New Technology and the Changing MIC

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Introduction

- We consider changes taking place in MIC/DIB as important
- Not clear what outcome will be
- Results of new tech and changing military tactics/strategy and rapid tech change in private sector
- Rapidly changing –cancellations of tech projects; legal challenges; resignations

Changing MIC/DIB

- Cold War MIC particular types firms and relations….
- Post CW
  - Decrease in milex then increase with war on terror and Afghanistan/Iraq
  - New technologies: Network centric warfare RMA
  - Increasing R&D costs
- Results
  - Increased concentration
  - Internationalisation: supply chains; weapon systems
  - Subcontracting
  - Some change in composition –buying relevant tech
  - Continuity and change

After RMA

- Cybersecurity issue recognised

- Private security firms –conflict roles

- Early 2010 started recognise need to consider civil technology developments

- Third offset strategy Artificial intelligence, autonomous systems
  - Second in 70s –network centric
  - First in 50s –tactical nuclear

Timeline

- 2015
  - Ashton Carter –Secretary of Defence –links with Silicon Valley –change procurement practices
  - DIUx: Defence Innovation Unit Experimental
- 2016
  - DIUx launched CSO: Commercial Solutions Opening process
  - Defence Innovation Board: Schmidt (Google/Alphabet)
  - Visits to private companies
- 2017
  - Trump Admin: return to major invest conventional.
  - Stops Third Offset–but spirit remained
  - Recognition importance cloud computing cyber security –DIB not ready

Timeline

- 2018
  - DiUx to DIU: accelerate AI machine learning etc for security needs
  - JAIC (Joint Artificial Intelligence Unit) unit: DoD: accelerate AI capability – adopt techniques developed in commercial
- 2019
  - National Security Commission on Artificial Intelligence (NSCAI) set up by National Defense Authorization Act (NDAA): mandate to make recommendations to meet AI, machine learning needs for security.
  - Recognise need different approach –more comprehensive than JAIC- cooperation govt/agencies/unis/private companies as early in CW
  - JEDI cloud contract awarded to Microsoft –Amazon legal action -delayed

Timeline

- 2020
  - JADC2
  - NSF (National Science Foundation) restructuring approved –China threat – security and economic competitiveness/leadership
  - Techinquiry.org report –former Google scientist. Illustrated links new tech and DoD
- 2021
  - NSCAI final report
  - Biden infrastructure plan: Major new funding public/private research centres
  - JEDI cancelled but new initiative promised with more companies involved

Commercial tech and DIB

- So changing relations within MIC and changing links with new tech commercial companies

- These major commercial companies look very different to arms companies
  - large and higher R&D spenders 4-5 are >10% revenues
  - Range of smaller dynamic companies -mergers & acquisitions
  - Funding models differ venture capital, entrepreneurs with stable companies focussed on innovation expect failure and success

- DIU recognises this and government became willing to use companies outside traditional primes eg SpaceX to do what was in house

Commercial tech and DIB

- Unlike RMA DIB the defence primes tactic of takeover to get capability won't work: large and successful companies

- Tech firms also successfully becoming part of 'revolving door'/MIC – as shown by links and behaviour (appeals)

- Will still be plenty of work for primes in traditional areas, but growth likely to be where tech firms are

- So unclear how they will respond:

- They are not taking it lying down DESO contact won by General Dynamics after acquiring IT firm –Microsoft expected to win.

Cloud computing

- Area cloud computing valuable illustration of changes.
- Cloud systems move data from local machines to servers that could be anywhere
  - Increasingly important with online sales
  - Reduces infrastructure but still gives instant access
  - Reduces need for specialists on site
  - Can get analysis and other services online
  - Can access anywhere with limited hardware
  - More secure than if on local machines connected to internet
- Massive growth driven by commercial sector
  - Public sector saw benefits and started to use
  - Security services and defence later take up

Cloud computing

- Security concerns : attacks on commerce and finance by hostile countries
  - Major security concerns exist commercially.
  - Continuous developments of firewalls etc
  - Always Trade off accessibility and security
- Potential for defence administration and warfighting (JADC2)
  - Links development AI and autonomous weapons
  - Security risks clearly important
- Main defence contractors far behind civil developments and major tech firms too large to take over to get capabilities
- Driving changes in DoD practise

Cloud computing

- More complex market than might think
- Market has six segments –three initial
  - Infrastructure as a service: most advanced, provided architecture
  - Platform as a service: provides storage
  - Software as a service: software and support –biggest area
- over time developed
  - Business Process as a service
  - Cloud management and security services
  - Desktop as a service
- Security services expected to grow rapidly.
  - Cloud users need firewalls and security services
  - Need balance risks against ease of use
  - Security disproportionately important for defence clouds

Cloud computing

- Infrastructure as a service dynamic segment most imp for DOD
  - AWS dominates the market (45%), followed by Microsoft (18%)
  - JEDI won by Microsoft, though cancelled
- Cloud provision for DoD admin/management similar to civil
- Cloud provision for military to clear 'fog of war' more challenging
  - Provide comprehensive real time info, data and tools even in isolated areas and conflict with limited weight
  - Concern for security of such a system but already concern for commercial side over attacks by competitors and hostile states
- Cloud provision internationalised –Amazon expanding into space

Cloud computing

- JEDI process interesting
  - In initially Amazon and Microsoft and Google competed.
  - Google dropped out –conflicted with principles
  - Microsoft won, Amazon appealed, delayed process, then cancelled. New version promised not for one company.
- Interesting ethical issues
  - Alphabet formed in 2015 took 'Do the right thing' rather than 'Don't be evil'. In 2018 Google moved it from code of conduct preface to last sentence
  - Microsoft strong stance in support US military activities
  - Amazon no apparent concerns, already working with CIA on cloud
  - Silcon valley links to DARPA
  - But sensitivity and actions by employees eg Google robotics work (Maven). Overall, seems easily dealt with
  - In 2020 DoD adopted its own set of ethical principles for AI: responsible. Equitable, traceable, reliable, governable.

Conclusions

- Recognition of challenges of new technologies, AI and cloud computing and threats to US dominance
- Marked changes in DoD approach to military technology and large commercial tech firms
  - Civil R&D expenditure in these areas high and innovation fast
  - Large size and profitability of these companies –difficult to attract to defence budget
  - Defence companies cannot compete –nature of DIB
  - Recognition need to move to cloud DoD for both administration and warfighting
- JEDI project
  - Not that large but indicative
  - bids from tech companies
  - legal challenges and Amazon vs Microsoft
  - Cancellation
  - New multi-enterprise initiative to follow

Conclusions

- Despite changes lot money still going to conventional arms producers
- AI, machine learning, cloud, automation will grow as share of budget
- Not clear how established will respond –just focus on legacy? Fight back? Link with tech firms
- Future cuts in milex might change approach
- Not clear how attractive DOD projects will be for major civil tech firms but evidence suggests they want contracts.
- DOD is pushing and clear involvement of new tech figures in DoD advisory boards and revolving door developing

Conclusions

- New tech firms seem to have mastered environment in MIC very quickly
- Will civil technology firms become established part of DIB and how will this change them
- Already, established firms and some officials calling out development of cronyism
- Possible reactions: Cooperation, acquisition and competition. Will all probably play out differently than they have in the past
- There are also interesting dynamics internationally
- Very much 'watch this space' and the latest news
  - Forces software director resigned recently…