Space as Critical Infrastructure

Martin Nix
Co-chair Space Community of Interest
“The resilience of our critical infrastructure is vital to the Australian way of life that we know and value.

Critical infrastructure underpins the delivery of essential services such as power, water, health, communications systems and banking.”
Critical Infrastructure Resilience

- A resilience based approach.
- Assess our exposure to risk and learn from incidents.
- Responsibility shared by all governments and by owners and operators.
- Strong focus on business-government partnerships.
What is Critical Infrastructure

- physical facilities, supply chains, IT, and communication networks
- Groups: IT security, Banking, Transport, Water, Energy, Food chain, Health and Communications
- All interlinked with complexity increasing
Space: Australian view

Space Apps of significance
• Communications
• Earth Observation
• Global Navigation Satellite System

Assure access
Strong international co-operation

Innovation & skills

Security & economic well being
Policy on Space & GNSS

Dept. of Industry
• Space Co-ordination Unit
• Space Utilisation Policy
• Australian Spatial Consortium
• Geoscience Australia
  – Airservices, Maritime, Defence

Attorney Generals Dept
• Space Community of Interest for the Critical Infrastructure Advisory Council
Space Community of Interest

- Inaugural meeting
- Membership representative of 3 satellite systems
- Terms of Reference
- First attendance at CIAC meeting
- Risk work underway
Space Risks

<table>
<thead>
<tr>
<th>TISN Sector</th>
<th>Space Infrastructure &amp; Services</th>
<th>Risk Assessment and Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A. Communications</td>
<td>B. Earth Observation</td>
</tr>
<tr>
<td></td>
<td>Risk Matrix</td>
<td>Risk Matrix</td>
</tr>
<tr>
<td>1. Banking &amp; Finance</td>
<td>A1</td>
<td>B1</td>
</tr>
<tr>
<td>2. Communications</td>
<td>A2</td>
<td>B2</td>
</tr>
<tr>
<td>3. Energy</td>
<td>A3</td>
<td>B3</td>
</tr>
<tr>
<td>4. Food &amp; Grocery</td>
<td>A4</td>
<td>B4</td>
</tr>
<tr>
<td>5. Health</td>
<td>A5</td>
<td>B5</td>
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<tr>
<td>6. Transport</td>
<td>A6</td>
<td>B6</td>
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<tr>
<td>7. Water</td>
<td>A7</td>
<td>B7</td>
</tr>
<tr>
<td>8. All Sectors</td>
<td>A8</td>
<td>B8</td>
</tr>
</tbody>
</table>

**Risk Assessment and Impact**

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Consequences</th>
<th>Insignificant</th>
<th>Minor</th>
<th>Moderate</th>
<th>Major</th>
<th>Catastrophic</th>
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<tbody>
<tr>
<td>Almost Certain</td>
<td>High</td>
<td>High</td>
<td>Extreme</td>
<td>Extreme</td>
<td>Extreme</td>
<td></td>
</tr>
<tr>
<td>Likely</td>
<td>Moderate</td>
<td>High</td>
<td>High</td>
<td>Extreme</td>
<td>Extreme</td>
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<tr>
<td>Possible</td>
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<td>Moderate</td>
<td>High</td>
<td>Extreme</td>
<td>Extreme</td>
<td></td>
</tr>
<tr>
<td>Unlikely</td>
<td>Low</td>
<td>Low</td>
<td>Moderate</td>
<td>High</td>
<td>Extreme</td>
<td></td>
</tr>
<tr>
<td>Rare</td>
<td>Low</td>
<td>Low</td>
<td>Moderate</td>
<td>High</td>
<td>High</td>
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</tbody>
</table>
# GNSS Risk matrix: sample

<table>
<thead>
<tr>
<th>Failure/disruption of GNSS network infrastructure (i.e. CORS) for augmented GNSS services</th>
<th>Network receiver (CORS) fault</th>
<th>Augmented GNSS signals/data unavailable, unusable, unreliable</th>
<th>Incorrect tracking/processing settings; failure of motherboard; power failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interference/Jamming</td>
<td></td>
<td></td>
<td>Multipath; jamming devices</td>
</tr>
<tr>
<td>Failure of network processing hardware/software</td>
<td></td>
<td></td>
<td>Outdated software/firmware; lack of backup infrastructure; power failure; espionage</td>
</tr>
<tr>
<td>Loss of communications infrastructure</td>
<td></td>
<td></td>
<td>Loss of terrestrial and/or satellite communications for networking data and distributing augmented data</td>
</tr>
</tbody>
</table>

**C1. Banking & Finance** | Minor | Moderate

**C2. Communications** | Minor | Moderate

**C3. Energy** | Moderate | High

**C4. Food & Grocery** | Moderate | High

**C5. Health** | Insignificant | Low

**C6. Transport** | Major | Extreme

**C7. Water** | Insignificant | Low

**C8. Emergency Management** | Minor | Moderate

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**Local, Regional & Global**

**All** | **Possible** | **Hours - Days - Weeks**

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Next steps and observations

- Mechanism for assessing risk, impact and mitigation underway
- Will enable conversations with critical infrastructure sectors
- Is productivity loss from disruption an “extreme” or “moderate” risk in certain key sectors
- Mining, construction industries not yet covered.
- Ground infrastructure such as Beacons & CORS still to visit.
The management of Space Infrastructure Risk for Australia is underway.