RMA IV Ascendent: The Rise of the Killer Robots and the Recrudescence of RMA III: A New Nuclear Age?

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Trends, Shocks, and Discontinuities

- **Identify possible shocks and discontinuities**
  - **Trends: Powerful forces that are setting the stage for large scale change (e.g. demographic changes)**
  - **Shock: Abrupt and major event that may or may not be precursor to a discontinuity**
  - **Discontinuity: Abrupt, major and permanent change of the global security environment in response to one or more shocks**

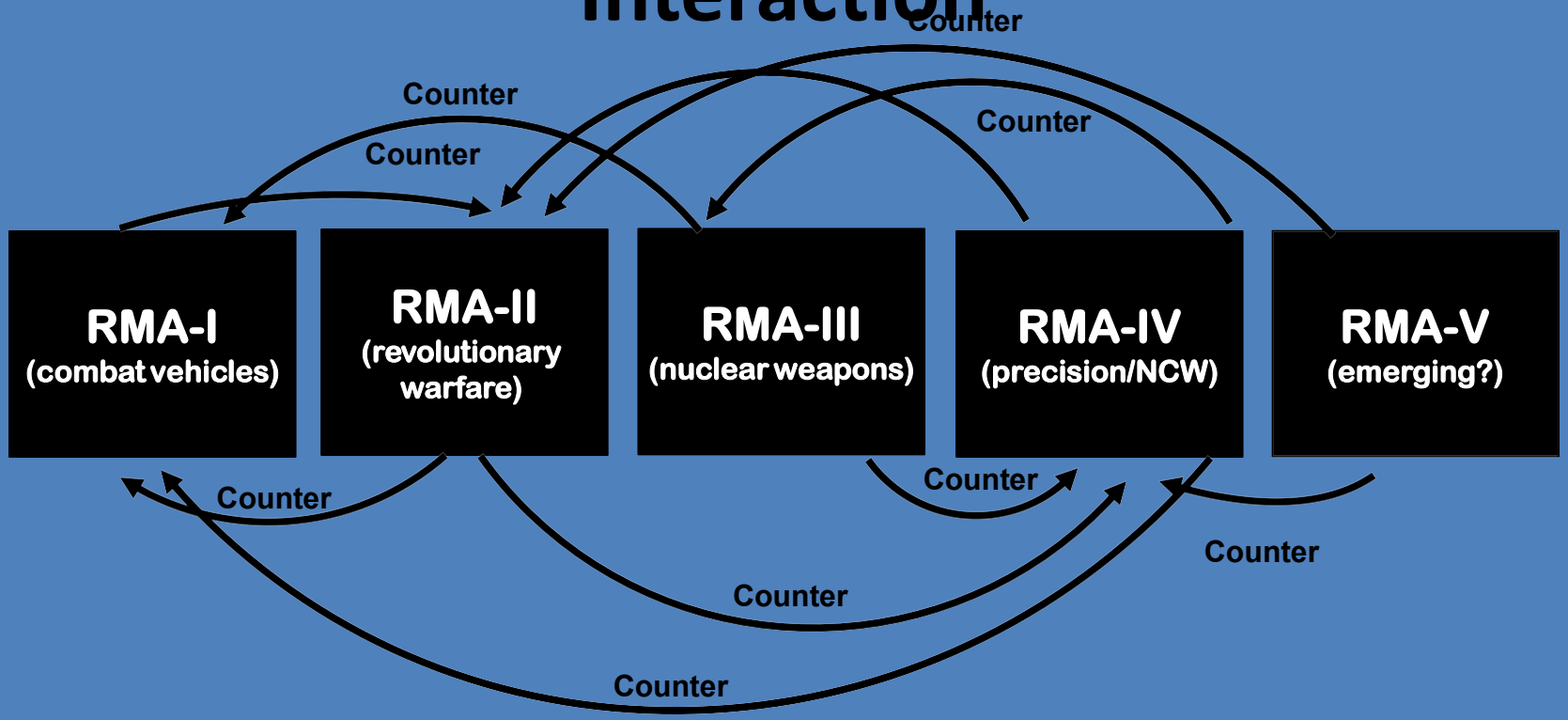
- **Possible shocks and discontinuities identified are not absolutely predictive – identification of current trends that lead to possible rapid and radical change that may become permanent**

The Four RMAs of the 20th Century

Four 20th-Century Revolutions in Military Affairs (all continuing)

RMA	Nominal Period of Change (all with older roots)	Characteristic Developments	Label for Resulting Strategy
I	1917–	Mechanization: self-propelled combat vehicles (air, sea, and land)	Industrial warfare
II	1930–	Insurgency; revolutionary, partisan, and guerilla warfare; terrorism, "Kulturkamph"	Insurgency
III	1945–	Nuclear weapons; long-range missile delivery	Mass-destruction weapons and long-range aircraft and missiles
IV	1980s-	Precision weapons; unmanned combat vehicles; persistent ISR; networked forces; computer-network operations (CNO)	Information technology

The RMA Measure-Countermeasure Interaction



The different RMAs can be viewed as different domains or "ways of war." Not unlike the game of " rock, paper, and scissors" the various RMAs interact with each other in dynamic process of thesis and antithesis. Should RMA-V be defined by its ability to counter prior RMAs, specifically RMA-II, RMA-III, and RMA-IV? Is RMA-V simply a "hybrid" of all four prior RMAs?

RMA IV - War in the Near-Future: Rise of the Killer Robots

Key Themes of the "Third Offset" aka War in the Near Future

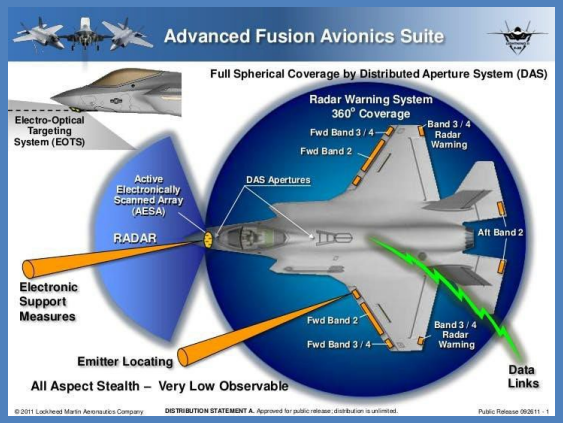
- Autonomous and/or Swarming Unmanned Air and Ground Vehicles
- Unmanned Vehicle Challenge to the Submarine
- The Emergence of Enhanced and Armored Infantry
- Extending the Operational Life of Large Combat Vehicles
- Global-Range Precision Strike
- Conflict Through Cyberspace
- Emergence of War in the Space Domain
- Prospect of non-nuclear transoceanic bombardment
- Innovations in Transoceanic Logistics

Evolution of Stealth Aircraft
On the top an "S" Curve?

The B-49 Flying Wing leads to the B-2, F-22, F-35, and B-21

F-35 As an Aerial Networked Targeting Node

- Aside from its low observable (LO) features F-35 represents a major advance in combat aircraft avionics
- Major improvement in 360 degree situation awareness for pilot
- ASEA, advanced electro-optical and EW sensors provides F-35 with new intelligence, surveillance, and reconnaissance capability
- Individual fighter can be networked with companion F-35s and 4th Generation fighters
- F-35 can provide forward targeting for long-range SAM systems through cooperative engagement scheme – See recent USN tests involving USMC F-35B and Arleigh Burke guided missile destroyer as Project RIOT test of F-35 as ballistic missile defense sensor



Ground Launched Long-Range Ballistic and Cruise Missiles

- With the collapse of the INF Treaty – Army and Navy/USMC going into the long-range coastal artillery business
- US Army and USMC will deploy long-range cruise and aero-ballistic missiles on transporter erector launchers (TELS)
- USAF will deploy Boost Glide Vehicles (BGVs) from strategic bombers

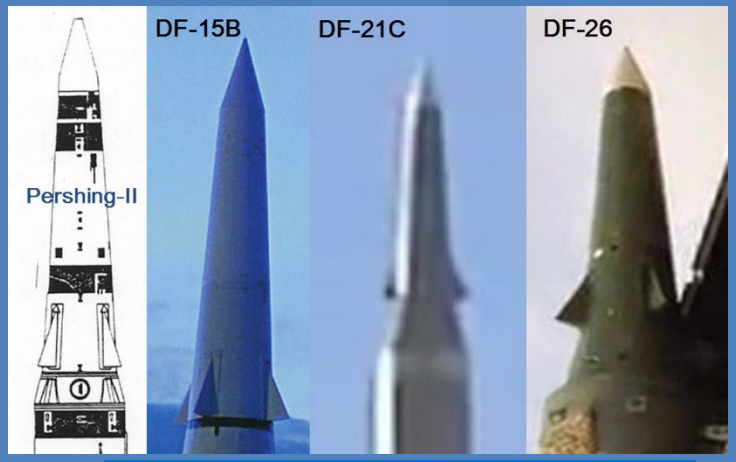
The Transformation of the USMC

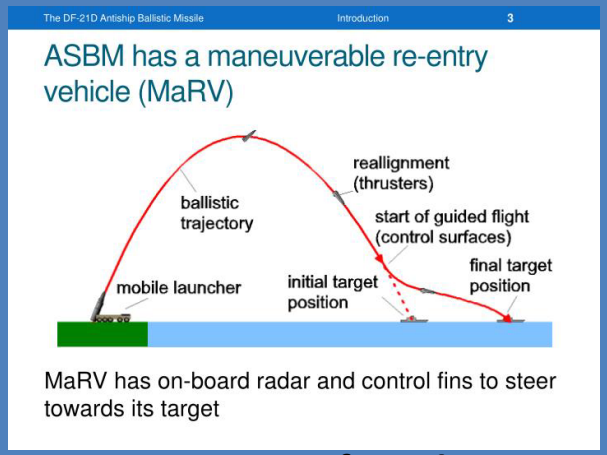
- Emergence of New USMC Concepts of Operation
- Rejection of classic amphibious assault doctrine – no more Inchon's or Iwo Jima's
- Fighting a regional war with China that looks like the Guadalcanal campaign
- Smaller and more agile forces armed with long-range precision guided missiles

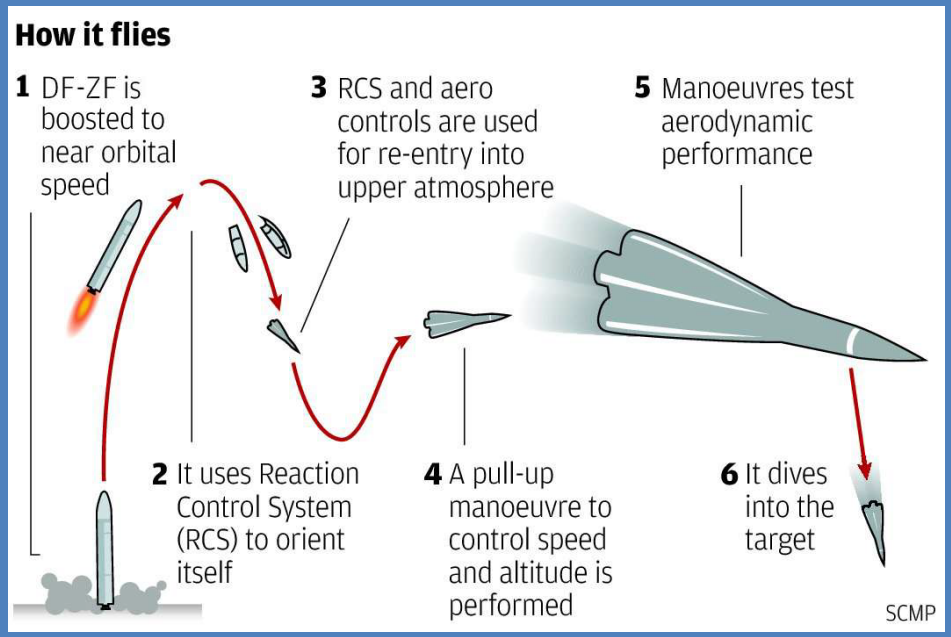
Major Advances in Indirect Fire Weapons

- Dramatic U.S. acceleration in development and deployment of extended range tube artillery and rocket systems
- Army and USMC “rediscover” the near-peer artillery and MLRS threat
- How will armor and infantry maneuver in a sensor infested battlefield?

The Anti-Ship Ballistic Missile (ASBM)







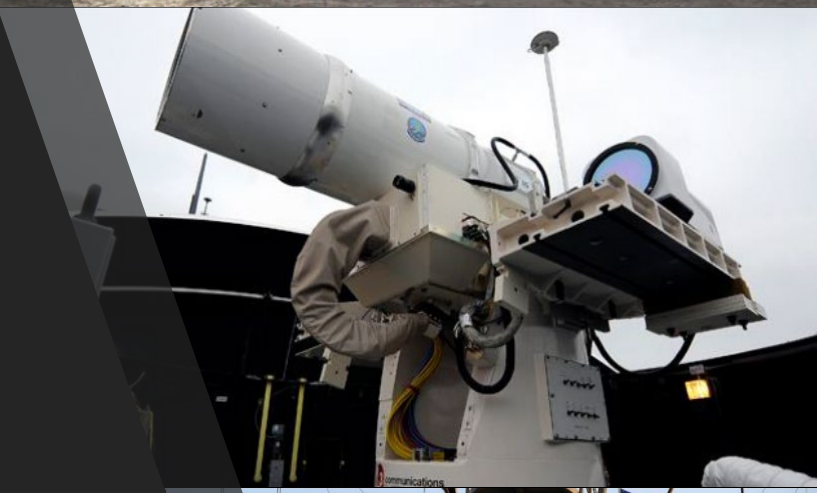
ASBM – Emergence of Pershing II in anti-ship form
Next generation ASBM is a boost-glide vehicle

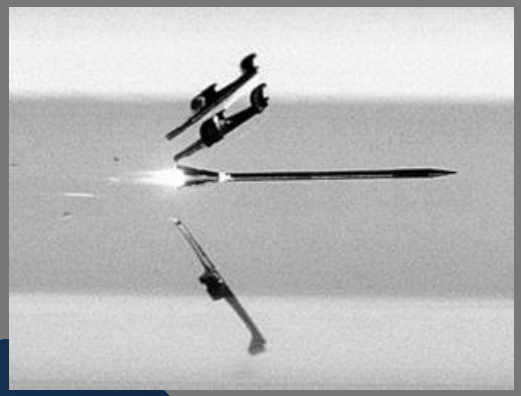
Diffusion of Long-Range Precision Guided Missiles

- Tomahawk class cruise missile on air, land, and sea platforms
- Emerging MRBM/IRBMs equipped with Maneuvering Re-entry Vehicles (MaRV), e.g., the Air Launch Ballistic Missile (ALBM) and Boost-glide Vehicle (BGV)
- Re-emergence of the air launched ballistic missile (ALBM)

Naval Directed Energy Weapons (DEW)

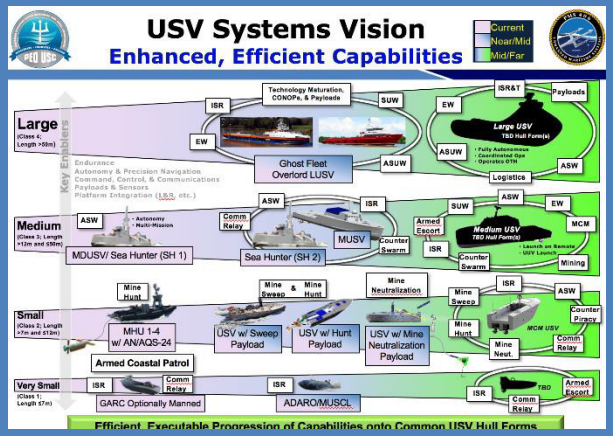
- USN taking the lead in developing tactical directed energy weapons – first step – multi-shot capacity against small UAVs and swarming unmanned and suicide boats





Emergence of Active Protection

- Global Diffusion of Active Protection Systems (APS)
- Effective against low velocity RPG and ATGMs
- Not effective against supersonic kenetic energy and rapid fire medium caliber rounds



Emerging Robotization of Warfare

By the late 2020s U.S. Joint Force will become increasing robotized

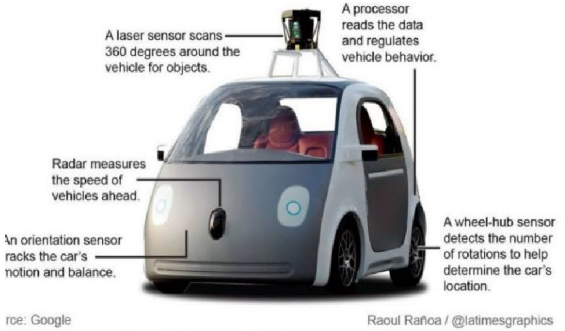
Rise of the “Super” Soldier?

The DARPA Warrior Web concept aims to develop a skin suit with embedded technology to reduce Soldier injuries while maintaining Soldier performance.

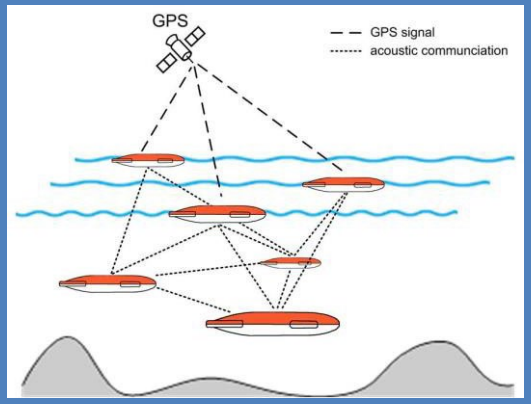
Will the armored/enhanced soldier supported by robots be the wave of the future to land warfare?

Post 2020: Semi-Autonomous/Autonomous UGVs

- **Fully autonomous armed UGVs are likely to emerge in the next ten years. "Arms Race" between Google and global automotive industries to develop autonomous vehicles. A wide range of logistic systems will provide "mechanical mules" for dismounted forces within the next five years. Investments in cooperative behavior may extend the envelope in this regard.**



Swarming Takes Off



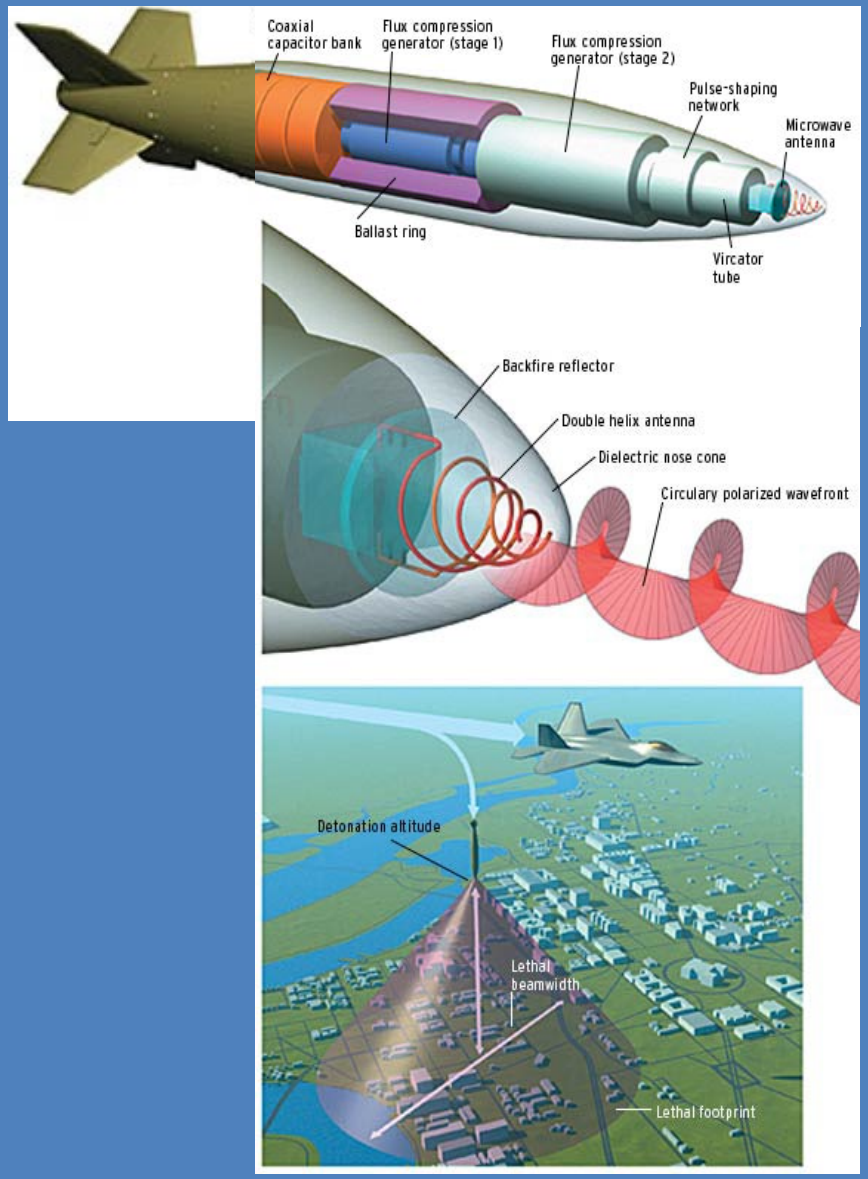
- Swarming reconnaissance and strike systems rapidly emerging – key is power source and endurance of these systems
- Commercial demand signals may be as important as military demand signals to develop this aspect of Un-crewed Aerial Vehicles (UAS) development

Re-Emergence of U.S. SHORADS

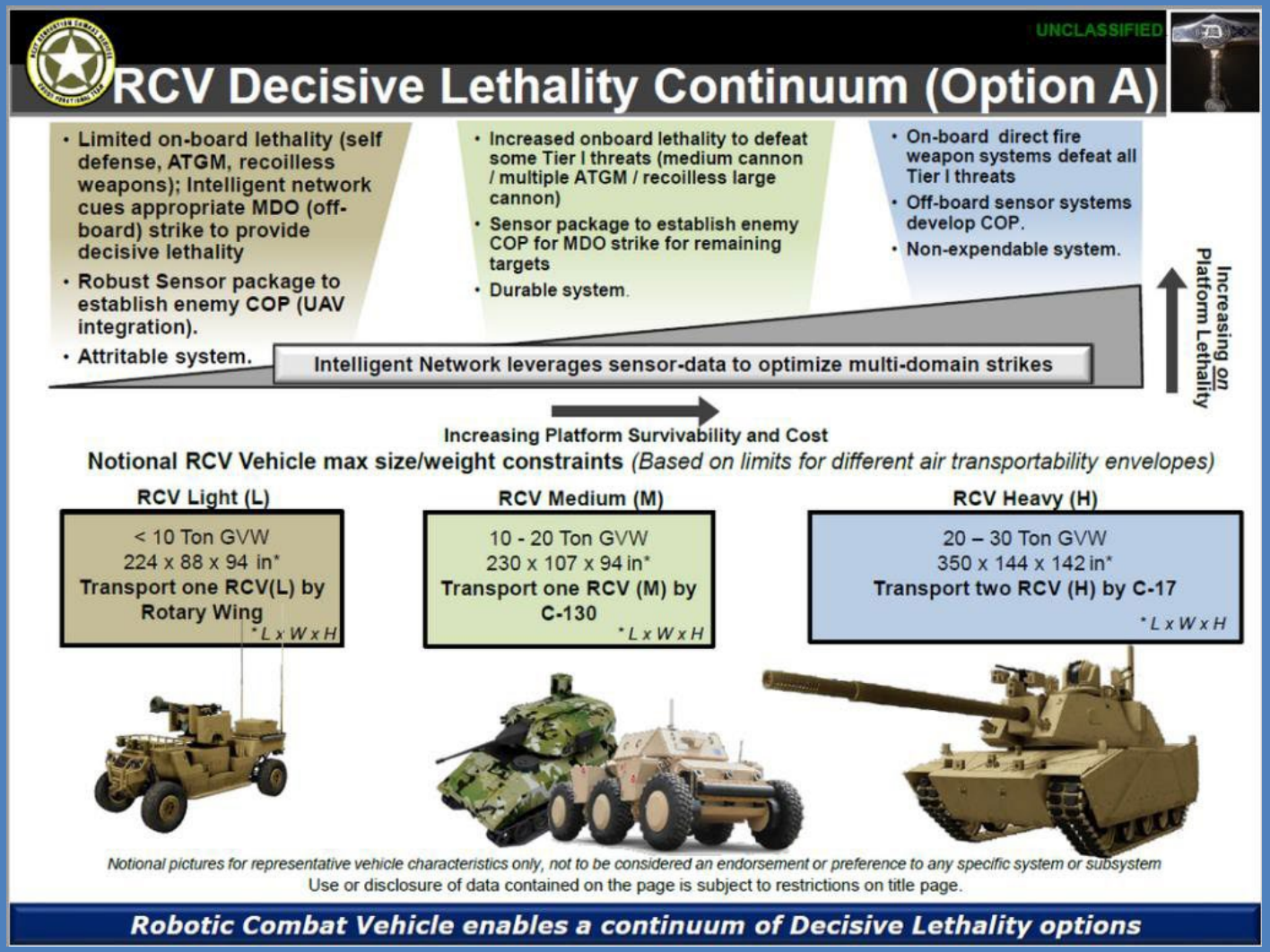
- **US Army and USMC are investing in short range air defense systems (SHORADS) in response to the rise of the small and micro drone threat**
- **Includes the deployment of guided weapons and directed energy weapons (DEWs)**

Microwave Weapons Help Manage Target Location Errors, Destroy Electronics, Damage Weapons Pits

- High powered, narrow band microwave bombs dropped in vicinity of suspected enemy weapons
- Frequency range from 1-10 GHz can penetrate electronics hardened against nuclear detonation
- Could generate eddy currents in the warhead pit, causing it to heat and deform
- Destructive effects 400-500 meters
- Possible counterforce option against deployed mobile nuclear-forces?
- Big question about actual weapon effectiveness



Robotization of the U.S. Army



- **After false start of the Future Combat Systems program – Army is investing heavily in Robotized Combat Vehicles (RCVs)**

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Robotic Warfare Battlefield Geometry

Network Lethality
Sensors collate data into a Common Operating Picture. 1
AI/ML rapidly generate options for the Commander and identify the best available system to deliver effects. 2
Commander conducts multi-domain strike. 3

Sensor Influence
Theater assets develop situational understanding of the Close and Deep Maneuver Area. 1
Unmanned ground sensors and UAS swarms develop COP. 2
EW capabilities and sensor feed identify HPTs; UAS lethal strikes and loitering munitions achieve desired effects. 3

Robotic Influence
Provide additional space and time prior to the first human engagement with the threat. 1
Provide advanced capabilities at the Company level via modular mission payloads. 2
Attrit and disrupt the threat's scheme of maneuver prior to first human engagement. 3

Ground Warfare in the late 2020s

Integrating RCVs in ground warfare

Robotized Surface Fleet As Mobile Ammunition Dumps and More

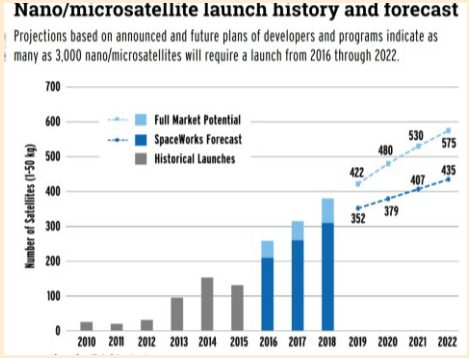
- Navy faces the problem that its forward deployed forces will go “Winchester” early during regional war – limits of the Vertical Launch System (VLS)
- Allows the remote launching of long-range weapons from un-crewed ships
- USVs can act as decoys for the fleet once empty of long-range munitions

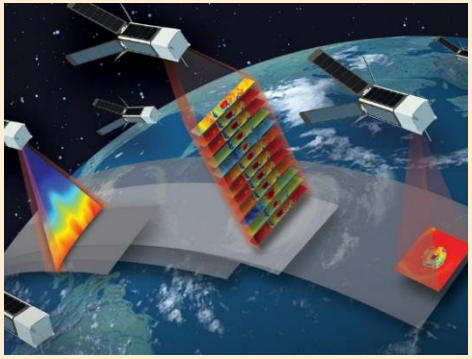
Move to Larger Vehicles

- U.S. Navy AUV missions increasing in duration (with goal 46 to 70 days) requiring more stored energy
- Possible solutions
  - Increase energy density (requires technology breakthrough)
  - Increase volume (being pursued)
- LDUUV concept under development with limited operational capability planned for 2015
- Six Boeing designed “Orcas” under construction

Emergence of Re-usable First Stage Rockets
Space X Takes the Lead

The Rise of Large Small Satellite Constellations





- Question: What is the real demand signal for large constellations of small satellites in LEO?
- Second question: What is the real demand signal for small SLVs?
- Third question: Will this severely damage optical astronomy?

Emerging LEO ASAT

Aegis BMD SM-3 Evolution Plan

Block IA	Block IB	Block II	Block IIA
Block 2004 • 1-Color Seeker • Pulsed DACS	• 2- Color Seeker - Increased IR Acquisition - Improved Discrimination • TDACS - Increased Divert - Lowers AUR Cost • All-Reflective Optics (ARO) • Advanced Signal Processor (ASP)	High Velocity Variant • Block IB Seeker • 21" Propulsion - 2nd & 3rd Stage - Increased Missile Vbo = xx • 21" Nosecone • MK 41 VLS Compatible	High Divert Variant • Large Diameter KW - Advanced Discrimination Seeker - High Divert DACS • 21" Propulsion - 2nd & 3rd Stage - Increased Missile Vbo = yy • 21" Nosecone • MK 41 VLS Compatible
Block 2004	Block 2008	Block 2010 / 2012	Block 2012 / 2014

Funded Since PB06 | Capability Change From Previous Block

Approved for Public Release
06-MDA-1922 (13 SEP 06)

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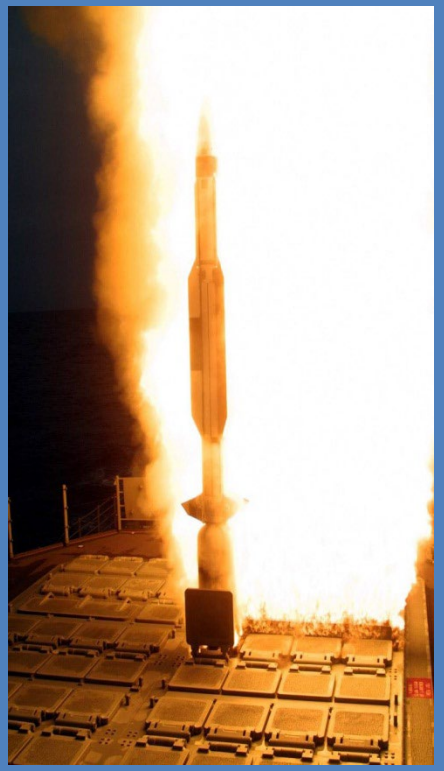


Alternative ASAT Options at All Altitudes

India, China, and other major powers will likely have a wide range of ASAT options by 2020

F-15 ASAT Test

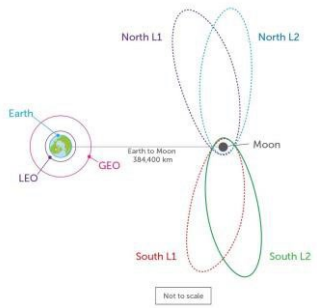
Russian Airborne ASAT

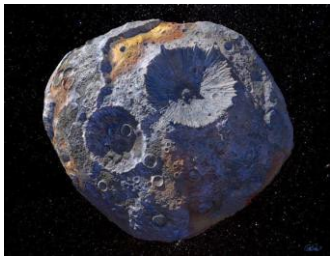
"Tactical" Laser DEW may emerge as "blinding" ASAT

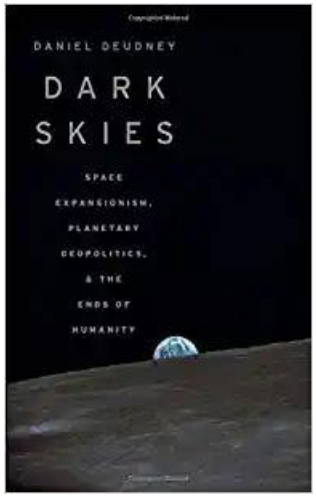
Chinese Medium bomber as ASAT launcher

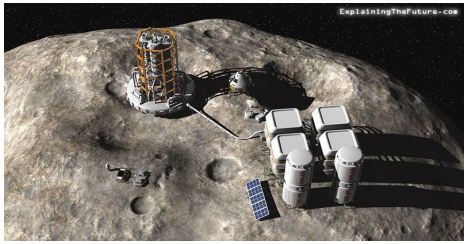
Outer Space and the Moon and Asteroids New Dimension of War?

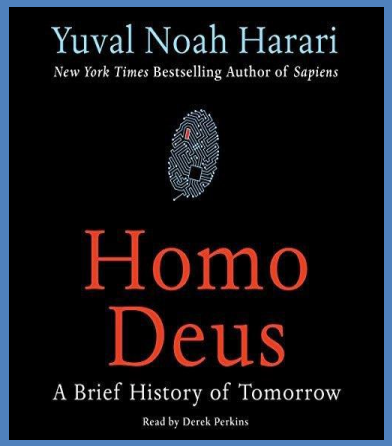
- Creation of the United States Space Force (USSF) implies future offensive and defense operations at least out to cis-lunar space
- Have we thought through the large implications of these actions and trends?
- Geostrategic implication of asteroid mining?

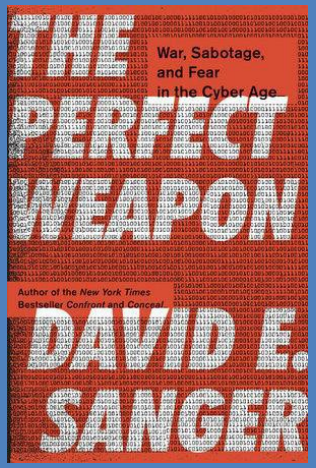


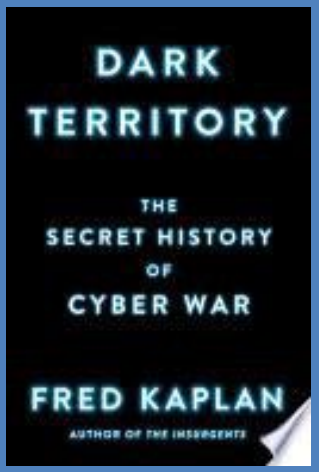




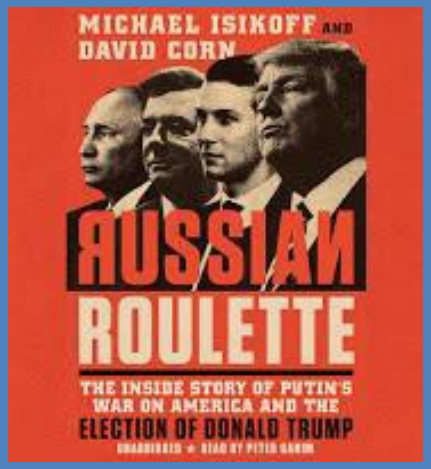


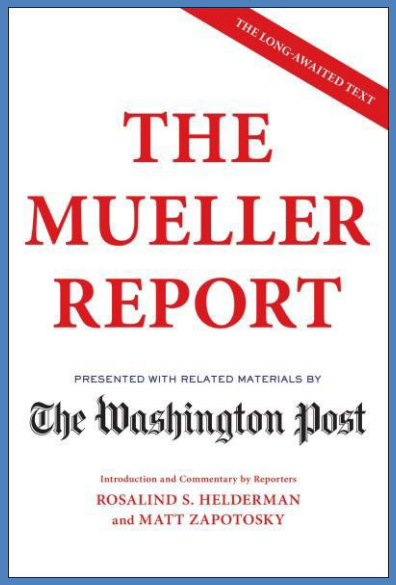


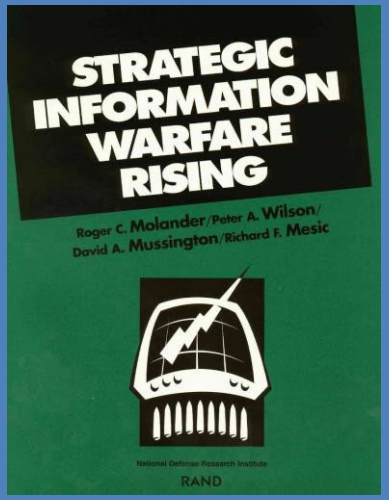




Conflict Through Cyberspace







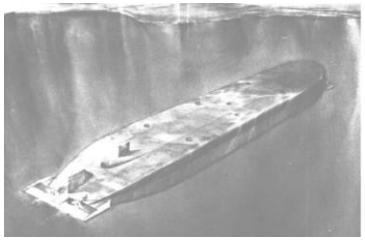
On "Active Measures" aka subversion aka "Kulturkampf" aka "Hybrid" Warfare

- USSR and PRC had sophisticated "active" measures programs during Cold War
- Those tools and techniques have not change since the end of the Cold War
  - Extensive use of all media for propaganda and disinformation
  - Creation of sympathetic media outlets
  - Creating agents in place
  - Creative use of corruption
- The Internet enabled "new" media has opened up new opportunities to conduct "Information Operations" of increased sophistication
- Salafist-Jihadi movements have proven to be very adept at using Internet to sustain global insurgencies
- Subversion and terrorism by remote control
  - Role of Communist Parties during Cold War
  - Creative use of Internet as a means to recruit followers to commit acts of terrorism including suicide attacks
- Scale of suicide attacks has risen dramatically over the last twenty years – scale similar to the Japanese use of the Kamikazes during WW II

Innovations in Global Logistics?

The Russians and/or Chinese may attempt to carry out a mining campaign along the U.S. coasts especially in response to a similar U.S. campaign.

- **Very large USVs and/or UUVs could be used as arsenal platforms to deal with the fleet's "Winchester" problem.**
- **Sea planes could prove attractive in SEA**
- **The modernized Panama Canal becomes a prime strategic logistics node and target for the PLAN**
- **Can a large expeditionary force the Western Pacific be sustained?**
- **Will large portions of the civilian large capacity air fleet be mobilized through an expanded CRAF program?**
- **What role for very large hybrid air ships?**
- **What about the mobilization of U.S. and non-U.S. cargo vessels? How might these ALOCs and SLOCs be protected from air and submarine attack?**
- **Australia becomes a key to any sustained Asian campaign – replay of the WW-II SWP campaign .**
- **Will Europe, India or Brazil be a secure source of war material? Both providing "Lend Lease"?**



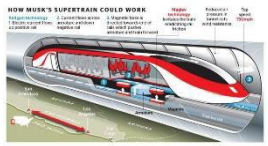
What is National Mobilization Circa 2032?

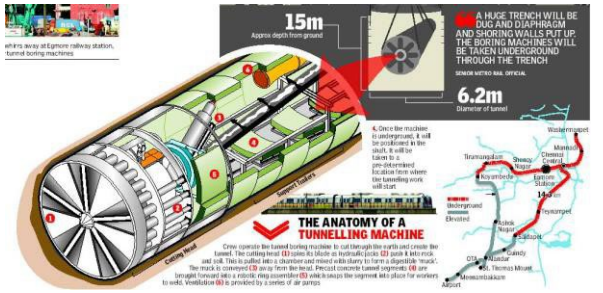
- Using the U.S. industrial capacity *to produce "war robots"*
- By the 2030s the U.S. will have a very large capacity to produce mobile and autonomous vehicles.
- How might that industrial capacity be reconfigured to produce unmanned autonomous fighting vehicles?
- Should the U.S. be prepared to replace combat troops with unmanned combat aerial vehicles that are designed for mass production?
- Should this approach to ground fighting vehicles and naval warships be taken?
- How might the tools and technique of 3D manufacturing be employed in this regard?
- Is this the way the address the prospect of a large land war in Eurasia – to replace human combat soldiers with robots?

What is National Mobilization Circa 2032? (II)

On Replacing the Arsenal of Long-range PGMs –

- **It is likely one of the highest priorities is the creation of additional and protected production facilities of long-range PGMs.**
- **These long-range PGMs will include not only cruise and ballistic missiles but long-range underwater attack systems.**
- **Boost-glide vehicles may be in vogue**
- **The surge production capacity of these weapons will be highly dependent as to whether their design is amenable to rapid mass production including the likely use of 3D aka additive manufacturing techniques.**
- **Additive manufacturing may facilitate dispersed and concealed manufacturing – 21st century version of Japanese WW - II industries**





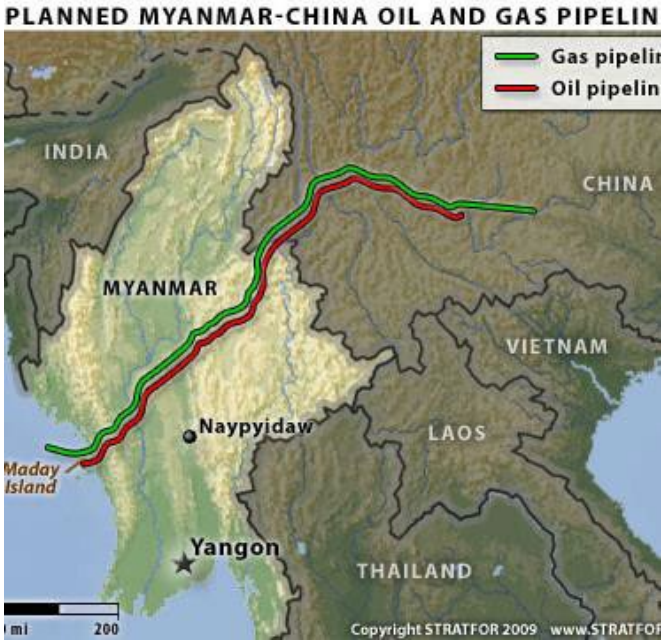
Aside from Active Missile Defense – Passive Defense Options?

- Elon Musk has created the “The Boring Company” to revolutionize tunnel building for the “Hyper Loop” and general vehicle and cargo transportation
- Tunneling advances and super concrete are already here

Recrudescence of RMA III: A Second Nuclear Age?

Spectrum of Nuclear Weapon "Use" Options

- Increasingly explicit threats about nuclear weapon use including regional military exercises that include same
- Explicit doctrine on limited nuclear weapon use to compensate for high technology "conventional" inferiority
- Explicit threats of "grab and threaten to smash" scenarios with nuclear "use" designed to paralyze U.S. "Denial" operations
- Deter attacks against China following non-nuclear strategic attacks (cyber and kinetic) against Asian and possibly U.S. targets
- Extensive high definition multi-media programming – the "horrors of nuclear war" – strategic IO campaign to "knock out" key U.S. ally
- Nuclear test(s) (below and/or above ground) during a regional crisis or during the opening phases of regional war
- Demonstration shots over the battlefield
- Demonstration shots over the ocean
- HEMP shots over military formations
- HEMP shots over major city or cities
- HAND shots to deny LEO operational viability
- Limited battlefield use to reverse military setbacks
- Limited use against regional military targets
- Limited use against regional civilian targets
- Further nuclear escalation (counter-value and counterforce) against CONUS

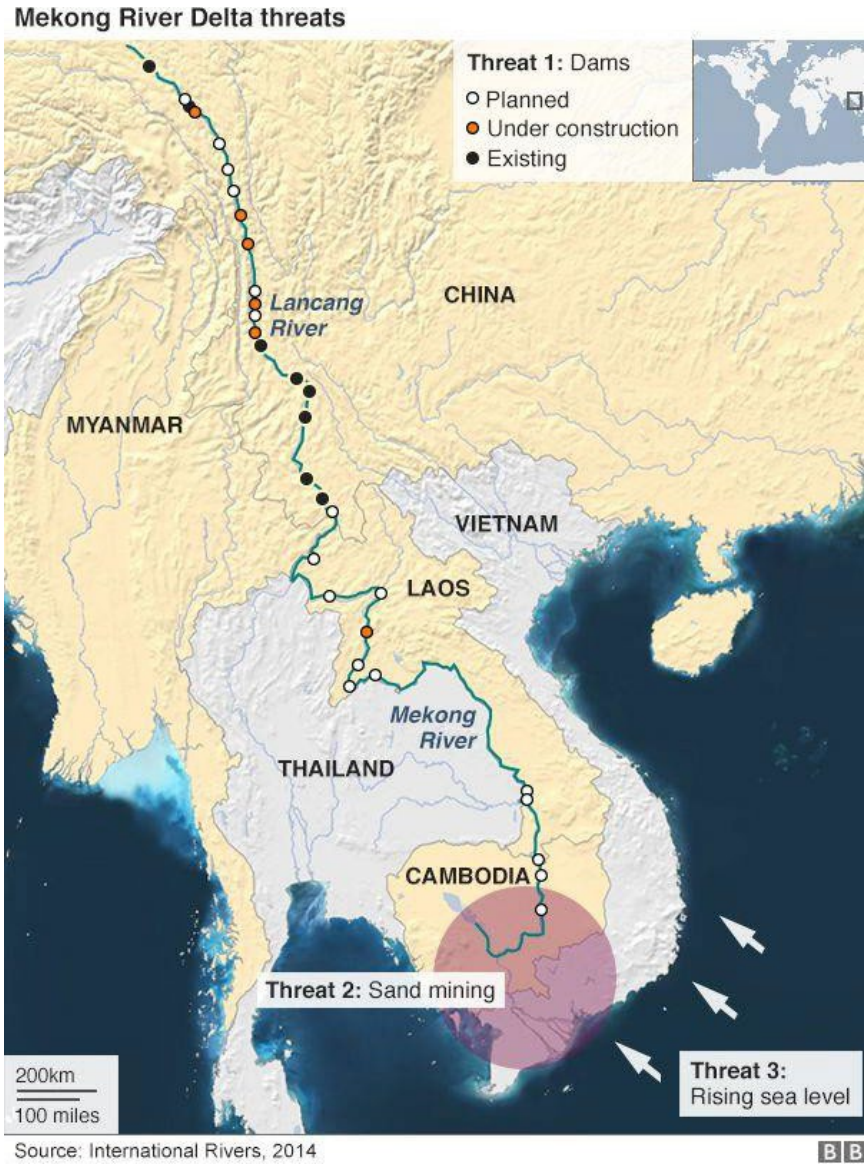


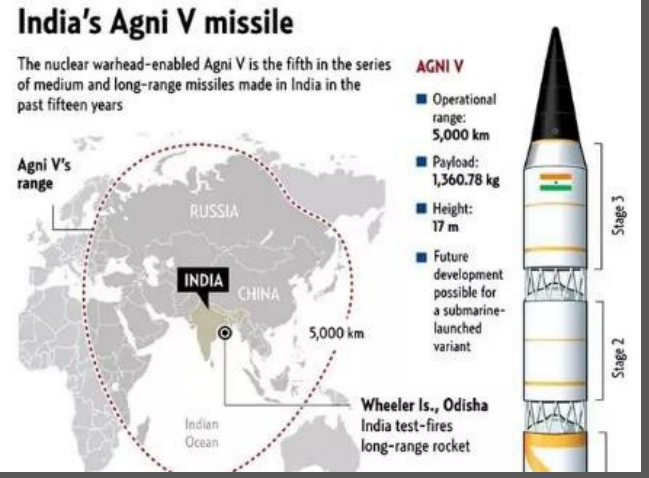
Explosive Growth of China's Transportation Infrastructure – Military Consequences of the Belt and Road Initiative (BRI)

Issue of Tibetan Water Division Becomes Major Tension Between China, India, and SEA states

- Systemic diversion of water from the Tibetan Plateau by China has greatly increased political tensions with India
- Looming major water shortages south of Tibet in South and Southeast Asia

Mekong Dam System

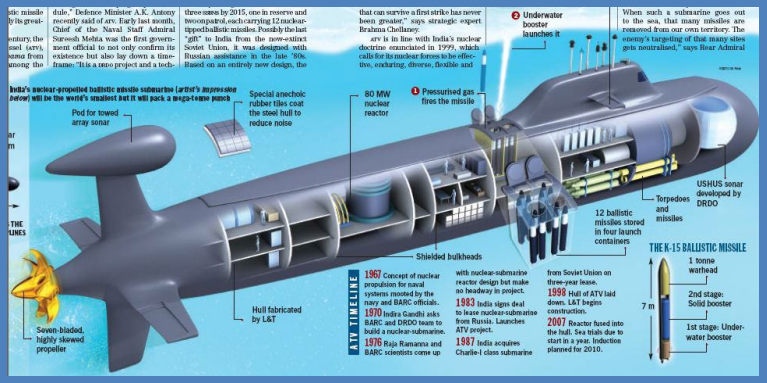




India-China-Pakistan Nuclear "Arms Race"

- Nuclear competition in South Asia should not be forgotten – regional nuclear war between India and Pakistan is plausible

The Emerging Indian Triad

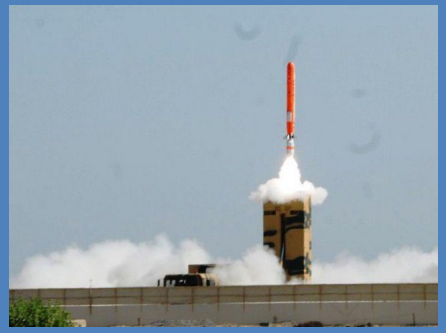


India and Pakistan have steadily increased the size and diversity of their nuclear arsenals

Pakistan's Nuclear Force Diversification

Pakistani nuclear modernization

- MRBM/SRBM
  - Shaheen 2 (Haft-6) MRBM
  - NASR (Haft-9) SRBM
  - Shaheen 1A (Haft-4)
  - Abdali (Haft-2)SRBM
  - Shaheen 3 (Haft-10)
  - Ababeel MIRV
- cruise missiles
  - Babur GLCM (Haft-7)
  - Ra'ad ALCM (Haft-8)
  - Sea-based CM



Pakistan developing diverse nuclear force
Strong interest in developing and deploying battlefield nuclear weapons
Doctrinal interest in "Escalate to de-escalate" options
Nuclear weapons are a RMA II response to India's superiority in RMA I capabilities and likely acquisition of RMA IV type capabilities
Pakistan's concerns about expanding U.S. and India defense ties

Possible Consequences of Nuclear War Between India and Pakistan

War with 100 low-yield nuclear weapons

Summary of Consequences of Regional nuclear war between India and Pakistan(from studies done at Rutgers, the University of Colorado-Boulder and UCLA)

•War is fought with **100 Hiroshima-size weapons** (currently available in India-Pakistan arsenals), which have half of 1 percent (0.05%) of the total explosive power of all currently operational and deployed U.S.-Russian nuclear weapons

•**20 million people die from the direct effects** of the weapons, which is equal to nearly half the number of people killed during World War II

•Weapons detonated in the largest cities of India and Pakistan create massive firestorms which produce millions of tons of smoke

•**1 to 5 million tons of smoke quickly rise 50 km above cloud level into the stratosphere**

•The smoke spreads around the world, forming a stratospheric smoke layer that blocks sunlight from reaching the surface of Earth

•**Within 10 days following the explosions, temperatures in the Northern Hemisphere would become colder than those experienced during the pre-industrial Little Ice Age**

•These nuclear war-induced effects on temperature would be twice as large as those which followed the largest volcanic eruption in the last 500 years, in 1816, which caused "The Year Without Summer"

•This cold weather would also cause a 10% decline in average global rainfall and a large reduction in the Asian summer monsoon.

•**25-40% of the protective ozone layer would be destroyed at the mid-latitudes, and 50-70% would be destroyed at northern high latitudes.** Massive increases of harmful UV light would result, with significantly negative effects on human, animal and plant life.

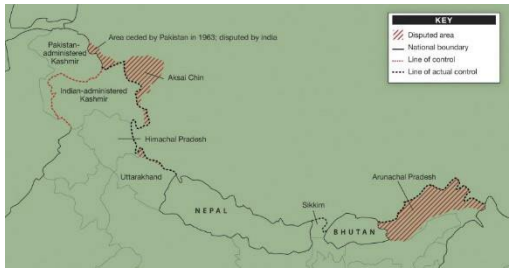
•These changes in global climate would cause **significantly shortened growing seasons in the Northern Hemisphere** for at least years. It would be too cold to grow wheat in most of Canada.

•World grain stocks, which already are at historically low levels, would be completely depleted. Grain exporting nations would likely cease exports in order to meet their own food needs.

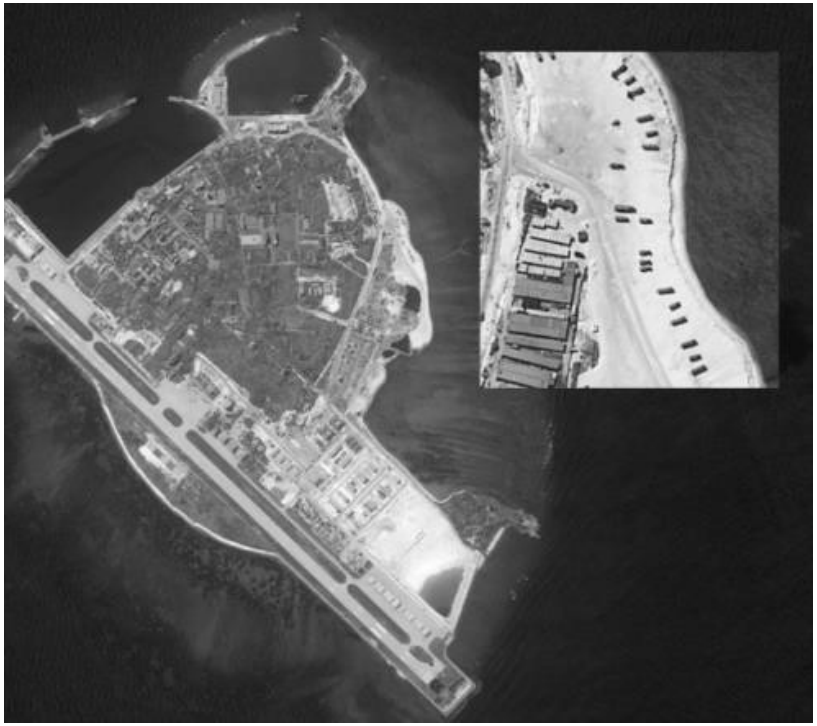
•Some medical experts predict that ensuing **food shortages would cause hundreds of millions of already hungry people, who now depend upon food imports, to starve to death** during the years following the nuclear conflict.

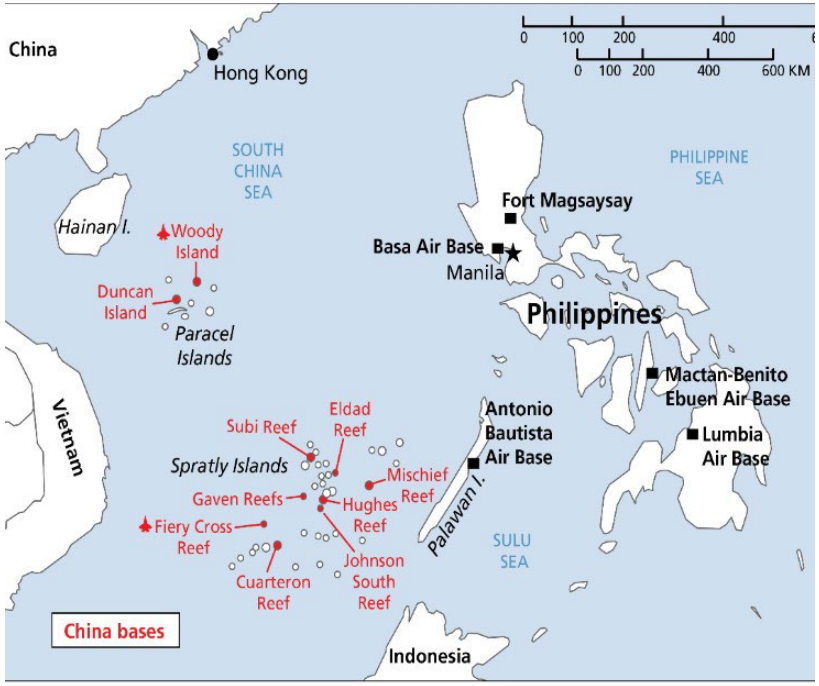
Possible effects of two-sided nuclear war between India and Pakistan

India-China's Border Flash Points



The Struggle for Military Dominance over the "First and Second Island Chains"

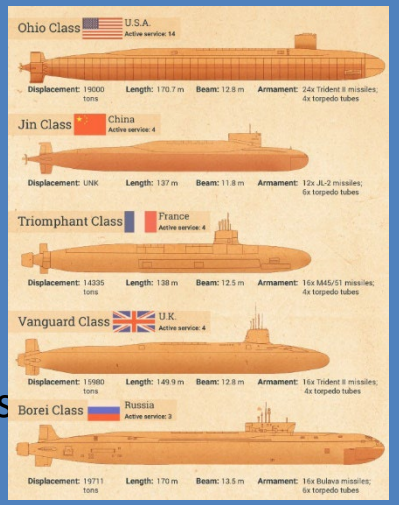




The Key Geo-Strategic Role of the Philippines

- U.S. has opportunity to deploy land-based aviation and long-range missiles to put the PLAN at risk as was provide for the defense of the Philippines
- Key assumption: A post-Deteurte regime is in power – Chinese success in neutralizing the Philippines is worth several carrier battle groups
- U.S. presence likely to be reinforced as a result of the Russo-Ukrainian war

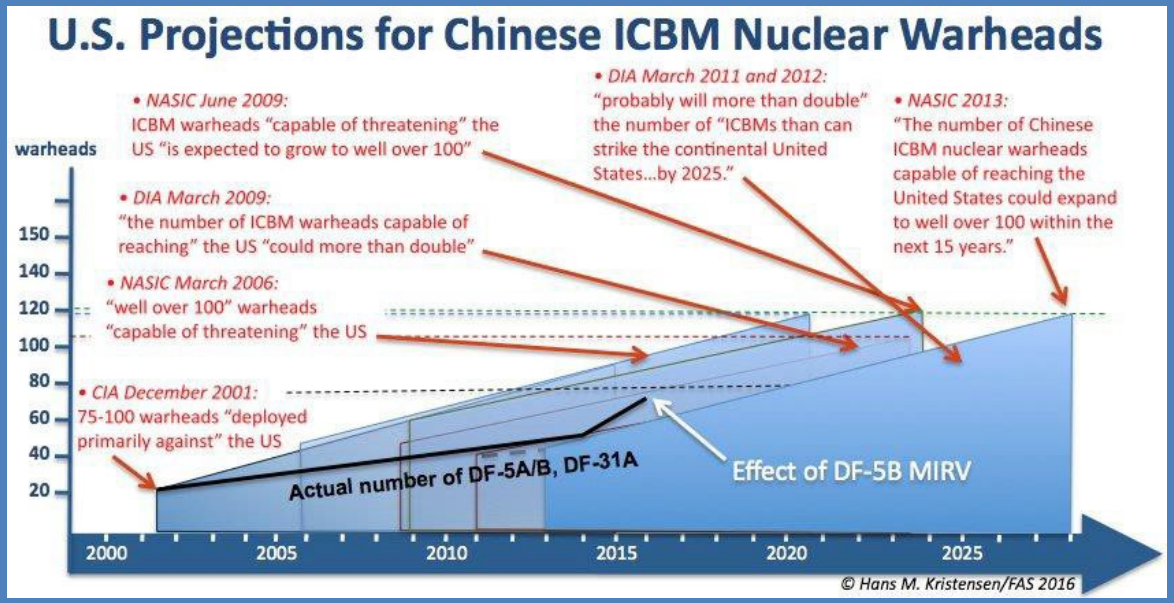
Current PRC Nuclear Forces

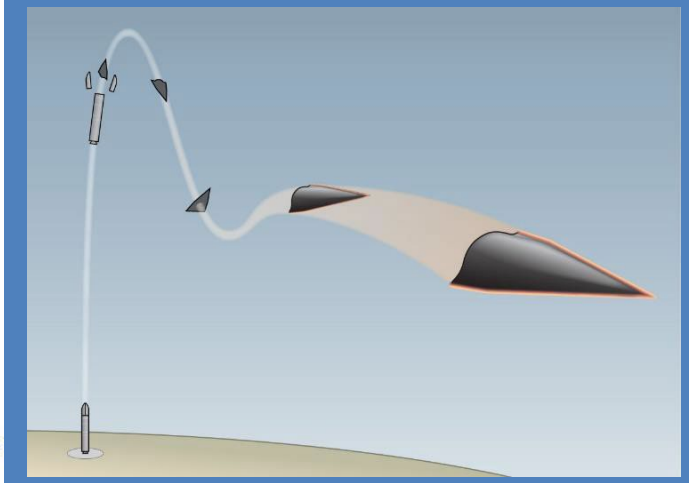


China appears satisfied with the size its nuclear arsenal

- No First Use and Assured Retaliation
- Size much less existence of NSNF remains uncertain
- High anxiety about U.S. expansion of its regional and national BMD s
- Developing countermeasures: MaRV, MIRV, BGV

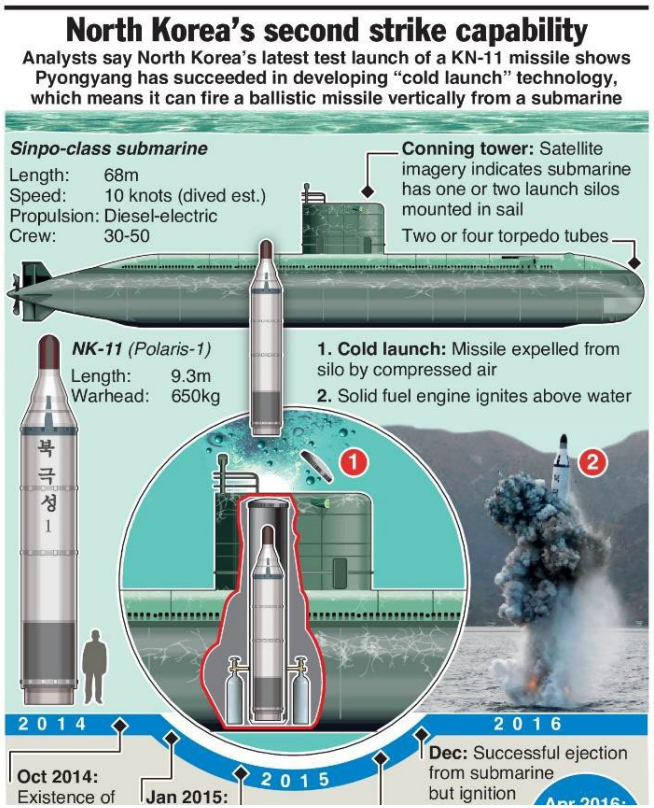
Robust modernization of the missile delivery system
Development of a long-range aircraft uncertain – several current options available
Will this change with President Xi for life





Impact of Chinese Deployment of MIRV/MaRV

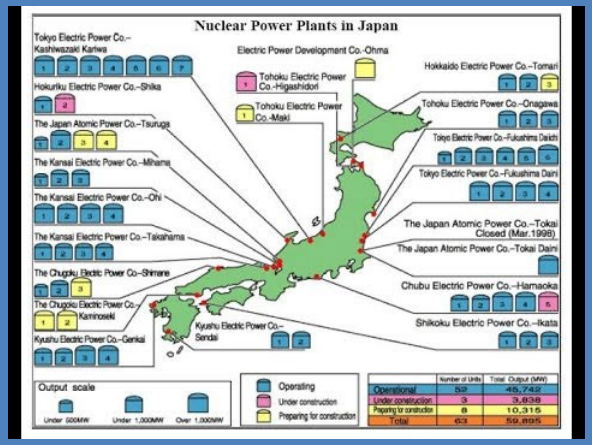
- Deploying MIRV is efficient to increase size of nuclear arsenal
- Current IC projection of Chinese nuclear arsenal may prove to be very low
- Indian and Chinese MIRV "race"?
- China may give some emphasis to maneuvering warheads as BMD countermeasure – provides dual purpose transoceanic strike options

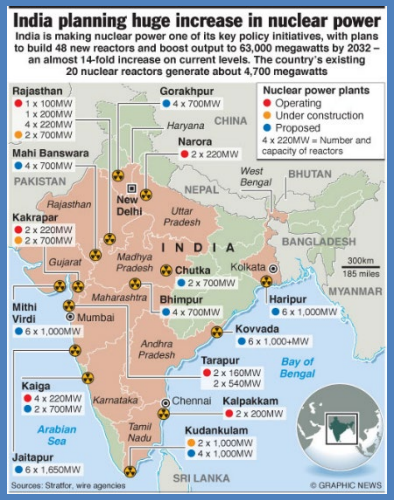


DPRK SLBM and Mobile SRBM Successes

North Korea has made major progress in developing solid propellant SLBMs and MRBMs

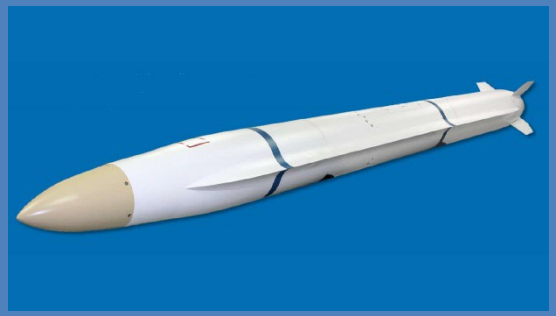
Civil Nuclear Power Plants: Prime Targets For Maximum Long-Term Damage





Nuclear power reactors might be the "doomsday" targets of choice

U.S Next Generation Defensive Options



Extent of U.S. new offense and defense options contingent to outcome of any future Biden administration negotiations with the KJU

Any residual DPRK nuclear force will likely prompt investment in boost-phase interceptor concepts

ABL proved to be a operational failure

USN and Japanese Aegis class warships could provide some boost-phase defense

F-22 and/or F-36 armed with new AAM could provide boost-phase defense option

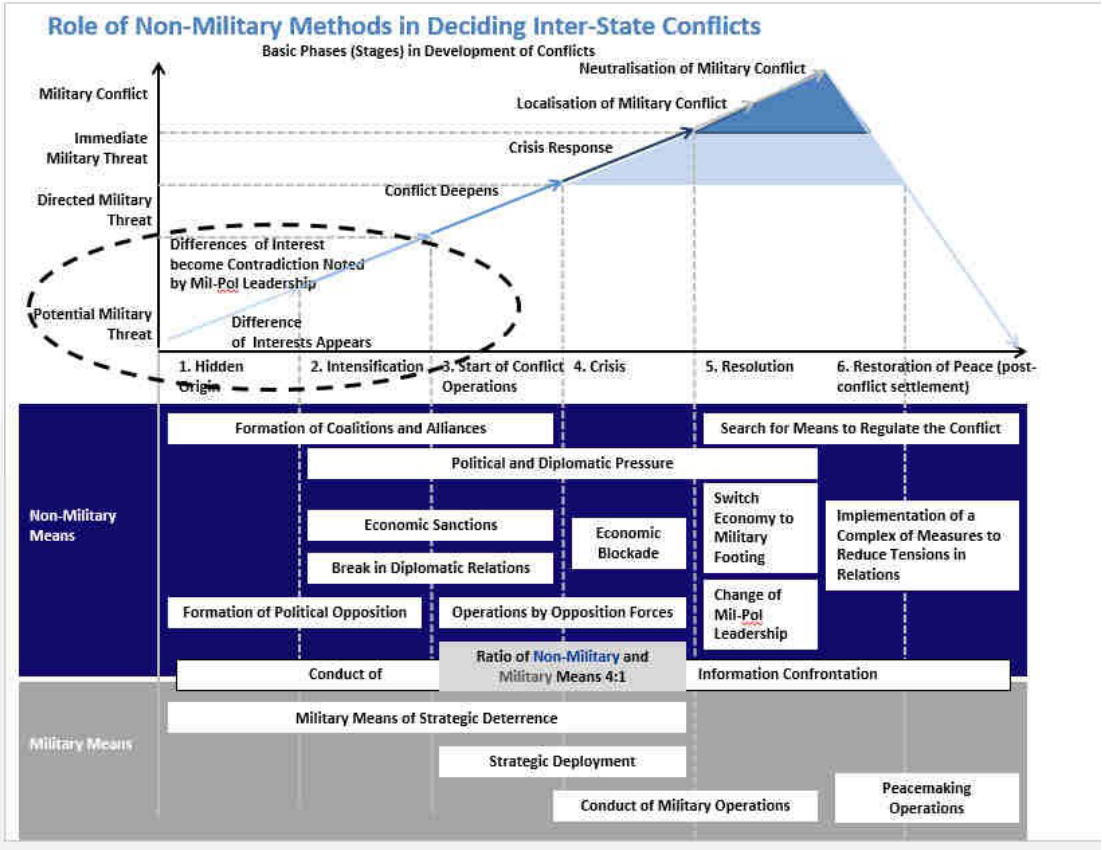
On Chinese Nuclear Weapon "Use" – Some Questions

- How robust is any U.S. Indo-Pacific campaign plan to Chinese nuclear weapon "use" options?
- Will the presence of U.S. and Chinese nuclear arsenal encourage or discourage various forms of escalation at the theater and homeland zone of operations"
- What is the U.S. policy and operational plans to respond to the limited use of nuclear weapons for military effects by the PLA?

Major East Asian War Planning Issues

- Would an air-naval clash in South China Sea (SCS) be regionally contained and of short duration?
- Would military operations in the SCS flow from horizon escalation during a China-Taiwan or Japan-China military confrontation?
- What are the planning implications of an extensive extended deterrent commitment to Vietnam?
- Should U.S. plan to deploy a Joint Expeditionary Forces into Vietnam as part of a Flexible Deterrent Operation (FDO)?
- To defend Vietnam from a Chinese combined arms offensive?
- To support India in the event of Chinese military intervention into Myanmar aka Burma?
- How to manage military escalation during a future regional conflict in the presence of four nuclear-armed states: China, India, Pakistan, and North Korea?

Russia's "New Generation" Warfare



- Translated by Dave Johnson in "Nuclear Weapons in Russia's Approach to Conflict", *Foundation pour la Recherche Strategique*, #06/2016, November 2016

Russian “Non Contact” aka “Shock and Awe” Campaign Against Ukraine

- Kremlin may wish to avoid heavy casualties of a large-scale ground invasion of Ukraine
- Similar to U.S. military campaigns against Siberia and Iraq
- Heavy emphasis on air, missile, and cyber attacks to cripple Ukraine’s capacity to resist invasion and collapse the Ukrainian will to resist
- Air-missile campaign combined with the use of “fifth column”, Spetsnaz and VDV forces to overthrow the government in Kyiv.
- Operation has features similar to the Russian intervention to save the Syrian Assad regime
- Carpet bombing of selected cities is possible to terrorize the population and produce mass population displacements – precedent is the bombing of Grozny and Aleppo
- Strategy may not be decisive – See U.S. experience in Vietnam, Iraq and Afghanistan
- If Moscow’s strategic objectives not realized, major invasion could follow

Russian Combined Arms Warfare

- Russian Army is about 350,000 troops (Two thirds contract soldiers – still large cadre of one-year draftees)
- Russian Army modernization has fallen behind the investment in the Russian Aerospace Forces and Russian Navy
- Russian airborne and air assault troops number about 60,000
- Russian Army is a modernized version of the Cold War Red Army
- Heavy emphasis on long-range fires and mechanized maneuver forces
- Heavy emphasis on deploying mobile SAM systems to defeat NATO airpower
- Russian Armored Fighting Vehicles (AFVs) are upgraded versions of Soviet era combat vehicles
- Russian tube and multiple rocket artillery proven very effective against Ukrainian forces in Donbas fighting
- Now using drones to provide ISR support for indirect fires
- Very heavy emphasis on Electronic Warfare (EW) aka Radio-Electronic Combat (REC) capabilities – to defeat UAVs, PGMs and enemy command and control systems

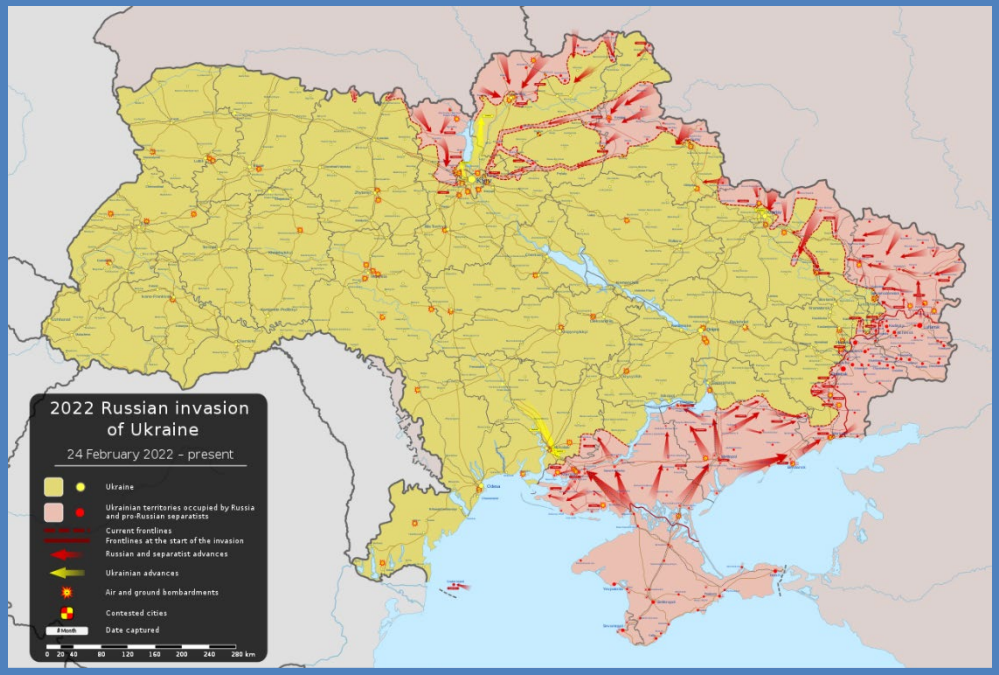
Air and Naval Assault Operations: Risky Business

- Russian airborne/air assault operations fraught with risk
- Major threat from mobile and man-portable SAM systems
- Russian Navy amphibious operations fraught with risk
- Russian Navy can provide limited fire support
- Seizure of Odessa particularly challenging
- Major amphibious ships vulnerable to ground and air launched anti-ship missiles

Invasion of Eastern Ukraine

- **Build-up underway to conduct all-out effort to seize eastern Ukraine including reinforcements from the Far East**
- **Similar scenario when Stalin drew down Red Army in Far East for Battle of Moscow 1941 confident Japan would not strike**
- **Will Xi give Putin the green light in this regard during their February summit at the opening the Winter Olympics?**
- **History rhymes : A replay of the Ribbentrop-Molotov Pact of 1939 – Hitler and Stalin carve up Eastern Europe**

The Invasion Begins –January 24



- **Kremlin planned for a very short war**
- **Minimal preemptive air and missile strikes against Ukrainian Air Force**
- **Expectation that Russian special and air assault forces could decapitate the Zelensky government quickly**
- **Expectation that Ukrainian military resistance would be disorganized**
- **Expectation that the bulk of the Ukrainian population would greet the Russian forces as liberators**

How has the Atlantic Alliance Responded?

The Biden administration and NATO Europe had a wide range of response options:

- **Most likely response is severe financial and economic warfare**
  - **Crippling the Russian banking system – selective denial of access to SWIFT**
  - **Partial buyers boycott of Russian NG and petroleum sales**
  - **Freezing and seizing of the oligarch class's global assets**
- **Major global economic shock with the de facto blockade of Ukrainian and Russian grain exports coupled with a surge in oil and gas prices**
- **Significant military reinforcement of NATO eastern flank**
- **Major arms support to Ukraine to deny Russian military victory**
- **Sufficient armaments to Ukraine to give prospect of victory**
- **Russia likely to retaliate with major cyber attacks on European and U.S critical infrastructures**
  - **Best to have some cash since ATMs wont work for awhile!**
  - **Russia will likely accept cease-fire once limited war aims are reached**
  - **Ukraine may not accept the cease-fire and keep fighting**

Mass Deployment of Man-portable PGMs







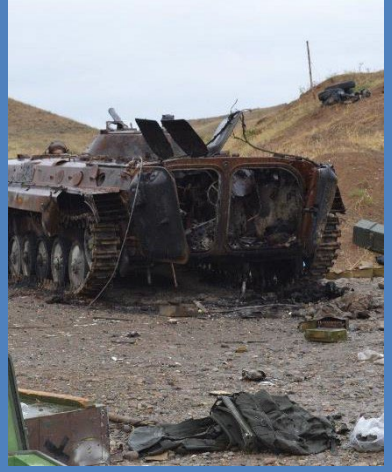
- Current NATO consensus: Help Ukraine's military defeat Russian invasion force
- Create ground lines of communication for advanced infantry anti-tank and anti-air PGMs
- UK had initiated airlift of thousands of NLAWs anti-tank missiles – France may provide *Eryx* anti-tank missiles
- Wide range of light and man portable Surface to Air Missiles made for rapid deployment such as *Starstreak*

The Failure of the Russian Armed Forces

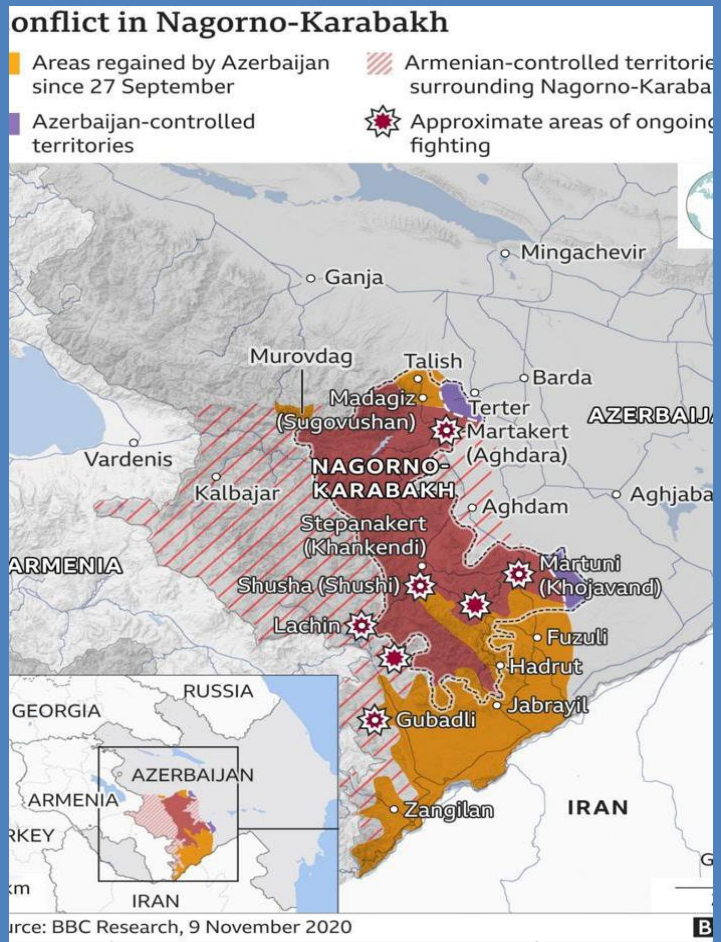
- Quick strike to decapitate the Zelensky government failed – Zelensky has become the Churchill of Ukraine
- Ukrainian Air Forces has survived to contest the air space with a small number of combat aircraft and a wide array of SAMs that provide a limited but effective Integrated Air Defense (IAD) system
- Russian Army spreads out its forces along three major lines of attack
- Thrust to incircle Kyiv proves insufficient
- Russian tactical and operational performance is dismal
- Terrain compels Russian military vehicles to rely mainly on roads – vulnerable to ambush – Ukraine suburbs prove particularly dangerous
- The fatal vulnerability of the Russian family of Main Battle Tanks (MBT)

On the Battlefield Dominance of PGMs

- First major inter-state war in the 21st century
- Maturation and diffusion of mobile battlefield precision guided munitions
- Due to poor tactics Russian ground and air forces have suffered severe casualties
- Ukrainian armed forces have proven very adept using guided weapons provided by the Atlantic Alliance and indigenous arsenal



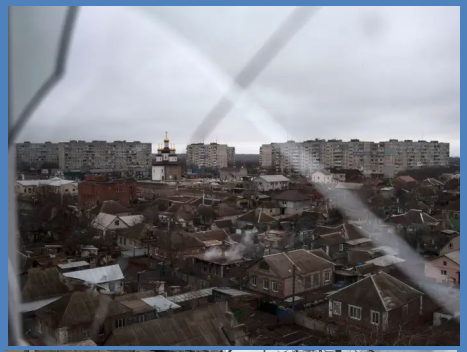
Conflict over Nagorno-Karabakh: Azerbaijan's Decisive Victory over Armenia



- Azerbaijan initiates conflict with Armenia
- Turkey and Israel provide decisive military assistance to Azerbaijan
- Armenian ground forces overwhelmed by Azerbaijan precision munition attacks
- Russian has mutual defense pact with Armenia
- Moscow imposes Munich style cease-fire on Armenia
- Russian force will sustain single road to sustain Armenian enclave

Russian Resorts to City Bombardment

Destruction of Grozny and Aleppo as Prologue

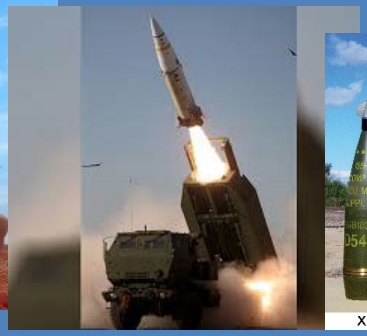


- The three major ground offensives had stalled out aka reached a culmination point
- Kremlin now resorting to bombardment of major cities to break the Ukrainian will to resist
- Mass use of TU-22M medium bombers to carpet bomb not possible until Ukrainian Air Force neutralized
- Russians highly reliant on massed tube and rocket artillery – resupply subject to interdiction and UCAV attack
- Strikes against key Ukrainian infrastructure by long-range cruise missile and precision guided SRBMs

The Russian Invasion – Two Months On

- **25% of the Russian invasion force out of combat – approximately 20,000 KIA and 30,000+ WIA – thousands of AFVs destroyed or captured**
- **Russian armed Forces faces a manpower crisis – attempt to recruit foreigners such as Syrians**
- **Critical domestic moment is April 1 when new tranche of Russian draftees are supposed to replace those that have ended their service – draftees being forced to sign contracts aka "stop loss"**
- **Ukrainian forces are launching limited counterattacks in the East and South of their country**
- **Mariupol may fall in the near future – extracted very heavy price from Russian combat forces – Odesa may well have been saved especially after the sinking of the Moscow**
- **Ukraine has won the information war up to this point**

How Might Atlantic Alliance Expand its Military Support?



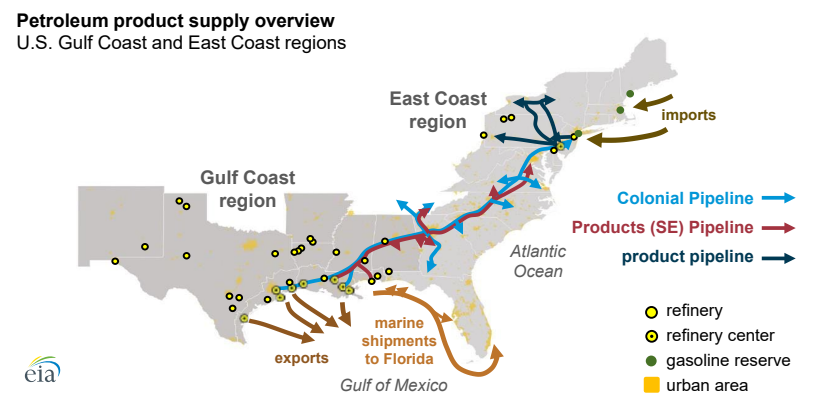
XM1156 Precision Guidance Kit on 155mm Projectiles

- Provide long-range counter-battery capability:
  - HIMARS truck mounted launchers armed with Guided Multiple Launch Rocket Launch System (GMLRS) and the ATACMS Short-range Ballistic Missile (SRBM)
- More UCAVs such as the RQ-7 Shadow and RQ-1C Gray Eagle
- JDAMs guided bomb kits
- JSOW glide bombs
- Air and ground launched anti-ship missile such as Harpoon
- Soviet designed AFVs and artillery held by East Europeans
- Precision guided fuses for Soviet designed artillery and mortar ammunition
- Soviet designed combat aircraft in possession by East Europeans – Polish MiG-29s?
- A-10s?

Any major surge in new types of weapons by Atlantic Alliance may prompt more vigorous military response by the Kremlin

What Comes Next?

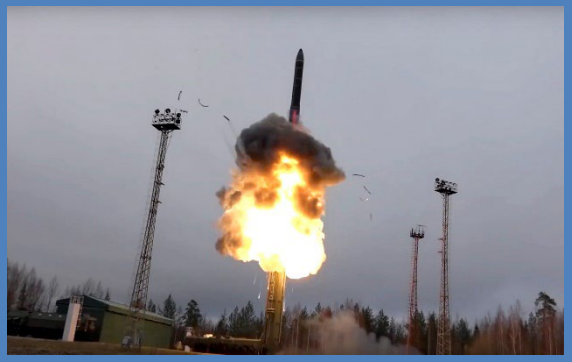
War Through Cyberspace: Already Underway!



- Russia has been conducting Computer Network Operations (CNO) against the U.S. and Europe for years
- Most of these operations have been in the form of Information or Influence Operations to destabilize targeted countries
- Most dramatic has been Moscow interventions in the U.S. and European electoral process
- Extensive effort by Russia to prepare the battlefield with the use of Computer Network Espionage (CNE) to carry out attacks on U.S. critical infrastructures
- Russian attack on Colonial Pipeline was a shot across the bow – Kremlin likely used cyber criminals in a "letters of mark" operation
- Biden has promised major retaliation if Russia launches crippling cyber attacks – such attacks are likely if US and EU impose draconian financial and energy sanctions following Russian invasion of Ukraine
- Cyberwarfare is the most likely route that a regional Russo-Ukrainian war becomes a global war

So far the Russian use of strategic cyber weapons has been rather muted

War in Space?



- Russia conducted direct ascent ASAT test in 2021 that caused debris that threatened the International Space Station (ISS) – had Russian Cosmonauts aboard!
- Was this another shot across the bow?
- Space war much less likely than strategic cyberwar during a terrestrial conflict
- Multiple means to disrupt if not destroy satellite constellations – includes laser, radio frequency weapons and electronic jammers and attacks through cyberspace – GPS is a prime target
- Space warfare is another route for global escalation of a terrestrial war

The Geopolitics of Natural Gas

- Europe is 40% reliant upon Russian natural gas – Germany very dependent especially after nuclear power shutdowns
- US and EU launched a buyers' boycott of Russian natural gas as part of the punishment package following further Russian aggression in Europe
- U.S. has capacity to deliver via LNG tanker substantial supplies
- Those supplies are not sufficient to replace Russia gas via pipelines
- Should the US provide financial support to Europe to acquire additional sources of LNG – Nigeria, Qatar?
- US has imposed an oil embargo while Europe has not
- There is a parallel inflationary shock caused by the disruption of the flow of cereals and corn out of the Black Sea region

RFAF Non-Nuclear threat to NATO Europe and CONUS

- Over the next ten years, RF will be able to carry out a non-nuclear strategic missile campaign against the United States and NATO Europe
- Key civilian infrastructure targets very vulnerable to precision attacks
- What role does the NATO nuclear forces play in deterring such an attack?
- Similar PRC capability will emerge during the same time-frame

Spectrum of Nuclear Weapon "Use" Options

- Increasingly explicit threats about nuclear weapon use including regional military exercises that include same
- Explicit doctrine on limited nuclear weapon use to compensate for high technology "conventional" inferiority
- Explicit threats of "grab and threaten to smash" scenarios with nuclear "use" designed to paralyze U.S. retaliation and denial operations
- Deter attacks against China following non-nuclear strategic attacks (cyber and kinetic) against Asian and possibly U.S. targets
- Extensive high definition multi-media programming – the "horrors of nuclear war" – strategic IO campaign to "knock out" key U.S. ally
- Nuclear test(s) (below and/or above ground) during a regional crisis or during the opening phases of regional war
- Demonstration shots over the battlefield
- Demonstration shots over the ocean
- High Altitude Electromagnetic Pulse (HEMP) shots over naval formations
- HEMP shots over major city or cities
- High Altitude Nuclear Detonation (HAND) shots to deny LEO operational viability
- Limited battlefield use to reverse military setbacks
- Limited use against regional military targets
- Limited use against regional civilian targets
- Further nuclear escalation (counter-value and counterforce) against CONUS

On Nuclear "Signaling"

- France has put to sea three out of its four SSBNs
- France recently tested its ASMP "non-strategic" air launched supersonic cruise missile
- French Foreign Minister has spoken of NATO's nuclear potential
- At present both the UK and US governments have not overtly responded to Putin's implicit and explicit threats of nuclear escalation – US has option to sortie additional SSBNs and put B-2 fleet on nuclear alert
- Other option is to put the NATO dual capable aircraft (DCA) on Quick Reaction Alert (QRA)
- If the Kremlin uses war gas or carries out a limited nuclear operation, then US, UK, and France will put nuclear forces on very high alert
- What will China do? What will the other nuclear-armed states do?
- This is not a replay of the bilateral Cuban Missile Crisis of 1962 – potentially much more dangerous

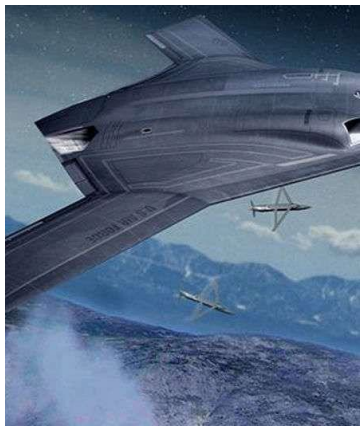
What Are the Atlantic Alliance Response Options?

If Putin chose to escalate with WMD?

- **Putin may believe that Russia can use war gas to coerce Zelensky to make major concessions to gain cease fire**
- **Alternatively, Putin may believe that Russia can use its non-strategic nuclear weapons to either reverse the course of the war and coerce Zelensky to make major concessions to end the war**
- **Limited use Non-Strategic Nuclear Forces (NSNF) in a military campaign – part of a "grab and threaten to smash" strategy**
  - **This could range from the resumption of atmospheric nuclear tests to a HEMP shot over a major European City**
- **The successful use of its nuclear arsenal by Russia to "shoot" its way out of a regional military failure will be historic prompt for further nuclear weapon proliferation; therefore:**
- **NATO may respond by launching air campaign to destroy surviving Russian forces fighting in Ukraine that includes Crimea and putting is tri-national nuclear forces on high alert**

The 2018 U.S. Nuclear Posture Review (NPR)

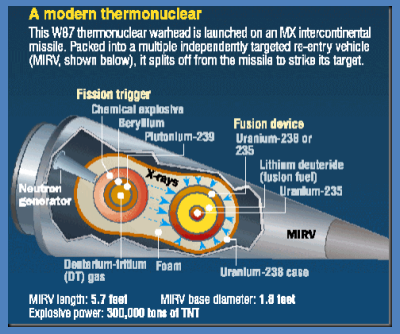
- Continue modernizing the "Triad"
  - Columbia class SSBN to replace the Trident SSBN
    - Continued produced and modernization of the Trident II SLBM
  - Replace the B-2 and B-1B with the B-21
  - Keep the B-52 with new avionics and engines
    - Replace the Advanced Cruise Missile (ACM) with the Long-range standoff weapon (LSRO) – LO or hypersonic?
  - Replace the Minuteman III with the Ground Based Strategic Deterrent (GBSD) ICBM – possibly armed with a boost-guide vehicle (BGV)
  - Modernize the B61 bomb arsenal with the precision guided B-61-12 –with low yield option
- Additional initiatives
  - Deploy low yield variant of the W-76 on the Trident II SLBMs
  - Develop a Tomahawk –N follow-on– Nuclear-armed SLCM – LO or hypersonic

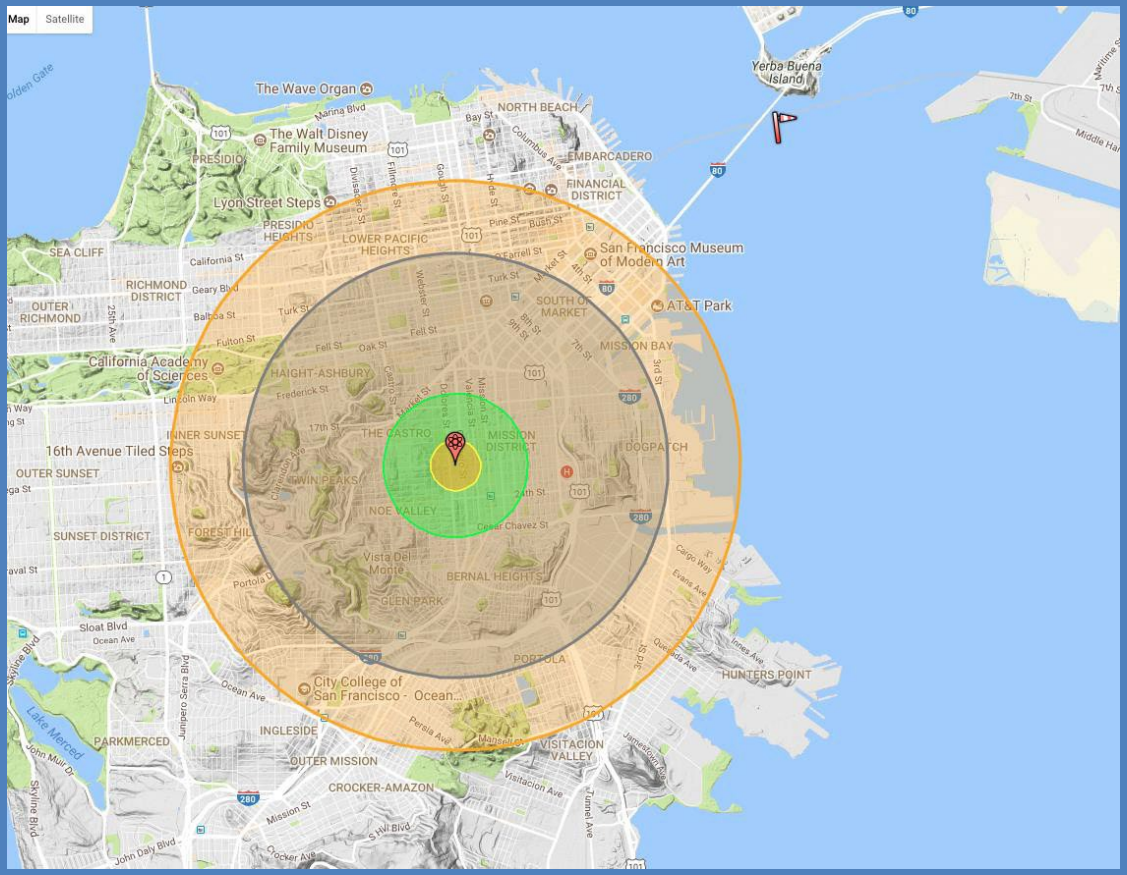


How to deal with the Russian nuclear threat?

- NATO fighter bomber are deployed in Europe with nuclear weapons
- This is a rationale for the B61-12 bomb program
- This is a rationale for the rapid deployment of a low yield warhead on some Trident II SLBMs
- Is this an appropriate response to the Kremlin threat of “using” nuclear weapon?


B-2 dropping a training B61-12 nuclear bomb.





- **Approx. 300,000 fatalities**
- **Approx. 1.5 million casualties**

Source: Burgess Laird, RAND Corp.

100 KT Detonation over San Francisco

Conclusion

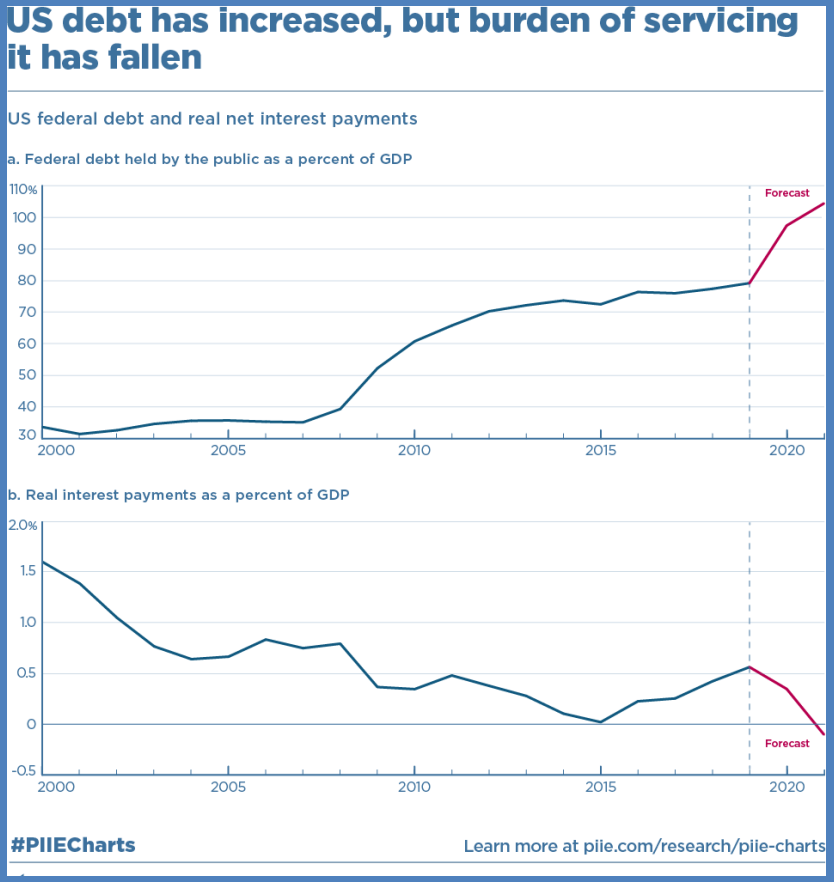
- **Sadly but not unexpectedly: "The End of History" idea was an illusion***
- **The decade of 2020 is looking more like the late 1930s**
- **The Biden administration faces acute domestic and foreign challenges**
- **Even if war is not ended with WMD escalation the Russia-Ukraine crisis will not go away**
- **Russia is a major national security distraction for an administration that wants to focus on the China challenge and major domestic issues**
  - **From a national military strategy planning perspective there is good news: The Indo-Pacific theater of operation is primarily an USAF and USN potential battlefield**
  - **The European theater is primarily an Army and USAF show**
  - **Irony: Putin's moves of greatness have made the case for a modern and large U.S. Army returning to Europe**
- **The very act of Russia invading unoccupied Ukraine has turned the fate of Ukraine and the Alliance response into a U.S. vital national interest**
- **China and Iran will be carefully watching as to how Alliance decides to pursue this proxy war with Russia and to what end**

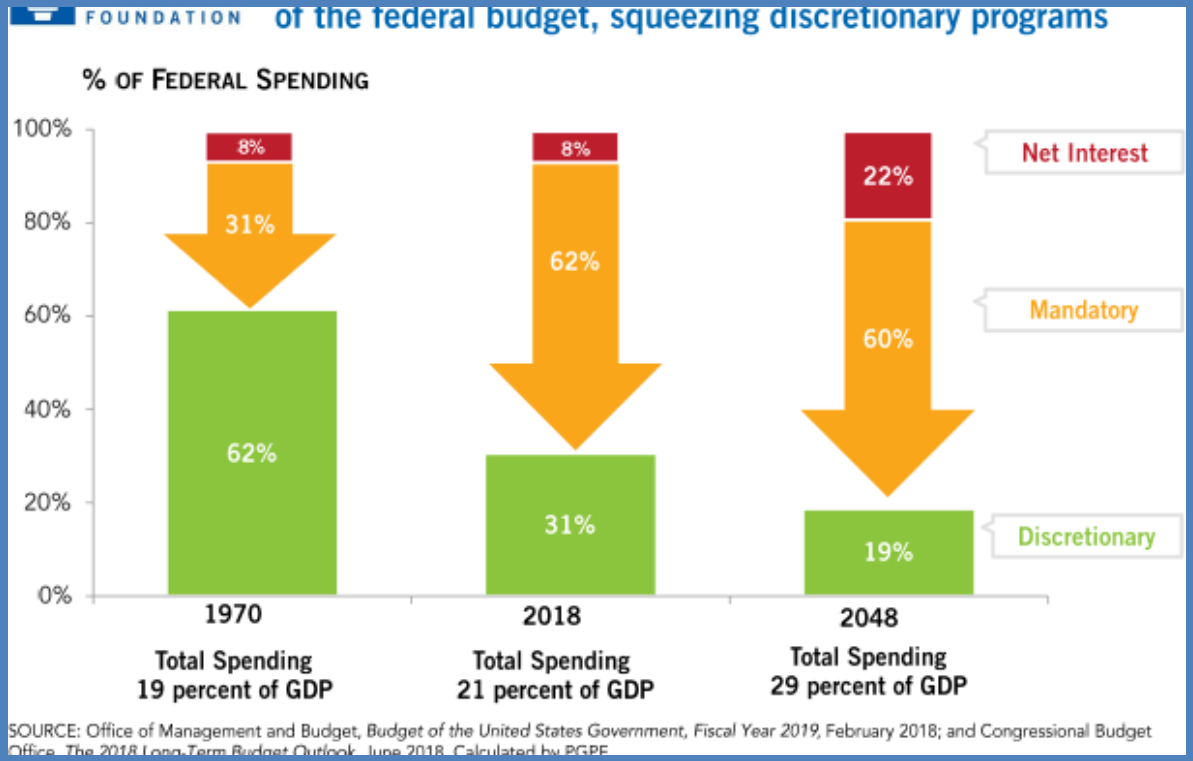
* ***"You may not be interested in war, but war is interested in you", Leon Trotsky***

BACK UP

Key Relationship Between Inflation and Debt

- **The ability of the U.S. to manage massive increase in debt incurred during COVID-19 pandemic depends in part on the pathway of global inflation during the 2020s**

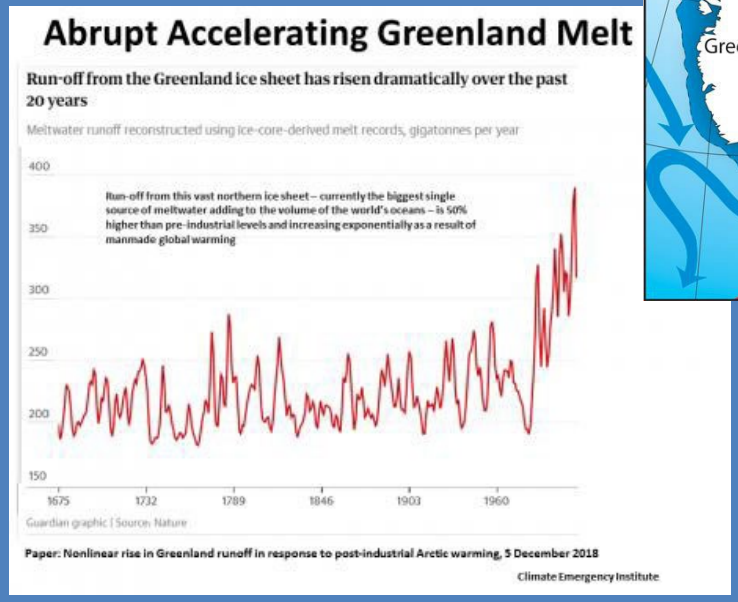




Increasing Pressure of Mandatory Spending

The downward pressure on defense spending during the 2020s

Climate Change as an Accelerant to Conflict and Claimant for Federal Funding



- What if forecasts of water runoff from Greenland and Antarctica are too optimistic?
- Rising sea level coupled with cyclonic storms creates massive demand for coastal city protection
- May produce rapid disruption of North Atlantic currents
- The strategic surprise is the velocity of this change