OUT OF THE BOX AND INTO THE FIRE:
How Product Innovation is Possible by Design

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Thanks to conference and program chairs: Rob McAlpine / Mike Wotton

Introduction

Research and product development projects

Interest in developing deeper understanding of unique challenges of fire management – extension of past experience
“This is the inaugural conference in what we envision becoming a biennial event ....”

“The unique program will provide a balance between presentations from forest fire managers and the scientific community. “

“Our goal is to provide a venue ... to exchange best practices with other fire managers and ... scientists ... as well as other scientists from a number of disciplines.”
OUT OF THE BOX AND INTO THE FIRE: How Product Innovation is Possible by Design
OUT OF THE BOX AND **INTO THE FIRE:**
How Product Innovation is Possible by Design
How can someone without experience learn to innovate through design?

What are some of the key attributes of the process?

What is industrial design?
It’s easy being a firefighter.
Overview of Industrial Design

1957  Establishment of ICSID
International Council of Societies of Industrial Design

1971  Working Definition
Industrial design is a creative activity whose aim is to determine the formal qualities of objects produced by industry.

These formal qualities include the external features but are principally those structural and functional relationships that convert a system to a coherent unity both from the point of view of the producer and the user.
Objectified.
How does one train people to design anything and everything? How does a profession develop around innovation?

You need a **general process that is widely applicable.** You increasingly need **teams of the right people.**

Interdisciplinarity has taken a new lead
You need to be **open-minded enough to share** the territory and you need to be **confident enough to take risk**.
Domain Knowledge of Industrial Design

History of design and product analysis
Math and physics
Mass production techniques
Anthropometrics and ergonomics

Business and marketing aspects
Fundamental psychology
Aspects of use and operation
Task analysis

User of the product, service or environment
Understanding of desired experience
People don’t want toasters. **They want toast.**
‘Virgin Mary grilled cheese’ sells for $28,000 (E-Bay 2004)
seating device

action or function
Carleton University School of Industrial Design

Exists within Faculty of Engineering and Design
Premiere design school in Canada; one of the best in N. America and internationally
(500 applicants, 250 portfolios, 38 admitted annually)
Celebrated 35th Anniversary in 2008
700+ graduates; 150 students in program at any time
4 year intense program leading to major thesis project and B.I.D
Overview of Major Project

Runs full academic year from September to April
Phased project carried out in groups of 4-8 under a project advisor

Research >
  Concept development >
    Preliminary design and ergonomic testing >
      Design development (iteration) CAD modeling, prototyping >
        Final design and documentation

External advisors play a key role
Design Collaborations with Industry Partners

Value for the student
Experience in near-real-life work scenarios
Job opportunities
Increase in portfolio credibility
Inspiring opportunities (enhancement of student self-value)

Value for the external organization
Young fresh ideas
Employee rejuvenation
Insight into the program of study – input into the program
Exposure to top students – extended job interview
Project opportunities not restricted by budget (R+D without the overhead)

Value for all parties
Upon graduation, students are one step closer to understanding the professional environment they are expected to enter and function effectively in.
Overview of Recent IDES 4300 Major Projects

EMS Bicycle Paramedic Project (2001-02)
Tactical EMS (TEMS) (2002-03)
Ottawa EMS Paramedics (2003-04)
  Defibrillator Stretcher Mount
  Marine Paramedic Equipment Packs
  Paramedic Team Leader (PTL) Equipment Pack
  Paramedic Team Leader (PTL) Equipment Transport Dolly
OMNR collaborations over the years

Kim Kamo
1995-2003  Crew Leader (Thunder Bay Fire Center)
2003-05  Fire Management Technician
2000  Bachelor of Industrial Design, Carleton University

2004-2005
Pump Back Board  Gabe Pell
Hose Pack  Jonathan LeRoy
Chainsaw Pack  Ryan Lukas
THE WOODCHUCK
Test Prototype

Top Load-Lifter Straps
Tension Strap

Adjustable Shoulder Straps
Taught Mesh Back Panel

Adjustable Hip Belt
Exterior Pockets

Belt-Stabilizer Straps
Gas Can Securing Strap

Designed by: Ryan Lukas
A backpack designed to carry a chainsaw, tool-kit, gas can and axe for wildland forest fire rangers.
FEATURES

Here are the main features of the RINO Hose pack.

All Straps (Shoulder, hip belt, sternum) should be adjusted to a comfortable fit.

The Perforated opening should be fully opened to the indicated size to maximize the area for easier hose deployment.

The shoulder straps and hip belt should be fastened around the hose pack when in storage or when being air dropped onto the fire line to minimize the profile.
OMNR collaborations over the years

2006-07
Helmet Communications System Chad Harber
Suppression Pump Pack Colin Roberts
Fire Incident Pack Laura Mulligan
Chainsaw Leg Protection Logan Taylor
Rooftop Sprinkler System Jenna Stephens-Wells
**OMNR collaborations over the years**

**2007-08**

<table>
<thead>
<tr>
<th>Item</th>
<th>Collaborator</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-part Camp Bag</td>
<td>Melany Bailette</td>
</tr>
<tr>
<td>Raincoat</td>
<td>Sarom Prom</td>
</tr>
<tr>
<td>Hose Strangler</td>
<td>Jess Tien</td>
</tr>
<tr>
<td>Mobile Power Unit</td>
<td>Bonnie Van Tassel</td>
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OMNR collaborations over the years

2009-10
Sector Response Office Design

Undergraduate students      Matt Lytle
                           Daniel Van Willigen
MDES Graduate students     Erin Hueston
                           Peter Wehrspan
Special Advisor            David Popovich (SMART Technologies)
In addition to a multitude of TV and computer monitors, most Sector Response Offices (SRO) are equipped with SMART Technology Boards, wall charts/maps and basic white boards as a means of communicating forest fire data.

The goal of this research is to determine if a more effective process or product can be implemented for the Ontario Ministry of Natural Resources to monitor and control forest fires in the province.
Height Testing Model
Magnets

Magnet Design Development

SRO DESIGN - DANIEL VAN WILLIGEN & MATT LYTLE - PHASE 4 - TESTING RESULTS & DESIGN 2010/03/01
UI development
As a result of testing and further research.
How does one train people to design anything and everything? How does a profession develop around innovation? You need a general process that is widely applicable. You increasingly need teams of the right people. Interdisciplinarity has taken a new lead.
You need to be **open-minded enough to share** the territory and you need to be **confident enough to take risk.**
“You’ve got a bunch of smart guys.  
*Put’em in a room and kick’em in the ass ‘till they come up with something.*”

Robert F. Kennedy (paraphrased, Thirteen Days)
To my students
and the future they will make their own

Thomas Homer-Dixon / The Ingenuity Gap
“We wanted to push ourselves and other members of the fire community, if not outside of our individual comfort zones, at least closer to the edge of that box.”

wildland fire canada 2010, program welcome

Thank you.