FORUM AEROSPACE INNOVATION

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COLLABORATE GLOBALLY TO DEVELOP AEROSPACE INNOVATION

IN COLLABORATION WITH:

CRIAQ

ORGANIZED BY:

AÉRO MONTRÉAL 10 YEARS

Québec's Aerospace Cluster

How to Leverage Collaborative Innovation Between Canada and the USA in the Aerospace Industry?

FORUM AEROSPACE INNOVATION

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AERO MONTREAL 10 YEARS

Outline

- Benefits of international partnerships
- Challenges to overcome
  - Cost
  - Funding
  - Intellectual property (IP)
  - ITAR – Military research
- Scenarios of how research partnerships could be established

Benefits of International Partnerships between Canada and USA Universities

- Research universities in the US have a lot of money and collaboration opportunities
  - NSF provides a ranking of universities based upon R&D dollars
  - For example:
    - UNC is ranked first at $2.2 billion per year (due to their medical school)
    - Georgia Tech averages around $725 million per year in R&D (purely an Engineering school)
- Leverage the expertise and facilities across the border
- Universities/countries can provide the following to each other:
  - Fundamental and Applied research advances
  - Researchers and students
  - Unique skill-sets
  - Models and tools
  - New Methods and approaches to engineering

Collaboration between GT/ASDL across the globe

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AIRBUS
Sikorsky A United Technologies Company
SAIC From Science to Solutions
BOEING
Raytheon
NATIONAL INSTITUTE OF AEROSPACE
SAFRAN Hispano-Suiza
EADS
DLR
UNITED STATES JOINT FORCES COMMAND
Gulfstream A GENERAL DYNAMICS COMPANY
AEROJET
SAAB
BAE SYSTEMS
Rockwell Collins
Rolls-Royce
NORTHROP GRUMMAN
NASA
DARPA
SIEMENS
NSF
ARL
FEDERAL AVIATION ADMINISTRATION
NAVSEA NAVAL SURFACE WARFARE CENTER PANAMA CITY DIVISION
Orbital
Pratt & Whitney A United Technologies Company
Aurora FLIGHT SCIENCES
THALES
LOCKHEED MARTIN
ONR
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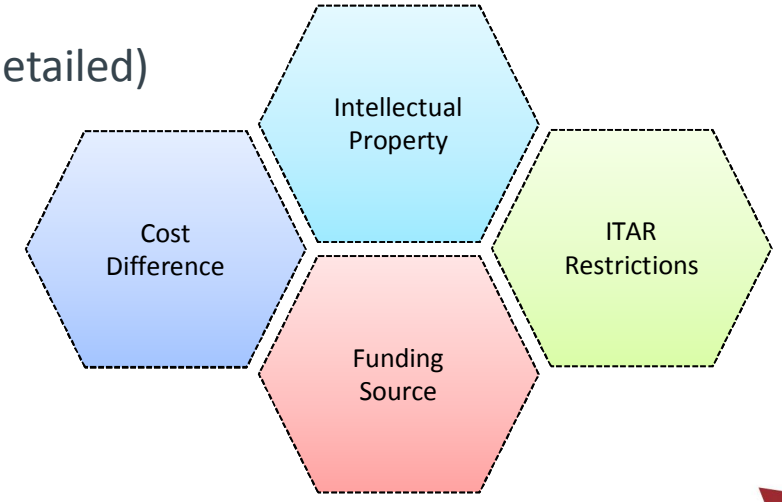
Why does collaboration not happen?

- Research with Canadian companies and Canadian research centers has been limited.
  - Latest project was with the Navy for an acquisition program (ONR collaboration).
- Challenges to overcome (to be detailed)



Difference in Cost – Academia and Industry

- In US academia, the cost for a Graduate student to work on a research project for a company (Graduate research assistantship at GT)
  - US$60k/year for 20 hrs per week: ~75$ CAN per hour
  - A significant part comes from the high tuition of most major aerospace schools and overhead
  - In other words, it is more expensive on a per hour basis to hire a student in a US school compared to most engineers in Canada working full time
- Industry
  - 2014 median pay for aerospace engineers in USA is 135,000 $ CAN
  - A part of this difference comes from the low Canadian currency

Sources of Funding

- In general, funding from government agencies ***cannot*** cross the border, such as NASA, FAA, etc.

- Industry funding ***can*** cross the border, but it puts *major constraints* on the companies.
  - US companies cannot get a high tax break on money sent outside the country(as if that money was spent in the country)
    →*Sending funding in another country is seen as the last option.*
  - Even a Canadian company that hires a US grad student cannot claim all the tax break→it goes both ways

Intellectual Property (IP)

- Bayh-Dole Act (1980)
  - Bayh–Dole permits a university, small business, or non-profit institution to elect to pursue ownership of an invention in preference to the government
- In general, any technology developed by Georgia Tech researchers during a project performed for the US government is owned by Georgia Tech
- IP negotiations, indemnification clauses and contract dispute arbitration court of law are typical points of contention and must be negotiated for each project ahead
- Typical length of negotiation is about 6-12 months regardless of the value of the effort

International Traffic in Arms Regulation (ITAR)

- Numerous research projects relating to aerospace engineering fall under ITAR because they relate to military applications
  - Limitation of possible collaboration for these projects
  - International students are not allowed to work on those projects
- A set of software and simulation environments contain ITAR codes
  - i.e. Noise model in the Environmental Design Space (EDS)

And Yet Collaborations do exist: GT/ASDL partners

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Georgia Tech Global Footprint

- Georgia Tech has a global footprint, which provides many potential models for collaboration
- Examples of Georgia Tech's international affiliations:
  - Georgia Tech-Lorraine (GTL) campus offers undergraduate and graduate degree programs all year around
  - Georgia Tech-Shenzhen provides students from China, the U.S. and any other countries the opportunity to pursue their master's degree from the School of Electrical and Computer Engineering
  - Georgia Tech-Singapore campus provides the Logistics Institute-Asia Pacific (TLI-AP), a collaboration with the National University of Singapore that offers research and education programs in global logistics
  - The Georgia Tech Panama Logistics Innovation and Research Center focusses mainly on logistics and trade. Located in Panama City, the Center has three core thrusts: applied research, education, and competitiveness
  - The Trade & Logistics Innovation Center of Mexico is a joint effort between Georgia Tech and the Tecnológico De Monterrey in Mexico
- Approximately 10% of undergraduates are international students
  - 90 students total from Canada (14 undergrad students, 76 graduate students)

How Can Research Partnerships be Established?

- Technical collaboration where funding would not cross the border
  - Example: NASA (or other US agency) funds Georgia Tech and Canadian agency funds Canadian university to do collaborative research
- Exchange of students/researchers
  - Example: Current working relationship with Université de Sherbrooke where there is an exchange of students between programs
  - Example: Supélec university in France places students at both Georgia Tech Lorraine and GT-Atlanta campuses. Research collaborations are also occurring.
- Easier to establish a partnership (and share funding) if the company is established in both countries. Industry with presence in both countries supports a Global network of Universities that collaborate and are supported by their local organizations. Example companies:
  - Bombardier (Learjet in US)
  - Airbus
  - Pratt & Whitney
  - Rolls Royce
  - GE