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3C Overview
3C Executive Team

Established, experienced and well-respected team

DR. JOHN MARIS
President & Owner

MR. PHIL COLE
Vice President Business Development

MR. SAM GRAINGER
Vice President Operations
Awards

<table>
<thead>
<tr>
<th>Award</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Canadian American Business Achievement Award</strong></td>
<td>Awarded for leading a joint enterprise demonstrating strong business growth, remarkable innovation, noteworthy contributions to local communities and the capacity to provide their partners with a global advantage</td>
</tr>
<tr>
<td><strong>Canadian Aeronautics &amp; Space Institute: Trans Canada (McKee) Trophy</strong></td>
<td>Canada’s oldest and most prestigious aeronautical trophy awarded to Marinvent for the Canadian whose achievements were most outstanding in promoting aviation in Canada</td>
</tr>
<tr>
<td><strong>Aviation Week &amp; Space Technology Laureate</strong></td>
<td>Awarded for &quot;...helping to transition from paper in the cockpit to a digital flight deck.&quot;</td>
</tr>
<tr>
<td><strong>Canadian Business Aviation Association Industry Award</strong></td>
<td>Outstanding contribution to aviation</td>
</tr>
<tr>
<td><strong>Aerospace Association of Quebec (AQA) Prix de l’Entreprise</strong></td>
<td>Aerospace company of the year</td>
</tr>
<tr>
<td><strong>Canadian Business Aviation Association Industry Award</strong></td>
<td>Awarded for the safety gains achieved through human factors enhancements, systems engineering and flight test services.</td>
</tr>
<tr>
<td><strong>Create the Future Award</strong></td>
<td>APM product winner</td>
</tr>
<tr>
<td><strong>New Zealand Ministry of Defense Award of Excellence to Industry</strong></td>
<td>Marinvent singled out as one of the two most valuable contractors from a pool of more than 800 contractors for contributions to C-130 LEP and P-3K capital programs</td>
</tr>
<tr>
<td><strong>AIAC James C Floyd Award</strong></td>
<td>Aerospace company of the year</td>
</tr>
<tr>
<td><strong>C2-MTL Annual Aerospace Award</strong></td>
<td>Marinvent’s work on unmanned aerial systems flight test and evaluation with its Piaggio Avanti project singled out as aerospace innovation of the year</td>
</tr>
<tr>
<td><strong>NASA</strong></td>
<td>Small Business Subcontractor of the Year (TASAR)</td>
</tr>
<tr>
<td><strong>NASA</strong></td>
<td>LaRC 2014 Group Achievement Award</td>
</tr>
<tr>
<td><strong>Canadian Defense Executive of the Year</strong></td>
<td>Dr. John Maris</td>
</tr>
<tr>
<td><strong>Canadian Aviation Hall of Fame</strong></td>
<td>Dr. Maris Inducted</td>
</tr>
<tr>
<td><strong>Canadian Defense Review</strong></td>
<td>Canadian Top 50 Defense Companies 2015 - 2020</td>
</tr>
</tbody>
</table>
Description of 3C Business

**Spun out of Marinvent in 2016**
One of the highest profile and most award-winning aerospace SMEs in Canada.

**Only Independent Flight Test and Certification DAO**
TCCA-approved for Full-Service flight test and certification in Canada in March 2017 and is already generating revenue.

**Industry 4.0 compliant tools**
Web-based software tools for planning, optimization, and management. Integrates with PLM tools to save 20% of costs.
The Perfect Storm - increased demand and reduced capacity

**1,500+**

New certification projects per year

Certification capacity inefficiently distributed across the country and NON TRANSFERABLE – contracting problematic

**50%**

Loss of TCCA staff

The industry needed a change

- 76 DARs across Canada
- 5 TCCA Regions across Canada
- 43 DAOs across Canada
A New Certification Model for the Future

Periodic Certification Staff Demand for Projects

- Previous system was inflexible, making it impossible to maintain resource levels
- Certification is difficult, requiring many years of training
- Recruits must be mentored, not taught, which drains more resources and time
- The TCCA and DTAES crisis is affecting everyone

3C offers the only viable solution to these problems

Constant and expensive hire/layoff/re-hire cycle
## 3C Services

<table>
<thead>
<tr>
<th>Unique</th>
<th>Flight Test Planning and Execution</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Independent outsourced expert services in accordance with appropriate standards for either civil or military customers, or on behalf of DND</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unique</th>
<th>Outsourced Services Provision</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To Transport Canada, DTAES and ADM(Mat) to assist them in managing demand peaks, staff shortages and training needs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unique</th>
<th>Outsourced Airworthiness &amp; Certification</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>To civil and military customers, including Applicant's Representative services</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Rare</th>
<th>Business Planning &amp; Product Design</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Consulting for companies specifying or designing new aerospace and defence products that must meet airworthiness requirements</td>
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<tr>
<th>Rare</th>
<th>Tier 0 Consulting Services</th>
</tr>
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<tr>
<td></td>
<td>For Government Customers to help them make the best aviation-related procurement decisions</td>
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</table>

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<tr>
<th>Program Management Services</th>
<th>Training Next Generation of Delegates</th>
</tr>
</thead>
<tbody>
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<td></td>
<td>Training / Mentoring the next generation of certification professionals is critical to the future of Canada’s aerospace and defence sectors</td>
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<th>Complete Expert Process Training</th>
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<td></td>
<td>Fully independent and outsourced using Synthesis® tools and delivered by PMPs</td>
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<th>Complete Expert Process Training</th>
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<td>All aspects, including: Flight test engineering, airworthiness and certifiable product design</td>
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</tbody>
</table>
Market Primed for Change

Key factors

- Companies want faster/cheaper ways to obtain airworthiness approval and certification
- Shrinking capacity in the existing infrastructure
  - Bandwidth inadequacy and expertise turnover
- Ramp-up of defence spending on programs requiring airworthiness approval
- Inability to enact new regulations for previously-uncertified platforms and systems:
  - Artificial Intelligence, 3D Printing, Virtual Testing, Industry 4.0, Urban Air Mobility, Hybrid and Fully Electric Propulsion
Current 3C Delegates

• Michel Brulotte AP008, Helicopter QTP¹, FTA²
• Shawn Coyle AP002, Helicopter FTA
• Stephen Day AP006, QTP
• Chuck Ellis CSeries Chief Test Pilot AP010, QTP
• Sam Grainger AP003 S/W & Airborne H/W
• Waldemar Krolak AP011, FTE, TSO⁴
• Jim Manton AP012, QTP
• John Maris AP001, QTP, FTA, TSO
• Jim Martin AP007, FTE, FTA
• Danielle Méthot AP004, S/W
• Hany Sadek AP013, FTA

• Avionics Design Services, Systems-Avionics DAO
• M1 Composites, Structures DAO
• Bob Gow AP_, Systems, Avionics
• Mike Taews AP_, Structures
• Nadine Beaugé, AP_, S/W & Airborne H/W

To be added to next DAPM
Aerospace is Changing

• New Technologies
• New Infrastructure
• New Operational Models
• New Target Pricing Paradigm
• More & More Software
• New Regulations
• Maintain Safety & Security
More Software-Centric Systems

- Airspace Management
  - ABTM or ATC or independent UTM
  - Operations Centres and Command and Control
- Systems for Autonomy
  - Semi-Autonomous
  - Detect and Avoid
  - Navigation
  - Route planning
  - Route Optimization
- Energy Optimization
- Security
- Completely new booking systems
Safe Software and AI

- Means DO-178 or some derivative
- Seriously constrains where software goes and what it can do
- Costs a great deal compared with typical software (x10 at least)
- Determinism / Predictability
- Statically compiled
- Development process
- Restricted access to many processing resources
- Restricted access to tools
Another Way to View This

- Constrain the software behavior
- Supervision to protect what is outside from anomalous behavior
  - Well defined ICD
  - Health monitored
  - Error checked
  - Boundary checked
  - Firewalled
  - ...
- Multiple dissimilar code blocks for redundancy with voting
- A Fully Certifiable code “safe”
- Also useful from security perspective
Practicalities

Regulations = Laws

Public Acceptance is a serious obstacle

Regulations and Technologies must evolve together
Integrated Model Required
Why 3C

• Benefits of being Canadian
  • Leverage of Canadian tax credits
  • Advantageous exchange rate

• Flexibility
  • Rapid scalability and partner leverage
  • No “nickel and diming”

• Reputation with Regulators and customers
  • Ethically-driven, unparalleled integrity, close-knit team of recognized industry professionals
  • 3C is part of the design & certification team (not “job shop”)
  • Technical project managers (PMPs) for all projects

• Very broad experience with the “new”
  • Understand the technologies themselves and how to certify them

• 3C’s tools minimize Cost, Risk, Schedule
  • Purpose-built to optimize cert & flight test (>20% saving)
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MR. PHIL COLE
Vice President Business Development