Fri, Aug 15, 12:00-13:00, rm 420-422, 2025 Seattle Worldcon Panel MIL06 ***The Military-Industrial Complex*** **(MIC):** "The rise of the military-industrial complex was driven by increasingly complex technology and operational scale. The bigger the war, the more complex or technologically sophisticated the weapons, the larger and more sophisticated the required support system. We'll discuss the rise of empires, cost of support infrastructure, and the financial tradeoffs to conduct modern war."

Blaze Ward (mod), **AK Llyr**, **Bob Hranek**

[My career began with 6 years of USAF Computer Programming plus 34 more years as an Aerospace Systems Engineer. Since I was a Defense Contractor for the Intelligence Community, I'm usually depicted as representing *the Dark Side* on panels. Hence my 'Protogen' name plate, which fans of ***The Expanse*** will understand. That being said, I do NOT speak for ANY of my employers! My role on this panel is to add my Military-Industrial experience. I OVERprepare for all my panels, so if you'd like my file regarding The Military-Industrial Complex, then just email me at BobHranek@gmail.com]

U.S. President Eisenhower, **1961**: "we must guard against the acquisition of unwarranted influence, whether sought or unsought, by the military–industrial complex. The potential for the disastrous rise of misplaced power exists, & will persist."

MIC's Core Goals:

1. Like any other enduring entity, The Military-Industrial Complex's 1st Goal is its **continued existence**.
    a. The primary way of doing this is to always advertise its ability to overcome perceived **threats**.
    b. The second aspect of this is to make sure those funding it always perceive LOTS of threats to be overcome.
2. **Profit** is the motivation that drives industry, and any obstacle in the way of increased profit needs to be overcome.
    a. More ethical companies take a longer-term view to provide quality, reliable, enduring products for customers.
    b. Less ethical companies lie, cheat, steal, & bribe their way to the next quick financial gain they can grab.
        i. Obvious recent examples of this include Boeing bean-counters ignoring Engineers on what should be engineering decisions, leading to cutting too many corners, product failures, crashes, & deaths.
        ii. The death-knell of an organization is when it becomes more cost-effective to pay off lawsuits after accidents occur instead of preventing those accidents from occurring in the first place.
3. **Process** is a double-edged sword.
    a. Rigorous, well-developed processes are the foundation on which highly-complex (the most profitable ones) can be reliably managed and completed, maybe even on time, leading to repeatable financial successes.
    b. These same rigorous processes are too onerous & cost-prohibitive for smaller projects, so small projects tend to be ignored or actively discouraged, even if they could provide large gains to the customer.
        i. It boils down to: "if it doesn't help our company, then it doesn't matter if it helps the customer."
4. **Employee development** is a triple-edged sword.
    a. Development of your employees is needed to give them the skills & tools for continued success & growth.
    b. Retaining your best employees & trying to get other companies' best employees is a never-ending battle.
    c. Customer (mostly Government) employees are simultaneously groomed for favors, developed professionally, & hopefully join your ranks instead of a rival's when they retire from government service.
        i. There is very little distinction between military & government service (GS) employees in this regard.
5. **Customers** are to be **controlled**.
    a. **Lobbyists** are used to ensure customers (politicians) are constantly fed information favorable to the company.
        i. This includes invites to exclusive (& sometimes lavish) conferences, luncheons, support of their personal favorite charities, or whatever other techniques will gain their support for the company.
    b. Political coverage of a large project is provided by ensuring parts of it are made in as many congressional districts as possible, making it difficult for a congressman to defund it hurting their constituents' pockets.
        i. Examples of this include projects "too large to fail", like the F-35.
    c. Supportive politicians get larger corporate donations; unsupportive politicians gain funding for their rivals.
    d. Controlling voters is harder, because they're harder to predict, with less obvious return for the investment.

MIC's Threats:

6. Known-Knowns: like the armaments & inventories of many adversaries, as well as previous tests & battle results.

   a. E.G., how many tanks a country has, the range of their missiles, & how effectively they were last used.
7. Known-Unknowns: Weather & climate impacts, economic forecasts, & longevity of systems or even governments.
   a. E.G., how to defuse a bomb, theoretical physics answers, or even what next week's lottery numbers will be.
8. Unknown-Unknowns: things that blindside analysts, due to false preconceived notions or ignorance of something new.
   a. E.G., air raid on Pearl Harbor, which analysts '*knew*' couldn't work because it was too shallow for torpedoes.
9. Unknown-Knowns: things we don't know we know, refuse to acknowledge, or can't articulate.
   a. E.G. (1) a person does not share critical data with the group or is not listened too, like frozen Shuttle O-rings. (2) An approach is obviously failing, but no one wants to tell the leader, like in North Korea. (3) Being unprepared for Chinese Spy Balloons even though the US experimented with the same thing decades earlier. (4) What is the threshold for military response? Severing an undersea cable? Disabling/destroying satellites? (5) Failure to defend against Cyberattack on our infrastructure, like power, pipelines, finances, etc.
   b. 2025/06/02 AWST, p10, Chinese perform *Phase 1* cyberattacks daily, that US could treat as an *act of war*.
   c. 2025/03/18, 5 Chinese satellites practiced 'dogfighting' in space, so how to counter this new threat?

The rise of empires/MIC eras:

1st era: 1797-1961, until 1941 US only relied on civilian industries while at war, WW2 War Production Board changed that. The change from government owned shipyards & weapons manufacturing facilities to the Arsenal of Democracy.
2nd era: 1961-1993, the Cold War period saw mutual benefits between the MIC & the civilian technology market. Upon the collapse of the USSR, it was thought that a shrinking defense budget would boost US civilian economy.
3rd era: 1993+, Pentagon-urged consolidation saw mega-corps consuming smaller rivals or shifting to civilian markets. Recently, traditional defense contractors have faced competition from Silicon Valley & other tech companies.

10. I was an employee during the **General Electric Aerospace** to **Martin Marietta** to **Lockheed Martin** consolidation.
    a. I joined "Generous Electric" partly for the benefits & witnessed the decline to "Lockmart's" *standards*.
11. Top 10 U.S. Aerospace & Defense Contractors(2024 in $Billions): Lockheed Martin 65, RTX(*Raytheon*) 41, Northrup Grumman 35, General Dynamics 34, Boeing 33, L4Harris 16, HII 11.4, Leidos 11, Booz Allen Hamilton 7, Amentum 6.
12. Top 10 World Defense Contractors(2022 in $Billions): 5 of 10 are US, with #3 BAE Systems 34, China has #7-9, Russia #10.

Cost of MIC support infrastructure:

13. Industry is incentivized to promote conflicts, to promote profits on new and replacement equipment.
14. Quote from Contact: "First rule in government spending: why build one when you can have two at twice the price?"
15. Ramping up from about a dozen "Battlestar Galactica" space platforms to 1,000s of smaller satellite assets takes decades, 100s of $Billions, & the corresponding integrated ground architecture to ensure it can be used effectively.
16. 2025/06/30 AWST, p45-47, Taiwan competing with China's 90% of global commercial drone market, predicted to be worth $57.8 billion by 2030. Taiwan is investing $1.35 billion to make 15,000 UAS per month by 2028 with no Chinese components to comply with US requirements. Taiwan makes 95% of advanced ICs.
17. GPS cost $11 Billion (2024 $s) to establish, and about $2 Billion annually to operate.
    a. Most U.S. precision-strike weapons are reliant on GPS, so how much do you invest into protecting GPS?
    b. How much investment into backup systems does a nation make if its own GPS is not available?
       i. The U.S. invests in high-precision inertial navigation & other technologies, partially for this reason.
    c. Insurance money could be considered a waste up front, UNTIL you actually need it!
18. What are national options if most cost-effective access to space, like SpaceX, is taken away?
    a. Maintaining backup launch capability via United Launch Alliance, Arianespace, NASA, JAXA, NSIL, or the dozens of corporate launch service providers is a necessary extra cost, for national security.
    b. SpaceX initially cut off Ukraine's use of Starlink, degrading Ukraine's defense vs Russian War.
       i. Illustrates the danger of relying on ANY commercial space infrastructure.
19. 2025/07/14 AW&ST p12 & DARPA quantum apertures, one $1cm^3$ laser sensor can detect 10 MHz – 40 GHz signals.
    a. Combined with AI processing, this means the end of stealth for any platform emitting >1 milliwatt of energy.
    b. How much should a nation spend BEFORE its stealth capability is negated?
20. 2025/07/28 AW&ST p8, Pentagon will become largest shareholder in rare earth producer MP materials to offset China.

21. 2025/07/14 AWST, p56-60, "Hidden Asset" details the Armstrong Test Facility (ATF) history in the development of **NERVA** & several other government & commercial high-energy Aerospace projects. ATF needs to be saved from short-sighted budget cuts if the use of nuclear power in space is going to progress in the U.S.
22. What does a nation do when companies stop producing equipment required to maintain & repair its vehicles?
    a. 2025/07/14 AW&ST p30-32, one answer is Turkey's ASFAT (Military Factory & Shipyard Management), which employs about 30,000 people providing parts without relying on commercial companies.
    b. Cost savings can be huge, like manufacturer's $4500 A400M propeller spinner can be made for $70!
23. **Keeping national secrets cost$**: including building SCIFs where the work can be performed, COMPLETELY isolated computer systems, Tempest communications security & maintaining multiple clearance levels.
    a. SCIFs, must be built (extra $350-1000 per ft^2) & maintained to ensure classified work can be done securely.
    b. Computer Networks must be physically isolated from the internet & be made Tempest secure.
        i. For SCI & SAP systems, this includes their own international fiber-optic communications networks.
    c. Cleared personnel: 4.2 million Secret, 1.3 million Top Secret, ~200,000? SCI (like SI/TK), smaller for SAPs.
        i. The cost of obtaining a clearance is estimated to range from $420 (secret) to $6000 (priority SCI).

Financial tradeoffs to conduct modern war:

24. Industry is incentivized for PROFIT above ALL else. It takes keen oversight, usually by experienced government acquisition experts to actually trim the fat out of program budgets to get "more bang for the buck" delivered.
25. Premiere US 5th Generation stealth F-35 has a unit cost of $100 million in 2025.
26. 2025/06/02 AWST, p24, French *nEUROn* UCAV to have F-35 strike capability by 2035 for $29 million.
27. 2025/06/30 AWST, p26, demonstrate long lead times of modern systems: European Future Combat Air System (FCAS) started work in 2019 but there is already anxiety that it will NOT be ready by 2045. Too late for a 2030 need.
28. 2025/06/30 AWST, p35, F-35, F-15EX, & B-21 are in various stages of development, & Navy's F/A-XX on hold. Navy's "best-performing program is 6 months late & 57% over budget," Politically named *F-47* should be replaced by UCAVs.
29. The Catch-22 of cost-savings vs keeping production lines open to keep critical infrastructure and SMEs available, particularly a problem in long-lead items like nuclear submarines and aircraft carriers.
30. Chinese systems engineering, & weapons development rates in general, are much (2x? 3x?) faster than in the U.S.
31. 2025/06/30 AWST, p38-39, autonomous Collaborative Combat Aircraft (CCA) are designed to fulfill all air roles by 2040.
32. 2025/06, $300 Ukrainian drones destroying $100 million Russian bombers = the fiscal asymmetry of modern warfare.
33. 2025/05/22, Science News, Golden Dome plan has a major obstacle: Physics, U.S. current $60 billion limited kinetic-kill ICBM-intercept capability is unlikely to improve in next 15 years & tested as only 60% effective.
    a. "Ensuring protection from just 1 North Korean ICBM would require > 1,000 interceptors in orbit, the APS report finds. Protection from 10 might demand > 30,000 interceptors, depending on missile type & other assumptions." Since it can't defend against a massive attack, we're back to MAD.
    b. "May 5 Congressional Budget Office report suggests that, even with lower launch costs, the space-based effort alone would cost between $161 billion and $542 billion over a period of 20 years."
34. 2025/06/02, AWST, p16, ULA CEO Tory "Bruno proposed space-based high-energy lasers powered by chemically fueled electric generators or a small nuclear reactor" as part of the Golden Dome SDI recreation.
35. 2025/07/14, AWST, p16-17, $25 billion to start Golden Dome +$175 billion to *try* to make it operational by 2029.
    a. Low probability of success, but using AI-controlled lasers instead of kinetic-kill gives it a higher chance.
36. 2025/07/14, AWST, p18, the $2.56 billion 2024 contract to convert two 737-700 aircraft into E-7A early warning prototypes was cancelled when unit cost of it rose to $724 million per aircraft. 4 E-2D Hawkeyes will be procured as stopgap until Space Force's $29 billion R&D effort can start to field a space-based replacement capability by 2030.
37. 1988, **The New Politics Of Budgetary Process**, 468 pages by Aaron Wildavsky, 3-page review by William A. Niskanen.
    a. Thank you for this addition, **Blaze Ward**. I did not obtain the full book, so I'm relying on the review above.
    b. In 1964, Wildavsky wrote about his perceived order out of chaos of the U.S. budgetary process.
    c. The 'Old' bottom-up consensus started eroding with Reaganomics, rapid entitlement spending increases, & the democratization of Congress, reflected in the erosion of seniority & the proliferation of subcommittees.

d. Top-down budget process was implemented by the Congressional Budget Act of 1974, & the Balanced Budget & Emergency Deficit Control Act of 1985 (known as the Gramm-Rudman-Hollings Act).
e. The Impoundment Control Act of 1974 severely restricted the POTUS's authority to impound spending for any purpose, authority that was further restricted by a 1983 court decision.
    i. These restrictions are being destroyed under the current regime & Congress & SCOTUS failures.
f. Wildavsky foresaw the U.S. budget failures we've unfortunately become accustomed to, & blames the failure of consensus more than the processes that are in place.
g. This book is considered by William A. Niskanen to "be the definitive guide, both to the expected budget outcomes and the potential for improving this process."

What should a MilSF Writer's take-aways be from MIC?

38. *"How would YOU add MIC to your work? Or improve your understanding of works by some of the big MilSF writers?"*
39. Books: (thanks to **AK** **Llyr** for the starting set of 8 of these)
    a. 1952, The Space Merchants, by Frederik Pohl & Cyril M. Kornbluth. A true classic dealing satirically with hyper-developed consumerism.
    b. 1959, Starship Troopers, by Robert A. Heinlein. Military elite rule the human interstellar Terran Federation, & only veterans of a primarily military Federal Service enjoy full citizenship, including the right to vote.
    c. 1965-1985, Dune novels, by Frank Herbert. Epic saga set tens of thousands of years in the future, it chronicles a galactic human & transhuman civilization that has banned all "thinking machines", including computers, robots, & artificial intelligence. In their place, this technofeudal Imperium has developed advanced mental & physical disciplines & technologies that (mostly) adhere to the ban on computers.
    d. 1968, Stand on Zanzibar, by John Brunner. The novel is about overpopulation & its projected consequences. The story is set in 2010, mostly in the United States. The narrative follows the lives of a large cast of characters, chosen to give a broad cross-section of the future world.
    e. 1974, The Forever War, by Joe Haldeman. One of my favorites, this story revolves around elite soldiers that devote their lives to fighting an interstellar war & their society that changes just as rapidly as they do.
    f. 1975, The Shockwave Rider, by John Brunner. Notable for its hero's use of computer hacking skills to escape pursuit in a dystopian future, & for the coining of the word "worm" to describe a program that propagates itself through a computer network. It also introduces the concept of a *Delphi pool*, perhaps derived from the RAND Corporation's Delphi method – a prediction market on world events which bears close resemblance to DARPA's controversial & cancelled Policy Analysis Market.
    g. 1979, Hammer's Slammers, by author David Drake. One of the best military SF writers incorporates his own Vietnam experiences into gripping & thought-provoking stories of mercenary units in the far future.
    h. 1984, Neuromancer, by William Gibson. Set in a near-future dystopia, the narrative follows a computer hacker enlisted into a crew by a powerful artificial intelligence & a traumatized former soldier to complete a high-stakes heist. Corporate warfare & privatized surveillance.
    i. 1992, Snow Crash, by Neal Stephenson. Corporations as nation states & shadow economies with their own private electronic currency & armies. Its themes include history, linguistics, anthropology, archaeology, religion, computer science, politics, cryptography, memetics, & philosophy.
    j. 1992-1999, Mars trilogy (Red Mars, Green Mars, Blue Mars, & The Martians), by Kim Stanley Robinson. One of my favorite authors superbly chronicles the settlement & terraforming of the planet Mars through the personal & detailed viewpoints of a wide variety of characters spanning 187 years, from 2026 to 2212. Ultimately more utopian than dystopian, the story focuses on egalitarian, sociological, & scientific advances made on Mars, while Earth suffers from overpopulation & ecological disaster.
    k. 2011-2024, **The Expanse**, by James S. A. Corey, the joint pen name of authors Daniel Abraham & Ty Franck. **My favorite** pair of authors' exquisite story line captures corporate greed, military opportunism, geopolitical intrigue, & the exploitation of The Expanses beyond Earth nearly perfectly. The show nails the Aerospace technology, a plausible timeline over the next couple of centuries, & great characters in a fantastic narrative. **Email me if you'd like my DETAILED 14-page panel notes regarding the show & these written works of art**.

40. Movies & Shows: (thanks to **AK** **Llyr** for the starting set of 11 of these)
    a. 1974, The Parallax View, corporate-backed assassinations, false flag operations, & the struggle for truth.
    b. 1975, Three Days of the Condor, one of my favorite films, illustrating the dangers of an out-of-control MIC.
    c. 1976, Network, corporate media manipulation taken to its breaking point.
    d. 1987, RoboCop, corporate militarization, privatized law enforcement, & the parallel corruption of society.
    e. 1991, JFK, for the conspiracy fans.
    f. 2005, **Why We Fight**, describes the rise & maintenance of the U.S. military–industrial complex & its 50-year involvement with the wars led by the U.S. to date, especially its 2003 invasion of Iraq. The documentary asserts that in every decade since World War II, the American public was misled so that the government (incumbent Administration) could take them to war & fuel the military-industrial economy maintaining U.S. political dominance in the world. Interviewed about this matter are politician John McCain, political scientist and former CIA analyst Chalmers Johnson, politician Richard Perle, neoconservative commentator William Kristol, writer Gore Vidal, and public policy expert Joseph Cirincione.
    g. 2005, Syriana, multiple interconnected narratives about oil cartels, CIA black ops, & corporate exploitation in the Middle East. This was based upon actual events, if fictionalized. **AK** believes it did not go far enough.
    h. 2005, Lord of War, global arms trade & profits from conflict worldwide. Note at end about real-world arms dealing & the major powers' complicity is poignant in how corporations shape policy & conflict worldwide.
    i. 2006, Shadow Company, a documentary exploring the secretive world of private military contractors in Iraq.
    j. 2008, Superpower (no link), examines how the US has used its military & economic power to achieve global dominance. Noam Chomsky & Sergei Khrushchev are among those interviewed.
    k. 2013, Dirty Wars, this one hits close to home for **AK**. JSOC operations to forward corporate interests.
    l. 2016, Snowden, **AK** is writing book on modern surveillance that highlights how Total Information Awareness wasn't really shut down in 2003, but diversified to corporate interests & has led to the Surveillance State & corporate control of surveillance globally, how it is used to quash dissent, & control the public.
    m. 2019, Official Secrets, based on the case of whistleblower Katharine Gun, who exposed an illegal spying operation by American and British intelligence services regarding a war for oil in Iraq.
    n. 2023, The Diplomat, a quirky & entertaining TV series about diplomatic activity influenced by defense contractors, energy companies, & always messy human interpersonal interactions.
    o. 2023, **Oppenheimer**, about the man who led the Manhattan Project, highlighting the moral dilemmas & consequences of developing atomic weapons. **Email me if you'd like my DETAILED 3-page panel notes about this movie, nuclear weapons, & their use.**