

Amphibious Shipbuilding 101

NDIA Annual Meeting

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Terry O'Brien

Overview

- Basic tenets and principles
 - “Laws of Physics”
- Navy 30 Year Shipbuilding Plan (FY10)
 - New FY11 plan probably in Feb 11
- Navy Shipbuilding Procurement (FYDP)
- Thoughts
- Questions

Basic Tenets and Principles of Shipbuilding

- Shipbuilding is a manufacturing process.
 - stable and predictable quantities of future ships.
 - Change cost \$\$\$.
 - Labor intensive
 - Long construction spans
- No prototyping – lead ship is the prototype
- There have been successes – DD 963, DDG 51 and T-AKE.
- Many forces at work: Navy, Industry and Congress.

Ship Building Strategies

Today's Fleet

- LHA 1
- LHD
- LSD 41
- LSD 49
- LPD 4
- LPD 17

Next Fleet

- LHD 8
- LHA 6
- LPD 17

Future Fleet

- L(X)

How about two – big deck and small deck?

Reduce Amphibs to One Ship Type

Today's Fleet

- SSN 688
- SSGN 726
- SSBN 730
- SSN 21
- SSN 23
- SSN 774

Next Fleet

- SSN 774
- SSN 21
- SSBN(X)

Future Fleet

- SSN(X)
- SSBN(X)

Maximize Submarine Modularity

Today's Fleet

- FFG 7
- CG-47
- DDG-51
- DDG-72
- DDG-79

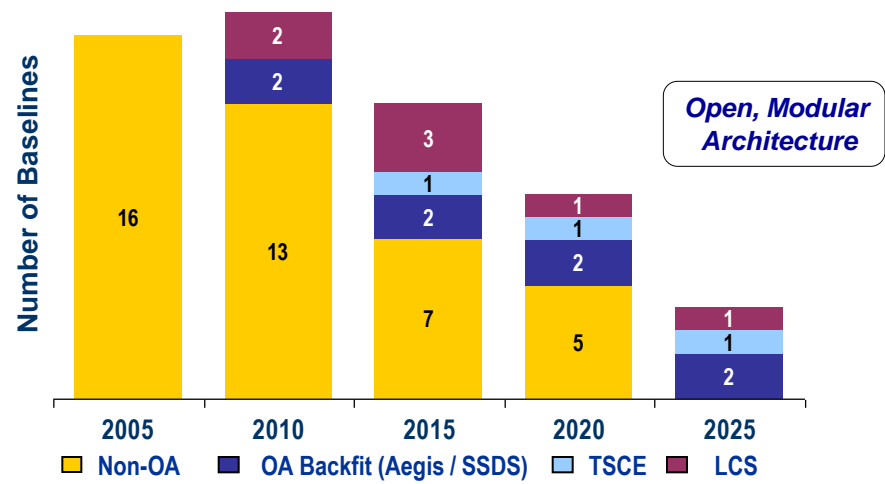
Next Fleet

- DDG-72
- DDG-79
- LCS-A
- LCS-B
- DDG-1000

Future Fleet

- LCS
- DDG-1000
- CG(X)

Maximize Combatant Reuse



Open, Modular Architecture

Potential to Neck Down to 4 Baselines

Commercial Shipbuilders

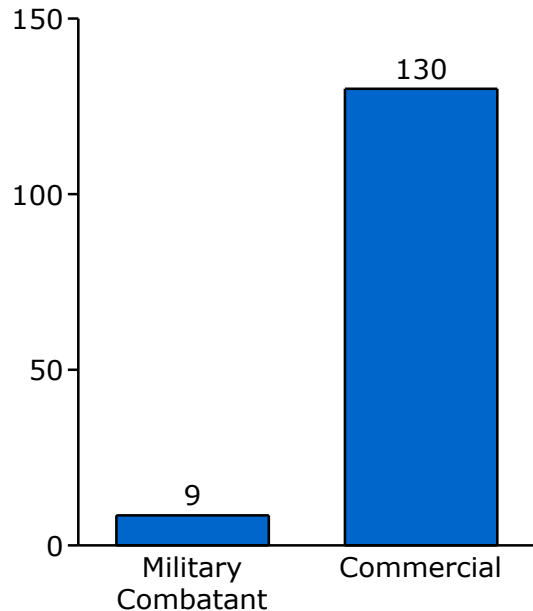
Commonality Prominent in their Business Model

Key insights from the global commercial model

- Intense focus on **design for production**: cost effective designs and reduced complexity
- Production **volume and intervals**: more ships per design and tighter timing between ships
- Much **fewer design changes** during production and between ships in a class

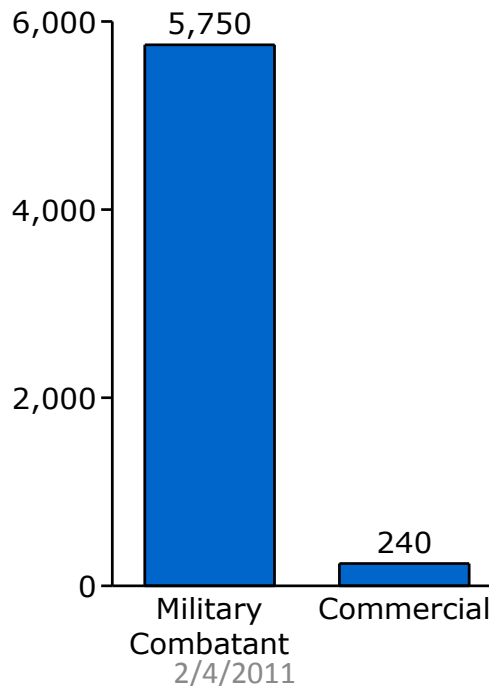
Consistent designs

ships built / design



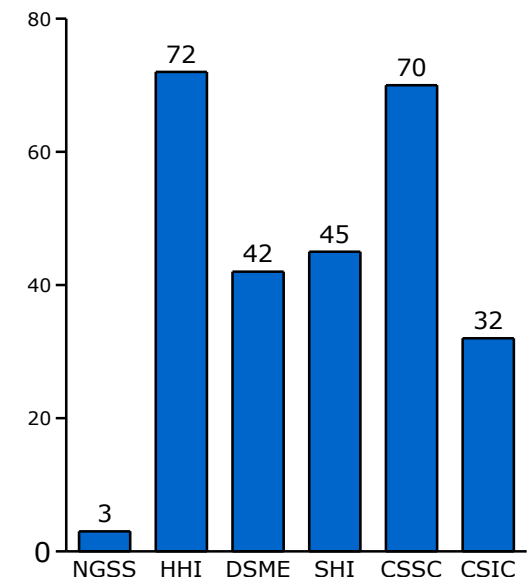
Few changes

Customer requested design modifications for first in class ships



High volume throughput

ships delivered 2006



Shipbuilding Procurement FYDP

	FY10	FY11	FY12	FY13	FY14	FY15	FY11-15
CVN 21				1			1
SSN 774	1	2	2	2	2	2	10
DDG 1000							0
DDG 51	1	2	1	2	1	2	8
LCS	2	2	3	4		4	17
LPD 17			1				1
LHA		1					1
MLP		1		1		1	3
T-AKE	2						0
T-ATF						1	1
JHSV	1	1	1	2	2	2	8
New Construction Total	7	9	8	12	9	12	50
Total New Construction (\$B)	\$12.40	\$13.80	\$13.40	\$13.80	\$14.40	\$17.00	\$72.40
Total Shipbuilding	\$15.00	\$16.10	\$15.00	\$16.80	\$17.40	\$18.90	\$84.30
*** Source - DON FY11 Presidents Budget							

USN Shipbuilding Plan & Force Structure

2011-2040

Table 4. FY 2011-2040 Long-Range Naval Vessel Construction Plan

Fiscal Year	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	
Aircraft Carrier			1				1					1					1					1						1			
Large Surface Combatant	2	1	2	1	2	1	2	1	2	1	2	1	2	1	1	2	2	1	2	1	2	2	2	2	2	2	2	2	2	2	
Small Surface Combatant	2	3	4	4	4	3	3	3	3	2	2	2	2	2	1	2	1	2	1	2	1	2	1	2	2	2	2	2	2	2	
Attack Submarines	2	2	2	2	2	2	2	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	2	1
Ballistic Missile Submarines								1			1		1	1	1	1	1	1	1	1	1	1	1								
Amphibious Warfare Ships	1	1				1	1		1		2		1		2		1		2		1		2		1			1	1	1	
Combat Logistics Force							1		1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1		1	
Support Vessels	2	1	3	2	4	2	3	3	3	4	2	3	3	2	1			1		2	1	1	2	2	2	2	2	2	2	2	

Table 5. FY 2011-2040 Naval Battle Force Inventory

Fiscal Year	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Aircraft Carrier	11	11	10	10	11	11	11	11	11	12	12	12	11	11	12	12	12	11	11	12	12	11	11	11	12	11	11	11	11	11
Large Surface Combatant	84	84	86	86	88	90	91	93	94	96	96	96	94	94	92	89	87	85	81	77	73	71	69	67	68	70	72	74	76	78
Small Surface Combatant	42	41	37	32	28	32	33	37	37	39	39	41	39	40	41	43	45	46	48	49	51	52	53	54	55	56	56	56	56	55
Attack Submarines	53	54	55	55	54	51	51	50	51	49	49	48	48	46	45	44	43	41	40	39	41	41	42	43	44	45	46	45	45	45
Cruise Missile Submarines	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	1													
Ballistic Missile Submarines	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	13	13	12	12	12	12	12	12	12	12	12	12	12
Amphibious Warfare Ships	29	30	30	30	31	33	33	33	33	33	34	34	35	36	36	36	35	36	34	33	33	32	31	33	30	30	29	29	29	30
Combat Logistics Force	29	29	29	30	30	30	30	30	30	31	29	29	28	28	28	26	26	26	25	25	24	25	26	26	25	26	27	27	28	28
Support Vessels	18	20	23	24	25	27	31	33	37	38	39	41	45	47	46	46	46	46	44	44	44	44	44	44	44	44	44	44	44	44
						292												304												301

Thoughts

- Future Shipbuilding Plans
 - Not just a budgetary effort...Acquisition, Requirements and Industry must participate.
- Unconstrained requirements are in fact financially constrained.
- Cooperate to graduate...
- Everyone wants to provide the best ships to our sailors.

Questions?