



**Australian Government**  
**Department of Defence**  
Capability Acquisition and  
Sustainment Group



# Fuze Incident, Shoalwater Bay, Australia 2014

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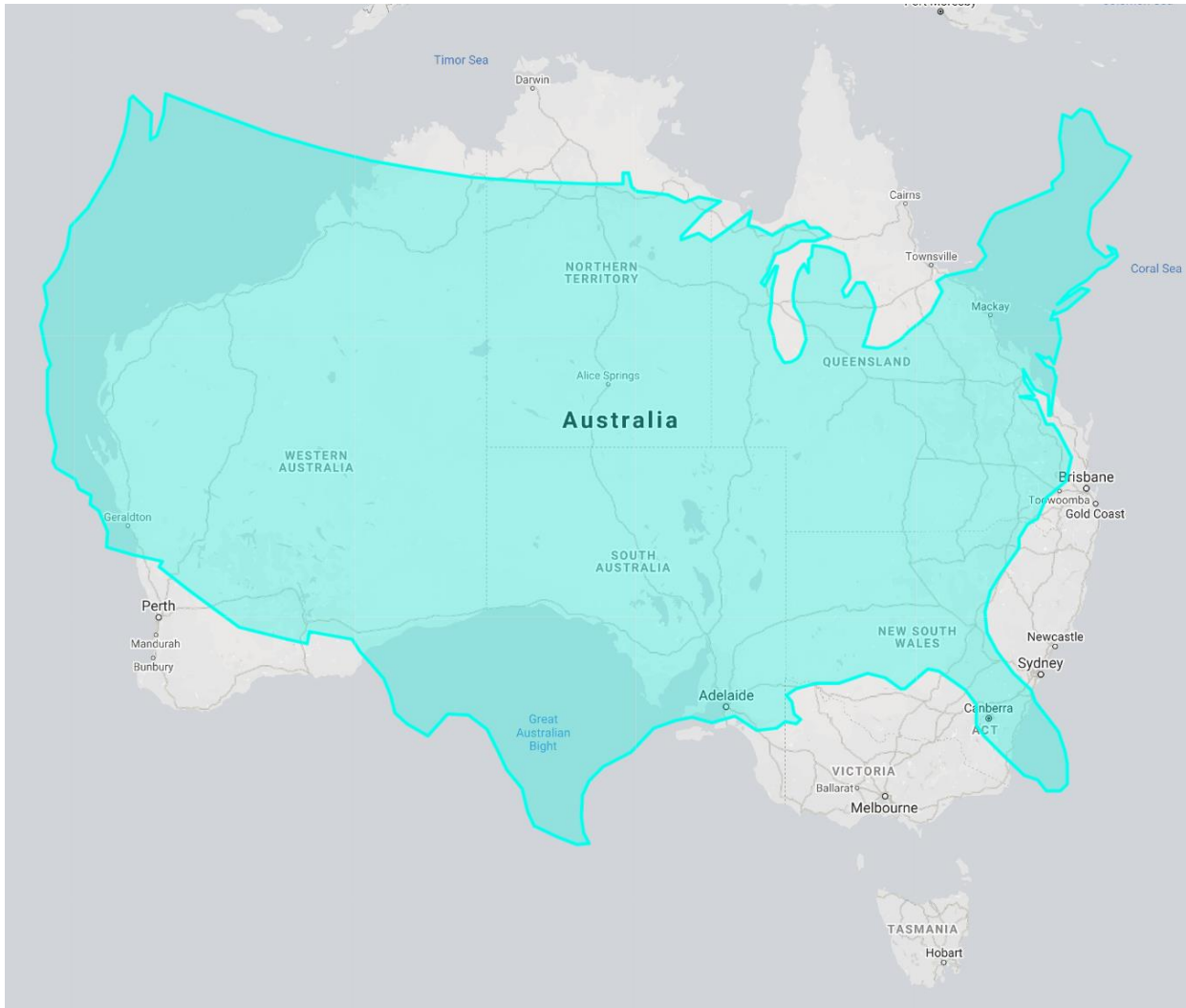


## Shoalwater Bay location





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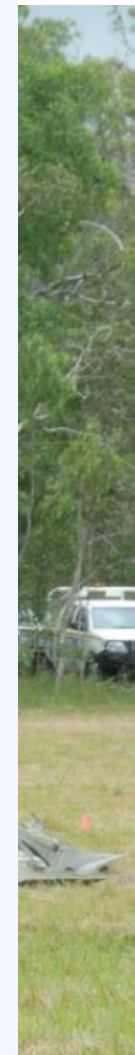
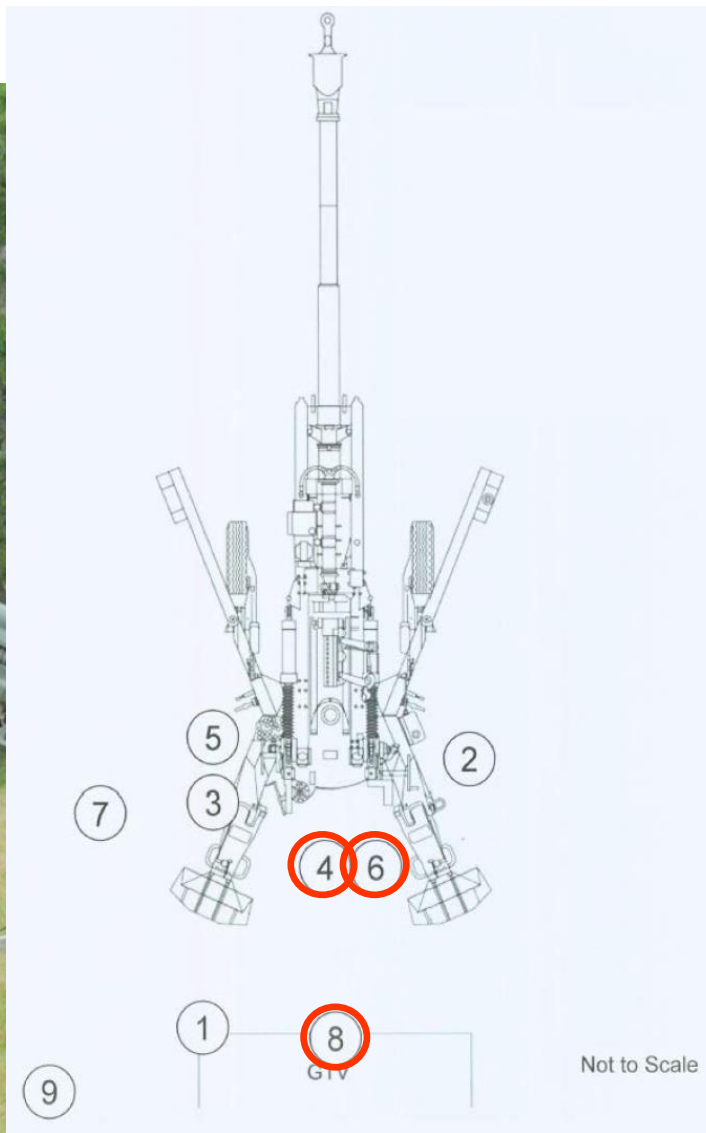


## Shoalwater Bay Incident Scene





# Shoalwater Bay Incident Scene





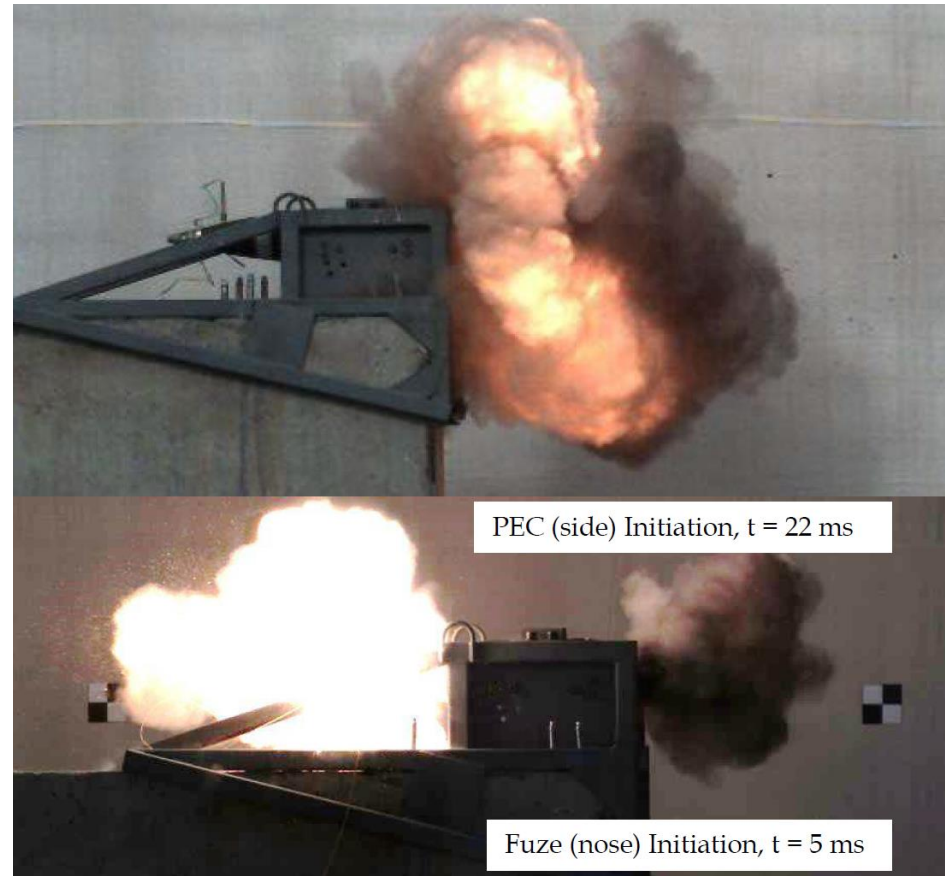
## Investigation and Inspector General ADF Inquiry

- ADF Investigative Service (ADFIS) launched investigation, and separate Chief of Defence Force directed Inquiry by Inspector General ADF (IGADF)
- ADFIS investigation focused on what had happened; Inquiry on systemic issues - how this happened
- Australian Defence Science and Technology Group (DST Group) contributed technical investigation under ADFIS investigation



## DST Investigation Findings

- Investigated all AUR elements based on Fault Tree Analysis (FTA)
- Expelling charge and fuze became the focus through this approach
- Analysis of forensic data, compared to experimental results narrowed the cause to a failure within the fuze

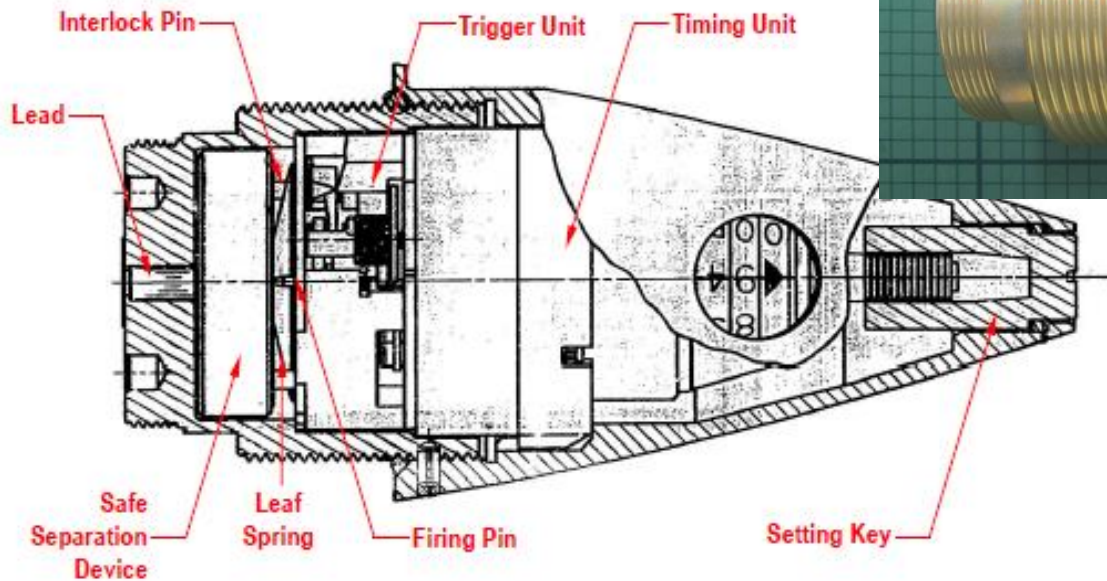






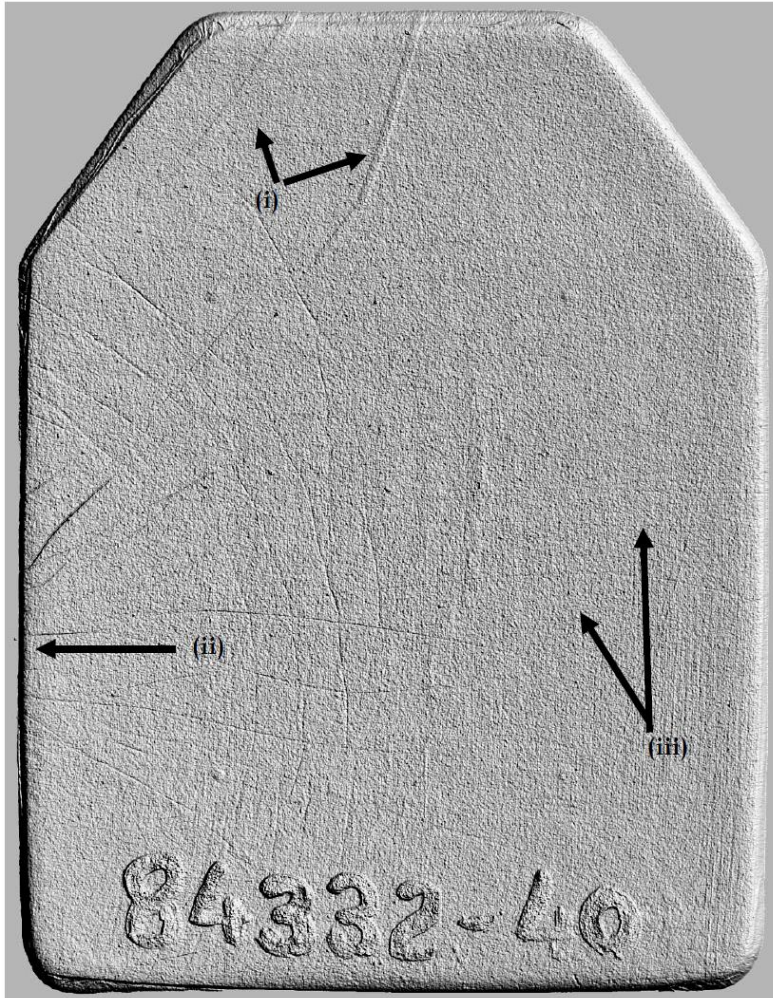
## DST Investigation Findings

- **Cause** - Fuze assembled with SSD in the armed state
- Set-forward on ramming drive SSD into fixed firing pin, initiating the projectile





## DST Investigation findings





## Inquiry Findings

- Produced 24 recommendations
  - From high-level systemic (EO Safety Program)
  - Review process of life extensions and surveillance
  - EO accident response methods
  - Wearing of PPE during training (based on DST investigation)
- Recommended implementation international accepted practice standards (MIL-STD-1316 and STANAG 4187)
- Recommended assessment of current fuze inventory against these standards
- Apportioned no blame on unit involved – failures systemic.



## Incident Context

- This system was assessed against requirements, risk associated with lack of malassembly feature identified as low likelihood but high consequence
- Many other similarly categorised risks that drowned out important message
- System for introduction into service (including fuze assessment) at the time was very compliance and template focused



## Incident Context

- Australia is a tech follower (especially for complex systems)
- Aus effort is in understanding suitability of a design for our context, not developing design
- Aus applies STANAG 4187 and MIL-STD-1316 and associated AOPs/MIL-STDs
  - As assessment standards, not design standards
- No in-depth Fuze Subject Matter Expertise



## Context - Global Supply Chain





## Outcomes

- Three fundamental outcomes
  1. Subject fuze removed from service and slated for disposal;
  2. Assessment conducted of fuze inventory;
  3. Systemic changes to manner in which we acquire and sustain explosives
    - Associated with introduction of Australian Workplace Health and Safety Act 2011
    - Movement to principles-based approach – understand important risks, and communicate them



## Outcomes – Fuze Disposal

- Large body of effort to dispose of extant stock of these fuzes fitted to obsolescent 105mm All Up Rounds (AUR)
- As they may be in the armed state (and extremely sensitive to impact stimulus) challenge to handle them safely for disposal
- large program in partnership with Australian munitions disposal industry to remotely process and interrogate the safe/arm state of the fuzes after removal from the AUR in support of safe disposal





## Outcomes – Fuze Disposal





## Outcomes – Fuze Inventory Audit

- Aus embarked on a body of effort to understand fuze inventory, consider against international best practice standards
- Still ongoing in mortar space, but completed for artillery and maritime
- Allowed sensible decisions to be made about which natures were kept in service, which were retired, and whether certain acquisition programs needed to be accelerated.

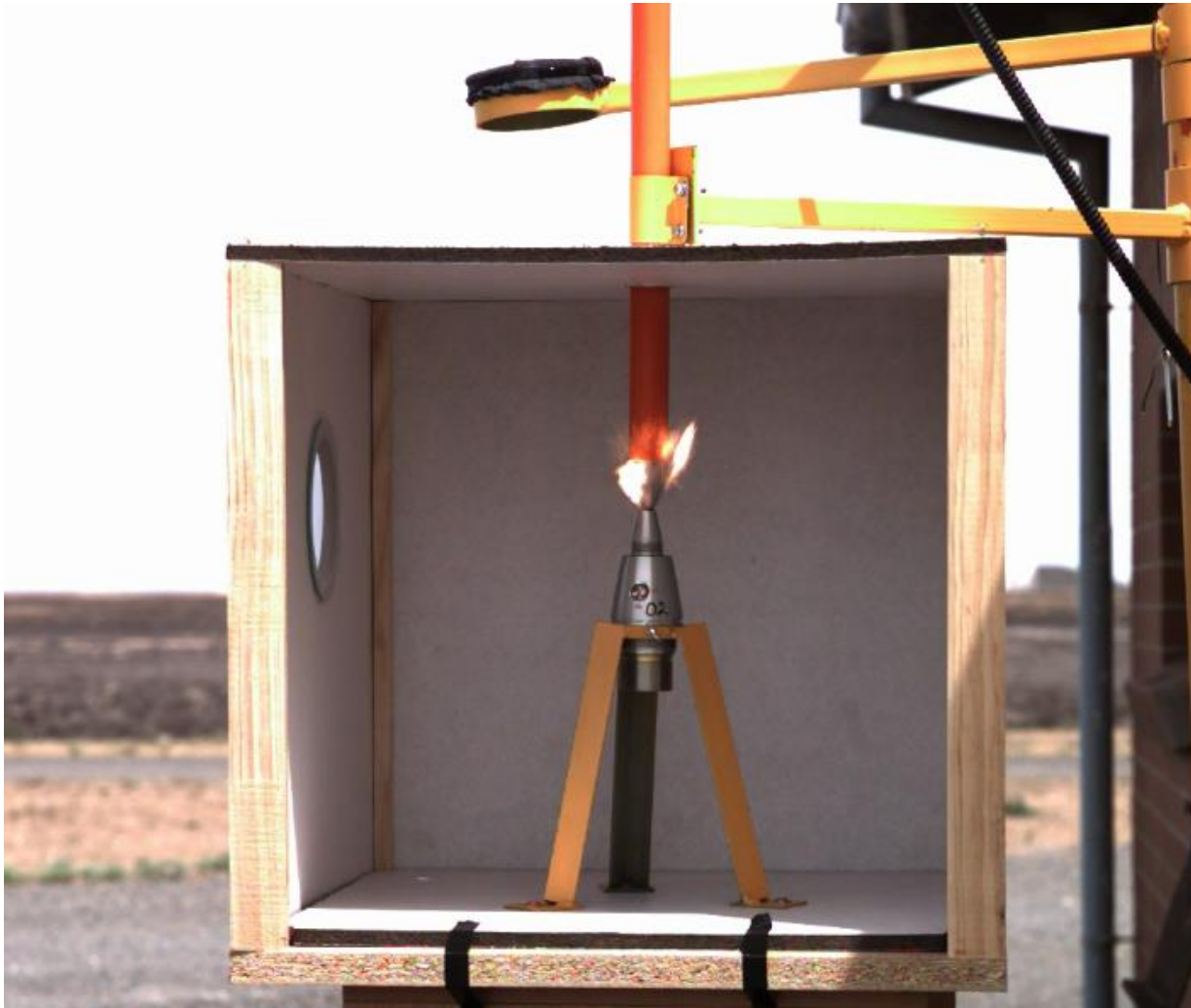


## Outcomes – Systemic Changes

- change to the manner in which we conduct IIS and assess risk – previous approaches led to the critical concerns (e.g. lack of malassembly feature) being lost in the noise of many high consequence-low likelihood risks
- Moved to a system to communicate critical information more explicitly – what do the services care about?
- Supported by systemic changes to put focus on risk technology areas – fuzing included
- Some efforts to re-establish fuze testing capability to conduct AOP-20 and MIL-STD-331 tests.



## Outcomes – fuze test capability development





## Lessons Learned

- Have a good understanding of the systems we purchase – smart customer!
  - Effective application of international best-practice standards
- Lack of Independent fuze suitability advice – addressed by mandated Regulator Engagement
- Re-establish deep technology area expertise – bootstrap upwards



## Lessons Learned

- Acquiring necessary information during procurement – procurement methodology
- Test capability/capacity can be expensive to establish and conduct, but allows independent determination of suitability
  - Assurances of compliance from manufacturers don't necessarily guarantee that a system is compliant
- Engagement with international fuze community
- Modernisation of Australian fuzing fleet - expensive!



## Questions



### Contact

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