

The logo for the Center for Strategic and Budgetary Assessments (CSBA) is displayed in a large, red, serif font. The letters are bold and closely spaced.

Center for Strategic and
Budgetary Assessments

Commanding the Seas: Reinvigorating U.S. Navy Surface Warfare



- **Challenges and opportunities**
- **Trends to address**
- **New concepts for:**
 - **Offensive sea control**
 - **Sea-based AAW**
 - **Weapons development**
 - **Increasing offensive sea control capacity**
 - **Addressing defensive and constabulary missions**
- **Capability and program implications**

CSBA *Challenges and Opportunities*

- **In 2001, the Navy planned a new surface warfare approach**
 - New family of CG(X), DD(X), LCS
 - Employing “Network-centric warfare”
 - All three ships now cancelled/truncated
- **Navy has an opportunity to implement new surface warfare concept**
 - Final specifications for Flight III DDG-51
 - Concept and design of follow-on SSC and modifications to LCS
 - Phased modernization of remaining CGs
 - New weapons and sensors
- **This study proposes a plan focused on:**
 - Large and small surface combatants
 - Results possible by mid-2020s



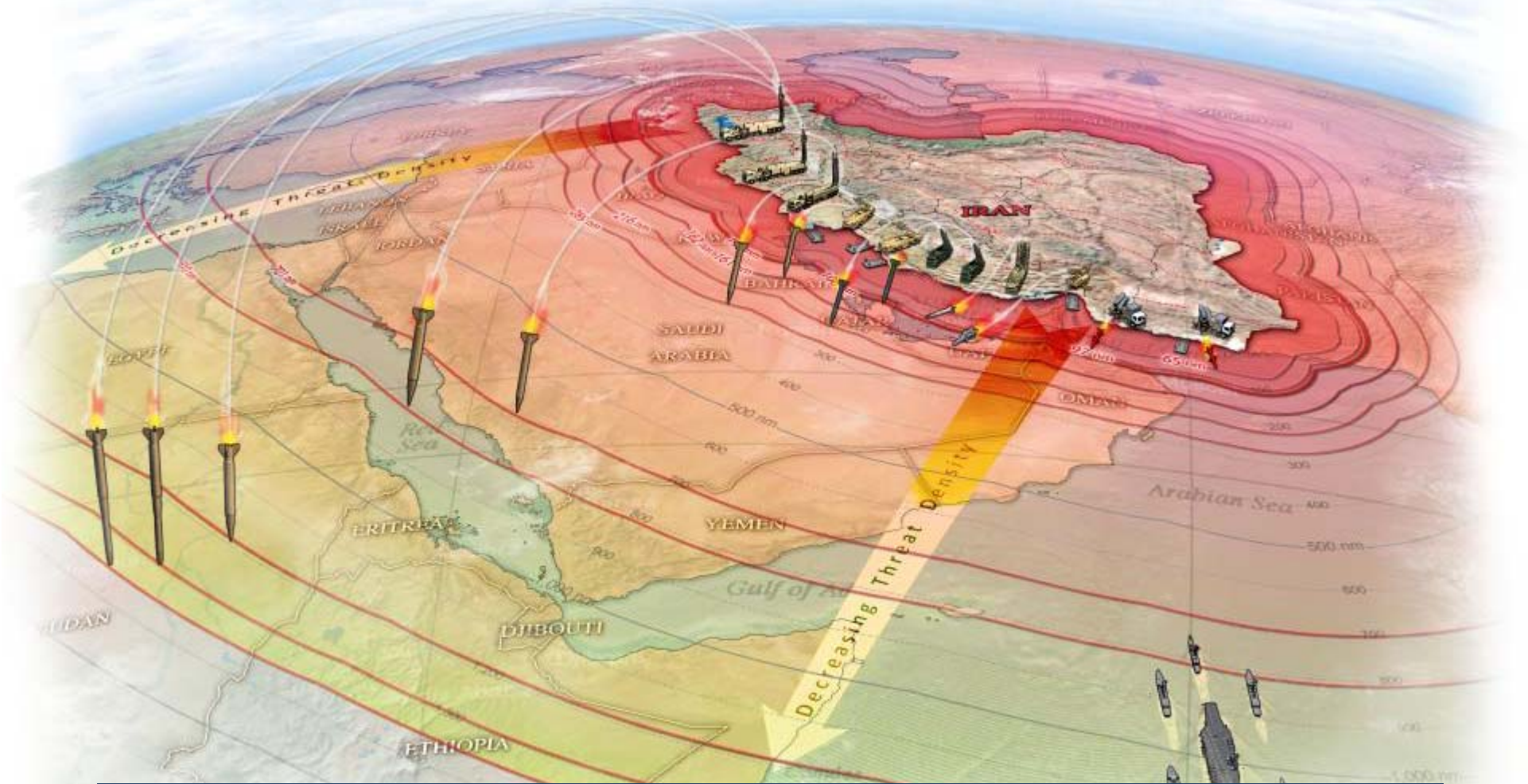
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Trends to Address

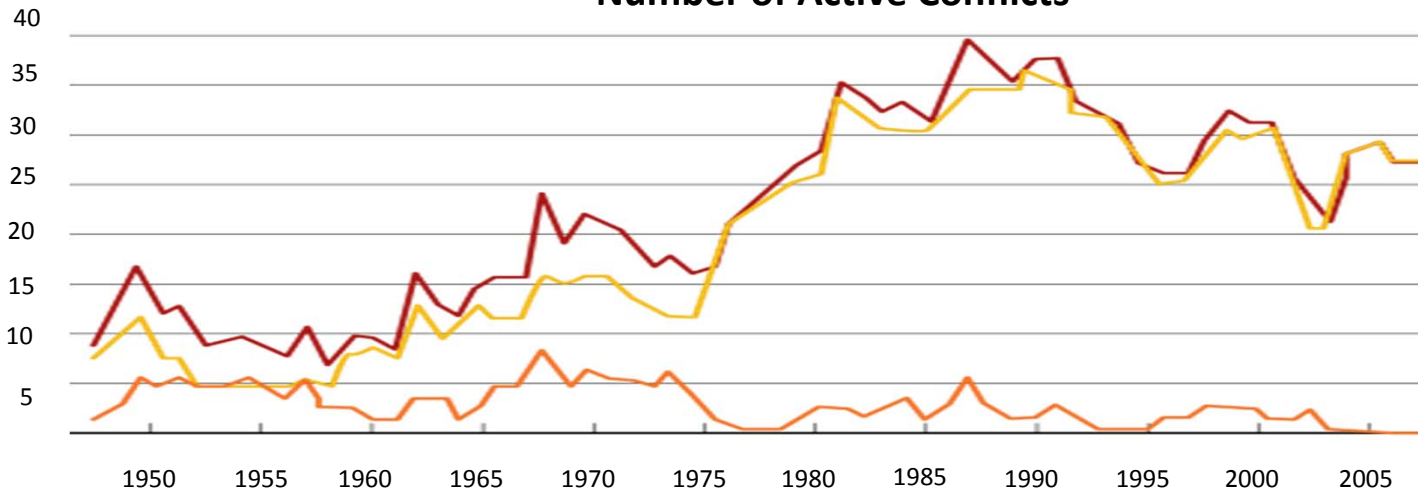


CSBA Trends – Anti-Access/Area-Denial

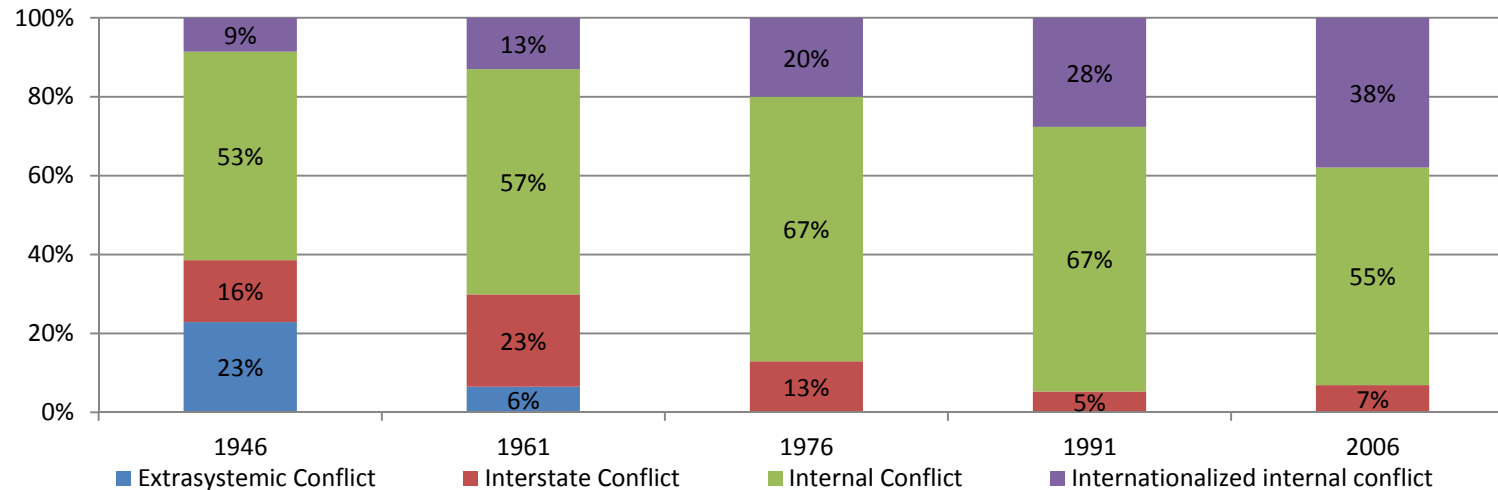


Iran shows less capable militaries can combine geography and “fire and forget” weapons in effective A2/AD network

Number of Active Conflicts

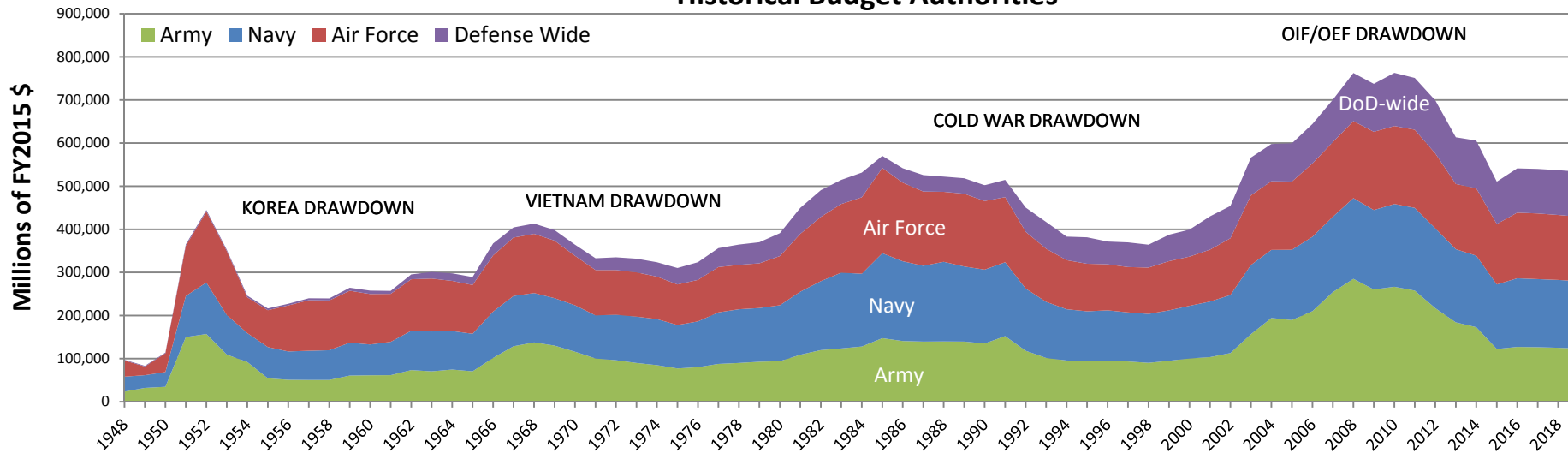


Types of Active Conflicts

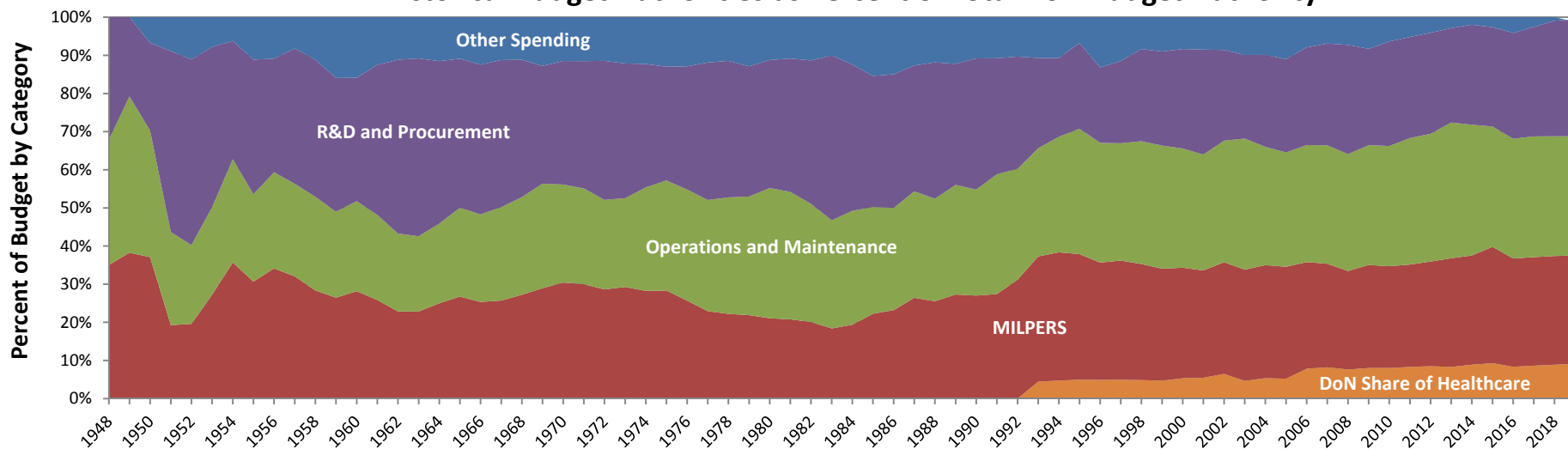


Proxy, paramilitary, and indirect conflicts on the rise

Historical Budget Authorities



Historical Budget Authorities as Percent of Total DoN Budget Authority



Budgets unlikely to rise; pressure continues on R&D and procurement

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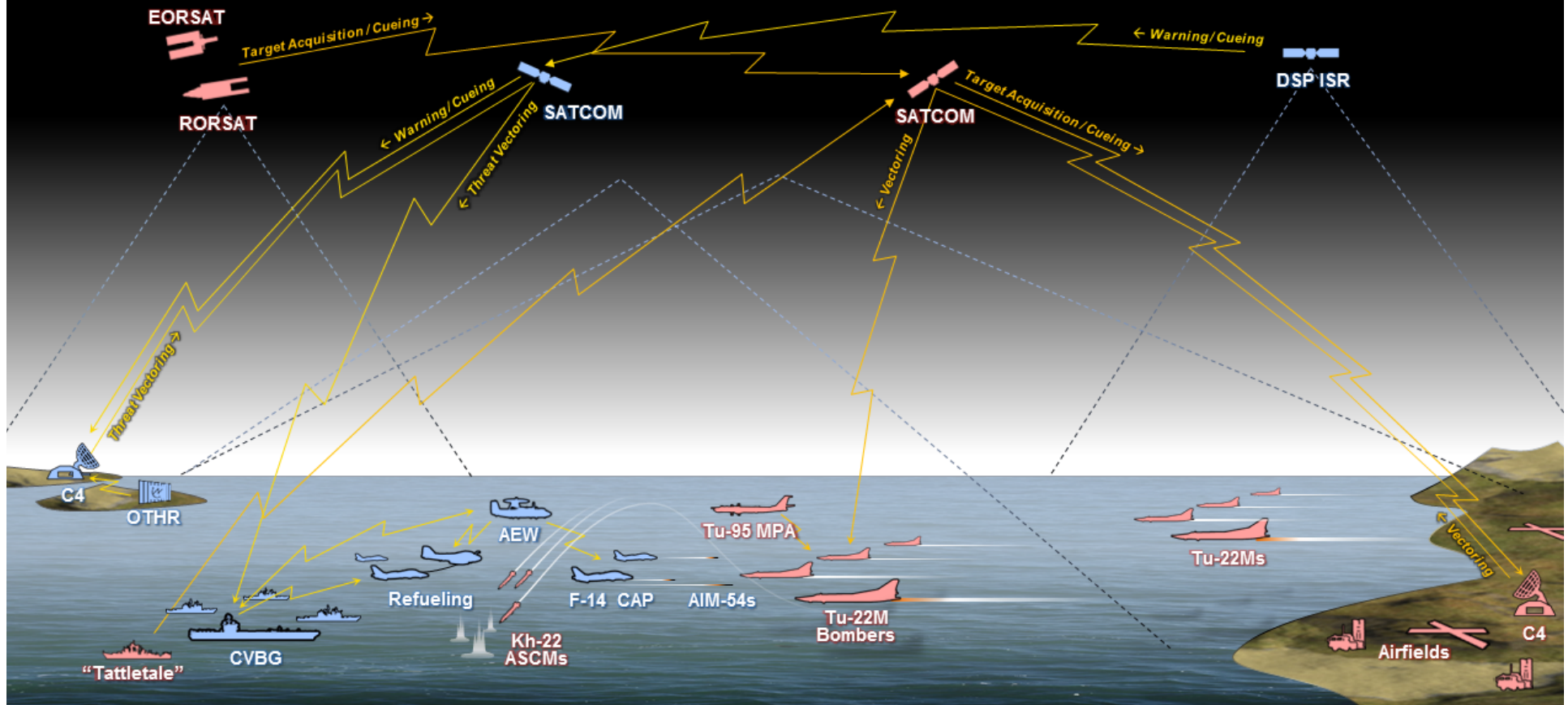
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New Surface Fleet Concepts & Programmatic Implications

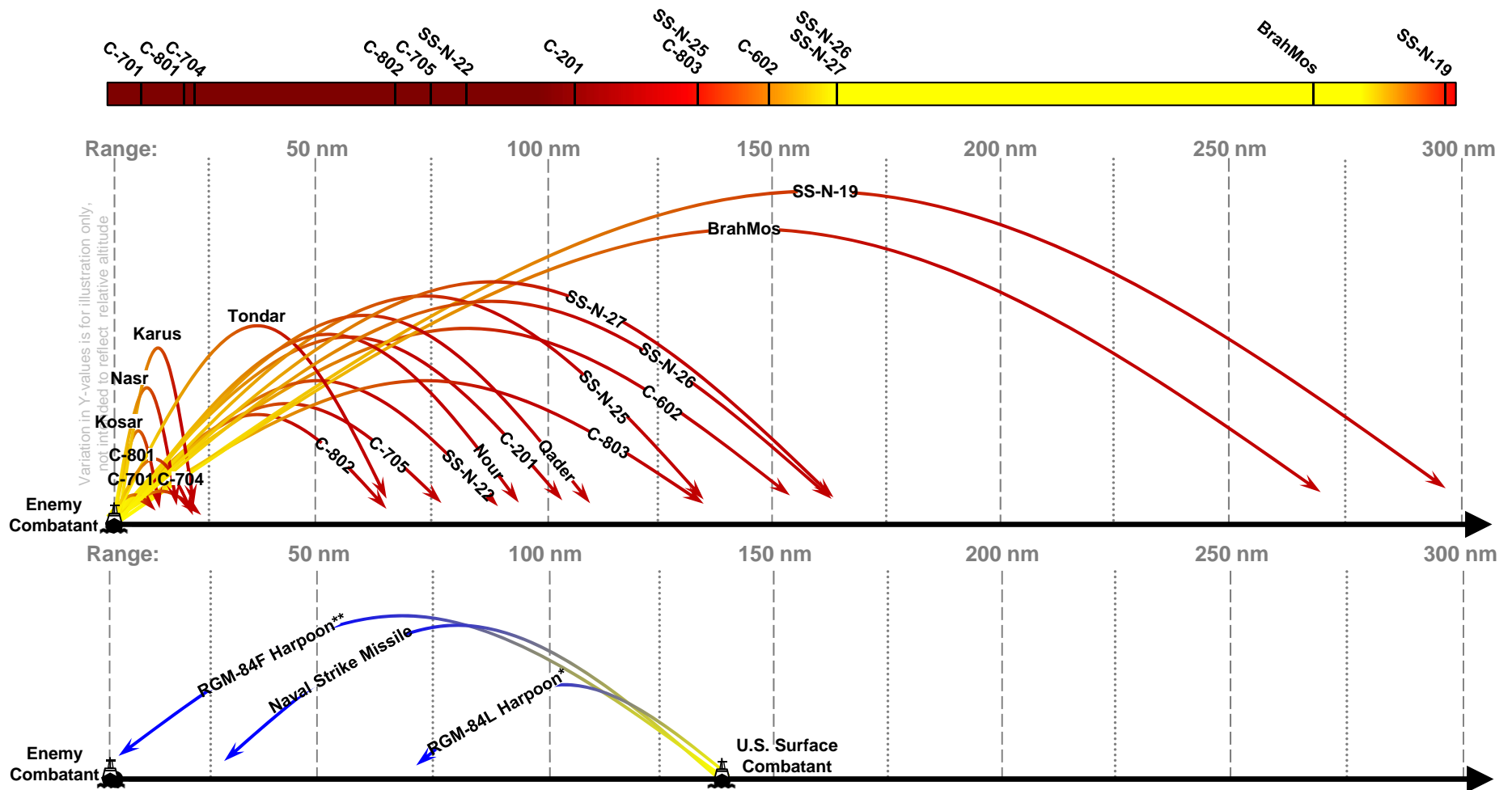


Cold War “Outer Air Battle”

- Enabled carriers to approach within striking distance of Russia
- Surface fleet’s contribution was “Up, Out and Down”
- Ships & aircraft able to engage Soviet bombers outside anti-ship missile range



Surface-Launched Missile Threat to U.S. Surface Combatants

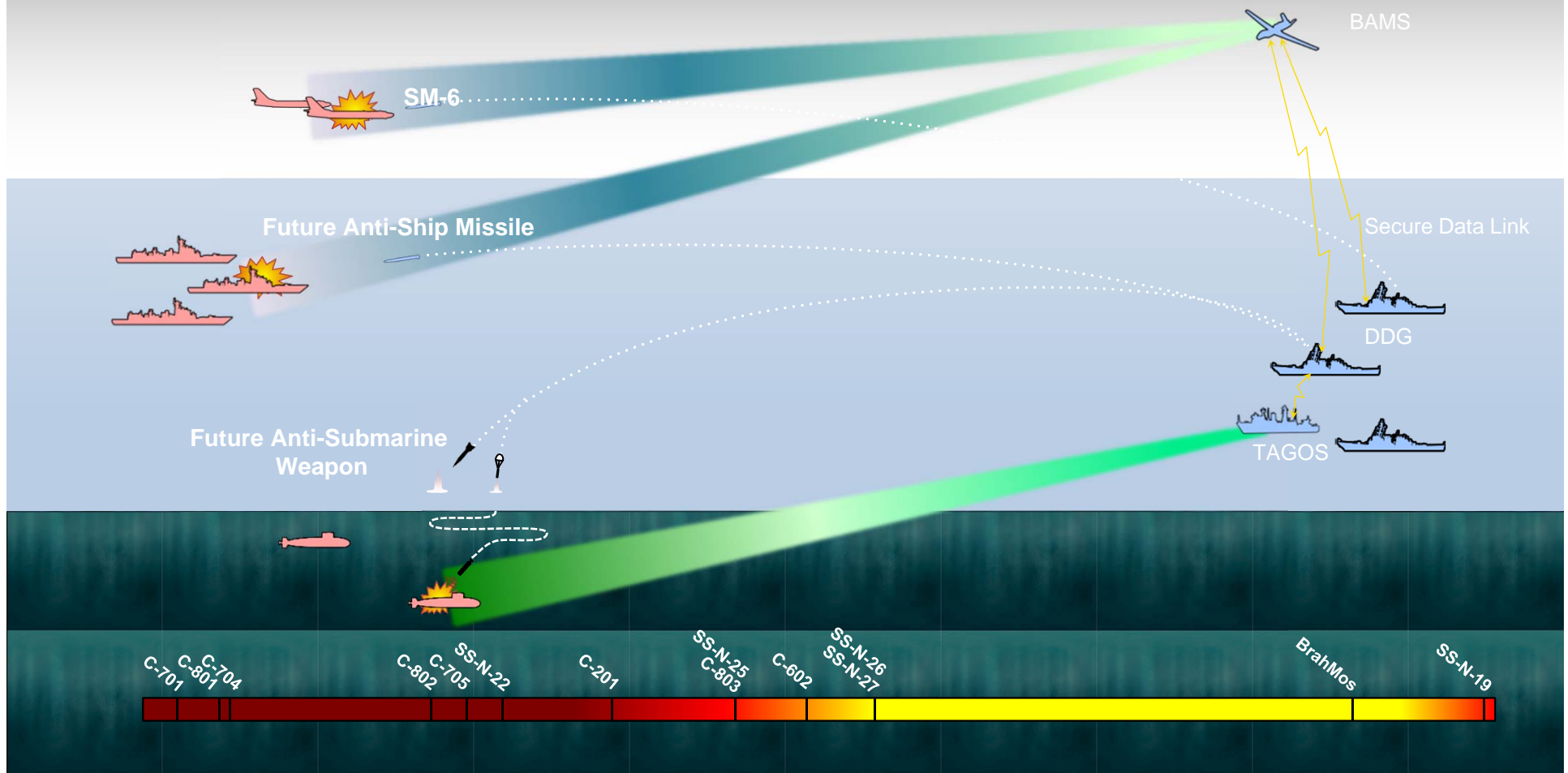


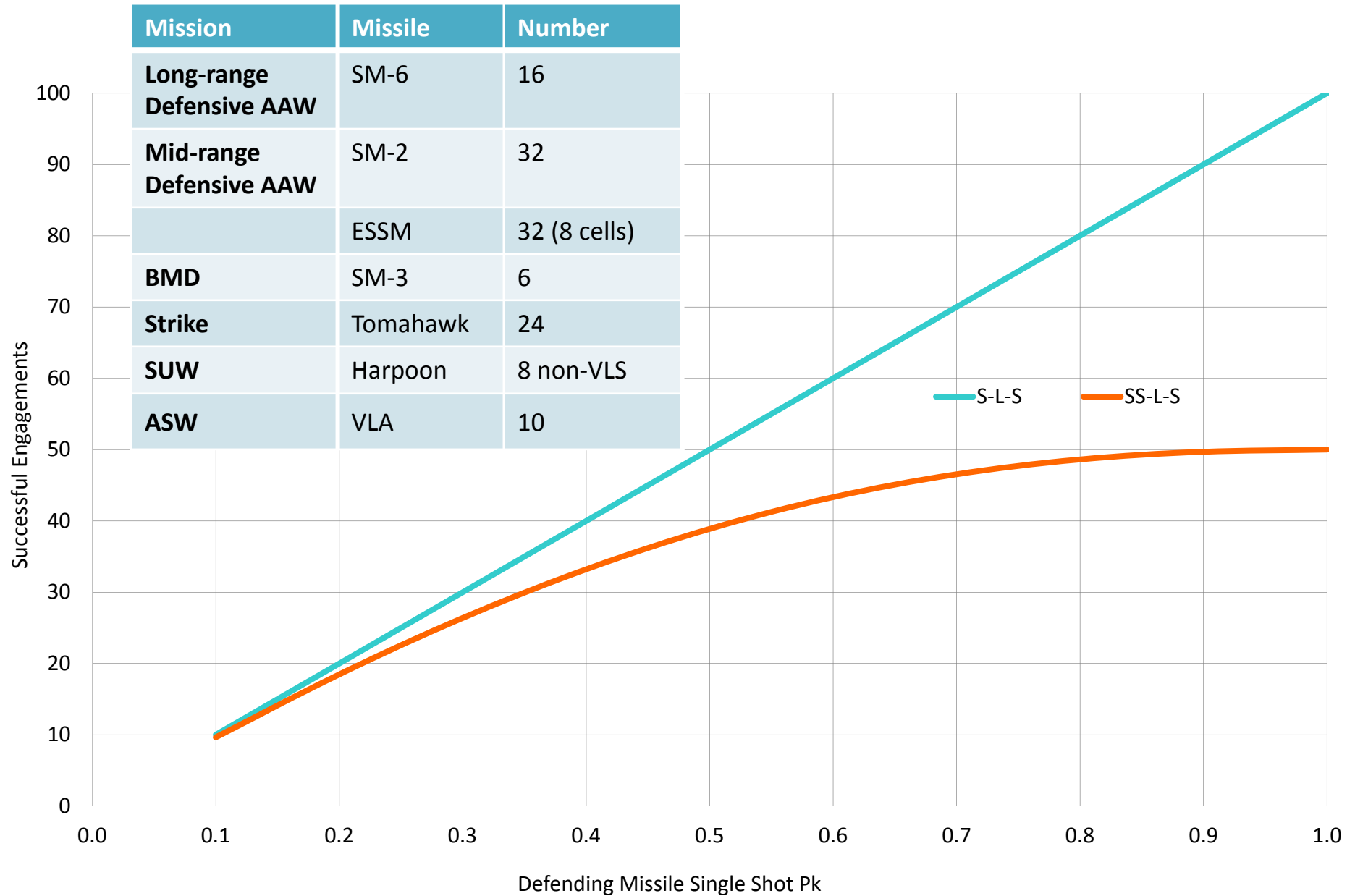
Naval Strike Missile range from IHS Jane's Navy International. All other ranges from IHS Jane's Defence: Weapons database.

* RGM-84L, a Harpoon Block II variant, is the only variant in service with the U.S. Navy.

** Extended-range Harpoon Block I variant previously in U.S. and foreign service.

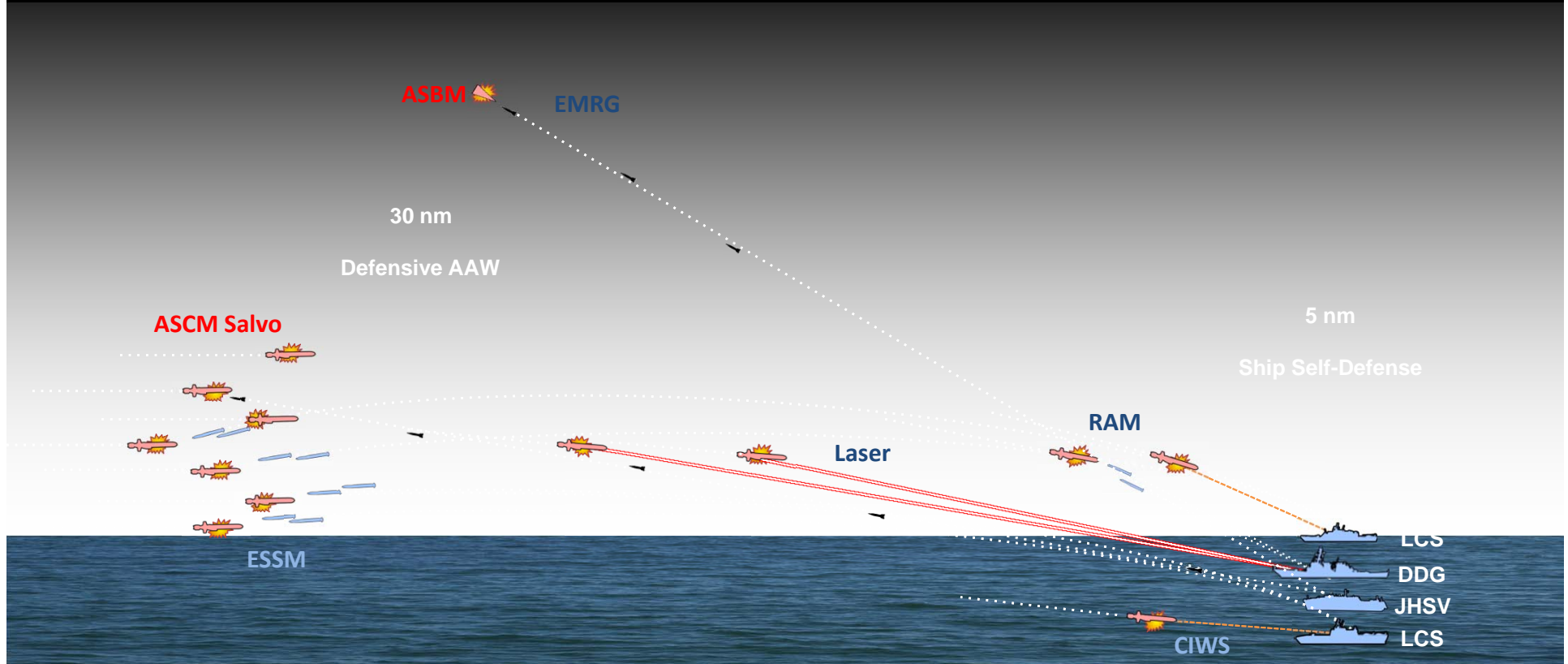
- Surface combatants will conduct bulk of sea control
 - Subs, carriers, amphibious ships conducting power projection in future scenarios
- Defeat enemy weapon launchers, not just enemy weapons





CSBA *A New Defensive AAW Concept*

- Shift to a single, dense defensive AAW layer
 - Smaller interceptors; just as capable and more numerous as longer range
 - Acknowledges challenges against OTH targets
 - Enables integration of lasers, railgun and electronic warfare
- Long-range interceptors used for offensive AAW



CSBA *Defensive AAW Program Implications*

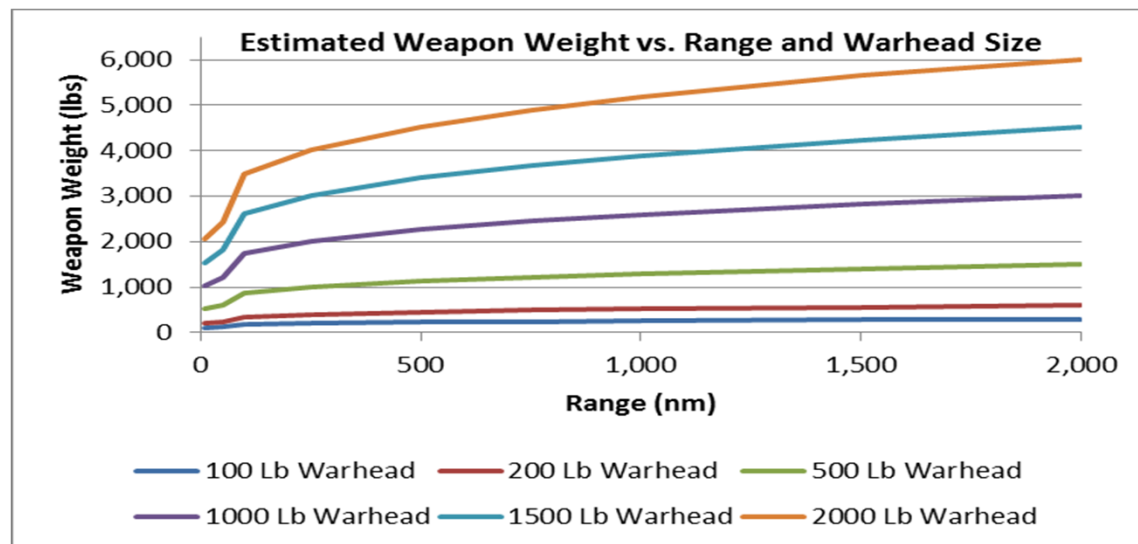


- Laser on some Flight III DDG-51
 - 300-500 kW able to conduct air defense
 - Needed power and cooling (~1500kW) too high for other ships
 - Smaller laser (~60-100 kW) could be used for counter-ISR, counter-UAV
- EM railgun on JHSV, DDG-1000
 - 32 MJ able to conduct air defense, strike
 - Power requirement of 17MW
 - 64 MJ EMRG on DDG-1000 for strike
- Shift defensive AAW to ~30 nm range
 - Smaller ESSM-like interceptor
 - EW systems
 - Laser
 - Electromagnetic railgun

CSBA *New Approach to Weapons Development*

Mission	Missile (replacement)	Number
Offensive AAW	SM-6	32
Defensive AAW	ESSM Blk II	96 (24 cells)
BMD	SM-3	6
Strike	Tomahawk (NGLAW)	24
SUW	Harpoon (LRASM)	8 non-VLS
ASW	VLA (None)	10

- More capacity needed from each VLS cell
- Emphasize:
 - relevant capability
 - multi-mission applicability
 - smaller size; > 1 per cell



- Planned solutions are large, single-mission weapons
- No ASW weapon able to outrange sub-launched anti-ship missiles

Getting the most out of the ship's main battery – the VLS magazine

Mission	Current Missile	Number	Future Missile	Number
Offensive AAW	SM-6	16	SM-6	42
Defensive AAW	SM-2	32	ESSM Blk II	96 (24 cells)
	ESSM	32 (8 cells)		
BMD	SM-3	6	SM-3	4
Strike	Tomahawk	24	LRASM	18
SUW	Harpoon	8 non-VLS	LRASM / SM	18/42
ASW	VLA	10	New ASW Missile	8



Multi-mission LRASM



Long-range ASROC

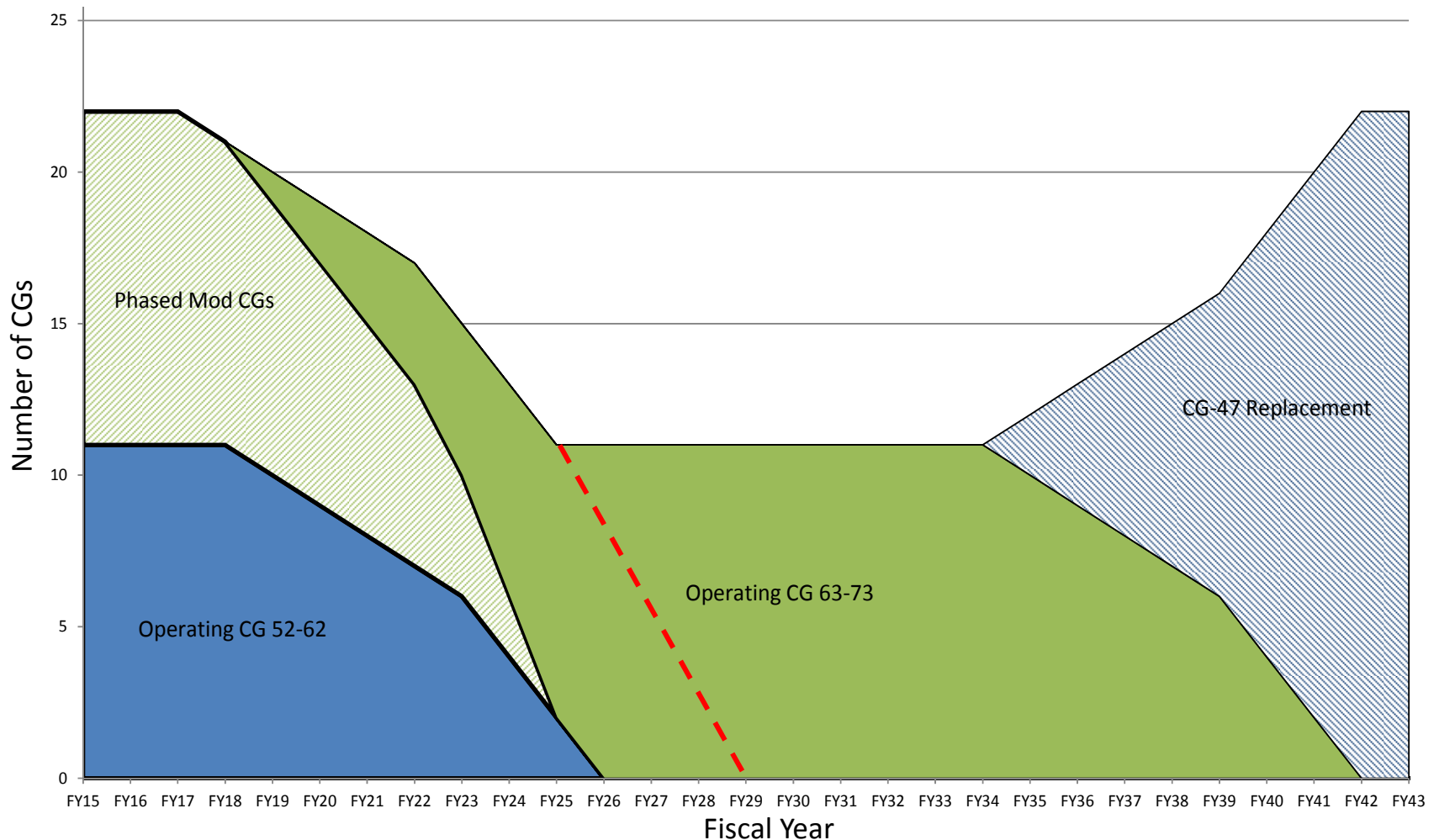


SM-6 for offense



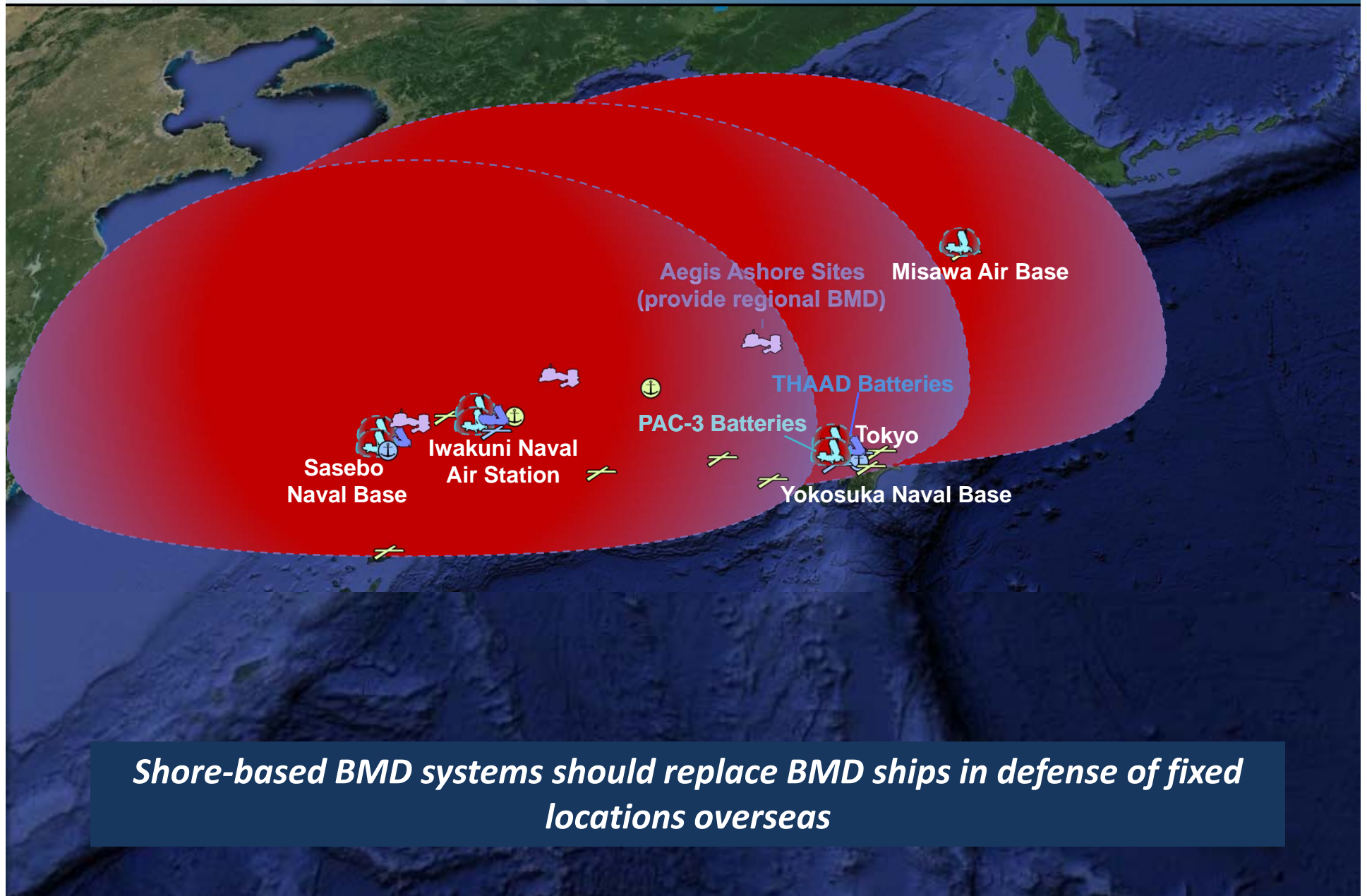
ESSM for defense

CSBA Approaches to Grow Offensive Capacity



Cruiser phased modernization needed for offensive sea control, air defense commander capacity

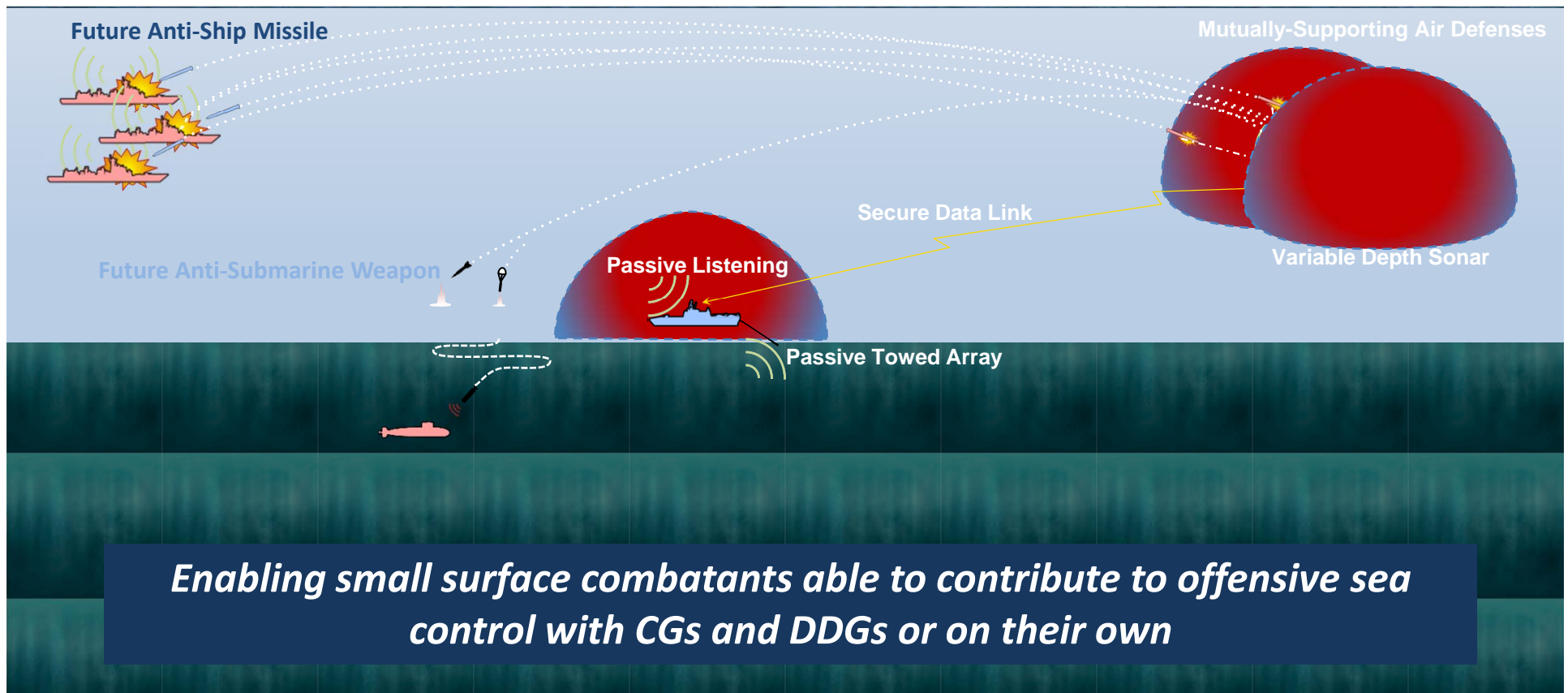
CSBA Approaches to Grow Offensive Capacity

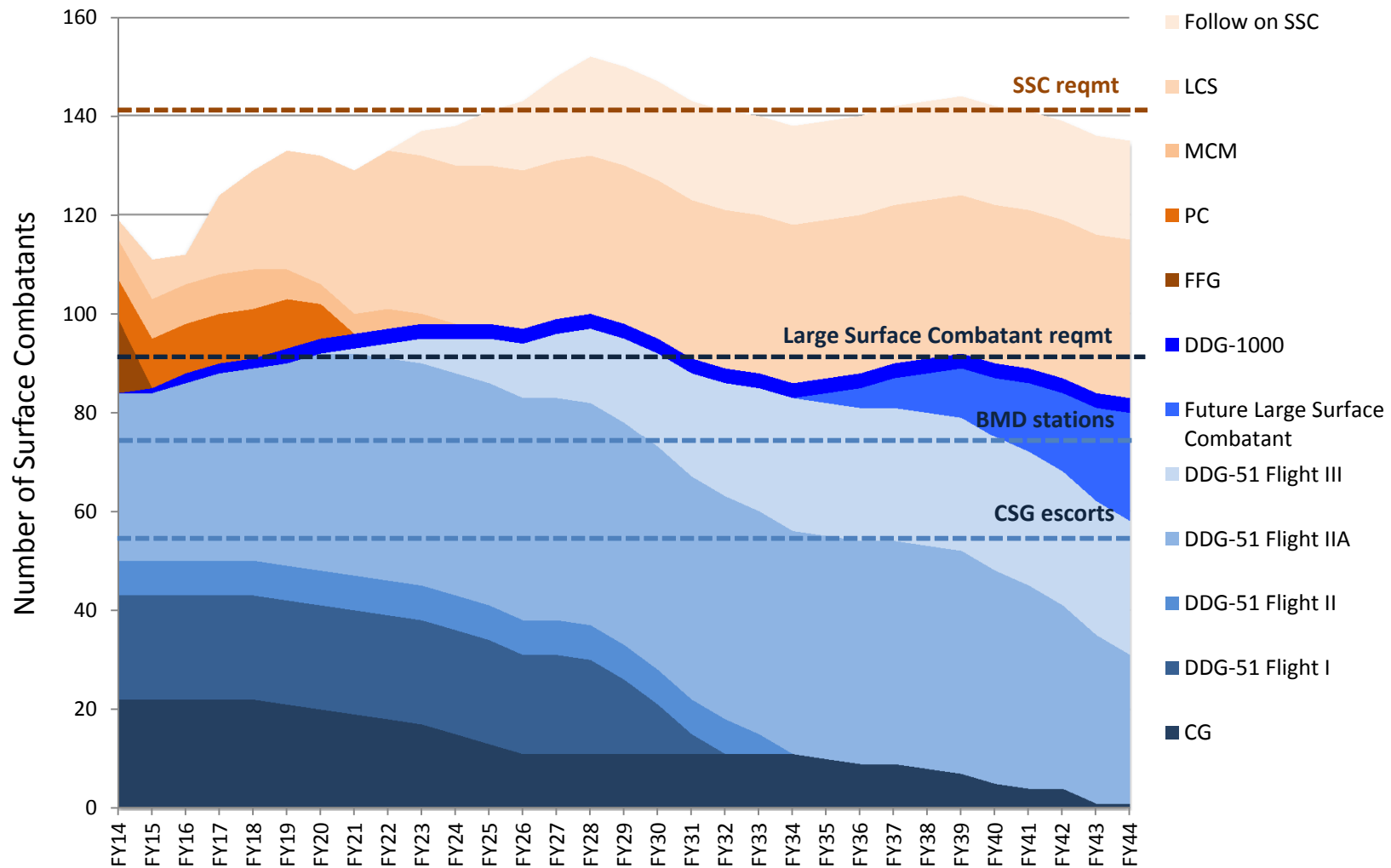


Shore-based BMD systems should replace BMD ships in defense of fixed locations overseas

CSBA Approaches to Grow Offensive Capacity

150 to 300 nm range engagement





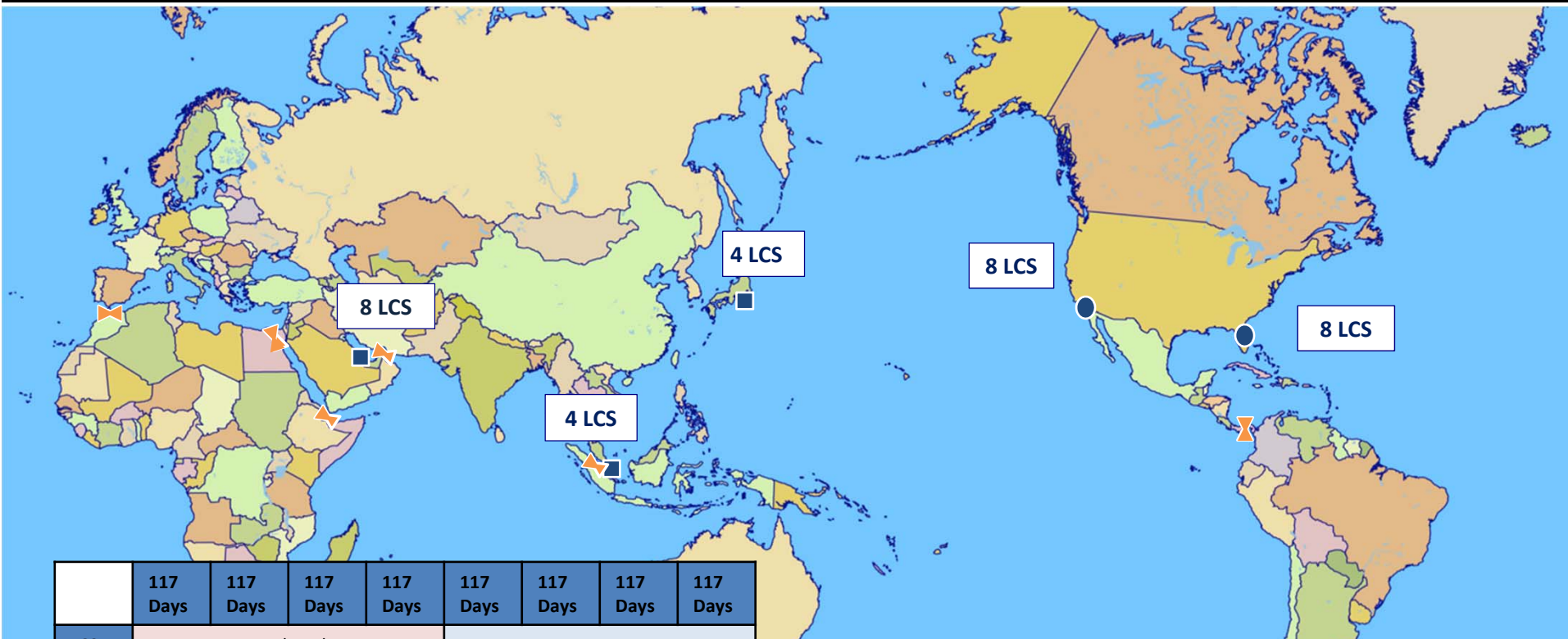
Growing SSC shortfall requires new approaches to escort, training and security missions so CGs and DDGs can focus on offense

LCS Procurement						
FY05	FY06	FY07	FY08	FY09	FY10	FY11
1	1	0	0	2	2	2
FY11	FY12	FY13	FY14	FY15	FY16	FY17
4	4	4	3	3	3	3

Follow-on SSC Procurement						
FY19	FY20	FY21	FY22	FY23	FY24	FY25
2	3	3	3	3	3	3

- Modify LCS to be the follow-on SSC
 - Only one variant
- Equip for defensive AAW, ASW and SUW missions
 - VLS (24 cell)
 - 3D radar (not SPY)
 - ASW mission package
 - Same gun
- Upgrade selected LCS with VLS





	117 Days	117 Days	117 Days	117 Days	117 Days	117 Days	117 Days	117 Days
LCS 1	Deployed				Homeport			
LCS 3	Homeport				Deployed			
Crew 101	LCS 1	Off Hull	LCS 3	LCS 1	Off Hull	LCS 3	LCS 1	Off Hull
Crew 102	Off Hull	LCS 3	LCS 1	Off Hull	LCS 3	LCS 1	Off Hull	LCS 3
Crew 103	LCS 3	LCS 1	Off Hull	LCS 3	LCS 1	Off Hull	LCS 3	LCS 1



	Deployed	Homeport
LCS forward	60-120 days	30 days
LCS CONUS	120-210 days	180 days

Shift LCS to dedicated crews; base some in today's overseas SSC ports

- Separate mission packages from LCS program
 - Whole MCM mission package
 - Whole SUW mission package
 - Parts of ASW mission package
- Add new mission packages
 - Electronic warfare
 - Humanitarian assistance
 - Maritime security
- Consider expanding non-combatant fleet
 - Less expensive option for some operations in low-threat environments



- Challenges demand a new approach to surface warfare
 - Networked family of CG(X), DD(X), LCS no longer viable
 - Access threats increasing defensive demands on all surface combatants
 - Instability will increase demands for training, cooperation and security
 - Budgets will preclude new designed until 2030s
- Navy has opportunity to implement a new surface fleet concept
 - Flight III DDG-51
 - Follow-on SSC and modifications to LCS
 - Phased modernization of CGs
 - New weapons and sensors (LRASM, AMDR variants, ESSM Block II, SEWIP)
 - Potential of the National Fleet
- Surface fleet must refocus on offensive sea control
 - CGs and DDGs equipped and available to defeat enemy platforms
 - Restore ability of SSCs to do escort, training and constabulary missions

Restoring the surface fleet's ability to gain sea control, protect non-combatant ships, train allies and partners, and secure sea lanes