Assessments

Automobile-Linked Crime in Canada

Automotive Industry-Government Relations in the 21st Century

Canadian Labour Market Relations, Regulations & Innovation

Materials and Manufacturing

Composite Acoustic Materials for Noise/Vibration Control

Laser Welding of Thermoplastics

Powder Metallurgy for High-Performance Automotive Components

High Efficiency Machining Processes

Wrought Magnesium for Automobiles

Fine-Celled Foam Structures for Automotive TPO Components

Renewable Biofibres and Biomaterials for Interior Parts

Processing Technologies of Light Materials Cast Components

Optimization of Composite Manufacturing by Resin Injection

Chemically Enhanced Formability of Automotive Aluminum Alloys

Magnesium Casting Processes II

Hydroforming of Advanced High Strength Steels

New Generation Steels II

Welding Processes of Advanced Materials

PROJECT LEADER

Dr. M. Bédard, Lakehead University

Dr. J. Miller Polgar, University of Western Ontario

Dr. J. Callaghan, University of Waterloo

Dr. D. Romilly, University of British Columbia

Dr. J. Durkin, University of Waterloo

Dr. A. Snowdon, University of Windsor

Dr. A. Howard, The Hospital for Sick Children, Toronto

Dr. H. MacLean, University of Toronto

Dr. R. Linden, University of Manitoba

Dr. R. Smart/Dr. R. Mann,

Centre for Addiction & Mental Health

Dr. D. Anastakis, Trent University

Dr. C. Yates, McMaster University

Dr. N. Atalla, Université de Sherbrooke

Dr. P. Bates, Royal Military College

Dr. C. Blais, Université Laval

Dr. M. Elbestawi, McMaster University

Dr. M. Niewczas, McMaster University

Dr. C. Park, University of Toronto

Dr. M. Sain, University of Toronto

Dr. S. Cockcroft, University of British Columbia

Dr. P. Hubert, McGill University

Dr. D. Malakhov, McMaster University

Dr. J. Wood, University of Western Ontario

Dr. M. Worswick, University of Waterloo

Dr. S. Yue, McGill University

Dr. N. Zhou, University of Waterloo

PROJECT TITLE

Powertrains, Fuels and Emissions

Electronic Controls for VT & HCCI Combustion
Chemical Hydrogen Storage Process Development
PEM Fuel Cells and Related Technologies
Hydrogen Safety & Infrastructure for Hydrogen Vehicles
On-Board Fuel Cell Powered Auxiliary Power Units
Combustion of Low-Emission Automotive-Tailored Natural Gas
Ultra-Clean Biodiesel Engines
Biodiesel Fuel for Sustainable Mobility

Design Processes

Regenerative Braking Systems
Collaborative Design Tools for Multidisciplinary Design
Neuro-Fuzzy Systems for Inspection in Manufacturing Processes
Model-Based Damage Diagnosis of Components

Intelligent Systems and Sensors

Canadian Automobile Research Simulation

Integrated Navigation & Communications Systems Development
Vehicle Communications & Applications

Cephalo-Ocular Behaviour & Visual Search Patterns of Drivers
Smart Technologies for Improved Acoustic Environment of Autos

Electrical Power Management & Safety Systems
Dynamic Collaborative Driving

PROJECT LEADER

Dr. D. Checkel, University of Alberta
Dr. B. Davis, Queen's University
Dr. X. Li, University of Waterloo
Dr. P. B nard, Universit  du Qu bec   Trois-Rivi res
Dr. B. Peppley, Queen's University
Dr. S. Rogak, University of British Columbia
Dr. N. Ashgriz, University of Toronto
Dr. M. Thomson, University of Toronto

Dr. S. Lambert, University of Waterloo
Dr. S. Lambert, University of Waterloo
Dr. B. Surgenor, Queen's University
Dr. F. Ghrib, University of Windsor

Dr. J. Caird, University of Calgary
Dr. A. Khan, Carleton University
Dr. E. Cannon, University of Calgary
Dr. B. Chaib-draa, Universit  Laval
Dr. S. Cherkaoui, Universit  de Sherbrooke
Dr. D. Laurendeau, Universit  Laval
Dr. A. Berry, Universit  de Sherbrooke
Dr. P. Masson, Universit  de Sherbrooke
Dr. W.T. Ng, University of Toronto
Dr. J. Huissoon, University of Waterloo
Dr. F. Michaud, Universit  de Sherbrooke

Research Excellence

In Action

Improving Inspection Improves Bottom Line

Automotive manufacturer requirements for zero defects in components have led to an increased need for quality control mechanisms at all stages of the supply chain. Quality and the economics of inspection are becoming increasingly important in the industrial competitiveness of the parts supplier companies. AUTO21 researchers have developed QVision, a neuro-fuzzy based machine vision system that went into its final stage of field testing at a Van-Rob Inc. manufacturing facility in Ontario during summer 2008. Dr. Brian Surgenor of Queen's University led the AUTO21 research project "*Neuro-Fuzzy Systems for Inspection in Manufacturing Processes.*"

QVision was developed in collaboration with Van-Rob after the company had challenges with a commercial machine vision system that was being used for inspection of a crosscar beam that supports a truck dash panel. The commercial system adequately inspected the part and the placement of 46 metal fastening clips, but Van-Rob was frustrated by the long development time for the system and also the



The QVision system is helping Van-Rob Inc. meet its inspection needs.

lack of a systematic method of dealing with changes in operating conditions. Working closely with Van-Rob engineers, the AUTO21 research team continues to develop QVision, with the goal of meeting the company's needs, both now and in the future.

QVision improves the performance of automated parts inspection systems through the application of intelligent (neuro-fuzzy) systems. The need for robust algorithms stems from the need for robust inspection systems that can deal with changes in the inspection operating environment without requiring excessive retuning of the analysis algorithm. In addition to the research conducted by Dr. Surgenor at Queen's University, researchers from Concordia University, McMaster University, Ryerson University and the University of Calgary took part in the project.

AUTO21 Knowledge Evolves into New Technology

An AUTO21 research team evolved its earlier work into a new technology to meet the needs of one of its industry partners. Sensor technology for vibration welding that was developed for laboratory use in the *Polymer Composites* project (2001-2004) has been adapted for potential use at a Mahle Inc. manufacturing facility. The company was interested in finding a real-time quality control mechanism for use on vibration-welded intake manifolds, in addition to the standard leak and burst tests.

Researchers at the Royal Military College and Queen's University working on the currently-funded *Laser Welding of Thermoplastics* project modified the original sensor technology to allow it to provide real-time feedback on the laser vibration welding process in an industrial environment. By mounting a piezoelectric sensor to the bottom of a weld fixture, (the tool used to hold the part during welding), the sensor is able to monitor forces acting on the parts during the joining process as it occurs. An abnormal response from the sensor would indicate a potentially defective weld and would trigger an alarm. If the weld does not meet the required standards, a signal occurs to allow the operator to intervene. The revised sensor technology was successfully tested on manifolds for two production vehicles and initial results indicated the mechanism was successful. Mahle has adapted the technology to meet their needs and now uses the sensors during start-ups.

Looking Through the Eyes of Older Drivers

Age-related visual decline affects most daily tasks including driving. Everything from the instrument panel display to road signs becomes more difficult to see as drivers get older. Researchers at the University of Calgary have developed a colour plug-in filtering system that allows designers and engineers to view images the way an older



driver might. The plug-in filter uses the NIH-public domain "ImageJ" image-processing application that allows an observer's spatial vision (acuity or contrast sensitivity) to be converted into a "vision filter." Different visual challenges can be mimicked by applying the filter to an image. The research was led by Dr. Donald Kline and was a sub-project of the *Canadian Automotive Research Simulation (CARS)* project (2003-2007).

Their research has shown digital imaging can be highly effective for optimizing complex displays (e.g., instruments, fonts and pictographs). For example, using an early stage black and white version of the filter to evaluate commonly used symbol signs, the research team determined that some signs could be improved by modifying the current design, but many others required an entirely new design. With professional graphics help from the Kent Allan Design Group, researchers were able to develop new more effective versions of some symbols for the U.S. Federal Highway Administration (FHWA), including the one for Pavement Ends.

The standard Pavement Ends symbol can be difficult for an older driver to clearly see due to visual decline. The redesigned version can be seen from considerably



The current Pavement Ends sign can be difficult for older drivers with visual decline to read. (left)

The redesigned version showed an increase in the legibility distance for both older and younger drivers. (right)

further away because the end of the pavement is illustrated using offset road chunks that signal rough road even when badly blurred by poor visual acuity. Testing of the new design showed the legibility distance was increased over the standard version for all drivers, especially older ones. A young driver gained 15 metres, an increase of 13 per cent while an older driver gained 32 metres, an increase of 43 per cent. The research team is now sharing their vision-based design approach and results with engineering and design professionals in the traffic and automotive community.

Keeping Police Sitting Safely

Professional drivers spend long periods of time sitting in their vehicles, which puts them at up to two times greater risk for developing back pain than the general population. For police officers, the issue is compounded by the amount of equipment they wear at all times and the limited space within the vehicle seats. In Ontario alone, an average of approximately \$22 million is spent in compensation claims for back injuries amongst police officers each year. An AUTO21 research team contributing to the *Advanced Seat Design* project is working to help this group of drivers prevent injuries through modified seat design. The sub-project is led by Dr. Jack Callaghan of the



AUTO21 seating research was tested by the Windsor Police Services with great results.

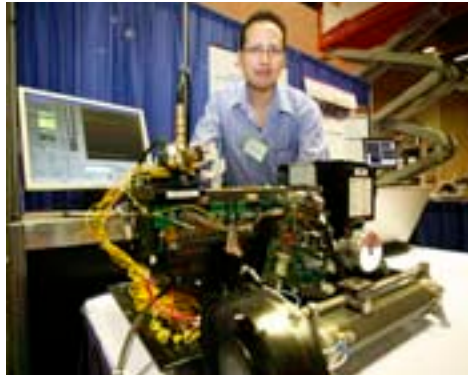
University of Waterloo, and is supported by additional researchers from the University of British Columbia, the University of Western Ontario, and the University of Michigan and Wayne State University in the United States.

An initial survey of 58 police officers from the Windsor Police Service identified physical problem areas associated with seat discomfort. The researchers then partnered with Leggett and Platt Automotive Group to develop a new seat design that uses an active lumbar support system that can help decrease these problem areas without compromising the officers' equipment requirements. In phase two of the project, the newly designed seating system was tested by 12 on-duty officers. When using the seat designed to accommodate the equipment worn by officers and provide support by interacting with their armoured vests, discomfort ratings over an eight-hour shift were significantly reduced compared to a standard seat. The finding of this work supports a strong impact of an active lumbar system (ALS) equipped seat for reducing officer discomfort.

Networking and Partnerships

Two conferences: one powerhouse event

In May 2007, members of AUTO21's research community joined forces with Canada's automotive industry community for a joint conference. The event merged AUTO21's popular Scientific Conference with the Automotive Parts Manufacturers' Association's annual conference and exhibition. In addition to an industry speaker program, AUTO21 research was featured at the Showcase of Innovation, an interactive display of current Network projects. About 1,200 people attended the conjoined AUTO21-APMA event.



AUTO21 research was on display for delegates to see.



A highlight of the event was the Mercedes fuel cell zero emissions vehicle.



AUTO21/EDGE organizers with Minister Sandra Pupatello and Deputy Minister Fareed Amin.

Leveraging partnerships to discuss opportunities

In November 2007, AUTO21 partnered with another NCE, the Emerging Dynamic Global Economics (EDGE) Network to host a seminar "China, India and the Canadian Auto Industry." The seminar helped to stimulate an exchange of ideas among industry stakeholders, academic and government representatives regarding the challenges and opportunities facing Canada's auto sector in relation to the rapidly developing economies of China and India. The event was sponsored by the Ontario Ministry of Economic Development and Trade.

AUTO21 heads east

In February 2008, an AUTO21 delegation visited Taiwan and Japan to share information on Canada's automotive research and development capabilities. The trip was organized by the Canadian Embassy in Japan. Delegates participated in seminars in each country and met with representatives from R&D groups and automotive companies.

HQP

Development

Chrysler Canada HQP Poster Competition

In June 2007, AUTO21 was proud to host the DaimlerChrysler Canada (now Chrysler Canada) HQP Poster Competition as part of the AUTO21 HQP conference. About 66 teams from 26 Canadian universities took part in the competition, which boasted a total prize purse of \$15,000.

The winning team from the University of Alberta contributed to the *Electronic Controls for VVT and HCCI Combustion* project, which investigates new internal combustion engine concepts to replace conventional spark ignition engines, resulting in more fuel efficiency and lower emissions.



Dr. Peter Frise and the first-place winners, *Electronic Controls for VVT and HCCI Combustion* project team from the University of Alberta.

Final Placement	Project Title	University	Award
First	Electronic Controls for VVT and HCCI Combustion	University of Alberta	\$4,500
Second	Safe Transportation for Seniors	University of Western Ontario	\$3,500
Third	Hydroforming of Advanced High Strength Steels	University of Waterloo	\$2,500
Fourth	Renewable Biofibres and Biomaterials for Interior Parts	University of Toronto	\$1,500
Honourable mention	Laser Welding of Thermoplastics	McGill University	\$1,000

Evaluating Young Automotive Innovators at Canada Wide Science Fair

For the third year, AUTO21 partnered with the Yves Landry Foundation, the Canadian Institute for the Relief of Pain and Disability and the Woodbridge Group to sponsor the automotive division at the Canada Wide Science Fair in Truro, Nova Scotia. The national science fair is a remarkable gathering of leading young science and technology innovators from elementary and

high schools across Canada. About 12 per cent of total science fair entries were also entered in the automotive division which makes this AUTO21-led initiative one of the largest single categories in the Fair.

In addition to the sponsorship, several AUTO21 HQP participated as judges in the automotive division. The students

were previous winners of the Honda Canada HQP Poster Competition held in conjunction with the AUTO21 2006 HQP Conference.

A Network of Excellence

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Dr. Kendal Bushe
Dr. Steven Cockcroft
Dr. Martin Davy

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Dr. William Dunford
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Dr. Ming Zheng
Dr. Biao Zhou

York University

Dr. Stephanie Ross
Dr. David Wiesenthal

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Ford Motor Company

Dr. Ken Kendall
Aston Martin

Dr. Hamideh Parizi
Simulent Inc.

Dr. Keith Fagan
Globis Data Inc.

Dr. Barrie Kirk
Globis Data Inc.

Mr. G. Wang
Meridian Technologies Inc.

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Transport Canada

Dr. Michael Ghargouri
Chalk River Laboratories

Dr. Stuart Neill
National Research Council Canada

Dr. John Cavanaugh
Wayne State University

Dr. Richard Gilbert
Centre for Sustainable Transportation

Dr. Velimir Radmilovic
University of California at Berkeley

Ms. Aline Chouinard
Transport Canada

Prof. Carol Kolga
St. Clair College

Dr. Matthew Reed
University of Michigan

Dr. Daryoush Emadi
CANMET-MTL

Dr. Mengnie Victor Li
Portland State University

Dr. Tod Rutherford
Syracuse University

Dr. Elhachmi Es-Sadiqi
CANMET-MTL

Mr. Eric Maire
Institut National des Sciences
Appliquées de Lyon

Dr. Mahi Sahoo
CANMET-MTL

Dr. Zhili Feng
Oak Ridge National Laboratory

Ms. Lynn Mytelka
UNU/MERIT

Dr. Partho Sarkar
Alberta Research Council

Dr. Langis Gagnon
Centre de recherche informatique
de Montréal

Mr. Pierre Thiffault
Transport Canada

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Alcan
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Aston Martin
Autoliv Electronics Canada Inc.
Bruehl & Kjaer
Canadian Autoparts Toyota
Case New Holland
Center for Applied Research on Polymers
and Composites
Centre technique des industries
mécaniques (CETIM)
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CMC Microsystems
Collins and Aikman Plastics Ltd.
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Dofasco Inc.
Domfer Metal Powders Ltd.
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Meridian Technologies Inc.
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Niedemair Plastics Technologies
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Robosoft Corporation
Rotoflex International
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Timminco Ltd.
TISEC Inc.
Trilion Quality Systems
University of Windsor/Chrysler Canada
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Centre
Van Rob Stampings
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Public Sector Partners

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Prevention of Musculoskeletal Disorders
- University of Waterloo
Chalk River Laboratories
City of Calgary
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Mothers Against Drunk Driving Canada
Municipal Health & Safety Association
National Research Council - Institute for
Fuel Cell Innovation
National Research Council Canada
- Institute for Chemical Process and
Environmental Technology
Natural Resources Canada -
CANMET-MTL
Natural Resources Canada - Public
Works And Government Services
Canada
New Brunswick Innovation Foundation
Nova Scotia Department of Health
Promotion and Protection
Ontario Centres of Excellence
Ontario Ministry of Agriculture, Food
and Rural Affairs

Ontario Ministry of Long Term
Health Care
Ontario Ministry of Research and
Innovation - Ontario Research Fund -
IAMI
Ontario Ministry of Transportation
Royal Canadian Mounted Police
Saskatchewan Canola Development
Commission
Saskatchewan Research Council
Société de l'assurance automobile
du Québec
USCAR
Workplace Safety & Insurance
Board of Ontario
WorkSafeBC

Financial **Statements**

May 14, 2008

Auditors' Report

To the Directors of the AUTO21 Inc.

We have audited the balance sheet of the **AUTO21 Inc.** as at March 31, 2008 and the statements of operations and changes in net assets and cash flows for the year then ended. These financial statements are the responsibility of the corporation's management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation.

In our opinion, these financial statements present fairly, in all material respects, the financial position of the corporation as at March 31, 2008 and the results of its operations and its cash flows for the year then ended in accordance with Canadian generally accepted accounting principles.

PricewaterhouseCoopers LLP

Chartered Accountants, Licensed Public Accountants

PricewaterhouseCoopers refers to the Canadian firm of PricewaterhouseCoopers LLP and the other member firms of PricewaterhouseCoopers International Limited, each of which is a separate and independent legal entity.

Balance Sheet

As at March 31, 2008

	2008	2007
	\$	\$
Assets		
Cash (note 4)	2,930,814	1,657,165
Accounts receivable (note 6)	1,327,983	29,173
Prepaid expenses	86,838	42,939
Property, plant and equipment (note 5)	4,995	50,127
	<u>4,350,630</u>	<u>1,779,404</u>
Liabilities		
Accounts payable and accrued liabilities	33,849	33,368
Deferred revenue (note 6)	3,948,316	1,332,046
	<u>3,982,165</u>	<u>1,365,414</u>
Net assets	<u>368,465</u>	<u>413,990</u>
	<u>4,350,630</u>	<u>1,779,404</u>

Approved by the Board of Directors



Director: John Mann



Director: Gerry Lukassen

Statement of Operations and Changes in Net Assets

For the year ended March 31, 2008

	2008	2007
	\$	\$
Revenues		
Government assistance - NSERC	3,272,902	4,436,906
Government assistance - SSHRC	1,090,967	1,478,968
Industrial research support	409,279	359,717
University of Windsor contributions (note 7)	226,743	222,065
Other revenue	98,320	-
Conference fees	39,760	44,158
Event sponsorship	101,480	103,889
Interest	53,255	42,403
	<hr/>	<hr/>
	5,292,706	6,688,106
Expenses		
Project (note 8)	3,526,910	4,756,444
Industrial research expenditure	405,112	375,550
Operating (note 7)	850,997	832,675
Networking	207,497	201,122
Network conferences	347,715	524,811
	<hr/>	<hr/>
	5,338,231	6,690,602
Net expenses	(45,525)	(2,496)
Net assets – Beginning of year	<hr/>	<hr/>
	413,990	416,486
Net assets – End of year	<hr/>	<hr/>
	368,465	413,990

Statement of Cash Flows

For the year ended March 31, 2008

	2008	2007
	\$	\$
Cash flows from operating activities		
Net expenses	(45,525)	(2,496)
Adjustment for		
Amortization	45,132	49,010
	(393)	46,514
Net change in non-cash working capital		
(Increase) decrease in		
Accounts receivable	(1,298,810)	(12,673)
Prepaid expenses	(43,899)	283
Increase (decrease) in		
Accounts payable and accrued liabilities	481	(6,456)
Deferred revenue	2,616,270	(138,799)
Net change in cash and cash equivalents	1,273,649	(111,131)
Cash and cash equivalents – Beginning of year	1,657,165	1,768,296
Cash and cash equivalents – End of year	2,930,814	1,657,165

Notes to Financial Statements

March 31, 2008

1. Nature of operations

AUTO21 Inc. (and prior to April 1, 2006, AUTO21 Network of Centres of Excellence), one of the Federal Networks of Centres of Excellence, commenced operations in fiscal 2001/2002 through an agreement with the Natural Sciences and Engineering Research Council ("NSERC") and the Social Sciences and Humanities Research Council ("SSHRC"). AUTO21 Inc. has completed the final year of its initial seven-year research cycle and has been renewed for an additional seven-year cycle with a midterm review scheduled for 2011.

2. Significant accounting policies

Revenue recognition

a) Government assistance

The corporation follows the deferral method of accounting for government contributions. These restricted contributions are recognized as revenue in the period in which the related expenses are incurred.

b) Other

Other revenue is recognized in the period which the contributions are earned.

Cash and cash equivalents

Cash and cash equivalents consist of cash and highly liquid investments. All cash and cash equivalents are classified as held for trading. These instruments are accounted for at fair value with the change in fair value recognized in the statement of operations and changes in net assets during the year.

Property, plant and equipment

Property, plant and equipment are recorded at cost and amortized over their useful lives as follows:

Computer equipment	3 years straight-line
Furniture and fixtures	7 years straight-line
Leaseholds improvements	7 years straight-line

Use of estimates

The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

Notes to Financial Statements

March 31, 2008

3. Changes in accounting policies

The Corporation adopted the recommendations of Canadian Institute of Chartered Accountants (CICA) Handbook Sections 3855, "Financial Instruments – Recognition and Measurement" and 3861, "Financial Instruments – Disclosure and Presentation," on April 1, 2007. The adoption of these new financial instruments standards resulted in changes in the accounting for financial instruments. The comparative financial statements have not been restated. The principal changes in the accounting for financial instruments due to the adoption of these accounting standards are described below.

Financial assets and financial liabilities

Under the new standards, financial assets and financial liabilities are initially recognized at fair value and are subsequently accounted for based on their classification as described below. The classification depends on the purpose for which the financial instruments were acquired and their characteristics. Except in very limited circumstances, the classification is not changed subsequent to initial recognition.

Held for trading

Financial assets that are purchased and incurred with the intention of generating profits in the near term are classified as held for trading. These instruments are accounted for at fair value with the change in the fair value recognized in operations during the period.

Receivables and payables

Receivables and payables are accounted for at amortized cost using the effective interest method, net of any impairment. Due to the short term nature of these balances, the effective interest method results in no significant differences from the book value.

Other

There are no financial assets on the balance sheet designated as either available for sale or held to maturity.

Notes to Financial Statements

March 31, 2008

4. Cash

Cash represents amounts held in trust by the University of Windsor ("the University") in accordance with the Host Agreement:

	2008	2007
	\$	\$
Restricted cash	2,500,987	1,146,981
Unrestricted cash	429,827	510,184
	<u>2,930,814</u>	<u>1,657,165</u>

Restricted cash represents government and other assistance received, which is subject to NSERC, SSHRC and other expenditure eligibility requirements.

5. Property, plant and equipment

	Cost	2008 Accumulated Amortization	Net
	\$	\$	\$
Computer equipment	50,875	50,875	–
Furniture and fixtures	52,912	48,383	4,529
Leasehold improvements	265,017	264,551	466
	<u>368,804</u>	<u>363,809</u>	<u>4,995</u>
		2007 Accumulated Amortization	Net
		\$	\$
Computer equipment	50,875	50,875	–
Furniture and fixtures	52,912	41,111	11,801
Leasehold improvements	265,017	226,691	38,326
	<u>368,804</u>	<u>318,677</u>	<u>50,127</u>

Notes to Financial Statements

March 31, 2008

6. Deferred revenue and subsequent event

	2008 \$	2007 \$
Balance – Beginning of year – Government Funds	908,179	1,024,053
Contributions received from NSERC	4,350,000	4,350,000
Contributions received from SSHRC	1,450,000	1,450,000
Total Government Funds	5,800,000	5,800,000
	6,708,179	6,824,053
Less: Amount recognized as government assistance in year	4,363,869	5,915,874
Balance – End of year – Government Funds	2,344,310	908,179
Other funds received	1,604,006	423,867
Balance – End of year	3,948,316	1,332,046

Other funds include monies received or invoiced from external supporters held in trust for the corporation's and researchers, deposits received in connection with Conference Revenues scheduled in the next fiscal year and proceeds relating to a cy prés public interest legal settlement not involving AUTO21 Inc.

Subsequent to year end, the corporation received an additional \$1,278,000 relating to this settlement. These amounts will be expended over a three year period for various initiatives consistent with the mandate of AUTO21 Inc.

7. Contributions from the Host Institution

In accordance with the corporation's Host Agreement with the University, the University has agreed to provide the corporation with annual funding and in kind contributions.

During the year, the corporation received funding and in kind contributions from the University.

8. Project expenses

From time to time, funds are returned to the corporation from several participating institutions (universities). These refunds are the result of excess carryovers and residual funds from concluded projects. Project expenses reflect the net payments less refunds.

Notes to Financial Statements

March 31, 2008

9. Financial instruments

The corporation's financial instruments consist of cash, accounts receivable, accounts payable and accrued liabilities. Due to the short term period to maturity of the instruments, the carrying values, as presented in the balance sheet, are reasonable estimates of fair value. It is management's opinion that the corporation is not exposed to significant interest rate, foreign currency or credit risks arising from these financial instruments.

