Observations on Developing Future Integrated Air and Missile Defense (IAMD) Systems

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Setting the Stage

- The future will find Australian Defence Forces (ADF) conducting global operations
- In a variety of environments from low intensity up to Anti-Access Area Denial (A2AD) conditions
- Requiring IAMD to protect joint forces

The Threat in 2035*

- Ballistic missile, cruise missile and hypersonic capabilities proliferate
- They are accurate and longer range
- They are also cheap, lowering the cost of entry
- So peers will increase salvo size
- And non-peers will use them in never-before seen situations

Our tech lead is getting smaller

* See Gunzinger, M., & Clark, B., *Winning the Salvo Competition*, Washington, DC: Center for Strategic and Budgetary Assessments, 2016, pp. i, ii, 1-9

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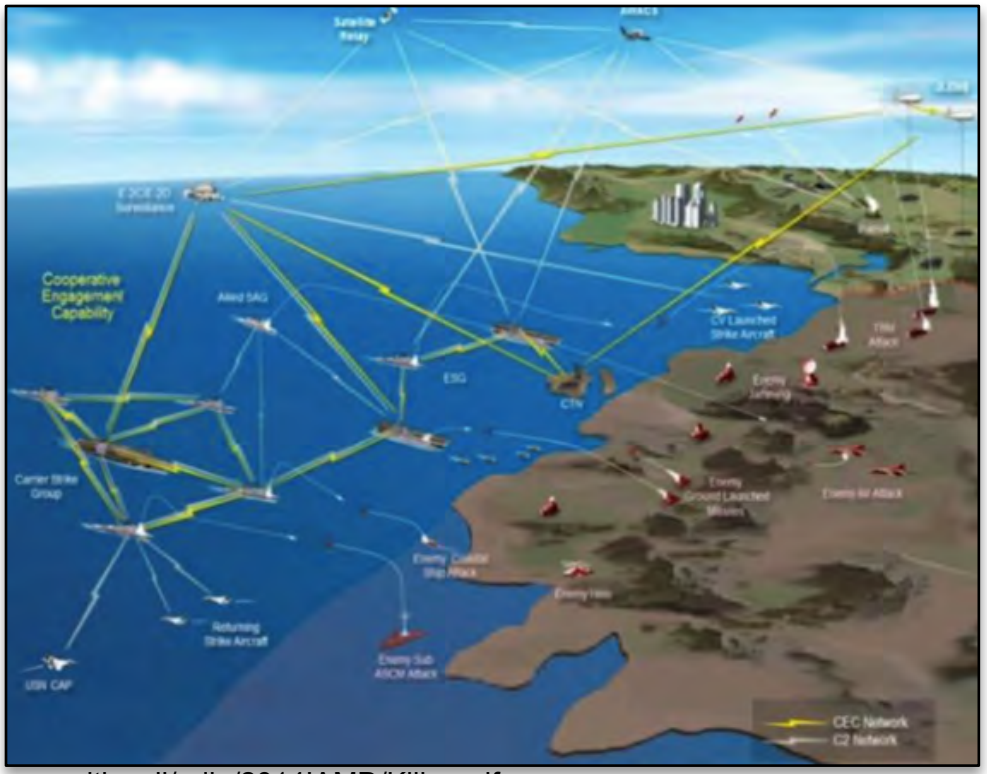
IAMD

- IAMD is the capability to provide unified air and ballistic missile defense
- IAMD will change from “classic” long-range ballistic missile defenses and moderate-range air defenses
- Into a future where every asset is part of the IAMD net

IAMD everywhere, all the time

IAMD Enablers

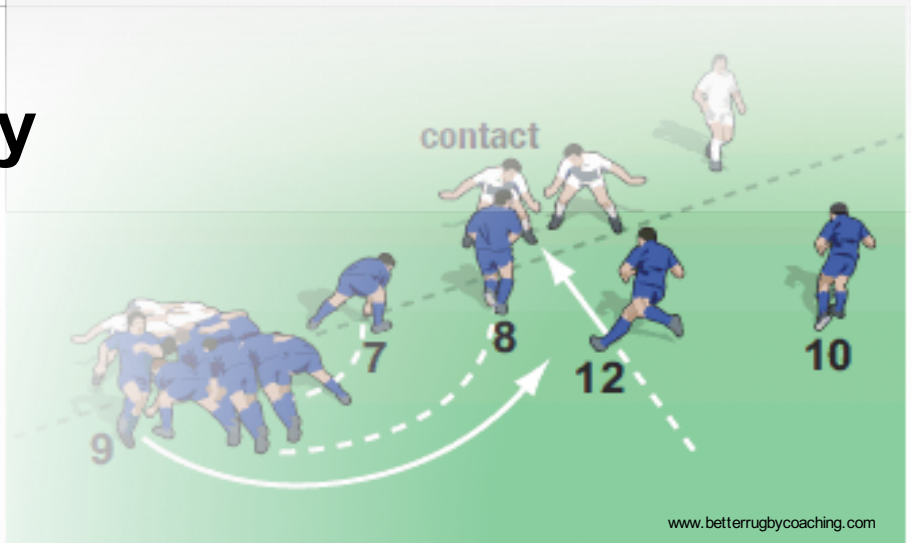
- Resilient, ubiquitous, interoperable network
- Engagement quality system of systems
- Joint priorities & formats
- Netted sensors, BMC3 and shooters
- Third offset approaches



ww.dtic.mil/ndia/2014IAMD/Kilby.pdf

IAMD CONOPS and Requirements

- **Unified Ops demand rigorous CONOPS**
- **Roles and responsibilities must be clearly identified**
- **All systems must work together to achieve common goals in coalition and sovereign operations**
- **Practice like you play**
  - Mod/SIM, HWIL
  - Experiment
  - Exercise & test



IAMD Development Considerations

- **Some recommended considerations informed by MITRE experiences and developments in partnership with the US Government and Armed Forces**
  - **Fully network sensors and shooters**
  - **Engage on network from the start**
  - **Pursue simple, lower-cost interceptors**

Leverage current technology and leap to the end state

Fully Network Sensors and Shooters

- Every element is a sensor – even weapons
- Eases coalition operations – Allied and even civil sensors can be integrated
- When target is fixed by any element, never before thought of weapons can engage
- Capitalize on autonomy and disaggregation

- But… must defend the network from nonkinetic cyber and electronic attack

Engage on Network From the Start

- Don't launch organic – intercept organic
- Don't launch on network – intercept organic
- Do launch on network – intercept on network
- Now weapons aren't limited by organic links
- Communications enables BLOS weapons

- But… must defend the network from nonkinetic cyber and electronic attack

Pursue Simple, Lower-Cost Effects

- Increase the A2AD-to-IAMD cost ratio
- Use the network to enable new strategies
- Be smaller, shorter range, disaggregated
- Electronic warfare, directed energy, anti-PNT, cyber*
- Dark F-35s, deep autonomy, hyper velocity*

- But… must defend the network from nonkinetic cyber and electronic attack

* See Gunzinger, M., & Clark, B., *Winning the Salvo Competition*, Washington, DC: Center for Strategic and Budgetary Assessments, 2016, pp. 21-24, 29-41

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Summary

- Counter proliferation of ballistic and cruise missiles with low-cost IAMD
- Leap frog current architecture and embrace networks and third offset approaches
- But defend the network