Business Model & Future Activity Briefing
ISSB Forum
Mark Hodge - CEO

October 31, 2014
Capability through collaboration
DMTC Operational Context

Vision: To provide technology solutions enabling industry to enhance Australian Defence capability.

Mission:
DMTC leads, facilitates and manages cooperative research in the defence sector in materials, manufacturing & related themes, with the Defence customer, industry and research sector as key stakeholders.

Strategic Intent:
CAPABILITY THROUGH COLLABORATION

Corporate Structure:
Public Company. Not for Profit. Limited by Guarantee

Resources under management
~$87M (incl. $30M DMO – Ind Div) over 7 years from July 2008 “Core”
~$23M (incl. $7.5M Land 125) over 5 years from Jan 2011 “Program 7”
~$40M (est. incl new programs) over 3 years from July ‘15
The Numbers

5 Programs across AIR, LAND and SEA Domains containing

34 Active Projects delivering new technologies and manufacturing processes

~500 people directly involved in DMTC activities from 32 Participant organisations

~$150 Million total resources on improving capability includes ~$50M Defence - balance from Industry & Research sectors
Defence R&D perspective

USER
- Driven by threat environment
- Soldier-proof
- Operational requirement
- Time critical (deployment)
- Fieldable, modular, flexible

INDUSTRY
- Has to be small, lightweight & 99.99% reliable
- Has to be best of breed. Have to have it now.
- Can’t field it without ACIB endorsement
- Capability driver
- Systems approach
- Budget constrained
- Acquisition strategy
- Risk aware/averse

S&T
- Profit motive
- Contract tenure
- Needs S&T “as advertised”

Program Mgr
- My product can do everything you need
- I need security of contract to innovate
- I need flexibility to work out the kinks in my product
- The next DCP funding window is 7 years away
- Best value = cheapest acquisition. Sustainment is someone else’s problem
- We need to risk mitigate – buy COTS, MOTS
- The next DCP funding window is 7 years away
- I need to see the requirements definition case
- Customer’s role is to integrate, commercialize – I’ve moved on
- You don’t get it - this project is unique – I need more time, money
- I’ve been doing this for years – I don’t need program management

If you push long enough, they’ll come around

My product can do everything you need

Listen mate – I define the requirements

We need to risk mitigate – buy COTS, MOTS

Can’t field it without ACIB endorsement

I need to see the requirements definition case

S&T
- Swing for the fences
- Risk inherency
- Cost, schedule estimate
Transition to current state

DMTC Ltd.

Commercial rights to IP

Research funds, IP rights for research

In-Kind

Research Participant

Industry Participant

Industry Participant

Industry Participant

Research Participant

Research Participant

Research Participant

Research Participant

Industry Participant

Industry Participant

Research Participant

Industry Participant

Research Participant
Personnel Survivability Goals

Also known as Program 7 – Personnel Survivability works to:

Improve level of personnel protection for armed and support personnel

- ↓ weight, bulk, cost etc.
- ↑ multi-insult capability (blast/ballistic, agent protection)
- ↓ signature (visible/IR/radar), adaptive/broadband materials
- ↑ utility & fit (design integration, power management, anthropometry, load carriage, thermal management, etc.)

Provide a path to field consistent with ADF acquisition requirements

- Address utilisation “valley of death”
- Practical enhancement of protection and/or performance of soldier/personnel
IP Model

- **Robust Model** – geared towards rapid utilisation of technology
  - DMTC legal, beneficial owner of project IP (ensures ongoing access for Defence)
  - Participants retain ownership of all background IP
  - IP controlled at the individual project level ("competitors" can work separately)

- **Defence / Government Stakeholders**
  - Access to IP through industry capability but also has claw through rights to all IP generated within projects
  - Allows Defence to engage with industry via DMTC without locking up IP with any single industry partner.

- **Industry Participants**
  - Automatic, royalty free rights to exploit project IP
  - Generally not funded in projects, benefit derived through ability to commercially exploit IP

- **Research Participants**
  - Funded to conduct research for projects, not permitted to commercially exploit IP
  - Rights to exploit IP for research and education purposes
Technologies - Personnel

**Hard Armour**

**Soft Armour & Fabrics**

**Power Systems**

- Hard Armour
- Soft Armour & Fabrics
- Power Systems

Graph showing strength per weight:
- Cotton
- Silk
- Viscose
- Nylon
- Polyester
- Aramid
- Polyethylene

Legend:
- Decreasing Comfort
Progress

Capability Development Trajectory

CAPABILITY THROUGH COLLABORATION
Fuel Cells - Technology

- 72 Hour Patrol ~ 65 kg of batteries (4 soldiers)
- 45 kg of batteries are ‘spare’

<table>
<thead>
<tr>
<th>FFC Metrics</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Energy System</td>
<td>912 W-h (scalable)</td>
</tr>
<tr>
<td>Major Components</td>
<td>Battery, Fuel Tank, Pump, Controller, Hydrogen Generator, Fuel Cell Stack, Cooling, Waste Tank, Regulator</td>
</tr>
<tr>
<td>Voltage</td>
<td>24V</td>
</tr>
<tr>
<td>Current</td>
<td>10A</td>
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<tr>
<td>Power</td>
<td>230W</td>
</tr>
<tr>
<td>Fuel</td>
<td>Non Flammable Chemical Hydride</td>
</tr>
<tr>
<td>Weight</td>
<td>Cell: ~ 1.3kg Fuel: ~ 1kg (dry)</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>External &lt; 45 deg. C</td>
</tr>
</tbody>
</table>

Potential to replace 45kg of batteries!!!
Fuel Cells – Development Timeline

June 2012 – TRL 4
- Catalyst-based H2 on demand
- 0.9 kWh integrated fuel tank
- Integrated waste tank

July 2013 – TRL 5

June 2015 – TRL 7 (proj)
- Catalyst-free H2 on-demand (using pre-existing Horizon technology)
- Scalable fuel tank placed outside the system
- Waste tank integrated to fuel tank
Fuel Cells – Ongoing Development

Technical
• Finalise FFC to TRL 7
• Development of PFC – reduces individual battery burden on soldier by half.
• Cost/mass effective 160 W-h / 200g fuel cartridges.
• TRL 6 by mid 2015.

Commercial
• DMTC licence to use Centre IP in commercial product by Horizon.
• Royalty arrangements encourage domestic manufacture.
Bulk of DMTC projects operate through mid-level TRL's (TRL 3-4 up to around TRL 7-8) in the so-called “Valley of Death”.

DMTC conducts some projects that feed directly into platforms and production lines e.g. automated welding.

DMTC conducts some fundamental research activities where required in order to support applied outcomes e.g. new material characteristics.

“R” Balanced Programs “D”
Future work – soldier space

Land 2110 – DIRF funded activity

The problem:
Lack of dermal protection from aerosolised hazardous chemical, biological or radiological (CBR) substances from air-permeable Individual Protective Equipment (IPE) suits

DIRF Project:
Develop Membrane Protective Adsorbent Composite Technology - Aerosol-Vapour (MPACT-AV) fabric through the use of novel adsorbent-nanofibre membranes

Aim:
New equipment designed with aerosol protection utilising this new fabric technology that can offer the required levels of vapour and aerosol protection with the smallest possible increase in user burden

Partners:
DMTC will work with DSTO and a range of industry and research partners to achieve these aims.
Conclusions

Reduced costs to defence for new capability through a collaborative, risk sharing model that reduces development costs borne by each party by ~ 60%

Capability impact linked to operational need (for Defence and defence industry)

Flexible vehicle for maintaining access to IP for Defence

Provide a mechanism w/in research and industry for maintenance of specialist technical capability

Support a more competitive and productive Australian defence industry

Create stronger and more integrated supply chains

Foster enduring collaborative relationships between SMEs, major manufacturers, research organisations, industry bodies and Defence

Proven model for rapid innovative solutions to problems faced by the ADF
Program-Technology Matrix

AIR PLATFORMS
MARITIME PLATFORMS
ARMOUR APPLICATIONS
PROPULSION SYSTEMS
PERSONNEL SURVIVABILITY
NEW PROGRAM
NEW PROGRAM

Maintenance, sustainment & support technologies (corrosion, fatigue, FOD, materials upgrade etc.)

Titanium component fabrication and

Prognostics, detection & repair for Al alloys

New generation composite materials & manufacturing processes

Robotics, automation & lean manufacturing

New ferritic materials & joining technologies

Materials

New/Lean manufacturing & Component Performance

Modeling, Simulation & Validation

Repair technologies

& composites

Textile tech.

& component systems integration
Awards & Recognition

Continuous Improvement Award (AiG, AIDN, DIIC)

National Innovation Award (Land Defence Australia)

Safeguarding Australia Eureka Prize (Australian Museum)
Thank you

Mark Hodge – CEO

Level 2, 24 Wakefield Street
Hawthorn, Vic 3122
Australia
Email: mark.hodge@dmtc.com.au
Ph: +61 (3) 9214 4447
Fax: +61 (3) 9818 0622

Questions, discussion